1982 305(b) Report
Volume II

Ohio
Surface Water Quality and Pollutant Source Monitoring Program for FY'81 and FY '82
(October 1, 1980 - September 30, 1982)

Edited by
J. F. Estenik

Ohio 5-Year Surface Water Monitoring Strategy, 1982 -1986

Edited by
D. R. Dudley

Ohio Environmental Protection Agency
Division of Wastewater Pollution Control
Surveillance and Water Quality Standards Section
Columbus, Ohio 43215

April 1, 1982

Summary

This volume describes Ohio's monitoring strategy and program, as required by 40 Code of Federal Regulations (CFR) 35.562(a)(3) and 40 CFR 35.599 (b)(1), pursuant to Section 106 (e)(1) of the Clean Water Act. This Act requires the State to establish and maintain a broad range of monitoring activities, both before and after implementation of pollution controls. This volume is divided into the following two sections; a description of Ohio EPA's surface water monitoring program titled, Ohio EPA Surface Water Quality and Pollutant Source Monitoring Program (pp. 120) and Ohio EPA's monitoring strategy titled, Ohio EPA 5-Year Surface Water Monitoring Strategy, 1982-1986 (pp. 170).

Monitoring program information in this volume is for the FY '81 and FY '82 monitoring years (i.e., from October 1, 1980 through September 30, 1982). The monitoring program section lists objectives, priorities and present and projected Ohio EPA monitoring activities for the following: (1) compliance monitoring, (2) intensive surveys and synoptic surveys, (3) fixed station monitoring (National Ambient Water Quality Monitoring Network - NAWQMN), (4) toxic substance monitoring, (5) lake and reservoir monitoring, (6) radiological monitoring, (7) biological monitoring, (8) Ohio River Sanitation Commission (ORSANCO) monitoring (both field and laboratory), (9) United States Geological Survey (USGS)/Ohio EPA cooperative programs, and (10) International Joint Commission (I.J.C.) Lake Erie programs. Ambient station location, station description, river mile location, STORET station number (and equivalent USGS station number, where applicable), parameters sampled, sampling frequency, Ohio EPA district, station purpose, and the State Beneficial Use Designation at the station site are included in the text were appropriate. Also listed are major municipal and industrial dischargers.

Ohio EPA's surface water monitoring program has undergone substantial changes since 1980. The impetus to review, evaluate and modify/develop surface water monitoring in Ohio resulted from the writing of Ohio's 1980 Biennial Water Quality Report - 305(b). The focus of the program has shifted from an emphasis on a large number (163) of fixed ambient monitoring stations and approximately 6 comprehensive intensive surveys per year in 1978-1979 to a small number (39) of National Ambient Water Quality Monitoring Network (NAWQMN) sites and approximately 15 comprehensive intensive surveys per year in 1981-1982. The Ohio EPA Intensive Survey Program emphasizes integrated biological and physical/chemical studies. This is a departure from a previous emphasis of physical/chemical only water quality evaluations. Evaluations of biological condition are used in conjunction with a use designation, wasteload allocation, and an economic and use value analysis. The Ohio EPA will also initate the use of synoptic surveys which are used to sample or measure selected parameters at representative sites for moderate periods of time (i.e., from several months to several years).

Another important change in Ohio's surface water monitoring program was the development of a 5-year intraagency monitoring strategy, which is included in this volume. The strategy was developed to identify information needs and to design monitoring networks to meet those needs. The strategy is being used to coordinate intensive surveys, wasteload allocations, water quality management plans, water quality standards revisions, NPDES Permits, and construction grants so that each program works to the benefit of the other. The 5-year strategy document has not been updated as scheduled; however, substantial expansion and refinement has occurred and the information combined in the strategy has had an impact on planning 1982 monitoring work.

Ohio
Surface Water Quality and Pollutant Source Monitoring Program for FY'81 and FY '82
(October 1, 1980 - September 30, 1982)

Pursuant to Section 106(e)(1)
of
Public Law 95-217

Ohio Environmental Protection Agency
Division of Wastewater Pollution Control
Surveillance and Water Quality Standards Section
Columbus, Ohio 43215

April 1, 1982

TABLE OF CONTENTS

		Page
I.	Introduction	
	A. A Historical Review of Monitoring	1
	B. A Historical Review of Ohio EPA's Past Water Quality Monitoring Program	2
II.	Objectives	
	A. Purpose and Objectives as Stated in Appendix A 40 CFR 35	2
	B. Program Functions and Objectives	3
III.	Recent Major Changes in Ohio's Surface Water Quality Monitoring Program	
	A. Ohio EPA's 5-year Monitoring Strategy	4
	B. Section 205(g) Grant	5
IV.	Current Administrative Tasks	
	A. Development of Program Management Tools	5
	B. Interagency Monitoring Strategy for Ohio	5
	C. Ohio EPA Monitoring Strategy and Monitoring Program - FY'83	6
	D. Toxics Monitoring Program	8
	E. Water Quality Standards	8
V.	Monitoring Program	
	A. Compliance Monitoring	10
	1. Objectives and Priorities	10
	2. Present and Projected Activities	10
	B. Fixed Station Monitoring	12
	1. Objectives and Priorities	13
	2. Present and Projected Activities	13
	a. National Ambient Water Quality Monitoring Network (NAWQMN)	13
	b. State Water Quality Monitoring Program (Ohio EPA)	14
	c. U. S. Geological Survey (USGS)/Ohio EPA Cooperative Programs	14
	C. Toxic Substance Monitoring	17
	1. Chemical	17
	a. Objectives and Priorities	17
	b. Present and Projected Activities	18
	2. Biological Monitoring (Field - Macroinvertebrates)	19
	a. Objectives and Priorities	19
	b. Present and Projected Activities	19
	3. Biological Monitoring (Laboratory - Assay)	19
	a. Objectives and Priorities	19
	b. Present and Projected Activities	22
	4. Sediment	23
	5. Dredge Material	23

TABLE OF CONTENTS (continued)

	Page
D. Radiological Monitoring	24
E. Intensive Surveys, Synoptic Surveys and Special Studies	25
1. Objectives and Priorities	25
2. Present and Projected Activities	26
F. Modeling and Wasteload Allocation Activities	31
1. Objectives and Priorities	31
2. Present and Projected Activities	33
a. Advanced Wastewater Treatment (AWT)/Advanced Secondary Treatment (AST) Justifications from the Grants Priority Lists	33
b. Wasteload Allocations (WLAs)	33
G. Lakes and Reservoirs Program	33
1. Objectives and Priorities	33
2. Present and Projected Activities	35
H. Lake Erie Monitoring and International Joint Commission on the Great Lakes (IJC) Programs	40
1. Objectives and Priorities	40
2. Present and Projected Activities	40
a. Great Lakes National Program	40
b. Lake Erie Problem Areas	41
I. Ohio River Monitoring - Ohio River Valley Water Sanitation Commission (ORSANCO) Programs	42
VI. Ohio's 305(b) Biennial Water Quality Report	
A. Objectives and Priorities	44
B. Present and Projected Activities	47
VII. Data Processing, Storage and Reporting	
A. Compliance Monitoring Data (LEAPS)	49
B. Fixed Station Monitoring Data and Intensive Survey Data (STORET)	49
C. Fish Information System (FINS)	50
D. Quality Assurance Coordinator	50
1. Objectives and Priorities	50
2. Present and Projected Activities	51
VIII. Division of Wastewater Pollution Control Laboratory (Ohio EPA) Quality Assurance Review	53
References	58

APPENDICES

Page

Appendix 1 Biological Criteria Tables

Table 1 - Biological Criteria (Macroinvertebrate) for attainment determining aquatic life use designations and of Clean Water Act goals (March 1981) 1

Table 2 - Biological Criteria (Fish) for attainment determining aquatic life use designations and of Clean Water Act goals (November 1980) 2

Appendix 2 Major Dischargers

Key for Appendices 2 A and 2 B 4
Appendix 2 A - Major Industrial Dischargers 5
Appendix 2 B - Major Municipal Dischargers 17
Appendix 2 C - Inspection Criteria Checklist 34

Appendix 3 Ohio EPA Ambient Monitoring Stations
Key for Tables 1

Table 1 - Ohio National Ambient Water Quality Monitoring Network (NAWQMN) Program 4

Table 2 - Ohio EPA ambient low-flow stations discontinued October 1980 12

Table 3 - Ohio EPA monthly and quarterly fixed station ambient monitoring program discontinued October 1981 21

Table 4 - Tentative lake restoration priority list (master list in alphabetical order) 27

Table 5 - Lake Erie (IJC) tributary sampling locations and parameter sampling frequencies 30

Table 6 - Lake Erie (IJC) intake sampling locations and parameter sampling frequencies 32

Appendix 4 Division of Wastewater Pollution Control Laboratory (Ohio EPA) Quality Assurance Tables

Table 1 - Ohio EPA Chemistry Labortory detection limits (1981-1982) 1

Table 2 - Control limits for precision and accuracy for parameters analyzed at the Ohio EPA Chemistry Laboratory 2

Table 3 - Averaged quality in-house audit sample results for the Ohio EPA Chemistry Laboratory 7

APPENDICES

Page

Table 4 - U.S. EPA performance evaluation report 8

Table 5 - Field sampling statistics - percision 10

Table 6 - Field sampling statistics - quality control blanks . . 11

Table 7 - Percent of total number of 1979 - 1981 samples with Hg concentrations greater than or equal to 0.5 ug/l . . 13

Table 8 - Ohio Department of Health Laboratory detection limits (1975-1981) 14

FIGURE

Figure 1 - Ohio National Ambient Water Quality Monitoring Network (NAWQMN) Station locations 11

TABLES

Page

Table 1 - Interagency committees particpated in by the Ohio EPA and selected representatives 7

Table 2 - USGS operated Ohio National Stream Quality Accounting Network (NASQAN) Stations 16

Table 3A - Ohio EPA permanent National Ambient Water Quality Monitoring Network (NAWQMN) Biomonitoring Stations . . . 20

Table 3B - Ohio EPA National Ambient Water Quality Monitoring Network (NAWQMN) Biomonitoring Stations discontinued October 1981 21

Table 4 - Ohio EPA emergency radiological monitoring stations . . 24

Table 5 - Intensive surveys (segments/streams) and special studies conducted during FY'79 and FY'80 28

Table 6 - Intensive survey segment/stream studies conducted during FY'81 28

Table 7 - Parameters monitored to determine wasteload allocations 32

Table 8 - Justifications and reports for Advanced Treatment Projects which will be submitted during FY'82 34

Table 9 - Wasteload Allocation reports for studies conducted during FY'81 which will be submitted during FY'82 . . . 34

Table 10 - Parameters that will be sampled at primary lake stations to determine trophic state (TSI and RTI) during the summer of 1982 36

Table 11A- Lakes surveyed by the Ohio EPA/USGS in 1981 37

Table 11B- Tentative list of lakes to be surveyed in Ohio by the Ohio EPA/USGS 38

Table 12 - Great Lakes National Planning Office (GLNPO) grantees' and contractors' projects that will be evaluated by the Ohio EPA 43

Table 13 - ORSANCO primary stream monitoring network, Ohio portion - the Ohio River and major Ohio tributaries 45

Table 14 - ORSANCO biological monitoring network, Ohio portion - the Ohio River and major Ohio tributaries 46

I. INTRODUCTION

A. A Historical Review of Monitoring

Environmental monitoring is an important step in the management and protection of natural resources. Ideally, monitoring is the activity that "drives" the progression of events from problem identification and assessment, through management decisions on such issues as pollution abatement programs, and finally to the enforcement of environmental regulations. A succession of federal laws and guidelines have attempted to relate the purpose of monitoring directly to management goals (Ward 1979). Initial guidelines for coordinating water data acquisition activities were issued by the U.S. Bureau of the Budget in 1964. Next, the Federal Water Quality Act of 1965 (P.L. 89-234) created or reorganized state and local agencies which resulted in more systematic water quality monitoring programs (Ward 1979). Water quality standards were established as a result of PL 89-234, and monitoring was oriented towards the assessment of in-stream conditions and the detection of water quality standard violations (Loftis and Ward 1979). The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) introduced effluent standards to water quality management programs, and effluent monitoring was added to the activities of regulatory agencies. The U.S. Environmental Protection Agency (U.S. EPA) has issued the most recent guidelines for monitoring programs in Model State Water Monitoring Program (U.S. EPA 1975) and Basic Water Monitoring Program (U.S. EPA 1977).

Until recently, subjective evaluations rather than scientific principles have been the basis for the detailed design of most data collection programs. Subjective judgement was adequate to meet the needs of many programs in the past, but today's monitoring activities need to be fine tuned with sound scientific principles (Moss et al. 1978). Numerous authorities have voiced similar criticisms, most notably the National Academy of Science (NAS 1977) which listed three major deficiencies in the overall environmental monitoring program of the U.S. EPA:

1) the inadequate use of scientific principles to design, operate and evaluate monitoring programs,
2) the need to monitor in anticipation of, and to detect new environmental problems and
3) the fragmentation of monitoring among and within various governmental agencies.

These fundamental problems in monitoring foster inefficiency and produce less information per unit effort. The Ohio EPA is reviewing surface water monitoring activities in Ohio with the goal of correcting major deficiencies cited in the NAS study (1977), thereby minimizing dependence on subjective judgement. This review effort has produced a monitoring strategy document covering a 5-year time period entitled Ohio 5-year Surface Water Monitoring Strategy 1983-1987 (Ohio EPA 1981). Surface water quality monitoring activities in Ohio for each federal fiscal year (i.e., from October through September) will continue to be described in an annual document entitled Ohio Surface Water Quality and Pollutant Source Montoring Program.

B. A Historical Review of Ohio EPA's Past Water Quality Monitoring Program

The Ohio EPA and its predecessor agency, the Ohio Department of Health, have been engaged in major water quality monitoring programs since 1949. The first round of in-depth river basin surveys were conducted between 1949 and 1960, and included the sampling and analyses of point source discharges as well as streams. The following river basins were included: The Maumee, Great Miami, Scioto, Cuyahoga, Muskingum and Mahoning. Fixed monitoring stations were established to provide on-going monitoring in critical stream segments upon completion of the original surveys (i.e., after 1960). Several of the original basin surveys were updated during the late 1960's; all were updated from 1973 to 1980 by studies pursuant to Sections 208 and 303(e) of the Clean Water Act. Most of the later studies included biological assessments, analyses for additional physical/chemical parameters, where appropriate, and bioassays of certain wastewater discharges. Fixed monitoring stations were added or deleted throughout Ohio's ambient monitoring network as a result of intensive survey evaluations and an analysis of the State's 1975 305(b) water quality report. Stations were also established in Lake Erie tributaries to monitor loadings to the Lake in accordance with the terms of the 1972 and 1978 U.S. - Canadian agreements on water quality of the Great Lakes (International Joint Commission - I.J.C. - 1972; I.J.C. 1978).

Fish samples from the Ohio River, Lake Erie and major tributaries have been analyzed for pesticides and other organic residues in cooperation with other agencies for the last several years. In addition, an advanced early warning monitoring program has been initiated by the Ohio River Valley Water Sanitation Commission (ORSANCO) on the Ohio River to provide a warning to downstream users of potential hazards of contaminated water. The Ohio EPA, in cooperation with the Ohio Department of Natural Resources (DNR) and U.S. Geological Survey (USGS), has a number of continuous 4 parameter water quality monitors and stream flow gages as part of Ohio EPA's ambient monitoring network. The Ohio EPA and USGS are also evaluating selected Ohio public lakes and reservoirs to determine water quality and eutrophic status.

II. OBJECTIVES

A. Purpose and Objectives as Stated in Appendix A 40 CFR 35

The purpose of this document is to describe Ohio's monitoring program, as required initially by 40 Code of Federal Regulations (CFR) 35.562(a)(1) and 40 CFR 35.1537-4(d), pursuant to Section 106(e)(1) of the Clean Water Act (hereafter referred to as the Act), and is intended to serve as a means of communication with U.S. EPA, Region V and the public.

Appendix A to Subpart G of 40 CFR 35 sets forth the minimum requirements for an acceptable monitoring strategy/program under the Act. The objectives and general requirements stated therein are as follows:

- To provide data, information, or reports necessary to determine compliance with permit terms and conditions,

- To develop and maintain an understanding of the quality (causes and effects of such quality of the waters) in the State for the purpose of supporting State water pollution control activities in relation to the achievement of national goals according to the Act,

- To report on such quality and its causes and effects and

- To assess the effectiveness of the State's pollution control program.

To this end, the State is required to establish and maintain a broad range of monitoring activities, both before and after implementing pollution controls, including: measurement of pollutant sources, determination of water quality (physical, chemical and biological), and the evaluation of their effects upon the State's beneficial use designations.

Monitoring programs and activities shall be carried out according to normally accepted practices, promulgated or otherwise issued by the Administrator of U.S. EPA, in the form of regulations, guidelines, technical manuals and handbooks.

B. Program Functions and Objectives

The ultimate purpose of a monitoring program is to fulfill the data and information needs of the State Pollution Control Agency and to meet minimum "core" requirements needed by U.S. EPA to meet national goals (e.g., National Ambient Water Quality Monitoring Network - NAWQMN Stations). To this end, the following monitoring program criteria must be met.

1. Monitoring must be an integrated part of an overall State program - not an end in itself.

2. Monitoring is an activity that "drives" the remainder of the State's pollution control program.

3. Feedback from management is necessary to establish monitoring priorities.

The objectives listed in Appendix A 40 CFR 35 can be divided into the following three functional categories which follow a logical progression from problem identification, to corrective measures, to legal action (if necessary);

1. Surface water quality assessment,

2. Water quality management and pollution abatement and

3. Enforcement.

We believe that these three monitoring program functional categories and the following eight, specific objectives fulfill the requirements of the Act.

Surface Water Quality Assessment

1. To collect and interpret baseline data on the physical/chemical and biological quality of the surface waters of Ohio.

2. To establish, where possible, cause and effect relationships among existing water quality, sources of pollution and prevailing land use.

3. To compare existing water quality with state and national criteria and the legislative goals of the Clean Water Act.

4. To publish documented reports on site specific problem assessments for use in water quality management programs.

Water Quality Management and Pollution Abatement

5. To develop/revise water use designations, to substantiate their attainability and to develop criteria to protect those uses.

6. To formulate, assess and revise waste load allocations, effluent limitations, permit conditions and water quality management strategies consistent with attainable water uses.

7. To assess the effectiveness of the State's pollution control program.

Enforcement

8. To conduct inspections and collect data to insure compliance with National Permit Discharge Elimination System (NPDES) Permits.

9. To collect and analyze data necessary to prepare legal action against dischargers.

III. RECENT MAJOR CHANGES IN OHIO'S SURFACE WATER QUALITY MONITORING PROGRAM

A. Ohio EPA's 5-year Monitoring Strategy

The Ohio EPA has reviewed surface water monitoring activities in Ohio with the goal of establishing a methodology for the design and management of these activities so that maximum information is obtained per unit effort. That basic goal has been met as evidenced by the 5-year Monitoring Strategy Document entitled Ohio 5-year Surface Water Monitoring Strategy 1983-1987 (Ohio EPA 1981). We have begun to implement the methodology in two steps, first, the identification of information needs, and secondly, the design of monitoring networks to meet those needs. The majority of the 5-year Monitoring Strategy Document defines the data needs of surface water programs within the Ohio EPA.

The impetus to develop this document can be traced to the experience of writing the 1980 Water Quality Inventory Report for Ohio (305(b) Report). We learned through that experience what a wealth of water quality data are being collected, and that the utility of the data was greatly impeded by the absence of a well-defined strategy as to how the data are to be transferred into information that is meaningful to decision makers. Preliminary work on the Monitoring Strategy was begun in September 1980, and the first draft was distributed and reviewed by the Ohio EPA and U.S. EPA during February 1981. The draft Monitoring Strategy was instrumental in developing Ohio EPA's Monitoring Activities List and Program for FY 1982.

We had hoped to complete a comprehensive document for the initial Ohio 5-year Surface Water Monitoring Strategy 1982-1986, but some sections of the Monitoring Strategy for FY '82 - '86 had to be omitted or left in draft form. The completeness of the Monitoring Strategy is expected to improve as program managers recognize and appreciate that a small investment of their time spent in developing and/or refining the 5-year Monitoring Strategy will result in substantial improvements in the overall efficiency of their respective programs. It is hoped that releasing the Monitoring Strategy in its present form will spur the involvement of staff from other key water quality programs.

This document (Ohio 5-year Surface Water Monitoring Strategy, 1983 - 1987) will be revised and will be completed during 1982. Thereafter, the 5-year Monitoring Strategy will be updated annually to reflect changes in information needs and the resources available to meet those needs. The details of surface water quality monitoring activities in Ohio for each federal fiscal year (i.e., 10/1 to 9/30) will continue to be described in an annual document entitled Ohio Surface Water Quality and Pollutant Source Montoring Program.

B. Section 205(g) Grant

Much of the intensive survey work now being conducted by the Ohio EPA is funded under the Section 205(g) Grant. These grant monies were made possible through the State Management Assistance Program Delegation Agreement between U.S. EPA and Ohio EPA which was finalized in June 1981. The purpose of the Agreement is to delegate to the Ohio EPA the authority to review and certify Ohio municipal construction grant project documents, and to perform grant program management tasks. Ohio EPA has used 205(g) Grant monies to staff the Division of Construction Grants to handle the basic administration of the program. In addition, the Division of Wastewater Pollution Control uses 205(g) funds to provide the technical support needed to develop water quality analyses on individual Construction Grant projects. Water quality analyses are required under U.S. EPA policy (PRM 79-7) and the details of Ohio's program to conduct these analyses are continued in Appendix V of the 205(g) Delegation Agreement.

IV. CURRENT ADMINISTRATIVE TASKS

A. Development of Program Management Tools

1. The Division of Wastewater Pollution Control will establish a tracking system for the effluent monitoring program. The system will be used to track where and what effluent monitoring needs to be (has been) done, and will be used to optimize effluent monitoring resources. Specific needs of the system will be outlined and current resources that may be of value will be investigated.

2. The Surveillance and Standards Section will develop/maintain a filing system for general program materials, technical literature and word processing documents to organize important materials and reduce duplication of effort. Priorities for the areas that will be covered will be set and staff responsibilities for the maintenance of the filing system routine will be established.

B. Interagency Monitoring Strategy for Ohio

1. A goal of the Ohio EPA is to improve the coordination of monitoring activities with other Federal and State agencies and to develop a more integrated water quality monitoring program throughout Ohio during 1982. The following project will be intitiated to improve, coordinate and integrate monitoring in Ohio: A bibliography of data sources on water resources/quality in Ohio will be compiled. Ohio EPA will continue to work with the U.S. EPA and other Federal and State agencies in the development of an interagency monitoring strategy during 1982.

2. The Ohio EPA, Divisions of Wastewater Pollution Control and the Planning Coordinator will participate in interagency committees to provide an avenue for the exchange of information and an input for problem solving regarding specific, highlighted areas of concern. The various interagency committees and Ohio EPA representatives are listed in Table 1.

C. Ohio EPA Monitoring Strategy and Monitoring Program - FY'83

1. The Ohio EPA, Surveillance and Standards Section will review, update and revise a 5-year Water Monitoring Strategy (1983-1987) and a State Water Monitoring Program Description (FY'83) in conformance with Appendix A, 40 CFR, Part 35, 1511-1, and reflecting the requirements of Annex II of the 1978 Great Lakes Agreement (I.J.C. 1978). The Monitoring Strategy and Monitoring Program Documents will include all monitoring programs regardless of funding source, an incorporation of the requirements of the Great Lakes International Surveillance Plan (GLISP) and a plan for monitoring toxic substances. The Ohio EPA, Surveillance and Standards Section will continue to revise and update both documents annually. The 5-Year Monitoring Strategy (1983-1987) draft will be submitted to U.S. EPA during 1982.

2. The Ohio EPA will incorporate its 5-year Monitoring Strategy into the Continuing Planning Process (CCP). Revisions to the CCP description will be reported as outputs to the State work program. The outputs will involve an analysis and evaluation of existing conditions and anticipated conditions resulting from changes in land use, the economy and population. The data base will include information about both point sources and nonpoint sources and will provide program managers with a valid and useable data base for decision making while optimizing the use of monitoring resources.

3. The Ohio EPA, Surveillance and Standards Section will develop, revise and update a list of monitoring activities annually. The FY'83 Monitoring Activities List will be completed and submitted to U.S. EPA by June 1, 1982. A Monitoring Program document, Ohio Surface Water Quality and Pollutant Source Monitoring Program for FY'83, will be developed from the U.S. EPA/Ohio EPA agreed to Monitoring Activity List for FY'83. The Monitoring Program Document will be revised, completed and submitted to U.S. EPA by August 1, 1982.

4. The Ohio EPA, Surveillance and Standards Section will develop and implement a tracking document on a word processing system. The tracking document will be used to fulfill 106 Grant requirements, to manage monitoring programs and to report quarterly interim progress for the Ohio EPA Surface Water Monitoring Programs to U.S. EPA.

Table 1: Interagency committees participated in by the Ohio EPA and selected representatives

Committee[a]	Representative[b]
ORSANCO Technical Advisory Committee	E. Rotering
ORSANCO NPDES Coordinating Committee	R. Phelps
ORSANCO Water Quality Criteria Conflicts	G. Martin
ORSANCO Biological Water Quality	P. Abrams
ORSANCO Monitoring Strategy	C. Yoder
Ohio Ad Hoc Monitoring Committee	G. Martin
Board of Unreclaimed Acid Mined Lands	E. Rotering
Great Lakes - Upper Mississippi River Board of State Sanitary Engineers	Vacant
Region V Ad Hoc Wasteload Allocation	S. Amragy
I.J.C. Great Lakes Water Quality Board (Director's Alternate)	E. Rotering
I.J.C. Water Quality Programs	A. Turner
I.J.C. Point Source Correspondent	M. Tin
I.J.C. Nonpoint Source Correspondent	C. Wilhelm
I.J.C. Dredging Sub-Committee	J. Albrecht
I.J.C. Lake Erie Task Force	R. Wysenski
I.J.C. Surveillance Work Group Correspondent	G. Garrett

a. ORSANCO, Ohio River Valley Water Sanitation Commission; ASIWPCA, Association of State and Interstate Water Pollution Control Administrators; I.J.C., International Joint Commission on the Great Lakes.
b. All representatives are Division of Wastewater Pollution Control staff.

D. Toxics Monitoring Program

The Ohio EPA, Surveillance and Standards Section will develop and implement a toxics monitoring strategy as part of the 5-year Monitoring Strategy (1983-1987) Document and FY'82 Monitoring Program.

1. Objectives and Priorities

   - To evaluate potential problem areas,
   - To develop baseline data on toxics in water, sediment and fish and
   - To determine the biomagnification of toxics in representative fish species as a measure of long-term trend information on the fate of toxicants.

2. Present and Projected Activities

   a. The Ohio EPA will develop a list of potential problem areas (subbasins),

   b. The Ohio EPA, Surveillance and Standards Section will develop methodologies for the identification and assessment of toxic problems; a preliminary draft will be submitted to U.S. EPA during 1982 and

   c. The Ohio EPA will develop process charts for using toxics information/data in Ohio's Water Quality Standard Program.

E. Water Quality Standards

1. The Ohio EPA, Divisions of Surveillance and Standards, Water Quality Planning and Assessment and Industrial Wastewater Section will refine and implement an integrated approach to Ohio's Water Quality Standards, the Wasteload Allocation process, an assessment of total daily maximum loads and the National Permit Discharge Elimination System (NPDES) Permit process as presented in Appendix V of the 205(g) Agreement. The completion, implementation and refinement of Ohio EPA's 5-year Monitoring Strategy will be used to resolve existing differences between Ohio EPA and U. S. EPA regarding processes, methodology and criteria for setting Ohio's Water Quality Standards, Use Designations, Wasteload Allocations and NPDES Permit issuance.

2. The Ohio EPA, Surveillance and Standards Section will submit a report entitled White Paper on Aquatic Stream Uses in Ohio (justification document) on an integrated Water Quality Standard/Wasteload Allocation/NPDES Permit process program to U.S. EPA during 1982. Data collected during the 1981 Big Darby Intensive Survey will be used to field test, refine and validate the aquatic life stream use criteria developed by the Ohio EPA (Appendix 1). Other intensive survey data collected during 1979, 1980 and 1981 will also be used in the justification document.

3. The Ohio EPA, Surveillance and Standards Section will adopt a revised format for the presentation of Water Quality Standards in the Ohio Administrative Code to facilitate the Water Quality Standards review process as outlined in Appendix V of the 205(g) Agreement. An outline of the changes that will be made within the framework of the Ohio Administrative Code will be submitted to U.S. EPA.

4. The Ohio EPA, Special Projects Section will finalize procedures for economic impact analysis procedures that will be used to evaluate the impact of wastewater treatment on municipalities and industries in the Water Quality Standards setting process. U.S. EPA comments on the most recent draft of Attachment V-4 of the 205(g) Agreement will be reviewed, and an Ohio EPA response will be submitted. The Ohio EPA response/information will be incorporated into the 5-year Monitoring Strategy.

5. The Ohio EPA, Surveillance and Standards Section will review Ohio's Water Quality Standards and assess surface water stream uses in accordance with the process outlined in the 205(g) Agreement. Desk top review procedures (Appendix V) will be developed, and subbasins that were studied during 1981 will be reviewed. Plans for field work that will be conducted in streams that must be reevaluated will be developed. Comprehensive water quality reports for the Mahoning and Great Miami Rivers will be completed, and public hearings will be scheduled and held.

6. The Ohio EPA, Surveillance and Standards Section will review specific Statewide Water Quality Standards Criteria. The scientific validity and attainability for the iron, lead, oil and grease and ammonia standards in Ohio's surface waters will be evaluated. The remaining State Water Quality Standards Criteria will be assessed to determine the need for review. An outline describing how changes will be made will be developed.

7. The Ohio EPA, Surveillance and Standards Section will develop procedures and establish a consistent methodology that will be employed in classifying water for non-aquatic life uses during FY'82.

8. The Ohio EPA, Surveillance and Standards and Special Projects Sections will develop a policy statement on use-value analysis which establishes guidelines for assessing actual and potential benefits of stream use characteristics. Staff that will be responsible for this project will be assigned and the scope of the policy will be defined.

9. The Ohio EPA, Surveillance and Standards Section will provide general coordination and give technical assistance with regard to the Water Quality Standards Program.

V. MONITORING PROGRAM

A. Compliance Monitoring

1. Objectives and Priorities

The primary objectives of Ohio EPA's compliance monitoring component are as follows:

- To determine compliance with National Permit Discharge Elimination System (NPDES) Permit conditions,
- To validate self-monitoring reports (MRs) and
- To provide support for enforcement actions.

In addition, the data generated are used to support the State's Continuing Planning Process, and are used in the preparation and modification of NPDES Permits and facility design policies. The Ohio EPA, Industrial Wastewater Section will establish guidelines for NPDES Permit review that are consistent with Appendix V of the 205(g) Agreement, and integrate the data needs of the NPDES permitting process into the 205(g) approach. A work group will be identified to draft the procedure and the guidelines/information will be included in the next 5-year Monitoring Strategy submission.

There are 95 major industrial and 155 major municipal entities on Ohio EPA's FY'82 major discharger lists (Appendix 2), as indicated in the Section 106 program submission. These entities have the highest priority in the compliance monitoring sampling inspection program. Major dischargers that will be monitored were selected using an inspection criteria checklist (Appendix 2, Part C).

2. Present and Projected Activities

The present activities for monitoring wastewater treatment facility effluent quality consists of Self-Monitoring Reports (MRs), Compliance Evaluation Inspections (CEIs), Compliance Sampling Inspections (CSIs), Sampling for Toxics, Biomonitoring and Pretreatment Compliance Program Inspections of Publicly Owned Treatment Works (POTWs) and Industrial Users (IUs).

Self-Monitoring Reports (MRs) - The submission of monthly, self-monitoring reports to the Ohio EPA is required of all NPDES permit holders. These reports include physical and/or chemical data for parameters which are limited by the NPDES Permit, and may also include parameters required to be monitored, but not limited.

Compliance Evaluation Inspections (CEIs) - are inspections of wastewater treatment facilities that include a review of plant operations and analytical procedures, but do not require the analysis of an unknown sample or a review of an analytical technique by a chemist.

Compliance Sampling Inspections (CSIs) - are inspections of wastewater treatment facilities that include effluent sampling and analysis. Detailed procedures of the sampling and analytical techniques are found in Compliance Monitoring Guidelines, Ohio EPA, Division of Wastewater Pollution Control, September 1975. Samples are split and analyzed by both the permittee and the Ohio EPA during these inspections, and the results of the analysis are compared to ensure accuracy in quality control.

Inspections and Sampling by U.S. EPA - U.S. EPA, Region V, Eastern District Office (EDO), also undertakes sampling and performs inspections using methods similar to those used by the Ohio EPA. EDO results are transmitted to the Ohio EPA for use in water quality management programs.

a. The Ohio EPA will conduct 195 (FY'81) and 111 (FY'82) Compliance Evaluation Inspections (CEIs), 30 municipal and 30 industrial (FY'81), and 31 municipal and 26 industrial (FY'82) Compliance Sampling Inspections (CSIs) to ensure compliance with National Permit Discharge Elimination System (NPDES) Permit conditions. The selection will be made from the major municipal and major industrial Ohio dischargers (Appendix 2). Ninety-eight (98) of the CEIs will be used as the first part of a Quality Assurance Program to upgrade the quality of permittee self-monitoring data (MRs) reported to the Ohio EPA. The Ohio EPA will also review the results of a National Reference Sampling Program. The U.S. EPA will provide reference samples that will be distributed to selected major dischargers as part of the National Enforcement Reference Sample Program. The results of the reference sample analyses will be reviewed and recommendations and selective follow-up will be made by the Ohio EPA as a second part of the upgrading of the self-monitoring program. The Ohio EPA, Special Projects and Surveillance and Standards Sections will conduct detailed follow-up laboratory inspections on 40 entities that scored poorly on the 1981 reference sample analyses.

b. The Ohio EPA is expanding its compliance sampling program to identify and evaluate the effects of toxic substances, particularly the priority pollutants. The expansion will include 30 screening, static bioassays and 10 definitive, static bioassays conducted by the Ohio EPA at selected NPDES dischargers' facilities chosen from Appendix 2 (See Toxics Monitoring, Biological - Assay, for further details).

c. Pretreatment Compliance Program Inspections of Publicly Owned Treatment Works (POTWs) and Pretreatment Compliance Inspections of Industrial Users

   The overall objective of the State Pretreatment Program is to control the discharge of incompatible toxicants from industrial facilities into Publicly Owned Treatment Works (POTWs). Particular emphasis will be given to the control of discharges with a high probability of significant POTW interference

(including excessive contamination of POTW sludge which would prevent sludge reuse), or those which would cause significant violation(s) of water quality standards in public waters.

1. Objectives and Priorities

The immediate objective of the Pretreatment Program is as follows:

- To determine the progress in the development of Ohio's Pretreatment Program,.
- To assure and maintain surface water quality standards,
- To assure the integrity of treatment plant processes and
- To assure the quality of sewage sludge for agricultural uses.

2. Present and Projected Activities

The Ohio EPA, Special Projects Section will complete 80 POTWs compliance inspection reports and an unspecified number of industrial user compliance inspection reports during FY'82.

d. The Ohio EPA will respond to public complaints and conduct water pollution complaint investigations to determine the nature and extent of the water quality problem. Ohio EPA personnel will select a complaint survey protocol and coordinate the data collection with other information needs.

e. The Ohio EPA will monitor and provide necessary sampling and data (survey), will document the extent of the water quality problem(s), and will prepare data/reports/cases. Expert testimony will be provided to support municipal and industrial NPDES or other enforcement/compliance actions to ensure compliance with NPDES Permit limits.

f. The Ohio EPA will provide reasonable technical assistance (information) and/or data to consultants and the general public concerning water quality in Ohio.

B. Fixed Station Monitoring

Monitoring at fixed stations represents one of several types of monitoring programs conducted by the State of Ohio. Fixed monitoring stations are used to assess water quality by providing data concerning water quality problems and trends. The Ohio EPA, Surveillance and Standards Section will review and evaluate Ohio EPA's fixed station ambient monitoring network with regard to State and Federal needs. The network design will be improved by establishing specific information needs and data analysis techniques. This, in turn, will improve the reporting of water

quality trends and aid in the assessment of the State's pollution control efforts as required by Section 305(b) of the Clean Water Act (see Section VI). A table listing future ambient monitoring station locations, parameter coverage and sampling frequency, and a map showing station locations will be submitted to U.S. EPA. The above information will be incorporated in Ohio EPA's 5-year Montoring Strategy and the Ohio Surface Water Quality and Pollutant Source Monitoring Program Documents. Ohio's FY'82 ambient monitoring station locations, parameter coverage and sampling frequency, and a map showing each station's location are included in Appendix 3, Key to Tables, Table 1 and Figure 1.

1. Objectives and Priorities

Fixed station monitoring in Ohio is designed to meet the following objectives:

- To establish quality baseline data for water and aquatic communities which contributes to the development and/or revision of water quality standards,
- To determine violations of current water quality standards,
- To aid in the confirmation of stream segment classification as either effluent limited, or water quality limited,
- To provide a continuing assessment of water pollution control programs,
- To characterize and define trends in the physical, chemical and biological condition of the State's surface waters,
- To determine inputs and impacts from nonpoint sources,
- To determine inputs and impacts from urban areas,
- To determine pollutant loadings to Lake Erie,
- To provide a partial data base for the Biennial Section 305(b) Water Quality Assessment and
- To act as a triggering mechanism for intensive surveys, enforcement proceedings or other actions.

2. Present and Projected Activities

a. National Ambient Water Quality Monitoring Network (NAWQMN)

The primary objective of the NAWQMN Network is to measure progress toward achieving national water quality goals. This network is the core of the Ohio EPA ambient monitoring program. These monthly stations (Appendix 3, Table 1 and Figure 1) were selected using guidance developed by U.S. EPA, and most have a great deal of historical monitoring data. The Ohio EPA will

monitor 39 monthly NAWQMN sites according to the frequencies and parameters listed in Basic Water Monitoring Program (U.S. EPA 1977). The station locations, parameter coverage and sampling frequency for each NAWQMN Station are listed in Appendix 3, Key to Tables and Table 1.

b. State Water Quality Monitoring Program (Ohio EPA)

The Ohio EPA, Surveillance and Standards Section will no longer monitor 54 low-flow monitoring stations (effective October 1980) and 43 quarterly and 32 of the 34 monthly Ohio EPA fixed station ambient monitoring network stations (effective October 1981) listed in Appendix 3, Tables 2 and 3. The Ohio EPA will continue to monitor 3 of its monthly stations, one each in the Cuyahoga, the Rocky and Black Rivers, as part of the Lake Erie Monitoring Program (see Section H for details).

c. U.S. Geological Survey (USGS)/Ohio EPA Cooperative Programs

The USGS in Ohio conducts programs for, or cooperatively with, municipal, State and Federal agencies. The Ohio EPA engages in a cost sharing contract with the USGS for the collection of water quality data which are generally made available to public and government users. Data collection activities by the USGS in Ohio are described in Index of Current Water Resources Activities in Ohio and Geological Survey Circular 719, The National Stream Quality Accounting Network (NASQAN) - Some Questions and Answers (Ficke, J.F. and Hawkinson, R.O., 1975) and are available from the District Chief, USGS, 975 West Third Avenue, Columbus, Ohio 43212 (614-469-5553).

The Ohio EPA/USGS cooperative program consists of stream gaging, automatic water quality monitoring, manual water quality sampling, time of travel analysis, reaeration studies and lake water quality assessments.

1. Ohio EPA/USGS Stream Gages (Discharge Stations)

The Ohio EPA/USGS cooperative ambient monitoring program will operate approximately 30 fixed stream gaging stations that provide continuous flow data during FY'81 and FY'82. Ohio EPA monitoring stations are coordinated with USGS stream gages when possible.

2. The Ohio EPA/USGS Continuous, Four Parameter Water Quality Monitors

The Ohio EPA/USGS cooperative ambient monitoring program will operate 27 (FY'81) and 10 to 15 (FY'82) fixed, automatic water quality monitors. The monitors provide continuous pH, temperature, dissolved oxygen and conductivity water quality data. USGS will provide the Ohio EPA with a water quality summary which contains data analyses for pH, dissolved oxygen and temperature from its continuous water quality monitors. The data will be used for trend analysis and will be included in Ohio's 1982 305(b) Biennial Water Quality Report. Ohio EPA monitoring stations are

coordinated with USGS continuous monitoring sites when possible.

3. Ohio EPA/USGS NASQAN - NAWQMN Stations

The USGS operates, collects and reports data at 9 National Stream Quality Accounting Network (NASQAN) Stations in Ohio as part of the National Ambient Water Quality Monitoring Network (NAWQMN) (Table 2). Systematic, continuous measurements are made at NASQAN stations which emphasize long-term trend analyses of the quality of the Nation's streams. Chemical Oxygen Demand (COD) will be added to the list of physical/chemical parameters already monitored at the 9 NASQAN/NAWQMN Stations; the Ohio EPA will pay for COD analyses during 1982.

4. Ohio EPA/USGS Low Flow Stations

a. Low flow stations are used to establish base flows needed to compute Wasteload Allocations (WLAs), and to characterize water quality under low flow conditions. In general, 4 to 5 years of data collection are required for the information to be complete. USGS is currently operating 80 low flow stations throughout Ohio. Forty (40) additional low flow stations will be established during 1982 under 205(g) funding.

b. USGS will develop a regional method for accurately estimating low flow characteristics at any ungaged site in Ohio during 1982. Basic characteristics that will be used in the development of this technique include; drainage area, average basin slope, main channel length and slope, percent forest, percent storage, average annual precipatation and index at relative infiltration.

5. Ohio EPA/USGS Reaeration Studies

a. Reaeration data are critical to the WLA process. The USGS will develop reaeration rate data for different stream types in Ohio. Reaeration coefficients for 10 stream segments will be funded through the 106 Grant and reaeration coefficients for 15 stream segments will be funded through 205(g).

b. USGS will test reaeration study methods during 1982. The results of radioactive and hydrocarbon gas tracer methods will be compared and the reliability of the hydrocarbon gas tracer method will be determined.

6. Ohio EPA/USGS Lake Quality Studies

See the Lakes and Reservoirs Program, Section G for a detailed description of these objectives, priorities and activities.

Table 2: USGS operated Ohio National Stream Quality Accounting Network (NASQAN) Stations[a]

Station Description	RM (Map)	Station #	District	Use Designation
Cuyahoga River				
Cuyahoga River at Independence (Old Rockside Rd.)	13.5 (E-2)	502020 (04208000)	NEDO	WWH
Grand River				
Grand River near Painesville (Rt. 84)	8.7 (F-2)	502530 (04212200)	NEDO	WWH
Great Miami River				
Great Miami River at New Baltimore (Blue Rock Rd.)	20.8 (H-11)	600030 (03274600)	SWDO	WWH
Hocking River				
Hocking River at Athens (U.S. 33)	39.6 (O-2)	601650 (03159510)	SEDO	WWH
Little Miami River				
Little Miami River at Milford (U.S. 50)	12.7 (K-5)	600520 (03245500)	SWDO	WWH
Maumee River				
Maumee River at Waterville (Rt. 64)	20.8 (A-11)	500080 (04193500)	NWDO	WWH
Muskingum River				
Muskingum River at McConnelsville (Rt. 37)	48.2 (P-16)	601860 (03150000)	SEDO	WWH
Sandusky River				
Sandusky River at above Fremont (Rice Rd.)	20.3 (C-4)	500820 (04198000)	NWDO	WWH
Scioto River				
Scioto River near Richmondale (Higby Rd.)	56.0 (M-11)	600770 (03234500)	SEDO	WWH

a. Abbreviations are described in Appendix 3, Key for Tables, Page 1.

7. Ohio EPA/USGS Miscellaneous Water Resource Investigations

USGS will provide data to meet special Ohio EPA program needs as requested by the Ohio EPA. Most of these special requests are related to WLAs. The Ohio EPA will pay for the data retrieval and analysis.

C. Toxic Substances Monitoring[a]

Ohio EPA does not have the laboratory resources to conduct a comprehensive toxics monitoring program. Until such resources are developed, toxics monitoring by the Ohio EPA will be limited. A fish tissue analysis program for pesticides and PCBs was conducted during 1977, in cooperation with the Ohio Department of Natural Resources and the Ohio Department of Agriculture. Fish were collected from 1976 and 1978 to 1981 by the Ohio EPA, in cooperation with U.S. EPA, Region V. Sample analyses were performed by the U.S. EPA Environmental Research Laboratory-Duluth.

A similar fish tissue analysis program was conducted in 1981. Although the Ohio EPA possesses the resources to carry out the collection of fish samples, the extent of the fish tissue monitoring program for 1982 will be entirely dependent upon available U.S. EPA laboratory capabilities. The Ohio EPA is committed to collecting fish samples at 6 sites (5 rivers and 1 bay) in a FY'82 agreement with the Great Lakes National Planning Office (GLNPO). The data will be used to determine contaminant input to Lake Erie.

The Ohio Department of Health (ODH) acquired a gas chromatograph-mass spectrometer (GC-MS) in November 1980. A limited number of water sample analyses will be processed by the ODH Laboratories.

1. Chemical

The Ohio EPA will improve its chemical laboratory analysis capability for toxic materials. A multi-year implementation plan to bridge the gap between projected needs and actual capabilities with regard to chemical analyses, especially organic toxics analysis, will be finalized during FY'82. Laboratory support contacts will be identified and equipment purchases will be made. In addition, the Ohio EPA will continue to develop/organize an Ohio EPA equipment inventory that cross references each piece of equipment to the specific program element that it supports.

a. Objectives and Priorities

- To develop a toxicant monitoring strategy as part of the 5-year Monitoring Strategy (1983-1987) and incorporate it into the FY'82 Monitoring Program,

a. - The reader is also referred to IV. Current Administrative Tasks, Section D.

- To improve laboratory capabilities for the analysis of organic toxics,

- To control toxicant discharges from point sources and

- To provide chemical data on the presence of toxic pollutants being discharged to the waters of the State.

b. Present and Projected Activities

The Ohio EPA will evaluate selected National Permit Discharge Elimination System (NPDES) discharger effluent chemical data to determine whether toxicant limits should be established.

1. The Ohio EPA will develop a methodology jointly agreed to by the Ohio EPA and U.S. EPA for evaluating NPDES Permits with regard to toxicants.

2. The Ohio EPA will develop a list of NPDES permitted facilities that have the highest potential for discharging toxicants (completion date - FY'81).

3. The Ohio EPA will evaluate the priority facilities selected above according to agreed upon methodology.

4. The Ohio EPA will coordinate activities 2 and 3 (listed above) with other Ohio EPA Agency needs and activities. The final number of discharges evaluated will be dependent upon activity 1 (listed above). A decision on the final number will be made by December 30, 1981.

Selected priority facilities that are evaluated may be required to do the following:

a. conduct biomonitoring,
b. conduct process evaluations,
c. conduct special chemical tests,
d. conduct fish flesh analysis and
e. develop additional information (i.e., treatability studies, economic assessments, etc.) used to determine environmental damage and/or human health risks.

Ohio EPA personnel will integrate, review and assess data and/or information provided by the permitted entity to determine whether toxicant permit limits should be established.

2. Biological Monitoring (Field - Macroinvertebrate)

The Ohio EPA Biomonitoring Program uses field and laboratory analyses (see Section V, C3) to assess pollution effects on aquatic community structure and pollutant toxic effects on selected test organisms.

a. Objectives and Priorities

The objectives of the Macroinvertebrate Biological Monitoring Program are as follows:

- To evaluate long-term trends,
- To measure the effectiveness of Ohio's Water Quality Standards and
- To establish conditions satisfactory to support balanced, aquatic communities.

Biological data from the NAWQMN Stations (Table 3A) are used for long-term trend analyses, and as a measure of the effectiveness of Ohio water quality standards to establish conditions satisfactory to support balanced, aquatic communities. All macroinvertebrate biomonitoring investigations emphasize benthos (counts, identifications and diversity indices). In addition, intensive surveys include fish data (relative abundance, community composition, similarity coefficients, condition factor and diversity indices).

b. Present and Projected Activities

Macroinvertebrate field investigations will be conducted annually at 10 permanent locations as part of the National Ambient Water Quality Montoring Network (NAWQMN) (Table 3A), and at 5 additional locations on a rotating basis. Selection criteria for the 10 permanent NAWQMN Biomonitoring Stations were the availability of historical data, certain high quality areas/segments, certain significant environmental problem areas/segments, a high probability of sampler retrieval and logistics (i.e., nearness to Columbus or other core stations). Five (5) additional State biomonitoring sites are selected yearly based upon special needs (i.e., special surveillance monitoring problems, intensive surveys, enforcement actions, etc.). Ten (10) locations previously sampled by the Ohio EPA will be deleted from the NAWQMN Biological Monitoring Program, effective January 1982 (Table 3B).

3. Biological Monitoring (Laboratory - Assay)

a. Objectives and Priorities

The Ohio EPA bioassay program presently utilizes two species of test organisms and static bioassays. Biological Monitoring Assay Program objectives are as follows:

Table 3A : Ohio EPA permanent National Ambient Water Quality Monitoring Network (NAWQMN) Biomonitoring Stations[a]

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	USE DESIGNATION
Black River Basin				
Black River at Elyria	14.9 (D-4)	501520	NEDO	WWH
Cuyahoga River Basin				
Cuyahoga River at Independence	14.2 (E-2)	502020	NEDO	WWH
Great Miami River Basin				
Great Miami River at Dayton	87.1 (H-9)	600310	SWDO	WWH
Little Miami River Basin				
Little Miami River at Old Town	80.0 (K-1)	600570	SWDO	EWH
Maumee River Basin				
Maumee River at Waterville	21.0 (A-11)	500080	NWDO	WWH
Muskingum River Basin				
Mohican River at Greer	16.7 (P-2)	601870	SEDO	WWH
Muskingum River at McConnellsville	47.7 (P-16)	601860	SEDO	WWH
Ohio Brush Creek Basin				
Ohio Brush Creek near West Union	16.5 (L-2)	600660	SEDO	EWH
Portage River Basin				
Portage River at Woodville	27.8 (B-1)	500510	NWDO	WWH
Scioto River Basin				
Scioto River near Circleville	100.8 (M-8)	601340	CDO	WWH

a. Abbreviations are described in Appendix 3, Key for Tables, Page 1.

Table 3B : Ohio EPA National Ambient Water Quality Monitoring Network (NAWQMN) Biomonitoring Stations discontinued October 1981[a]

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	USE DESIGNATION
Conneaut Creek Basin				
Conneaut Creek at Conneaut	6.8 (F-3)	502870	NEDO	CWH
Grand River Basin				
Grand River near Painesville	8.4 (F-2)	502530	NEDO	WWH
Great Miami River Basin				
Mad River at Eagle City	28.7 (H-3)	610040	SWDO	CWH
Hocking River Basin				
Hocking River at Athens	33.1 (O-1)	601650	SEDO	WWH
Huron River Basin				
Huron River below Milan	11.7 (D-2)	501050	NWDO	EWH
Mahoning River Basin				
Mahoning River at Lowellville	10.3 (T-3)	602300	NEDO	MRS
Muskingum River Basin				
Licking River below Newark	25.6 (P-13)	601770	CDO	WWH
Raccoon Creek Basin				
Raccoon Creek near Adamsville	29.6 (M-2)	601400	SEDO	WWH
Scioto River Basin				
Olentangy River near Worthington	12.3 (M-3)	601290	CDO	WWH
Scioto River near Richmondale	56.2 (M-11)	600770	SEDO	WWH

a. Abbreviations are described in Appendix 3, Key for Tables, Page 1.

- To improve biological assay laboratory capabilities for the analysis of toxicants,

- To provide toxicity data used in the NPDES permitting process for new sources,

- To provide toxicity data for establishing NPDES Permit limitations,

- To determine if an effluent is toxic during a compliance monitoring inspection, and, if toxic,

- To determine the extent of toxicity; data are reported as median lethal concentration and/or median effective concentration,

- To determine, if possible, the toxic constituent(s),

- To provide toxicity data for use in intensive survey or other special studies and

- To provide toxicity data for enforcement actions.

b. Present and Projected Activities

1. The Ohio EPA will improve its bioassay laboratory capabilities for the analysis of toxics. A multi-year implementation plan that will be used to bridge the gap between projected biological laboratory needs and actual laboratory capabilities with regard to bioassay testing will be finalized during FY'82. The plan will include the identification of laboratory support contracts and equipment purchases.

2. The Ohio EPA will develop a protocol on the use of Ohio EPA bioassay data by managers when writing NPDES Permits.

3. The Ohio EPA will determine the toxicity of selected effluents in its Compliance Sampling Program. The program will include 30 screening, static bioassays and 10 definitive, static bioassays to be conducted in conjunction with Compliance Sampling Inspections (CSIs). Entities will be selected from municipal and industrial dischargers undergoing Compliance Sampling Inspections selected from Appendix 2. The final number of facilities tested will depend upon the development of a jointly agreed to U.S. EPA/Ohio EPA methodology for evaluating NPDES Permits with regard to toxicants (to be completed 03/31/82).

   Ten (10) individuals of each test organism (Fathead minnows - Pimephales promelas and Daphnia pulex) are exposed to a sample of full strength effluent for 48 hours in a static, screening bioassay. The control in a screening bioassay is conducted with rearing unit water.

If screening bioassay data demonstrate that an effluent is toxic (i.e., if either test organism has 20% or greater applicable adverse effect - mortality or immobility), a follow-up definitive, static bioassay is conducted. Ten (10) fish and 20 daphnia are exposed to a range of five effluent concentrations (usually 100% through 10% by volume effluent and controls) in replicate containers (5 organisms per container) for 96 hours in a definitive, static bioassay; the data are reported as an estimate of the median lethal concentration (LC_{50} or TLM_{50}) and/or the median effective concentration (EC_{50}). Rearing unit water is used in a definitive test only if the receiving water is of insufficient quality or quantity for use in a bioassay. Definitive bioassays will be scheduled on a worst-case first basis.

4. In addition to the 30 screening, static bioassays and 10 definitive, static bioassays, a limited number of additional biossays will be conducted for use in enforcement or litigation proceedings on an as-needed basis.

5. The submission of a report containing organic scan analysis data and Ames Test data may be required of dischargers that have had their effluents evaluated with the screening and definitive bioassays.

4. Sediment

Arrangements will be made with the Ohio Department of Health in 1981 to conduct analyses for heavy metals and organics on sediment samples. Approximately one-half of these samples will be committed to the 1982 intensive surveys; the remaining samples will be used for other intensive surveys, synoptic surveys, special studies, site investigations, enforcement actions and/or complaint monitoring.

5. Dredge Material

The Ohio EPA monitors dredge and fill activities as required by Section 401 (Water Quality Certification) of the Act. Assessments and evaluations of individual applications for Section 401 Water Quality Certifications are conducted to determine ecological impacts and to insure compliance with Federal and State water quality regulations. Water and sediment are sampled by the applicant; the analyses of metals and organic chemicals are emphasized. Approximately 25 applications are received and reviewed for certification each month.

D. Radiological Monitoring

The Adjutant General Disaster Service Agency (DSA) has primary responsibility for responding to radiation incidents in Ohio. Radiation response activities are coordinated between DSA and the Ohio EPA Emergency Response and Surveillance and Standards Sections.

Total alpha and gross beta activity, both dissolved and suspended, are monitored by the Ohio EPA, Surveillance and Standards Section at the stations listed (Table 4) upon notification of a general radiation emergency, or at appropriate locations in the event of a spill.

Table 4: Ohio EPA emergency radiological monitoring stations[a]

STATION DESCRIPTION	RM	STATION #	DISTRICT	USE DESIGNATION
LAKE ERIE				
Cleveland Nottingham Intake (Cuyahoga Co.)	-	504120	NEDO	EWH(LE),PWS
Toledo Intake (Lucas Co.)	-	504010	NWDO	EWH(LE),PWS
SCIOTO RIVER				
Scioto River at Shadeville (SR 665) (Franklin Co.)	119.5	600810	CDO	WWH
GREAT MIAMI RIVER				
Great Miami River near New Baltimore (Hamilton Co.)	20.8	600030	SWDO	WWH

a. Abbreviations are described in Appendix 3, Key for Tables, Page 1.

E. Intensive Surveys, Special Studies and Synoptic Surveys

The Ohio EPA has initiated an Intensive Survey Program to investigate water quality in selected rivers and streams. Selections are made on a priority basis within the Division of Wastewater Pollution Control during the March-April preceding the June-October field season. These investigations are conducted for the purpose of addressing specific water quality issues and to serve as a mechanism for integrating surface water monitoring programs.

Pre-survey planning and field work, coordinated by the Water Quality Unit under the direction of the Surveillance and Standards Section, are developed with the assistance of the appropriate District Surveillance staff. Simulation modeling, when included, is performed by the Water Quality Planning and Assessment Section.

All intensive surveys include comprehensive physical/chemical and biological sampling. Flow, cross-sectional measurements and time-of-travel studies are performed when data for calibration and/or verification of the Water Quality Planning Model II (WQPM II) or other appropriate models are required. All field and laboratory procedures conform to those outlined in the Ohio EPA Quality Assurance Manual (Ohio EPA 1980).

1. Objectives and Priorities

Intensive survey, synoptic survey and special study objectives are as follows:

- To provide a partial data base for Ohio's 305(b) Biennial Water Quality Reports.
- To provide some basis for understanding and describing the biological quality and receiving stream water quality and the processes that affect that quality,
- To determine if the Clean Water Act goal of fishable/swimmable waters is being achieved,
- To evaluate water use designations,
- To evaluate water quality standards,
- To develop baseline data necessary for the protection of high quality streams,
- To evaluate the suitability of a stream segment or lake for receiving wastewater from a potential new discharge source,
- To establish a systematic process for selecting intensive survey stream segments,
- To identify toxic substances entering State waters, and to assess their impact on existing and planned stream uses,

- To identify, quantify and differentiate water quality problems and contributions from both point and nonpoint pollution sources, and to assess their impact on existing or planned stream uses,

- To provide minimum data required for calibration and verification of the Water Quality Planning Model II (WQPM II) or other appropriate models,

- To validate stream segment classifications as water quality or effluent limited,

- To refine procedures for resolving conflicts between biological and modeling results,

- To determine water quality conditions by using aquatic communities as indicators,

- To review, evaluate and improve the location and distribution of fixed station monitoring network stations against State and Federal needs,

- To bridge gaps between data from effluent and fixed monitoring stations,

- To provide data to explain trends,

- To improve the reporting of water quality trends,

- To assess the effectiveness of surface water pollution control programs and to set priorities for their establishment or improvement,

- To provide support for the Agency's National Pollution Discharge Elimination System (NPDES) Permit enforcement program,

- To provide technical assistance to the Soil Conservation Service regarding Rural Abandoned Mine Program (RAMP) reclamation projects,

- To assess biological and water quality improvements from State administered reclamation projects,

2. Present and Projected Activities

   a. Technical reports are prepared by the Ohio EPA, Surveillance and Standards Section for each intensive survey. Physical/chemical data are entered into the STORET System (see Section VII, C) and are included as a part of the next Ohio EPA 305(b) Biennial Water Quality Report (see Section VI). Abstracts of each report are sent to U.S. EPA by June 30 of each fiscal year for the previous year's intensive surveys.

b. The Ohio EPA, Surveillance and Standards Section will analyze and interpret data and prepare reports for the intensive surveys and special studies conducted during FY'79 and FY'80 listed in Table 5.

c. Intensive Survey Segments for 1982

The Ohio EPA, Surveillance and Standards Section will prepare comprehensive water quality reports and abstracts for intensive surveys conducted during FY'81 (Table 6), and will make recommendations on water quality standards, wasteloads allocations and NPDES Permit limitations according to the process of Appendix V, 205(g). The Surveillance and Standards Section will complete biological/water quality reports for the surveys listed in Table 6 by July 1982.

d. The Ohio EPA, Surveillance and Standards Section will conduct intensive surveys during FY'82. The surveys will be conducted to provide data on specific issues such as wasteload allocations (WLAs) for water quality limited segments for municipalities on the Construction Grant Priority Lists; to assess stream use classification; and to determine water quality conditions by using aquatic communities as indicators. A list of segments/streams will be selected by March 15, 1982; intensive survey plans listing sites, parameter coverage, etc. will be developed by May 15, 1982.

e. The Ohio EPA, Surveillance and Standards Section will finalize the procedure for selecting priority segments/streams for water quality and biological analyses. This selection will be based upon the construction grant project priority and fast track lists, Advanced Wastewater Treatment/Advanced Secondary Treatment (AWT/AST) determination needs, the schedule for municipal and industrial National Pollution Discharge Elimination System (NPDES) Permits to be issued/reissued and the needs for water quality standards revisions. A work group that will draft the procedure will be identified; the procedure will be used to select the FY'82 intensive surveys. The final selecting procedure will also be included in Ohio EPA's 5-year Monitoring Strategy (1983-1987).

f. The Ohio EPA, Surveillance and Standards Section will make site inspections to evaluate the suitability of a stream segment or lake for receiving wastewater from a potential new discharger source. Evaluations with recommendations on the suitability for a new discharge will be provided.

g. The Ohio EPA, Surveillance and Standards Section will develop methodologies for evaluating high quality streams, and will collect the necessary baseline data to protect them. The protection of high quality streams will be a factor in the selection of subbasins for future intensive survey work. The Ohio EPA will conduct an intensive survey on the Little Miami River as a first step in achieving this objective.

Table 5: Intensive surveys (segment/stream) and special studies conducted during FY'79 and FY'80[a]

Intensive Survey	Report Status
Big Darby Creek (1979)	Complete - 1982
Great Miami River (1980)	Final Draft
Lick Run (1980)	Not Started
Little Salt Creek (1980)[b]	Rough Draft
Olentangy River (1979)	Rough Draft
Paramour Creek (1979)	Rough Draft
Sandusky River (1979)	Complete
Walnut Creek (1980)	Complete - 1982
Special Studies	
Gilroy Ditch (1979)	Complete
Mahoning River (1980)[d]	Rough Draft
Rocky Fork (1979)[c]	Final Draft
Scioto River (1979)	Complete

a. The year denotes the time during which the field data were collected.
b. Chemical/physical data only were collected during this study.
c. This report was prepared for a litigation proceeding.
d. This survey was conducted to determine attainable use designations and to support a review of the existing water quality standards.

Table 6: Intensive survey segment/stream studies conducted during FY'81

Bear Creek	Little Yellow Creek
Big Darby Creek	Muddy Creek
Bokes Creek	Nettle Creek
Cowles Creek	Rocky River
Elk Fork	Sandusky River
Fourmile Creek	Scioto River
Killbuck Creek	Silver/Eagle Creek
Licking River	East Branch Vermilion River
Little Chippewa Creek	Wierth Ditch

h. Synoptic Survey Program

The Ohio EPA, Surveillance and Standards Section will develop a Synoptic Survey Program during FY'81. Synoptic surveys will replace the Ohio EPA ambient fixed station networks (both monthly and quarterly) beginning during FY'82. Synoptic surveys are defined as the sampling or measurement of parameters at representative sites for a moderate period of time (i.e., from several months to several years). The surveys are a middle ground between intensive surveys and fixed station monitoring. They are designed to answer specific questions about water quality conditions/trends that either cannot be assessed within a short period of time, or that cannot be adequately addressed through fixed station monitoring. Synoptic surveys consist of a set of locations at which one or more types of data are collected for a specific purpose(s) (i.e., to fulfill specific information needs). Because data from any particular site may be used for more than one purpose, a single data collection site may play a role in more than one synoptic survey. The design element in the synoptic approach will greatly improve the utility of the data collected compared to the current fixed station network. Examples of the uses of such surveys are assessing the impact of land-use on specific water quality characteristics, assessing background water quality, determining sediment losses and the need for nonpoint pollution control measures and evaluating mine drainage streams. The Synoptic Survey Program will be implemented during May 1982.

i. The Ohio EPA, Surveillance and Standards Section will assess the water quality of raw public water supplies (surface water only) to ensure that Public Water Quality Standards are met, especially with regard to toxic pollutants. All activities will be coordinated with the Divisions of the Planning Coordinator, Wastewater and Public Water Supply.

j. The Ohio EPA, Industrial Wastewater Section will evaluate Rural Abandoned Mines Program (RAMP) reclamation projects. Technical assistance will be provided to the Soil Conservation Service regarding RAMP projects involving the discharge of impounded water. Data collection and evaluations of RAMP projects will be coorginated with other data needs.

k. The Ohio EPA, Surveillance and Standards Section will evaluate Ohio Department of Natural Resources (ODNR) Land Reborn (Board on Unreclaimed Strip Mined Lands and ODNR 1974) acid mine drainage reclamation projects (provided that funds can be made available). The evaluation will include assessments of biological quality, water quality and stream use attainability. A project proposal stating objectives, data needs, sampling design and project costs will be developed. Field study plans for the FY'82 field season will be completed by May 15, 1982, the study will be completed by October 1, 1982, and the evaluation, with report results and recommendations, will be submitted to U.S. EPA by June 1, 1983.

l. The Ohio EPA, Surveillance and Standards Section will continue to develop guidelines for conducting comprehensive biological/water quality surveys. Exising documentation will be expanded into a complete set of guidelines; key steps, from survey selection to the completion of the comprehensive water quality report, will be outlined.

m. The Ohio EPA, Surveillance and Standards Section will refine procedures for resolving conflicts between biological and modeling results to enable a consistent set of recommendations to be drawn from all monitoring results. The performance of the procedure in Attachment V-3 of the 205(g) Agreement will be evaluated and modified where appropriate.

n. The Ohio EPA, Surveillance and Standards and Special Projects Sections will compile a historical record of pollution abatement projects in Ohio. The record will be used to provide a data base to judge the effectiveness of Ohio's pollution control programs, and will report data on abatement project costs, treatment types and expected water quality improvements. The Ohio EPA will determine what means are available to accomplish this task during FY'82. The findings will be presented in the State's 1984 305(b) Biennial Water Quality Report.

o. The Ohio EPA, Division of the Planning Coordinator will evaluate and make water quality assessments of the following nonpoint sources:

   1. Urban runoff including combined sewer overflows. The data will be used to evaluate urban sources in light of stream use.

   2. Agricultural runoff. The data will be used to evaluate critical areas and nutrient losses in the Lake Erie Drainage Basin.

   3. Runoff from coal mining areas (active and abandoned). The data will be used to evaluate mine drainage in light of stream use and effluent requirements for Publicly Owned Treatment Works (POTWs) on such streams. The Surveillance and Standards Section will coordinate these projects with the Division of the Planning Coordinator and will provide technical assistance.

p. Stream surveys and evaluations of 316(a) demonstration projects

   1. Objectives and Priorities

      The objectives of the 316(a) demonstration project evaluations are as follows:

      - To verify that power plant thermal discharges with 316(a) variances have no adverse impact on aquatic life,

- To develop and implement a methodology for monitoring the entrainment and impingement of fish at cooling water intakes and

- To apply methods in the compliance monitoring of cooling water intakes in Lake Erie.

2. Present and Projected Activities

a. The Industrial Wastewater Section will develop and implement a methodology for monitoring the entrainment and impingement of fish at cooling water intakes. The methodology will be used in an evaluation of 316(a) demonstration projects. Initially, the methology will be implemented at one intake in the compliance monitoring of cooling water intakes in Lake Erie.

F. Modeling and Wasteload Allocation Activities

Through the Wasteload Allocation process, as required by Sections 303 and 208 of the Act, pollutants contained in point source discharges are modeled to determine the effluent limitations necessary to attain and maintain stream water quality standards. Wasteload allocation activities are coordinated with the FY'82 Construction Grants Program Priority List.

A construction grant will be awarded to advanced treatment projects only after the completion of an Advanced Wastewater Treatment (AWT)/Advanced Secondary Treatment (AST)justification. These justifications can be categorized as either simple or complex, depending on the number and location of other point sources in the affected stream reach. Simple advanced treatment projects for point sources on simple stream segments require limited field data and a simplified modeling procedure. Complex advanced treatment projects for point sources on complex stream segments require field surveys that collect additional data for the calibration and verification of the Water Quality Planning Model II (WQPM II) or other appropriate models (Table 7).

1. Objectives and Priorities

Objectives of the wasteload allocation proccess are as follows:

- To develop/update guidelines for modeling and wasteloads procedures,

- To review existing procedures and data, and refine the modeling and wasteload allocation process,

- To develop preliminary wasteload allocations using minimum data to support National Permit Discharge Elimination System (NPDES) Permit issuance,

Table 7: Parameters monitored to determine wasteload allocations[a]

	Decay Rate and Model Calibration Studies	Model Verification
Physical Parameters		
Discharge (cfs)	X	X
Depth, Average (ft)	X	-
pH (S.U.)	X	X
Temperature (^{o}C)	X	X
Velocity, Average (ft/sec)	X	-
Width (ft)	X	-
Chemical Parameters		
Ammonia (NH_3 as N) (mg/l)	X	X
$CBOD_5$ (mg/l)[b]	X	X
$CBOC_{20}$ (mg/l)[b]	X	X
Chlorides (mg/l)	X	X
Dissolved Oxygen (mg/l)	X	X
Dissolved Solids, Total (mg/l)	X	X
$NBOD_5$ (mg/l)[c]	X	X
$NBOD_{20}$ (mg/l)[c]	X	X
Total Kjeldahl Nitrogen (mg/l)	X	X

a. Other parameters may be selected as required depending on circumstances and data needs.
b. Carbinaceous Biochemical Oxygen Demand
c. Nitrogenous Biochemical Oxygen Demand

- To develop temporary NPDES Permit limitations and alternatives for proposed discharge locations,

- To recommend NPDES Permit limitations and

- To provide justification for Advanced Treatment Projects.

2. Present and Projected Activities

a. Selection of AWT/AST Justifications from the Grant Priority List

A number of simplified and complex advanced treatment projects have been selected for AWT/AST justification for FY'82 (Table 8) after reviewing the Ohio EPA "fast-track" list of the Grant Priority List. The Ohio EPA, Water Quality Planning and Assessment Section will prepare advanced wastewater treatment justifications and reports for stream segments which were previously studied where the stream use designation was not evaluated (Table 8) by June 1, 1982.

b. Wasteload Allocations (WLAs)

The Ohio EPA, Water Quality Planning and Assessment Section will develop wasteloads and alternative treatment strategy reports for surveys conducted during FY'81 (Table 9).

c. The Ohio EPA, Special Projects Section will evaluate the economics of each AWT/AST project to determine its affordability, and will perform a cost-benefit analysis. Forty (40) typical projects will be reviewed with the use of facility plans; ten (10) high cost projects on high value streams will also be reviewed. The economic evaluations will be coordinated with the Surveillance and Standards and Water Quality Planning Assessment Sections and the Division of Construction Grants.

G. Lakes and Reservoirs Program

Section 314(a) of the Federal Water Pollution Control Act Amendments of 1972 requires each state to develop/refine a classification system for inland lakes and reserviors, to establish a priority ranking of all publicly owned freshwater lakes and reservoirs that are in need of restoration and/or protection, and to update the classification at 5 to 10 year intervals.

1. Objectives and Priorities

The Ohio EPA Lakes and Reservoirs Program objectives are as follows:

- To develop a State Lake Restoration Strategy,

- To incorporate the State Lake Restoration Strategy into Ohio EPA's 5-year Monitoring Strategy,

Table 8: Justifications and reports for Advanced Treatment Projects which will be submitted during FY'82

Cuyahoga River (Akron, Kent) study plan only
East Fork Little Miami River (New Vienna)
Glady Run (Fayetteville, Brown Co.)
Grand River (Austinburg)
Great Miami River (Qunicy, Piqua)
Greenville Creek (Greenville, New Madison)
North Fork Licking River (Utica)
Little Miami River (Montgomery Co. E. Reg.)
Lost Creek (Troy New Plant)
Ludlow Creek (Englewood, Union)
Mad River (Springfield)
Mud Creek (Fairborn)
Raccoon Creek (Granville)
Scioto River (Kenton, Laruel, Greencamp)
Solomon Run (Saint Martin)
Stillwater Creek (Versailles)
Whetstone Creek (Edison)

Table 9: Wasteload Allocation reports for studies conducted during FY'81 which will be submitted during FY'82

Bear Creek
Big Darby Creek
Bokes Creek
Cowles Creek
Elk Fork
Fourmile Creek
Great Miami River Mainstem[b]
Killbuck Creek
Licking River
Little Chippewa Creek
Little Yellow Creek
Muddy Creek
Nettle Creek
Rocky River
Sandusky River
Scioto River[a]
Silver/Eagle Creek
East Branch Vermilion River
Wierth Ditch

---

a. Columbus to Waverly, Ohio
b. AWT/AST justifications for 22 simplified and 2 complex advanced treatment projects for dischargers to the Great Miami River mainstem and its tributaries. Field work was completed during FY'80.

- To develop baseline physical/chemical and biological data, especially for trophic status evaluation,

- To obtain necessary data for the Clean Lakes Program,

- To develop Phase I and Phase II Priority Lists consistent with the State project priority system for restoring specific lakes,

- To manage lake restoration projects, with primary emphasis on publicly owned recreational waters,

- To evaluate the effectiveness of lake restoration projects and

- To complete a policy for phosphorus removal at Wastewater Treatment Plants (WWTP) which discharge to inland lakes.

2. Present and Projected Activities

   a. The Ohio EPA, Surveillance and Standards Section will develop a State Lake Restoration Strategy, incorporate the Lake Restoration Strategy into Ohio EPA's 5-year Monitoring Strategy, and survey water quality in lakes and reservoirs as needed. A report listing those lakes which have a high priority for restoration will be submitted to the U.S. EPA during March 1982.

   b. Ohio EPA/USGS projects funded with prior year allocations will continue during FY '82. The Ohio EPA/USGS will submit a report on the 1979 and 1980 lakes sampling program to U.S. EPA. Sampling and the parameters to be sampled as part of the Ohio EPA/USGS 1982 314(a) program (Table 10) will provide sufficient information to classify lakes according to trophic state that are included on Ohio EPA's priority list of recreational lakes to be restored or protected (Appendix 3, Table 4). The parameters measured are limited to nutrients and related parameters for trophic index determinations (Table 10); other parameters (metals) are also measured.

      Lakes will be classified and ranked using Carlson's Trophic State Index (TSI) and the National Environmental Center's Relative Trophic Index (RTI). Sampling will be conducted during the period of highest, anticipated biological activity, (i.e., during July and August). A list of lakes sampled during 1981 (Table 11A) and a tentative list of lakes to be sampled during 1982, 1983 and 1984 (Table 11B) was selected from the more comprehensive list in Appendix 3, Table 4.

   c. The Ohio EPA will finalize a draft procedure for evaluating the impact of phosphorus removal at Wastewater Treatment Plants which discharge to inland lakes during 1982.

Table 10: Parameters that will be sampled at primary lake stations to determine trophic state (TSI and RTI) during the summer of 1982[a]

	Sampling Depth[b]		
PARAMETER (Chemical/Physical)	P	Sur	Bot
Alkalinity, Total, $CaCO_3$ [c]	-	X	X
Conductivity (field)	X	-	-
Dissolved Oxygen (field)[d]	X	-	-
Nitrate, NO_3 as N	-	X	X
Nitrite, NO_2 as N	-	X	X
Nitrogen, Ammonia, N	-	X	X
pH (field)	X	-	-
Phosphorus, Dissolved, P	-	X	X
Phosphorus, Total, P	-	X	X
Secchi Disc	-	-	-
Sulfate, SO_4			
Total Kjeldahl Nitrogen	-	X	X
Water Temperature (field)	X	-	-
PARAMETER (Biological)			
Chlorophyll a	-	X	-
Macrophyte Observations[e]	-	-	-

a. TSI = Carlson's Tropic State Index;
RTI = National Environmental Research Center's Relative Trophic Index
b. Sampling depth; Profile (P), Surface (Sur) samples are taken at a depth of 2 feet, Bottom (Bot)
c. Alkalinity will be determined in lakes that have low alkalinity and in lakes thought to be threatened with inflows of water having a low pH.
d. Dissolved oxygen will also be sampled in the hypolimnion if stratification occurs.
e. Observations are made throughout the entire study area.

Table 11A : Lakes surveyed by the Ohio EPA in 1981[a]

Action Lake (Butler)	Lake Park (Mahoning)
Cutler Lake (Muskingum)	Miami - Whitewater Lake (Hamilton)
Essington Lake (Perry)	Old Reid Park Pond (Clark)
Firestone Lake (Summit)	Sippo Lake (Stark)
Forty Acre Pond (Auglaize)	Sharon Lake (Hamilton)
Guilford Lake (Columbiana)	Snyder Park Lagoon (Clark)
Harrison Lake (Fulton)	Springfield Lake (Summit)
Hosterman Lake (Clark)	Summit Lake (Summit)
Lake Isabella (Hamilton)	Rocky Fork Lake (Highland)
Lake Loramie (Shelby)	Wolf Run Reservior (Noble)

a. Lake Name (County)

Table 11B: Tenative list of lakes to be surveyed by the Ohio EPA/USGS

Survey Date
Lake/Reservoir
(County)

1982	1983	1984
Beach City Reservoir (Tuscarawas)	Bellevue Reservoir (Huron)	Alum Creek Lake (Delaware)
Delaware Lake (Delaware)	Bresler Reservoir (Allen)	Grand Lake St. Mary's (Auglaize)
East Fork Lake (Clermont)	Celeryville Reservoir (Crawford)	Hinkley Lake (Medina)
Friendship Park Lake (Jefferson)	Clyde Reservoir (Seneca)	Hodgson Lake (Portage)
Grand Lake St. Mary's (Auglaize)	Dale Walburn Reservoir (Stark)	Indian Lake (Logan)
Grant Lake (Brown)	Ferguson Lake (Allen)	Lake Hope (Vinton)
Hammertown Lake (Jackson)	Forty Acre Pond (Auglaize)	Lake Lacomte (Hancock)
Lake Cohasset (Mahoning)	Kipton Reservoir (Lorain)	Lake Mosier (Hancock)
Lake Hope (Vinton)	Lake Glacier (Mahoning)	Medina Lake (Medina)
Meadowbrook Lake (Summit)	Metzger Reservoir (Allen)	New London Reservoir (Huron)
O'Shaughnessy Reservoir (Delaware)	Salem Reservoir (Columbiana)	Paulding Reservoir (Paulding)
Pymatuning Reservoir (Ashtabula)	Saulisberry Park Lake (Hardin)	Seneca Lake (Wayne)
Shreve Lake (Wayne)	Summit Lake (Summit)	Springfield Lake (Summit)
Turkey Creek Lake (Scioto)	Zepernick Lake (Columbiana)	Wellington Reservoir (Lorain)

Table 11: (continued)

Survey Date
Lake/Reservoir
(County)

Additional lakes that will be sampled as time allows

1982	1983	1984
Coldwell Lake (Noble)	Oak Hill Reservoir (Jackson)	Muzzy Lake (Portage)
Guilford Lake (Columbiana)	Piedmont Lake (Harrison)	
New Lexington Reservoir (Perry)		
Pleasant Hill Reservoir (Ashland)		

H. Lake Erie Monitoring and IJC Programs

Ohio EPA, in cooperation with U.S. EPA and the International Joint Commission on the Great Lakes (I.J.C.), conducts a monitoring program utilizing parameters requested by I.J.C.

1. Objectives and Priorities

The objectives of the Ohio EPA and I.J.C. Lake Erie monitoring programs are as follows:

- To restore and enhance water quality in near shore areas of Lake Erie,
- To monitor Lake Erie tributaries and selected lake sites to collect more definitive information on nutrient and contaminant loading to Lake Erie,
- To reduce phosphorus loading to Lake Erie,
- To obtain more definitive information on toxicant contamination of Lake Erie near shore areas through fish tissue analyses,
- To develop alternatives to abate pollution and schedule appropriate remedial programs for both point and nonpoint sources and
- To integrate all U.S. EPA-funded Lake Erie monitoring, research and demonstration projects conducted in Ohio into the overall State Water Quality Plan.

2. Present and Projected Activities

a. Great Lakes National Program

1. There are 17 I.J.C. sampling sites; 12 Lake Erie tributaries (Appendix 3, Table 5) and 5 Lake Erie water intakes (Appendix 3, Table 6). Samples are collected and analyzed for 44 parameters at the specified tributary sites, and for 46 parameters at the water intakes. Sampling frequency ranges from 1 to 26 times annually depending upon the parameter (Appendix 3, Tables 5 and 6). A report estimating the annual tributary loadings for FY'81 will be forwarded to the I.J.C. by the Ohio EPA, Surveillance and Standards Section by March 31, 1982.

2. The Ohio EPA, Surveillance and Standards Section will monitor 3 additional monthly ambient fixed stations, one each in the Black River (STORET station 501510), Rocky River (STORET station 501790) and Cuyahoga River, (STORET station 502130) that are not NAWQMN sites to improve I.J.C. loading estimates to Lake Erie from these tributaries.

b. Lake Erie Problem Areas

1. The Ohio EPA, Surveillance and Standards Section will review and evaluate existing annual data collected by the Great Lakes National Program Office (GLNPO) contractor for the Maumee River and Cuyahoga River high flow studies. An annual summary report that includes a compilation of the contractor's data, an evaluation of the contractor's progress, and Ohio EPA's estimate of Lake Erie loadings for specified parameters based on high flow data will be sumbitted to the U.S. EPA by Ohio EPA.

2. The Ohio EPA, Surveillance and Standards Section will prepare an executive summary-inventory report on the Rocky River and Black River Estuaries and nearshore areas using existing data, information and reports. A comprehensive inventory of existing information/data will be compiled for a joint State/Federal review. Additional data needs will be determined and plans for additional assessments will be developed. Alternatives to abate pollution will be developed and appropriate remedial programs for both point and nonpoint sources will be scheduled.

3. The Ohio EPA, Surveillance and Standards Section will evaluate phosphorus loadings within the Lake Erie Basin. Compliance data for dischargers impacting Lake Erie will be reviewed by the Division of Public Wastewater, and action will be taken to ensure compliance.

4. The Ohio EPA, Surveillance and Standards Section will collect indigenous fish samples, as specified in Element 4 of the Great Lakes Fish Monitoring Strategy. Samples will be collected from Lake Erie river mouths and bays having potential fish tissue toxicant problems, as identified through cooperative Ohio EPA/U.S. EPA (GLNPO) Gas Chromatograph/Mass Spectrometer (GC/MS) analyses. Fish samples will be collected in the Rocky River for Polychlorinated Biphenyls (PCBs) and pesticide analyses and in the Cuyahoga River for PCBs analysis during FY'82.

5. The Ohio EPA, Surveillance and Standards Section collected fish samples from the following Lake Erie river mouths and embayments during FY'81: The Black River, the Huron River, the Ashtabula River and the Vermilion River. The samples were collected and shipped to U.S. EPA by December 1, 1981.

6. The Ohio EPA, Surveillance and Standards Section will review fish tissue contaminant data reported to the Ohio EPA by U.S. EPA laboratories. The Ohio EPA will submit an annual report that includes a compilation of the raw analytical data, an evaluation of problem area(s) and an evaluation of contaminant trends.

7. The Ohio EPA, Divisions of the Planning Coordinator and Construction Grants will participate in a review and evaluation of annual data provided by GLNPO grantees and contractors. The Ohio EPA will submit a summary annual report to U.S. EPA that describes Ohio EPA's participation, and an evaluation of the project results for projects listed in Table 12.

8. The Ohio EPA, Division of Wastewater Pollution Control will review and evaluate annual data from the Ohio EPA/GLPO atmospheric deposition network collected by the Ohio EPA Air Laboratory. A summary annual report identifying, quantifying and evaluating atmospheric inputs to the Ohio waters of Lake Erie will be submitted to U.S. EPA.

I. Ohio River Monitoring - ORSANCO Programs

Ohio is a signatory state of the Ohio River Valley Water Sanitation Commission (ORSANCO) (ORSANCO 1948). In May, 1973, the ORSANCO Commission directed a study team to prepare a monitoring strategy for the Ohio River and the mouths of major tributaries that would satisfy the needs of state, interstate and federal agencies for the appraisal of water quality[a]. ORSANCO published a monitoring strategy in December, 1973, titled, Water Quality Monitoring Strategy for the Ohio River and Lower Reaches of Major Tributaries. Revisions to the ORSANCO monitoring document have been made and are in the process of being approved.

Ohio EPA endorses the ORSANCO monitoring strategy and relies on ORSANCO monitoring programs for water quality data on the Ohio River. The ORSANCO monitoring strategy addresses:

(1) Statutory and various agency requirements,
(2) A monitoring strategy,
(3) Water quality needs,
(4) Existing monitoring network,
(5) Recommended monitoring network, and
(6) Recommendations for implementing the proposed strategy.

The reader is referred to the ORSANCO monitoring strategy document (ORSANCO 1973) and Assessment of Water Quality Conditions Ohio River Mainstem 1978-9 (ORSANCO 1980) for specific information/data regarding ORSANCO program areas, or contact ORSANCO, 414 Walnut Street, Cincinnati, Ohio 45202 (513-421-1151).

An organic chemical detection system for the daily monitoring of source water for purgeable halocarbons (trichloromethanes, carbon tetrachloride and 15 other compounds), based on the installation of gas chromatographic units at 11 public and industrial water utilities on the Ohio, Allegheny, Monongahela and Kanawha Rivers, has been operational since late 1979.

ORSANCO's primary physical/chemical in-stream monitoring network consists of 37 stations, 22 located on the Ohio River and 15 in lower reaches of major tributaries. Thirteen primary monitoring stations

a. The study team was composed of the signatory states, the ORSANCO staff, the U.S. EPA, the U.S. Corps of Engineers, and the U.S. Geological Survey.

Table 12: GLNPO grantees' and contractors' projects that will be evaluated by the Ohio EPA[a]

1. The Defiance County agricultural demonstration project,
2. The Allen County Conservation Tillage Educational Program and Septic Tank Malfunction Program,
3. The Northeast Ohio Areawide Coordinating Agency (NOACA) study of stormwater impacts (chemical and biological) on 5 Lake Erie tributaries,
4. The Cleveland Department of Public Utilities Combined Sewer Overflow (CSO) control with hydrobrakes and off-line storage and
5. The Northeast Ohio Regional Sewer Districts CSO control with hydrobrakes and in-line flow regulation.

---

a. Projects 1 through 3 will be reviewed and evaluated by the Division of the Planning Coordinator, projects 4 and 5 will be reviewed and evaluated by the Division of Construction Grants.

are located in the 450 mile portion of the Ohio River which borders the State of Ohio. Four additional stations are located in the lower reaches of major, Ohio River tributaries (Table 13).

ORSANCO also conducts biological monitoring at 13 stations, either located in the Ohio River bordering Ohio, or in lower reaches of major Ohio River tributaries (Table 14). Macroinvertebrate count, identification and diversity index are determined from three replicate samples at each station in the Ohio River Mainstem using methods recommended in the U.S. EPA Biological Methods Manual (U.S. EPA 1973). The macroinvertebrate data (last collected during 1979) are used as an indication of water quality and suitability of the food chain to support balanced fish populations.

Fish are collected at selected locks and dams with rotenone, and are identified, counted and weighed to provide fish species composition and relative abundance data. Edible portions (fillets) of selected specimens of carp, channel catfish and shiners from designated locations are preserved and analyzed for the bioaccumulation of pesticides, trace organic contaminants and heavy metals, as specified in the U.S. EPA publication Basic Water Monitoring, 1976 (U.S. EPA 1977).

VI. OHIO'S 305(b) BIENNAL WATER QUALITY REPORT

Each state is required to prepare and submit a biennial water quality report to the Administrator as required by Section 305(b) of the Clean Water Act.

A. Objectives and Priorities

The objectives of the 305(b) Report are as follows:

- To transmit an analysis of the effectiveness of the Clean Water Act directly to Congress,
- To use as a reporting mechanism for feedback concerning Federal programs,
- To transmit the State's reactions to U.S. EPA's administration of the Clean Water Act,
- To describe the existing water quality of all navigable waters during the reporting period,
- To analyze the extent to which all navigable waters of the State provide for the protection and propagation of balanced populations of shellfish, fish, and wildlife, and allow recreational activities in and on the water,
- To analyze the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of balanced populations of shellfish, fish, and wildlife, and allow recreational activities in and on the water,

Table 13: Ohio River Valley Water Sanitation Commission (ORSANCO) Primary Physical/Chemical Monitoring Network, Ohio portion - The Ohio River and major Ohio River tributaries

Station	Approximate Mile Point	Type(a)
Ohio River, Pennsylvania-Ohio Border	40	A
Ohio River, above Wheeling	87	A
Ohio River, below Wheeling	126	A
Ohio River, Willow Island Dam	162	B
Muskingum River	6	B
Ohio River, below Little Kanawha River	192	B
Ohio River, Kyger Creek	260	A
Ohio River Gallipolis Dam	279	A
Ohio River, above Huntington	304	A
Ohio River, below Huntington	316	B
Ohio River, Greenup Dam	341	A
Scioto River	15	B
Ohio River, Meldahl Dam	436	B
Ohio River, above Cincinnati	463	A
Little Miami River	4	B
Great Miami River	6	A
Ohio River, Indiana-Ohio Border	490	A

a - Automatic Water Quality Monitor and Manual Sampling(A); Manual Sampling Only(B)

Table 14: Ohio River Valley Water Sanitation Commission (ORSANCO) Biological Monitoring Network, Ohio portion - The Ohio River and major Ohio River tributaries[a]

Station	Approximate Mile Point	Monitoring Parameter
Ohio River at Pike Island Dam	84.2	Macroinvertebrates, Fish
Ohio River at Hannibal Dam	126.4	Macroinvertebrates, Fish
Ohio River at Willow Island Dam	161.8	Macroinvertebrates
Muskingum River near lock and Dam #2	5.8	Macroinvertebrates
Ohio River at Belleville Dam	203.9	Macroinvertebrates, Fish
Ohio River at Addison	260.0	Macroinvertebrates
Ohio River at Gallipolis Dam	279.2	Macroinvertebrates, Fish
Ohio River at Huntington	304.2	Macroinvertebrates
Ohio River at Greenup Dam	341.0	Macroinvertebrates
Scioto River near Lucasville	15.0	Macroinvertebrates
Ohio River at Meldahl Dam	436.2	Macroinvertebrates, Fish
Little Miami at Cincinnati	7.5	Macroinvertebrates
Great Miami near Elizabethtown	5.5	Macroinvertebrates

a - Macroinvertebrate data were last collected in the Ohio River Mainstem in 1979. Fish population data and bioaccumulation (fillet) data are collected.

- To analyze the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of balanced populations of shellfish, fish and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of the Clean Water Act, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary, (i.e., to analyze and evaluate the environmental impact of achieving the objectives of the Clean Water Act),

- To analyze and evaluate the economic costs and benefits necessary to achieve the objectives of the Act,

- To analyze and evaluate the social costs and benefits necessary to achieve the objectives of the Act,

- To estimate a date when the objectives of the Act will be achieved,

- To describe the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs,

- To integrate groundwater and surface water monitoring and

- To recommend changes in the National Water Program,

B. Present and Projected Activities

The Ohio EPA, Surveillance and Standards Section is preparing the 1982 Water Quality Inventory Report for Ohio (305(b) Report). Existing and anticipated conditions resulting from changes in land use, point and nonpoint sources, the economy and the State's population will be analyzed, evaluated and reported.

Ohio's future 305(b) Reports will be used to effectively communicate and document Ohio EPA's comments on Federal water quality programs. The Surveillance and Standards Section is continuing to develop its reporting format, and to establish issues which will be reported in the 1982 and 1984 305(b) Reports.

1. The Ohio EPA, Divisions of Public Water Supply (Groundwater Section) and Hazardous Wastes will describe Ohio's groundwater monitoring network. Groundwater problems will be characterized in future 305(b) Reports. An integration of groundwater and surface water monitoring data will provide an improved data base for environmental problem assessment. The Surveillance and Standards Section will coordinate the activities of all groups (Division of Hazardous Wastes and Groundwater Section) involved and will formulate a combined surface water/groundwater monitoring strategy during 1983.

2. The Ohio EPA, Surveillance and Standards Section will compile and review Ohio EPA/USGS historical surface water data on toxic pollutants to provide an improved data base on toxics. This information/data will be presented in Ohio's 1982 305(b) Report and will be used in future toxic pollutant monitoring, toxic effluent control and toxic problem assessments.

3. Information on the generation and/or disposal of toxic substances within Ohio will be integrated into Ohio's future 305(b) Reports. The Surveillance and Standards Section is currently developing a work plan for this task. The information/data will be coordinated with various Ohio EPA groups (i.e., Pretreatment, Permitting, Hazardous Wastes, etc).

4. Ohio EPA will organize all current CSI bioassay screening and follow-up bioassay definitive data and all historical bioassay data into a table. The data will be evaluated, if possible, and presented in a Toxics Volume as part of Ohio's 1982 305(b) Report.

5. All Ohio EPA historical macroinvertebrate data (through June 30, 1979) were organized and presented in Ohio's 1980 305(b) Report (Volume VI). This data will be updated (through September 30, 1980), evaluated and improved. Biological information concerning dominant species/groups will be added to the statistical data already presented. All benthos data will be integrated into the 1982 305(b) Physical/Chemical/Biological basin reports volume.

6. The Ohio EPA will organize and integrate information about lakes potentially affected by mine drainage from the 1980 305(b) Report (Volume V) into the 1982 305(b) Lakes Volume. In addition, historical toxics problems/information involving several lakes will be included. The 1982 305(b)) Lakes Volume will also be updated and will include recent lakes survey data.

7. The Ohio EPA will organize all historical fish tissue toxics data into a table. The data will be evaluated, if possible, and included in the 1982 305(b) Toxics Volume.

8. The Ohio EPA will review historical (1970-1980) Ohio EPA/USGS water quality data for conventional toxic parameters. Standards violations through time will be highlighted as either parameter problems (e.g., total copper, pH, etc.), or parameter area problems (e.g., heavy metals, nutrients, etc.). The information/data will be incorporated into a summary paragraph(s) and will be presented as part of the 1982 305(b) Physical/Chemical/Biological Subbasin Reports Volume.

9. Ohio EPA will prepare trend data/evaluations for USGS/Ohio EPA cotinuous monitoring data for D.O., pH and Temperature. The evaluations will be integrated into the 1982 305(b) Physical/Chemical/Biological Subbasin Reports Volume.

10. Intensive survey reports are comprehensive reports that include an evaluation of water quality problems. These reports are included as part of Ohio's 305(b) Report. Special toxics sections (information/data) will be added to intensive survey reports as an addendum when the data becomes available.

VII. DATA PROCESSING, STORAGE AND REPORTING

Data and information from Ohio's water monitoring programs are made available to U.S. EPA in the form, volume and manner agreed upon by the State and the Regional Administrator. The details of this agreement may be found in the Annual 106 Grant Program submission and throughout this document.

A. Compliance Monitoring Data (LEAPS)

Ohio EPA Compliance Monitoring Program data are processed by LEAPS, a comprehensive data storage and processing system designed and used by the Ohio EPA. National Permit Discharge Elimination System (NPDES) Permit holders submit self-monitoring data which are stored, processed and screened by LEAPS to determine exceptions to entities' permit requirements. Data stored and processed by LEAPS are reported to U.S. EPA per "Memorandum of Agreement" under Ohio's 402(b) Application.

The Ohio EPA will initiate the development of computer software during FY'82 for the LEAPS and PEMSO Data Systems which will be used to evaluate basin loading data for pollutants from point and nonpoint sources. A special emphasis will be given to future nutrient lake loading data. The computer software will allow the Ohio EPA to more effectively meet the requirements of Section 305(b) of the Act, aid in interpreting the results from intensive surveys, and incorporate nonpoint source loading data into the wasteload allocation process. Basin loading data will be reported in Ohio's 1984 305(b) Report.

B. Fixed Station Monitoring Data and Intensive Survey Data (STORET)

STORET is a computerized data base maintained by U.S. EPA for the storage and retrieval of parametric water quality data. All physical/chemical water quality monitoring data collected by the U.S. Geological Survey (USGS), the Ohio River Valley Water Sanitation Commission (ORSANCO), and monitoring, intensive survey, and synoptic survey physical/chemical water quality data collected by the Ohio EPA are entered into the STORET System and made available to STORET users.

1. The Ohio EPA will evaluate its use of the STORET System for data storage, retrieval and analysis. A narrative report containing recommendations which would increase Ohio EPA's effectiveness with regard to data processing, storage and analysis, and improve Ohio EPA's utilization of the STORET System will be submitted to U.S. EPA during May 1982.

2. Ohio EPA's ambient fixed monitoring station (NAWQMN) Network, intensive survey and synoptic survey physical/chemical data are entered into the STORET System by the Ohio EPA, Surveillance and Standards and Data and Systems Sections, edited and checked for accuracy.17aA26cA26a
The time frame for entering data into these systems from the time of sampling to final editing depends upon several variables including laboratory turn around, key-punching loads and "uptime" on STORET. Generally, 3 months are required for data processing, reporting and storage. The Ohio EPA will project a STORET work schedule and enter all ambient monitoring, intensive survey and synoptic survey physical/chemical data for FY'81 and FY'82 into the STORET System.

C. Fish Information System (FINS)

The State Data Center DEC System is being used to develop a Fish Information System (FINS), a data base developed by the Ohio EPA for the purpose of storing and rapidly analyzing fish relative abundance raw data. The Ohio EPA, Surveillance and Standards Section will enter all fish data from FY'81 and FY'82 intensive surveys into the FINS system.

D. Quality Assurance Coordinator

1. Objectives and Priorities

The Ohio EPA designated a Quality Assurance Coordinator (QAC) during May 1981. Current objectives of Ohio EPA's QAC and Quality Assurance Program (QAP) are as follows:

- To review the State's Environmental Quality Assurance/Quality Control Program to ensure it meets Regional QAP requirements,

- To ensure agreement of the State Environmental Quality Control Program with U.S. EPA, Region V Quality Assurance Program specifications,

- To define and improve the reliability (accuracy and precision) of Ohio EPA's data,

- To ensure that the Ohio EPA and Ohio Department of Health Laboratory staffs operate within constraints of the QAP,

- To ensure that NPDES dischargers are meeting the analytical requirements of 40 CFR 136 and

- To ensure that contract laboratories are meeting the requirements of 40 CFR 136.

2. Present and Projected Activities

   a. The Quality Assurance Coordinator (QAC) will maintain a close liaison with the Chief of the Quality Assurance Office, U.S. EPA, Region V. Ohio EPA's Environmental Quality Assurance/Quality Control Program will be reviewed to ensure that it meets Regional Quality Assurance Program requirements. The QAC will submit biannual reports detailing Ohio EPA's Environmental Quality Assurance/Quality Control Program to U.S. EPA by June 30, 1982, and December 31, 1982.

   b. The Ohio EPA will participate in a yearly laboratory inspection program conducted by the Chief of the Quality Assurance Office, U.S. EPA, Region V.

   c. The Quality Assurance Coordinator (QAC) will review and update Ohio EPA's Quality Assurance Program, coordinate inter-laboratory and intra-laboratory Environmental Quality Control Programs, and participate in the State's sampling and analytical Quality Assurance Programs. The QAC will provide and oversee the exchange of Quality Control Samples including referenced, audit, spiked, and duplicate samples. Assessments of parameter analytical accuracy, precision, completeness and representativeness will be made, and laboratory audit procedures of instrument performance and analyst performance will be evaluated. The QAC will make a quarterly assessment of overall laboratory performance and submit quarterly reports to U.S. EPA; Ohio Department of Health Laboratory reports will also be reviewed.

   d. The Quality Assurance Coordinator (QAC) will identify training and methodology gaps, and develop and implement training programs for Ohio EPA monitoring staff to ensure that the staff operates within the constraints of the Quality Assurance Program. Training classes will be conducted for Ohio EPA staff as needed; a training class will be conducted at least once per year.

   e. The Quality Assurance Coordinator (QAC) will implement Quality Assurance practices in laboratories outside of Ohio EPA "direct control" to ensure that contract laboratories are meeting the requirements of 40 CFR 136. The implementation of Quality Control practices will include the following: 1) ensuring adequate facilities and staff; 2) all laboratories will be required to use approved methods set forth in 40 CFR 136; 3)

all laboratories will be required to participate in the U.S. EPA performance sample program; 4) a daily Quality Control Program will be outlined for contract laboratories; and 5) all laboratories will be required to document the validity of all analytical data. The Quality Assurance Coordinator will attempt to visit all laboratories scoring less than a 60% success rate in the U.S. EPA Discharge Monitoring Report Quality Assurance Program. Technical assistance will be given and laboratory inspections will be coordinated with compliance inspections (see Section VI).

f. The Quality Assurance Coordinator will ensure that National Permit Discharge Elimination System (NPDES) dischargers are meeting the requirements of 40 CFR 136. NPDES discharger requests for variance from analytical protocols/methods in 40 CFR 136 will be reviewed and acted upon (i.e., accepted or rejected). The review of the variance request and final decision will be coordinated with the U.S. EPA Regional Quality Assurance Office.

VIII. DIVISION OF WASTEWATER POLLUTION CONTROL LABORATORY (OHIO EPA) QUALITY ASSURANCE REVIEW

SUMMARY

In May 1981 the Ohio EPA Division of Wastewater Pollution Control (DWPC) identified a Quality Assurance Officer (QAO) in order to institute a division-wide Quality Assurance Program. The goals of the Quality Assurance Program are to establish greater reliability and standardization of procedures for all facets of data collection and reporting. The following report describes the major activities and accomplishments of the Quality Assurance Program during its first year (1981-82).

For most parameters analyzed at the DWPC lab, levels of accuracy, precision and detection were improved in 1981-82 from historical (1980) information. Field quality control programs were instituted on a regular basis to measure sampling error and monitor field contaminations. In-house and U.S. EPA laboratory audit sample programs in place prior to 1981 were continued. Technical Assistance in the form of Performance Audit Inspections (PAI's) and the Discharge Monitoring Report-Quality Assurance (DMR-QA) Program with U.S. EPA were instituted to assist public and industrial permittees meet the analytical requirements of the NPDES program under the Clean Water Act.

INTRODUCTION

Quality Assurance Policy - The goal of the Division of Wastewater Pollution Control's (DWPC) Quality Assurance Program is to promote greater standardization of procedures for all facets of data collection and reporting used in support of the DWPC's efforts in water pollution control and abatement. To achieve these goals, the DWPC will commit 10% of its monitoring surveillance program to quality assurance activities.

Methods and policies of the Quality Assurance Program are defined in the Manual of the Division of Wastewater Pollution Control Surveillance Methods and Quality Assurance Practices (Ohio EPA, undated). Specific goals of the manual are to establish detailed and documented procedures for the collection, analysis and reporting of all water quality data. Criteria for the acceptance or rejection of data are defined and documented. Only data which meet these criteria will be accepted for use without qualification.

Laboratory Quality Control Policy - Ten percent of the samples collected will be analyzed in duplicate to establish levels of precision and ten percent will be spiked and analyzed for recovery accuracy. Control limits based on precision and accuracy will determine the acceptance or rejection of data on a daily basis. In-house, unknown quality control audits will be performed quarterly for each method of analysis.

Field Quality Control Policy - Ten percent of all samples collected will be used to determine representativeness of sampling procedures. Field samples may be split for interlaboratory comparisons. Field blanks consisting of distilled water and preservative, where appropriate, will be collected along with regular samples. The purpose of the field blank is to establish practicable detection limits and to monitor possible contaminations. All field and laboratory instruments used in the measurement of physical, chemical and biological parameters shall be properly calibrated and maintained. Records will be kept of these operations for each instrument.

Interlaboratory Quality Control Policy - Sample splitting between the DWPC Laboratory, Ohio Department of Health and other laboratories will be conducted. The DWPC Laboratory will participate in interlaboratory performance and round robin studies including those of the U.S. EPA, I.J.C. and U.S.G.S.

Quality Assurance Officer (QAO) - The QAO will review and update the DWPC Quality Assurance Programs including, performance and audit studies, and control limits for each method or practice. A program document will be prepared annually summarizing these actitivies. The program document will define the levels of quality assurance for each method or practice during the past year. The QAO will be responsible for reviewing all documentation and records pertaining to instrument calibration and maintenance.

Outside Laboratory Contracts Policy

Whenever the DWPC negotiates an analytical services contract with a laboratory independent of direct DWPC control, the Quality Assurance Officer (QAO) will: assure that the laboratory has adequate facilities and staff to perform the analytical services; require the laboratory to use only analytical procedures set forth in 40 CFR 136 - "Test Procedures for the Analysis of Pollutants" (or approved alternative test procedures) and require that the laboratory demonstrate its analytical expertise by analyzing U.S. EPA performance samples for all of the parameters to be covered in the contract and make the results available to the QAO. In addition, the QAO will outline the minimum day-to-day quality control program that the laboratory must carry out in order to document the validity of its analytical data.

DISCUSSION

DWPC Laboratory Quality Assurance Review, Chemistry Lab Capabilities - The DWPC Chemistry Laboratory analyzed 60,000 parameters in 1981. Twenty seven different methods including; oxygen demands, physical measurements, nutrients, residues and metals were performed. All methods are approved for use under the NPDES Permit system by Region V, U.S. EPA. Capabilities for the analysis of 18 additional parameters will be added in 1982 to support the analytical requirements of the 106 and 205(g) monitoring programs.

Detection Limits - Detection limits are defined as the minimum value for a parameter distinguishable from zero. In most cases the calculated analytical detection limit was improved from 1981-82 (Appendix 4, Table 1). The most notable improvements occurred for Total Lead and Ammonia-Nitrogen Analyses. This is due to the increasing experience of new chemists on staff.

Control Limits

Control limits of precision and in most cases, accuracy were established for each parameter on a quarterly basis beginning in 1981 (Appendix 4, Table 2). The 95 percent confidence level was chosen as the criterion by which to accept and reject analytical water chemistry data. This results in the rejection of approximately 4 to 6 percent of all laboratory results over time.

Control limits are calculated using "Shewhart Equations" (Shewhart, 1922), originally developed for monitoring product quality control in production processes. Percent Recovery of spiked samples defines levels of accuracy, while results of duplicate (split sample) analyses define laboratory precision (replicability).

The precision and accuracy of most analyses improved in 1981 from levels back calculated for 1980. The reason for improvement was the definition of maximum acceptable limits for duplicate and spiked samples (95% Confidence Interval Estimate, CIE) previously not calculated. The definition of control limits in 1981 set constraints upon chemist and data quality, leading to the rejection of unacceptable results more frequently.

AUDIT ANALYSES

Quarterly audit samples are analyzed for each parameter and method in the laboratory. Audit samples are standards of unknown concentration. The QAO reviews the results against the known values and acceptance ranges. Results for 1980-81 are presented in Appendex 4, Table 3. This program needs to acquire greater standardization, such that samples are distributed quarterly rather than sporadically as in the past.

Percent Recoveries for most audit sample concentrations near the method detection limit were beyond acceptable ranges defined by accuracy charts. This is the expected outcome, as the coefficient of variation and standard deviation for both accuracy and precision increase quickly as the detection limit is approached. The level quantification for each parameter is suggested as ten times its detection limit value. Several quarterly in-house audit samples were completed unacceptably in 1980 and 1981. After eliminating unacceptable recoveries of concentrations near the detection limit, problems were noted in Total Filterable Residues, low level automated Chemical Oxygen Demand and Nitrate-Nitrogen. Review of the procedures was made to determine the cause and corrective action was taken. All COD's are now run using the reflux-titration method.

External audit samples were supplied in 1981 by U.S. EPA in Performance Study WP-007. The results are in Appendix 4, Table 4. Two parameters, automated COD (low level) and Total Chromium (both levels) were rated unacceptable. A new matrix modification procedure for Total Chromium was instituted to correct the problems.

Field Quality Assurance Review - A field quality assurance program was instituted for all chemical-physical parameters collected by the DWPC in 1981. A minimum of 10 percent of all samples were collected in duplicate to assess representativeness of chemical-sampling. Approximately 2 percent were submitted as field blanks to determine the presence of contaminants.

The Bio-Monitoring Section of the DWPC manages their own field quality control program to ensure sampling representativeness. These procedures are described in detail in the DWPC Quality Assurance Manual of Methods and Practices.

Chemical-Physical Field Quality Assurance Review - The purpose of the field duplicate is to assess representativeness of sampling. Samples are collected simultaneously as two discreet sets, rather than being collected as one sample, homogenized, and split as in the laboratory. Appendix 4, Table 5 identifies levels of precision for each parameter derived from field duplicate results of all 1981 stream sampling conducted by the DWPC. The maximum allowable difference between any pair of duplicate samples is defined as the Upper Control Limit (UCL). When duplicate sample differences exceed the UCL, the sampling conducted on that day or at that site may be considered unrepresentative. The reasons for poor agreement should be determined. If poor duplicate agreement is found to occur at a frequency of greater than approximately 5 percent, the sampling technique should be changed to reduce sources of error. Duplicate field sample differences may be expected to exceed the UCL, e.g. during sampling periods with exceptionally high stream flow and or high sediment run off. Sampling procedures may need to be modified to adjust to these conditions. Data tabulated in Appendix 4, Table 5 from the 1981 field samples will be used to determine quality control for 1982 stream samples.

Field blanks contain distilled water and preservative when needed. Field blanks are opened and preserved in the field. The field blank monitors souces of field contamination. Percentages of field blanks which exceeded the parameter detection limit are listed in Appendix 4, Table 6 along with the means and ranges.

The most notable field contamination problems in 1981 were copper, lead and mercury. A mercury contamination problem from June through November 1981 occurred in samples collected in all Ohio EPA Districts. The worst levels appeared to be from samples originating in the Northeast and Northwest Districts. Any Mercury data collected from June through December 1981 should be held suspect. All ambient monthly and quarterly monitoring data from NAWQMS and Ohio EPA stations for Mercury were deleted from the STORET system. Appendix 4, Table 7 compares the frequency distributions of Total Mercury violations from January 1979 through May 1981 to those from June through November 1981. A large increase in Mercury violations can be detected from June through December 1981.

Ammonia is a common contaminant of distilled water, and values in Appendix 4, Table 5 indicate Ammonia concentrations of up to 1.0 mg/l can occur. However, this contamination would not occur in natural stream water samples due to the presence of the carbonate buffering system in most surface waters. Field blanks will typically contain low but detectable levels of free Ammonia.

In 1982, field blanks should be collected whenever a mercury analysis is requested. Clean storage of cubitainers and preservatives should be a priority. Cubitainers and lids should be rinsed with a small volume of sample prior to collection to remove any possible sources of contamination. This procedure should not be used when oil and grease are visibly present or suspected.

Coordination with Ohio Department of Health Laboratory (ODHL) - Monthly review of precision and accuracy control charts from the Sanitary Chemistry Section of ODHL has been ongoing since 1980. Quarterly audit reports and yearly U.S. EPA audit studies are reviewed and problems, when encountered, are discussed with the ODHL Quality Assurance Officer.

Appendix 4, Table 8 lists detection limits from 1976 through 1981 for both organic and conventional analyses performed by ODHL in support of DWPC programs. In 1982 all conventional analyses performed by ODHL will be analyzed by the DWPC laboratory. Organic analytical services will continue to be provided to the DWPC by the Industrial Chemistry Section of ODHL.

TECHNICAL ASSISTANCE OUTSIDE THE DWPC

A Performance Audit Inspection program (PAI) was instituted for the purpose of augmenting the compliance evalution and sampling programs carried out by the DWPC. Four PAI inspections were performed in 1981. In 1982, 36 inspections are planned for both public and industrial NPDES permittee laboratories. Assistance from the staff of the DWPC Chemistry Laboratory is available to complete the 1982 projected goal of 36 PAI inspections.

The QAO will act as State Coordinator for the 1982 DMR-QA program. Follow-up activities for all DMR-QA participants who scored below the 60% sucess level will be initiated. PAI inspections will be coordinated with the DMR-QA program results.

Information concerning approved analytical test methods for use under the NPDES system is provided to the public upon request. Thirty five requests were filled in 1981.

REFERENCES

Board on Unreclaimed Strip Mined Lands and Department of Natural Resources State of Ohio. 1974. Land Reborn. State of Ohio. 91 pp.

International Joint Commission (I.J.C.). 1972. Great Lakes Water Quality. Agreement, with Annexes and Texts and Terms of Reference, Between the United States of America and Canada. Signed at Ottawa April, 15, 1972. With Appendix I dated November 31, 1972. pp.75.

International Joint Commission (I.J.C.). 1978. Great Lakes Water Quality. Agreement of 1978. Agreement with Annexes and Terms of Reference, Between the United States of America and Canada. Signed at Ottawa November 22, 1978. pp.52.

Loftis, J.C., and R.C. Ward. 1979. Regulatory water quality monitoring networks - statistical and economic considerations. U.S. Environmental Protection Agency, Office of Research and Development, Las Vegas, Nevada. 89 pp.

Moss, M.E., D.P. Lettenmaier, and E.F. Wood. 1978. On the design of hydrologic data networks. EOS, Transactions American Geophysical Union 59(8): 772-775.

National Academy of Sciences. 1977. Analytical studies for the U.S. Environmental Protection Agency, Volume 4, Environmental Monitoring. National Academy of Sciences, Washington, D.C. 199 pp.

Ohio Environmental Protection Agency. 1975. Compliance monitoring guidelines, Ohio EPA, Division of Wastewater Pollution Control, September 1975.

Ohio Environmental Protection Agency. 1981. Ohio 5-year Surface Water Monitoring Strategy (1983-1987).

Ohio River Valley Water Sanitation Compact. June 30, 1948. pp.12.

Ohio River Valley Water Sanitation Commission. July 1980. Assessment of Water Quality Conditions - Ohio River Mainstem 1978-9. Ohio River Valley Water Sanitation Commission. Cincinnati, Ohio. 108 pp.

Ohio River Valley Water Sanitation Commission. 1973. Water Quality Monitoring Strategy for the Ohio River and Lower Reaches of Major Tributaries. Ohio River Valley Water Sanitation Commission. Cincinnati, Ohio. pp. 97.

State Managment Assistance Program Delegation Agreement between U.S. EPA and Ohio EPA. June 1981. n.p.

U.S. Environmental Protection Agency. 1973. Biological Field and Laboratory Methods for Measuring the Quality of Surface Waters and Effluents. EPA-670/4-73-001, July 1973. C.I. Weber, Editor. n.p.

(continued)

U.S. Environmental Protection Agency. (1975a). Model State Water Monitoring Program. Office of Water and Hazardous Materials, Monitoring and Data Support Division. EPA 440/9-74-002. Washington, D.C.: U.S. Environmental Protection Agency. n.p.

U.S. Environmental Protection Agency. 1977. Basic water monitoring program - Developed by the standing working group on water monitoring. U.S. EPA, Washington, D.C. 51 pp.

U.S. Geological Survey. 1981 (published annually). Index of current water resources activities in Ohio.

U.S. Geological Survey. Geological Survey Circular 719. The national stream quality accounting network (NASQAN) - some questions and answers.

Ward, R.C. 1979. Regulatory water quality monitoring: a systems perspective. Water Resour. Bull. 15:369-380.

APPENDIX 1

Biological Criteria Tables

Table 1. Biological criteria (macroinvertebrate) for determining aquatic life use designations and attainment of Clean Water Act goals (March 1981).

	---------- CWA GOALS MET ----------		---------- CWA GOALS NOT MET ----------	
Evaluation Class Category	"Exceptional" Class I (EWH)	"Good" Class II (WWH)	"Fair" Class III	"Poor" Class IV
1.	Pollution sensitive species abundant	Pollution sensitive species present in moderate numbers	Pollution sensitive species present in low numbers	Pollution sensitive species absent
2.	Intermediate species present in low numbers	Intermediate species present in moderate numbers	Intermediate species abundant	Intermediate species present in low numbers or absent
3.	Tolerant species present in low numbers	Tolerant species present in low numbers	Tolerant species present in moderate numbers	Tolerant species abundant (all types may be absent if extreme toxic conditions exist)
4.	Number of taxa > 30	Number of taxa 25-30	Number of taxa 20-25	Number of taxa < 20
5.	Exceptional diversity Shannon index > 3.5	High diversity Shannon index 2.9-3.5	Moderate diversity Shannon index 2.3-2.9	Low diversity Shannon index < 2.3

Table 2. Biological criteria (fish) for determining aquatic life use designations and attainment of Clean Water Act goals (November 1980).

	---------- CWA GOALS MET ----------		---------- CWA GOALS NOT MET ----------	
Evaluation Class Category	"Exceptional" Class I (EWH)	"Good" Class II (WWH)	"Fair" Class III	"Poor" Class IV
1.	Exceptional, or unusual assemblage of species	Usual association of expected species	Some expected species absent, or in very low abundance	Most expected species absent
2.	Sensitive species abundant	Sensitive species present	Sensitive species absent, or in very low abundance	Sensitive species absent
3.	Exceptionally high diversity	High diversity	Declining diversity	Low diversity
4.	Composite index >9.0 - 9.5	Composite index >7.0 - 7.5, <9.0 - 9.5	Composite index >4.5 - 5.0, <7.0 - 7.5	Composite index <4.5 - 5.0
5.	Outstanding recreational fishery		Tolerant species increasing, beginning to dominate	Tolerant species dominate
6.	Rare, endangered, or threatened species present			

Conditions: Categories 1, 2, 3 and 4 (if data is available) must be met and 5 or 6 must also be met in order to be designated in a particular class.

Key for Appendices 2A and 2B - Major Dischargers

Facility

Facility name and division/plant are given.

Stream Network

Stream network numbers are taken from the Ohio LEAPS Data System. The assigned LEAPS stream numbers are used to describe a discharge network, i. e., the sequence of streams through which a discharge flows.

Facility Number

Top Number - Ohio EPA LEAPS Facility Number.

Lower Number - U.S. EPA/Ohio EPA NPDES Permit Number.

Receiving Stream

The receiving stream is the name of the stream that receives effluent from a discharger. The second and third stream of a discharge stream network may also be given.

RM

River mile - miles from the mouth.

Basin

Top Line - The Ohio Groundwater Basin Map Name (Ohio Department of Natural Resources - ODNR - 1975) followed by the Ohio EPA PEMSO Data System Basin Number.

Second Line - The Ohio Groundwater Subbasin Map Code (ODNR 1975) followed by the Ohio EPA PEMSO Data System Subbasin Codes (in parentheses).

* - Dischargers present only on the 1981 Major Discharger List.
** - Dischargers present only on the 1982 Major Discharger List.

Ohio Department of Natural Resources. 1975. "Publications, Division of Water". p. 6.

APPENDIX 2A

Major Industrial Dischargers FY '81 and FY '82

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
	SOUTHEAST DISTRICT INDUSTRIAL		
Allied Chemical Corp. Semet Solvay Div. 53 30	0IF00014 0H0007544 --	Ice Cr. Ohio R. --	SE Trib - 09 N-05 (0107, 0108, 0109)
Ashland Oil, Inc. Allied Plant 50	0IF00000 0H0007714 --	Ohio R. 318.20 --	-- -- --
Columbus & Southern Ohio Electric Conesville Generating Station 55 04	0IB00013 0H0005371 --	Muskingum R. Ohio R. --	Musk. - 17 P-11 (0102) --
Dayton Power & Light Co. J.M. Stuart Generating Station 50	0IB00049 0H0004316 --	Ohio R. -- --	-- -- --
Dover Chemical Corp. Subsidiary of ICC Industries, Inc. 55 04 580 160	0IF00040 0H0007269 --	Sugar Cr. 2.10 Tuscarawas R.	Musk. - 17 P-05 (0310, 0311)
Elkem Metals Marietta Plant 50 Formerly Union Carbide Ferro Alloy	0ID00001 0H0004006 --	Ohio R. 176.7 --	-- -- --
Empire Detroit Steel Div. of Cyclops Corp. 55 04 580	0ID00036 0H0004910 --	Tuscarawas R. 56.40 Muskingum R.	Musk. - 17 P-08 (0310, 0311)
Gould, Inc. Clevite Engine Parts Div. 55 04	0IC00000 0H0048372 --	Muskingum R. 50.00 Ohio R.	Musk. - 17 P-16 (0102) --
Gould, Inc. Foil Div. 55 04	0IC00011 0H0048364 --	Muskingum R. 51.10 Ohio R.	Musk. - 17 P-16 (0102) --
Ironton Coke Corp. McClouth Steel Corp. 50	0IF00015 0H0007579 --	Ohio R. -- --	-- -- --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
National Steel Corp. Weirton Steel Div. 56 33	0ID00032 0H0010774 --	Wells Run Ohio R. --	C. Trib - 06 S-2 (0102 - 0104)
New Boston Coke Corp. Portsmouth/New Boston Facility 50 Formerly Empire Detroit Steel	0ID00012 0H0006068 -- --	Ohio R. -- -- --	-- -- -- --
Ohio Edison Burger Plant 50	0IB00002 0H0001592 --	Ohio R. -- --	-- -- --
Ohio Edison Sammis Plant 50	0IB00010 0H0011525 --	Ohio R. -- --	-- -- --
Ohio Power Co. Cardinal Station 50	0IB00009 0H0012581 --	Ohio R. 76.50 --	-- -- --
Ohio Power Company Muskingum River Plant 55 70	0IB00003 0H0006149 --	Muskingum R. Ohio R. --	Musk. - 17 P-19 (0101, 0102)
Ohio Valley Electric Corp. Kyger Creek Generating Station 53 90	0IB00005 0H0005282 --	Kyger Cr. Ohio R. --	SE Trib - 09 N-02 (0105, 0106)
Ormet Corp. Reduction Div. 50	0IE00005 0H0011550 --	Ohio R. 117.00 --	-- -- --
Shell Oil Co. Shell Chemical Co. 54 70	0IF00008 0H0007030 --	Davis Cr. Ohio R. 188.60	Musk. - 17 P-19 (0101, 0102)
Stone Container Corp. Paperboard Div. 55 04 580	0IA00005 0H0004235 --	Tuscarawas R. 0.70 Muskingum R.	Musk. - 17 P-10 (0310) --
The Mead Corp. Chillicothe Mills of Mead Paper 53 10 320	0IA00002 0H0004481 --	Paint Cr. 3.30 Scioto R.	Scioto - 02 M-12 (0105) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Union Camp Corp. Chemical Div. 55 04 580	0IF00041 0H0007196 --	Tuscarawas R. Muskingum R. --	Musk. - 17 P-08 (0310, 0311)
Universal-Cyclops Steel Corp. Specialty Steel Div. 55 04	0ID00014 0H0004260 --	Muskingum R. 105.10 Ohio R.	Musk. - 17 P-11 (0102) --
United States Steel Corp. USS Chemicals 50	0IF00009 0H0007391 --	Ohio R. 332.00 --	-- -- --
Wheeling-Pittsburgh Steel Steubenville North Plant 56 33	0ID00033 0H0011347 --	Wells Run Ohio R. --	C. Trib - 06 S-2 (0102 - 0104)
Wheeling-Pittsburgh Steel Corp. Steubenville South Plant 50	0ID00034 0H0011355 --	Ohio R. 70.80 --	-- -- --
Wheeling-Pittsburgh Steel Corp. Martins Ferry Plant 50	0IC00020 0H0011339 --	Ohio R. 87.70 --	-- -- --
Wheeling-Pittsburgh Steel Yorkville Plant 50	0ID00035 0H0011371 --	Ohio R. 83.60 --	-- -- --

SOUTHWEST DISTRICT INDUSTRIAL

Armco Steel Corp. Middletown Works 51 13 120	1ID00001 0H0009997 --	Dicks Cr. Gr. Miami R. Ohio R.	G Miami - 14 H-09 (0106) --
Armco Steel Corp. New Miami Mill 51 13	1ID00002 0H0009989 --	Gr. Miami R. 43.40 Ohio R.	G Miami - 14 H-09 (0106) --
Cincinnati Gas and Electric Miami Fort Station 50	1IB00001 0H0009873 --	Ohio R. -- --	-- -- --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Cincinnati Gas and Electric Walter C. Beckjord Station 50	1IB00000 OH0009865 --	Ohio R. -- --	-- -- --
Crystal Tissue Co. Middletown Mill 51 13	1IA00000 OH0009539 --	Gr. Miami R. 47.20 Ohio R.	G Miami - 14 H-09 (0106) --
Dayton Power and Light Co. Frank M. Tait Station 51 13	1IB00003 OH0009245 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
Dayton Power and Light Co. O. H. Hutchings Station 51 13	1IB00004 OH0009261 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
Gulf Oil Co. Cincinnati Refinery 51 13	1IG00000 OH0009326 --	Gr. Miami R. 8.50 Ohio R.	G Miami - 14 H-11 (0107) --
Monsanto Co. Plastics and Petrochemicals 50	1IF00001 OH0009946 --	Ohio R. 484.10 --	-- -- --
**P. H. Glatfelter Co. Ohio Mill 51 13 formerly Bergstrom Paper	1IA00004 OH0009377 --	Gr. Miami R. 71.40 Ohio R.	G Miami - 14 H-09 (0106) --
Pentair Industries Inc. Miami Paper Corp. 51 13 050	1IA00007 OH0009784 --	Owl Cr. Gr. Miami R. Ohio R.	-- -- --
NORTHWEST DISTRICT INDUSTRIAL			
Brush Wellman, Inc. -- 64 70	2IE00000 OH0002518 --	Portage R. 17.20 Lake Erie	Portage - 16 B-2 (0103, 0106)
Cyclops Corp. Empire Detroit Steel Div. 55 04 590 120 060 010	2ID00003 OH0006840 --	Rocky Fork 15.25 Black Fork	Musk. - 17 P-01 (0209) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
General Motors Corp. Central Foundry Div. 64 10	2IN00004 OH0002666 --	Maumee R. 61.10 --	Maumee - 04 A-10 (0103) --
*Gulf Oil Co. Toledo Refinery 64 10	2IG00004 OH0002810 --	Maumee R. 1.60 Maumee Bay	Maumee - 04 A-12 (0114, 010, 0113)
Hooker Chemical and Plastics Durez Div. 53 10 800	2IF00002 OH0006769 --	Taylor Cr. 2.80 Scioto R.	Scioto - 02 M-01 (0212) --
J.H. Routh Packing Co. -- 65 47 050	2IH00010 OH0001643 --	Mills Cr. 0.80 Sandusky Bay	Sand. - 05 D-1 (0102, 0107)
Libby-Owens Ford Co. Plants 4 and 8 64 10	2IN00020 OH0002445 --	Maumee R. Maumee Bay --	Maumee - 04 A-12(0114, 0113)
Mansfield Products Co. White-Westinghouse Corp. 55 04 590 120 060 010	2IC00003 OH0004600 --	Rocky Fork Black Fork --	Musk. - 17 P-01 (0209) --
Ohio Decrative Prod. -- 64 10 240 200	2IC00018 OH0002852 --	Sixmile Cr. Auglaize R. --	-- -- --
Standard Oil Co. Lima Refinery 64 10 240 150	2IG00001 OH0002623 --	Ottawa R. 37.04 Auglaize R.	Maumee - 04 A-04 (0108) --
Standard Oil Co. of Ohio Toledo Refinery 64 12	2IG00007 OH0002461 --	Otter Cr. Maumee Bay --	Portage - 16 B-3 (0103, 0106)
Sun Petroleum Products Co. of Pennsylvania 64 12	2IG00003 OH0002763 --	Otter Cr. 5.40 Maumee Bay	Portage - 16 B-3 (0103, 0106)
Toledo Edison Co. Bayshore Station 60	2IB00000 OH0002925 --	Lake Erie -- --	-- -- --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Toledo Edison Co. David Besse Nuclear Station 60	2IB00011 OH0003786 --	Lake Erie -- --	-- -- --
Vistron Corp. Standard Oil Co. 64 10 240 150	2IF00004 OH0002615 --	Ottawa R. 36.85 Auglaize R.	Maumee - 04 A-04 (0108) --
Whirlpool Corp. Clyde Div. 65 18	2IC00008 OH0000965 --	Raccoon Cr. 11.00 Sandusky Bay	Sand. - 05 D-1 (0102, 0107)
Whirlpool Corp. Marion Facility 53 10 710 012	2IC00009 OH0007358 --	Rock Swale Ditch 2.31 L. Scioto R.	Scioto - 02 M-02 (0212) --

NORTHEAST DISTRICT INDUSTRIAL

Ashland Oil Inc. Ashland Petroleum Co. 55 04 580 210 030	3IG00000 OH0005657 --	Nimishillen Cr. Sandy Cr. Tuscarawas R.	Musk. - 17 P-07 (0314) --
Browning Ferris Industries -- 56 70 030	3IM00012 OH0063223 --	N. Fk. L. Beaver L. Beaver Cr. Ohio R.	L Beav. - 08 S-1 (0101) --
Chase Bag Co. -- 67 19	3IA00000 OH0000400 --	Chagrin R. -- --	Chagrin - 15 E-03 (0101) --
*Chemline Corp. Lisbon Plant 56 70 070	3IN00017 OH0051799 --	W. Fk. Beaver Cr. 5.40 L. Beaver Cr.	L Beav. - 08 S-1 (0101) --
Cleveland Electric Illum. Co. Avon Lake Plant 60	3IB00002 OH0001112 --	Lake Erie -- --	-- -- --
Cleveland Electric Illum. Co. Eastlake Plant 60	3IB00003 OH0001139 --	Lake Erie -- --	-- -- --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Cleveland Electric Illum. Co. Lakeshore Plant 60	3IB00004 OH0001147 --	Lake Erie -- --	-- -- --
Cleveland Elec. Illuminating Co. Ashtabula Plant 60	3IB00012 OH0001121 --	Lake Erie -- --	-- -- --
Copperweld Steel Co. Steel Bar Div. 57 03	3ID00050 OH0011207 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
Diamond Shamrock Chemical Co. Research Dept. Semi-Wk 69 21 010	3IF00002 OH0029149 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3 (0102, 0103)
E.I. DuPont, Inc. Chemicals, Dyes and Pigments 66 18	3IE00005 OH0000990 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
Ford Motor Co. Cleveland Manufacturing Complex 66 18 040	3IS00027 OH0001228 --	Big Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
G & W Natural Resources Group Chemical Div. - Titanium 69 21 010	3IE00017 OH0000493 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3 (0102, 0103)
*General Electric Co. Mahoning Glass Plant 57 03 140	3IN00020 OH0011231 --	Mosquito Cr. -- --	Mahon. - 18 T-3 (0102) --
*General Electric Co. Niles Glass Plant 57 03 140	3IN00021 OH0011223 --	Mosquito Cr. -- --	Mahon. - 18 T-3 (0102) --
General Motors Corp. Fisher Body Div. 65 86	3IS00001 OH0000272 --	Black R. -- --	Black - 20 D-4 (0101, 0103)
General Tire & Rubber Co. Chemical Plastics Div. 69 21 010	3IF00006 OH0002283 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3 (0102, 0103)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Harshaw Chemical Co. Div. of Kewanee Oil Co. 66 18	3IE00006 OH0000655 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
IMC Chemical Group, Inc. Chlorine-Alkali Plant 60	3IE00016 OH0000752 --	Lake Erie -- --	-- -- --
Jones & Laughlin Steel Corp. Cleveland Works Div. 66 18	3ID00017 OH0000850 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
J & L Steel Struthers Plant 57 03 Formerly Youngstown Sheet and Tube Co.	3ID00034 OH0063207 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
J & L Steel Campbell Works (J & L Steel) 57 03 Formerly Youngstown Sheet and Tube Co.	3ID00036 OH0011321 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
J & L Steel Brier Hill Plant #2 57 03 Formerly Youngstown Sheet and Tube Co.	3ID00037 OH0011312 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
Ohio Edison Co. Gorge Plant 66 18	3IB00006 OH0000213 --	Cuyahoga R. -- --	Cuyahog - 19 E-01 (0101, 0105)
Ohio Edison Co. Niles Plant 57 03	3IB00007 OH0011533 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
Olin Corp. Olin Plastics - TDI Plant 69 21 010	3IF00014 OH0001376 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3 (0102, 0103)
PPG Industries, Inc. Chemical Div. 55 04 580	3IE00010 OH0005177 --	Tuscarawas R. 123.60 Muskingum R.	Musk. - 17 P-06 (0310) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Packaging Corp. of America Paperboard Products Div. 55 04 580 290 040	3IA???03 OH0006718 --	R. Styx 0.70 Chippewa Cr.	Musk. - 17 P-06 (0310) --
RMI Co. Sodium Chloride Plant 69 21 010	3IE00012 OH0002313 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3(0102, 0103)
Republic Steel Central Alloy Division 55 04 580 210 030 020 020	3ID00000 OH0006912 --	E. Br. Sandy Cr. Mdl. Br. Nimishillen Cr.	Musk. - 17 P-07 (0314) --
Republic Steel Corp. Masillon Plant 55 04 580	3ID00002 OH0006939 --	Tuscarawas R. Muskingum R. --	Musk. - 17 P-08 (0310, 0311)
Republic Steel Corp. Cleveland District 66 18	3ID00003 OH0000957 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
Republic Steel Corp. Mahoning Valley District 57 03	3ID00004 OH0011274 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
Republic Steel Corp. Mahoning Valley District 57 03	3ID00006 OH0011282 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
S C M Corp. Glidden Durkee Div. 69 21 010	3IE00013 OH0000523 --	Fields Brook Ashtabula R. --	Ashtab. - 07 F-3 (0102, 0103)
Thomas Steel Strip Corp. Strip Div. 57 03 175 050	3IC00056E. OH0011363 --	Br. Duck Cr. -- --	Mahon. - 18 T-3 (0102) --
Union Carbide Corp. Metals Division 60	3IN00036 OH0000027 --	Lake Erie -- --	-- -- --
U.S. Steel Corp. Lorain-Cuyahoga Works 65 86	3ID00028 OH0001562 --	Black R. Lake Erie --	Black - 20 D-4 (0101, 0103)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
*U.S. Steel Corp. Youngstown Works 57 03	3ID00027 OH0011916 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
*U.S. Steel Corp. McDonald Mills 57 03	3ID00029 OH0063215 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
CENTRAL DISTRICT INDUSTRIAL			
Container Corp. of America Circleville Plant 53 10	4IA00000 OH0005681 --	Scioto R. 95.70 Ohio R.	Scioto - 02 M-08 (0101, 0201)
Crown Zellerbach Corp. Gaylord Container Div. 53 10 450 060	4IA00001 OH0004961 --	PawPaw Creek, Walnut Creek Scioto R.	Scioto - 02 M-09 (0208) --
E.I. DuPont de Nemours and Co. Coating and Resins Div. 53 10	4IF00001 OH0006327 --	Scioto R. 91.80 Ohio R.	Scioto - 02 M-08 (0101, 0201)
Owens Illinois, Inc. TV Products Div. 53 10	4IN00032 OH0006971 --	Scioto R. Ohio R. --	Scioto - 02 M-08 (0101, 0201)
PPG Industries, Inc. Coating and Resins Div. 53 10 390 3 10 430	4IF00002 OH0004251 -- --	Scippo Cr. Scioto R. -- Scioto R.	Scioto - 02 M-08 (0101, 0201) --

APPENDIX 2B

Major Municipal Dischargers FY '81 and FY '82

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
	SOUTHEAST DISTRICT MUNICIPAL		
City of Athens Service Directors Office 54 50	OPD00000 OH0023931 --	Hocking R. Ohio R. --	Hocking - 01 O-3 (0101) --
Belmont Co. Sewer Authority #1 -- 50	OPQ00000 OH0049999 --	Ohio R. 90.20 --	-- -- --
City of Cambridge Sewage Treatment Plant 55 04 560	OPD00020 OH0024309 --	Wills Cr. 58.90 Muskingum R.	Musk. - 17 P-18 (0105) --
City of Chillicothe Easterly STP 53 10	OPD00003 OH0024406 --	Scioto R. Ohio R. --	Scioto - 02 M-11 (0101) --
City of Coshocton Sewage Control Plant 55 04	OPD00004 OH0024775 --	Muskingum R. Ohio R. --	Musk. - 17 P-11 (0102) --
City of Dover Mayor and Council 55 04 580	OPD00005 OH0024945 --	Tuscarawas R. 55.50 Muskingum R.	Musk. - 17 P-08 (0310, 0311)
City of Ironton Sewage Treatment Plant 50	OPD00007 OH0025852 --	Ohio R. 326.70 --	-- -- --
City of Jackson Wastewater Plant Mayor and Council 53 10 270 020	OPD00008 OH0020834 --	L. Salt Cr. 21.20 Salt Cr.	Scioto - 02 M-16 (0104) --
City of Logan Wastewater Treatment Plant 54 50	OPD00009 OH0023388 --	Hocking R. 67.78 Ohio R.	Hocking - 01 O-2 (0102) --
City of Marietta Div. of Water and Sewer 50	OPD00016 OH0026344 --	Ohio R. 172.00 --	-- -- --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of New Philadelphia Mayor and Council 55 04 580	OPD00012 OH0026727 --	Tuscarawas R. 50.70 Muskingum R.	Musk. - 17 P-10 (0310) --
City of Portsmouth Sewage Treatment Plant 50	OPD00013 OH0027197 --	Ohio R. 35.70 --	-- -- --
City of Steubenville Mayor and Council 50	OPD00014 OH0027511 --	Ohio R. 65.20 --	-- -- --
City of Wellston Sewage Treatment Plant 53 70 140	OPC00013 OH0023507 --	L. Raccoon Cr. Raccoon Cr. Ohio R.	SE Trib - 09 N-02 (0105, 0106)
*City of Wellston Wastewater Plant Office of City Clerk 53 70 140	OPD00018 OH0059056 --	L. Raccoon Cr. 2.00 Raccoon Cr.	SE Trib - 09 N-02 (0105, 0106)
City of Zanesville Utilities Dept. 55 04	OPE00000 OH0028240 --	Muskingum R. 70.50 Ohio R.	Musk. - 17 P-16 (0102) --
Twin City Water & Wastewater Dept. Sewage Treatment Plant 55 04 580 110	OPD00015 OH0020079 --	Stillwater Cr. 3.10 Tuscarawas R.	Musk. - 17 P-09 (0312) --

SOUTHWEST DISTRICT MUNICIPAL

Butler County Regional STP Lesourdsville 51 13	1PK00011 OH0049417 --	Gr. Miami R. Ohio R. --	G Miami - 14 -- --
City of Bellefontaine Sewage Treatment Plant 51 13 350 010 010	1PD00000 OH0024066 --	Opossum Run 3.50 --	G Miami - 14 H-01 (0110, 0111)
City of Cincinnati Metropolitan Sewer District 51 40	1PM00001 OH0025461 --	Mill Cr. Ohio R. 472.50	Mill Cr - 23 J --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Cincinnati Metropolitan Sewer District 50	1PL00000 OH0025453 --	Ohio R. 465.10 --	-- -- --
City of Dayton WWTP Water Dept. 51 13	1PF00000 OH0024881 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
City of Englewood Water and Sewage Dept. 51 13 200	1PD00001 OH0025011 --	Stillwater R. 8.70 --	G Miami - 14 H-06 (0104) --
City of Fairborn Sewage Treatment Plant 51 13 190	1PD00002 OH0025062 --	Mad R. 9.20 Gr. Miami R.	G Miami - 14 H-04 (0101, 0111, 0113)
City of Fairfield Safety-Service Director 51 13	1PD00003 OH0025071 --	Gr. Miami R. 31.00 Ohio R.	G Miami - 14 H-11 (0107) --
City of Franklin Miami Conservancy District 51 13	1PD00004 OH0025275 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
City of Greenville Sewage Treatment Plant 51 13 200 100	1PD00005 OH0025429 --	Greenville Cr. 19.30 --	G Miami - 14 H-07 (0104) --
City of Hamilton Dept. of Public Utilities 51 13	1PE00002 OH0025445 --	Gr. Miami R. 33.00 Ohio R.	G Miami - 14 H-11 (0107) --
City of Lebanon (Warren Co. SW Regional) 52 11 160	1PC00003 OH0021059 --	Turtle Cr. 6.20 L. Miami R.	L Miami - 11 K-5 (0105) --
City of Miamisburg Water and Sewer Div. 51 13	1PD00017 OH0026492 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
City of Middletown Dept. of Public Utilities 51 13	1PE00003 OH0026522 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Oxford Utilities Dept. 51 13 110	1PD00007 OH0026930 --	Fourmile Cr. 16.40 Gr. Miami R.	G Miami - 14 H-10 (0105) --
City of Piqua STP Utilities Dept. 51 13	1PD00008 OH0027049 --	Gr. Miami R. 111.90 --	G Miami - 14 H-02 (0101) --
City of Sidney Sewage Treatment Plant 51 13	1PD00009 OH0027421 --	Gr. Miami R. 127.78 --	G Miami - 14 H-02 (0101) --
City of Springfield Water Pollution Control Dept. 51 13 190	1PE00007 OH0027481 --	Mad R. 24.70 Gr. Miami R.	G Miami - 14 H-04 (0101, 0111, 0113)
City of Troy Div. of Sanitation 51 13	1PD00019 OH0027758 --	Gr. Miami R. 103.50 --	G Miami - 14 H-05 (0101, 0111, 0113)
City of Urbana Service Dept. 51 13 190	1PD00011 OH0027880 --	Mad R. 27.50 Gr. Miami R.	G Miami - 14 H-03 (0113) --
City of Vandalia Div. of Engineering 51 13	1PD00012 OH0027901 --	Gr. Miami R. 92.50 --	G Miami - 14 H-05 (0101, 0111, 0113)
City of West Carrollton Sewage Treatment Plant 51 13	1PD00014 OH0020133 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
City of Wilmington Dept. of Public Service 52 11 190 090	1PD00013 OH0028134 --	Lytle Cr. 5.00 L. Miami R.	L Miami - 11 K-3 (0103) --
City of Xenia Dept. of Utilities 52 11	1PD00015 OH0028193 --	L. Miami R. 72.00 --	L Miami - 11 K-1 (0101) --
City of Xenia Dept. of Utlities 52 11 270	1PD00016 OH0028207 --	Glady Run 6.50 L. Miami R.	L Miami - 11 K-1 (0101) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Clark Co. Commissioners Southwest Regional WWTP 51 13 190	1PK00013 OH0049794 --	Mad R. Gr. Miami R. --	G Miami - 14 H-04 (0101, 0111, 0113)
Clermont Co. Commissioners Middle East Fork Regional 52 11 050	1PK00009 OH0049379 --	E. Fk. L. Miami R. L. Miami R. --	L Miami - 11 K-4 (0104) --
Clermont Co. Commissioners Amelia-Batavia Regional 52 11 050	1PK00010 OH0049387 --	E. Fk. L. Miami R. 8.20 L. Miami R.	L Miami - 11 K-4 (0104) --
Greene Co. Commissioners Beaver Cr. Sewage Treatment Pl, 52 11 290	1PK00003 OH0025381 --	Beaver Cr. L. Miami R. --	L Miami - 11 K-1 (0101) --
Greene Co. Commissioners Board of Co. Commissioners 52 11	1PK00014 OH0040592 --	L. Miami R. -- --	L Miami - 11 K-1 (0101) --
Hamilton Co. Commissioners Met. S.D. of Greater Cincinnati 50	1PK00006 OH0025470 --	Ohio R. -- --	-- -- --
Hamilton Co. Commissioners Wastewater Treatment Plant 52 11 070	1PK00005 OH0025488 --	Sycamore Cr. L. Miami R. --	L Miami - 11 K-5 (0105) --
Kettering Montgomery Co. Sanitary Dept. 52 11 290 040	1PL00001 OH0026590 --	L. Beaver Cr. 5.50 L. Miami R.	L Miami - 11 K-1 (0101) --
Montgomery Co. W. Reg. WWTP Sanitary Engineering Dept. 51 13	1PL00002 OH0026638 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-09 (0106) --
Ohio Suburban Water Co. Sewage Treatment Plant 51 13	1PS00000 OH0049298 --	Gr. Miami R. Ohio R. --	G Miami - 14 H-05 (0101, 0111, 0113)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
	NORTHWEST DISTRICT MUNICIPAL		
City of Ashland Wastewater Treatment Plant 55 04 590 120 040 040 010	2PD00010 OH0023906 --	Lang Cr. 4.00 Jerome Fk.	Musk. - 17 P-02 (0209) --
City of Bellevue Sewage Treatment Plant 65 47	2PD00037 OH0020672 --	Mills Cr. 14.20 Sandusky Bay	Sand. - 05 D-1 (0102, 0107)
City of Bowling Green Municipal Utilities Dept. 64 70	2PD00009 OH0024139 --	Poe Ditch Portage R. --	Portage - 16 B-1 (0102, 0103)
City of Bryan Sewage Treatment Plant 64 10 250 050 020	2PD00018 OH0020532 --	Prairie Cr. 12.50 Tiffin R.	Maumee - 04 A-08 (0104) --
City of Bucyrus Sewage Treatment Plant 65 13	2PD00021 OH0052922 --	Sandusky R. 112.31 --	Sand. - 05 C-2 (0102) --
City of Celina Sewage Treatment Plant 50 17 020	2PD00033 OH0020320 --	Beaver Cr. 0.30 Wabash R.	Wabash - 22 G --
City of Clyde Sewage Treatment Plant 65 18	2PD00004 OH0024686 --	Raccoon Cr. 10.40 Sandusky Bay	Sand. - 05 D-1 (0102, 0107)
City of Defiance Sewage Treatment Plant 64 10	2PD00013 OH0024899 --	Maumee R. 61.60 --	Maumee - 04 A-10 (0103) --
City of Delphos Sewage Treatment Plant 64 10 240 180	2PD00029 OH0024929 --	Jennings Cr. 4.80 Auglaize R.	Maumee - 04 A-03 (0107) --
City of Findlay Sewage Treatment Plant 64 10 240 130	2PD00008 OH0025135 --	Blanchard R. 54.60 Auglaize R.	Maumee - 04 A-06 (0109) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Fostoria Sewage Treatment Plant 64 70	2PD00031 OH0052744 --	E. Br. Portage R. 10.80 Portage R.	Portage - 16 B-1 (0103, 0106)
City of Fremont Sewage Treatment Plant 65 13	2PD00007 OH0025291 --	Sandusky R. 14.10 Sandusky Bay	Sand. - 05 C-4 (0105) --
City of Galion Sewage Treatment Plant 53 10 530	2PD00030 OH0025313 --	Olentangy R. 87.80 Scioto R.	Scioto - 02 M-03 (0211) --
City of Kenton Sewage Treatment Plant 53 10	2PD00020 OH0025925 --	Scioto R. 212.90 Ohio R.	Scioto - 02 M-01 (0212) --
City of Lima Dept. of Utilities 64 10 240 150	2PE00000 OH0026069 --	Ottawa R. 37.20 Auglaize R.	Maumee - 04 A-04 (0108) --
City of Mansfield Sewage Treatment Plant 55 04 590 120 060 010	2PE00001 OH0026328 --	Rocky Fork 12.40 Black Fork	Musk. - 17 P-01 (0209) --
City of Marion Sewage Treatment Plant 53 10 710	2PD00011 OH0026352 --	L. Scioto R. 6.55 Scioto R.	Scioto - 02 M-02 (0212) --
City of Mount Vernon Sewage Treatment Plant 55 04 590 110	2PD00012 OH0026662 --	Kokosing R. 24.50 Walhonding R.	Musk. - 17 P-12 (0207) --
City of Napoleon Sewage Treatment Plant 64 10	2PD00000 OH0020893 --	Maumee R. 45.90 --	Maumee - 04 A-11 ( ) --
City of Norwalk Sewage Treatment Plant 65 60 017 020	2PD00024 OH0052604 --	Rattlesnake Cr. 2.50 E. Br. Huron R.	Huron - 12 D-2 (0101) --
City of Oregon Sewage Treatment Plant 64 10	2PD00035 OH0052914 --	Maumee R. Maumee Bay --	Maumee - 04 A-11 ( ) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Perrysburg Sewage Treatment Plant 64 10	2PD00002 OH0021008 --	Maumee R. 14.30 Maumee Bay	Maumee - 04 A-11 ( ) --
City of Port Clinton Sewage Treatment Plant 64 70	2PD00014 OH0052876 --	Portage R. 8.50 Lake Erie	Portage - 16 B-2 (0103, 0106)
City of Saint Marys Sewage Treatment Plant 64 10 380	2PD00026 OH0021415 --	St. Mary's R. 93.60 Maumee R.	Maumee - 04 A-01 (0110) --
City of Sandusky Water Pollution Control Plant 65 13	2PF00001 OH0027332 --	Sandusky Bay -- --	-- -- --
City of Shelby -- 55 04 460 080	2PD00036 -- --	Black Fork Mohican R. --	Musk. - 17 P-01 --
City of Tiffin Sewage Treatment Plant 65 13	2PD00025 OH0052949 --	Sandusky R. -- --	Sand. - 05 C-4 (0105) --
City of Toledo Sewage Treatment Plant 64 10	2PF00000 OH0027740 --	Maumee R. 1.00 Maumee Bay	Maumee - 04 A-12 (0114, 0101, 0113)
City of Upper Sandusky Sewage Treatment Plant 65 13	2PD00039 OH0020001 --	Sandusky R. 81.00 --	Sand. - 05 C-2 (0102) --
City of Van Wert Sewage Treatment Plant 64 10 240 110 020 030	2PD00006 OH0027910 --	Town Cr. 22.20 L. Auglaize R.	Maumee - 04 A-02 (0106) --
City of Vermilion Sewage Treatment Plant 65 76	2PD00032 OH0023612 --	Vermilion R. 0.60 Lake Erie	Vermil. - 21 D-3 (0101, 0103)
City of Wapakoneta Sewage Treatment 64 10 240	2PD00019 OH0027952 --	Auglaize R. 84.50 Maumee R.	Maumee - 04 A-03 (0107) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Willard Sewage Treatment Plant 65 60 030 035	2PD00005 OH0028118 --	Unnamed trib. 1.10 W. Br. Huron R.	Huron - 12 D-2 (0101) --
Lucas Co. Commissioners Lucas Co. Sanitary Engineer 64 10	2PK00000 OH0034223 --	Maumee R. 0.00 Maumee Bay	Maumee - 04 A-12 (0114, 0101, 0113)
Village of Archbold Sewage Treatment Plant 64 10 250 050	OPD00017 OH0020796 --	Brush Cr. 13.70 --	Maumee - 04 A-08 (0104) --

NORTHEAST DISTRICT MUNICIPAL

City of Akron Sewage Treatment Plant 66 18	3PF00000 OH0023833 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
City of Alliance Wastewater Treatment Plant 57 03	3PD00000 OH0023868 --	Mahoning R. -- --	Mahon. - 18 T-1 (0101) --
City of Amherst Sewage Treatment Plant 65 82	3PD00001 OH0021628 --	Beaver Cr. Lake Erie --	Black - 20 D-3 (0101, 0103)
City of Ashtabula Div. of Water Pollution Control 60	3PE00002 OH0023914 --	Lake Erie -- --	-- -- --
City of Avon Lake Sewage Treatment Plant 60	3PD00003 OH0023981 --	Lake Erie -- --	-- -- --
City of Barberton Dept. of Utilities 55 04 580	3PD00004 OH0024007 --	Tuscarawas R. Muskingum R. --	Musk. - 17 P-06 (0310) --
City of Bedford Div. of Wastewater 66 18 060 010	3PD00005 OH0024040 --	Wood Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Bedford Heights Sewage Treatment Plant 66 18 060	3PD00006 OH0024058 --	Tinkers Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
City of Berea Sewage Treatment Plant 66 17 020	3PD00007 OH0024104 --	E. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
City of Brookpark Wastewater Plant 66 17 010	3PD00012 OH0038024 --	Abram Cr. -- --	Rocky - 13 D-5 (0101, 0102)
City of Campbell Sewage Treatment Plant 57 03	3PD00008 OH0024325 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
City of Canton Sewage Treatment Plant 55 04 580 210	3PE00000 OH0024350 --	Nimishillen Cr. Sandy Cr. Tuscarawas R.	Musk. - 17 P-07 (0314) --
City of Conneaut Safety-Service Director 60	3PD00002 OH0024767 --	Lake Erie -- --	-- -- --
City of East Liverpool Sewage Treatment Plant 50	3PD00009 OH0024970 --	Ohio R. 40.20 --	-- -- --
City of Elyria Sewage Treatment Plant 65 86	3PD00034 OH0025003 --	Black R. Lake Erie --	Black - 20 D-4 (0101, 0103)
City of Euclid Wastewater Treatment Dept. 60	3PE00003 OH0031062 --	Lake Erie -- --	-- -- --
City of Geneva Geneva City Manager 68 70	3PD00014 OH0020109 --	Cowles Cr. Lake Erie --	Ashtab. - 07 F-3 (0102, 0103)
City of Girard Sewage Treatment Plant 57 03	3PD00010 OH0025364 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Kent Sewage Treatment Plant 66 18	3PD00031 OH0025917 --	Cuyahoga R. -- --	Cuyahog - 19 E-01 (0100) --
City of Lakewood Wastewater Treatment Plant 66 17	3PE00004 OH0026018 --	Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
City of Lorain Sewage Treatment Plant 65 86	3PE00005 OH0026093 --	Black R. Lake Erie --	Black - 20 D-4 (0101, 0103)
City of Maple Heights Sewage Treatment Plant 66 18 060	3PD00011 OH0026336 --	Tinkers Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
City of Massillon Sewage Treatment Plant 55 04 580	3PE00007 OH0020516 --	Tuscarawas R. Muskingum R. --	Musk. - 17 P-08 (0310, 0311)
City of Middleburg Heights Sewage Treatment Plant 66 17 010	3PK00006 OH0026506 --	Abram Cr. -- --	Rocky - 13 D-5 (0101, 0102)
City of Niles Sewage Treatment Plant 57 03	3PD00036 OH0026743 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
City of North Olmstead Wastewater Treatment Plant 66 17	3PD00016 OH0026778 --	Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
City of North Royalton Wastewater Div. 66 17 020	3PD00030 OH0026794 --	E. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
City of Oberlin Dept. of Public Works 65 86 040 010	3PD00025 OH0020427 --	Plum Cr. W. Br. Black R. --	Black - 20 D-4 (0101, 0103)
City of Orrville Director of Utilities 55 04 580 290 050	3PD00017 OH0020371 --	L. Chippewa Cr. Chippewa Cr. --	Musk. - 17 P-06 (0310) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Painesville Water Pollution Control Plant 68 20	3PD00029 OH0026948 --	Grand R. 21.20 Lake Erie	Grand - 03 F-2 (0101) --
City of Ravenna Sewage Treatment Plant 66 18	3PD00018 OH0023221 --	Wahoo Ditch Cuyahoga R. --	Cuyahog - 19 E-01 (0101, 0105)
City of Salem Div. of Water and Sewage 56 70 060	3PD00027 OH0027324 --	M. Fk. L. Beaver L. Beaver Cr. Ohio R.	L Beav. - 08 S-1 (0101) --
City of Solon Water Pollution Control Dept. 66 18 060 030	3PD00019 OH0027430 --	Beaver Meadow Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
City of Struthers Safety Services Dept. 57 03	3PD00026 OH0027600 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
City of Twinsburg Sewage Treatment Plant 66 18 060	3PD00039 OH0027863 --	Tinkers Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
City of Wadsworth Director of Services 55 04 580 290 040	3PD00022 OH0027936 --	R. Styx 0.20 Chippewa Cr.	Musk. - 17 P-06 (0310) --
City of Warren Warren Wastewater Plant 57 03	3PE00008 OH0027987 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --
City of Willoughby Service Director 60	3PD00024 OH0028126 --	Lake Erie -- --	-- -- --
City of Wooster Water Pollution 55 04 590	3PD00013 OH0028185 --	Killbuck Cr. Walhonding R. --	Musk. - 17 P-04 (0208) --
City of Youngstown Dept. of Public Works 57 03	3PE00006 OH0028223 --	Mahoning R. -- --	Mahon. - 18 T-3 (0102) --

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Cuyahoga Co. Commissioners Brecksville Sewage Plant 66 18	3PK00005 OH0024856 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
Cuyahoga Co. Commissioners Sanitary Engineer 60	3PL00000 OH0030503 --	Lake Erie -- --	-- -- --
Geauga Co. Commissioners Sanitary Engineers Dept. 67 19 050	3PK00010 OH0043494 --	Aurora Branch Chagrin R. --	Chagrin - 15 E-03 (0101) --
Lake Co. Commissioners Madison Sewer District #1 60	3PK00032 OH0036790 --	Lake Erie -- --	-- -- --
Lake Co. Commissioners Mentor Wastewater Treatment Plant 60	3PK00033 OH0043559 --	Lake Erie -- --	-- -- --
Mahoning Co. Commissioners Sanitary Engineering Dept. 57 03 100	3PK00002 OH0037249 --	Mill Cr. Mahoning R. --	Mahon. - 18 T-3 (0102) --
Mahoning Co. Commissioners Sanitary Engineering Dept. 57 03 130	3PK00011 OH0045721 --	Meander Cr. -- --	Mahon. - 18 T-3 (0102) --
Medina Co. Commissioners Medina Co. Sanitary Engineer 66 17 020	3PK00003 OH0045748 --	E. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
Medina Co. Commissioners Medina Co. Sanitary Engineer 66 17 030	3PK00004 OH0043567 --	W. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
*Medina Co. Commissioners Medina Co. Sanitary Engineer 66 17 030	3PK00007 OH0043583 --	W. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
*Medina Co. Commissioners Medina Co. Sanitary Engineer 66 17 030	3PK00008 OH0043575 --	W. Br. Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
Northeast Ohio Regional S.D. Westerly Plant 60	3PE00001 OH0024660 --	Lake Erie -- --	-- -- --
Northeast Ohio Reg. Sewer Dis. Strongsville "A" 66 17	3PD00021 OH0033693 --	Rocky R. -- --	Rocky - 13 D-5 (0101, 0102)
Northeast Ohio Regional S.D. Easterly Plant 60	3PF00001 OH0024643 --	Lake Erie -- --	-- -- --
Northeast Ohio Regional S.D. Southerly Plant 66 18	3PF00002 OH0024651 --	Cuyahoga R. -- --	Cuyahog - 19 E-02 (0101, 0105)
Ohio Water Devel. Auth. French Cr. Sewer Treatment Plant 65 86 010	3PP00015 OH0044512 --	French Cr. Black R. --	Black - 20 D-4 (0101, 0103)
Summit Co. Commissioner Summit Co. Sanitary Engineers 66 18 200 010	3PK00000 OH0043397 --	Powers Brook 0.00 Cuyahoga R.	Cuyahog - 19 E-02 (0101, 0105)
Summit Co. Commissioner Sewer District #15 66 18 080	3PK00001 OH0027642 --	Brandywine Cr. -- --	Cuyahog - 19 E-02 (0101, 0105)
Trumbull Co. Commissioners Trumbull Co. Sanitary Engineer 57 03 140	3PK00009 OH0043401 --	Mosquito Cr. -- --	Mahon. - 18 T-3 (0102) --

CENTRAL DISTRICT MUNICIPAL

City of Circleville Dept. of Public Utilities	4PD00003 OH0024465	Scioto R. Ohio R.	Scioto - 02 M-08 (0101,
City of Columbus Jackson Pike STP 53 10	4PF00000 OH0024732 --	Scioto R. Ohio R. --	Scioto - 02 M-08 (0101, 0201)

FACILITY STREAM NETWORK	FAC. NO. NPDES NO.	RECEIVING STREAM/RM	BASIN SUBBASIN
City of Columbus Southerly Plant 53 10	4PF00001 OH0024741 --	Scioto R. Ohio R. --	Scioto - 02 M-08 (0101, 0201)
City of Delaware Sewage Treatment Plant 53 10 530	4PD00004 OH0024911 --	Olentangy R. Scioto R. --	Scioto - 02 M-03 (0211) --
City of Heath Sewage Treatment Plant 55 04 480 140	4PC00007 OH0025763 --	S. Fk. Licking R. 2.30 Licking R.	Musk. - 17 P-14 (0104) --
City of Lancaster Sewage Treatment Plant 54 50	4PD00001 OH0026026 --	Hocking R. Ohio R. --	Hocking - 01 O-1 (0103) --
City of Marysville Sewage Treatment Plant 53 10 600	4PC00002 OH0020630 --	Mill Cr. Scioto R. --	Scioto - 02 M-05 (0212) --
City of Newark Sewage Treatment Plant 55 04 480	4PE00001 OH0026671 --	Licking R. 27.50 Muskingum R.	Musk. - 17 P-13 (0104) --
City of Reynoldsburg Sewage Treatment Plant 53 10 480 020	4PD00005 OH0027243 --	Blacklick Cr. Big Walnut Cr. Scioto R.	Scioto - 02 M-04 (0210) --
City of Washington Court House Sewage Treatment Plant 53 10 320	4PD00002 OH0028002 --	Paint Cr. Scioto R. --	Scioto - 02 M-13 (0105) --
Delaware Co. Commissioners Olentangy Environ. Control Center 53 10 530	4PK00001 OH0054399 --	Olentangy R. Scioto R. --	Scioto - 02 M-03 (0211) --
Ohio Utilities Co. Blacklick Estates 53 10 480 020	4PU00002 OH0036021 --	Blacklick Cr. Big Walnut Cr. Scioto R.	Scioto - 02 M-04 (0210) --

APPENDIX 2C

Inspection Criteria Checklist

INSPECTION CRITERIA CHECKLIST

Facility Name and Location:

NPDES Permit No.:

1. Compliance History (Period from _____ to _____)
Enter the number of months, within the past 12, this facility has been out of compliance with the following:

   a. Effluent limits: ____
   Check as appropriate below:
   1) insignificant violations: ____
   2) significant sporadic violations: ____
   3) significant/insignificant continual violations: ____

   b. Procedural requirements: ____
   Type: _____

   c. Schedule violations (yes or no): ____

2. Inspection History

   a. Date of last inspection: _____
   b. Type of inspection: _____
   c. Results: _____

3. Facility's Programs	Good	Marginal	Inadequate
a. Quality Assurance	____	____	____
b. O&M Program	____	____	____
c. Laboratory	____	____	____

4. Potential for significant industrial or toxicant discharges to the system (POTW only): Yes _____ No _____

Explain _____

_____

5. Is facility contributing to a water quality problem in the stream segment to which facility discharges? Yes _____ No _____
If yes, explain: _____

_____

6. Inspection recommendation for the current planning period.

_____ Inspection should be conducted
Type: CEI _____ CSI _____ PAI _____ O&M _____
_____ Inspection should not be conducted

Additional comments: _____

_____

_____

Completed by: _____ Date: _____
Reviewed by: _____ Date: _____
Approved by (Central Office): _____ Date: _____

EPA 4112

APPENDIX 3

Ohio EPA Ambient Monitoring Stations

Key for Tables [a]

PARAMETER	ABBREVIATION	M	Q	LF	AT
Acidity, Total, $CaCO_3$	Acid $CaCO_3$-T	-	-	-	X
Alkalinity, Total, $CaCO_3$	Alkaline $CaCO_3$-T	-	-	-	-
Aluminum, Total, Al	Al-T	-	-	-	X
Arsenic, Total As	As-T	-	-	-	X
Biological Oxyden Demand 5 day	BOD-5	-	-	-	X
Cadmium, Total, Cd	Cd-T	4	4	-	X
Carbon, Total Org., C	C-T-Org	-	-	-	X
Chemical Oxygen Demand	COD	12	4	1	-
Chloride, Cl	Cl	-	-	-	X
Chlorine, Total Residual	Cl_2-T-R	-	-	-	X
Chromium, Hex, Cr	Cr-Hex	-	-	-	X
Chromium, Total Cr	Cr-T	4	4	1	X
Conductivity (field)	Micromho (field)	12	4	1	-
Copper, Total, Cu	Cu-T	4	4	1	X
Cyanide, Total, CN	CN-T	-	-	-	X
Dissolved Oxygen (field)	D.O. (field)	12	4	1	-
Fecal Coli, Total, MF	Fecal Coli-T-MF	12	4	1	-
Flow (USGS)	Flow (USGS)	12	4	1	-
Fluoride, Diss., F	F-Diss	-	-	-	X
Hardness, Total $CaCO_3$	Hard $CaCO_3$-T	4	4	1	X
Iron, Total, Fe	Fe-T	4	4	1	X
Lead, Total, Pb	Pb-T	4	4	1	X

a. Station Type and Sampling Frequency: Monthly (M); Quarterly (Q); Low Flow (LF); Additional Tests (AT)

Key for Tables [a] (Continued)

PARAMETER	ABBREVIATION	M	Q	LF	AT
Manganese, Total, Mn	Mn-T	-	-	-	X
MBAS	MBAS	-	-	-	X
Mercury, Total, Hg	Hg-T	4	4	1	X
Nickel, Total, Ni	Ni-T	4	4	1	-
Nitrate, NO_3 as N	NO_3-N-T	12	4	1	-
Nitrite, NO_2 as N	NO_2-N-T	12	4	1	-
Nitrogen, Ammonia as N	NH_3-N-T	12	4	1	-
Oil-Grease, Total	O+G-T	12	4	1	-
Organic Scan	OS	-	-	-	X
pH (field)	pH (field)	12	4	1	-
Phenolics	Phenolics	4	4	1	X
Phosphorus, Dissolved, P	P-Diss	-	-	-	X
Phosphorus, Total, P	P-T	12	4	1	-
Polychlorinated Biphenyls	PCB	-	-	-	X
Residue, Total Flt. (Diss)	TDS	-	-	-	X
Residue, Total Nflt. (Susp)	TSS	12	4	1	X
Silica, Total (Diss)	Si-T-Diss	-	-	-	X
Sulfate, SO_4	SO_4-T	-	-	-	X
Total Kjeldahl Nitrogen	Kjel-T-N	12	4	1	-
Water Temperature (field)	Temp (field)	12	4	1	-
Zinc, Total, Zn	Zn-T	4	4	1	X

a. Station Type and Sampling Frequency: Monthly (M); Quarterly (Q); Low Flow (LF); Additional Tests (AT)

COLUMN CODES

RM - River mile, miles from mouth

(MAP) - Map codes refer to underground water maps of Ohio ("Publications, Division of Water", 1975. Ohio Department of Natural Resources, p. 6).

Station #

Top number - STORET (OEPA)
Lower number ( ) - USGS

District

CDO - Central District Office, Columbus
NEDO - Northeast District Office, Twinsburg
NWDO - Northwest District Office, Bowling Green
SEDO - Southeast District Office, Logan
SWDO - Southwest District Office, Dayton

Purpose

IJC - International Joint Commission
NASQAN - National Stream Quality Accounting Network (USGS)
NAWQMN - National Ambient Water Quality Monitoring Network. The number following NAWQMN refers to the location of the station shown on Figure 1.
OEPA - Ohio EPA

Sampling Frequency

(M) - Monthly sampling frequency
(Q) - Quarterly sampling frequency
(LF) - Sampled once per year during the low flow period
(A) - Annual

Use Designation

CRS - Cuyahoga River Standards
CWH - Coldwater Habitat
EWH - Exceptional Warmwater Habitat
LE - Lake Erie Standards
MRS - Mahoning River Standards
PWS - Public Drinking Water Source
WWH - Warmwater Habitat

Table 1: Ohio Monthly National Ambient Water Quality Monitoring Network (NAWQMN) Program [a]

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
ASHTABULA RIVER						
Ashtabula River near Ashtabula (State Rd)	5.5 (F-3)	502760 (04212500)	NEDO	NAWQMN-1, IJC (M)	WWH	
BLACK RIVER						
Black River at Elyria (Cascade Pk)	15.6 (D-4)	501520 (04200500)	NEDO	NAWQMN-2 (M)	WWH	
Black River below Elyria (Ford Rd)	10.4 (D-4)	501510 (04200550)	NEDO	IJC (M)	WWH	
CHAGRIN RIVER						
Chagrin River at Willoughby (Rt 84)	5.0 (E-3)	502400 (04209000)	NEDO	NAWQMN-3, IJC (M)	EWH	
CONNEAUT CREEK						
Conneaut Creek at Conneaut (Keefus Rd)	6.4 (F-3)	502870 (04213000)	NEDO	NAWQMN-4, IJC (M)	CWH	
CUYAHOGA RIVER						
Cuyahoga River at Independence (Old Rockside Rd.)	13.5 (E-2)	502020 (04208000)	NEDO	NAWQMN-5, NASQAN (M)	WWH	
Cuyahoga River at Cleveland (Lower Harvard Ave.)	7.3 (E-2)	502130 (04208503)	NEDO	IJC (M)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
GRAND RIVER						
Grand River near Painesville (Rt 84)	8.7 (F-2)	502530 (04212100)	NEDO	NAWQMN-6, NASQAN (M) IJC	WWH	
Grand River at Painesville (Rt 535)	2.3 (F-2)	502520 (04212200)	NEDO	IJC (M)	WWH	
GREAT MIAMI RIVER						
Great Miami River at Dayton (Main St. Bridge)	80.0 (H-9)	610060 (03270500)	SWDO	NAWQMN-7 (M)	WWH	CN-T(Q)
Great Miami River at New Baltimore (Blue Rock Road)	20.8 (H-11)	600030 (03274600)	SWDO	NAWQMN-8, NASQAN (M)	WWH	CN-T(Q)
Mad River at Eagle City (St. Paris Pike)	28.7 (H-3)	610040	SWDO	NAWQMN-9, (M)	CWH	CN-T(Q)
HOCKING						
Hocking River at Athens (U.S. 33)	39.6 (O-2)	601650 (03159510)	SEDO	NAWQMN-10, NASQAN (M)	WWH	
HURON RIVER						
Huron River below Milan (Mud Brook Rd)	11.7 (D-2)	501050	NWDO	NAWQMN-11, IJC (M)	EWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
LITTLE BEAVER CREEK						
Little Beaver Creek near East Liverpool (Grimms Bridge Road)	4.6 (S-1)	602000 (03109500)	NEDO	NAWQMN-12 (M)	WWH	
LITTLE MIAMI RIVER						
Little Miami River at Oldtown (U.S. 68)	79.5 (K-1)	600570	SWDO	NAWQMN-13 (M)	EWH	CN-T(Q)
Little Miami River at Milford (U.S. 50)	12.7 (K-5)	600520 (03245500)	SWDO	NAWQMN-14, NASQAN (M)	WWH	CN-T(Q)
MAHONING RIVER						
Mahoning River at Leavittsburg (Leavitt Rd)	45.0 (T-2)	602280 (03094000)	NEDO	NAWQMN-15 (M)	MRS	
Mahoning River at Lowellville (First St)	11.6 ($T\text{-}3_1$)	602300 (03099500)	NEDO	NAWQMN-16 (M)	MRS	CN-T, Phenolics, F-Diss, Fe-T
MAUMEE RIVER						
Maumee River at Antwerp (SR 49)	100.3 (A-7)	500140 (04183500)	NWDO	NAWQMN-17 (M)	WWH	Hard $CaCO_3$-T, TDS SO_4-T, Cl, As-T, Cd-T, Cr-T, Cu-T, Pb-T, Hg-T, Zn-T, PCB
Maumee River at Waterville (Rt 64)	20.8 (A-11)	500080 (04193500)	NWDO	NAWQMN-18, IJC, NASQAN (M)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
Auglaize River above Defiance (Harding Co Rd 195)	4.1 (A-7)	500290 (04191500)	NWDO	NAWQMN-19 (M)	WWH	Hard $CaCO_3$-T, P-Diss, SO_4-T, Cl, As-T, Cd-T, Cr-T, Cu-T, Pb-T, Hg-T, Zn-T, PCB, MBAS(Q)
MUSKINGUM RIVER						
Muskingum River below Coshocton (SR 83)	107.3 (P-11)	611740 (03140500)	SEDO	NAWQMN-20 (M)	WWH	Cl, Phenolics
Muskingum River at McConnelsville (SR 37)	48.2 (P-16)	601860 (03150000)	SEDO	NAWQMN-21, NASQAN (M)	WWH	
Licking River below Newark (Stadden Bridge)	25.6 (P-13)	601770 (03141650)	CDO	NAWQMN-22 (M)	WWH	BOD-5, Phenolics, Cl, SO_4-T
Mohican River at Greer (Rt 514)	16.6 (P-4)	601870 (03136000)	SEDO	NAWQMN-23 (M)	WWH	
Nimishillen Creek at North Industry (Cheyenne St)	8.2 (P-7)	601940 (03118500)	NEDO	NAWQMN-24 (M)	WWH	CN-T, Phenolics, F-Diss, Fe-T
Tuscarawas River near Massillon (Warmington St.)	85.3 (P-5)	601930 (03117000)	NEDO	NAWQMN-25 (M)	WWH	CN-T, Phenolics, F-Diss, Fe-T, PCBs (Q)
Tuscarawas River at Newcomerstown (SR 83)	21.3 (P-10)	611790 (03112900)	SEDO	NAWQMN-26 (M)	WWH	Cl, Phenolics
Walhonding River at Nellie (U.S. 36)	14.7 (P-4)	601910 (03138500)	SEDO	NAWQMN-27 (M)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
OHIO BRUSH CREEK						
Ohio Brush Creek near West Union (SR 348)	13.1 (L-2)	600660 (03237500)	SEDO	NAWQMN-28 (M)	EWH	
PORTAGE RIVER						
Portage River at Woodville (U.S. 20)	28.2 (B-1)	500510 (04195500)	NWDO	NAWQMN-29, IJC (M)	WWH	
RACCOON CREEK						
Raccoon Creek at Adamsville (U.S. Rt 35)	29.6 (N-2)	601400 (03202000)	SEDO	NAWQMN-30 (M)	WWH	Acid $CaCO_3$-T, Fe-T, Mn-T
ROCKY RIVER						
Rocky River near Berea (Cedar Pt Rd)	12.0 (D-5)	501800 (04201500)	NEDO	NAWQMN-31, IJC (M)	WWH	
Rocky River upstream Lakewood STP	3.0 (D-5)	501790	NEDO	IJC (M)	WWH	
SANDUSKY RIVER						
Sandusky River above Fremont (Rice Rd)	20.3 (C-4)	500820 (04198000)	NWDO	NAWQMN-32,IJC, NASQAN (M)	WWH	
SCIOTO RIVER						
Scioto River near Circleville (Florence Chapel Rd)	101.8 (M-8)	601340	CDO	NAWQMN-33 (M)	WWH	BOD-5, Phenolics

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
SCIOTO RIVER (Continued)						
Scioto River near Richmondale (Higby Rd)	56.0 (M-11)	600770 (03234500)	SEDO	NAWQMN-34, NASQAN (M)	WWH	
Big Darby Creek at Darbyville (SR 316)	13.2 (M-8)	601300 (03230500)	CDO	NAWQMN-35 (M)	EWH	
Olentangy River near Worthington (I-270)	11.5 (M-3)	601290 (03226800)	CDO	NAWQMN-36 (M)	WWH	
VERMILION RIVER						
Vermilion River at Vermilion (N. Ridge Rd)	4.5 (D-3)	501260 (04199500)	NWDO	NAWQMN-37, IJC (M)	EWH	
LAKE ERIE WATER INTAKES						
Oregon Water Intake	-	504240	NWDO	NAWQMN-38, IJC (M)	EWH (LE), PWS	
Sandusky Water Intake	-	504030	NWDO	IJC	EWH (LE), PWS	
Mentor Water Intake	-	504130	NEDO	NAWQMN-39, IJC (M)	EWH (LE), PWS	
Cleveland Crown Water Intake	-	504090	NEDO	IJC (M)	EWH (LE), PWS	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 1: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
LAKE ERIE WATER INTAKES (Continued)						
Ashtabula Water Intake	-	504160	NEDO	IJC (M)	EWH (LE), PWS	OS(Q) - for pesticides and PCBs
Conneaut Water Intake	-	504170	NEDO	OEPA (M)	EWH (LE), PWS	P-Diss, Si-T-Diss, C-T-Org, Fe-T, Cd-T, Phenolics, CN-T

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

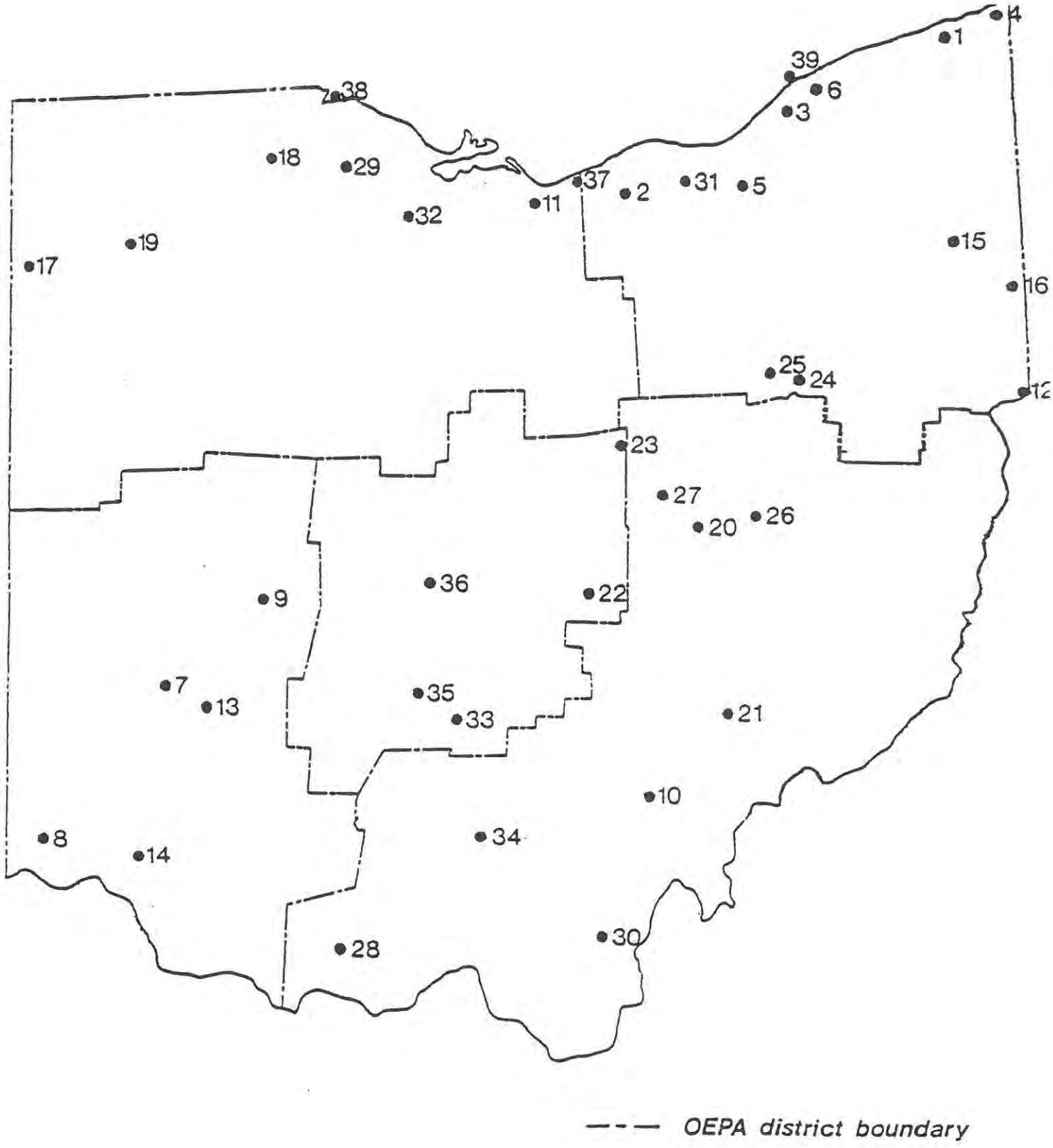


Fig. 1 Ohio NAWQMN Station Locations.

Table 2: Ohio EPA monthly and quarterly fixed ambient monitoring stations discontinued October 1981[a]

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
ASHTABULA RIVER						
Fields Brook near Ashtabula (15th St)	0.3 (F-3)	502780	NEDO	OEPA (M)	WWH	Cl_2-T-R, Hg-T, Phenolics, Cu-T, OS, Hard $CaCO_3$-T
CUYAHOGA RIVER						
Big Creek at Cleveland (Jennings Ave)	0.3 (E-2)	502120	NEDO	OEPA (Q)	WWH	MBAS, TDS, F-Diss, Cl
Little Cuyahoga River near Akron (Otto St. gage)	2.0 (E-1)	502080 (04205700)	NEDO	OEPA (Q)	WWH	MBAS, TDS, F-Diss, Cl
Mill Creek at Garfield Heights (Canal Road)	0.1 (E-2)	502110	NEDO	OEPA (Q)	WWH	MBAS, TDS, F-Diss, Cl
EUCLID CREEK						
Euclid Creek at Euclid (St. Clair Ave.)	1.7 (E-2)	504250 (04208690)	NEDO	OEPA (M)	WWH	Cl, Zn-T, Fe-T, Pb-T, Cu-T, Phenolics, Hard $CaCO_3$-T
GREAT MIAMI RIVER						
Great Miami River Below Lakeview (Rt 33)	156.2 (H-1)	600000	SWDO	OEPA (M)	WWH	CN-T(Q)
Great Miami River near Taylorsville (SR 440)	90.7	610050 (03263000)	SWDO	OEPA (M)	WWH	CN-T(Q)
Great Miami River at Miamisburg (SR 725)	66.4 (H-9)	600150 (03271500)	SWDO	OEPA (M)	WWH	CN-T(Q)

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
GREAT MIAMI RIVER (Continued)						
Great Miami River at Hamilton (Columbia Bridge)	34.9 (H-11)	600270 (03274000)	SWDO	OEPA (M)	WWH	CN-T(Q)
Great Miami River near Lawrenceburg (Lost Bridge)	5.2 (H-11)	600300	SWDO	OEPA (M)	WWH	CN-T(Q)
Buck Creek near Springfield (U.S. 40 and SR 4)	0.2 (H-3)	600350	SWDO	OEPA (Q)	WWH	CN-T
Dicks Creek near Excello (Yankee Rd)	2.5 (H-9)	600250	SWDO	OEPA (M)	WWH	CN-T(Q)
Four Mile Creek at New Miami (Jacksonburg Rd)	0.3 (H-10)	600260	SWDO	OEPA (Q)	WWH	CN-T
Greenville Creek near Covington (Rangeline Rd)	3.4 (H-6,7$_2$)	600060	SWDO	OEPA (Q)	WWH	CN-T
Indian Creek near Ross (SR 128)	0.5 (H-1)	600280	SWDO	OEPA (Q)	EWH	CN-T
Loramie Creek near Lockington (Harding-Wapak Rd)	0.4 (H-2)	600320	SWDO	OEPA (Q)	WWH	CN-T
Mad River above Dayton (Rt 444)	5.9 (H-4)	600190	SWDO	OEPA (M)	WWH	CN-T(Q)

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
GREAT MIAMI RIVER (Continued)						
Seven Mile Creek near Seven Mile (Taylor School Rd)	1.3 (H-10)	600340	SWDO	OEPA (Q)	WWH	CN-T
Stillwater River near Englewood (U.S. 40)	8.9 (H-6,7_1)	600110 (03266000)	SWDO	OEPA (M)	WWH	CN-T(Q)
Twin Creek near Franklin (Dayton-Oxford Rd)	0.6 (H-8,11a)	600180	SWDO	OEPA (Q)	EWH	CN-T
Whitewater River near Hoover (Suspension Bridge Rd)	0.5 (H-11)	600290	SWDO	OEPA (Q)	WWH	CN-T
HOCKING						
Hocking River below Lancaster (U.S. 33)	86.7 (O-1)	601550	CDO	OEPA (M)	WWH	Phenolics
Hocking River at Enterprise (CR 31 Bridge)	72.5 (O-1)	601530 (03157500)	SEDO	OEPA (M)	WWH	
HURON RIVER						
Rattlesnake Creek at Norwalk (Lais Rd)	1.7 (D-2)	501080	NWDO	OEPA (Q)	WWH	BOD-5
LAKE ERIE						
Turkey Creek near Conneaut (Lake Rd)	0.1 (F-3)	504260	NEDO	OEPA (Q)	CWH	MBAS, TDS, CN-T, F-Diss

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
LITTLE BEAVER CREEK						
North Fork at Fredericktown (Fredericktown Rd)	0.2 (S-1)	612010	NEDO	OEPA (Q)	CWH	MBAS, TDS, Cl
West Fork near Guilford (SR 30)	6.6 (S-1)	612000	NEDO	OEPA (Q)	WWH	MBAS, TDS, Cl
Chemline Tributary near Lisbon (SR 518)	0.1 (S-1)	602090	NEDO	OEPA (M)	WWH	Cl, TDS, Fe-T, Mn-T, Hard $CaCO_3$-T, F-Diss, CN-T(Q)
Stateline Creek East Branch near Negley (Twp. Rd 1024)	0.1 (S-1)	602060	NEDO	OEPA (M)	WWH	Cl, TDS, Fe-T, Mn-T, Hard $CaCO_3$-T, CN-T(Q)
Stateline Creek West Branch near Negley (Twp. Rd 1024)	0.1 (S-1)	602050 (03109320)	NEDO	OEPA (M)	WWH	Cl, TDS, Fe-T, Mn-T, Hard $CaCO_3$-T, F-Diss, CN-T(Q), PCBs (annually)
LITTLE MIAMI RIVER						
Little Miami River near Xenia (Bellbrook Rd)	68.2 (K-1)	610550	SWDO	OEPA (Q)	WWH	CN-T
Little Miami River at Spring Valley (Roxanna-New Burlington Rd)	59.3 (K-1)	600600	SWDO	OEPA (M)	WWH	CN-T(Q)
Little Miami River near Morrow (Stubbs Mill Rd)	35.7 (K-5)	610520	SWDO	OEPA (M)	WWH	CN-T(Q)

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
LITTLE MIAMI RIVER (Continued)						
East Fork Little Miami River at South Milford (near Terrace Park Country Club)	0.8 (K-5)	610530	SWDO	OEPA (M)	WWH	CN-T(Q)
Beaver Creek near Xenia (Factory Rd)	0.1 (K-1)	600510	SWDO	OEPA (Q)	WWH	CN-T
Caesar's Creek near Oregonia (Corwin Rd)	0.2 (K-2)	600550	SWDO	OEPA (M)	EWH	CN-T(Q)
MAHONING RIVER						
Mahoning River at Warren (South St. gage)	37.4 (T-2)	602400	NEDO	OEPA (Q)	MRS	MBAS, TDS, CN-T, F-Diss
Mahoning River at Niles (W. Park Ave)	33.1 (T-2)	602290	NEDO	OEPA (Q)	MRS	MBAS, TDS, CN-T, F-Diss
MAUMEE RIVER						
Auglaize River at Wapakoneta (Water St)	74.5 (A-3)	510240	NWDO	OEPA (Q)	WWH	BOD-5
Auglaize River at Wapakoneta (Glynwood Rd)	70.8 (A-3)	510250	NWDO	OEPA (Q)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
MAUMEE RIVER (Continued)						
Blanchard River below Findlay (Co Rd 140)	53.0 (A-6)	500040 (04189000)	NWDO	OEPA (M)	WWH	Hard $CaCO_3$-T, TDS, P-Diss, Cl, As-T, Cd-T, Cr-T, Cu-T, Pb-T, Hg-T, Ni-T, Zn-T, MBAS, BOD-5, PCBs
Ottawa River at Allentown (SR 81)	28.4 (A-4)	500050 (04187500)	NWDO	OEPA (M)	WWH	Hard $CaCO_3$-T, TDS P-Diss, Cl, BOD-5, As-T, Cd-T, Cr-T, Cr-Hex, Cu-T, Pb-T, Hg-T, Zn-T, MBAS, Phenolics, PCBs
St. Marys River at St. Marys (Aqueduct Rd)	47.2 (A-1)	510010	NWDO	OEPA (Q)	WWH	BOD-5
St. Marys River at St. Marys (Glynwood Rd)	43.0 (A-1)	510020	NWDO	OEPA (Q)	WWH	
MILL CREEK						
Mill Creek near Hamilton (Tylersville Rd)	24.5 (J)	600440	SWDO	OEPA (M)	WWH	CN-T(Q)
Mill Creek at Carthage (Anthony Wayne Avenue)	11.0 (J)	600410 (03259000)	SWDO	OEPA (M)	WWH	CN-T(Q)
Mill Creek at Cincinnati (Gest Rd)	0.5 (J)	600430	SWDO	OEPA (M)	WWH	CN-T(Q)

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
MUSKINGUM RIVER						
Muskingum River at Dresden (SR 208)	91.3 (P-11)	611750 (03144500)	SEDO	OEPA (M)	WWH	
Hurford Run at Canton (Church St)	0.2 (P-7)	611850	NEDO	OEPA (Q)	WWH	MBAS, TDS, Cl, F-Diss
Jerome Fork near Ashland (Rt 42)	13.0 (P-2)	611860	NWDO	OEPA (Q)	WWH	BOD-5
Jerome Fork near Ashland (Co Rd 1302)	10.5 (P-2)	611870	NWDO	OEPA (Q)	WWH	BOD-5
Kokosing River near Mt. Vernon (SR 661)	23.6 (P-12)	611880	NWDO	OEPA (Q)	WWH	BOD-5
Kokosing River near Mt. Vernon (Twp Rd 257)	21.6 (P-12)	611890	NWDO	OEPA (Q)	WWH	BOD-5
Rocky Fork near Mansfield (SR 39)	12.5 (P-1)	611900	NWDO	OEPA (Q)	WWH	BOD-5
Rocky Fork near Mansfield (Illinois Ave)	10.1 (P-1)	611910	NWDO	OEPA (Q)	WWH	BOD-5
Tuscarawas River at Massillon (Walnut St)	88.4 (P-5)	611840	NEDO	OEPA (Q)	WWH	MBAS, TDS, Cl, F-Diss
Wolf Creek at Barberton (Snyder Ave)	0.2 (P-6)	611820	NEDO	OEPA (Q)	WWH	MBAS, TDS, Cl, F-Diss

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
ROCKY RIVER						
West Branch Rocky River near Medina (Fenn Rd)	28.0 (D-5)	501820	NEDO	OEPA (Q)	WWH	MBAS, TDS, CN-T, Cl
SANDUSKY RIVER						
Sandusky River at Fremont (Twp Rd 549)	13.0 (C-4)	500890	NWDO	OEPA (Q)	WWH	BOD-5
SCIOTO RIVER						
Scioto River near Kenton (CR 175)	206.8 (M-1)	610760	NWDO	OEPA (Q)	WWH	BOD-5
Scioto River near Kenton (CR 106)	201.0 (M-1)	610770	NWDO	OEPA (Q)	WWH	BOD-5
Little Scioto River near Marion (SR 309)	8.9 (M-2)	610750	NWDO	OEPA (Q)	WWH	BOD-5
Little Scioto River near Marion (SR 739)	2.6 (M-2)	610740	NWDO	OEPA (Q)	WWH	BOD-5
Mill Creek below Marysville (Radnor Rd)	17.2 (M-5)	601350	CDO	OEPA (M)	WWH	CN-T, Phenolics
Paint Creek near Bournesville (Jones-Levee Rd)	22.1 (M-12,13)	601320 (03234000)	SEDO	OEPA (M)	EWH	
Rocky Fork of Paint Creek near Barrett's Mills (Browning Rd)	2.8 (M-14)	610800 (03232500)	SEDO	OEPA (Q)	EWH	(b), TDS

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

b - Nutrients (Nitrate - Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from minimum parameter list.

Table 2: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS
SCIOTO RIVER (Continued)						
Whetstone Creek near Mt. Gilead (SR 61)	21.5 (M-3)	610780	NWDO	OEPA (Q)	WWH	BOD-5
Whetstone Creek near Mt. Gilead (Mt. Gilead-Cardington Rd)	19.9 (M-3)	610790	NWDO	OEPA (Q)	WWH	BOD-5
WABASH RIVER						
Beaver Creek at Celina (SR 703)	10.7 (G)	605010	NWDO	OEPA (Q)	WWH	BOD-5
Beaver Creek at Celina (below STP discharge, Meyer Rd)	9.6 (G)	605020	NWDO	OEPA (Q)	WWH	BOD-5

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters and their monitoring frequency for all stations; additional parameters that are monitored are listed under additional parameters.

Table 3: Ohio EPA ambient low-flow monitoring stations discontinued October 1980[a]

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
BLACK RIVER						
French Creek near Lorain (Rt 301)	0.7 (D-4)	501530	NEDO	OEPA (LF)	WWH	
CUYAHOGA RIVER						
Cuyahoga River near Akron (USGS gage, Old Portage Trail)	40.3 (E-2)	502160 (04206000)	NEDO	OEPA (LF)	WWH	
Cuyahoga River at Cleveland (W. Third St)	3.0 (E-2)	502140 (04208506)	NEDO	OEPA (LF)	WWH	F-Diss, CN-T, No Flow
Tinkers Creek at Bedford (USGS gage at SR 14)	5.5 (E-2)	502220 (04207200)	NEDO	OEPA (LF)	WWH	Hard $CaCO_3$-T, Zn-T, Pb-T, Cr-T
GREAT MIAMI RIVER						
Great Miami River below Piqua (Peterson Rd)	108.8 (H-2)	600090	SWDO	OEPA (LF)	WWH	
Mad River near Urbana (SR 36)	39.0 (H-3)	600130	SWDO	OEPA (LF)	CWH	
Mad River below Springfield (lower Valley Pike)	23.5 (H-4)	610010	SWDO	OEPA (LF)	WWH	
HURON RIVER						
East Branch Huron River below Norwalk (Schaeffer Rd)	2.0 (D-2)	501070	NWDO	OEPA (LF)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nutrients (Nitrate-Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from the minimum parameters list.

Table 3: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
LITTLE BEAVER CREEK						
Middle Fork near Salem (Beachwood Rd)	52.8 (S-1)	602120	NEDO	OEPA (LF)	WWH	TSS, CN-T, F-Diss
MAUMEE RIVER						
Maumee River at Defiance (WTP)	65.6 (A-7)	500180 (04184100)	NWDO	OEPA (LF)	WWH	
Maumee River near Florida (CR 18)	54.6 (A-10)	510210	NWDO	OEPA (LF)	WWH	
Auglaize River near Fort Jennings (SR 224)	39.5 (A-3)	500070	NWDO	OEPA (LF)	WWH	
Auglaize River near Cloverdale (SR 114)	28.5 (A-3)	500110	NWDO	OEPA (LF)	WWH	
Auglaize River near Oakwood (SR 613)	19.3 (A-3)	500130	NWDO	OEPA (LF)	WWH	
Blanchard River near Dupont (CR 21)	2.5 (A-5)	500090	NWDO	OEPA (LF)	WWH	
Little Auglaize River below Melrose (SR 613)	2.0 (A-2)	510200	NWDO	OEPA (LF)	WWH	
Ottawa River above Lima (Thayer Rd)	45.4 (A-4)	500270	NWDO	OEPA (LF)	WWH	
Ottawa River near Kalida (CR 19)	0.7 (A-4)	500150	NWDO	OEPA (LF)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nutrients (Nitrate-Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from the minimum parameters list.

Table 3: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
MAUMEE RIVER (CONTINUED)						
St. Joseph River below Edgerton (SR 49)	8.9 (A-9)	510180	NWDO	OEPA (LF)	WWH	
St. Marys River near Willshire (SR 81)	1.3 (A-1)	510170	NWDO	OEPA (LF)	WWH	
Tiffin River at Defiance (W. High St)	0.8 (A-8)	500160	NWDO	OEPA (LF)	WWH	
MUSKINGUM RIVER						
Chippewa Creek at Easton (USGS gage at SR 585)	6.8 (P-6)	611810 (03116200)	NEDO	OEPA (LF)	WWH	Fe-T
Killbuck Creek near Wooster (Willow Rd)	44.8 (P-3)	601880	NEDO	OEPA (LF)	WWH	Fe-T
Sandy Creek at Waynesburg (USGS gage)	17.4 (P-7)	611800 (03117500)	NEDO	OEPA (LF)	WWH	
Tuscarawas River at Canal Fulton (Market St)	95.9 (P-5)	611830	NEDO	OEPA (LF)	WWH	TSS, Fe-T
Wills Creek at Cambridge (Twp Rd 452)	54.9 (P-17)	611760	SEDO	OEPA (LF)	WWH	TSS
Wills Creek below Dam (Twp Rd 274)	6.2 (P-17)	611770 (03143500)	SEDO	OEPA (LF)	WWH	TSS

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nutrients (Nitrate-Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from the minimum parameters list.

Table 3: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
PORTAGE RIVER						
North Branch Portage River at Pemberville	0.1 (B-1)	500520 (N. River Rd)	NWDO	OEPA (LF)	WWH	
ROCKY RIVER						
Abrams Creek near Berea (Cedar Point Rd)	0.9 (D-5)	501830	NEDO	OEPA (LF)	WWH	Hard $CaCO_3$-T, F-Diss, Zn-T
SANDUSKY RIVER						
Sandusky River below Upper Sandusky (CR 121)	78.7 (C-2)	500860	NWDO	OEPA (LF)	WWH	
Sandusky River below Mexico (Scott Bridge Rd)	48.0 (O-3)	500830	NWDO	OEPA (LF)	WWH	
SCIOTO RIVER						
Big Darby Creek below Plain City (Cemetary Pike Rd)	50.3 (M-6)	600790	CDO	OEPA (LF)	EWH	
Paint Creek below Washington C.H. (SR 35)	64.3 (M-13)	600740	CDO	OEPA (LF)	WWH	
Walnut Creek below Baltimore (Leonard Rd)	36.6 (M-9)	600750	CDO	OEPA (LF)	WWH	
WABASH RIVER						
Wabash River near New Corydon, Ind (State Line)	465.6 (G)	610000	NWDO	OEPA (LF)	WWH	

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nu ents (Nitrate-Nitrite, Total Phosphorus, TKN and N N) are deleted from the minimum parameters lis

Table 3: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
MINOR OHIO TRIBUTARIES						
Bullskin Creek near Cedron (Cedron Rd)	3.1 (K-6)	609100	SWDO	OEPA (LF)	WWH	(b)
Captina Creek near Powhatan Point (SR 148)	3.2 (S-4)	609210	SEDO	OEPA (LF)	WWH	(b), TDS, Al-T, Mn-T
Cross Creek near Mingo Junction (Twp Rd 167)	1.7 (S-2)	609250	SEDO	OEPA (LF)	WWH	(b), TDS
Duck Creek near Marietta (SR 26)	1.8 (R-1,2)	609180	SEDO	OEPA (LF)	WWH	(b), TDS
Eagle Creek near Ripley (CR 49)	3.7 (L-3)	609120	SEDO	OEPA (LF)	EWH	(b), TDS
Indian Guyan Creek near Bradrick (SR 243)	2.5 (N-5)	609150	SEDO	OEPA (LF)	WWH	(b), TDS
Leading Creek near Middleport (SR 7)	1.4 (O-4)	609160	SEDO	OEPA (LF)	WWH	(b), TDS
Little Muskingum River near Reno (CR 9)	2.3 (R-2)	609190	SEDO	OEPA (LF)	WWH	(b), TDS
Little Scioto River near Sciotoville (Twp Rd 248)	2.1 (N-4)	609130	SEDO	OEPA (LF)	EWH	(b), TDS

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nutrients (Nitrate-Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from the minimum parameters list.

Table 3: (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	ADDITIONAL PARAMETERS[a]
McMahon Creek near Bellaire (SR 147)	1.3 (S-4)	609220	SEDO	OEPA (LF)	WWH	(b), TDS, Al-T, Mn-T
Pine Creek near Garden City (SR 52)	4.1 (N-4)	609140	SEDO	OEPA (LF)	WWH	(b), TDS
Shade River near Keno (Twp Rd 114)	5.9 (O-4)	609170	SEDO	OEPA (LF)	EWH	(b), TDS
Short Creek near Rayland (SR 150)	3.9 (S-3)	609240	SEDO	OEPA (LF)	WWH	(b), TDS, Al-T, Mn-T
Sunfish Creek near Cameron (SR 78)	6.8 (S-4)	609200	SEDO	OEPA (LF)	WWH	(b), TDS
Symmes Creek near Chesapeake (SR 7)	0.4 (N-3)	609270	SEDO	OEPA (LF)		
Ten Mile Creek near New Palestine (SR 749)	1.1 (K-6)	609050	SWDO	OEPA (LF)	WWH	(b)
Wheeling Creek near Bridgeport (CR 24)	1.5 (S-3)	609230	SEDO	OEPA (LF)	WWH	(b), TDS, Al-T, Mn-T
White Oak Creek below Georgetown (Rt. 221)	5.7 (L-1)	609110	SEDO	OEPA (LF)	WWH	(b), TDS
Yellow Creek near Hammondsville (SR 213)	2.5 (S-2)	609260	SEDO	OEPA (LF)	WWH	(b), TDS, Al-T, Mn-T

a - The key (Appendix 3, Page 1) lists the physical/chemical parameters monitored at all stations; special test(s) (additional parameters that are monitored) are listed under additional parameters.

b - Nutrients (Nitrate-Nitrite, Total Phosphorus, TKN and NH_3-N) are deleted from the minimum parameters list.

Table 4: Tenative lake restoration priority list (master list in alphabetical order)[a]

Name	County	Added to List	OEPA/USGS Surveys '75	'76	'77	'78	'79	'80	OEPA Misc Surv	OEPA 314 '80	OEPA 314 '81	NOACA	NES USEPA	No W.Q. Data Known	No Chlorophyll Data
Acton Lake	Butler	--	X	--	--	--	--	--	--	--	X-	--	--	--	X
Adams Lake	Adams	--	--	--	--	--	--	X	X	--	--	--	--	--	--
Belmont Lake	Belmont	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Brady Lake	Portage	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Buckeye Lake	Licking	--	X	--	--	X	--	--	--	--	--	--	--	--	--
Charles Mill Lake	Ashland	--	--	--	--	X	--	--	--	--	--	--	1973	--	--
Clouse Lake	Perry	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Cutler Lake	Muskingum	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Dillon Reservoir	Muskingum	--	--	--	X	--	--	--	--	--	--	--	--	--	--
Dow Lake	Athens	--	--	--	--	X	--	--	--	--	--	--	--	--	--
East Fork Lake	Clermont	--	--	--	--	--	X	--	--	--	--	--	--	--	--
East Reservoir	Summit	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Essington Lake	Perry	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Findley Lake	Lorain	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Firestone Reservoir	Summit	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Forty Acre Pond	Auglaize	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Grand Lake St. Marys	Auglaize	--	X	--	--	--	--	--	--	--	--	--	1973	--	--
Grant Lake	Brown	--	--	--	--	--	--	--	--	--	--	--	1973	--	--
Guilford Lake	Columbiana	--	X	--	--	--	--	--	--	--	X	--	--	--	X
Harrison Lake	Fulton	--	X	--	--	--	--	--	--	--	X	--	--	--	X
Hosterman Lake	Clark	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Indian Lake	Logan	--	--	--	X	--	--	--	--	--	--	--	--	--	--

Table 4: (Continued)

Name	County	Added to List	OEPA/USGS Surveys '75	'76	'77	'78	'79	'80	OEPA Misc Surv	OEPA 314 '80	OEPA 314 '81	NOACA	NES USEPA	No W.Q. Data Known	No Chloropyll Data
Jackson Lake	Jackson	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Jefferson Lake	Jefferson	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Lake Alma	Vinton	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Lake Hope	Vinton	--	X	--	--	X	--	--	--	--	--	--	--	--	--
Lake Isabella	Hamilton	X	--	--	--	--	--	--	--	--	X	--	--	X	--
Lake Loramie	Shelby	--	X	--	--	--	--	--	--	--	X	--	--	--	X
Lake Park	Mahoning	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Lake White	Pike	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Lower Shaker Lake	Cuyahoga	--	--	--	--	--	--	--	--	--	--	X	--	--	--
Madison Lake	Madison	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Meadowbrook Lake	Portage	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Miami-Whitewater Lake	Hamilton	X	--	--	--	--	--	--	--	--	X	--	--	X	--
Mosquito Creek Lake	Trumbull	X	--	X	--	--	--	--	--	--	--	--	--	--	--
Mt. Gilead Lake (Upper)	Morrow	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Mt. Gilead Lake (Lower)	Morrow	--	--	--	--	--	--	--	--	X	--	--	--	--	--
New Lexington Res.	Perry	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Newport Lake	Mahoning	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Nimisila Reservoir	Summit	--	--	--	X	--	--	--	--	--	--	--	--	--	--
Old Reid Park Pond	Clark	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Paint Creek Lake	Highland	--	X	--	--	--	--	--	--	--	--	--	--	--	X
Piedmont Lake	Harrison	--	--	--	X	--	--	--	--	--	--	--	--	--	--
Pine Lake	Ross	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Punderson Lake	Geauga	X	X	--	--	--	--	--	--	X	--	--	--	--	--
Pymatuning Reservoir	Ashtabula	--	--	--	--	--	--	--	--	--	--	--	X	--	--

Table 4: (Continued)

Name	County	Added to List	OEPA/USGS Surveys '75	'76	'77	'78	'79	'80	OEPA Misc Surv	OEPA 314 '80	OEPA 314 '81	NOACA	NES USEPA	No W.Q. Data Known	No Chlorophyll Data
Richwood Lake	Union	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Rocky Fork Lake	Highland	--	X	--	--	--	--	--	--	--	X	--	--	--	X
Sippo Lake	Stark	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Sharon Woods Lake	Hamilton	X	--	--	--	--	--	--	--	--	X	--	--	X	--
Snyder Park Lagoon	Clark	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Springfield Lake	Summit	--	--	--	--	--	--	--	X	--	X	--	--	--	--
Summit Lake	Summit	--	--	X	--	--	--	--	X	--	X	--	--	--	--
Sunny Lake	Portage	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Winton Lake	Hamilton	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Wolf Run Reservoir	Noble	--	--	X	--	--	--	--	--	--	X	--	--	--	X
Van Buren Lake	Hancock	--	--	--	--	--	--	X	--	--	--	--	--	--	--

a - OEPA = Ohio EPA; USGS = U.S. Geological Survey; OEPA 314 = Ohio EPA Section 314 of the Clean Water Act (Clean Lakes Program); NOACA = Northeast Ohio Areawide Coordinating Agency; NES USEPA = National Eutrophication Survey - U.S. EPA; No WQ data known = no water quality data known.

Table 5: Lake Erie (IJC) tributary sampling locations and parameter sampling frequency

Tributary Parameter	Ashtabula River	Black River	Chagrin River	Conneaut Creek	Cuyahoga River	Grand River	Huron River	Maumee River	Portage River	Rocky River	Sandusky River	Vermilion River
Alkalinity	12	12	12	12	12	12	12	12	12	12	12	12
Aluminum, Total	2	2	2	2	2	2	2	2	2	2	2	2
Ammonia-N, Total	12	12	12	12	12	12	12	12	12	12	12	12
Arsenic, Total	2	2	2	2	2	2	2	2	2	2	2	2
Cadmium, Total	6	12	6	6	6	6	6	6	6	6	6	6
Calcium, Total	12	12	12	12	12	12	12	12	12	12	12	12
COD	12	12	-	-	12	12	12	-	-	-	-	-
Chloride	12	12	12	12	12	12	12	12	12	12	12	12
Chromium, Total	6	12	6	6	6	6	6	6	6	6	6	6
Conductivity	12	12	12	12	12	12	12	12	12	12	12	12
Copper, Total	12	12	6	6	12	12	6	6	6	6	6	6
Dissolved Organic Carbon	12	12	12	12	26	12	12	26	12	12	12	12
Dissolved Oxygen	12	12	12	12	12	12	12	12	12	12	12	12
Dissolved Solids, Total	12	12	-	-	12	12	-	12	-	-	-	-
Fecal Coliform	12	12	12	12	12	12	-	12	-	12	12	-
Flow	12	12	12	12	12	12	12	12	12	12	12	12
Fluoride, Total	-	-	-	-	12	-	-	-	-	-	-	-
Hardness	12	12	6	6	12	12	6	6	6	6	6	6
Iron, Total	6	6	6	6	12	6	6	6	6	6	6	6
Lead, Total	12	12	12	12	12	12	12	12	12	12	12	12
Manganese, Total	2	2	2	2	2	2	2	2	2	2	2	2
MBAS	-	-	-	-	12	12	-	-	-	-	-	-
Mercury, Total	6	6	6	6	6	6	6	6	6	6	6	6

Table 5: (Continued)

Tributary Parameter	Ashtabula River	Black River	Chagrin River	Conneaut Creek	Cuyahoga River	Grand River	Huron River	Maumee River	Portage River	Rocky River	Sandusky River	Vermilion River
Nickel, Total	6	6	6	6	6	6	6	6	6	6	6	6
Nitrate-Nitrite	12	12	12	12	12	12	12	12	12	12	12	12
Oil & Grease	*	*	*	*	*	*	*	*	*	*	*	*
Organic Scan	1	1	1	1	1	1	1	1	1	1	1	1
Phenolics	12	12	12	12	12	12	-	-	-	12	-	-
Phosphorus, Soluable Reactive	12	12	12	12	12	12	12	12	12	12	12	12
Phosphorus, Total	12	12	12	12	12	12	12	12	12	12	12	12
pH	12	12	12	12	12	12	12	12	12	12	12	12
Phthalic Acid Esters	-	12	-	-	12	-	-	-	-	-	-	-
Polychlorinated Biphenyls	12	12	12	12	12	12	12	12	12	12	12	12
Selenium, Total	2	2	2	2	2	2	2	2	2	2	2	2
Silica, Dissolved Total	12	12	12	12	12	12	12	12	12	12	12	12
Sodium, Total	12	12	12	12	12	12	12	12	12	12	12	12
Specific Conductance	12	12	12	12	12	12	12	12	12	12	12	12
Sulphate	12	12	12	12	12	12	12	12	12	12	12	12
Suspended Solids	12	12	12	12	12	12	12	12	12	12	12	12
Total kjeldahl Nitrogen	12	12	12	12	12	12	12	12	12	12	12	12
Total Organic Carbon	12	12	12	12	26	12	12	26	12	12	12	12
Turbidity	12	12	12	12	12	12	12	12	12	12	12	12
Vanadium, Total	2	2	2	2	2	2	2	2	2	2	2	2
Water Temperature	12	12	12	12	12	12	12	12	12	12	12	12
Zinc, Total	12	12	6	6	12	12	6	6	6	6	6	6

Table 6: Lake Erie (IJC) intake sampling locations and parameter sampling frequency

Intake Parameter	Ashtabula	Cleveland Crown	Oregon	OWS Mentor	Sandusky
Aldrin/Dieldrin	-	4	4	-	-
Alkalinity	12	12	12	12	12
Aluminum, Total	-	4	4	-	-
Ammonia-N, Total	12	12	12	12	12
Arsenic, Total	-	4	4	-	-
Cadmium, Total	-	4	4	-	-
Chlordane	-	4	4	-	-
Chloride	12	12	12	12	12
Chromium, Total	-	4	4	-	-
Copper, Total	-	4	4	-	-
Cyanide	-	4	4	-	-
DDT & Metabolites	-	4	4	-	-
Diazinon	-	4	4	-	-
Dissolved Oxygen	-	12	12	-	-
Endrine	-	4	4	-	-
Fecal Coliform	12	12	12	12	12
Fecal Streptococci	-	12	12	-	-
Fluoride, Total	-	4	4	-	-
Hardness	-	4	4	-	-
Heptachlor	-	4	4	-	-
Iron, Total	-	4	4	-	-
Lead, Total	-	4	4	-	-

Table 6: (Continued)

Intake Parameter	Ashtabula	Cleveland Crown	Oregon	OWS Mentor	Sandusky
Lindane	-	4	4	-	-
Mercury, Total	-	4	4	-	-
Methoxychlor	-	4	4	-	-
Mirex	-	4	4	-	-
Nickel, Total	-	4	4	-	-
Nitrate-Nitrite	12	12	12	12	12
Parathion	-	4	4	-	-
Phenolics	-	4	4	-	-
Phosphorus, Soluble Reactive	-	12	12	-	-
Phosphorus, Total	12	12	12	12	12
pH	12	12	12	12	12
Phthalic Acid Esters	-	4	4	-	-
Polychlorinated Biphenyls	-	4	4	-	-
Selenium, Total	-	4	4	-	-
Silica, Dissolved Total	12	12	12	12	12
Specific Conductance	12	12	12	12	12
Sulfate	12	12	12	12	12
Taste & Odor	-	12	12	-	-
Total Kjeldahl Nitrogen	12	12	12	12	12
Toxaphene	-	4	4	-	-
Turbidity	12	12	12	12	12
Vanadium, Total	-	4	4	-	-
Water Temperature	12	12	12	12	12
Zinc, Total	-	4	4	-	-

APPENDIX 4

Prepared by
Donna Myers

Division of Wastewater Pollution Control laboratory (Ohio EPA)
Quality Assurance Tables
April 1, 1982

Table 1

DWPC
Chemistry Laboratory 1981 - 82
Detection Limits[1]

PARAMETER (Units)	1981	1982
Biochemical Oxygen Demand (mg/l) (BOD_5, BOD_{20}, $cBOD_5$, $cBOD_{20}$)	1	1
Chemical Oxygen Demand		
Automated (mg/l)	10	10
Manual (mg/l)	4	10
Total Residue (mg/l)	10	10
Total Filterable Residue (mg/l)	10	10
Total Nonfilterable Residue (mg/l)	5	5
Nitrate-Nitrite (mg/l)	0.05-0.09	0.05
Nitrite (mg/l)	0.02-0.03	0.02
Ammonia (mg/l)	0.05-0.09	0.05
Total Kjeldahl Nitrogen (mg/l)	0.1-0.3	0.1
Total Phosphorus		
High Level (mg/l)	0.05	0.05
Low Level (mg/l)	--	0.005
Dissolved Phosphorus		
High Level (mg/l)	0.05	0.05
Low Level (mg/l)	--	0.005
T. Cadmium (ug/l)	0.5-1.0	0.5
T. Calcium (mg/l)	1 - 2	1
T. Chromium (ug/l)	30-40	30
T. Copper (ug/l)	10-20	10
T. Iron (ug/l)	50-70	50
D. Iron (ug/l)	50-70	50
T. Lead (ug/l)	5-10	2
T. Magnesium (mg/l)	1-10	1
T. Manganese (ug/l)	--	100
T. Nickel (ug/l)	30-40	30
T. Zinc (ug/l)	10-15	10

[1]Detection limit is statistically defined as twice the standard deviation of the concentration difference of a series of duplicate measurements of a solution near the blank absorbance measurement.

TABLE 2: Control Limits for Precision and Accuracy for Parameters Analysed at the DWPC Chemistry Laboratory.

PARAMETER (UNITS)		AVERAGE RANGE	UPPER WARNING LIMIT	UPPER CONTROL LIMIT	AVERAGE PERCENT RECOVERY	95% CONFIDENCE INTERVAL	STANDARD DEVIATION OF PERCENT RECOVERY
FIVE DAY BIOCHEMICAL OXYGEN DEMAND (mg/l)							
	dilution volumes						
1980	300 mls	0.26	0.6	0.8			
	200 mls	0.23	0.6	0.8			
	100 mls	0.23	0.6	0.7			
	50 mls	0.45	1.3	1.6			
1981	300 mls	0.18	0.5	0.6			
	200 mls	0.23	0.6	0.8			
	100 mls	0.23	0.6	0.8			
1981	Glucose Glutamic Acid	227.2					
CHEMICAL OXYGEN DEMAND (mg/l)							
1980	(manual)	1.05	2.6	3.4			
1981	(manual)	0.71	1.8	2.3			
1981	(automated)	3.58	9.0	11.7	105.1	89.8-120.4	7.65

Table 2: Continued

PARAMETER (UNITS)		AVERAGE RANGE	UPPER WARNING LIMIT	UPPER CONTROL LIMIT	AVERAGE PERCENT RECOVERY	95% CONFIDENCE INTERVAL	STANDARD DEVIATION OF PERCENT RECOVERY
TOTAL ZINC (ug/l)							
1980		7.35	18.5	24.0	97.2	81.0-113.4	8.11
1981	Jan-June	3.30	8.3	9.9	100.6	86.1-115.1	7.27
1981	June-Dec	3.20	7.9	10.3	100.4	8.96-111.2	5.40
AMMONIA (mg/l)							
1980	May-Aug	0.02	0.06	0.07	99.8	75.0-124.6	12.4
1980	Aug-Dec	0.02	0.05	0.07	95.7	82.6-108.8	6.55
1981	Sept-Dec	0.04	0.09	0.12	100.4	87.4-113.4	6.50
1981	O-D	0.02	0.05	0.07	99.9	93.6-106.1	3.15
NITRATE-NITRITE (mg/l)							
1980-81	Jan-July	0.033	0.08	0.11	100.6	90.2-111.0	5.21
1981	Sept-Dec	0.015	0.04	0.05	98.1	88.5-107.7	4.80
NITRITE (mg/l)							
1981	Jan-Sept	0.007	0.016	0.021	97.8	90.9-102.8	2.50
1981	Sept-Dec	0.007	0.017	0.022	99.1	92.7-105.5	3.20
TOTAL PHOSPHORUS (mg/l)							
1980	Jan-June	0.020	0.05	0.07	99.0	88.1-109.9	5.45
1980	July-Dec	0.020	0.05	0.07	99.8	86.1-113.5	6.83
1981	June-Sept	0.030	0.08	0.11	102.5	94.5-110.5	4.00
1981	Sept-Dec	0.025	0.063	0.082	101.0	93.0-109.0	8.00

** Total Cadmium and Lead were run via graphite furnace techniques. All other metal analyses were performed via flame atomic absorption spectrophotometry.

Table 2: Continued

PARAMETER (UNITS)		AVERAGE RANGE	UPPER WARNING LIMIT	UPPER CONTROL LIMIT	AVERAGE PERCENT RECOVERY	95% CONFIDENCE INTERVAL	STANDARD DEVIATION OF PERCENT RECOVERY
TOTAL CADMIUM** (ug/l)							
1980		0.063	0.16	0.20	80.0	29.2-130.8	25.4
1981		0.044	0.11	0.14	98.6	73.8-123.5	12.4
TOTAL CALCIUM* (mg/l)							
1980		1.29	3.2	4.2	NO DATA		
1981	Jan-Aug	1.14	2.9	3.7	100.8	53.9-147.8	23.5
1981	Aug-Dec	1.04	2.6	3.3	103.5	89.8-117.2	6.85
TOTAL CHROMIUM (ug/l)							
1980		21.43	54	70	103.7	85.2-122.1	9.2
1981	Jan-Sept	12.56	32	41	110.4	123.9-96.9	6.75
1981	Sept-Dec	4.74	12	16	96.2	88.5-103.8	3.80
TOTAL COPPER (ug/l)							
1980		2.45	6	8	93.9	83.6-104.2	5.14
1981	Jan-June	2.81	7	9	98.2	92.4-104.0	2.90
1981	July-Dec	3.58	9	12	99.9	93.4-106.3	3.20

PARAMETER (UNITS)		AVERAGE RANGE	UPPER WARNING LIMIT	UPPER CONTROL LIMIT	AVERAGE PERCENT RECOVERY	95% CONFIDENCE INTERVAL	STANDARD DEVIATION OF PERCENT RECOVERY
TOTAL IRON (ug/l)							
1980		22.0	55	77	92.3	47.1-137.5	22.61
1981	Jan-June	19.0	47	61	95.8	77.3-114.3	9.26
	(0-999)						
1981	June-Dec	19.0	48	62			
	(1000-5000)						
1981	June-Dec	41.8	105	137	102.0	89-115.	6.50
TOTAL LEAD** (ug/l)							
1980		0.8	2.0	2.6	NO DATA		
1981	Jan-June	1.93	4.8	6.3	97.7	49.3-146.1	24.20
1981	June-Dec	0.51	1.3	1.7	97.6	78.1-117.1	9.75
TOTAL MAGNESIUM* mg/l)							
1980		0.94	2.4	3.1	118.8	31.3-206.4	43.78
1981	Jan-June	1.06	2.7	3.5	118.1	48.9-187.4	34.64
	(0-25)						
1981	July-Dec	0.32	0.8	1.0			
	(26-50)						
1981	July-Dec	0.48	1.2	1.6	101.7	89.9-113.5	5.90
TOTAL NICKEL (ug/l)							
1980		12.3	31	40	93.3	85.9-100.6	3.67
1981	Jan-June	8.8	22	29	100.8	86.5-115.1	7.15
1981	July-Dec	11.3	39	51	100.0	94.9-105.2	2.50

* Emmission method changed to absorption method of determination in 6/81

Table 2: Continued

PARAMETER (UNITS)		AVERAGE RANGE	UPPER WARNING LIMIT	UPPER CONTROL LIMIT	AVERAGE PERCENT RECOVERY	95% CONFIDENCE INTERVAL	STANDARD DEVIATION OF PERCENT RECOVERY
TOTAL SOLIDS (mg/l)							
1981		INSUFFICIENT DATA					
TOTAL DISSOLVED SOLIDS (mg/l)							
1980		11.2	28.2	36.8	ACCURACY ON A	CONTROLS DAILY	NOT IMPLEMENTED BASIS
	(0-299)						
1981	July-Dec	4.49	7.2	14.7			
	(300-399)						
1981	July-Dec	4.28	10.8	14.0			
	(400-499)						
1981	July-Dec	3.42	8.6	11.2			
	(500-599)						
1981	July-Dec	6.50	16.3	21.3			
	(600-)						
1981	July-Dec	5.13	12.9	16.8			
TOTAL SUSPENDED SOLIDS (mg/l)							
1980	all volumes (250 mls)	3.00	7.5	9.8	ACCURACY ON A	CONTROLS DAILY	NOT IMPLEMENTED BASIS
1981	July-Dec (200 mls) or less	1.34	3.4	4.4			
1981	July-Dec	1.30	3.3	4.3			

TABLE 3: Averaged Quarterly In-house Audit Sample Results for the DWPC Chemistry Laboratory*

	1980			1981				1980			1981		
PARAMETERS (UNITS)	TRUE VALUE	MEASURED VALUE	MEAN PERCENT RECOVERY	TRUE VALUE	MEASURED VALUE	MEAN PERCENT RECOVERY	PARAMETER (UNITS)	TRUE VALUE	MEASURED VALUE	MEAN PERCENT RECOVERY	TRUE VALUE	MEASURED VALUE	MEAN PERCENT RECOVERY
pH (S.U.)	8.6	8.7	1.2	8.6	8.7	1.2	Total	0.52	0.47	90.4	0.52	0.53	102.6
Percent Bias	7.7	7.7	0.0	7.7	7.7	0.0	Kjeldahl	4.12	4.17	101.1	4.12	4.17	101.1
							Nitrogen (mg/l)						
Conductivity	572	575	100.5	1490	1410	94.6	Total	0.14	0.15	107.1	0.14	0.13	95.2
(umhos/cm)	113	116	102.7	294	282	95.9	Phosphorus (mg/l)	0.93	0.95	102.4	0.93	0.95	102.5
							High Level						
Biochemical	2.4	2.5	104.2	2.4	2.6	108.3	Total				6.5	5.5	84.6
Oxygen Demand	100.6	108	107.4	100.6			Cadmium				10	8.4	84.0
(mg/l)							(ug/l)				50	49.5	99.0
Chemical Oxygen	15.4	26.3	171.0	15.4	30	194.8	Total				4.4	6.7	151.5
Demand (mg/l)	233.3	238	102.2	233.3	226	96.9	Chromium				304	306	100.8
(automated)							(ug/l)				65	66.3	102.1
Chemical Oxygen	15.4	15.1	97.7	15.4	13.8	89.3	Total	8.7	10.6	121.8	8.7	9.0	103.5
Demand (mg/l)	233.3	212	90.9	233.3	236.2	101.2	Copper	374	414	110.8	374	412	110.1
manual reflux							(ug/l)	37	44	120.0	37	41	109.9
Total Filterable	338	396	117.2	338	359	106.2	Total	16	25	156.3	850	796	93.7
Residue (mg/l)	54	62.3	115.4	54	61	112.9	Iron	796	840	105.5	90	78	86.7
							(ug/l)	78	65	83.3			
Total Nonfilterable	21.7	20.7	95.2				Total	165	170	103.0	8.7	5.7	65.1
Residue (mg/l)	64.6	63.1	97.7				Nickel	96	95	99.0	165	163	98.6
							(ug/l)				96	92	95.5
Ammonia-Nitrogen	0.19	0.22	114.4	0.19	0.18	96.1	Total				80	83	103.8
(mg/l)	1.3	1.4	110.6	1.3	1.27	97.9	Lead				18	17	95.6
							(ug/l)				250	262	104.8
Nitrate-Nitrite	0.31	0.26	85.2	0.31	0.27	86.0	Total	6.1	4.5	73.8	6.1	5	82.0
(mg/l)	1.59	1.65	103.8	1.59	1.53	96.4	Zinc	478	532	111.2	478	485	101.5
							(ug/)	26	24	90.4	26	24	92.3

* Audit Samples were run in only the third and fourth quarters of 1981 due to the very small number of analyses completed in the first two quarters of 1981

Table 4:

PERFORMANCE EVALUATION REPORT DATE:10/15/81

WATER POLLUTION STUDY NUMBER WP007

LABORATORY: OH004 Ohio EPA / Columbus

PARAMETER	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
CHROMIUM	1	100	76.5	53.8-96.2	59.0-91.0	NOT ACCEPTABLE
	2	15	9.18	5.50-13.1	6.44-12.1	NOT ACCEPTABLE
COPPER	1	135	130.	106.-152.	111.-146.	ACCEPTABLE
	2	13	11.4	6.70-17.4	8.02-16.1	ACCEPTABLE
IRON	1	280	275.	222.-330.	235.-317.	ACCEPTABLE
	2	10	15.4	3.55-30.9	6.93-27.5	ACCEPTABLE
NICKEL	1	150	150.	114.-181.	122.-173.	ACCEPTABLE
	2	20	15.0	6.37-24.4	8.60-22.1	ACCEPTABLE
ZINC	1	157	140.	115.-164.	121.-158.	ACCEPTABLE
	2	14	14.0	4.18-25.6	6.84-23.0	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.30	8.12	7.86-8.41	7.93-8.34	ACCEPTABLE
	4	5.20	5.22	5.00-5.44	5.05-5.39	ACCEPTABLE
SPEC. COND. (UMHOS AT 25 C)	1	138	130.	110.-147.	115.-143.	ACCEPTABLE
	2	595	530.	453.-600.	471.-582.	CHECK FOR ERR.
TDS AT 180 C	1	67.5	67.7	32.1-106.	41.2-96.7	ACCEPTABLE
	2	321.8	314.	251.-383.	267.-366.	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	0.18	0.189	.130-.248	.144-.233	ACCEPTABLE
	2	1.53	1.57	1.33-1.81	1.39-1.75	ACCEPTABLE
NITRATE-NITROGEN	1	0.22	0.250	.203-.296	.214-.285	ACCEPTABLE
	2	1.63	1.75	1.50-1.97	1.56-1.92	ACCEPTABLE
KJELDAHL-NITROGEN	3	0.36	0.313	.146-.563	.199-.511	ACCEPTABLE
	4	4.42	4.48	3.54-5.25	3.76-5.04	ACCEPTABLE
TOTAL PHOSPHORUS	3	0.10	0.094	.066-.129	.073-.121	ACCEPTABLE
	4	1.34	1.30	1.17-1.48	1.21-1.44	ACCEPTABLE

PERFORMAN EVALUATION REPORT DATE:10/15/81

WATER POLLUTION STUDY NUMBER WP007

LABORATORY: OH004 Ohio EPA /Columbus/

PARAMETER	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	4.5	12.3	6.49-18.3	7.93-16.8	NOT ACCEPTABLE
	2	207	222.	182.-244.	189.-237.	ACCEPTABLE
5 DAY BOD	1	3.4	3.84	1.57-6.26	2.15-5.69	ACCEPTABLE
	2	79.6	95.6	63.5-138.	72.6-129.	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
NON-FILTERABLE RESIDUE (IN MG/L)	1	20.3	21.7	17.8-25.6	18.7-24.6	ACCEPTABLE
	2	64.3	64.6	56.0-73.1	58.1-71.0	ACCEPTABLE

Table 5: Field Sampling Statistics - Precision

Parameter (Units)	Average Concentration	± One Standard Deviation	Upper Confidence Limit	Number of Samples
Conductivity (umos/cm)	21.3	21.5	64	44
pH	0.10	0.30	0.3	31
BOD_5	0.51	0.64	1.5	29
COD (mg/l)	5.38	5.47	16	47
Nitrate-Nitrite (mg/l)	0.082	0.24	0.25	52
Nitrite (mg/l)	0.006	0.012	0.02	48
Ammonia (mg/l)	0.045	0.099	0.14	51
TKN (mg/l)	0.157	0.277	0.47	53
Total Phosphorus (mg/l)	0.034	0.045	0.10	47
Hardness (mg/l)	4.51	6.80	13	38
Total Solids (mg/l)			insufficient data	
Total Filterable Solids (mg/l)	14.54	15.17	44	48
Total Nonfilterable Solids (mg/l)	5.77	7.25	17	47
Phenolics (ug/l)			insufficient data	
Cadmium (ug/l)	0.17	0.58	0.5	45
Calcium (ug/l)	1.34	1.78	4.0	41
Chromium (ug/l)	0.95	4.84	3	42
Copper (ug/l)	6.16	13.79	18	43
Iron (ug/l)	68.5	101.8	206	40
Lead (ug/l)	0.89	2.18	2.7	45
Magnesium (ug/l)	0.54	0.76	1.6	43
Manganese (ug/l)			insufficient data	
Nickel (ug/l)	0.77	5.03	2	43
Zinc (ug/l)	4.21	9.88	13	43

Table 6: Field Sampling Statistics - Quality Control Blanks

Parameter (Units)	Mean Blank Concentration	Range	Number of Samples	Number in Excess of Detection Limits	Percent in Excess of Detection Limits
Conductivity (umhos/cm)	5.2	2.0 - 15	8	1	12.5
BOD_5 (mg/l)	less than 1.0	less than 1.0	10	0	0.0
COD (mg/l)	1.10	0 - 5	10	2	20.0
Nitrate-Nitrite (mg/l)	0.02	0.00 - 0.15	12	2	16.7
Nitrite (mg/l)	less than 0.02	0.00 - 0.01	12	0	0.0
Ammonia (mg/l)	0.02	0.00 - 0.09	15	4	26.7
TKN (mg/l)	0.03	0.00 - 0.1	12	4	33.3
Total Phosphorus (mg/l)	0.01	0.00 - 0.10	15	1	6.7
Total Filterable Residue (mg/l)	8.62	0 - 21	9	4	44.4
Total Nonfilterable Residue (mg/l)	0.24	0 - 1.2	9	1	11.1
Total Cadmium (ug/l)	0.00	0.0	9	0	0.0
Total Calcium (mg/l)	0.12	0 - 0.3	6	3	50.0
Total Copper (ug/l)	10.0	0 - 70	10	3	30.0

Table 6: (Continued)

Parameter (Units)	Mean Blank Concentration	Range	Number of Samples	Number in Excess of Detection Limits	Percent in Excess of Detection Limits
Total Iron (ug/l)	5.0	0 - 30	9	1	11.1
Total Lead (ug/l)	3.5	0 - 12	6	2	33.3
Total Magnesium (mg/l)	0.7	0.0 - 0.1	7	4	57.0
Total Mercury (ug/l)	0.77	0.0 - 2.3	3	2	66.7
Total Nickel (ug/l)	6.7	0 - 40	6	1	16.7
Total Zinc (ug/l)	4.6	0 - 40	11	2	18.2

TABLE: 7
Percent of Total No. of 1979-1981 Samples with Hg Concentrations Greater Than or Equal to 0.5 ug/l

%	J	F	M	A	M	J	J	A	S	O	N	D
1979	8.3	6.3	7.3	0.0	0.0	0.0	0.0	15.0	20.0	18.2	34.8	25.0
n	(24)	(16)	(41)	(19)	(25)	(32)	(19)	(20)	(30)	(22)	(23)	(12)
x 1979	11.2%											
1980	0.0	10.5	5.6	4.7	16.2	0.0	15.8	0.0	9.1	0.0	5.3	24.1
n	(13)	(19)	(36)	(15)	(37)	(27)	(19)	(21)	(22)	(3)	(19)	(29)
x 1980	7.6%											
1981	9.1	0.0	12.1	4.4	9.5	29.4	23.1	71.4	52.6	33.3	12.5	-
n	(22)	(32)	(33)	(23)	(21)	(29)	(26)	(21)	(38)	(12)	(8)	-
x 1981a	7.0% (Jan - May)											
x 1981b	37.1% (June-Nov)											

* Data Based on Ohio EPA and NAWQMN stations
n = sample size

Table 8: Detectable limits for parameters routinely monitored by the Ohio Department of Health Laboratories

PHYSICAL/CHEMICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Turbidity (J.U.)	1	1	1 (Feb)	1	0.5 (Jul)	0.5	0.5
Conductivity at 25°C(Micromhos)	1	1	1	1	1	2 (Mar)	0.4
pH (+ SU)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alkalinity Total, $CaCO_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Alkalinity Phth, $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Alkalinity, $CaCo_3$ Stabl(mg/l)	0	0	0	0	10	10 (Feb)	10
Acidity Total, $CaCo_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Acidity M.O., $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Hardness Total, $CaCo_3$(mg/l)	2	2	2	2	2	2	4
Residue, Total (mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Total Volatile (mg/l)	10	10	10	10	20	20	20
Residue, Total Nflt(Sus)(mg/l)	10	10	10	10	10	10	10
Residue, Vol Nflt (mg/l)	10	10	10	10	10	10	20
Residue, Total Flt(Diss)(mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Vol Flt (mg/l)	10	10	10	10	20	20	20
Residue, Settable (mg/l)	0.1	0.1	0.1	-	-	-	-
Nitrogen Ammonia, N (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Nitrite, N (mg/l)	0.05	0.05	0.05	0.05	0.01 (Feb)	0.01	0.01
Nitrate, N(mg/l)	0.1	0.05 (Jan)	0.05	0.05	0.05	0.05	0.05
TKN(mg/l)	0.3	0.05 (Sept)	0.05	0.05	0.05	0.05	0.05
Phosphorus, Total, P(mg/l)	0.1	0.05 (Sept)	0.05	0.05	0.05	0.05	0.02
Phorphorus, Soluble, P(mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.02
Phosphate Total, Low Level (mg/l)	-	-	-	-	0.010	0.010	0.002
Phosphate Ortho, Low Level (mg/l)	-	-	-	-	0.002	0.002	0.002
Sulfate, SO_4(mg/l)	10	10	10	10	10	10	10
Sulfide, S(mg/l)	-	-	-	-	1 (May)	1	1
Chloride, Cl(mg/l)	5	5	5	5	5	5	5
Fluoride Diss, F(mg/l)	0.02	0.02	0.02	0.05(Aug)	0.05	0.05	0.05
Calcium Total, Ca(mg/l) Flame AAS	2	2	2	2	2	2	2

Table 8: continued

PHYSICAL/CHEMICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Magnesium Total, Mg(mg/l) Flm AAS	2	2	2	2	2	2	2
Potassium Total, K(mg/l)	1	1	1	1	1	1	1
Sodium Total, Na(mg/l)	5	5	5	5	5	5	5
Aluminum Total, Al(ug/l)	200	200	200	200	200	200	200
Antimony Total, Sb (ug/l)	10	10	10	10	10	10	10
Arsenic Total, As (ug/l) HGA	10	10	10	10	10	10	10
Barium Total, Ba (ug/l)	200 (Mar)*	200	200	200	200	200	200
Berylium Total, Be (ug/l)	10	10	10	10	10	10	10
Cadmium Total, Cd (ug/l)	10	5 (Jul)	5	5	5	5	5
Chromium Total, Cr (ug/l)	30	30	30	30	30	30	30
Chromium Hex, Cr (ug/l)	30	30	30	30	30	30	30
Cobalt Total, Co (ug/l)	30	30	30	30	30	30	30
Copper Total, Cu (ug/l)	30	30	30	30	30	30	30
Iron Total, Fe (ug/l)	30	30	30	30	30	30	30
Iron Diss, Fe (ug/l)	30	30	30	30	30	30	30
Lead Total, Pb (ug/l)	10	10	5 (Feb)	5	5	5	5
Lithium Total, Li (ug/l)	100	100	100	100	100	100	100
Manganese Total, Mn (ug/l)	30	30	30	30	30	30	30
Manganese Diss, Mn (ug/l)		-	-	-	30	30	30
Mercury Total, Hg (ug/l)	1.0	0.5 (Jul)	0.5	0.5	0.5	0.5	0.5
Molybdenum Total, Mo (ug/l)	100	100	100	100	100	100	100
Nickel Total, Ni (ug/l)	100	100	100	100	100	100	100
Selenium Total, Se (ug/l)	10	5 (Jul)	5	5	5	5	5
Silica Diss, Si (mg/l)	-	-	-	-	0.05 (Jul)	0.05	0.05
Silver Total, Ag (ug/l)	30	30	30	30	30	30	30
Strontium Total, Sr (ug/l)	200	200	200	200	200	200	200
Thallium Total, Tl (ug/l)	10	-	-	-	-	-	-
Tin Total, Sm (ug/l)	10	10	10	10	10	10	10

Table 8: continued

RADIOLOGICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Titanium Total, Ti (ug/l)	500	500	500	500	500	500	500
Vanadium total, V (ug/l)	10	10	10	10	10	10	10
Zinc Total, Zn (ug/l)	30	30	30	30	30	30	30
BOD, 5-Day (mg/l)	1	1	1	1	1	1	1
COD (mg/l)	4	4	4	4	4	4	4
Carbon Total Org, C (mg/l)	1	1	1	1	1	1	1
Cyanide, CN (mg/l)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MBAS (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Oil-Grease, Total (mg/l)	0.50	5 (Feb)	5	5	5	5	5
Phenolics (ug/l)	2	2	2	2	2	2	2
Beta, Total (pc/l)**	1	1	1	1	3	3	4 Jun
Beta, Diss (pc/l)	1	1	1	1	3	3	4
Beta, Suspd (pc/l)	1	1	1	1	3	3	4
Alpha, Total (pc/l)	1	1	1	1	3	3	3
Alpha, Diss (pc/l)	1	1	1	1	3	3	3
Alpha, Suspd (pc/l)	1	1	1	1	3	3	3
Radium 226, Total (pc/l)	1	1	1	1	1	1	1
Strontium 89, Total (pc/l)	5	5	5	5	5	5	5
Strontium 90, Total (pc/l)	1	1	1	1	1	1	1

BIOLOGICAL PARAMETERS

Coliform Total, MF (#/100 ml)	1	1	1	1	1	1	1
Coliform Total, MPN (#/100 ml)	1	1	1	1	1	1	1
Fecal Coli Total, MF (#/100 ml)	1	1	1	1	1	1	1
Fecal Strep Total, MF (#/100 ml)	1	1	1	1	1	1	1
Plate Count, Total (#/ml)	1	1	1	1	1	1	1
Algae, Total (#/ml)	1	1	1	1	1	1	1

PESTICIDE, PCB AND PHTHALATE PARAMETERS 1979-1982***

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)
Aldrin, Whl Smpl	0.03	0.2
BHC, Whl Smpl	0.01	0.2
DDD, Whl Smpl	0.10	0.4
DDE, Whl Smpl	0.05	0.4
DDT, Whl Smpl	0.10	0.4
Diazinon, Whl Smpl	0.1	0.3
Dieldrin, Whl Smpl	0.05	0.4
Chlordane, Whl Smpl	0.4	4.0
Endrin, Whl Smpl	0.03	0.4
Heptachlor, Whl Smpl	0.03	0.3
Heptachlor Epexide, Whl Smpl	0.03	0.3
Lindane, Whl Smpl	0.01	0.2
Malathion, Whl Smpl	0.1	-
Methoxychlor, Whl Smpl	0.15	2.4
Methyl Parathion, Whl Smpl	0.1	0.4
Mirex, Whl Smpl	0.25	0.5
Parathion, Whl Smpl	0.15	0.4
PCB, Whl Smpl	0.5	5.0
Phthalates, Whl Smpl	100	-
Silvex, Whl Smpl	1	-
Toxaphene, Whl Smpl	0.5	5.0
2,4-D, Whl Smpl	10	-

Table 8: continued

PESTICIDE, PCB AND PHTHALATE PARAMETERS 1979-1982***

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)

NONPESTICIDE ORGANICS (ug/l) (GC/MS; PURGE AND TRAP METHODOLOGY) 1979-1982****

Parameter		Parameter	
Benzene	0.5	1,2 dichloroethane	0.5
Bromodichloromethane	0.5	Ethylbenzene	0.5
Bromoform	1.5	Methylene chloride	1.5
Carbon tetrachloride	0.5	Tetrachloroethane	0.5
Chlorobenzene	0.5	Tetrachloroethylene	0.5
Chloroform	0.5	Trichloroethylene	0.5
Dibromochloromethane	0.5	Toluene	0.5
Dichlorobenzenes	0.5	Xylenes	0.5

NONPESTICIDE ORGANICS (mg/l) (FID - DETECTOR; SOLVENT/SOLVENT EXTRATION) 1979-1982*****

Benzene	0.1	Ethylbenzene	0.1
Bromoform	0.2	Methylene chloride	0.1
Carbon tetrachloride	0.2	Tetrachloroethane	0.1
Chlorobenzene	0.1	Tetrachloroethylene	0.1
Chlorodibromomethane	0.1	Trichloroethanes	0.1
Chloroform	0.1	Trichloroethylene	0.1
Cis 1,2-dichloroethylene	0.1	Toluene	0.1
Dichlorobromomethane	0.1	Vinyl chloride	0.1
1,2-Dichloroethane	0.1	Xylene	0.1

* The detectable limit before March 1975 was 100 ug/l.
** The detectable limit changed from 3 to 2 between 1980 and 1981, and than changed to 4 in June of 1981.
*** Water Matrix - 1 liter extracted and concentrated to 5 mls. Oil Matrix - 1 gm diluted to 100 mls with hexane (oil values are based on the response of standards).
**** 5 ml sample - normal operation.
***** 1 liter sample - concentration ratio 100 to 1.

Ohio 5-Year Surface Water Monitoring Strategy, 1982 - 1986

Ohio Environmental Protection Agency
Office of Wastewater Pollution Control
Division of Surveillance and Standards

September 1, 1981

CONTENTS [a]

			PAGE
PREFACE			1
PART 1	THE RELATIONSHIP BETWEEN MONITORING AND WATER QUALITY MANAGEMENT		
1.1	Introduction		2
1.2	The Use of Monitoring Results in Point Source Control Programs		3
* 1.3	The Use of Monitoring Data in Other Water Quality Programs		8
PART 2	SURFACE WATER MONITORING STRATEGY		
2.1	A Review of Ohio's Past Monitoring Programs		9
2.2	Basic Purpose and Objectives under the the Clean Water Act		9
2.3	An Approach to the Design and Management of Monitoring Activities in Ohio		12
2.4	Subbasins for Study		14
2.5	The Monitoring System Matrix - An Evaluation Tool		15
PART 3	SURFACE WATER PROGRAM DESCRIPTIONS AND INFORMATION NEEDS		
3.1	Agency Information Needs, Data Needs, and Monitoring Goals		20
3.2	The General Data Needs of Programs		
	3.21	Water quality standards.	27
*	3.22	Wasteload allocations.	29
*	3.23	Economic evaluation	32
	3.24	Comprehensive WQ evaluations	33
*	3.25	Construstion grants.	40
*	3.26	NPDES permit review.	41
	3.27	Toxic pollutants	46
*	3.28	Water quality planning	47
*	3.29	Clean Lakes program.	47
	3.210	316 program	47
	3.211	305b report	47

[a] Sections marked with * have been omitted or included in draft form.

PAGE

GLOSSARY 50

REFERENCES 52

APPENDICES

1. Monitoring Activities, FY'81 106 Grant
2. Estimation of Costs for Monitoring Activities
3. Types of Data Needed by Subbasin
*4. Low-Flow Stream Use Designation Procedures
5. Stream Segment Use Designations by Subbasin
6. Matrix Text Activities vs. Objectives
7. Tables A & B, Municipal Sewer Fees

---

[a] Sections marked with * have been omitted or included in draft form.

PREFACE

The Ohio EPA has reviewed surface water monitoring activities in Ohio with the goal of establishing a methodology for the design and management of these activities so that maximum information is obtained per unit effort. That basic goal has been met as evidenced by this document (see Part 2.3). We have begun to implement the methodology in two steps, first, the identification of information needs, and secondly, the design of monitoring networks to meet those needs. The majority of this document, the 5-year Monitoring Strategy, defines the data needs of surface water programs within Ohio EPA.

The impetus to develop this document can be traced to the experience of writing the 1980 Water Quality Inventory Report for Ohio (305(b) report). We learned through that experience that a wealth of water quality data is being collected, but the utility of the data is greatly impeded by the absence of a well-defined strategy for transforming the data into information that is meaningful to decision makers. Preliminary work on the Monitoring Strategy began in September 1980 and in February 1981 the first draft was distributed and reviewed by the Ohio EPA and U.S. EPA. The draft Monitoring Strategy was instrumental in developing the Monitoring Activities List and Program for FY 1982.

We had hoped to complete a comprehensive document for the initial Ohio 5-year Monitoring Strategy, but unfortunately some sections of the Monitoring Strategy for FY '82 - '86 had to be omitted, or left in draft form [a]. The completeness of the Monitoring Strategy is expected to improve as program managers recognize and appreciate that a small investment of their time spent in developing and/or refining the 5-year Monitoring Strategy will result in substantial improvements in the overall efficiency of their respective programs. It is hoped that releasing the Monitoring Strategy in its present form will spur the involvement of staff from other key water quality programs.

This document will be revised beginning in November 1981 and the Ohio 5-year Surface Water Monitoring Strategy, 1983 - 1987 will be completed by January 15, 1981. Thereafter, the 5-year Monitoring Strategy will be updated annually to reflect changes in information needs and the resources available to meet those needs. The details of surface water quality monitoring activities in Ohio for each federal fiscal year (i.e., 10/1 to 9/30) will continue to be described in an annual document entitled Ohio Water Quality and Pollutant Source Montoring Program.

---

[a] An explaination of the status of an incomplete section is given within notation marks (! ... !).

PART 1

THE RELATIONSHIP BETWEEN MONITORING AND WATER QUALITY MANAGEMENT

1.1 Introduction

Environmental monitoring is an important step in the management and protection of natural resources. Ideally, monitoring is the activity that "drives" the progression of events from problem identification and assessment, through management decisions on such issues as pollution abatement programs, and finally to the enforcement of environmental regulations. A succession of federal laws and guidelines have attempted to relate the purpose of water quality monitoring directly to management goals (Ward 1979). Initial guidelines for coordinating water data acquisition activities were issued by the U.S. Bureau of the Budget in 1964. Next, the Federal Water Quality Act of 1965 (P.L. 89-234) created or reorganized state and local agencies which resulted in more systematic water quality monitoring programs (Ward 1979). Water quality standards were established as a result of PL 89-234, and monitoring was oriented towards the assessment of in-stream conditions and the detection of water quality standard violations (Loftis and Ward 1979). The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) introduced effluent standards to water quality management programs, and effluent monitoring was added to the activities of regulatory agencies. The U.S. Environmental Protection Agency (U.S. EPA) has issued guidelines for monitoring programs in Model State Water Monitoring Program (U.S. EPA 1975) and Basic Water Monitoring Program (U.S. EPA 1977).

Today, for a variety of reasons, it is apparent that there is a large and growing need for precise analytical methodology in the design and management of data gathering networks (Moss et al. 1978). The primary reason is the decreasing marginal utility of the data. In other words, "As more information becomes available and the hydrological uncertainties are reduced, more objective management of these programs is required because the added value of each new increment of data is less than its predecessors"(Moss et al. 1978). Data needs have also become more specific and thus demand more fine-tuned collection programs. Finally, the resources available to meet data needs are limited. Numerous authorities have voiced similar concerns, most notably the National Academy of Science (NAS 1977) which listed three major deficiencies in the overall environmental monitoring program of the U.S. EPA:

1) the inadequate use of scientific principles to design, operate and evaluate monitoring programs,
2) the need to monitor in anticipation of, and to detect new environmental problems, and
3) the fragmentation of monitoring among and within various governmental agencies.

More recently, a report released by the General Accounting Office (1981) recommended major changes in the monitoring approaches of the U.S. EPA and the U.S. Geological Survey. The report found that the continued emphasis on fixed station networks by both agencies is inefficient and produces less information per unit effort when compared to other monitoring programs such as intensive or synoptic surveys.

The obvious purpose of any monitoring program is to fulfill the data needs of the state pollution control agency and to meet minimum "core" requirements needed by U.S. EPA to meet national goals (e.g., NAWQMN stations). However, collecting data is not an end in itself because there is no inherent value in the data themselves (Moss et al. 1978). The value of the data lies in the information that can be conveyed to a decision making process. Our experience in Ohio indicates that, in all to many cases, this simple truth has been overlooked and monitoring programs tend to continue as simply data collecting mechanisms. Thus, a key process in the development of the 5-year Monitoring Strategy has been defining the relationship between environmental monitoring and water quality management programs.

At Ohio EPA the application of monitoring data is primarily related to the management of the pollution abatement programs funded under the Clean Water Act. An understanding of how the information is used in the management process is essential to those who technically design and evaluate monitoring activities. For example, a limnologist would design different protocols for sampling a lake depending upon whether general background information is needed or whether the lake is a canidate for a grant under the Clean Lakes Program. Differing sampling protocols are needed because the results from a brief reconnaissance survey may be appropriate to characterize general lake quality, but data from such a survey are inappropriate for deciding whether or not to fund lake restoration projects. It is also true that the best data collection network cannot overcome a problem of the misuse of data that it produces. That is, there is nothing to prevent data from a well-designed general lake survey from being misused or misrepresented by unqualified people to meet the more specific information needs of lake restoration projects. Therefore, to minimize the misuse of data and to acquaint those who design the data collection networks with the intended use of that data, the information needs and decision making processes of Ohio EPA and U.S. EPA are an integral part of the 5-year Monitoring Strategy.

1.2 The Use of Monitoring Results in Point Source Control Programs

Information derived from water monitoring data must be an essential part of the construction grants management and decision making process if the expenditure of public funds for the construction of municipal treatment facilities is to be justified. The valid use of monitoring data is no less important in establishing the level of treatment to be required of industrial dischargers. Water monitoring data is necessary to satisfy two broad activities related to point source control programs; 1) the wasteload allocation process, and 2) the water quality standards process, especially the evaluation of stream uses.

The Ohio EPA is seeking to better integrate the various water pollution control programs by defining a logical progression of management steps that will result in a cost-effective system of water quality assessments, sound decisions on pollution abatement projects, and finally, if needed, enforcement action. Figure 1A highlights the sequence of events leading to the issuance of an NPDES permit. The figure depicts conceptual relationships in the management process and is not a step by step process chart. It must be stressed that the collection of water quality data necessary to support the re-evaluation of stream uses and classification of the stream as water quality

FIG. 1A. Conceptual relationship between water quality stand[illegible] wasteload allocations and the NPDES permitting process. The solid lines and boxes show the key steps in the management process, the dotted lines and boxes represent the prerequisites that are needed to make the system work, and the dashed lines and boxes depict public participatation and feedback within the system.

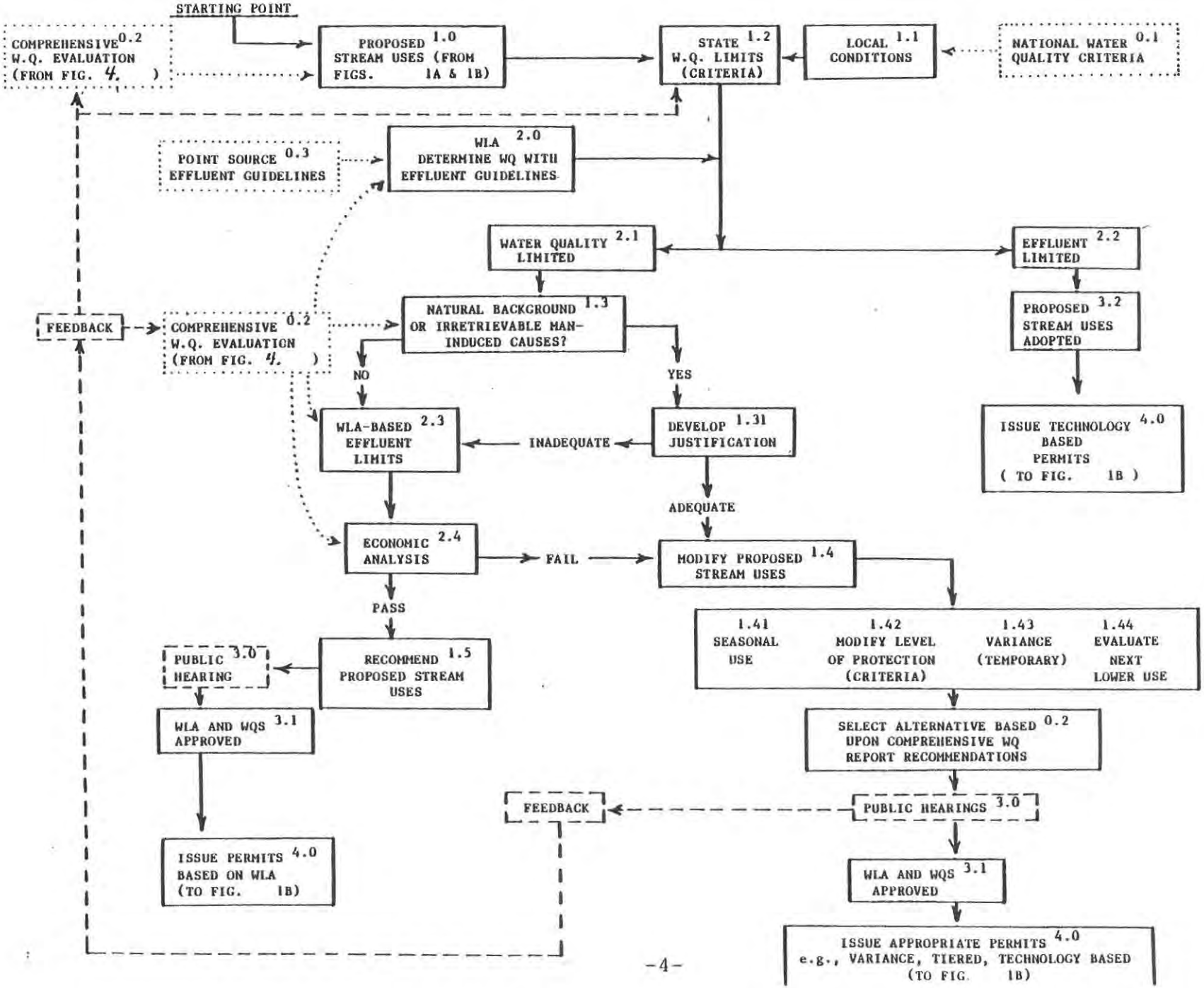
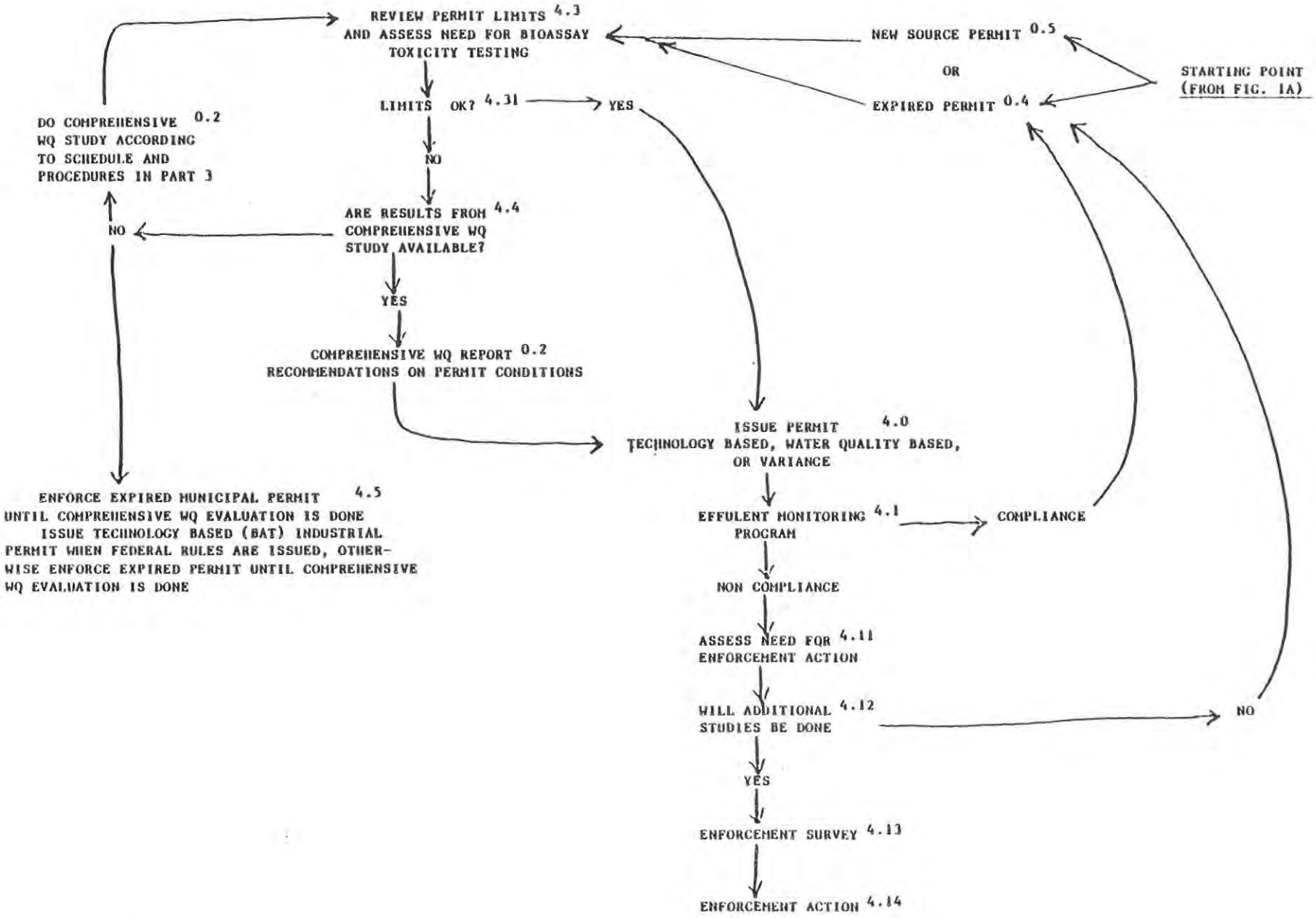


FIG. 1B. Conceptual relationship between water quality standards, wasteload allocations, and the NPDES permitting process (continued from 1A).



or effluent limited will be necessary before the approach outlined in Fig. 1A can work. Part 3.24 discusses the compilation of comprehensive water quality evaluations.

Figures 1A and 1B illustrate the conceptual relationship between water quality standards (WQS), wasteload allocations (WLA), and the National Pollutant Discharge Elimination System (NPDES) permitting process. The comprehensive water quality evaluation (step 0.2) is the underlying force that drives the system from problem assessment through the sequence of managemnet decisions on pollution abatement projects. The key steps in the management process are represented as solid blocks. Prerequisites that are needed to make the system work and the public participation process are shown as dotted and dashed blocks, respectively. Many of the steps shown in Figs. 1A and 1B are very general but greater detail is provided in Part 3 of the 5-year Monitoring Strategy.

The management process begins with the development of water quality standards (WQS) using the results of the comprehensive water quality report (step 0.2). The WQS for any given stream consist of two parts: first, a designated use that the stream is capable of supporting, and secondly, criteria or limits for the levels of pollutants or other characteristics of the waterbody. When the criteria for a pollutant are not violated, they will generally ensure a level of water quality sufficient to support a specific designated use. Details of the methodology that Ohio EPA is using to a re-evaluate stream uses are described in Part 3.21: suffice it to say here that a proposed aquatic life stream use is formulated based upon biological criteria and existing chemical/physical conditions (step 1.0). The limits or criteria for the proposed stream use (step 1.2) are developed from national water quality criteria (step 0.1) and can be tailored to fit local conditions (step 1.1).

Next the stream segment is classified as water quality limited (step 2.1), or effluent limited (step 2.2). Water quality limited is where water quality limits are not achievable through the imposition of point source effluent guidelines (CWA, Section 301(b)(1)(A) and Section 301 (b)(1)(B)). Effluent limited is where water quality limits are achievable through the imposition of point source effluent guidelines. This classification is made according to the wasteload allocation (WLA) results reported in the comprehensive water quality report (steps 0.1, 0.3 and 2.0). As shown in Fig 1A, proposed stream uses are adopted for effluent limited segments (step 3.2) and technology based permits are issued (step 4.0).

The proposed stream uses may be modified in water quality limited segments (step 1.4). Natural background and/or irretrievable man-induced causes for poor water quality are investigated (step 1.3) and a justification is developed (step 1.3) if these are the apparent causes for non-attainment of the proposed stream use. The proposed stream use will be adopted in situations where natural background or irretrievable man-induced conditions do not prevent the attainment of that use and where the necessary wastewater treatment facilities are affordable and result in worthwhile environmental benefits (e.g., economic analysis is passed, step 2.4). In these situations NPDES permits would be issued (step 4.0) based upon the WLA effluent limits (step 2.3). If natural background and/or irretrievable man-induced causes are justified, or the economic test is failed (e.g. wastewater treatment is not affordable), the proposed water quality standards are modified (step 1.4).

Figure 1A shows the four basic alternatives for modification:

1.41. Seasonal use designation where criteria are applicable only during certain times of the year. (Note that this is not equivalent to the Seasonal Warmwater Habitat use as defined in the Ohio WQS. See Part 3.21 for further discussion).

1.42 Modify level of protection by having less stringent criteria for certain parameters but retain the same general use designation.

1.43. Issue variances for specific discharger(s) that delay the imposition of more stringent effluent limitations on the parameter(s) that exceed WQS criteria.

1.44. Remove the present designated use and evaluate the next lower use designation.

One of these four alternatives is selected based upon the recommendations contained in the comprehensive water quality report (step 0.2). NPDES permits are then issued in accordance with the type of modification made (step 4.0) following public hearings (step 3.0). Also included in Fig. 1A is a proposal for combining the public participation involvement in the WLA and WQS process (steps 3.0 and 3.1). This should be possible because the two programs will be more closely integrated from the initial data collection, through the compilation of the comprehensive report, and into the management decision making process. Figure 1A also denotes the channels for feedback the public hearing process.

Figure 1B is a process chart for the issuance, review, and renewal of NPDES permits. Detailed procedures for the review process (step 4.3) and the criteria for determining the adequacy of limits (step 4.31) are found in Part 3.26. An essential element of this process chart is what to do when a permit expires (step 0.4) and the review process determines the limits to be unacceptable (e.g., the permit limitations cause WQS to be exceeded). There is widespread concern at the local, state, and national level about the costs of achieving water quality standards irrespective of any evaluation of the environmental degradation resulting from the WQS violation(s). The congressionally mandated review of Advanced Treatment projects is a prime example of an attempt to limit federal funding to wastewater treatment facilities that can be expected to result in material water quality benefits.

Both Ohio EPA and U.S. EPA recognize this concern as legitimate and believe that actions should not be taken which require more stringent wastewater treatment <u>without</u> adequate water quality survey data to justify the additional costs. Therefore, water quality based NPDES permits will only be issued after careful consideration of stream uses, and in some cases, the cost may be too high for meeting those uses. However, because of constraints on monitoring resources, it will be some time before the backlog of water quality problem areas can be studied in sufficient detail to evaluate stream uses and use value (Fig. 1B, step 4.4).

The following policy will be adhered to when NPDES permits expire before adequate biological and water quality assessments are made. Under Ohio law the entity must make a request for permit renewal prior to the expiration of their current NPDES permit. The conditions and limits of an expired NPDES permit are enforceable until such time that Ohio EPA completes its review of the request for renewal, and, as a matter of policy, the review and the issuance of a final permit table will not be completed until the management steps in Fig. 1A are completed. In those cases where the expired permit contains only a final table for effluent limits and where interim effluent limits are included in Findings and Orders issued by the Director, the interim limits will be enforced. Enforcing expired permits in this manner (step 4.5) is a preferable alternative to re-issuing existing or technology based permits as an interim step because it avoids the conflict with Sec. 301b of the CWA which states that effluent limitations must ensure the attainment of WQS. The process shown in Fig. 1B complies with Sec. 301b but in a way that reflects current environmental management thinking, not rigid adherence to the previous emphasis on implementing effluent controls without full consideration of their environmental and economic impacts.

The above discussion and Figs. 1A and 1B were intended to give an overview of the major components of the wastewater management program and to show that monitoring must be the key element that drives the system. A more thorough discussion of the wastewater management system is presented in Parts 3.21-3.25. Emphasis in the remainder of the 5-year Monitoring Strategy is on the mechanisms that integrate the WQS, WLA, permits, and constructon grants programs, and on the monitoring support these programs need.

A comprehensive water quality monitoring strategy should consider other issues as well, such as non point pollution, groundwater quality, and toxic pollutants. These issues have not been ignored in this edition of the 5-year Monitoring Strategy, but neither have they received the attention they deserve, a consequence of limited manpower and the difficultly of coordinating the interests and concern of other Offices within Ohio EPA. Any water quality issue can be addressed through the 5-year Monitoring Strategy as explained in Part 2.3. Future editions will include expanded coverage of those topics that program managers and staff take an active role in developing.

!1.3 The Use of Monitoring Data in Other Water Quality Programs

General discussions of the use of monitoring data in the management of other water quality programs will appear in future editions of the 5-year Monitoring Strategy. !

PART 2
MONITORING ACTIVITIES

2.1 A Review of EPA's Past Monitoring Programs

The Ohio EPA and its predecessor agency, the Ohio Department of Health, have been engaged in major water quality monitoring programs since 1949. The first round of in-depth river basin surveys were conducted between 1949 and 1960, and included the sampling and analyses of point source discharges as well as streams. The following river basins were included: The Maumee, Great Miami, Scioto, Cuyahoga, Muskingum and Mahoning. Fixed monitoring stations were established to provide on-going monitoring in critical stream segments upon completion of the original surveys, i.e., after 1960. Several of the original basin surveys were updated during the late 1960's; all were updated from 1973 to 1980 by studies pursuant to Sections 208 and 303(e) of the Clean Water Act. Most of the later studies included limited biological assessments, analyses for additional chemical/physical parameters, where appropriate, and bioassays of certain wastewater discharges. Fixed monitoring stations were added or deleted throughout Ohio's ambient monitoring network as a result of intensive survey evaluations and an analysis of the State's 1975 305(b) water quality report. Stations were also established in Lake Erie tributaries to monitor loadings to the lake in accordance with the terms of the 1972 U.S. - Canadian agreements on water quality of the Great Lakes.

Fish samples from the Ohio River, Lake Erie and major tributaries have been analyzed for pesticides and other organic residues in cooperation with other agencies for the last several years. In addition, an advanced early warning monitoring program has been initiated by the Ohio River Valley Water Sanitation Commission (ORSANCO) on the Ohio River to provide a warning to downstream users of potential hazards of contaminated water. The Ohio EPA, in cooperation with the Ohio Department of Natural Resources (DNR) and U.S. Geological Survey (USGS), has 13 continuous 4 parameter water quality monitors and stream flow gages as part of Ohio EPA's ambient monitoring network. The Ohio EPA and USGS are also evaluating selected Ohio public lakes and reservoirs to determine water quality and eutrophic status.

2.2 Basic Purpose and Objectives under the Clean Water Act

Appendix A to Subpart G of 40 CFR 35 sets forth the minimum requirements for an acceptable monitoring strategy under the Act. The objectives and general requirements stated therein are as follows:

- To provide data, information, or reports necessary to determine compliance with permit terms and conditions,
- To develop and maintain an understanding of the quality (causes and effects of such quality of the waters) in the State for the purpose of supporting State water pollution control activities in relation to the achievement of national goals according to the Act,
- To report on such quality and its causes and effects, and
- To assess the effectiveness of the State's pollution control program.

To this end, the State is required to establish and maintain a broad range of monitoring activities, both before and after implementing pollution controls, including: measurement of pollutant sources, determination of water quality (physical, chemical and biological), and the evaluation of their effects upon the State's beneficial use designations. Monitoring programs and activities shall be carried out according to normally accepted practices which have been promulgated or otherwise issued by the Administrator of U.S. EPA, in the form of regulations, guidelines, technical manuals, or handbooks.

The objectives listed in Appendix A 40 CFR 35 can be divided into three functional categories which follow a logical progression from problem identification, to corrective measures, to legal action (if necessary). We believe that these three functional categories and the nine objectives listed in Table 1 fulfill the requirements of the Act.
Defining the monitoring requirements in this way stresses the inter-relationship between monitoring support and the water quality management steps discussed in Part 1.2. Monitoring is plainly identified as a key element in each functional step. It follows that management decisions can only be as good as the monitoring support available, especially with the complexity of todays water quality issues.

Table 1. Water quality monitoring objectives as defined by the Clean Water Act and Appendix A to Subpart G of 40 CFR 35.

Function: Surface Water Quality Assessment

Objective 1. To collect and interpret baseline data on the physical/chemical and biological quality of the surface waters of Ohio.

Objective 2. To establish, where possible, cause and effect relationships between existing water quality, sources of pollution, and prevailing land use.

Objective 3. To compare existing water quality with state and national criteria and the legislative goals of the Clean Water Act.

Objective 4. To publish documented reports on site-specific and state-wide problem assessments for use in water quality management programs.

Function: Water Quality Management and Pollution Abatement

Objective 5. To develop and revise water use designations, to substantiate their attainability, and to develop criteria to protect those uses.

Objective 6. To formulate, assess, and revise wasteload allocations, effluent limitations, permit conditions, and water quality management strategies consistent with attainable water uses.

Objective 7. To assess the effectiveness of the State's pollution control program.

Function: Enforcement

Objective 8. To conduct inspections and collect data to insure compliance with NPDES permits.

Objective 9. To collect and analyze data necessary to prepare legal action against discharges.

2.3 An Approach to the Design and Management of Surface Water Monitoring Activities in Ohio

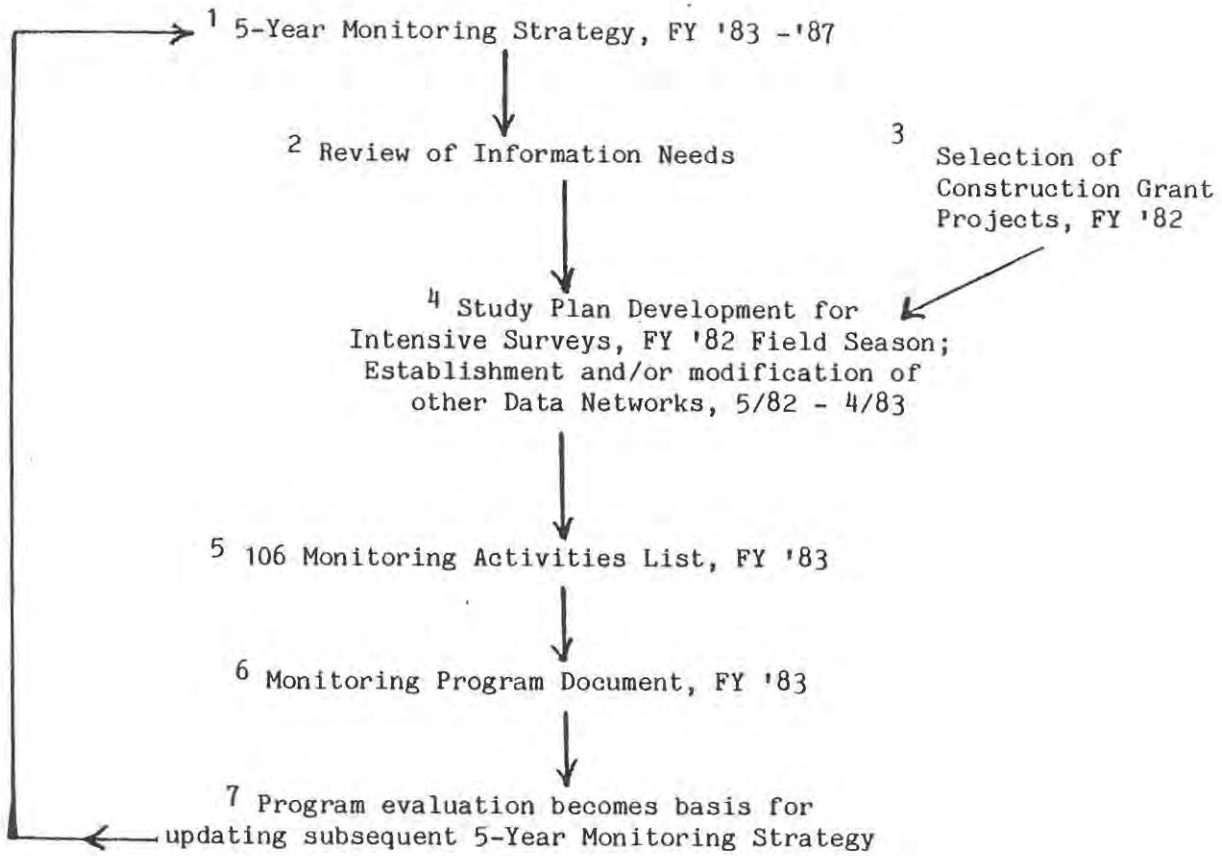
The need for water quality data exceeds our ability to produce it. The information needs of large scale, and often urgent, water quality issues such as wasteload allocations, advanced treatment justifications, and water quality standard use designations compete with one another and with the needs of less urgent, but still vitally important issues such as the detection of water quality trends and the evaluation of streams with respect to the goal of aquatic protection. Some information needs frequently do not receive adequate attention in the design and evaluation of monitoring activities which results in the collection of insufficient data to resolve the issue. Because many decisions in wastewater management programs cannot be delayed until such time that adequate information does exist, data are often unintentionally misused in order to support the decision made. Thus, it is essential to develop an overall framework in which to place information needs to ensure that sufficient data are available to make valid management decisions.

The key element of the 5-year Monitoring Strategy is the definition of an approach to the design, refinement, and management of surface water monitoring activities conducted by Ohio EPA. Staff members from Ohio EPA and U.S. EPA have jointly evolved a sequence of administrative and technical steps that will greatly improve the utility of the monitoring activities over the next several years. The objective is to avoid the common pitfall of initiating data collection activities without sufficient thought as to how the data can and will be used. This can only be done by fine tuning monitoring activities to meet specific monitoring needs.

Figure 2 presents the basic management steps that determine the State's surface water monitoring activities for any given year (reporting period based upon the federal fiscal year, Oct. 1 - Sept. 30). The initial step is the revision of the 5-year Monitoring Strategy, and a more or less concurrent evaluation or review (step 2) of the information needs of all surface water programs. Special emphasis is placed on the subbasins and stream segments where Construction Grant Projects have been selected (step 3) for water quality analyses (wasteloads and/or biological studies). Note that the the first three steps are targeted to be completed by February 15. It is imparative that this target date be met so that adequate time exists to conduct thorough design work for the plans of study (step 4). After planning work for the upcoming field season, the 106 Monitoring Activities List for the next fiscal year is prepared (steps 5 and 6). The Monitoring Program Document is then revised and added to based upon the Activities List. The overall water program evaluation (step 7) becomes the basis for revising the 5-year Monitoring Strategy, and the process repeats itself during the next year.

The development of the 5-year strategy is an iterative process that reflects the changing data needs and goals of the Agency. This is accomplished through defining agency information needs and establishing immediate and long-term monitoring goals (see Part 3). Subbasins are selected where monitoring efforts will be concentrated and basic data needs are outlined (see Parts 2.4 and 3). The management steps outlined in Fig. 2 result in an intergration of short-term, high priority needs with long-term, lower priority (e.g., less urgent) needs. The 106 Monitoring Activities List is the mechanism whereby the changing resources available to meet monitoring needs are considered in determining the level of monitoring work to be undertaken each year.

Fig. 2. A framework for managing surface water monitoring activities conducted by the Ohio EPA.



Target Dates for Completing Steps	
1	January 15, 1982
2	February 15, 1982
3	December 20, 1981
4	March 15, 1982
5	June 1, 1981
6	August 1, 1982
7	November 1, 1982

2.4 Selecting Subbasins for Study

The selection of hydrologic units or subbasins for intensive study is also an integral part of an effective monitoring strategy. The selection process should consider all information needs, not just a single issue, although major program needs such as advanced wastewater treatment justifications and WQS use-attainability issues must clearly receive emphasis. The exact procedure to be used in selecting areas for monitoring work is presently undefined, but the choice of subbasins for study in FY '82 will incorporate consideration of more than just the Construction Grant Project Priority List, which for all practical purposes is a single issue priority list.

Appendix 3 is a catalog of basic types of information needs or water quality issues that may be significant to a particular group in a particular subbasin. It is our intent to use the information in Appendix 3 as a springboard for selecting the geographical setting for monitoring work. Appendix 3 will also serve as a mechanism to alert those who plan intensive surveys of where certain types of water quality studies are needed.

The annual list of projects or stream segments for study should allow for the most efficient expenditure of the monitoring resources available. Efficiency in monitoring is obviously improved by concentrating studies in individual subbasins rather than scattering work between subbasins throughout the state year after year. Projects on the 1981 construction grant priority list are scattered in 39 subbasins throughout the state and yet only 7 subbasins have 3 or more priority projects. Ideally the selection of segments for WLA study and/or intensive survey study should be limited to projects in these 7 "most critical" subbasins and perhaps adjacent subbasins within the same drainage. Municipalities within these priority subbasins should be made priority projects as well, whenever this is possible. Monitoring activities in subbasins with a low density of priority projects should be delayed until the number of priority projects increases or resources are available to do the monitoring necessary.

2.5 The Monitoring System Matrix, An Evaluation Tool

It is the State's responsibility to establish a monitoring program which will fulfill the nine objectives listed in Part 2.2. The 1981 Basic Wastewater Program Grant (Sec. 106 grant) identified 37 monitoring related activities (see appendix 1) which the Office of Wastewater is undertaking to meet that responsibility. Nineteen of the activities are closely related to the basic objectives while the remainder involve administrative tasks or concern very special, non-recurring tasks. The relationships between the 19 monitoring activities and the basic objectives are explored in Table 2. The monitoring objectives and activities are combined in Table 2 to form a matrix or framework within which the total water quality monitoring system is defined and evaluated. As stated by Ward (1979):..."The matrix, by defining the regulatory monitoring system and clarifying the many interactions within the system, provides a basis upon which a more thorough approach to managing, evaluating, and eventually optimizing regulatory monitoring can be developed". The interrelationships of the activities and objectives are depicted as follows:

xxxx - The activity directly results in the objective being met. (i.e., the direct result of a monitoring activity is the collection of data).

xxx - The activity is an essential component in meeting the objective. (i.e., data generated from certain activities are essential for establishing cause/effect relationships).

xx - The activity is indirectly related to meeting the objective. (i.e., the activity generates information or reports which are of value in meeting the objective).

x - The activity can be related to meeting the objective in limited or specific cases, either directly or indirectly. (i.e., NAWQMN station data could be used in an enforcement action but the small number of stations in the State make this unlikely).

Also shown in Table 2 is an approximate cost of each activity. These figures do not include transportation expenses which would substantially raise the cost for some activities (e.g., 20 & 13, 12, 22, 21, 1, 2, 30). Only rough estimates of manpower and laboratory analysis costs could be made for some activities because accurate time and sample accounting procedures are not available (see Appendix 2 for specifics of cost calculations). Although a more detailed analysis of monitoring efficiency is desirable, this matrix can serve as a mechanism to target inefficient activities for in-depth examination. For example, an activity score (number of x's in Table 2 for each activity) can be totaled and used as a subjective rating of each activities' value to the overall objectives of the monitoring program.

Table 2. Monitoring system matrix for FY'81 (see text for explanation of symbols).

Activity Cost[a] ($\times 10^3$ $)	Description of Monitoring Activity[b] (Activity No.)	Objective 1 collect baseline data	Objective 2 establish cause/effect	Objective 3 compare WQ with goals	Objective 4 publish reports	Objective 5 Revise WQS	Objective 6 assess WLA and permits	Objective 7 assess overall abatement program	Objective 8 insure compliance with NPDES permits	Objective 9 prepare enforcement
51.3	National Ambient Water Quality Monitoring Network (NAWQMN) (11)	XXXX	X	XXX	X	X	X	X		X
74.1	State Ambient Water Quality Monitoring Net.(20 & 13)	XXXX	X	XXX	X	X	X	X		X
6.3	NAWQMN - Biomonitoring (14)	XXXX	XX	XXX	X	X		XX		
3.2	Monitoring Lake Erie fish for toxic residues (7)	XXXX	XX	XXX	X			X		
27.0	Clean Lakes Program (12)	XXXX	XXX	X	XXX	X		X		
334.4	Intensive Surveys (re: AST/AWT, WLA) (30 & 28)	XXXX	XXX	XXX	XXX	XXX	XXX	XXX	XX	X
76.2	USGS Gages	XXXX			XXX		XXX			
39.0	USGS low flow stations	XXXX			XX		XXX			
165.0	USGS continuous water quality monitors	XXXX	XX	XX	XX	XX	XXX	X		
3.3	USGS COD monitoring	XXXX					XXX			
19.3	USGS lake studies	XXXX	XX	XX	XXX	X	X	X		
36.6	USGS stream reaera-tion studies	XXXX					XXX			

Table 2. (Continued)

Activity Cost[a] ($\times 10^3$\$)	Description of Monitoring Activity[b] (Activity No.)	Objective 1 collect baseline data	Objective 2 establish cause/effect	Objective 3 compare WQ with goals	Objective 4 publish reports	Objective 5 Revise WQS	Objective 6 assess WLA and permits	Objective 7 assess overall abatement program	Objective 8 insure compliance with NPDES permits	Objective 9 prepare enforcement
6.3	Review Mahoning River WQS (5)			XX		XXXX	XXX	XX		
25.4	Review statewide WQS (25)					XXXX	XXX	XX		
10.8	305b report (26)			XXX	XXXX	XX	X	XXX		
38.5	Compliance monitoring (1)	XXXX						XX	XXX	XXX
15.1	Compliance sampling inspections inspections with toxic bioassays (2)	XXXX	X	X	XXX		X	XX	XXX	XXX
53.9	NPDES enforcement support (21)	XXX	XXX		X					XXXX
55.5	Investigate complaints (22)	XXXX	XX							XX

[a]Estimated costs of manpower and sample analysis(see appendix 2 for breakdown of costs).

[b]See appendix 1 for description of activities.

The activity score can be used to compute a dollar cost per unit score for each activity (Table 3). Those activities with low activity scores or those ranking in the top 25% with regard to cost per unit activity score may then be selected for immediate review. Using the ranking of cost/score ratios the five activities targeted for review are intensive surveys, USGS gages, USGS continuous monitors, state ambient network, and complaint investigations. Intensive surveys and both USGS activities are integral components of the state's monitoring effort and their high cost of operation overwhelms even high activity scores. However, because they are the most costly activities to maintain, every effort should be made to maximize the use of the data generated. The state ambient network is also expensive (even without transportation costs) and will be targeted for in-depth review. A combination of reducing costs and increasing the utility of the data should be sought. Complaint investigation appears to be an activity where substantial improvement in cost per unit activity score is possible. Investigating fewer complaints and utilizing the data to meet other objectives would improve the overall monitoring program.

Each interrelated component in the matrix is discussed in Appendix 6. We have attempted to define the regulatory monitoring system as precisely as possible. The purpose of this exercise is twofold. First, the comments and suggestions relating to each activity and objective provide a springboard for the assessment of data collection and analysis techniques. That is, it provides a starting point upon which a more thorough approach to managing, evaluating, and eventually optimizing the monitoring activities can be developed. Secondly, it provides a means of recording and organizing both general and specific ideas for improving monitoring activities. Many such ideas arise in "brainstorming" sessions or are suggested by outside-agengy sources, but are seldom written down and, thus, are not explored and implemented. Much of the narrative in Appendix 6 is only a skeleton upon which to build and refine. The descriptions of some portions of the matrix were made very brief because of the time constraints for completing this document. The most pertinent ideas and suggestions will be evaluated and incorporated into the monitoring activities through a system of addressing information needs (see Part 2.3).

Table 3. A ranking of 19 monitoring activities based upon the ratio of cost in thousands of dollars per activity score, a subjective evaluation of the activities' value to the overall monitoring program. Underlined activities are being reviewed to improve cost/score ratio.

Activity	Activity Score	Ratio Cost/Score	Rank
NAWQMN	13	3.9	8
State Ambient	13	5.7	5
NAWQMN biomonitoring	13	0.5	16
Fish toxic residues	11	0.3	19
Clean Lakes	13	2.1	11
Intensive Surveys	25	13.4	1
USGS Gages	10	7.6	3
USGS Low Flow	9	4.3	7
USGS Continuous Flow Monitors	16	10.3	2
USGS COD Monitoring	7	0.5	17
USGS Lake Studies	11	1.5	12
USGS Stream Reaeration	9	5.2	6
Mahoning R. WQS	11	0.6	15
Statewide WQS	9	2.8	10
305(b) Report	13	0.8	13
Compliance Monitoring	12	3.2	9
Compliance Monitoring - Toxic Bioassay	18	0.8	14
NPDES Enforcement	11	0.5	18
Investigate Complaints	8	6.9	4

PART 3
SURFACE WATER PROGRAM DESCRIPTIONS AND INFORMATION NEEDS

3.1 Agency Information Needs, Data Needs, And Monitoring Goals

For monitoring to be effective, that is for it to have a decisive impact upon wastewater management programs, the basic information needs of the management process must be assembled and addressed through the framework outlined in Part 2.3. An initial list of work or information needs was developed with input from various groups within the agency. These groups were asked to estimate the types and ammounts of information concerning water quality that their programs would require during the next 5 years. Table 4 lists the information needs of the water quality management programs administered by Ohio EPA along with one or more objectives for each need. The objectives are concise reasons why the information is needed for the management of specific programs. At present many information needs and objectives are broadly defined, however, every effort should be made to refine them as precisely as possible so that more specific data needs can be determined.

Table 4 also lists monitoring goals that have been established in order to fulfill the information needs. Most information needs have immediate goals or tasks identified which are a pre-requisite to proceding within the monitoring strategy framework outlined in Part 2.3. A review of each immediate goal should be undertaken to define the specific elements of the task, the resources and responsibilities for the task, and a schedule for completing the task. After the immediate goals are achieved it will be possible to review long-term goals (e.g., estimates of required monitoring activities) and to reset priorities.

The majority of the needs and goals of the 5-year Monitoring Strategy relate to the municipal construction grants program and its supporting activities. Information derived from water monitoring data must play an essential role in the municipal construction grant management process in order to ensure that expenditure of public funds are justified. Water monitoring data is necessary to satisfy two broad activities related to the construction grants program; 1) the water quality standards process, especially the evaluation of stream uses, and 2) the wasteload allocation process. The general kinds of data needed in these two activities are discussed seperately in Parts 3.21 and 3.22. This is followed by a section which outlines the integration of the two activities into a comprehensive water quality evaluation. Part 3.25 summarizes the construction grant program in Ohio.

The remainder of Part 3.2 addresses other water quality programs administered by the agency. The brevity with which some programs are addressed is not meant to denote that they will receive a secondary role in future development of the 5-year Monitoring Strategy or the Monitoring Program. Limitations on time and resources dictated that emphasis had to be placed somewhere, and the wastewater management program was the obvious choice because of ongoing efforts by Ohio EPA to obtain a State Management Assistant Grant (section 205g). Other water quality issues such as toxic pollutants, groundwater quality, and nonpoint pollution are important concerns and must receive greater attention in Ohio's Monitoring Program. It is our intent to better define Agency information needs and monitoring goals in these areas at the earliest possible date.

...le 4. A priority listing of the monitoring needs of the water qualit, ...anagement programs administered by the Ohio EPA. A generalized objective is listed for each need along with immediate and 5-year goals where they have been determined.

Part A - Surface Water Monitoring

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
GENERAL PROGRAM NEEDS			
1. Water quality assessments for small communities currently without WWTPs.	To document water quality impacts and justify treatment needs for municipalities entering construction grants program.	Immediate - select appropriate survey methodology. estimated # of surveys: '82: 30; '83: 50; '84: 70; '85: 40; '86: 10	Moderate
2. Water quality assessments and modeling for pending ADVANCED TREATMENT projects.	To justify funding ADVANCED TREATMENT construction grants projects in accordance with federal requirements.	Immediate - coordinate the development of detailed survey study plans with other information needs. estimated # of surveys: '82: 40; '83: 50; '84: 60; '85: 50; '86: 30	High
3. Water quality assessments of completed ADVANCED SECONDARY TREATMENT projects.	To assess impact of completed AST projects and to determine if AWT facilities are justifiable.	estimated # of surveys: '82: 0; '83: 5; '84: 10; '85: 15; '86: 20	Low-High
4. Stream surveys for pending municipal enforcement actions	To document extent of water quality problem in support of enforcement action	Immediate - review survey methodologies and derive guidelines estimated # of surveys: '82: 20; '83: 25; '84: 30; '85: 35; '86: 40	High
5. Stream surveys for pending industrial enforcement actions	To document extent of water quality problem in support of enforcement action	Immediate - review survey methodologies and derive guidelines estimated # of surveys Industrial: '82: 5; '83: 5; '84: 5; '85: 5; '86: 5 Coal program: '82: 2; '83: 2; '84: 2; '85: 2; '86: 2	High

Table 4. (Continued)

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
6. Water quality assessments and modeling in areas with permitted industrial entities.	To develop and support NPDES permit limits for industrial dischargers.	Immediate - incorporate as a factor in the selection of subbasins for survey See also #2 1986 - Have work completed in 107 subbasins	High
7. Stream surveys of 316(a) demonstration projects.	To verify that power plant thermal discharges with 316(a) variances have no adverse impact on aquatic life.	1982 - 2 surveys on Muskingum River 1983-'86 - periodic low-flow event effect monitoring in 3 river basins.	High ? Low
8. Evaluation of 316(b) demonstration projects.	To develop and implement a methodology for monitoring the entrainment and impingement of fish at cooling water intakes; To apply methods in the compliance monitoring of cooling water intakes in Lake Erie.	Immediate - development of methodology 1982-'86 - evaluate 6 projects in Lake Erie. especially # 11.	High ? Moderate
9. Evaluate acid mine drainage reclamation projects	To provide technical assistance to Soil Conservation Service regarding RAMP projects involving the discharge of impounded water; to assess the need for and effectiveness of other mine drainage reclamation projects.	Immediate - coordinate evaluation of RAMP projects with other data needs, especially # 11. 1982 - coordinate data collection and analysis with other agenices involved in the mine drainage issue (ODNR, Dept. of Interior, USGS). 1982-'86 - conduct studies and report results.	High High ?
10. Field testing of aquatic life stream use criteria.	To refine and validate the OEPA aquatic life stream use criteria, including EWH, WWH I, WWH II, and IS (formerly SWH)	Immediate - develop study plan and conduct field surveys in 1981. 1982 - write justification document for stream use criteria.	High High
11. Assess stream uses in Ohio's surface waters.	To review the water quality standards in accordance	Immediate - develop desk top review procedures (appendix 5) and review subbasin to be studied in 1981; Plan field work in streams to be reevaluated.	High
12. Develop procedures for non-aquatic life stream uses.	To establish consistent methodology to be employed in classifying water for non-aquatic life uses	Immediate - develop procedures.	High

Table 4. (Continued)

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
13. Review specific statewide WQS criteria.	To evaluate scientific validity and attainability in Ohio waters of the following criteria: Iron, Lead, Oil and Grease, Ammonia.	Immediate - assess need for review of other criteria, outline how any changes will be made.	High
14. Policy statement on use-value analysis.	To establish guidelines for assessing actual and potential benefits of stream use characteristics.	Immediate - define scope of statement and assign responsible staff.	High
15. Water quality surveys of high quality streams.	To develop baseline data necessary for the protection of high quality streams.	Immediate - develop methodologies and incorporate as a factor in the selection of subbasins for survey work; See also #2. 1982-'86 - survey high quality streams in all subbasins selected for study.	Moderate
16. Compile previous data on toxic pollutants in the aquatic environment and information on the generation and/or disposal of toxic substances within Ohio	To provide base line data for use in toxic pollutant monitoring and effluent control	Immediate - Develope a work plan for this task and coordinate with pretreatment, permitting groups, Hazardous Wastes, ect. 1982- Include results as part of 305(b) report	High
17. Monitor aquatic environment for the presence of toxic pollutants.	To evaluate potential problem areas and develop baseline data on toxics in water, sediment, and fish.	Immediate - list potential problem areas (subbasins); develop methodologies for evaluation; develop process charts for using information in WQS program, etc. 1982-'86 ?	High
18. Survey water quality in lakes and reservoirs.	To develop baseline data, especially for trophic status evaluation; to obtain necessary data for the Clean Lakes Program; to evaluate the effectiveness of lakes restoration projects.	?	?
19. Assemble report on the water quality of Lake Erie.	To strenghten 305(b) report; To provide information useful to the general public; To provide data useful to agency programs.	Immediate - Develop outline for report, and assign responsibilities for its completion.	Moderate

Table 4. (Continued)

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
20. Long term monitoring of surface waters.	To determine WQ trends and assess the impact of the states pollution control efforts as required by the 305(b) report.	Immediate - develop methodologies for data collection and analysis. 1982-'86 ?	Moderate
21. Develop feedback concerning federal water quality programs and incorporate into 305(b) report.	To effectively communicate, and document where appropriate, Ohio EPA's comments on federal programs.	Immediate - establish format and issues to be developed for 1982 and '84 305(b) reports.	Moderate
22. Investigate water pollution complaints.	To determine nature and extent of water quality problem.	Immediate - select a survey protocol and coordinate data collection with other information needs	Moderate
23. Develop set of basin maps for general use in the Division	To fulfill multiple uses in reporting monitoring data of all types, especially in 305(b) report.	Immediate - Determine the most useful format and have a final set of plates made by graphics	High
24. Compile historical record of pollution abatement projects in Ohio including data on costs, treatment types, and W.Q. improvements	To provide a data base to judge the effectiveness of pollution control programs	Immediate - Determine available means to accomplish task 1984 - present findings in 305(b) report	Moderate
25. Evaluation of groundwater monitoring and existing data.	To meet Section 305(b) reporting requirements;	Immediate - Describe data network, present yearly summary statistics, and characterize problems	High
	To locate areas of surface/groundwater hydrologic interaction.	1982 - map locations of groundwater/surface water exchange.	Moderate
	To integrate groundwater surface water monitoring;	1983 - coordinate activities of all groups involved and formulate a combined groundwater/surface water monitoring strategy.	Moderate
26. Developing integrated water quality monitoring throughout the State.	To compile bibliography of data sources on water resources/quality in Ohio;	1982 - complete bibliography	Moderate
	To develop a "water quality/data assurance system" in order to facilitate maximum exchange of data - between users;	1984 - finialize "water quality/data assurance system"	Low-High
	To institute a state-wide water monitoring strategy encompassing parties engaged in monitoring.	1986 - Implement integrated statewide monitoring strategy.	Moderate-High

Table 4. (Continued)

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
27. Water quality assessments of urban NPS runoff (including combined sewer overflows?)	To evaluate water quality problems (especially metals) arising from urban runoff and relate to WQS use-attainability; To assess proposed pollution abatement programs in light of findings.	?	?
28. Compile basin loading data for pollutants including non point and point sources	To meet requirements of Section 305(b); To aid in interpreting results from intensive surveys; To incorporate NPS loading into wasteload allocation process; To incorporate NPS loading information into decisions concerning phosphorus removal at WWTP.	1982 Develop software to calculate loadings for LEAPS and PEMSO data bases. 1982 - Finalize draft procedure for evaluating the impact of P removal on Ohio's surface water. 1984 - Report basin loadings in the 305(b) report	High Low Moderate
29. Water quality assessments of raw public water supplies (surface water only).	To insure public water supply WQS are met, especially with regard to toxic pollutants.	Immediate - coordinate activities of Office of Planning, Wastewater, and Public Water Supply.	?
30. Evaluate the Ohio EPA effluent monitoring program	To determine the effectiveness of the program and improve the rate of compliance; To coordinate the program with the other monitoring activities and needs	Immediate - Assess the methods used in compliance monitoring (including role of self-monitoring reports in selection of entities for sampling, rates of past compliance, etc.) and make recommendations. Compile basic facts on compliance program (see monitoring matrix)	High
31. Monitoring of major dischargers. 170 Municipal 100 Industrial	To insure compliance with NPDES permit conditions.		High

No. of entities	'82	'83	'84	'85	'86
Industrial					
CEI	50	40	25	10	0
CSI	50	60	75	90	100
Municipal					
CEI	135	130	120	110	100
CSI	35	40	50	60	70

Table 4. (Continued)

Part B - Point Source Effluent Monitoring

WORK OR INFORMATION NEEDS	OBJECTIVE	GOALS	PRIORITY
GENERAL PROGRAM NEEDS			
32. Monitoring of non-major dischargers. 1000 Municipal minors 500 Industrial primaries	To insure compliance with NPDES permit conditions.	Year No. of entities '82 '83 '84 '85 '86 Industrial CEI 100 200 300 300 300 CSI 50 100 175 175 175 Municipal CEI 200 300 400 500 500 CSI 20 30 50 75 100	High
33. Establish tracking system for effluent monitoring program.	To track where and what effluent monitoring needs to be done, and has been done; To optimize the use of effluent monitoring resources.	Immediate - outline specific needs of system, investigate current resources that may be of value.	
34. Bioassays of NPDES discharges.	To provide toxicity data used in permitting process: 1) for new sources 2) for establishing permit limitation 3) for compliance monitoring	Immediate - establish how managers would use data in writing permits. No. of bioassays '82 '83 '84 '85 '86 Public / Industrial Screening bioassays 10/30 20/40 30/80 40/100 50/140	
	To provide toxicity data for use in intensive studies.	Definitive bioassays 5/15 5/20 10/40 10/50 10/70 Flow-thru bioassays 0/5 0/5 0/10 0/10 0/15 Ames Test 0/30 0/30 0/30 0/30 0/30	
35. GC/MS Scans of NPDES discharges.	To provide data on the presence of toxic pollutants being discharged to the water of the State.	Immediate - coordinate with other information needs and activities (see #12). No. of scans '82 '83 '84 '85 '86 Industrial 15 20 40 50 70 Public 30 30 30 30 30	

3.21 Water Quality Standards - Stream Uses Determined thru Biological Criteria

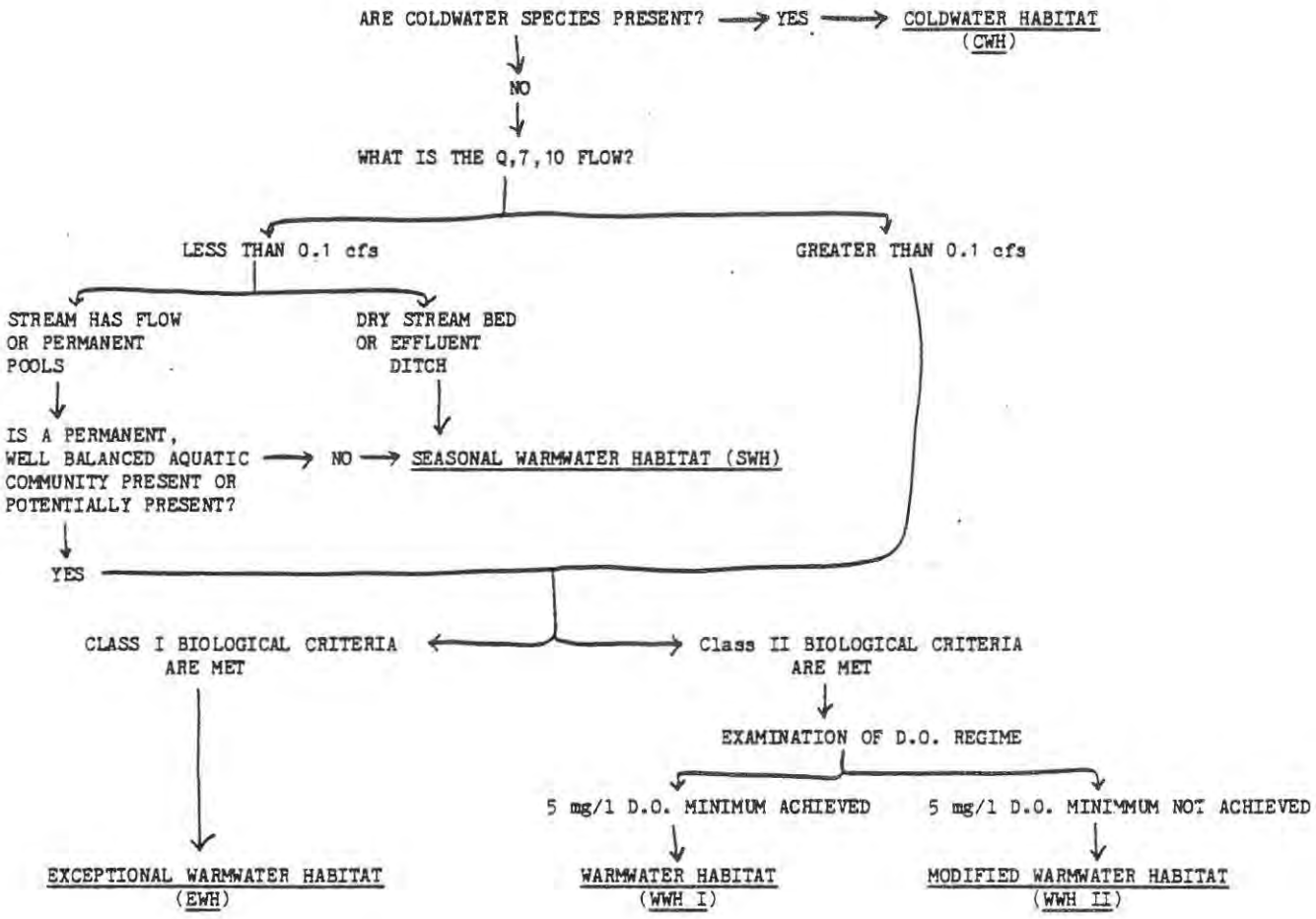
The primary data needs for the water quality standards program are for evaluating use designations and for establishing water quality limits or criteria for pollutants and other water body characteristics. A methodology for determining aquatic life uses has been developed. It is essential to refine the methodology through field studies in 1981 and to document the findings in a professional manner that will adequately support the agency's decisions on stream uses. A position paper or "White Paper on Aquatic Life Stream Uses in Ohio" will be produced in 1982. This position paper will address both existing stream uses and potential stream uses.

Constraints on available manpower and other resources are expected to preclude a detailed evaluation of stream uses for all waters of the State. Therefore when intensive survey/WLA studies are scheduled for a subbasin, the Division of Surveillance will review the appropriateness of the existing stream uses throughout the subbasin. This desk top review will involve consulting with district personnel, the Office of the Planning Coordinator, and other appropriate information sources. As many streams as possible in the subbasin will be examined but special emphasis must be given to segments which recieve point source discharges because of the potential impact on wastwater treatment facilities. However, all impacts on stream uses will be considered for all segments evaluated. The Division will recommend either a continuation of the existing stream uses or a re-evaluation of stream uses through the process described below. The reader is refered to Appendix 5 for a more in-depth discussion of the procedures and results of the desk top review.

Figure 3 summarizes the proposed methodology for determining aquatic life uses in Ohio's surface waters. Coldwater Habitat (CWH) waters are classified primarily from information on stocked streams supplied by the Ohio Department of Natural Resources (ODNR), and secondarily from information collected by Ohio EPA or others that would indicate that the stream use is attainable. The determination of the Q7,10 flow is based upon the records of USGS, ODNR, and Ohio EPA. Use classifications in streams with a Q7,10 of less than 0.1 cfs are determined acccording to the protocols established in "Procedures for Determining Use Designations for Low-Flow Streams", an Ohio EPA working document (Appendix 4). The U.S. EPA Rules concerning Ohio's WQS (45FR79053) requires that the Seasonal Warmwater Habitat use designation include a definition of the time period to which it applies and that it be done on a case by case basis.

Low flow streams and seasonal warmwater habitat will be evaluated in "White Paper on Aquatic Life Streams Uses in Ohio". The definition of SWH as currently used in the Ohio WQS is "...waters capable of supporting the propagation and habitation of aquatic organisms on a seasonal basis". At present, the use designation is not truly seasonal in that the set of criteria does <u>not</u> vary from one period of the year to another. Therefore, if this type of stream use and associated criteria are retained in the Ohio WQS a new set of seasonally variable criteria may be recommended. Although roughly correlated with flow, the designation of a SWH stream is <u>not</u> determined by the flow regime. The factor which characterizes such a stream is the presence or absence of certain biological communities on a year round basis (see Appendix 4). Thus, the stream is not seasonal in the sense that it lacks flow during part of the year, rather the stream is seasonal in the sense that it is without a certain characteristic fauna part of the year.

Fig. 3. A methodology for proposing stream aquatic life uses in Ohio's surface waters. The proposed use designations (underlined) are the starting point for wastewater management process chart (Fig. 1A, step 1.0).



Only a small fraction of the State's surface waters will be classified as Intermittent Streams or CWH. Most streams will be designated for other aquatic life uses based upon the biological criteria presented in Tables 5 and 6. Exceptional Warmwater Habitat (EWH) will be proposed in all cases where the Class I biological criteria are met. If conflicts arise where exceptional biological communities (Class I) are found in streams that do not meet the EWH WQS, then the level of protection (specific criteria) would be modified, provided the EWH WQS are not attainable because of environmental or economic reasons (see Part 1 and Fig. 1A). An evaluation of minimum dissolved oxygen (D.O.) concentrations will be conducted in streams where the Class II biological criteria are met. The issue of how and where to assess prevailing D.O. regimes and the influence of cultural modification in land use on the "natural regime" will be an important topic in the "White Paper on Aquatic Life Stream Use in Ohio." Warmwater Habitat (WWH I) will be proposed for those stream segments where Class II biological criteria are met and the minimum D.O. in stream sections unaffected by cultural impacts is 5 mg/l or above. Stream segments that cannot attain a 5 mg/l D.O. concentration because of prevailing land use impacts will be classified as Modified Warmwater Habitat (WWH II). Aquatic life stream uses that do not fully meet the fishable/swimmable goal of the Act are considered through the process outlined in Parts 1 and 3.23.

A procedure for determining other stream uses (i.e., public drinking water supply, industrial water supply, etc.) is being developed.

Data needs for criteria development are rather vague at this time. More specific information will be available once U.S. EPA gears up its WQS program to include criteria for toxic pollutants. Specific criteria are targeted for general review during the next revision of the Ohio WQS. The scientific basis and the attainability in Ohio waters of the iron, lead, and oil and grease criteria will be evaluated. Also, the table listing the ammonia criteria and the equation used to derive the values in the table must be examined for accuracy.

A list of the geographic locales where use attainability is an issue is provided in Appendix 5 of the 5-year Monitoring Strategy. Monitoring and data analysis activities in these stream segments will be a priority during the next five years. The 112 Limited Warmwater Habitat (LWH) stream segments are all candidates for a timely review of use-attainability because of their disapproved status with U.S. EPA. Stream segments where environmental conditions may substantially influence the attainability of a stream use are also listed in Appendix 5 of the 5-year Monitoring Strategy. All Exceptional Warmwater Habitat (EWH) streams and Secondary Contact Recreation (SCR) segments are also listed as locales where use-attainability data would be helpful because there is very little hard data supporting these classifications in most circumstances. We also suspect that some streams currently classified as WWH I or WWH II may qualify for the EWH designation.

!3.22 Wasteload allocations - section to be developed !

Table 5. Biological criteria (fish) for determining aquatic life use designations and attainment of Clean Water Act goals (November, 1980).

	---------- CWA GOALS MET ----------		---------- CWA GOALS NOT MET ----------	
Evaluation Class Category	"Exceptional" Class I (EWH)	"Good" Class II (WWH)	"Fair" Class III	"Poor" Class IV
1.	Exceptional, or unusual assemblage of species	Usual association of expected species	Some expected species absent, or in very low abundance	Most expected species absent
2.	Sensitive species abundant	Sensitive species present	Sensitive species absent, or in very low abundance	Sensitive species absent
3.	Exceptionally high diversity	High diversity	Declining diversity	Low diversity
4.	Composite index >9.0 - 9.5	Composite index >7.0 - 7.5, <9.0 - 9.5	Composite index >4.5 - 5.0, <7.0 - 7.5	Composite index <4.5 - 5.0
5.	Outstanding recreational fishery		Tolerant species increasing, beginning to dominate	Tolerant species dominate
6.	Rare, endangered, or threatened species present			

Conditions: Categories 1, 2, 3 and 4 (if data is available) must be met and 5 or 6 must also be met in order to be designated in a particular class.

Table 6. Biological criteria (macroinvertebrate) for determining aquatic life use designations and attainment of Clean Water Act goals (March, 1981).

	CWA GOALS MET		CWA GOALS NOT MET	
Evaluation Class Category	"Exceptional" Class I (EWH)	"Good" Class II (WWH)	"Fair" Class III	"Poor" Class IV
1.	Pollution sensitive species abundant	Pollution sensitive species present in moderate numbers	Pollution sensitive species present in low numbers	Pollution sensitive species absent
2.	Intermediate species present in low numbers	Intermediate species present in moderate numbers	Intermediate species abundant	Intermediate species present in low numbers or absent
3.	Tolerant species present in low numbers	Tolerant species present in low numbers	Tolerant species present in moderate numbers	Tolerant species abundant (all types may be absent if extreme toxic conditions exist)
4.	Number of taxa > 30	Number of taxa 25-30	Number of taxa 20-25	Number of taxa < 20
5.	Exceptional diversity Shannon index > 3.5	High diversity Shannon index 2.9-3.5	Moderate diversity Shannon index 2.3-2.9	Low diversity Shannon index < 2.3

!3.23 Ecomonic Evaluation and Analysis - this section still considered draft!

The basis in law for conducting economic analyses as part of the wastewater management process can be found in sections 302 and 303 of the Clean Water Act. In short, the Act states that the environmental benefits from a pollution abatement project must justify the costs of the project. More specifically, in section 303 of the Act there is a statement that the uses and values of a stream must justify the costs of a pollution abatement project. Therefore it is the policy of Ohio EPA to consider economic factors when stream uses and criteria are set.

Federal regulations concerning the downgrading of water quality standards for "widespread adverse economic impact" are published at 40 CFR 35.1550. Broad guidelines concerning downgradings were issued in Chapter 5 of "Guidelines for State and Areawide Water Quality Management Program Development" (USEPA, 1976), and within the last year a series of draft economic guidelines has been circulated by U.S. EPA. It is difficult to assess how the recent regulation "freeze" at the federal level will affect further development of national economic guidelines. In the absence of firm and reasonable federal guidelines the Ohio EPA will continue to refine its own economic analysis procedures.

For municipal projects income measurements are used to screen projects to see if the costs are too high. U.S. EPA is now using a table developed in the Illinois consent decree:

Median household income in community	Total wastewater service cost criterion (percent)	Wastewater service Cost/month
Less than $10,000	1.0	less than $8
$10,000 -17,000	1.5	$12 - $21
Over $17,000	1.75	$25 +

We consider these brackets too wide; also they haven't been adjusted for inflation so that almost all incomes in Ohio are in the top bracket. The bottom 5% income level villages fall in the second category which is much too high to avoid adverse economic impacts. The top category is much too low, the affluent communities in Ohio can pay as much as $50 per month. Because of these problems, we have our own measures of adverse impact - Tables A and B (Appexdix 7), which are inflation adjusted and better reflect actual conditions. These Table A serves as triggering mechanisms only. Detailed study of the ecomonic impact of a project is warranted wherever the wastewater service cost criteria in Table A is exceeded. Table B serves to delineate the uppermost financial burden of wastewater service cost that community can afford without "widespread adverse economic impact".

For industrial wastewater treatment projects the only measure now accepted for financial unreasonability is an expense which shuts the entity down. We are still working on a better measure of adverse impact.

The Ohio EPA is also developing a cost/benefit or use-value analysis. The Congress has mandated reviews of high cost projects to determine if they are justified and to avoid large expenditures for little or no environmental gain. While we are working on cost/benefit analysis, we have developed no objective tests for reasonability. Right now we are only considering projects where it seems obvious that the environmental gain does not justify the expense. We plan to draft a policy statement on the important issues to consider in use-value analysis. The policy statement must clearly communicate the ecological principles to consider when judging the value of individual components (e.g., stream segments) to the larger ecosystem (e.g., river basin). Guidelines must be given to ensure that the full range of actual and potential benefits are considered and given thier proper emphasis when weighing costs vs benefits. Cost/benefit analysis will never remove all subjectivity from the decision making on a project. What we hope to do is lower the subjectivity, not eliminate it from the decision making process.

3.24 Comprehensive Water Quality Evaluations

Purpose

The purpose of Part 3.24 is to outline the interactions of the Office of Constructions Grants and the Divisions of Water Quality Planning and Assessment (WQPA), and Surveillance and Standards, and Speical Projects in completing comprehensive water quality evaluations (i.e., WLA/intensive survey reports) needed for the management of water quality programs, especially wastewater programs.

Comprehensive Water Quality Evaluations

Why is a comprehensive water quality evaluation that simultaneously addresses wasteload allocation and intensive biological and water quality survey results needed? Most simply because it makes economic and environmental sense. The expenditure of public funds for the construction of advanced municipal treatment facilities will clearly continue to be monitored closely to ensure that the cost in dollars has real and worthwhile environmental benefits. The wasteload allocation (WLA) process, through assigning allowable pollutant loadings, sets the basis for the cost of wastewater treatment. However, the WLA process only simulates whether or not certain water quality parameters meet established water quality limits or standards. The WLA process alone does not adequately assess all of the environmental consequences of attainment or nonattainment of the water quality standards. In many instances, an intensive biological and water quality survey of the receiving waters must be made to appraise the real environmental benefits expected after advanced treatment is installed and operating as designed. Intensive surveys can also be used to evaluate stream uses and criteria (pollutant limits) and possibly recommend changes that will affect individual WLA's. Obviously, close coordination of WLA and intensive survey work is needed to insure the wise expenditure of construction grant funds. In recognition of this, the results of comprehensive water quality evaluations are depicted as a driving force behind the key management steps in the overall wastewater management process (see Part 1, Fig. 1A).

WQPA And Surveillance Interactions

Figure 4 illustrates the interactions of Construction Grants, WQPA, Surveillance, and economists (Division of Special Projects) in completing a comprehensive water quality evaluation. It is essential to recognize that each Office or Division retains complete autonomy over all activities for which it is responsible. The box shape in Fig. 4, denotes which group or division is responsible for the task or activity. Certain key elements in the process chart are denoted as coordinated activities to emphasize the need for close cooperation between the groups involved. This does not imply centralized authority or the absence of clearly assigned responsiblities: each division retains responsibility for their activities throughout the process chart. This is explained in more detail below.

Figure 4 also indicates the chronological sequence of steps in the process. Groups or blocks of activities are marked off with dashed lines and labeled with large numerals. These blocks of activities follow one another in the numerical sequence indicated. Concurrent blocks of activities appear as 2A, 2B, etc. The boxes for each activity are also numbered (0.101 to 0.20) for convenience in referencing and discussing the process chart.

Block 1 - Initial Planning

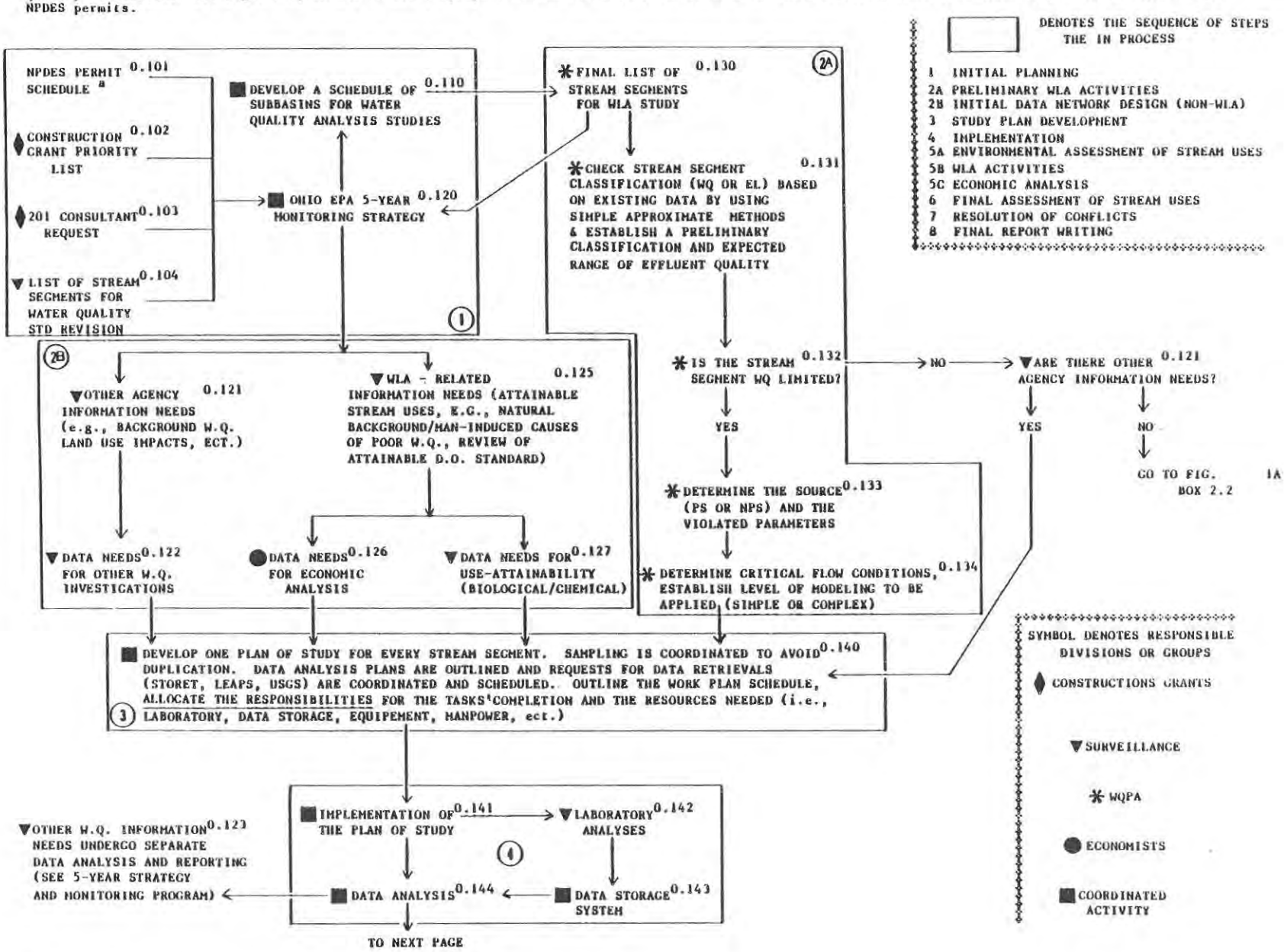
These activities result in a decision as to where WLA and intensive survey work will be done. The primary factors determining this are listed as 0.101 through 0.104. The 5-year strategy (0.120) serves as an organizational framework for this information. The 5-year strategy will project a schedule of subbasins for intensive monitoring efforts over the next five years. The schedule can be updated each year to reflect changing priorities on the construction grant list. However, the construction grant priority listing system must be revised to accommodate the limitations of the monitoring support activities upon which it depends. Substantial increases in monitoring support resources would be needed to adequately conduct water quality analysis studies as outlined here. Without the additional monitoring support to evaluate WQS and biological benefits at the same time that WLA's are done, there is no assurance that advanced municipal treatment projects will be cost beneficial.

Note that the 5-year strategy begins in 1982 meaning that the process was circumvented in 1981 (i.e. steps 0.101-0.104 directly to step 0.110). The initial planning steps will be greatly improved in subsequent years through the sequence of events discussed in Part 2.3.

Block 2A - Preliminary WLA Activities

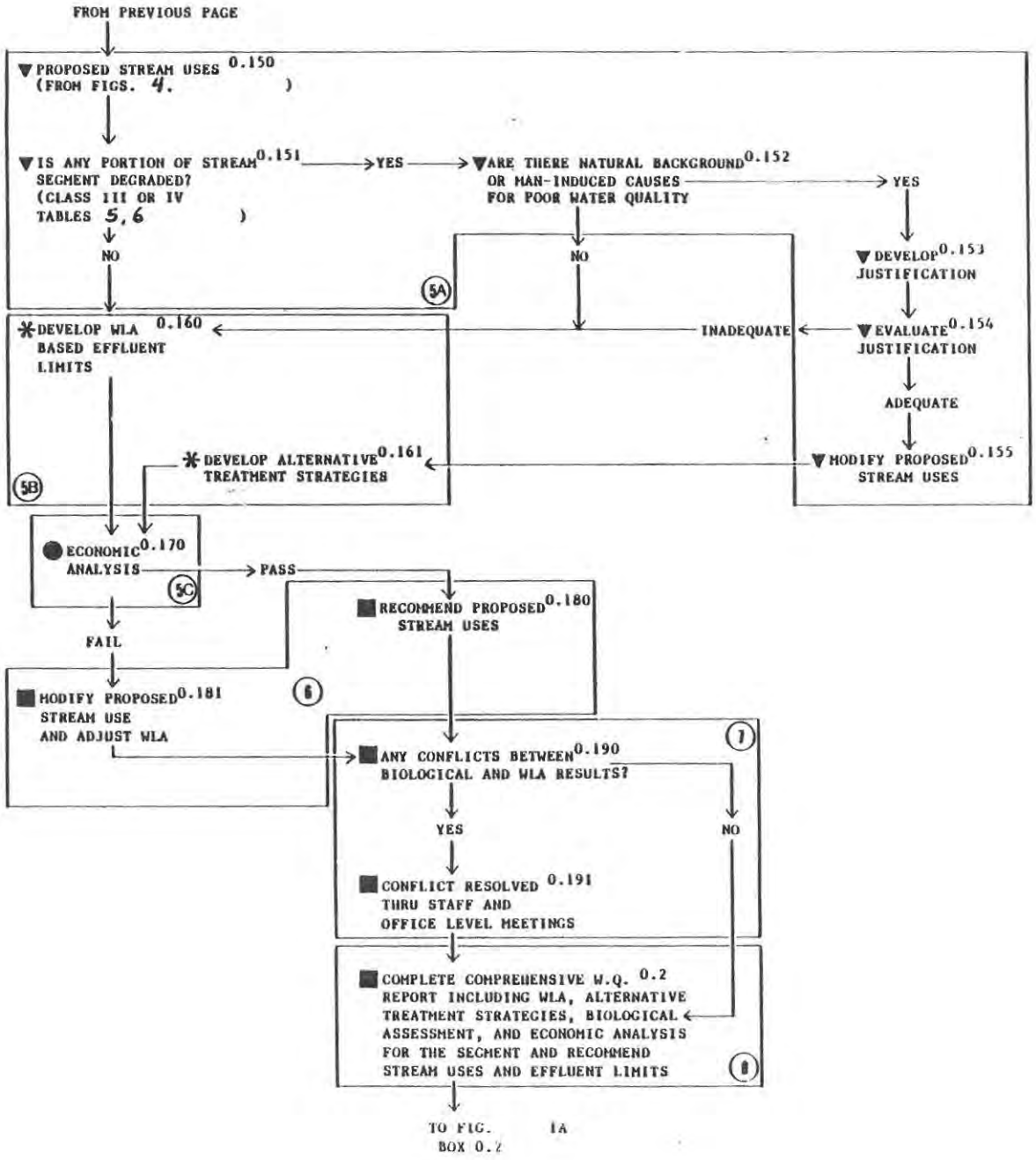
These activities are fairly self-evident and are discussed in further detail in Part 3.22. Responsibilities for the described activities are delegated within the division of WQPA. Note that the final list of stream segments where WLA studies will be done becomes part of the 5-year Monitoring Strategy.

Fig. 4. Process chart depicting the interactions of WQPA, Surveillance, Construction Grants, and economists in completing a comprehensive water quality evaluation. See Figs. V-5, 1A and 1B for a synopsis of how the evaluation is used in the overall wastewater management process of WQS, WLA and NPDES permits.



[a]Industrial and Public permitting groups are responsible for generating this schedule.

Fig. 4. (continued).



Block 2B - Initial Data Network Design

The Division of Surveillance will identify two categories of water quality information needs in subbasins scheduled for water quality analysis studies. First, information needs related to the WLA process such as stream uses and criteria, and secondly, other water quality information needs listed in the 5-year Monitoring Strategy. For some stream segments slated for WLA study, there may be no other information needs and the Division of WQPA would proceed independently, since there would be no need for coordination. However, it is very likely that other water quality information needs will be identified for most stream segments. At this point, a need for coordination of monitoring activities has been established and the process moves to block 3.

Block 3 - Study Plan Development

The Division of Surveillance will take the lead in coordinating development of study plans. This step represents the critically important coordination of monitoring activities between WQPA and Surveillance. Each group will bring to this step knowledge of the stream segment or segments in question obtained in the preliminary activities of blocks 2A and 2B. Each group involved will know what data is needed in order for them to complete their assigned tasks and will retain direct responsibility over seeing that it gets done. The major elements to be coordinated are spelled out in step 0.140 and the savings in manpower and resources should be obvious. A further benefit is that each group is aware of the others' activities and plans, which puts the overall study in perspective and improves the water quality evaluation.

Coordination between the Divisions of Water Quality Planning and Assessment and Surveillance and Standards will occur in the following specific areas:

1. The scheduling of stream segments for waste load allocation, water quality analysis, and intensive surveys must be coordinated between WQPA and Surveillance and take into account the 5-year Monitoring Strategy. Intensive stream surveys conducted by Surveillance for the purpose of establishing baseline conditions and use designations must precede or coincide with the WLA and water quality analysis.

2. Coordination in the development of AT justifications is particularly critical. The need for treatment beyond secondary must take into account the actual benefits that will be derived from the standpoint of both improved water quality and the recovery of degraded aquatic communities. The results of intensive stream surveys and WLA's will provide the basis for recommendations made regarding whether or not an AT project should be approved and to what degree advanced treatment should be provided.

3. The level of effort expended by Surveillance for a given project will largely depend on its size and complexity. Generally projects classified as simple by WQPA will require less effort than those classified as complex. These determinations will be made on a project by project basis in coordination with WQPA.

4. The development of a plan of study for each project must be closely coordinated between Surveillance and WQPA. Although many aspects of the field work for intensive surveys (Surveillance) and water quality analysis (WQPA) are different in scope and purpose certain areas require close coordination. Particularly important is the collection of data for model calibration and verification in which both Surveillance (Districts) and WQPA staff will be involved.

5. Coordination of field work between the intensive survey and water quality analysis parts of certain projects will be required to avoid duplication of effort. This coordination should be identified and detailed in the plan of study.

6. Although many aspects of the data analysis between Surveillance and WQPA are separate by definition, there are certain areas where close coordination is needed to avoid duplication. Requests for data from USGS, LEAPS, and STORET made by Surveillance and WQPA may often times overlap. It should be the responsibility of the Surveillance and WQPA project coordinators to cooperate in making such requests. It is also essential that the WLA report be comprehensive by combining the results, recommendations, and conclusions of the wasteload modeling, water quality analysis and intensive biological and water quality survey. This is a fundamental and necessary requirement for the eventual issuance of a NPDES permit as outlined in Figure 1A.

7. Although revisions to water quality standards is primarily a Surveillance responsibility, close coordination with WQPA will be necessary. This coordination is particularly important in the establishment and/or modification of use designations and water quality criteria. It is critical that water quality standards issues be resolved prior to finalizing WLA's and subsequent approval or denial of AT projects.

8. Laboratory analyses must be carefully projected and scheduled to avoid overloading the analytical capabilities of the OEPA and outside labs. The allocation (parameter specific) and scheduling must include all water quality studies undertaken by the agency in a given year.

9. Equipment ordering, inventory, and repair will be critical as more and more concurrent studies are undertaken. Detailed plans of study will allow maximum utilization of critical equipment items and hopefully avoid delays caused by unavailable equipment.

Block 4 - Implementation of Intensive Survey

The study plan is implemented in this block. These activities are self-evident, but deserving of mention because if not done correctly and carefully, the data will be of no value. Resources must be available to complete laboratory analyses in a timely fashion and to enter the data into a useable storage system. Note that a separate activity is listed (step 0.123) for analyzing data to meet other water quality information needs (e.g. those in step 0.121) because they are not directly involved in the WQS, WLA, construction grant process.

Basically, there are three general facets of each intensive biological and water quality survey, 1) chemical/physical water quality, 2) macroinvertebrates, and 3) fish. The collection of water samples for chemical analysis is performed in each survey at pre-determined sampling locations at frequencies ranging from 3-4 times per summer (July-October) to once per week depending on the survey level. This will include stream flows when feasible. These are normally collected by District personnel. These chemical samples are used to characterize instream water quality over the sampling period and cannot be used for determining decay rates for non-conservative parameters (e.g. biochemical oxygen demand, ammonia, phenols, cyanide). Macroinvertebrates are collected at pre-determined sampling locations by setting out artificial substrate samplers for a six week period, usually between June and October. This work is performed by Biomonitoring Section personnel. Fish are collected at pre-determined sampling locations largely via the boat electrofishing method during July-October. This work is performed by Water Quality Section personnel.

Data collected for modeling analysis will be planned and implemented by WQPA. This work will involve grab samples, cross-sectional measurements, flows, diurnal oxygen measurements and time of travel studies in stream segments where simplified modeling is appropriate. However, in complex situations stream flow, time of travel, and 24 hour composite sampling for a period of 1 to 4 days will be required. This detailed sampling is necessary to determine stream assimilation, instream decay rates for non-conservative parameters, model calibration and verification and is different from the chemical sampling program used by Surveillance to characterize water quality over the sampling period.

Block 5A - Environmental Assessment of Stream Uses

Stream uses are intially proposed by the Division of Surveillance (step 0.150) according to the methodologies discussed in Part 3.21. Stream segments that do not meet the goals of the Clean Water Act (e.g., Biological classes III or IV) are evaluated to determine if natural background or man-induced causes prevent attainment of the proposed use. Where justified, the proposed stream uses from step 0.150 may be modified in step 0.155. Part 1 briefly discusses the options available in modifying use designations.

Block 5B - WLA Activities

The details of the WLA procedures are discussed in Part 3.22. Some WLA activities proceed concurrently with Block 5A activities. However, the development of a final set of WLA-based effluent limits is dependent on the proposed uses in steps 0.150 or 0.155.

Block 5C - Economic Analyses

Economic analyses are discussed in Part 3.23

Block 6 - Final Assessment of Stream Uses

Dependent upon the economic analyses, the proposed stream uses (steps 0.150 or 0.155) are either endorsed or modified.

Block 7 - Resolution of Conflicts

Should conflicts arise between the biological and WLA results, these will be resolved as indicated below.

Step 1 - The respective WQPA and Surveillance technical staffs will meet to discuss and attempt to resolve the conflict(s). The initial discussions will take place within a maximum of two weeks time.

Step 2 - If step 1 fails the respective WQPA and Surveillance Division Chiefs will meet with both staffs to attempt resolution. These discussions will also be given a maximum of two weeks to be successful.

Step 3 - If step 2 fails the respective WQPA and Surveillance Division Chiefs and staffs will meet with the Chief, Office of Wastewater to resolve the conflict. This step will occur within a maximum of 1 week .

Block 8 - Completion of Comprehensive Water Quality Report

The comprehensive water quality evaluation is compiled into an integrated final report which includes the recommended stream uses, the WLA results, the recommended effluent limits, the biological assessment, and the economic analyses. As with the activities in Block 3, each group retains responsibility for completing their section of the report, but it is a coordinated activity to insure continuity and effective communication. It is essential to maintain continuity and effective communication because of the reports' importance in the overall wastewater management program (see Part 1). The Division of WQPA will be responsible for the printing and distribution of the final document.

!3.25 The Construction Grant Program in Ohio - section to be included in the Monitoring Strategy for FY '83-'87!

!3.26 NPDES Permits - Basis for Renewals and the Effluent Monitoring Program
this section still considered draft, subject to ongoing discussions with U.S. EPA, Region V!

The Federal Water Pollution Control Act Amendments of 1972 broke precedence with the previous water pollution control legislation by instituting effluent limitations as the primary means to abate pollution and achieve clean water. The National Pollutant Discharge Elimination System (NPDES) was established in Section 402 to enforce the effluent limitations mandated by other sections of the act. Effluent control was a quick and effective way to abate pollution because point source dischargers were forced to upgrade treatment facilities and to meet the initial technology based effluent limitations by 1977. However, the level of pollution abatement achieved in this way varied from state to state across the country depending upon the level of wastewater treatment commonly existing in the state prior to 1972. In Ohio, the requirement for secondary treatment was not a radical change because of the high percentage of municipalities operating secondary WWTP's since the 1960's. The second set of technology based effluent limitations required by Section 301 (BAT, BTWWT) becomes effective in 1983 or 1984 and may have a greater impact on reducing pollutant loadings from municipalities and industries in Ohio.

Other strengths of the NPDES permit program include the condition for determining compliance with permit limitations and the option to pursue legal action when a discharger is not in compliance. Further, the permitting program gives the entity a set, or table, of limitations that will be enforceable, and thus provides the basis for designing the needed wastewater treatment facilities.

However, the permitting program is not without its weaknesses and unneeded expeditures on wastewater treatment facilities may result unless careful attention is given to the process of renewing permits. The overriding weakness of the NPDES program is the tendency to emphasize pollution abatement irrespective of the Clean Water Act goals of fishable/swimmable waters. Section 303 mandates that NPDES permits must contain limitations that comply with water quality standards if those limitations are more stringent than the technology based guidelines. This extra measure of pollution abatement may or may not be required to meet the fishable/swimmable goal, but this can only be determined through a comprehensive water quality evaluation (see Part 3.23). As emphasized in Part 1.2 of this document, the foundation of wastewater management must be sound biological and water quality monitoring from which decisions are made concerning WQS, WLA, and permit limitations. Issuing water quality based permits without an examination of stream uses and criteria circumvents the process outlined in Part 1.2, and transfers to a final permit table limitations that have unproven environmental benefits. It must be stressed that it is a gross over-simplification to assume that environmental benefits result from meeting a given WQS criteria, and it is especially inappropriate to give the alleged environmental benefit complete precedence over the cost of wastewater treatment facilities. However, this is exactly what has happened in some instances in Ohio because the permitting program has not been integrated with the water quality standard revision process. The sequence of decision making steps outlined in Appendix V of 205(g) delegation agreement strategy and the development of a technically sound monitoring program will eliminate this problem in the future.

Permit Review and Renewals

A general discussion of the permitting program was given in Part 1 and Fig 1B . Details of the municipal review process (Fig 1B, steps 4.3 & 4.31) are shown in Fig. 5.

All municipal permits are drafted by the Districts and submitted to the Central Office for final approval and issuence. Effluent limitations for the major parameters (BOD, SS, ammonia, and D.O.) are essentially a function of whether the segment is effluent limited or water quality limited. The Central Office municipal permitting staff checks on the appropriateness of the classificaton used by the District Offices because the classification of effluent and water quality limited segments has not been standardized throughout the State. In effluent limited segments secondary treatment is usually enough to meet the WQS criteria for convential pollutants. If it is a water quality limited segment then whatever is necessary to meet the WQS is specified in the permits provided it is not more stringent than 10 mg/l BOD, 12 mg/l suspended solids, 1.5 mg/l ammonia, and 5.0-6.0 mg/l D.O. District office personnel utilize the best available information in drafting WQ based effluent limitations, which usually consists of outdated or un-approved WLAs. However, because the Advanced Treatment review process requires justification of limits more stringent than secondary treatment, Ohio EPA does not renew water quality based permits until after a comprehensive water quality evaluation is done and approved by U.S. EPA. The justification of Advanced Treatment levels is performed according to the guidelines of PRM-79-7 and the procedueres discussed in Part 3.23. The backlog of 50-60 expired major municipal permits (see Appendix 6) places a high priority on scheduling the necessary field and office work so that these permits can be renewed with solid and justified limits derived from the comprehensive WQ evaluations.

Most industrial dischargers in Ohio were issued BPT permits before the 1977 deadline and most of the permits have expired or will expire in June 1981. The U.S. EPA is long overdue in issuing the next set of effluent limitations (BAT or BCT guidelines). Ohio EPA and U.S. EPA are negotiating a workable solution for re-newing industrial NPDES permits in a manner consistent with the principals in Part 1.2 and Fig. 1B.

Fig. 5 The municipal NPDES permit review process at Ohio EPA. [draft]

STREAM CLASSIFICATION	DISTRICT OFFICE ACTION	PERMIT LIMITS	CENTRAL OFFICE ACTION	
Effluent limited segment	Draft permit using technology guidelines	30 BOD 30 SS	Approve choice of stream classification	Issue permit
Water quality limited segment	Draft permit using "available" information	no more stringent than: 10 BOD 12 SS 1.5 ammonia	Delay action until comprehensive WQ evaluation is completed	Issue permit based upon WLA in the comprehensive WQ report

STREAM CLASSIFICATION	WWTP CONSTRUCTION	CENTRAL OFFICE ACTION	
Water quality limited segment where limits more stringent than 10/12/1.5 are needed	Build and operate WWTP which meets 10/12/1.5 limits	Assess need for lower limits by conducting a new comprehensive WQ evaluation	Issue permit based new recommendations

Effluent Monitoring Program

After the permit is issued (Fig. 1B, step 4.0) the effluent monitoring program (step 4.1) must be maintained to ensure compliance with permit limitations. Actually, effluent monitoring itself only determines compliance with permit limitations, but its function is to provide a basis for persuing legal action against discharges that violate their permits. The Litigation Sceening Committee of the Ohio EPA assesses the needs for enforcement action and additional data (steps 4.11 &4.12) for all cases of permit non-compliance reported by District Offices of the Ohio EPA.

Because it is an enforcement tool, the effluent monitoring program must be designed to be an effective mechanism to catch any violations of permit limits. A heavy reliance is placed on the self-monitoring data supplied by the dischargers in conjunction with agency sampling, inspections, and quality assurance practices. Specifically, compliance monitoring refers to measuring and analyzing effluent and reviewing reports and information obtained from dischargers. Compliance review is conducted by the Ohio EPA and refers to the review of all written material relating to the status of compliance of an NPDES permit. Compliance inspection involves field related activities conducted to determine the status of compliance with permit requirements and includes evaluations (non-sampling), facility inspections, and sampling inspections. In those inspections where samples are collected, the integrity of the sample must be guarded and thoroughly documented. The Ohio EPA has compiled a Quality Assurance Manual and employs a QA officer within the Office of Wastewater, Division of Special Projects, to handle this aspect of the program.

The basic effluent monitoring program goals which have been followed by Region V and Ohio EPA are (USEPA, 1981):

1. sampling inspections annually at all existing major permittees,
2. evaluations completed annually at all major permittees that are under construction or have previously demonstrated compliance,
3. examination of permittees quality control procedures, and
4. coordination, where practical, of sampling inspections as part of intensive surveys.

The recommendations of that same report questioned whether the priorities of the effluent monitoring program are in line with the program's function as an enforcement tool. Two important recommendations of the EPA report are paraphrased below:

1. Coordinate compliance monitoring with intensive survey data needs and work schedule,
2. Concentrate compliance monitoring where self-monitoring data and/or operation and maintainance problems have been identified.

The effluent monitoring goals established through the criteria listed above are shown in Table 4. These goals are in the process of being revised downward because of resource availability and a change in emphasis brought about by the recommendations cited above. We plan to evaluate the effluent monitoring program and make more specific recommendations as soon as possible.

Other Data Needs

The drafting of municipal and industrial permits often calls for information concerning the concentration of a particular parameter in the receiving water in order to determine permit limits that will meet WQS. This is particularly true with non-conventional and toxic pollutants. In the absence of any information regarding the in-stream concentration of a parameter, the permit writer is faced with guessing at a number that sounds reasonable or simply assuming a zero background level for the pollutant. The specifics of this kind of data need (parameter and location) must be communicated by the District offices to the Division of Surveillance. We plan to establish a tracking system to organize the detailed data needs within the effluent monitoring program. If enough led time is given it would be possible to schedule the necessary sampling and analysis. The tracking system would aid in optimizing resources through facilitating coordinating of data needs for the permitting program with other data collection activities. Data collection, especially for toxic substances, would be most efficiently obtained by coordinating the activity with the other data needs and activities discussed in Part 3.27.

The use of biological toxicity testing as a component in NPDES permits has recently been proposed by the U.S. EPA (1981). Authorized by Sections 308 and 402 of the Clean Water Act the toxicity tests will be used in three aspects of the NPDES permit program: a requirement to provide information in the application phase, a permit limitation, and a compliance monitoring requirement or a reporting requirement.

Toxicity tests will be required when:

1. technology-based guidelines are not available, or analysis for priority pollutants indicates their absence or only small amounts present,
2. technology-based guidelines are available and the discharge meets such limits, but because BPT is the equivalent of BCT or BAT, no additional treatment is required,
3. technology-based guidelines are available and additional treatment is needed to meet the guidelines but evidence (in form of experience or research) indicates there is still toxicity, and
4. receiving water is water-quality limited and the discharge is expected to have significant impact on it (need to have mixing zone study).

Our immediate goal in this area is to establish how managers would use bioassay toxicity data in writing permits in Ohio.

3.27 Toxic Pollutants

Environmental managers and the general public have voiced increasing concern over the occurrence of toxic and hazardous wastes in the environment during the past year or two. This concern has led to a strong emphasis on toxic water pollutants (also known as priority pollutants) within national water pollution control policies. Specifically, several factors are expected to prompt a rapid increase in the data needs related to toxic pollutants (Section 307(a)(1) of the Clean Water Act). New federal regulations on water quality standards may call for including selected toxic pollutants in state water quality standards. This will entail the establishment of criteria tailored to site-specific locales and will obviously require substantial information. In addition, fish tissue analysis, effluent monitoring, and enforcement monitoring will include the measurement of toxic pollutants.

Meeting the data needs of all toxic water pollutant issues must be an important component of the monitoring program. Two very general information needs have been established. The first is to compile previous data on toxic pollutants in the aquatic environment and also information on the generation and/or disposal of toxic substances within Ohio. This is a prerequisite for the design and operation of an effective toxics monitoring program. The immediate goals are to develop as much information as possible from a variety of sources and include the findings as part of the 1982 305(b) report. The second need is to establish a data network design to monitor the aquatic environment for the presence of toxic pollutants. Immediate goals here include developing scientifically based methodologies for evaluating the problem and developing process charts for using the information at the management level.

Two specific information needs concerning effluent monitoring of toxic water pollutants are included in Table 4. Both of these activities must be coordinated with other data networks aimed at determining the presence of toxic substances in the aquatic environment. Very rough projections of the number of bioassays and GC/MS scans are listed in Table 4. These estimates will be changed to reflect available resources and the requirements of evolving data networks.

Ohio EPA currently does not have the laboratory resources to conduct a comprehensive toxics monitoring program. Until such resources are developed, toxics monitoring by Ohio EPA will be limited. The Ohio Department of Health (ODH) acquired a gas chromatograph-mass spectrophotometer (GC-MS) in November 1980. Although a limited number of samples can be run by the ODH laboratories, fish tissue analyses and sediment analyses will be very restricted until additional manpower and space are made available.

!3.208 Water Quality Planning &
3.209 Lakes Program sections not avaliable!

3.210 The 316 Program

The Ohio EPA 316 program involves the assessment of impacts to fish and other aquatic life caused by thermal dischargers, 316(a), and cooling water intakes, 316(b). The program is administered by the Division of Industrial Wastewater. Guidelines for the program have been published (OEPA, 1978).

Many thermal dischargers (especially large electric utilities) cannot meet the Ohio in-stream water quality standards for temperature and thus have been required to submit reports or demonstrations that detail the impacts of the discharge on the receiving stream. The Ohio EPA has granted specific variances from the in-stream WQS to nine electric generating stations because, based upon an evaluation of the 316(a) demonstrations, they do not significantly harm the resident aquatic community. Intensive surveys performed on river basins where power plants are located would give Ohio EPA a means of verifying the findings of 316(a) demonstrations. In some cases, such as the Muskingum River, where 316(a) and 316(b) demonstrations are still under review the additional information provided by an intensive survey would be a valuable addendum to the reports submitted by the utilities.

The 316(b) demonstrations submitted by Ohio electric utilities show that cooling water intakes on Lake Erie kill more than 115 million fish per year. Ohio EPA is seeking to reduce these fish losses by requiring the utilities to modify the equipment or operating regimes of their plants. A sampling methodology needs to be developed to determine the effectiveness of cooling water intake modifications. Once a method is developed, the power plants should be evaluated on a yearly basis until such time that they demonstrate a significant reduction in the numder of fish killed.

3.211 The 305b program

Section 305(b) of the Clean Water Act requires each State to prepare and submit a biennial water quality report to the Adminstrator. This report is to include:

1. A description of the existing water quality of all navigable waters during the reporting period;

2. An analysis of the extent to which all navigable waters of the State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water;

3. An analysis of the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of the Clean Water Act, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary;

4. An estimate of (i) the environmental impact, (ii) the economic and social costs necessary to achieve the objective of the Clean Water Act, (iii) the economic and social benefits of such achievement, and (iv) an estimate of the date of such achievement; and

5. A description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs.

The U.S. EPA uses the 305(b) biennial water quality report as a reference for the review of federal program areas such as the continuing planning process, the water quality monitoring strategy submissions, and various grant applications filed under Sections 106, 201, 208 and 314 of the Clean Water Act.

The State of Ohio has outlined three basic functions of the 305(b) biennial water quality report:

1. An outlet for feedback concerning federal water quality programs,
2. A resource document containing information needed in management decisions including an assessment of the State's water pollution control programs, and
3. A reporting mechanism to the general public.

The feedback concerning federal programs is channeled into several categories including an analysis of the effectiveness of the Clean Water Act and an appraisal of U.S. EPA's administration of the Act. Specific changes in national water quality programs will be recommended wherever possible.

Future 305(b) reports submitted by Ohio will build upon the comprehensive reporting format initiated in 1980. The usefullness of the report in making management decisions on water quality issues will be strengthened through integrating 305(b) report planning with the 5-year Monitoring Strategy. Some water quality issues identified in the 5-year Monitoring Strategy will have specific 305(b) reporting plans outlined 2 or even 4 years in advanced. This will allow long range planning and allocation of resources for the completion of 305(b) reports. It will save time in compiling the report because the last minute "scramble" to assemble data and analyze it in a maner appropreiate for the 305(b) report will be avoided. Instead, specific data networks, designed for specific purposes and described in the Monitoring Program, ensure that data analysis will proceded quickly and with minimum effort. It may then be possible to devote more time to improving the presentation of results (graphs, maps, figures, summary statements) so that environmental managers and the general public are better informed about water quality in Ohio.

A basic outline for the 305(b) report is given below.

Core Report

Volumn 1. Executive Summary

a. summary of conclusions from other volumns
b. feedback concerning federal programs
c. summary of results targeted for management decisions
d. abstracts of other volumns (expanded table of contents)

Volumn 2. Monitoring Program Document

a. description of monitoring activities
b. evaluation of monitoring activities

Volumn 3. Ohio Lakes and Reservoirs

a. basic reporting of data
b. results targeted for management decisions

Volumn 4. Subbasin Reports

a. major basin summaries
b. subbasin summaries and detailed results
   1. attainment of CWA goals, assessments made only where chemical/physical plus fish and/or benthos data is available
   2. W.Q. degradation areas, assessments made where only chemical/physical data is available, or fish and/or benthos data is limited
   3. results targeted for management decisions if the issue is confined to a specific subbasin

Reference Document 1

Annual summary statistics for ambient W.Q. network

Reference Document 2

WQS Violations tables for ambient W.Q. network

Supplemental Reports and Reference Documents

Volumns 5 thru ?

These volumns will be added as needed to report the results which are targeted for specific management purposes when it is not appropriate to integrate the results into the Core Report. An example from the 1980 report was "Water Quality Analysis of Ohio Surface Waters in Abandoned Coal Mine Watersheds".

GLOSSARY

Data needs are general or specific types of data requested in the Monitoring Strategy or Program. These data supply the information required to make decisions regarding water quality management in Ohio.

Data network is a set of locations at which one or more types of data are collected for a single purpose or use (i.e., to fulfill specific information needs). Because data from any particular site may be used for more than one purpose, a single data collection site may play a role in more than one data network.

Fixed station monitoring means the repeated, long-term sampling or measurement of parameters at representive sites for the purpose of determining water quality trends and characteristics. A fixed station monitoring site may play a role in one or more data networks.

Information needs are general or specific types of information needed to manage the various programs administered by the agency. Also included are requests for information made by U.S. EPA.

Intensive survey means the frequent sampling or measurement of parameters at representive sites for a relatively short period of time (e.g., several days to several months). These surveys are designed to accurately assess water quality conditions and to determine cause/effect relationships primarily with regard to point source pollution impacts.

Monitoring Program refers to the document (Ohio Water Quality and Pollutant Source Monitoring Program) describing water quality monitoring in Ohio pursuant to Section 106(e)(1) of the Clean Water Act. This document is submitted to U.S. EPA, Region V, in August of each year and describes in detail the monitoring activities planned for the following federal fiscal year.

Monitoring Strategy (Ohio 5-year Monitoring Strategy) refers to the document describing the design and management of monitoring activities in Ohio. It is a 5-year planning tool which presents an organized system for the collection of information needed to manage the water quality of Ohio's surface waters. The document is revised in January of each year, is submitted to U.S. EPA Region V for review and comment, and then becomes the basis upon which the Monitoring Program for the next federal fiscal year is revised.

Monitoring activities refer to specific data collecting networks, systems, or surveys (i.e., NAWQMN, effluent bioassay screening, intensive survey) or monitoring-related activities (i.e., WQS review, 305b report) identified in the Monitoring Program or Strategy. They may fulfill one or more purposes.

Monitoring goals are projections of the amount and kinds of monitoring to be accomplished over a 5-year time period. The goals are designed to meet information needs based upon a system of high, medium, or low priority. Resources will be expended to meet all high priority goals before medium, and then low, priority goals are addressed.

Synoptic survey means the sampling or measurement of parameters at representive sites for a moderate period of time (e.g., several months to several years). The surveys are a middle ground between intensive surveys and fixed station monitoring. They are designed to answer specific questions about water quality conditions that cannot be assessed within a short time period, and yet are not adequately addressed through fixed station monitoring either. Examples of the uses of such surveys are assessing the impact of land-use on specific water quality characteristics, assessing background water quality, and determining sediment losses and the need for non-point pollution contol measures.

References

General Accounting Office. 1981. Better monitoring techniques are needed to assess the quality of rivers and streams, Volume 1. Report CED 81-30 General Accounting Office, Comptroller General of the United States, Washington, D.C. 121 pp.

Loftis, J.C., and R. C. Ward. 1979. Regulatory water quality monitoring networks - statistical and economic considerations. U.S. Environmental Portection Agency, Office of Research and Development, Las Vegas, Nevada. EPA-600/4-79-055. 89 pp.

Moss, M.E., D.P. Lettenmaier, and E.F. Wood. 1978. On the design of hydrologic data networks. EOS, Transactions of Amer. Geophysical Union 59: 772-775.

National Academy of Sciences. 1977. Analytical studies for the U.S. Environmental Protection Agency, Vol. 4, Environmental Monitoring. National Academy of Sciences, Washington, D.C. 199 pp.

Ohio Environmental Protection Agency. 1978. Guidelines for the submittal of demonstrations pursuant to Sections 316(a) and 316(b) of the Clean Water Act and Chapter 3745-1 of the Ohio Administrative Code. Division of Industrial Wastewater, Ohio EPA, Columbus, Ohio. 55 pp.

U.S. Environmental Protection Agency. 1975. Model state water monitoring program. Office of Water and Hazardous Materials, Monitoring and Data Support Division, U.S. EPA, Washington, D.C. EPA/9-074-002. n.p.

U.S. Environmental Protection Agency. 1976. Guidelines for state and areawide water quality management program development, Chapter 5, water quality standards. U.S. EPA, Washington, D.C. n.p.

U.S. Environmental Protection Agency. 1977. Basic water monitoring program. Developed by the standing work group on water monitoring. U.S. EPA, Washington, D.C. 51 pp.

U.S. Environmental Protection Agency, 1981. Use of effluent toxicity testing in the second round of NPDES permit issuance, January 1981, draft. U.S. EPA, Office of Water Enforcement, Industrial Permits Branch, Washington, D.C.

Ward, R.C. 1979. Regulatory water quality monitoring: a systems perspective. Water Resources Bull. 15:369-380.

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 1

Monitoring Activities List, FY'81 106 Grant

OEPA FY 81 Water Monitoring Outputs
"Modified Attachment A"

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
1	Districts	Conduct CSI or CEI at each major discharger	a) 30 Mun. CSI's b) 30 Non-mun CSI's c) 195 CEI's	July 30		ODH lab turn around time has been slow. Staffing problem in SW could cause a problem.	1. Progressing
2	Districts Webster	Expand Compliance Sampling Program to identify toxic substances including bioassay (Dapnia, fathead minnows), Ames Test, & organic scans	a)Sampling for toxics at 26 of the above CSI's b)Bioassay methods manual revision c)Full-scale bioassay (May 15-Sept. 30) d) Ames tests resource needs	May 15 May 15 Sept. 30 July 30		Organic analyses and Ames test to be done by dischargers	2. 10 screening bioassays completed. EPA input has not been received on Ames test and organics.
3	Districts	Upgrade quality of permittee self monitoring data by conducting CEI for for DMR Quality Assurance Program (this is not a PAI)	a) 98 CEI's for DMR quality assurance included in 195 CEI's above b) Review results from National Enforcement reference sample program, develop recommendations and do follow-up	July 30		Inspection includes review of analytical procedures but does not require analyzing unknowns or a review of analytical techniques by a chemist	3a) Progressing b) Results available from U.S. EPA. OEPA will begin reviewing.
4	Duffield	Initiate a program for pre-treatment CEI's	78 pretreatment CEI's included in 195 CEI's above			Additional inspection time to evaluate a municipalities pre-treatment program plus inspection of selected tributary facilities. See 10/21 memo from A.R. Winklhofer for details	4. See 10/21/81 memo for outputs 1) No progress-will be done 2) No progress-no completion date 3) inspections; Bellefontaine, Barberton, Steubenville Cleveland, Ripley

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
5	Yoder Dudley	Review WQS for the Mahoning River	Fish community assessed & designated			Difficulty in getting water quality data has caused delay.	5. Progressing;Draft 5/31
6	Garrett Martin	Identify activities OEPA is willing to implement GL monitoring with & without GLNPO funding assistance	a) Status report on GL monitoring activities & supplementary funding needs submitted to GLNPO b) Detail OEPA needs for establishing the capacity to implement contaminant trend monitoring c) Review & comments on GL Monitoring Strategy	May 15			6. a. Initiated review of data developed by by CLEAR. b. No progress. c. No progress.
7	Smith	Determine contaminant inputs into Lake Erie 1) Collect fish samples 5 rivers & 1 bay	a) Interagency agreement for fish contaminant monitoring b) Fish samples collected 6 sites	Oct. 80 Oct. 80	Oct. 80 Oct. 80		7. Completed
8	Garrett Districts	Control of Phosphorus SEA	Review 108 project, participate in Phosphorus Management Task Force and update phosphorus loads to Lake Erie			Also see Dr. Turner's 8/26/80 letter	8. Review completed transmittal 2/6/81. Tributary loading needs to be developed
9	Turner	Designate quality assurance coordinator & provide sufficient resources to carry out QA responsibility	Midyear and end of year report				9. Delayed due to freeze. Position posted for second time on March 23. Donna Meyers selected - probable start date of May 18, 1981.

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
10	Martin Estenik Dudley	Review & update Water Monitoring Strategy in conformance with Appendix A 40 CFR 35 including a monitoring strategy of toxic substances consistent with SEA	a) Submit State Water Monitoring Plan for FY 81 including toxics by by 12/31/80	Oct. 80	Nov. 80		10. 81 monitoring program submitted 11/80 5 yr. monitoring strategy rough draft completed by 2/15/81
			b) 5 Year Monitoring Strategy Final Draft	May 15			
			c) 5 year monitoring strategy final document	June 15			
			d) FY 82 Monitoring Plan Draft	July 30			
			e) Final FY 82 Monitoring Plan	Sept. 30			
11	Districts	Operate National Ambient Monitoring Network fixed stations	39 sites sampled according to frequencies & parameters listed in "Basic Water Monitoring Program". Data certified as accurate & put in STORET (9 sites operated by USGS)	Monthly		Physical/chemical data	11. Progressing
12	Abrams Yoder	Classify & prioritize publicly owned lakes	Sample 40 lakes & begin prioritization	Dec. 81		Reduced effort (2.6 to 1.2 MY)	12. Progressing
13	Districts	Determine nutrient loadings to Lake Erie. Monitor 3 Lake Erie tributaries that are not NAWN sites-Black, Rocky and Cuyahoga Rivers	OEPA operate 3 monthly sites, interpret data certified as accurate put on STORET	Monthly		Include additional parameters in lab pricing for all Lake Erie tributaries: Na, Cl, Ca, PCB, Dis. Silicate, & Sulfate.	13. Operating 3 monthly stations with additional parameters

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
14	Martin Abrams	Develop a prioritized list of fixed network sites that would be appropriate for biological monitoring & which support needs of water media programs. Complete monitoring program consistent with BWMP	Implement monitoring program at 10 sites & input data to STORET (benthos)	May 1		Stations reduced from 20 to 10	14. Delayed pending completion of 5 year monitoring strategy
15	Estenik Smith	Review Toxicant Monitoring Program	Draft report April Final report May 15, 1981			Resource requirements reduced 0.3 MY (0.4 MY to 0.1 MY) Highlight issue #3 SEA	15. No progress. Schedule will not be met.
16	Martin	Develop an interagency strategy for monitoring activities in Ohio	Draft report April 1981 Final report June 1981			Highlight issue #11 SEA	16. Progressing slowly Schedule will not be met
17	Gray Ioannides	Laboratory capability	Develop program needs for 3 years - Dec. 1980 Prepare implementation plan by April 1981	Mar. 13 May 15		Highlight issue #12 Requirements reduced 0.1 MY	17. Draft has been delayed now scheduled for 5/15/81. June 1 is more realistic.
18		Review existing data & prepare report on extent of problem, additional data needs & recommendations for Lake Erie problem areas	a) Maumee Estuary Report January 1981 b) Cuyahoga, Black, & Rocky River Estuary Report March 1981 c)Prepare report for Ashtabula Area by June 81 utilizing existing data.			Highlight Issue #9,SEA	18a) No progress, delayed indefinitely b) No progress, delayed indefinitely. c) Fish collected, data will not be available until June or July
19		Prepare workplans for needed corrective action Maumee, Cuyahoga, Black & Rocky Rivers	Report prepared by June 1981			Highlight issue #9 SEA	19. No progress

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
20	Districts	Operate State Fixed Monitoring Network	a) 34 monthly stations b) 43 quarterly stations	Monthly		Existing OEPA program Continue until monitoring strategy review completed.	20. All stations operational
21		Monitoring & case preparation to support NPDES enforcement	Provide necessary data & expert testimony to support enforcement action			Existing OEPA program	21. Continuing
22	Districts	Water Pollution complaint investigations	Respond to public complaints			Existing OEPA Program	22. Continuing
23		Technical assistance to public, consultants, public agencies, & industry with regard to Ohio's Water Quality	Provide information for reasonable requests			Existing OEPA Program	23. Continuing
24	Albrecht	Section 401 - State Water Quality Certification for dredge and fill activities	Review an average of 25 applications per month			Existing OEPA Program Section 401, CWA	24. Continuing
25	Garrett Martin Yoder Dudley	Water Quality Standards Program	Provide expertise for review & development of WQS. Not including Mahoning River			Section 303, CWA Awaiting revised regulations or guidance	25. Progressing, lack expertise for toxics
26	Estenik Districts Abrams Yoder	305(b) Water Quality Report	Continue work to improve quality of report & reduce time to complete report	Apr.1, 1982			26. Progressing

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
27	Yoder	STORET, data entry, review and retrieval	Enter fixed station & intensive survey data into STORET. Insure quality of data.	Sept '81		USEPA requirement. Will be hiring an ES1 under 205(g) beginning July 1. This should help improve data handling and entry.	27. Delays in entering ambient data. Data is not being entered when new station descriptions are needed (intensive surveys) Need to improve data handling storage and retrievals methods.
28	Yoder Abrams	Intensive stream survey data analysis, interpretation & report preparation	a) Reports for: Olentangy River Paramour Creek Scioto River Big Darby Creek Gilroy Ditch Great Miami River Little Salt Creek Walnut Creek Rocky Fork (new 2/23/81)	 Sept '81 Sept '81 Jul. '81 1982 Apr '81 Apr '81 Sept '81 Jun '81	(all benthic drafts completed) Dec '81	2.3 WY-data analysis interpretation, report preparation & coordination with Water Quality Management Division 0.6 WY-benthic invertebrate sample analysis 0.4 WY-fish sample analysis	28. Olentangy-9/30 Paramour-9/30 Scioto-final draft 2/20 Big Darby - 1982 Gilroy - completed Great Miami - 4/30 Little Salt - 4/30 Walnut - 9/30 Rocky Fork - final draft
29		Evaluation of POTW chlorination policy	Assist IJC & Region V Waste Load Allocation Committee in evaluating chlorination practices				29. No progress, because no WLAC meeting
30	Amragy	Develop simplified AWT/AST justification, WLA's and conduct intensive surveys	a) Great Miami River WLA (mainstem only) b) Great Miami tributaries 1) 22 simplified AWT/AST projects			1)Report preparation only; data collected in FY 80 or under	30a) Progressing - draft - July 1 b) Project list for tributaries increased to 41 simplified & complex projects

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
Amragy			2) 2 complex AWT/AST (Urbana and Tipp City)			contract 2)Tributary projects will be completed based upon construction grant priority list	
Amragy			c) Simplified and complex AWT/AST projects on OEPA fast track list			c) Projects to be selected after reviewing grant priority list and OEPA "fast-track" list will be available October 31, 1981	c) List of all projects for 1981 under 205(g) 106 and 208 will be sent by May 1
Martin			d) Intensive survey for WLA (Scioto River) Field work & some data analysis			d)Data analysis, modeling & report preparation FY 82	d) Deleted - will do 205(g)
Amragy Martin			e) Toxics evaluation with items c and d			e)Compile and evaluate available toxics data do process evaluation and assess potential for presence of toxicants.	e) Will consider during plan of study development. Will also use pretreatment recomendations
Amragy			f) Reaeration & decay rate studies				f) Progessing
Martin			g) Weekly biological & chemical monitoring associated with item d			Work completed by surveillance staff. Specific segments to be determined by 1/81	g) Draft segment list completed. Final list March.
Martin			h) Little Miami - chemical/physical monitoring			Protect high quality water & revise WQ standards	h) Planning will take place 5/4 through 6/1/81
Martin			i) 205(g) treatment needs assessment and stream use attainability (physical, chemical, bilogical work)	Mar. 6		Surveillance & Standards portion	i)Progressing under 205(g)

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
31	Management Support	a)Division of Surveillance b)Division of Planning & Assessment				15% of Act. 30, a-d.	31a) Continuing at higher than anticipated level b) Continuing
32	Garrett Martin Yoder	Division Filing System for Surveillance	Central Divisional Files	June 30		new 2/23/81	
33	Martin Yoder	Data handling, processing, storage and retrieval system - develop plan of action	Improve efficiency, enter new data into STORET, improve software	June 30		new 2/23/81	
34		Participate in interagency committees	a)ORSANCO Criterica WQ conflicts Comm.(Martin) b) ORSANCO Biological Water Quality Comm (Abrams) c) ORSANCO Monitoring Strategy Comm (Yoder) d) ASWIPCA WQS Work Group (Martin) e) Ohio Ad Hoc Water Monitoring Comm (Martin) f) IJC Dredging Sub-Comm (Albrecht) g) IJC Phoshorus Issues (Garrett) h) IJC W.Q. Board Consultation (Garrett) i) Lake Erie Work Group (Wysenski and Garrett) j) IJC Lake Erie Problem Areas Assessment (Garrett)			New 2/23/81	

Activity	Responsibility	Description of Activity	Output	Date Due	Date Completed	Remarks	2nd Quarter Comments
35	Martin	Coordination and Contract	a) Develop FY 82 contract (Martin)			new 2/23/81	
	Garrett	Development with USGS	b) Review Low Flow Report (Garrett)		April 1981		b. Review completed
36	Martin Ioannides	ODH Laboratory Contract coordination and development	a) Oversee FY 81 contract b) Develop FY 82 contract			new 2/23/81	
37	Martin Gray	USEPA 106 grant, 205(g) grant and 314(a) grants	a) Develop, implement and oversee b)Coordination, discussions and coorespondence with USEPA			new 2/23/81	Preparation of 205(g) grant has been very time consuming since mid-February

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 2

Estimation of Costs for Monitoring Activities

Total Activity Cost ($x10^3$ $)	Description of Monitoring Activity (Activity No.)	Central Office Salary Costs $	District Salary Costs $	Sample Analysis Costs (#)	Sample Analysis Costs $	Other Costs $
51.3	National Ambient Water Quality Monitoring Network (NAWQMN) (11)		15,828	(6900)	35,466	
74.1	State Ambient Water Quality Monitoring Net.(20 & 13)		24,194	(9700)	49,858	
6.3	NAWQMN - Biomonitoring (14)	6307		(40)		
3.2	Monitoring Lake Erie fish for toxic residues (7)	2102	1131			
27.0	Clean Lakes Program (12)	21,024	4522	(300)	1542	
334.4	Intensive Surveys (re: AST/AWT, WLA) (30 & 28)	69,379	14,697	(36300)	186,582	
76.2	USGS Gages	54,662	9044			76,248
39.0	USGS low flow stations					39,050
165.0	USGS continuous water quality monitors					164,941
3.3	USGS COD monitoring					3250
19.3	USGS lake studies					19,340
36.6	USGS stream reaeration studies					36,575

Total Activity Cost ($x10^3$\$)	Description of Monitoring Activity (Activity No.)	Central Office Salary Costs \$	District Salary Costs \$	Sample Analysis Costs (#)	Sample Analysis Costs \$	Other Costs \$
6.3	Review Mahoning River WQS (5)	6307				
25.4	Review statewide WQS (25)	23,126	2261			
10.8	305b report (26)	6307	4522			
38.5	Compliance monitoring (1)		24,812	(2650)	13,621	
15.1	Compliance sampling inspections inspections with toxic bioassays (2)	18,922	4522	(2050)	10,537	
53.9	NPDES enforcement support (21)	6307	38,439	(3000)	15,420	
55.5	Investigate complaints (22)		45,222	(2000)	10,280	

Methods for estimating costs

Salary costs - Annual cost (pay plus fringes) figures taken from the State employee position control roster (81/10/04).

Sample analysis costs - An average cost of 5.14 dollars per sample analysis was assumed and multiplied by the number of analyses per activity. The average cost figure is based on the following:

	ODH Contract	OEPA lab	QA Program
$	183,000	$120,000	$ 20,000
# analyses	35,400	27,500	-

$ 323,000/62,900 analyses = $5.14 per analysis

Activities 11, 20 & 13, 14 - Number of samples estimated from needs inventory, July 1980 (attached).

Activity 12 - Number of samples estimated by John Youger, OEPA, Biomonitoring Section.

Activities 1 & 2 - Number of samples estimated from needs inventory, July 1980.

Screening bioassay costs included in activity 1 while 16 full scale bioassays are included in activity 2.

Activities 21 & 22 - Number of samples estimated by assuming that between 1/4 to 1/2 of the work days spent on these activities would involve the collections of samples at 3 sites and analysis of 30 parameters. Man year estimates were provided by the Districts.

Activity 30 - Number of samples projected based upon 1980 intensive survey record:

Scioto R. - 2369 analyses
Mahoning R. - 3286 analyses
Great Miami R. - 6254 analyses
Walnut Cr. - 3581 analyses
Little Salt Cr. - 2800 analyses
Others - 1000 analyses
Organic scans - 700 analyses

USGS activities - Costs taken from proposed cooperative program FY '81, dated 81/10/03 (attached).

7/1/80-6/30/81

PROPOSED COOPERATIVE PROGRAM

State Fiscal Year 1981

Date 10/3/80

Ohio Environmental Protection Agency ØH09

Item No.	Description	Proj. No.	Cooperator funding				Federal matching	Tota fund
			Repay	Direct	Unmatched	Total		
1.	Discharge Stations (29 stations)	001	36,844	796	968	38,608	37,640	76,248
2.	CQ Ground Water (12 wells)***	003	0	1,100	0	1,100	1,100	2,200
3.	COD Analysis (NASQAN) (9 stations)	003	1,625	0	0	1,625	1,625	3,250
4.	Water Quality Annual Summary ****	003	0	0	2,075	2,075	0	2,075
5.	Misc. WR Investigations	010	11,000	0	500	11,500	11,000	22,500
6.	Low-flow Stations and WQ Analysis	016	19,525	0	0	19,525	19,525	39,050
7.	Lake Quality Study	027	5,580	4,090	0	9,670	9,670	19,340
8.	Monitor Stations *	042	76,068	5,915	975	82,958	81,983	164,941
9.	Low-flow Frequency Report **	044	4,000	0	0	4,000	4,000	8,000
10.	Stream Reaeration Study	053	13,500	0	9,575	23,075	13,500	36,575
	TOTALS		168,142	11,901	14,093	194,136	180,043	374,179

* Assumes operation of 15 monitors (1/2 or less support)
** Extend thru 12/80
*** Discontinued 10/1/80
**** Discontinued 10/1/80

Ohio EPA, Office of Wastewater Pollution Control[a]
5 Year Laboratory Needs Projection - October 1979 to September 1984

April 25, 1980

BACKGROUND

This 5 year laboratory needs assessment was prompted by an April 3, 1980 request from Williams Sanders, Director, Surveillance and Analysis Division, USEPA, Region V. Input was received from the Divisions of Industrial and Public Wastewater, the Division of Water Quality Planning and Assessment, the Division of Surveillance and the District Offices. This assessment reflects our best estimate of our laboratory needs for the next five years based upon current laboratory requirements and recent program direction from USEPA. The needs are realistic in the sense that they reflect a pragmatic sampling program to meet the program requirements of the Office of Wastewater. However, these estimates may be unrealistic in the sense that they show expanded laboratory needs during a period of government austerity. The analytical needs and manpower assumptions are detailed by program area below. No manpower estimates are given for personnel to collect samples for Wasteload Allocations (WLA's) or for laboratory personnel to support increases in analytical requirements for conventional inorganic analyses, metals, organics and bacteriological analyses. However, manpower needs (above existing staff levels) are included for biological analyses, bioassay testing, sample collection (other than WLA's), and data interpretation (other than WLA's). All analytical needs are summarized in Attachments 1 to 5.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NDPES)

Analytical needs to support NPDES permit enforcement were separated into two cateogires. Compliance Sampling Inspections (CSI) Routine refers to all sampling inspections except for those requiring bioassay testing. CSI Bioassay Toxics refers to sampling inspections that include bioassay testing.

CSI Routine

The industrial CSI's assumed four sampling points per inspection and the municipal CSI's assumed one sampling point per inspection. The number of parameters per sample media are estimated needs based upon past sampling experience. Table 1 lists the expected number of municipal and industrial permit samplings by year. Table 2 summarizes the analytical needs for industrial and municipal CSI's by year and sample media.

(a) Contact Gary Martin, Ohio EPA, Division of Surveillance and Standards for further information 614-466-9092.

Table 1. Projected Municipal and Industrial NPDES permit CSI's for FY 80 to FY 84

Year	Municipal Samplings	No. of Municipal Samples	Industrial Sampling	No. of Industrial Samples	Total No. of Samples
FY 80	30	30	40	160	190
FY 81	40	40	100	400	440
FY 82	50	50	125	500	550
FY 83	60	60	150	600	660
FY 84	60	60	150	600	660

Table 2. CSI Routine Analytical Needs for FY 80 to FY 84

Sample Media	No. of Parameters per Sample	FY 80	FY 81	FY 82	FY 83	FY 84
Conventional	7	1330	3080	3850	4620	4620
Metals	6	1140	2640	3300	3960	3960
Organics	"scan"	100	160	200	240	240
Bacteriological	1	50	80	100	120	120

The number of samples and analyses to support the Division of Industrial Wastewater, Strip Mine Unit for NPDES enforcement is presented in Table 3.

Table 3. Strip Mine NPDES Enforcement Analytical Needs for FY 80 to FY 84.

Year	Total Samples	Total Conventional Parameters	Total Metal Parameters
FY 80	360	3100	2000
FY 81	360	3100	2000
FY 82	240	1875	1250
FY 83	120	925	600
FY 84	120	925	600

The increase in CSI's beginning in FY 81 would require an additional 1.5 Man Years committed to this program. Another 1.5 Man Years would be required beginning FY 82 for a total of 3 additional Man Years.

CSI Bioassay Toxics

Table 4 contains the projected number of bioassay types the Biomonitoring Section will be able to perform during the period FY 80-FY 84. These projections are based upon the assumptions that a proposed expanded bioassay[a] facility will be operational by 1982 and that an additional 1.5 personnel will be acquired by the same date.

Table 5 contains the projected number of chemical analyses required to be performed in conjunction with the bioassays listed in Table 4. These projections are based upon 17 individual conventional parameters and 15 individual metal parameters being analyzed at frequencies of two times when a screening bioassay is conducted, and 14 times when a full scale, or sediment, bioassay is conducted. These projections were achieved by multiplying the number of individual conventional, or metal, parameters by their analyzed frequency. The resulting product was multiplied by the projected number of bioassay types (one half the projected number, in the case of full scale and sediment bioassay); the resulting two, or three, products were summed. FY 80 is a combination of completed and projected analyses. Organic scans will be performed as needed, but were not included in these projections.

Table 4. Projected Number of Bioassay Types.

	Type of Bioassay			
FY	Screening	Full Scale	Sediment	Total
80	25	16	-	41
81	60	24	-	84
82	65	26	10	101
83	70	30	20	120
84	70	30	20	120

(a) See attachment 11 - "Ohio EPA Toxics Monitoring Program".

Table 5. Projected Number of Chemical Analyses.

FY	Type 1 Conventional Inorganics (17 parameters/sample)	Type 2 Metals (15 parameters/sample)
80	2754	2430
81	4896	4320
82	6494	5730
83	8330	7350
84	8330	7350

AMBIENT MONITORING

Analytical needs to support ambient water monitoring were separated into four categories. Surface Water Monitoring refers to the Ohio EPA fixed station State Water Quality Monitoring Network, mine drainage stream water quality assessments, compliant investigations involving surface waters, and site inspections for proposed discharges to Waters of the State. Wasteload Allocations (WLA) and Intensive Surveys includes all sampling to support development of WLA's and all intensive stream surveys. Basic Monitoring Network refers to the National Ambient Water Quality Monitoring Network (NAWQMN). Clean Lakes includes all monitoring efforts directed at water quality assessment of lakes in Ohio (Lake Erie excepted).

Surface Water Monitoring

The Ohio EPA fixed station State Water Quality Monitoring Network includes 34 monthly monitoring stations, 43 quarterly stations (sampled four times per year) and 54 low flow stations (sampled once a year during low flow). The fixed station monitoring network was projected to remain unchanged in analytical requirements for the next 5 years (see Table 6).

Table 6. Ohio EPA Fixed Station State Water Quality Monitoring Network Analytical Needs for FY 80 to FY 84

Sample Media	Monthly Stations	Quarterly Stations	Low Flow Station	Yearly Total
Conventional	4500	2200	700	7400
Metals	1200	700	450	2350
Organics	25	0	0	25
Bacteriological	800	300	100	1200

Compliant investigations and site inspections were based upon 250 samples each during FY 80 through FY 84. The analytical requirements are summarized in Table 7 for complaints and site inspections.

Table 7. Analytical Needs for Compliant Investigations and Site Inspections for FY 80 to FY 84.

Sample Media	FY 80	FY 81	FY 82	FY 83	FY 84
Conventional	5000	5000	5000	5000	5000
Metals	1500	1500	1500	1500	1500
Organics	25	25	25	25	25
Biological	10	20	20	20	20
Bacteriological	800	800	800	800	800

Mine drainage stream water quality assessments are based upon 8 conventional and 10 metal parameters per sample. Table 8 summarizes the number of analyses from FY 80 through FY 84.

Table 8. Analytical Needs for Mine Drainage Stream Water Water Quality Assessments for FY 80 to FY 84

Sample Media	Year	FY 80	FY 81	FY 82	FY 83	FY 84
No. of Samples		560	650	740	830	830
Conventional		4480	5200	5920	6640	6640
Metals		5600	6500	7400	8300	8300

Wasteload Allocations and Intensive Survey

Intensive Surveys

Intensive stream surveys are conducted by the Division of Surveillance and Water Quality Standards and include both biological and chemical analyses. The analytical requirements are based upon six intensive surveys on stream segments per year during FY 80 and FY 81 and nine intensive surveys per year during FY 82, 83 and 84. Table 9 summarizes the analytical requirements. Manpower needs include present staffing levels and six full-time summer employees each year for FY 80 and 81. Manpower needs for FY 82-84 include eight full-time summer employees each year and three permanent civil service positions beginning in FY 82. These additional manpower needs are shown in Table 10.

Table 9. Intensive Stream Survey Analytical Needs for FY 80 to FY 84.

FY	No. Survey Segments	Total Chemical Samples (a)	Total Macroinvertebrate Samples (b)	Total Fish (c) Samples
84	6	720	48	192
81	6	720	48	192
82	9	1080	72	288
83	9	1080	72	288
84	9	1080	72	288

(a) Based upon 10 stations sampled 12 times on each intensive survey stream segment. Assume 15 conventional and 10 metal parameters per sample. Organic scans performed as needed.

(b) Based upon 8 benthic macroinvertebrate sampling stations for each intensive survey stream segment (each station sampled once using artifical substrates).

(c) Based upon 16 fish sampling stations for each intensive stream survey segment (each station sampled twice using boat electro-fishing).

Table 10. Additional Manpwower Needs for Intensive Stream Surveys.

FFY	Chemical Sampling	Biological Sampling	
	Summer	Summer	Civil Service
80	2	4	0
81	2	4	0.5
82	3	5	3.5
83	3	5	3.5
84	3	5	3.5

Wasteload Allocations (WLA)

Analytical needs are difficult to predict at this time; however, estimates are shown in Table 11. No man power estimates are included.

Table 11. Analytical Needs to Support WLA's

FY	Conventional Parameters	Metal Parameters
80	6000	1000
81	6000	1000
82	6000	1000
83	8000	1500
84	10000	1500

Basic Monitoring Network

The analytical needs to support the 39 station National Ambient Water Quality Monitoring Network (NAWQMN) is expected to be constant for FY 80 to FY 84. The analytical needs include 5000 conventional parameters, 1400 metal parameters, 40 biological samples (20 benthic macroinvertebrates and 20 periphyton), and 500 bacteriological samples per year.

Clean Lakes

In the OEPA/USGS cooperative program most analyses are being done by USGS, only those analyses being performed by the ODH Laboratory have been estimated. In the OEPA Seasonal Lakes Program all analyses are performed by the ODH Laboratory. The analytical needs for clean lakes are summarized in Table 12. Manpower needs include 2 summer full-time positions in FY 80, 82, 83 and 84 and 4 summer positions in FY 81.

Table 12. Analytical Needs for Clean Lakes, FY 81 - 84[a]

FFY	OEPA/USGS Program	OEPA Seasonal	Trophic Classification
80	100	600	500
81	100	600	1000
82	100	600	500
83	100	600	500
84	100	600	500

(a) 85% conventional parameters, 15% metal parameters.

Ambient Monitoring - Tissue/Sediment

SEDIMENT - Problem Assessment (Surface Water)
Intensive Survey, Basic Monitoring, 401

	Samples				Labs	
FY	Problem Assessment (Surface Water)[a]	401[b]	Intensive Survey[a]	Basic Monitoring[c]	Total ODH	Total OEPA
80	35	10	45	10	100	-
81	35	10	45	10	100	-
82	35	10	45	10	100	-
83	45	20	50	10	100	25
84	50	30	60	10	100	50

(a) Sample includes following parameter types: 7 conventional, 10 metals, 1 organic scan.

(b) Sample includes following parameter types: 5 conventional, 10 metals, 1 organic scan.

(c) Sample includes following parameter types: 10 metals, 1 organic scan

TISSUE[a] - Problem Assessment (Surface Water), Intensive Survey, Basic Monitoring

FY	Problem Assess. (Surface Water)	Intensive Survey	Basic Monitoring	Total
80	-	-	-	0
81	-	-	-	0
82	-	-	-	0
83	25	25	-	50
84	50	40	10	100

(a) Sample includes following parmeter list: 10 metals, 1 organic scan

DREDGING/WETLANDS

The following assumptions have been made:

(a) one additional person in 401 program by FY 82.
(b) number of applications received reamins unchanged at 240/year.

Water Samples

Water samples include 15 conventional parameters and 10 metal parameters.
FY '80 - '81: 20% of projects sampled.
FY '82: 30% of projects sampled.
FY '83: 35% of projects sampled and 15 previously permitted projects sampled for determining impacts and compliance.
FY '84: 40% of projects sampled and 25 previously permitted projects sampled for determining impacts and compliance.

Sediment Samples

Sediment samples include 7 conventional parameters, 10 metal parameters, and an organic scan.
FY '80 - 82: 4% of projects sampled
FY '83: 8% of projects sampled.
FY '84: 12.5% of projects sampled.

SUMMARY

A. Analytical Needs

The analytical needs to support Office of Wastewater Pollution Control Programs show an increase of 130% between FY 79 and FY 84. The needed increases by year are approximately 60% in FY 80, 15% in 81, 10% in 82 and 83, and 5% in 84. These needs could be met by increasing the ODH contract and expanding the Ohio EPA Laboratory (see attachments 6-10).

B. Manpower Needs

Manpower needs are not included for personnel to collect or analyze data samples for Wasteload Allocations, or for laboratory support for chemical analyses. All other manpower needs, above present staffing levels, are summarized below. The listed manpower needs are for the Division of Surveillance and Water Quality Standards.

Year	Summer Positions	Civil Service	Total
80	8	-	8
81	10	2	12
82	10	9	19
83	10	9	19
84	10	9	19

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 3

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS

Appendix 3

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS

Appendix 3 provides a format for cataloging various water quality information needs by drainage basin units (subbasins). The function of appendix 3 is to maintain a general listing of all significant water quality/water resource issues in a subbasin for the following purposes.

1. To allow the selection of intensive stream surveys and synoptic surveys to be based upon consideration of more than just a single issue (e.g., Construction Grant Priority List)

2. Once streams are selected for study, to allow the monitoring design to consider and <u>possibly</u> supply data revelant to more than just a single issue.

It is our intent that the information in appendix 3 become the basis for choosing between two Construction Grant Projects (in seperate subbasins) of equal priority. This approach to selecting stream surveys, coupled with adequate monitoring design techniques, ensures that resources expended in monitoring efforts will yield data useful for multiple information needs.

Appendix 3
Notes for Users

Subbasin Name
An abbrievated name of the hydrologic unit or subbasin. The subbasins listed are those delimited by the Ohio Department of Natural Resources. (citation?)

Subbasin Code
A letter/number code for each subbasin following the system established by the Ohio DNR.

Year of Survey
A projected scheduling of water quality surveys for the subbasins based upon the needs and priority issues which are identified in subsequent columns.

Advanced Treatment Issues
!A method for listing these issues will be identified in the final Monitoring Strategy, '83-'87 (Jan. 1982)!

Major and Sign. Dischargers (major and significant dischargers)
Mun. (municipal) - The number of major and significant minicipal dischargers (as identified in Ohio Water Quality and Pollutant Source Monitoring Program for FY '81) is listed followed by the permit expiration date(s) in parentheses.
Ind. (industrial) - The number of major and significant industrial dischargers (as identified in Ohio Water Quality and Pollutant Source Monitoring Program for FY '81) is listed followed by the permit expiration date(s) in parentheses.

LWH Seg. (Limited Warmwater Habitat segments)
The number of stream segments classified as LWH in the 1978 Ohio WQS is listed for each subbasin.

EWH Seg. (Exceptional Warmwater Habitat segments)
A subjective ranking (1= most suitable, 3= least suitable,) of the subbasins ability to support EWH communities is listed followed by the number of stream segments classified as EWH in the 1978 Ohio WQS. For example, a listing of 2,02 indicates that the subbasin is moderately capable of supporting EWH communities and that two stream segments were classified as EWH in 1978. The section of Surviellance derived the subjective evaluations based upon a modification of the Segment Scoring data found in the Construction Grant Priority system (citation?). !Subjective ranking will be revised in the final Monitoring Strategy, '83-'87 (Jan. 1982).!

Agr. (Agricultural WQ problem areas)
Information in this column derived from Agricultural Water Quality Problems Areas, Ohio EPA, Office of Planning (draft of 3/81). The number listed equals the square miles of drainage area which have been identified as critical area(s), times a weighting factor, where the weighting factor is 1.0 for category I critical areas, and 0.5 for category II critical areas. Water quality problems are known to exist in category I critical areas, while WQ problems are suspected in category II areas. The individual critical areas are listed in comment column.

Oil/Gas

A ranking of the potential of oil and gas drilling activities impacting the aquatic environment is listed for each subbasin (information has not yet been compiled). !Issue to be addressed in the Monitoring Strategy, '83-'87 (Jan. 1982).!

Mine Dra (Mine Drainage)

A subjective ranking (1=most severely impacted, 3= least severely impacted, 4=no impact) of mine drainage problems in each subbasin is listed followed by the number of streams segments classified as mine drainage affected in the 1978 Ohio WQS. For example, a listing of 2,03 indicates that mine drainage is a moderate problem in the subbasin and that three stream segments were classified as mine drainage affected in 1978. The Office of Planning, Ohio EPA conducted the evaluations.

Urb. (Urban non point impacts)

!Issue will be addressed in the Monitoring Strategy, '83-'87 (Jan. 1982).!

Pot. Sed. Yield Rank (potential sediment yield ranking)

Ranking of subbasins units with regard to gross erosion potential as calulated by the PEMSO model (citation?).

Toxics

A ranking of the potential for the presence of toxicants in the aquatic environment is listed for each subbasin (information has not yet been compiled). !Issue will be addressed in the Monitoring Strategy, '83-'87 (Jan. 1982).!

New Sources

Anticipated new point sources within the subbasin are listed in this column (information has not yet been compiled). !Issue to be addressed in the Monitoring Strategy, '83-'87 (Jan. 1982).!

Special Concerns

Special water quality concerns within each subbasin are identified in this column. Examples include special enforcement issues highlighted by the Litigation Screening Committee (LSC), lake survey priorities of the Clean Lakes Program, the Scenic Rivers program, and other issues identified by the Water Quality Review Board (WQRB) of the Office of Wastewater.

Abbreviations

SCR - Secondary Contact Recreation Segment

WQRB - Water Quality Review Board

Lake RPL - Lake restoration priority list

Agr. WQ problem areas - Agricultural water quality problem areas

WQ - Water quality

WQS- Water quality standard(s)

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Maumee R. Basin	A														
St. Marys R.	A-01			01('83)			3,00	026		4,00		10[illegible]			Lake RPL: Grand Lake St. Marys and Fourty Acre Pond Agr. WQ problem areas: category 1: Chickasaw & Little Chickasaw Creeks
L. Auglaize R.	A-02			01('85)			2,00	204		4,00		091			Agr. WQ problem areas: category 2: L. Auglaize R., Prairie Cr.
Upper Auglaize R.	A-03			02('80) ('84)	01('81)	01	2,00	167		4,00		097			Agr. WQ problem areas: category 2: upper Auglaize River
Ottawa R.	A-04			02('80) ('85)	03('79) ('80) ('80)	03	3,00	066		4,00		101			Agr. WQ problem areas: category 2: headwaters Ottawa River
Blanchard R. (lower)	A-05			02('77) ('85)			2,00			4,00		116			
Blanchard R. (upper)	A-06			01('82)	01('80)	01	2,00	123		4,00		116			Agr. WQ problem areas: category 2: upper Blanchard River
Upper Maumee L. Auglaize	A-07				01('78)		2,00	107		4,00		081			Agr. WQ problem areas: category 2: Flat Rock Creek
Tiffin R.	A-08			02('81) ('85)			1,00	037		4,00		111			Agr. WQ problem areas: category 2: Lost Creek, Beaver Cr
St. Joseph R.	A-09				01('82)		1,00			4,00		121			

[a] See [illegible] notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Maumee R. (middle)	A-10			02('83) ('85)	01('81)		2,00	072		4,00		119			Scenic River Agr. WQ problem areas: category 2: South Turkeyfoot Creek
Maumee R. (lower)	A-11			02('82) ('85)		01	2,00			4,00		127			Scenic River
Maumee R. (lower) Tenmile Cr.	A-12			02('80) ('82)	02('80) ('82)	02	2,00			4,00		128			
Portage R. Basin	B														
Upper Portage R.	B-01			02('83) ('85)		02	3,00	160		4,00		118			Agr. WQ problem areas: category 1: Middle Branch & Bull Cr. (category 2): Rocky Ford Cr. Lake RPL: Van Buren Lake
Lower Portage R. Muddy Cr.	B-02			02('82) ('83)	02('81) ('81)		3,00			4,00		108			
Toussaint Cr. adjacent L. Erie tributaries	B-03				04('79) ('79) (2@'80)		3,00			4,00		124			

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Sandusky R. Basin	C														
Tymochtee Cr.	C-01						1,00	300		4,00		114			Agr. WQ problem areas: category 1: Tymochtee Creek
Sandusky R. (upper portion)	C-02			02('80) ('83)		02	1,00	090		4,00		105			Agr. WQ problem areas: category 1: Broken Sword Creek
Sandusky R. (middle portion)	C-03						1,00	177		4,00		099			Agr. WQ problem areas: category 1: Honey Creek
Sandusky R. (lower portion)	C-04			02('80) ('80)	02('81) ('85)	01	1,00	191		4,00		110			Agr. WQ problem areas: category 1: Wolf Creek & Rock Creek
Huron, Vermilion, Black and Rocky R. Basins and Adjacent Streams	D														
Pickered Cr.-Pike Cr. and adjacent L. Erie tributaries	D-01			02('83) ('85)	03('81) ('81) ('83)		3,00			4,00		130			
Huron R.	D-02			03('80) ('82) ('83)		03	2,01	201		4,00		115			Agr. WQ problem areas: category 2: Holiday Lake tributaries Huron River
Vermilion R. and adjacent L. Erie tributaries	D-03			02('81) ('85)		01	2,01	200		4,00	Y	113			Agr. WQ problem areas: category 2: Vermilion R. headwaters
Black R.	D-04			04('81) (2@'80) ('82)	03('80) (2@'81)	02	3,00			4,00	Y	102			Lake RPL: Findley Lake
Rocky R.	D-05	1981		11('83) ('84) (9@'80)		04	3,00	150		4,00	Y	066			Agr. WQ problem areas: category 1: West Branch Rocky River

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Cuyahoga and Chagrin R. Basins	E														
Upper Cuyahoga R.	E-01	1981		01('80)	02('79) ('80)	02	1,00	102		4,00	Y	046			Agr. WQ problem areas: category 2: upper Cuyahoga River Lake RPL: Brady Lake, Punderson Lake, and Springfield Lake
Lower Cuyahoga R. and adjacent L. Erie tributaries	E-02	1981		11('79) (4@'80) ('81) (4@'82) ('83)	07('81) (2@'80) (2@'82) ('83) ('84)	09	3,00			4,00		051			2 SCR segments Lake RPL: Meadowbrook Lake, Sunny Lake and Lower Shaker Lake
Chagrin R.	E-03			01('82)	02('80) ('81)		1,01			4,00	Y	065			
Grand R. Basin and Adjacent Areas	F														
Grand R. (upper)	F-01						2,00			4,00		088			
Grand R. (lower)	F-02			01('80)		01	2,00			4,00		086			
Ashtabula R. and Conneaut Cr. and adjacent L. Erie tributaries	F-03			01('81)	08('78) (6@'81) ('??)	01	2,00			4,00		084			WQRB - Cowles Creek, stream use and economics of treatment alternatives for Geneva WQRB - Fields Brook, stream use and toxics criteria

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Wabash R. Basin	G			01'(83)	01('79)		3,01	125		4,00		085			Agr. WQ problem areas: category 2: headwaters Wabash River, category 1: Beaver Creek Barnes Creek, Coldwater Cr. Lake RPL: Grand Lake St. Marys
Miami R. Basin	H														
Upper Miami R.	H-01			01('82)			1,03			4,00					Lake RPL: Indian Lake
Portion Miami R. basin (Loramie) and Mosquito Cr.	H-02			02('77) ('80)			1,01			4,00		078			Lake RPL: Lake Loramie
Upper Mad R.	H-03			01('80)	01('84)		1,00			4,00					Lake RPL: Old Reid Park Pond, Snyder Park Lagoon ?
Miami R. (part of middle and lower Mad R.	H-04,05			06('80) ('81) (3@'82) ('84)	02('80) ('81)		1,03			4,00		078			Lake RPL: Hosterman Lake
Stillwater R.	H-06,07			02('80) ('85)			1,02	012		4,00		068			Agr. WQ problem areas: category 2: Brush Creek
Twin Cr. and Ohio portion of E. Fork of Whitewater R.	H-08,11						2,01	157		4,00		068			Agr. WQ problem areas: category 2: Twin Creek
Miami R. (lower part of middle portion)	H-09			06('82) (3@'80) ('83) ('85)	08('79) 01 (2@'80) (3@'81) (2@'82)		2,01	024		4,00	Y	067			Agr. WQ problem areas: category 2: Elk Creek

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Fourmile Cr.	H-10			01('80)	01('80)		2,02	069		4,00		050			Agr. WQ problem areas: category 2: Sevenmile Creek Lake RPL: Action Lake
Miami R. (lower portion)	H-11			03('80) ('80) ('81)	01('80)		2,02	053		4,00		036			Agr. WQ problem areas: category 2: Indian Creek Lake RPL: Miami-Whitewater Lake
Mill Cr. Basin and Adjacent Ohio R. tributaries	J			01('81)	02('79) ('79)	02	3,00			4,00	Y	016			SCR segment Lake RPL: Winton & Sharon Woods Lakes
Little Miami R. Basin	K														
Upper L. Miami R.	K-01			05('81) (4@'80)			2,04	119		4,00		076			WQRB - Gilroy Ditch, stream use and economics of treatment alternatives for South Charleston
Caesar Cr.	K-02						2,03			4,00		073			Agr. WQ problem areas: category 2: Caesar Creek
Todd Fork	K-03			01('80)			2,01	130		4,00		057			Agr. WQ problem areas: category 2: lower Todd Fork, Cowan Cr.
East Fork Little Miami R.	K-04			02('82) ('82)			2,03	039		4,00		072			Agr. WQ problem areas: category 2: Stonelick Creek Lake RPL: East Fork Lake, Stonelick Reservoir

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Portion Lower L. Miami R.	K-05			02('77) ('80)	01('81)	01	2,02	033		4,00	Y	060			SCR segment Agr. WQ problem areas: category 2: Turtle Creek and Dry Run Lake RPL: Lake Isabella
Indian Cr.	K-06						2,01			4,00		060			
Eagle, Ohio Brush, Straight, and Whiteoak Cr. Basins	L														
Whiteoak Cr.	L-01			01('77)			1,07	117		4,00		056			Lake RPL: Grant Lake Agr. WQ problem areas: category 2: Whiteoak Creek
Ohio Brush Cr.	L-02						3,02	217		4,00		038			Lake RPL: Adams Lake Agr. WQ problem areas: category 2: Ohio Brush Creek
Eagle Cr. and Straight Cr.	L-03						2,10	025		4,00		043			Agr. WQ problem areas: category 2: East Fork Eagle Creek WQRB - East Fork Eagle Cr., SEDO request for data prior to drafting permit for Copeland Corp. WQRB - Little Three Mile Cr. SEDO request for data prior to drafting permit for DP&L Stuart Station

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Drn	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Scioto R. Basin	M														
Scioto R. (part upper portion)	M-01			01('82)	01('80)		2,00			4,00		098			
Scioto R. (part upper portion)	M-02			01('80)	01('80)		2,00			4,00		098			Lake RPL: Richwood Lake WQRB - S. Rock Swale Ditch, stream use and permit for Whirlpool Marion Plant
Olentangy River	M-03			03('80) ('80) ('80)			2,00	078		4,00		104			Lake RPL: Mt. Gilead Lake, Pine Lake Agr. WQ problem areas: category 2: headwaters Olentangy River
Big Walnut Creek	M-04			02('82) ('??0)			2,03	095		4,00		090			Agr. WQ problem areas: category 2: headwaters Big Walnut Cr.
Mill Creek and portion of middle Scioto River	M-05			01('77)	01('81)		2,00	093		4,00		077			Agr. WQ problem areas: category 2: Mill Creek
Upper Darby Creek	M-06				01('80)		1,01	226		4,00		089			Agr. WQ problem areas: category 2: Big Darby Creek
Deer Creek	M-07						2,00	204		4,00		085			Lake RPL: Madison Lake Agr. WQ problem areas: category 2: Deer Creek, Clark Run, Duffs Fork
Scioto R. (middle portion)	M-08			03('80) ('80) ('85)	05('77) 01 (2@'80) (2@'81)		1,02			4,00		077			SCR segment
Walnut Creek	M-09				01('81)			140		4,00		079			Agr. WQ problem areas: category 2: Walnut Creek

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Salt Creek	M-10						2,03	226		3,00		026			Agr. WQ problem areas: category 2: Salt Creek
Scioto R. (lower portion)	M-11			01('80)			2,00	017		4,00		05			Agr. WQ problem areas: category 2: Kinnikinnick Creek
Lower Paint Creek	M-12			01('80)	01('79)		2,01	112		4,00		049			Agr. WQ problem areas: category 2: lower Paint Creek WQRB - Paint Creek, SEDO request for data prior to drafting permit for Mead Co.
Upper Paint Creek	M-13,14						2,02	072		4,00		049			Lake RPL: Paint Creek & Rocky Fork Res Agr. WQ problem areas: category 2: Rocky Fork
Scioto R. (lower portion)	M-15						2,00	072		4,00		026			Lake RPL: Lake White Agr. WQ problem areas: category 2: Sunfish Creek
Little Salt Creek	M-16			01('82)			2,02			3,00		05			
Scioto Brush Cr. and adjacent Ohio River tributaries	M-17						2,01	137		4,00		09			Agr. WQ problem areas: category 2: Scioto Brush Creek

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Raccoon Cr., Symmes Cr., Little Scioto R. and Pine Cr. Basins	N														
Upper Raccoon Cr.	N-01						3,03			1,05		037			Lake RPL: Lake Hope WQRB - Elk Fork, SEDO request for data prior to drafting permit for Austin Powder Co., (also ERB issue)
Lower Raccoon Cr.	N-02			02('77) ('77)	01('82)		3,03			3,04		011			Lake RPL: Lake Alma
Symmes Cr., Ice Creek, and Indian Guyan Creek, and adajacent Ohio R. tributaries	N-03,05				01('80)		3,02	178		3,01		022			Lake RPL: Jackson Lake Agr. WQ problem areas: category 2: Symmes Creek
L. Scioto R. and Pine Cr., and adjacent Ohio R. tributaries	N-4						3,01	116		3,00		010			Agr. WQ problem areas: category 2: Little Scioto River
Hocking R., Shade R. and Leading Cr. Basins	O														
Hocking River (upper portion)	O-01			01('80)			3,01	049		3,00		045			Agr. WQ problem areas: category 2: Little Rush Creek Lake RPL: Clouse Lake, New Lexington Reservoir
Hocking River (middle portion)	O-02			01('83)			3,04			3,02		031			
Hocking River (lower portion)	O-03			01('82)			3,02			3,01		013			Lake RPL: Dow Lake
Shade R. and Leading Creek	O-04						3,02			3,00		029			

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Muskingum R. Basin	P														
Black and Clear Fork	P-01			02('80) ('80)	02('80) ('81)	01	1,00			4,00		063			
Lower Mohician R.	P-02			01('80)	02('78) ('81)	02	1,00			3,00		058			Lake RPL: Charles Mill Reservoir
Upper Killbuck Cr.	P-03			01('80)		02	1,00			4,00		025			
Walhonding River (a portion)	P-04						1,00			4,01		021			
Tuscarawas River (middle) and Sugar Creek	P-05			03('80) (2@'82)	05('80) (2@'80) (2@'82)		2,00	178		2,00		020			Agr. WQ problem areas: category 2: Sugar Creek, Walnut Creek, & Goose Creek WQRB - Sugar Creek, SEDO request for data prior to drafting permit for Dover Chemical Co. WQRB (?) - Brush Run, stream use and economics of treatment alternatives at Baltic
Tuscarawas River (upper portion)	P-06			03('80) ??????	04('80) (2@'81) ('??)	07	2,00			3,00		047			SCR segment Lake RPL: Firestone and Nimisila Reservoirs, Summit Lake
Sandy Creek	P-07			01('80)	04('80) ('80) (2@'81)	04	2,00			3,00		064			SCR segment
Conotton Creek	P-08						2,00			1,01		042			Lake RPL: Sippo Lake
Stillwater Creek	P-09			01('83)			2,00			3,05		040			Lake RPL: Piedmont Lake

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Tuscarawas River (part, lower portion)	P-10			02('77) ('80)	02('81) ('81)	01	2,00			3,00		047			
Muskingum River (part, upper portion)	P-11			01('80)	02('80) ('81)	01	3,00			4,02		021			
Kokosing River	P-12			01('80)			1,00	050		4,00		058			Agr. WQ problem areas: category 2: headwaters Kokosing River
Licking River (part portion)	P-13			01('80)			3,01			4,00		061			Lake RPL: Dillon Reservoir
South Fork Licking River	P-14			02('84) ('85)	01('81)		3,00			4,00		061			Lake RPL: Buckeye Lake
Moxahala Creek	P-15						3,01			1,02		044			Lake RPL: Essington Lake
Muskingum River (middle portion)	P-16			01('82)	02('80) ('81)		3,01			1,01		033			Lake RPL: Cutler Lake
Lower Wills Creek	P-17				01('81)		3,00			1,03		039			Lake RPL: Wills Creek Lake WQRB - Wills Creek, SEDO request for data prior to drafting permit for NCR
Upper Wills Creek	P-18			01('80)	01('79)		3,00			1,03		039			SCR segment WQRB - see P-17
Lower Muskingum R and adjacent Ohio R. tributaries	P-19				02('81) ('82)		3,02			1,01		032			
Little Muskingum R.and Duck Cr. Basins	R-01,02			01('77)						1,07		006			Lake RPL: Wolf Run Reservoir

[a] See user notes on pages 2-3 for explaination of column headings and contents.

CATEGORIES OF MONITORING NEEDS LISTED BY SUBBASINS[a]

Subbasin Name	Sub basin Code	Year of Survey	Advanced Treatment Issues	Major and Sign. Dischargers Mun.	Major and Sign. Dischargers Ind.	LWH Seg.	EWH Seg.	Agr.	Oil Gas	Mine Dra	Urb.	Pot. Sed. Yield Rank	Toxics	New Point Sources	Special Concerns Enforcement, Clean Lakes, Scenic River, etc.
Little Beaver, Yellow, Cross, Short, Wheeling, McMahon, Captina, and Sunfish Creek Basins	S														
Little Beaver Cr.	S-01			01('80)	02('80) ('??)	02	1,00			3,00		080			Land fills Lake RPL: East Palestine Reservoir, Guilford Lake
Yellow Cr., Cross Cr., & McIntyre Cr.	S-02				02('79) ('80)		1,01			1,02		017			Lake RPL: Jefferson Lake
Short Creek, and Wheeling Creek	S-03				01('79)		1,00			1,03		004			first ODNR strip mine plan WQRB - Piney Fork and Perrin Run, Consolidation Coal Co., Piney Fork Mine permit and and reclaimation issues
McMahon Creek, Captina Cr., and Sunfish Creek	S-04						1,00	057		1,06		002			Lake RPL: Belmont Lake Agr. WQ problem areas: category 2: Sunfish Creek
Mahoning River, Pymatuning and Yankee Creek Basins	T														
Mahoning River (upper portion)	T-01			01('81)	01('77)		3,00			3,00		126			Lake RPL: Lake Park
Mahoning River (middle portion)	T-02						3,00			3,00		100			
Mahoning River (lower portion)	T-03	1980		09('77) ('79) ('80) ('81) (4@'82) ('??)	12('79) (4@'80) ('81) (2@'82) ('83) (3@'??)		3,00			3,00		100			Lake RPL: Mosquito Creek Reservoir, Newport Lake
Pymatuning Cr. and Yankee Creek	T-04						3,00			4,00		096			Lake RPL: Pymatuning Reservoir

[a] See us notes on pages 2-3 for explaination of column headings and contents.

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 4

Low-Flow Stream Use Designation Procedures

!This procedure considered draft, will be revised and included as part of the "White Paper on Aquatic Life Stream Uses in Ohio" to be produced in 1982.!

PROCEDURES FOR DETERMING USE DESIGNATIONS FOR LOW-FLOW STREAMS

INTRODUCTION

Purpose and Need

The proposed procedure is an attempt to maintain some degree of objectivity in classifying low-flow streams which will allow Ohio EPA to arrive at a speedy decision with a minimum expenditure of funds and limited personnel. Determination of use designations is based upon the temporality of aquatic communities and the suitability of a low-flow stream habitat to support balanced communities of aquatic life on an annual basis.

Definition of Low-flow Stream

The adopted Ohio EPA definition (OAC Rule 3745-1-09) was disapproved by USEPA and has been redefined in the recent water quality standards proposal (44 FR 131, pp.39486-39508). The major change was with decreasing the 7Q10 flow criterion from 1 cfs to 0.1 cfs. All streams meeting this hydraulic criterion are to be classified as warmwater habitat (WWH) until they can be shown by Ohio EPA or an NPDES permit holder that a less beneficial use (e.g., Seasonal Warmwater Habitat, Limited Warmwater Habitat) is justifiable.

Sesonal Warmwater Habitat (SWH)

The adopted Ohio definition (OAC Rule 3745-1-07(D)) was also disapproved by USEPA and redefined (44 FR 131, pp.39486-39508). Again the major change was with the 7Q10 flow criterion of 1 cfs which is proposed as 0.1 cfs. The 50% wastewater flow condition remains the same. Were a stream low-flow to be reclassified from WWH, this use (SWH) would be the first choice. The current Ohio EPA waste load allocation (WLA) procedural policy indicates that if any initial WLA alternative includes SWH, then the Division of Surveillance and Standards provides an assessment. Therefore, it is essential that a workable procedure for making SWH determinations be available.

Existing and New Discharges

The determination procedure and hydraulic criteria varies slightly between streams with existing discharges and those with proposed discharges as outlined below:

Existing Discharge	New discharges
Must decide if WWH is necessary; based on existence of a balanced community of aquatic life.	Must define existing chemical/ physical and biological status and determine use classification. WWH is the minimum beneficial use acceptable; may recommend less beneficial use at public hearings.

GENERAL PROCEDURE

Procedural Flow Chart (refer to Figure 1)

Figure 1 outlines the general procedure for making use designation determinations in streams that meet the hydraulic criteria for low-flow streams. Initially, the need for such determinations will be a direct result of the initial WLA proposals. Individual low-flow segments will be referred to the appropriate District Surveillance Chief, at which time a site inspection and a determination of the stream flow status will be made. If the stream in question is an effluent ditch (i.e., flow is 100% effluent), or an intermittent-dry stream (i.e., dry stream bed, no standing pools), then no further investigation is necessary and the stream automatically is recommended for SWH. If the stream flow appears to be continuous, intermittent with pools, or of an undetermined status then an instream investigation will be necessary. The District Surveillance Chief may at this time choose to request field assistance from the Water Quality Section. The Water Quality Section has the option of either granting or denying the request for assistance. Requests for such assistance by the Districts should be made only in extreme circumstances. Upon completion of an instream investigation, the District Surveillance Chief will make the use designation determination.

Basis of Determination

Two basic requirements need to be met in order for a low-flow stream to be classified as a WWH:

1) there must be a balanced assemblage of aquatic organisms present; and
2) the aquatic communities must be able to inhabitat the stream on an annual basis.

A biological evaluation using fish has been developed to be used specifically for classifying low-flow streams. The evaluation incorporates the necessary population and community parameters needed to determine if a low-flow stream is capable of supporting a balanced community of aquatic organisms on a year-round basis.

FIELD METHODS

Investigations Not Requiring Instream Sampling

If a low-flow stream is determined to be an intermittent-dry stream or effluent ditch, then no instream sampling will be necessary. The investigator should complete the field inspection sheet (Figure 2) and take representative photographs of the site during the initial investigation.

Investigations Requiring Instream Sampling

If a low-flow stream is determined to be intermittent with pools, appears to have continuous flow, or is of an undetermined flow status, then an instream investigation will be necessary. Sampling location selection will vary from stream to stream and between streams with and without discharges. Representative locations should be selected and no more than 4 or 5 locations per stream should be necessary. Location selection and number of locations will be left to the discretion of each District investigator. Whenever a stream with one or more discharges is sampled, every effort should be made to base the determination on an upstream sample. Chemical/physical data should

be collected as specified on the field inspection sheet (Figure 2). All field and sample collection methods should conform to Ohio EPA Quality Assurance practices.

FIELD METHODS

Depending on stream size a 4'x8' to 6'x15' 1/8" ace mesh straight seine should be used to collect fish. Each sampling location should cover a minimum of 100 meters and include all macrohabitats (e.g. pools, riffles). Electrofishing in combination with seines may be used when necessary. Several passes should be made through the study area until the investigator is reasonably assured that the data collected is an adequate representation of the fish community. After identification, captured fish should be returned to the stream. Voucher specimens, if needed, should be preserved in a 10% solution of borax buffered formalin. An example data sheet is included in this outline (Figure 3).

ANALYTICAL METHODS

Fish Evaluation

This evaluation is based on the diversity and the temporality of the fish community and was developed specifically for use in classifying low-flow streams. Community diversity in terms of number of species, sensitivity of fish to water quality and environmental perturbations, and the relative mobilty of fish species are all considered in this evaluation. The computational formula is as follows:

Number of Fish Species x Fish Index= Fish Evaluation

The number of fish species is the number of species collected at each sampling location which are represented by two or more individuals. Species represented by only one individual will not be counted. The fish index is an evaluation based upon the relative mobility and general environmental sensitivity of each species as follows:

Classification	Sedentary	Mobile
Sensitive	10	5
Sensitive Intermediate	8	4
Intermediate	6	3
Intermediate Tolerant	4	2
Tolerant	2	1

Each fish species likely to be encountered in low-flow streams are assigned one of the values indicated above. These assignments are based on the scientific literature and/or best information available. Multiplying the number of fish species by the fish index yields the fish evaluation.

Additional Considerations

Another factor, which is not specifically included in the fish evaluation is the presence of certain key organisms which have long (i.e., < 1 year) life cycles. The incidence of such organisms (Table 1) in low-flow streams may be an additional indication that at least certain representatives of the aquatic community are present on an annual basis. This may provide additional information about the temporal aspects of the community and may aid the District investigator in making a final determination. In addition, the occurrence of an endangered species (Table 2) would automatically classify the stream as WWH or higher.

DECISION GUIDANCE

The objective of this procedure is to classify streams that meet the hydraulic definition of low-flow stream using a biological evaluation when appropriate. In order to calibrate the fish evaluation index several low-flow streams will be sampled using the methods and analytical techniques outlined in this procedure. As a result of these investigations ranges of values for each evaluation index characteristic of SWH and WWH will be determined.

Figure 1: Procedural flow chart for determining the use designation of streams which meet the hydraulic criteria of low-flow streams (OAC Rule 3745-1-09).

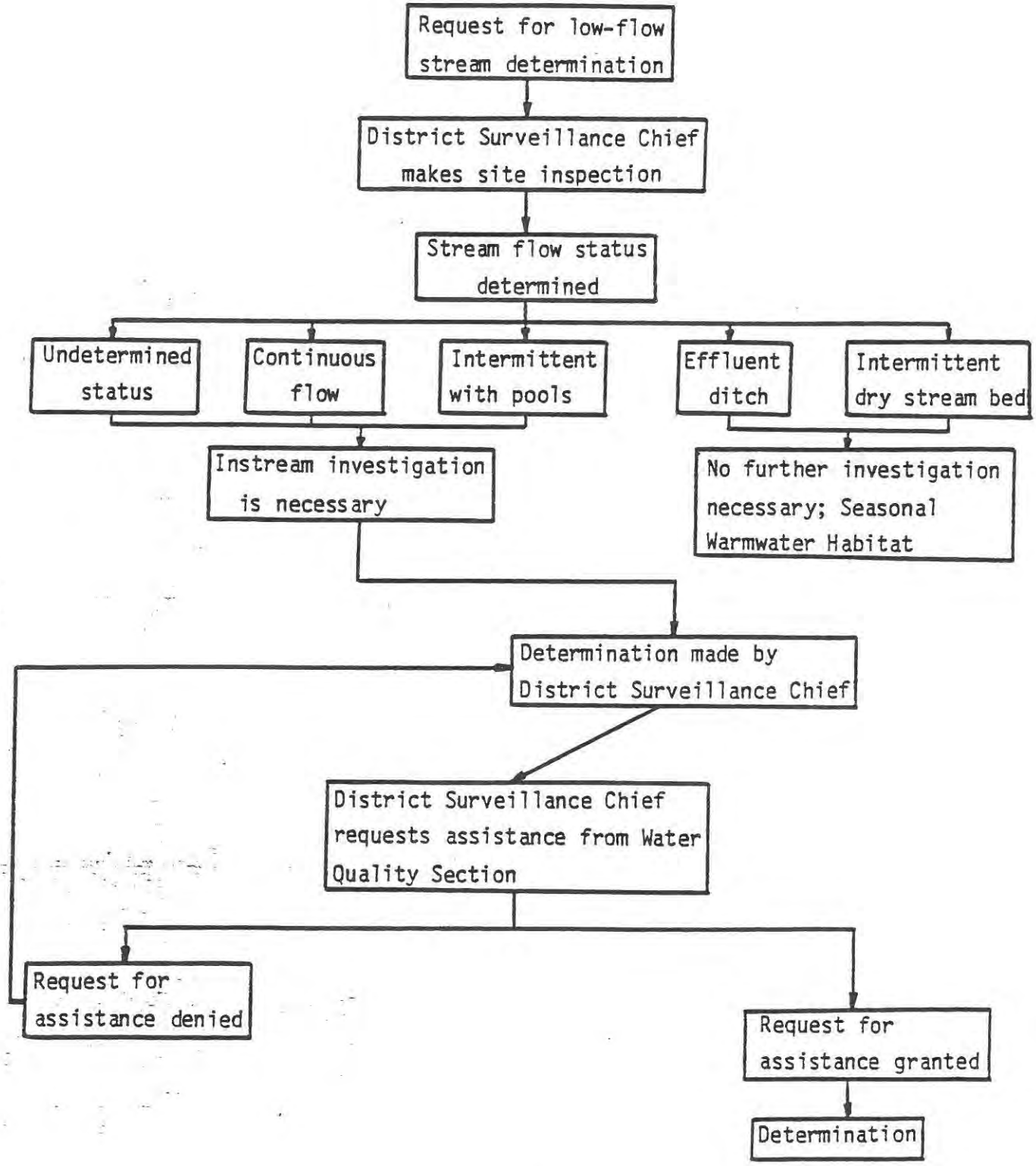


Figure 2: Sample site inspection field sheet for use in making site investigations of low-flow streams.

SITE INSPECTION SHEET

Stream_____ County_____
Twp._____ Locality_____
Investigators_____ District_____
Date_____ Time_____
Stream flow type (circle one): Undetermined Continuous Intermittent pools Intermittent-dry Effluent ditch
Water: Clear Low Turb. High Turb. Polluted (specify)_____
_____ Flow: High Medium Low Dry_____
Channel condition: Recently Channelized Channelized-Recovering Natural
Habitat: Pools Riffles Runs Gradient (ft./mi.)_____
Bottom:_____
_____
Aquatic Veg.: Fil. Green Algae Blue-greens Diatoms Submergent Emergent
Banks: Steep Sloped Modified Vegetation cover: Good Slight None
Canopy: Open 25% 50% 75% 100% Shrubs Small Trees Large Trees
Stream width:_____ Stream Depth_____
Physical/Chemical: T(^{o}C)_____ D.O._____ Cond._____
pH_____ TDS_____ TSS_____ Hardness_____
NH_3-N_____ NO_3-N_____ TKN_____ BOD_5_____
Total P_____ Other(specify)*_____
Investigation performed: Fish Macroinvertebrate community
Notes:_____
_____
_____
_____

*-total residual chlorine should be measured downstream from municipal wastewater effluents.

Figure 3: Fish data sheet

Time sampled_____ Approx. distance sampled_____

Species	Assigned value	#counted one	#counted two	Numbers (optional)

A. Total sum of assigned values_____X

B. Total number of species*_____X

C. Fish evaluation (A x B)= X

*-only includes species represented by two or more individuals.

Table 1: List of organisms with life cycles greater than one year.

Table 2: List of endangered species.

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 5

Stream Use Classification Tracking Document

APPENDIX 5

Stream Use Classification Tracking Document

The purposes of this appendix are: 1) to track specific stream use designation issues (information regarding current use, whether a re-evaluation is needed, and the results of the evaluation) and 2), to catelog information, data, and reports dealing with each stream or stream segment. There are several ways the document can be used, but its primary function, at least initially, will be to track stream use evaluations.

Streams or stream segments are listed 1) because the Agency is aware of water quality problems that may impact the attainable use, and/or 2) a desk top review of stream use has been conducted. The Water Quality Review Board is the primary mechanism by which the Agency and the Office of Wastewater is made aware of specific stream use and WQS issues. As stream use classification issues are ennumerated they are cateloged in appendices 5 and 3 of the Monitoring Strategy.

The desk top review of stream use involves consulting all available information sources regarding the current and potential quality of the stream. The sources consulted and the results are listed in the status/comment column. The desk top review determines whether the existing use is appropriate or whether the stream use should be re-evaluated via the methods set forth in Part 3.21.

The Division of Surveillance conducts a desk top review of stream uses within as many subbasins as possible prior to doing high level water quality monitoring in the area. Those streams listed in the Ohio Gazetteer of Streams are cateloged in appendix 5, and then are subjected to review. Other streams are added to appendix 5 if there are special circmstances exist which would warrent a re-evaluation of stream use, or other special water quality evaluation. .

!Because of delays in selecting surveys for the 1981 field season, desk top reviews of stream use issues were done as best as possible during study plan development. The results (locations where stream use is being evaluated) have not yet been incorporated into this tracking document, except for the Elk Fork watershed (see page 10). Ideally, a more thorough desk top review should be completed and incorporated into appendix 5 prior to writing study plans. Any additions or changes resulting from doing study plans, as well as the final results of all stream use evaluations, would then be tracked in this document.!

Contents

	Page #
High level surveys	
Rocky River	4
Big Darby Creek	6
Scioto River	8
Intermediate level surveys	
Sandusky River	9
Licking River	9
Low level surveys	
Elk Fork	10
Weirth Ditch	11
Little Yellow Creek	11
Nettle Creek	11
Fourmile Creek	11
Bokes Creek	11
Killbuck Creek	11
Silver Creek/Eagle Creek	11
Cowles Creek	11
Subbasins not being studied in 1981	12
Listing of Stream Survey References	33

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Rocky River - entire basin to estuary	1981			High level study slated	D-5
Rocky River - Lakewood STP to confluence with Lake Erie (Cuyahoga Co.)		LWH		Y0004	D-5
Abrams Creek - Middleburg Hts. STP to confluence with Rocky River (Cuyahoga Co.)		LWH		Y00004 fish collections in segment?	D-5
Abrams Creek - Middleburg Hts. STP to Grayton Road (Cuyahoga Co.)		LWH			D-5
East Branch Rocky River - Berea STP to confluence with West Branch (Cuyahoga Co.)		LWH		Y00004	D-5
East Branch Rocky River - headwaters to Berea STP					D-5
Baldwin Creek - headwaters to East Branch Rocky River					D-5
Big Brook - headwaters to East Branch Rocky River					D-5
West Branch Rocky River - headwaters to confluence with East Branch					D-5
Plum Creek - headwater to West Branch					D-5
Baker Creek -headwaters to West Branch					D-5
Cossett Creek - headwater to West Branch					D-5
Mallet Creek - headwater to West Branch					D-5

[a]see listing at end of document for explanation of coding system used for information sources

Stream and description (River Mile)	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
North Branch - headwater to West Branch					D-5
Plum Creek - headwater to North Branch					D-5
Remson Creek - headwater to North Branch					D-5
Granger Creek - headwater to Remson Creek					D-5

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Big Darby Creek and all tributaries - headwaters to confluence with Scioto River (Pickaway county)	1981	EWH		High level study slated Purpose of validate stream use criteria IS/CM00002	M-6,-8
Georges Creek - headwaters to Big Darby Creek					
Greenbrier Creek - headwaters to Big Darby Creek					
Springwater Run - headwaters to Big Darby Creek					
Hellbranch Run - headwaters to Big Darby Creek					
Little Darby Creek - headwaters to Big Darby Creek					
Spring Fork - headwaters to Little Darby Creek					
Barron Creek - headwaters to Little Darby Creek				intermittent stream	
Treacle Creek - headwaters to Little Darby Creek					
Proctor Run - headwaters to Treacle Creek					
Howard Run - headwaters to Treacle Creek				intermittent stream	
Lake Run - headwaters to Little Darby Creek					
Jumping Run - headwaters to Lake Run				intermittent stream	
Clover Run - headwaters to Little Darby Creek				intermittent stream	
Threemile Run - headwaters to Big Darby Creek				intermittent stream	
Sugar Run - headwaters to Big Darby Creek					
Robinson Run - headwaters to Big Darby Creek					

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Sugar Run - headwaters to Big Darby Creek				intermittent stream	
Buck Run - headwaters to Big Darby Creek					
Prairie Run - headwaters to Big Darby Creek				intermittent stream	
Hay Run - headwaters to Big Darby Creek				intermittent stream	
Pleasant Run - headwaters to Big Darby Creek				intermittent stream	
Little Darby Creek - headwaters to Big Darby Creek					
Flat Branch - headwaters to Big Darby Creek					

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Scioto River - above Columbus to Chillicothe	1981			High level study slated	M-8, 5
Scioto River - Greenlawn Avenue Dam to confluence with Big Darby Creek (Pickaway Co.)		LWH		IS/CF00001, IS/CM00003	M-8
Scioto River - Greenlawn dam to confluence with Big Darby Creek (Pickaway county)		SCR		IS/CF00001, IS/CM00003	M-8
Bantas Fork - headwaters to confluence with Twin Creek (Preble county)		EWH			M-8
Millers Fork - headwaters to confluence with Twin Creek (Preble county)		EWH			M-8

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Elk Fork - headwaters to State Route 677 (Vinton County) !RM 18.6 - 11.85!	1981	MD	6.75	Desk top review of stream use found that additional data is needed (DRD 8/81). reasons: ERB case with Austin Powder Co. Advanced treatment issue at McArthur information sources: Y00010 - Y00012 segment under study, see SP 81-16	N-1
Elk Fork - State Route 677 to Raccoon Creek (Vinton County) !RM 11.85 - 0.0!	1981	WWH	11.85	as above, additional reason for study - no evidence found for downstream segment being recovered from mine drainage information sources: Y00010 - Y00013 segment under study, see SP 81-16	N-1
Puncheon Fork - headwaters to Elk Fork (Vinton County) !RM 5.6 - 0.0!	1981	MD	5.6	same as Elk Fork information sources: Y00009 - Y00012 segment under study, see SP 81-16	N-1
Wolf Run - headwaters to Elk Fork (Vinton County) !RM 7.0 - 0.0!	1981	WWH	7.0	Desk top review concludes that additional data would be useful in classifying stream because of strip mines in drainage (DRD 81/8). information sources: Y00011, Y00012 segment under study, see SP 81-16	N-1
Flat Run - Headwaters to Elk Fork (Vinton County) !RM 3.5 - 0.0!	1981	WWH	3.5	Stream use should be re-evaluated. reason - recieving streams are probably mine drainage impacted and this small drainage may be to small to retain a WWH community (DRD, 81/08). information sources: segment under study, see SP 81-16	N-1
Alman Run - headwaters to Elk Fork (Vinton County) !RM 3.1 - 0.0!	1981	WWH	3.1	same as Flat Run information sources: segment under study, see SP 81-16	N-1

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Wierth Ditch - headwaters to St. Marys River	1981			Low level qualitative study slated	A-1
Little Yellow Creek - headwaters to Cutoff Ditch	1981			Low level qualitative study slated	B-1
North Branch Portage River - Confluence with Poe Ditch to confluence with Middle Branch in Pemberville (Wood Co.)					B-1
East Branch Portage River - Fostoria to Gygnet Road (Wood Co.)		LWH			B-1
Nettle Creek - headwaters to U.S. RT 36	1981			Low level qualitative study slated	H-3
Fourmile Creek - above Oxford to Sevenmile Creek	1981			Low level quanitative study slated	H-10
Big Cave Run - headwaters to confluence with Sevenmile Creek (Butler county)		EWH			H-10
Sevenmile Creek - confluence with Big Cave Run to confluence with Fourmile Creek (Butler county)		EWH			H-10
Bokes Creek - mainstem near West Mansfield	1981			Low level qualitative study slated	M-2
Killbuck Creek - Wooster STP to Wayne-Holmes County line (Wayne Co.)	1981	LWH		Low level quanitative study slated	P-3
Killbuck Creek - Creston STP to confluence with Little Killbuck (Wayne Co.)		LWH			P-3
Sugar Creek - above Orville to Beach City Reservior	1981			Intermediate level study slated	P-5
Silver Creek, Eagle Creek - upper section near Hiram, Garrettsville	1981				T-2
Cowles Creek - headwater to Lake Erie	1981	WWH			F-3

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Sandusky River - above Tiffin to Fremont	1981			Intermediate level study slated	C-4
Sandusky River - Fremont STP to confluence with Muskellung Creek (Sandusky Co.)		LWH			C-4
Tuscarawas River - From PPG to confluence with Sandy Creek (Stark Co.)		LWH			P-5,-6
Licking River - above Newark to Dillon Reservoir	1981			Intermediate level study slated	P-13
Rocky Fork, Lost Run and tributaries - headwaters to confluence with Licking River (Licking county)		EWH			P-13

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Auglaize River - Hamilton St. in Wapakoneta to Glynwood Road (Auglaize Co.)		LWH			A-3
Ottawa River - Standard Oil Lima Refinery outfall to Allen-Putnam county line (Allen Co.)		LWH		IS/CM('77)	A-4
Ottawa River - Standard Oil Lima Refinery outfall to Rt. 81 in Allentown (Allen Co.)		LWH		IS/CM('77)	A-4
Ottawa River - Lover's Lane control structure near Bellefontaine Avenue in Lima to Neff Road (Allen Co.)		LWH		IS/CM('77)	A-4
Blanchard River - Findlay STP to Hancock C.R. 128 (Hancock Co.)		LWH		IS/CFM('77) WLA/S ('80)	A-6
Maumee River - I-75 to confluence with Maumee Bay (Lucas Co.)		LWH			A-11
Ottawa River - Cherry Street to Summit Street (Lucas Co.)		LWH			A-11
Swan Creek - Detroit Ave. to confluence with Maumee River (Lucas Co.)		LWH			A-12
Paramour Creek - Crestline STP to confluence with Allen Run (Crawford Co.)		LWH		IS/CM('79) WLA/S('80)	C-2
Sandusky River - Bucyrus STP to Mt. Zion Rd. (Crawford Co.)		LWH		IS/CM('79) WLA/S('80)	C-2
Huron River - River road in Monroeville to Rt. 6 bridge in Huron (Erie county)		EWH			D-2
Huron River - Rt. 6 bridge in Huron to confluence with Lake Erie (Erie Co.)		LWH			D-2

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description (River Mile)	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Jacob Creek - Willard STP to Holiday Lake (Huron Co.)		LWH			D-2
Rattlesnake Creek - Norwalk STP to confluence with Huron River (Huron Co.)		LWH			D-2
Vermilion River - Erie - Huron county line to estuary (Erie county)		EWH			D-3
Skellinger Creek - New London STP to confluence with East Branch Vermilion (Huron Co.)		LWH			D-3
Black River - Elyria STP to confluence with Lake Erie (Lorain Co.)		LWH		Y	D-4
Plum Creek - Oberlin STP to confluence with west branch Black River (Lorain Co.)		LWH		Y	D-4
Cuyahoga River - Lake Rockwell to Akron	1981			High level study slated	E-1
Cuyahoga River - Monroe Falls Dam Pool (Summit Co.)		LWH		Y ??? not sampled in Y00004	E-1
Congress Lake Outlet - headwaters to Cuyahoga River				Y00004	E-1
Potter Creek - headwaters to Congress Lake Outlet					E-1
Wahoo Ditch - Ravenna STP to confluence with Congress Lake Outlet (Breakneck Creek) (Portage Co.)		LWH			E-1
Fish Creek - headwater to Cuyahoga River					E-1
Little Cuyahoga River - headwaters to Cuyahoga River				Y00004	E-1

[a] s sting at end of document for explanation of coding system used for ormation sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Cuyahoga River - Akron to ship channel	1981			High level study slated Y00004	E-2
Cuyhoga River - Akron STP to Penninsula (Summit Co.)		LWH		degraded zone - examine uses and level of protection Y00004, Y00006	E-2
Cuyahoga River - confluence with Little Cuyahoga River to Cleveland Southerly sewage treatment plant (Cuyahoga county)		SCR		Fecal coliform criteria needs work establish use and need for protection relate to disinfection practices at Akron	E-2
Cuyahoga River - boundries of National Park				need assessment of State/National Resource Waters	E-2
Kingsbury Run - headwaters to Cuyahoga River				Urban tributary	E-2
Morgan Run - headwaters to Cuyahoga River				Urban tributary	E-2
Burk Branch - headwaters to Cuyahoga River				Urban tributary	E-2
Big Creek - headwaters to Ford Motor Company				urban tributary, entire length flows thru Metro parks, CLeve. Zoo? Y00007 Y00004	E-2
Big Creek - Ford Motor Co. to confluence with Cuyahoga River (Cuyahoga Co.)		LWH		see above, consider State Resource Water Y00004 fish collection in segment ?	E-2
Mill Creek - headwaters to Granger Road				Urban tributary	E-2
Mill Creek - Granger Rd. to confluence with Cuyahoga River (Cuyahoga Co.)		LWH SCR		near mouth , impact of combined sewers? Y00004 fish collection in segment ?	E-2

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Tinkers Creek - headwaters to Cuyahoga River				headwaters unique? consider State Resource waters in parts? Y00004, Y00005	E-2
Pond Brook - Aurora Shores STP to confluence with Tinkers Creek (Summit Co.) from Aurora Westerly to confluence with Tinkers Creek		LWH		WLA/C('80)	E-2
Chippewa Creek - headwaters to Cuyahoga River				Y00004, Y00005	E-2
Brandywine Creek - Hudson Village STP to Macedonia STP (Summit Co.)		LWH		Y00004, Y00005 fish collection in segment ?	E-2
Brandywine Creek -Macedonia #15 to Brandywine Gorge		LWH		D.O. standard ? established at 2 ppm Y00004, Y00005 fish collection in segment ?	E-2
Brandywine Creek - Macedonia #15 to confluence with Cuyahoga River (Summit Co.)		LWH		Very high ammonia standard Y00004, Y00005 fish collection in segment ?	E-2
Stanford Run - headwaters to Cuyahoga River				Y00005	E-2
Slipper Run - headwaters to Cuyahoga River				Y00004	E-2
Boston run - headwaters to Cuyahoga River				Y00004, Y00005	E-2
Haskell Run - headwaters to Cuyahoga River				Y00005	E-2
Ritchie Run - headwaters to Haskell Run					E-2
Salt Run - headwaters to Cuyahoga River				Y00005	E-2

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Dickerson Run - headwaters to Cuyahoga River				Y00005	E-2
Langes Run - headwaters to Cuyahoga River				Y00005	E-2
Roberson Run - headwaters to Cuyahoga River				Y00005	E-2
Furnace Run - headwaters to Cuyahoga River				Y00004, Y00005	E-2
Yellow Creek - headwaters to Cuyahoga River				Y00004, Y00005	E-2
North Fork Yellow Creek - headwaters to Yellow Creek					E-2
Woodward Creek - headwaters to Cuyahoga River					E-2
Mud Brook - Confluence with Powers Brook to Wyoga Lake (Summit Co.)		LWH		Y00004	E-2
Powers Brook - Hudson #6 to confluence with Mud Brook (Summit Co.)		LWH			E-2

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description (River Mile)	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Chagrin River and all tributaries, except East Branch, Silver Creek and Aurora Branch - headwaters to confluence with Lake Erie (Lake county)		EWH		Y	E-3
Cemetary Creek - Jefferson STP to confluence with Mill Creek (Ashtabula Co.)		LWH			F-2
Fields Brook - Cook Rd. to confluence with Ashtabula River (Ashtabula Co.)		LWH		IS/CM('80)	F-3
Mississinewa River - headwaters to Ohio-Indiana State Line (Darke county)		EWH			G
Cherokee Mans Run - headwaters to Indian Lake (Logan county)		EWH			H-1
McKee Creek - headwaters to confluence with Stoney Creek (Logan county)		EWH			H-1
Stoney Creek - headwaters to confluence with Great Miami River (Logan county)		EWH			H-1
Spring Creek - headwaters to confluence with Great Miami River (Miami county)		EWH			H-2
Jackson Creek - headwaters to confluence with Mad River (Clark county)		EWH			H-4
Donnells Creek - headwaters to confluence with Mad River (Clark county)		EWH		Unpublished fish data - CY	H-4
Lost Creek and East Branch - headwaters to confluence with Great Miami River (Miami county)		EWH			H-5

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Brush Creek and tributaries - headwaters to confluence with Stillwater River (Miami county)		EWH		LLS('79)	H-6
Painter Creek - headwaters to confluence with Stillwater River (Miami county)		EWH			H-6
Twin Creek - confluence with Bantas Fork to confluence with Great Miami River (Warren county)		EWH			H-8
Elk Creek - headwaters to confluence with Great Miami River (Butler county)		EWH			H-9
Great Miami River - From Dayton WWTP to 2nd St. in Franklin (Warren Co.)		LWH		IS/CM('80) WLA/C('80)	H-9
Sevenmile Creek					
Indian Creek and tributaries - headwaters to confluence with Great Miami River (Butler county)		EWH			H-11
Dry Fork - headwaters to confluence with Whitewater River (Hamilton county)		EWH		Y(Ohio J. Sci.1978)	H-11
Mill Creek - I-275 to Spring Grove Avenue (Hamilton Co.)		LWH			J
Mill Creek, Ross Run, West Fork and tributary - Spring Grove Ave. to confluence with Ohio River (Hamilton Co.)		LWH			J
Mill Creek, Ross Run, West Fork and tributary - I-275 to confluence with Little Miami River (Hamilton county)		SCR			J

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Little Miami River - above Xenia to Ohio River				High level study slated	K
Lisbon Fork - headwaters to confluence with Little Miami River (Clark county)		EWH			K-1
Little Miami River - headwaters to confluence with Ludlow Creek (Greene county)		EWH		Y(ODNR fish survey - 1967)	K-1
Mill Run - headwaters to confluence with Little Miami River (Warren county)		EWH			K-1
Newman Run - headwaters to confluence with Little Miami River (Warren county)		EWH			K-1
Anderson Fork - confluence with Grog Run to confluence with Caesar Creek (Greene county)		EWH			K-2
Caesar Creek and North Branch - headwaters to confluence with Anderson Fork (Greene county)		EWH			K-2
Painters Creek - headwaters to confluence with Anderson Fork (Greene county)		EWH			K-2
Todd Fork, Dutch Creek and Lick Run - headwaters to confluence with Little Miami River (Warren county)		EWH			K-3
East Fork Little Miami River - Fayetteville to Williamsburg (Clermont county)		EWH			K-4
Stonelick Creek - headwaters to confluence with Brushy Fork (Clermont county)		EWH			K-4
Dodson Creek - headwaters to confluence with East Fork Little Miami River (Highland county)		EWH			K-4

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Duck Creek and tributaries - Headwaters to confluence with Little Miami River (Hamilton Co.)		LWH			K-5
Duck Creek and tributary - headwaters to confluence with Ohio River (Hamilton county)		SCR			K-5
Halls Creek - headwaters to confluence with Little Miami River (Warren county)		EWH			K-5
Olive Branch - headwaters to confluence with Little Miami River (Warren county)		EWH			K-5
Indian Creek - headwaters to confluence with Ohio River (Clermont county)		EWH			K-6

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
East Fork Whiteoak Creek - confluence with Middle Run to confluence with North Fork (Brown county)		EWH			L-1
Miranda Run - headwaters to confluence with Whiteoak Creek (Brown county)		EWH			L-1
North Fork Whiteoak Creek and tributaries - headwaters to confluence with East Fork (Brown county)		EWH			L-1
Shot Pouch Run - headwaters to confluence with Whiteoak Creek (Brown county)		EWH			L-1
Sterling Run and tributaries - Grant Lake to confluence with Whiteoak Creek (Brown county)		EWH			L-1
Unity Creek - headwaters to confluence with Whiteoak Creek (Brown county)		EWH			L-1
Whiteoak Creek - headwaters to Georgetown (Brown county)		EWH			L-1

Stream and description (River Mile)	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Ohio Brush Creek - headwaters to confluence with Baker Fork (Adams county)		EWH			L-2
Ohio Brush Creek and tributaries, except Beasley Fork - confluence with Cherry Fork to mouth (Adams county)		EWH			L-2
Baylor Run - headwaters to confluence with Eagle Creek (Brown county)		EWH			L-3
Beetle Creek - headwaters to confluence with Eagle Creek (Brown county)		EWH			L-3
Cornick Run and tributaries - headwaters to confluence with Ohio River (Brown county)		EWH			L-3
Eagle Creek and all tributaries - headwaters to confluence Indian Lick (Brown county)		EWH			L-3

Stream and description [River Mile]	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Threemile Creek and tributaries - headwaters to confluence with Ohio River (Brown county)		EWH			L-3
Alum Creek - Delaware-Morrow county line to Alum Creek reservoir (Delaware county)		EWH			M-4
Blacklick Creek - headwaters to Rt. 16 (Franklin county)		EWH			M-4
Rocky Fork - headwaters to Gahanna (Franklin county)		EWH			M-4
Paint Creek - headwaters to confluence with Sevenmile Creek (Preble county)		EWH			M-10
Sevenmile Creek - headwaters to Eaton (Preble county)		EWH			M-10
Salt Creek - headwaters to confluence with Scioto River (Ross county)		EWH		Y(A. White -EIS)	M-10
Paint Creek - Paint Creek Reservoir to confluence with North Fork (Ross county)		EWH			M-12
Rattlesnake Creek - headwaters to confluence with Paint Creek (Highland county)		EWH		USGS Study	M-13
Rocky Fork and tributaries, and Clear Creek - headwaters to confluence with Paint Creek (Highland county)		EWH			M-14

Stream and description (River Mile)	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Little Salt Creek and tributaries - headwaters to Jackson (Jackson county)		EWH		IS/CF('80)	M-16
Scioto Brush Creek and all tributaries - headwaters to confluence with Scioto River (Scioto county)		EWH			M-17
Strongs Run and tributaries - headwaters to confluence with Raccoon Creek (Gallia county)		EWH			N-1
Brushy Fork - headwaters to confluence with Raccoon Creek (Vinton county)		EWH			N-1
Wheelabout Creek - headwaters to confluence with Raccoon Creek (Vinton county)		EWH			N-1
Hewett Fork and tributaries - headwaters to confluence with Raccoon Creek (Vinton county)		MD			N-1
Raccoon Creek, including West and East branches - headwaters to Tycoon Lake (Vinton county)		MD			N-1
Raccoon Creek tributaries, except Elk Fork, from Lake Hope to Vinton-Gallia county line - headwaters to confluence with Raccoon Creek (Vinton county)		MD			N-1
Twomile Run - Benedict Preparation Plant to confluence with Raccoon Creek (Vinton county)		MD			N-1

[a] See listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Kyger Creek and tributary - headwaters to confluence with Ohio River (Gallia county)		MD			N-2
Little Raccoon Creek - confluence with Sand Run to confluence with Raccoon Creek (Gallia county)		MD			N-2
Little Raccoon Creek tributaries from Lake Alma to Jackson-Gallia county line - headwaters to confluence with Little Raccoon Creek (Jackson county)		MD			N-2
Little Raccoon Creek - headwaters to T.R. 21 (Vinton county)		EWH			N-2
Little Raccoon Creek - C.R. 25 to Lake Alma (Vinton county)		EWH			N-2
McConnel Run - headwaters to confluence with Little Raccoon Creek (Vinton county)		EWH			N-2
Little Raccoon Creek - T.R. 21 to C.R. 25 (Vinton county)		MD			N-2
Little Scioto River and tributaries - headwaters to confluence with Ohio River (Scioto county)		EWH			N-4
Ice Creek, Little Ice Creek and tributaries - headwaters to Cemetery Road in Ironton (Lawrence county)		EWH			N-5
Storms Creek and tributaries - headwaters to 3rd street bridge in Ironton (Lawrence county)		EWH			N-5
Osburn Run - headwaters to confluence with Ohio River (Lawrence county)		MD			N-5

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Rush Creek - headwaters to confluence with Little Rush Creek (Fairfield county)		MD			O-1
Clear Creek - headwaters to confluence with Hocking River (Hocking county)		EWH			O-1
Margaret Creek - headwaters to S.R. 682 (Athens county)		EWH			O-2
Stroud Run - headwaters to confluence with Hocking River (Athens county)		EWH			O-2
Monday Creek, Little Monday Creek and Snow Creek - headwaters to confluence with Hocking River (Athens county)		MD			O-2
Sunday Creek and West Branch - headwaters to confluence with Hocking River (Athens county)		MD			O-2
Scott Creek, Clear Fork and tributary - headwaters to confluence with Hocking River (Hocking county)		EWH		LLS (78)	O-2
East Branch Sunday Creek - headwaters to Burr Oak Reservoir (Morgan county)		EWH			O-2
Federal Creek and tributaries - headwaters to confluence with Sharps Fork (Athens county)		EWH		IS/C('77)	O-3
Fourmile Creek and East Fork - headwaters to confluence with Hocking River (Athens county)		EWH			O-3
Federal Creek and all tributaries - confluence with Sharps Fork to confluence with Hocking River (Athens county)		MD		IS/C('77)	O-3

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Forked Run - headwaters to Forked Run Reservoir (Meigs county)		EWH			O-4
Shade River, including Middle and East Branches - headwaters to confluence with Ohio River (Meigs county)		EWH			O-4
Rocky Fork - Mansfield STP to Applegate Road (Richland Co.)		LWH		IS/C('74-77), IS/CF('79), WLA/C('80)	P-1
Jerome Fork - Confluence with Lang Creek to Old U.S. 30 in Jeromesville (Ashland Co.)		LWH		WLA/S('80)	P-2
Lang Creek - Ashland STP confluence with Jerome Fork (Ashland Co.)		LWH		WLA/S('80)	P-2
Mill Creek and tributaries - headwaters to confluence with Walhonding River (Coshocton county)		MD			P-4
Tuscarawas River - Confluence with Chippewa Creek to Massillon STP (Stark Co.)		LWH			P-6
Chippewa Creek - Confluence with Little Chippewa to confluence with Tuscarawas River (Summit Co.)		LWH			P-6
Tuscarawas River - Barberton STP to confluence with Chippewa Creek (Summit Co.)		LWH			P-6
Tuscarawas River - Barberton sewage treatment plant to Clinton (Summit county)		SCR			P-6

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
River Styx - Wadsworth STP to confluence with Chippewa Creek (Wayne Co.)		LWH			P-6
East Branch Nimishillen Creek - Louisville to confluence with Middle Branch (Stark Co.)		LWH			P-7
East Branch Nimishillen Creek - confluence with Middle Branch to confluence with Nimishillen Creek (Stark County)		LWH			P-7
Hurford Run - Headwaters to confluence with Nimishillen Creek (Stark Co.)		LWH			P-7
Nimishillen Creek - Canton STP to confluence with Sandy Creek (Tuscarawas Co.)		LWH			P-7
Nimishillen Creek - Canton city limits to confluence with Sandy Creek (Tuscarawas county)		SCR			P-7
Conotton Creek and tributaries - headwaters to Jewett (Harrison county)		MD			P-8
Piedmont Reservoir tributaries - headwaters to confluence with Piedmont Reservoir (Belmont county)		MD			P-9
Boggs Fork and tributaries - Holloway to confluence with Stillwater Creek (Harrison county)		MD			P-9
Skull Fork and Tributary - headwaters to confluence with Stillwater Creek (Harrison county)		MD			P-9
Stillwater Creek - headwaters to confluence with Brushy Fork (Harrison county)		MD			P-9

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Little Stillwater Creek - confluence with Plum Run to Dennison (Tuscarawas county)		MD			P-9
Tuscarawas River - River mile 5.0 to confluence with Muskingum River (Coshocton Co.)		LWH			P-10
Muskingum River - Confluence of Walhonding and Tuscarawas Rivers to Rt. 83 Bridge (Coshocton Co.)		LWH		IS/CF('78)	P-11
Mill Fork and tributaries - headwaters to confluence with Little Wakatomika Creek (Muskingum county)		MD			P-11
Wakatomika Creek - Frazeysburg to confluence with Muskingum River (Muskingum county)		MD			P-11
Jonathan Creek and tributaries, including Turkey Run - confluence with Turkey Run to confluence with Moxahala Creek (Muskingum county)		MD			P-15
Moxhala Creek and tributaries - headwaters to confluence with Muskingum River (Muskingum county)		MD			P-15
Jonathan Creek and tributaries - headwaters to confluence with Turkey Run (Perry county)		EWH			P-15
Bald Eagle Run - headwaters to confluence with Muskingum River (Morgan county)		EWH			P-16
Brush Creek and tributaries - headwaters to confluence with Muskingum River (Muskingum county)		MD			P-16
White Eyes Creek and tributary - headwaters to confluence with Wills Creek (Coshocton county)		MD			P-17
Wills Creek - Cambridge to downstream Wills Creek Reservoir (Coshocton county)		MD			P-17

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Crooked Creek and tributaries - headwaters to confluence with Wills Creek (Guernsey county)		MD			P-17
Buffalo Fork and tributaries - headwaters to confluence with Wills Creek (Guernsey county)		MD			P-18
Leatherwood Creek and Shannon Run - headwaters to Cambridge (Guernsey county)		MD			P-18
Wills Creek - Byesville sewage treatment plant to confluence with Chapman Run (Guernsey county)		SCR			P-18
Buffalo Creek and tributaries - headwaters to confluence with Buffalo Fork (Noble county)		MD			P-18
Olive Green Creek and tributaries - headwaters to confluence with Muskingum River (Morgan county)		EWH			P-19
Wolf Creek and tributaries - headwaters to confluence with Muskingum River (Washington county)		EWH			P-19
Cushing Run and tributaries - headwaters to confluence with Muskingum River (Washington county)		MD			P-19
Buffalo Run - headwaters to confluence with West Fork Duck Creek (Noble county)		MD			R-1
Johnny Woods River - headwaters to confluence with West Fork Duck Creek (Noble county)		MD			R-1
Duck Creek - confluence of East and West Forks to confluence with Ohio River (Washington county)		MD			R-1

[a] see listing at end of document for explanation of coding system used for information sources

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
East Fork Duck Creek and tributaries, except Pawpaw Creek - headwaters to confluence with Duck Creek (Washington county)		MD			R-1
Warren Run - headwaters to confluence with West Fork Duck Creek (Washington county)		MD			R-1
West Fork Duck Creek - headwaters to confluence with Duck Creek (Washington county)		MD			R-1
Opossum Creek and Tributary - headwaters to confluence with Ohio River (Monroe county)		MD			R-2
State Line Creek - From BFI and state line to confluence with North Fork (Columbiana Co.)		LWH			S-1
Middle Fork Little Beaver Creek - Salem STP to Mahoning-Columbiana County line (Mahoning River)		LWH			S-1
Elkhorn Creek and tributaries - headwaters to confluence with Yellow Creek (Jefferson county)		EWH			S-2
North Fork Yellow Creek - Salineville to confluence with Yellow Creek (Jefferson county)		MD			S-2

Stream and description !River Mile!	Year of Survey	1978 WQS use	Length (miles)	Status/Comments[a] regarding revisions to stream use previous study results/publications	Subbasin Code
Short Creek, Piney Fork and Middle Fork and tributaries - headwaters to confluence with Ohio River (Jefferson county)		MD			S-3
Big Run - New Nacco mine number three portal to confluence with Ohio River (Belmont county)		MD			S-4
Captina Creek - confluence of North and South Forks to confluence with Ohio River (Belmont county)		MD			S-4
Cat Run - New Nacco mine number one portal to confluence with Captina Creek (Belmont county)		MD			S-4
Little McMahon Creek - confluence with Chambers Run to confluence with McMahon Creek (Belmont county)		MD			S-4
McMahon Creek - headwaters to confluence with Ohio River (Belmont county)		MD			S-4
Pipe Creek - headwaters to confluence with Ohio River (Belmont county)		MD			S-4

Listing of Stream Survey References

Information regarding stream survey results is coded in appendix 5 under the Status/Comments heading. All known information has been referenced regardless of its source or suitability for fulfilling Agency data needs. Letter codes are used to specify the general category of survey work done by Ohio EPA (see below), and the number which follows directs the user to the specific citation for the survey results.

Survey code	Interpretation
WLA/S #	Simplified wasteload allocation conducted by Ohio EPA
WLA/C #	Complex wasteload allocation conducted by Ohio EPA
IS/C #	Intensive survey, chemical/physical parameters, conducted by Ohio EPA
IS/CF #	Intensive survey, chemical/physical parameters and fish sampling, conducted by Ohio EPA
IS/CM #	Intensive survey, chemical/physical parameters and macroinvertebrate sampling, conducted by Ohio EPA
IS/CFM #	Intensive survey, chemical/physical parameters, fish sampling, and macroinvertebrate sampling, conducted by Ohio EPA
LLS #	Low level survey, types of results vary, conducted by Ohio EPA
Y #	Survey results obtained from sources other than Ohio EPA

Survey Code	ID #	Reference (Surveillance Literature File number)
IS/CF	00001	Yoder, C.O., P.S. Albeit, and M.A. Smith. 1981. The distribution of fishes in the mainstem Scioto River as affected by pollutant loadings. Technical report OEPA 81/3. Stat of Ohio Environmental Protection Agency, Office of Wastewater Pollution Control, Division of Surviellance and Standards, Columbus, Ohio. pp. ( )
IS/CM?	00002	citation for Big Darby Report
IS/CM	00003	citation for Scioto River 1980 data
Y	00004	Northeast Ohio Areawide Coordinating Agency. 1978. Water quality management plan. Technical Appendix A21, Analysis of stream habitats. Northeast Ohio Areawide Coordinating Agency, Cleveland, Ohio. 2 vols.
Y	00005	citation for L.Orr ,Kent St.
Y	00006	citaion for B. Carlson , Kent St.
Y	00007	Ohio Department of Natural Resources. 1959. Water inventory of the Cuyahoga and Chagrin river basins. Vol. 2, Map supplement. Ohio Department of Natural Resources, Division of Water. Columbus, Ohio. 32 pp.
Y	00008	(ODNR fish survey - 1967)
Y	00009	U. S. Geological Survey. 1979. Water resources data for Ohio 1979, Vol. 3 Coal areas. Water Data Report OH 79-3. U.S. Geological Survey, Columbus, Ohio. pp.
Y	00010	U. S. Geological Survey. 1980. Water resources data for Ohio 1980, Appendix - Coal areas. Water Data Report OH 79-A. U.S. Geological Survey, Columbus, Ohio. pp.
Y	00011	Skelly and Loy. 1973. (unpublished data).
Y	00012	Ohio Environmental Protection Agency. 1980. Southeast Ohio River tributaries - list of proposed mine drainage streams (draft). Prepared by the Industrial Coal Operations Group, Division of Industrial Wastewater, Office of Wastewater Pollution Control, Ohio EPA, Columbus Ohio. np.
Y	00013	Federal Water Pollution Control Administration. 1967. Recommendation for water pollution control - Raccoon Creek Basin, Ohio. Mine Drainage Unit Planning and Evaluation Section. Ohio River Basin Project, Wheeling W. Va. Field Station. n.p.

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 6

The Monitoring System Matrix
An analysis of activities vs. objectives

APPENDIX 6

The Monitoring System Matrix - An analysis of activities vs. objectives

		Page
2.301	NAWQMN	3
2.302	State Ambient	4
2.303	NAWQMN Biomonitoring	5
2.304	Toxic residues/fish tissue	6
2.305	Clean Lakes	7
2.306	USGS lakes	8
2.307	Intensive surveys	9
2.308	USGS gages	10
2.309	USGS low-flow stations	10
2.310	USGS continuous water quality monitors	10
2.311	USGS COD monitoring	11
2.312	USGS stream reareation studies	11
2.313	NPDES enforcement	11
2.314	305b report	12
2.315	Compliance monitoring-bioassay	14

!This Appendix has recieved very little attention sine the February 1981 draft. The utility and quality of this document will improve gradually as more manpower is available to critically review monitoring activities and to design synoptic surveys. The Division of Surveillance regards the continued refinement of this appendix as an aid in the evaluation of monitoring activities such as NAWQMN and the design of synoptic surveys.!

It is the State's responsibility to establish a monitoring program which will fulfill the nine objectives listed in Part 2.2. The 1981 106 grant identified 31 monitoring related activities (see Appendix 1) which the Office of Wastewater is undertaking to meet that responsibility. Nineteen of the activities are closely related to the basic objectives while the remaining twelve involve administrative tasks or concern very special, non-recurring tasks. The relationships between the 19 monitoring activities and the basic objectives are explored in Table 2 (see Part 2.5). The monitoring objectives and activities are combined in Table 2 to form a matrix or framework within which the total water quality monitoring system is defined and evaluated. As stated by Ward (1979):..."The matrix, by defining the regulatory monitoring system and clarifying the many interactions within the system, provides a basis upon which a more thorough approach to managing, evaluating, and eventually optimizing regulatory monitoring can be developed". The interrelationships of the activities and objectives are depicted as follows:

xxxx - The activity directly results in the objective being met. (i.e., the direct result of a monitoring activity is the collection of data).

xxx - The activity is an essential component in meeting the objective. (i.e., data generated from certain activities are essential for establishing cause/effect relationships).

xx - The activity is indirectly related to meeting the objective. (i.e., the activity generates information or reports which are of value in meeting the objective).

x - The activity can be related to meeting the objective in limited or specific cases, either directly or indirectly. (i.e., NAWQMN station data could be used in an enforcement action but the small number of stations in the State make this unlikely).

Each interrelated component in Table 2 is discussed here in Appendix 6. We have attempted to define the regulatory monitoring system as precisely as possible. The underlined material describes the current approach to integrating the activity and objective while the remaining comments raise issues to be considered in developing the 5-year monitoring strategy. The purpose of this exercise is twofold. First, the comments and suggestions relating to each activity and objective provide a springboard for the assessment of data collection and analysis techniques . That is, it provides a starting point upon which a more thorough approach to managing, evaluating, and eventually optimizing the monitoring activities can be developed. Secondly, it provides a means of recording and organizing both general and specific ideas for improving monitoring activities. Many such ideas arise in "brainstorming" sessions or are suggested by outside-agengy sources, but are seldom written down and, thus, are not explored and implemented. Much of the narrative in Appendix 6 is only a skeleton upon which to build and refine. The descriptions of some portions of the matrix were made very brief because of the time constraints for completing this document. The most pertinent ideas and suggestions will be evaluated and incorporated into the monitoring activities through a system of addressing information needs (see Part 2.3).

2.301 - National Ambient Water Quality Monitoring Network (NAWQMN)

xxxx - objective 1, data collection
Monthly data are collected from 39 stations. Basic information on each site is given in the 1981 monitoring program document.
The station network should be evaluated in light of national and state needs. Issues to consider: Are the specifics of the activity federally mandated? Station locations, sampling frequency, use of data for trend analysis, other uses of data.

xxx - objective 3, data used to compare existing W.Q. with CWA goals
The 1980 305b report accomplished this objective but NAWQMN data were not distinguished from other data. The national use of the data by U.S. EPA is described in U.S. EPA 1975 and 1977.
The station network should be re-evaluated. Details of how U.S. EPA uses the data should be explored. Assessments of the methods used to analyze the data should be conducted. Report mean concentrations with statistical data in addition to reporting violations.

x - objective 2, data are used to establish cause/effect
To a limited extent the 1980 305b report and intensive surveys fulfill objective.
The role of NAWQMN data in determining cause/effect needs to be better defined, i.e., the establishment of specific hypotheses testing, type of data analysis and criteria for accepting hypotheses.

x - objective 5, data used in revising WQS
Previous WQS revisions did not utilize data in any pre-determined manner.
A methodology for determining use-attainability is under development and will specify how data (including NAWQMN data) is to be used. Role of NAWQMN network needs study.

x - objective 7, assessment of overall wastewater control programs.
No system exists for fulfilling this objective, partial assessments appear in 305b reports.
General approach to this objective needs direction, could probably be fulfilled in 305b report. Role of NAWQMN network needs study.

x - objective 4, published reports
The 1980 305b report published results from NAWQMN stations, yearly summary statistics and violations information.
Intensive surveys may have an occassion to publish data as well.
Are there ways to improve upon the presentation of NAWQMN data? Different statistical techniques? Possible soft-ware application? Combined assessments with other station networks?

x - objective 6, assessment of WLA & NPDES permits
NAWQMN data can be used to meet this objective in specific but limited cases where dischargers are located near existing stations.
This individualized use of data does not require immediate attention in the strategy.

x - objective 9, enforcement support
Comments under objective 6 apply.

2.302 - State Ambient Water Quality Monitoring Network

xxxx - objective 1, data collection
Data is collected monthly from 34 stations, quarterly from 43 stations.
The station network should be re- evaluated in light of specific needs. Issues to consider: Station locations, sampling frequency, use of data for trend analysis, other uses of data?

xxx - objective 3, data used to compare existing W.Q. with CWA goals
The 1980 305b report accomplished this objective but use of State Ambient Network was data not distinguished from other activities.
Comments under Actvitity 11 apply.

x - objective 2, data used to establish cause/effect
To a limited extent the 1980 305b report and intensive surveys fulfill objective.
Comments under Activity 11 apply.

x - objective 5, data used in revising WQS
Previous WQS revisions did not utilize data in any pre-determined manner.
Comments under Activity 11 apply

x - objective 7, assessment of overall program
Comments under Activity 11 apply.
General approach to this objective needs directions, could probably be fulfilled in 305b report.

x - objective 4, published reports
1980 305b report published results from State Ambient Network stations, yearly summary statistics and violations information.
Comments under Activity 11 apply.

x - objective 6, assessment of WLA & permits
State Ambient Network data can be used to meet this objective in specific cases where dischargers are located near existing stations.
This individualized use of data does not require immediate attention in strategy.

x - objective 9, enforcement support
Comments under objective 6 apply.

2.303 - NAWQMN - Biomonitoring (macroinvertebrate)

xxxx - objective 1, data collection
Data is collected yearly from 10 stations.

xxx - objective 3, data used to compare existing W.Q. with CWA goals
The 1980 305b report accomplish this objective but NAWQMN data not distinguished from other activities.

xx - objective 2, data used to establish cause/effect
To a limited extent the 1980 305b report and intensive surveys fulfill objective.
Comments under Activity 11 apply. Further, the strengths of biomonitoring make it well suited to meeting this objective. We need to assess the best use of this network e.g., are the sites well chosen with respect to locations where information needs are the greatest.

x - objective 5, data used in revising WQS
Previous WQS revisions did not utilize data in any pre-determined manner.
Comments under Activity 11 apply

xx - objective 7, assessment of overall program
Comments under Activity 11 apply.
General approach to this objective needs directions, could probably be fulfilled in 305b report. Comments under objective 2 apply

x - objective 4, published reports
The 1980 305b report published results from NAWQMN stations.

2.304 - Monitoring Ohio fish for toxic residues

xxxx - objective 1, data collection
Data is collected annually from several Lake Erie tributaries in accordance with the USEPA-Great Lakes Fish Monitoring Strategy and from other Ohio streams in conjunction with the intensive survey effort.
It should be determined how the USEPA is using the data. OEPA choice of stations should be reevaluated. Should stations solely be used for intensive surveys? Alternatives to be considered - location of hot spots, problem assessment, determination of cause and effect, abatement effectiveness, etc. It should be determined how the data from this activity can be included in the intensive survey reports. The two year delay in receiving sample analysis results preclude their use in any way other than an appendix. It should be determined if a special report should be written or the results just included as a section in the 305b report.

xxx - objective 3, data used to compare existing W.Q. with CWA goals
Data from this activity has not yet been used towards this objective.
Inclusion in the 305b should assist in this goal. Again USEPA use of this data should be determined. It should be determined how to include this information in the intensive survey reports to fulfill this objective.

xx - objective 2, data used to establish cause and effect
Data from this activity has not yet been used towards this objective
Inclusion in 305b and intensive survey reports should partially fulfill this objective. Comments under Activity 11 apply.

- objective 4,
Data from this activity has not yet been used towards this objective.
Inclusion in the 305b and intensive survey should fulfill this goal. Items to be considered are: how should the data be presented, can a computer software package be developed, trend analysis, environmental and health implications, sport fishing implications, etc.

x - objective 7, assessment of overall wastewater control programs
Element 4 of the USEPA Great Lakes Fish Monitoring Strategy was designed to determine the progress of remedial programs i.e., trend analysis of problems areas. The Ohio EPA does not have the facilities to participate in this objective.
The same program could be instituted for inland streams, but the problem remains lack of resources for the effort.

2.305 - Clean Lakes Program

xxxx - objective 1, data collection
Nutrient and productivity related parameters are measured, primarily in the summer months. Data will be used to determine trophic levels of those lakes to be restored or protected. (A list of these lakes is attached.) Data will be used as one tool in developing a priority list of lakes to receive restoration grants.

xxx - objective 2 - establish cause/effect
Sampling in conjunction with Phase 1 grants (Feasibility studies) will determine cause and effects of problems. Followup sampling following Phase 2 grants (implementation) will establish benefits of restoration/protection.

x - objective 3 - Compare WQ with CWA goals
The goal of the Clean Water Act on a national level is to restore one lake in each urban area in the United States.
Ohio lakes selected for the priority list include lakes from all urban areas of the states.

xxx - objective 4 - publish reports
States desiring to apply for 314 restoration monies are required to submit a report to the USEPA by January 1, 1982, prioritizing those lakes in the state to be restored or protected. This report need not necessarily be "published".

x - objective 5 - revise WQS
Results of lake survey to be used in use-attainability determinations.

x - objective 7 - assess overall abatement program
Data collected for trophic level determinations will be entered into STORET and available for any use. A protocol for assessing success of lake restoration projects is needed.

2.306 - OEPA/USGS Lake Studies

xxxx - objective 1, data collection
Data is collected during the spring and summer at a primary sampling station established in each lake. The parameters and sampling format are given in the 1981 monitoring strategy document. Previously studied lakes and candidates for future survey are listed in the latest 305(b) document. The frequency of resampling should be evaluated along with the need for bottom sediment sampling.

xxx - objective 2, data are used to establish cause/effect
Specific hypothesis have not been tested. A program for resampling specific problem lakes should be initiated to determine parametric trends and/or support orginial values. A watershed-wide intensive integrated sampling program (lake and stream) needed to thoroughly investigate problems.

x - objective 3, compare WQ with goals
See objective 7.

xxx - objective 4, publish reports
Annual OEPA-USGS lakes report and 305(b) report fulfill objective. Summary report is being written. A way to decrease elapsed time between completion of sampling and printing of final report is needed.

x - objective 5, revise WQS
Resampling of lakes to document trends, see objective 2. Trends should be determined before standards are revised.

x - objective 6, assessment of WLA and permits
Lakes data is frequently requested to support need for installation of sewer systems and for support of NPDES limits. Information frequently requested for lakes for which no water quality data is known.

x - objective 7, assess overall abatement program
Can be an integral part of any effort to assess overall abatement program. Trends must be determined. See objective 2.

2.307 - Intensive Surveys

xxxx - objective 1, collect baseline data
Chemical/physical and biological data is collected in specific stream/river segments annually. Many data needs should be considered; effort should be optimized to satisfy as many needs as possible.

xxx - objective 2, establish cause/effect
Data is used to establish extent of environmental problems and whenever possible determine their cause(s). Better consideration of overall agency data needs in design of surveys; more consideration of validity of data for detecting problems, violations, etc.

xxx - objective 3, compare existing WQ with CWA goals
Results can be used to determine attainment of CWA goals. This should receive more emphasis, especially in intensive survey reports; already receives some attention in 305(b); need to integrate all types of monitoring data together in 305(b) report for meeting this objective.

xxx - objective 4, publish reports
Reports are published for each intesive survey report. A fairly uniform format has evolved but some guidelines need to be written down (i.e.) abstract contents.

xxx - objective 5, revise WQS
Previous WQS revisions did not use data in any prescribed manner. Intensive survey data will play a key role in establishing WQS, especially attainable uses, etc. Methodology will spell out what data is needed and is to be used.

xxx - objective 6, assess WLA and NPDES permits
Results can be used to assess WLA and permits. More attention in survey reports needs to be given to assessing adequacy of WLA (and permits) for meeting WQS and CWA goals.

xxx - objective 7, assess overall wastewater programs
Results are used to assess effectiveness of programs. Long-range strategy should include re-surveying areas after point and/or nonpoint controls have been implemented.

xx - objective 8, compliance with NPDES permits
Results can supply indirect information about permit compliance. Compliance monitoring, bioassays, CEI's need to be better coordinated with intensive surveys.

x - objective 9, enforcement actions
Results can be useful in supporting enforcement.

2.308 - USGS Gages

xxxx - objective 1, data collection
Daily flow data is provided at ??? gaging stations.

xxx - objective 4, publish reports
Annual reports published by USGS.

xxx - objective 6, assess WLA
Flow data is essential for WLA efforts.

2.309 - USGS low-flow stations

xxxx - objective 1, collect data
USGS goal is to provide low-flow frequency data for each 50 square mile area in the state.

xx - objective 4, publish reports
USGS publishes annual reports that include this data.

xxx - objective 6, assess WLA and permits
Low-flow frequency data is needed for WLA and establishing WQ based NPDES permits.

2.310 - USGS continuous WQ monitors

xxxx - objective 1, collect data
USGS operates ???? four parameter continuous monitors statewide.
The use of these monitors is decreasing, a trend that needs to be reversed.

xx - objective 2, establish cause/effect
Data is collected continuously for four key WQ parameters.
Trend analysis of these results needs to be stressed.

xx - objective 3, WQ goals
Results are used in intensive survey reports.
The use of this data needs to be expanded to the 305(b) report.

xx - objective 4, publish reports
USGS publishes results annually.

xx - objective 5, revise WQS
Previous WQS did not use data in prescribed manner.
Methodology is being developed.

xxx - objective 6, assess WLA
Continuous data is used in WLA calibration and verification.

x - objective 7, assess WW programs
Results can be used to assess effectiveness of programs.
Trend analyses must receive a greater emphasis.

2.311 - USGS COD monitoring

xxxx - objective 1, collect data
COD data is collected at 9 NASQAN stations.

xxx - objective 6, assess WLA

2.312 - USGS stream reaeration studies

xxxx - objective 1, collect data
Reaeration rates are determined in ???? stream segments.

xxx - objective 6, assess WLA
Reaeration rates are important in developing WLA.

2.313 - NPDES Enforcement

xxx - objective 1, collect data
WQ data is often collected for litigation purposes.
Satisfying other agency data needs should be considered.

xx - objective 2, cause/effect
Sampling attempts to establish cause/effect for litigation actions. More attention needs to be given to validity of sampling design and resulting data.

xx - objective 4, publish reports
Data may be used in intensive survey, 305(b) reports.

xxxx - objective 9, enforcement
Purpose of this activity is enforcement.

2.314 - 305(b) report

xxxx - objective 4, publish reports
The 305(b) report is a biennial report which is to be submitted by April 1 of each reporting year. Reporting years during this 5 year monitoring strategy are 1982, 1984 and 1986.

1. The USEPA Region V wants us to continue with a detailed, multi-volume 305(b) report similar to Ohio's 1980 305(b) submission. We have been informed of this both by letter and by personal communication.

2. Future 305(b) reports could be used as a reporting mechanism for the following projects.
   a. Intensive Surveys, Special Studies and Litigations.
   The finished study could be added to future 305(b)'s, as prepared for public distribution, in a reference document. This would not require any additional time on our part.
   b. Abstracts for the above intensive surveys.
   The submission of these abstracts is now required as part of the 106 Grant. They have been submitted prior to analyzing the data and writing the intensive survey in the past. This would save some man hours and the reports (abstracts) would improve and be accurate.
   c. The 314 Clean Lakes Inventory.
   This is now a separate report (submission date for the next Clean Lakes Report - January 1, 1982). If this is incorporated into the Lakes Volume of the 305(b) report, we could save some man hours and could submit a better 314 Clean Lakes Inventory Report.

xxx - objective 3, compare WQ with goals
The 305(b) report should provide the following:
1. A thorough description of existing water quality, including an analysis of the extent to which such waters currently support balanced populations of aquatic life and allow for recreational activity.
2. An assessment of nonpoint source problems, along with recommendations for their control (including cost estimates for implementation).

The following volumes of the 1980 305(b) were used to answer the above tasks (at least in part):

Volume III	-	Intensive Surveys and Special Studies.
Volume IV	-	Subbasin Reports (chemical/physical evaluation).
Volume V	-	Water Quality Analysis of Ohio Surface Waters in Abandoned Coal Mine Watersheds.
Volume VII	-	Biological Evaluations (Benthos)

xxx - objective 7, assess overall abatement program
The 305(b) report should provide the following:
1. An evaluation of the effectiveness of existing pollution control programs and recommendations for future modifications to those programs, if needed.
2. An estimate of the environmental, social and economic impacts of achieving or not achieving the goals of the Act. An estimate of the date of such achievement should be included.

Only part of task one was addressed in the 1980 305(b) report. Volume IV Subbasin Reports (Chemical/physical evaluation) and Volume VI - Biological Evaluation (Benthos) attempted to evaluate the stream and biological (benthic) quality with criteria developed by the Ohio EPA. We were able to determine (estimate) the total number of river miles (comprehensive) in the following categories; 1) meet goals, 2) will meet goals, and 3) will not meet goals by 1985. The immediate results of the evaluation were the following:

1. A comprehensive presentation of what we know and, more importantly, what we do not know about surface water quality in Ohio Rivers,
2. an improved Monitoring Program document,
3. the planning for an improved monitoring program, and
4. the development of a 5-year monitoring strategy.

xx - objective 5, revise WQS
The 305(b) report is a vital source of information concerning existing water quality and has been used in the WQS revision process. The report also makes projections of water quality conditions after implementation of the control programs specified in the Act.

Limited data concerning the above task were provided in Volume IV - 1980 305(b) - Subbasin Reports (chemical/physical evaluation), however, the data were not evaluated with respect to changes or modifications of water quality standards. The 2 programs must be integrated more closely so that information needs can be fulfilled simultaneously.

x - objective 6, assess WLA and permits
The 305(b) report provides existing water quality data and provides projections of water quality conditions after implementation of the control programs specified in the Act.

The following volume of the 1980 305(b) was used to answer the above task (in part):
Volume IV - Subbasin Reports (Chemical/physical evaluation). The data in Volume IV were not applied to any assessments.

2.315 - Compliance sampling inspections - inspections with toxic bioassays

This activity includes only one type of bioassay we conduct, the screening bioassay. The screening bioassay only indicates if an effluent is toxic or not; it does not enable the LC50, or EC50, to be determined. Screening bioassays are intended as triggering mechanisms for indicating which effluents require a definitive bioassay. The definitive bioassay will enable an LC50, or EC50, to be determined. I suggest we either rewrite the description of Monitoring Activity #2 to include definitive bioassays or define another Monitoring Activity - definitive bioassays. The use of definitive bioassays may be the same as screening bioassays but they provide more in-depth information. Definitive bioassays could also be used in meeting Objective 5 - revision of WQS - on either level xx or level x.

I feel our bioassay capabilities are under utilized in meeting various objectives. I have felt free to indicate the objectives that bioassay data could help to meet. I have tried to keep the text brief. Please call me if more is needed. C.O. Webster 22 Jan. 1981.

xxxx - objective 1, toxic discharges to surface waters are identified. Need to develop priorities for types of effluent to be assayed.

xxx - objective 4, report is prepared for each bioassay conducted; reports distributed to Central Office and District personnel in Surveillance and Industrial Wastewater. Reports used in 305(b) preparation(?).

x - objective 6, bioassay reports available for use here. Actual use unknown.

xxx - objective 8, if toxicity is limited by permit, data may be used. Extent of actual use is unknown. Need to develop formal strategy.

xxx - objective 9, initial preparation only, to identify toxic effluent; requires definitive bioassay prior to litigation. Formal strategy needs to be developed.

x - objective 2, bioassay data and chemical data, used in conjunction, may establish cause and effect; same is true for bentic data and bioassay data. Extent of usage is unknown.

x - objective 3, if there is a decrease in the percent of effluents assayed which prove toxic in coming years, then bioassays would show the discharge of toxic pollutants in toxic amounts is decreasing.

xx - objective 7, see objectives 1, 3, 4, and 8.

Ohio EPA 5-Year Surface Water Monitoring Strategy
FFY 1982-1986

Appendix 7

Tables A & B - Municipal Sewer Fees

EXHIBIT IA

URBAN INDEX - TABLE A

MEDIAN ANNUAL INCOME / CAPITA FOR COMMUNITY	MARGINAL RATE	ANNUAL TOTAL SEWER FEE / CAPITA
$ 5600 - 5750	2.55 %	0 - 3.82
5751 - 6000	3.23	3.83 - 11.90
6001 - 6250	3.32	11.91 - 20.20
6251 - 6500	3.40	20.21 - 28.70
6501 - 6750	3.47	28.71 - 37.37
6751 - 7000	3.53	37.38 - 46.20
7001 - 7250	3.58	46.21 - 55.16
7251 - 7500	3.64	55.17 - 64.26
7501 - 7750	3.71	64.27 - 73.53
7751 - 8000	3.76	73.54 - 82.94
8001 - 8250	3.84	82.95 - 92.53
8251 - 8500	3.84	92.54 -102.14
8501 - 8750	3.92	102.15 -111.93
8751 - 9000	3.96	111.94 -121.82
9001 - 9250	4.02	121.83 -131.87
9251 - 9500	4.04	131.88 -141.97
9501 - 9750	4.08	141.98 -152.18
9751 -10000	4.12	152.19 -162.48
10001-10250	4.18	162.49 -172.94
10251-10500	4.17	172.95 -183.38
10501-10750	4.26	183.39 -194.02
10751-11000	4.27	194.03 -204.69

EXHIBIT IB

URBAN INDEX - TABLE B

MEDIAN ANNUAL INCOME / CAPITA FOR COMMUNITY	MARGINAL RATE	ANNUAL TOTAL SEWER FEE / CAPITA
$ 5600 - 5750	3.82 %	0 - 5.73
5751 - 6000	4.85	5.74 - 17.86
6001 - 6250	4.98	17.87 - 30.30
6251 - 6500	5.10	30.31 - 43.06
6501 - 6750	5.20	43.07 - 56.05
6751 - 7000	5.30	56.06 - 69.30
7001 - 7250	5.38	69.31 - 82.74
7251 - 7500	5.46	82.75 - 96.39
7501 - 7750	5.56	96.40 -110.30
7751 - 8000	5.65	110.31 -124.42
8001 - 8250	5.75	124.43 -138.80
8251 - 8500	5.76	138.81 -153.20
8501 - 8750	5.88	153.21 -167.90
8751 - 9000	5.94	167.91 -182.74
9001 - 9250	6.02	182.75 -197.80
9251 - 9500	6.06	197.81 -212.95
9501 - 9750	6.13	212.96 -228.27
9751 -10000	6.18	228.28 -243.72
10001-10250	5.01	243.73 -256.25
10251-10500	2.50	256.26 -262.50
10501-10750	2.50	262.51 -268.75
10751-11000	2.50	268.76 -275.00

EXHIBIT IIA

NON-URBAN INDEX - TABLE A

MEDIAN ANNUAL INCOME / CAPITA FOR COMMUNITY	MARGINAL RATE	ANNUAL TOTAL SEWER FEE / CAPITA
$ 5000 - 5250	2.69 %	$ 0 - 6.72
5251 - 5500	2.70	6.73 - 13.46
5501 - 5750	2.77	13.47 - 20.38
5751 - 6000	2.85	20.39 - 27.50
6001 - 6250	2.90	27.51 - 34.75
6251 - 6500	2.99	34.76 - 42.22
6501 - 6750	3.03	42.23 - 49.79
6751 - 7000	3.11	49.80 - 57.57
7001 - 7250	3.14	57.58 - 65.42
7251 - 7500	3.21	65.43 - 73.44
7501 - 7750	3.26	73.44 - 81.59
7751 - 8000	3.31	81.60 - 89.86
8001 - 8250	3.34	89.87 - 98.21
8251 - 8500	3.39	98.22 -106.69
8501 - 8750	3.44	106.70 -115.29
8751 - 9000	3.51	115.30 -124.06
9001 - 9250	3.51	124.07 -132.83
9251 - 9500	3.56	132.84 -141.74
9501 - 9750	3.58	141.75 -150.70
9751 -10000	3.66	150.71 -159.84

EXHIBIT IIB

NON-URBAN INDEX - TABLE B

MEDIAN ANNUAL INCOME / CAPITA FOR COMMUNITY	MARGINAL RATE	ANNUAL TOTAL SEWER FEE / CAPITA
$ 5000 - 5250	4.03 %	$ 0 - 10.08
5251 - 5500	4.05	10.09 - 20.20
5501 - 5750	4.15	20.21 - 30.57
5751 - 6000	4.28	30.58 - 41.26
6001 - 6250	4.35	41.27 - 52.13
6251 - 6500	4.48	52.14 - 63.34
6501 - 6750	4.54	63.35 - 74.68
6751 - 7000	4.67	74.69 - 86.35
7001 - 7250	4.72	86.36 - 98.14
7251 - 7500	4.81	98.15 -110.16
7501 - 7750	4.89	110.17 -122.39
7751 - 8000	4.96	122.40 -134.78
8001 - 8250	5.01	134.79 -147.31
8251 - 8500	5.09	147.31 -160.04
8501 - 8750	5.16	160.05 -172.94
8751 - 9000	5.26	172.95 -186.08
9001 - 9250	5.27	186.09 -199.25
9251 - 9500	5.34	199.26 -212.61
9501 - 9750	2.71	212.62 -219.38
9751 -10000	2.25	219.39 -225.00

OHIO'S 1982 305(b) VOLUME IV

A final copy of Ohio's Volume IV 1982 305(b) Report (Subbasin Reports) was not completed. This is a final draft copy. All information/data in each of the three (3) parts is organized using the same basin/subbasin organization and is presented in the same sequence. The information/data are accurate, however, the three (3) parts were never integrated. The three (3) parts are as follows:

Part 1 Each basin/subbasin table reports total stream and principal stream miles evaluated in Part 2. Evaluations are based upon physical/chemical criteria (evaluated as: NONE = no problem(s); MINOR = does not meet 1983 goals now, but will meet goals by 1983; and MAJOR = does not meet 1983 goals) and physical/chemical/biological criteria (evaluated as: EXCELLENT and GOOD = currently meets 1983 goals; and FAIR and POOR = does not currently meet 1983 goals). Each segment described and delineated in Part 2 is reported in each table under Total Stream Miles and also under Principal Stream Miles, if applicable. Refer to Part 2, pages IV-P2-1 to IV-P2-21 for a detailed description of the criteria and how they were used to evaluate each basin segment.

Part 2 Basin/subbasin segments are evaluated as meeting or not meeting goals based upon data in reference documents of this report, other information cited in each section, and criteria described in the Introduction of Part 2. Water quality standard violations frequency and the magnitude and extent of the problem(s) is(are) described whenever possible. A detailed description of the methods used are found in Part 2, Introduction, pages IV-P2-1 to IV-P2-21.

Part 3 Municipal entities in the Construction Grants Program are listed and the following information is provided: entity name, Facility and NPDES Permit numbers, receiving stream and river mile location, Grant Permit Number, Construction Grant Step, and treatment level.

TABLE OF CONTENTS - VOLUME IV

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
INTRODUCTION	-	1	-
SUMMARY	-	18	-
SUBBASIN REPORTS			
Maumee River Basin			
St. Mary's River Subbasin (A-1)	1	22	1
Little Auglaize River Subbasin (A-2)	2	25	24
Upper Auglaize River Subbasin (A-3) and Lower Auglaize River Subbasin (A-7)	3	27	34
Ottawa River Subbasin (A-4)	4	30	5
Blanchard River Subbasin (A-5 and A-6)	5	34	6
Upper Maumee River Subbasin (A-7) and Middle Maumee River Subbasin (A-10)	6	38	4,8,11
Tiffin River Basin (A-8)	7	39	9
St. Joseph River Basin (A-9)	8	40	10
Lower Maumee River Basin (A-11)	6	43	12,13
Lower Maumee River Basin and Tenmile Creek Subbasin (A-12)	9	45	11,14

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Portage River Basin			
Upper Portage River Basin (B-1) and Lower Portage River Subbasin (B-2)	10	47	15
Sandusky River Basin			
Tymochtee Creek Basin (C-1) and Sandusky River Subbasins (C-2, C-3, C-4)	11	53	18
Huron, Vermilion, Black, and Rocky River Basin			
Huron River Subbasin (D-2)	12	61	22
Vermilion River Subbasin (D-3)	13	66	24
Black River Subbasin (D-4)	14	68	25
Rocky River Subbasin (D-5)	15	72	27
Cuyahoga and Chagrin River Basin			
Upper Cuyahoga River Subbasin (E-1) and Lower Cuyahoga River Subbasin (E-2)	16	75	29
Chagrin River Subbasin (E-3)	17	93	32

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Grand River Basin			
Grand River Subbasin (F-1 and F-2)	18	95	35
Conneaut Creek Subbasin (F-3)	19	106	-
Ashtabula River Subbasin (F-3)	20	108	36
Lake Erie Minor Tributaries			
Beaver Creek (D-3)	21	112	-
Cowles Creek (F-3)	21	112	36
Euclid Creek (E-2)	21	114	-
Turkey Creek (F-3)	21	114	-
Wabash River Basin			
Wabash River Basin (G)	22	115	37

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Great Miami River Basin			
Upper Great Miami River Subbasin (H-1) and Loramie Creek Subbasin (H-2)	23	120	38,40
Upper Mad River Subbasin (H-3)	24	124	41,42
Middle Great Miami River Subbasin and Lower Mad River Subbasin (H-4,5)	25	126	39,40,41
Stillwater River Subbasin (H-6,7)	26	129	43
Twin Creek Subbasin (H-8)	27	131	45
Great Miami River Subbasin (lower part of middle portion) (H-9)	28	132	46
Fourmile Creek Subbasin (H-10)	29	141	49
Lower Great Miami River Subbasin (H-11)	30	144	50
Mill Creek Basin			
Mill Creek Basin (J)	31	148	52

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Little Miami River Basin			
Upper Little Miami River Subbasin (K-1)	32	152	54
Caesar Creek Subbasin (K-2)	33	157	55
Todd Fork Subbasin (K-3)	34	158	56
East Fork of Little Miami River Subbasin (K-4)	35	160	57
Lower Little Miami River Subbasin (K-5)	36	162	59
Scioto River Basin			
Upper Scioto River Subbasin (upper portion) (M-1) . .	37	169	67
Upper Scioto River Subbasin (lower portion)(M-2) . . .	38	173	67
Olentangy River Subbasin (M-3)	39	178	69
Big Walnut Creek Subbasin (M-4)	40	186	69
Mill Creek Subbasin and a portion of the Middle Scioto River Subbasin (M-5) .	41	188	-
Upper Big Darby Creek Subbasin (M-6)	42	193	72
Deer Creek Subbasin (M-7)	43	197	-

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Scioto River Basin (continued)			
Middle Scioto River Subbasin (M-8)	44	200	72
Walnut Creek Subbasin (M-9)	45	216	74
Salt Creek Subbasin (M-10)	46	219	76
Lower Scioto River Subbasin (M-11, M-15)	47	221	77,81
Lower Paint Creek Subbasin (M-12)	48	223	79
Upper Paint Creek Subbasin (M-13)	49	227	79
Rocky Fork and Rattlesnake Creek Subbasin (M-14) . . .	50	229	79
Little Salt Creek Subbasin (M-16)	51	231	76
Scioto Brush Creek Subbasin (M-17)	52	234	82
Hocking River, Shade River, and Leading Creek Basin			
Upper Hocking River Subbasin (O-1)	53	236	88
Middle Hocking River Subbasin (O-2)	54	241	89
Lower Hocking River Subbasin (O-3)	55	244	90
Shade River and Leading Creek Subbasin (O-4)	56	245	91

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Muskingum River Basin			
Black Clear Fork Subbasin (P-1) and Lower Mohican River Subbasin (P-2)	57	246	92
Upper Killbuck Creek Subbasin (P-3) and a part of the Walhonding River Subbasin (P-4)	58	254	95
Middle Tuscarawas River and Sugar Creek Subbasin (P-5), Upper Tuscarawas River Subbasin (P-6), and Sandy Creek Subbasin (P-7)	59	256	96
Conotton Creek Subbasin (P-8)	60	263	103
Stillwater Creek Subbasin (P-9)	61	264	104
Lower Tuscarawas River Subbasin (P-10)	62	266	97
Upper Muskingum River Subbasin (P-11)	63	268	105
Kokosing River Subbasin (P-12)	69	271	106
Licking River Subbasin (P-13)	65	274	107
South Fork Licking River Subbasin (P-14)	66	280	-
Moxahala Creek Subbasin (P-15)	67	282	-
Middle Muskingum River Subbasin (P-16) and Lower Muskingum River Subbasin (P-19)	68	285	105,112,115

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Wills Creek Subbasin (P-17, P-18)	69	287	113
Ohio River Tributary Subbasins			
Basin L			
Whiteoak Creek Subbasin (L-1)	70,71	292	64
Ohio Brush Creek Subbasin (L-2)	70,71	292	64
Eagle Creek and Straight Creek Subbasin (L-3)	70,71	293	-
Basin N			
Upper Raccoon Creek Subbasin (N-1)	70,71	293	83
Lower Raccoon Creek Subbasin (N-2)	70,71	294	83
Symmes Creek Subbasin (N-3)	70,71	295	85
Little Scioto River and Pine Creek Subbasin (N-4) . . .	70,71	296	84,86
Ice Creek and Indian Guyan Creek Subbasin (N-5)	70,71	297	85
Basin R			
Duck Creek Subbasin (R-1)	70,71	297	116
Little Muskingum River Subbasin (R-2)	70,71	297	116

SECTION	PAGE PART 1 (IV-P1-)	PART 2 (IV-P2-)	PART 3 (IV-P3-)
Basin S			
Little Beaver Creek Subbasin (S-1)	70,71	298	118
Yellow Creek, Cross Creek, and McIntyre Creek Subbasin (S-2)	70,71	301	120
Short Creek and Wheeling Creek Subbasin (S-3)	70,71	302	123
McMahon Creek, Captina Creek, and Sunfish Creek Subbasin (S-4)	70,71	303	124
Mahoning River, Pymatuning Creek, and Yankee Creek Basin			
Upper, Middle, and Lower Mahoning River Subbasins (T-1, T-2, T-3)	72	305	129

PART 1

Each basin/subbasin table reports total stream and principal stream miles evaluated in Part 2. Evaluations are based upon physical/chemical criteria (evaluated as: NONE = no problem(s); MINOR = does not meet 1983 goals now, but will meet goals by 1983; and MAJOR = does not meet 1983 goals) and physical/chemical/biological criteria (evaluated as: EXCELLENT and GOOD = currently meets 1983 goals; and FAIR and POOR = does not currently meet 1983 goals). Each segment described and delineated in Part 2 is reported in each table under Total Stream Miles and also under Principal Stream Miles, if applicable. Refer to Part 2, pages IV-P2-1 to IV-P2-21 for a detailed description of the criteria and how they were used to evaluate each basin segment.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - St. Marys River Subbasin (A-1)[a]
Total Stream Miles 181.4
Total Principal Stream Miles 59.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	6.4(3)	--
Expected to meet goals Prior to 1983	Minor	41.7(20)	32.0(54)
Not expected to meet goals Prior to 1983	Major	15.7(7)	15.7(27)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		63.8(31)	47.7(81)
Total Not Evaluated		149.9(69)	6.2(19)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Little Auglaize River Subbasin (A-2)[a]
Total Stream Miles 303.1
Total Principal Stream Miles 97.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	43.9(15)	43.9(45)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	5.1(2)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		49.0(16)	43.9(45)
Total Not Evaluated		254.1(84)	53.3(55)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Auglaize River Subbasin (A-3 and A-7)[a]
Total Stream Miles 378.8
Total Principal Stream Miles 182.4

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	104.2(28)	90.5(50)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	20.3(5)	11.4(6)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		124.3(33)	101.9(56)
Total Not Evaluated		254.3(67)	80.5(44)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Ottawa River Subbasin (A-4)[a]
Total Stream Miles 173.9 168.9
Total Principal Stream Miles 52.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	32.9(19)	--
Expected to meet goals Prior to 1983	Minor	14.9(9)	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	7.9(4)	7.9(15)
Does not meet 1983 goals	Fair	--	--
	Poor	39.6(23)	39.6(75)
Total Evaluated		95.3(54)	47.5(90)
Total Not Evaluated		73.6(46)	5.2(10)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Blanchard River Subbasin (A-5 and A-6)[a]
Total Stream Miles 337.3
Total Principal Stream Miles 91.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	96.3(29)	76.7(84)
Expected to meet goals Prior to 1983	Minor	2.6(1)	--
Not expected to meet goals Prior to 1983	Major	23.5(7)	14.3(16)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		122.4(36)	91.0(100)
Total Not Evaluated		214.9(64)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Maumee River Basin (A-7, A-10 and A-11)[a]
Total Stream Miles 599.5
Total Principal Stream Miles 214.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	46.3(8)	46.3(22)
Expected to meet goals Prior to 1983	Minor	46.6(8)	46.6(22)
Not expected to meet goals Prior to 1983	Major	14.1(2)	14.1(7)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		107.0(18)	107.0(50)
Total Not Evaluated		492.5(82)	107.9(50)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Tiffin River Subbasin (A-8)[a]
Total Stream Miles 316.9
Total Principal Stream Miles 59.3

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	59.3(19)	59.3(100)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		59.3(19)	59.3(100)
Total Not Evaluated		257.6(81)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - St. Joseph River Subbasin (A-9)[a]
Total Stream Miles 141.2
Total Principal Stream Miles 61.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	36.7(26)	36.7(60)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		36.7(26)	36.7(60)
Total Not Evaluated		104.5(74)	24.4(40)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Maumee River Basin (A)
Stream Miles Evaluated - Lower Maumee River
and Tenmile Creek Subbasins (A-12)[a]
Total Stream Miles 119.5
Total Principal Stream Miles 41.6 41.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	22.7(19)	22.7(55)
Expected to meet goals Prior to 1983	Minor	39.1(33)	11.9(29)
Not expected to meet goals Prior to 1983	Major	14.0(12)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		75.8(63)	34.6(83)
Total Not Evaluated		43.7(37)	6.9(17)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Portage River Basin (B)
Stream Miles Evaluated - Upper and Lower Portage River Subbasins (B-1 and B-2)[a]
Total Stream Miles 268.3
Total Principal Stream Miles 115.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	39.4(15)	27.9(24)
Expected to meet goals Prior to 1983	Minor	61.3(23)	17.5(15)
Not expected to meet goals Prior to 1983	Major	21.0(8)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		121.7(45)	45.4(39)
Total Not Evaluated		146.6(55)	70.5(61)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Sandusky River Basin (C)
Stream Miles Evaluated - Sandusky River and Tymochtee Creek
Subbasins (C-1, C-2, C-3 and C-4)[a]
Total Stream Miles 811.8
Total Principal Stream Miles 248.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	233.9(29)	157.8(64)
Expected to meet goals Prior to 1983	Minor	3.9(1)	--
Not expected to meet goals Prior to 1983	Major	22.9(3)	21.0 (8)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	53.4(6)	53.4(21)
Does not meet 1983 goals	Fair	--	--
	Poor	3.0(1)	3.0(1)
Total Evaluated		317.1(39)	235.2(95)
Total Not Evaluated		494.7(61)	13.0(5)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Huron River Basin (D-2)
Stream Miles Evaluated - Huron River Basin (D-2)[a]
Total Stream Miles 226.5
Total Principal Stream Miles 105.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	85.6(38)	65.6(62)
Expected to meet goals Prior to 1983	Minor	14.3(6)	14.3(14)
Not expected to meet goals Prior to 1983	Major	17.7(8)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		177.6(52)	79.9(76)
Total Not Evaluated		108.9(48)	25.8(24)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Vermilion River Basin (D-3)
Stream Miles Evaluated - Vermilion River Basin (D-3)[a]
Total Stream Miles 113.3
Total Principal Stream Miles 58.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	78.4(69)	58.7(100)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	5.6(5)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		84.0(74)	58.7(100)
Total Not Evaluated		29.3(26)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Black River Basin (D-4)
Stream Miles Evaluated - Black River Basin (D-4)[a]
Total Stream Miles 283.7
Total Principal Stream Miles 73.0 62.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	19.7(7)	19.7(27)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		19.7(7)	19.7(27)
Total Not Evaluated		264.0(93)	42.3(73)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Rocky River Basin (D-5)
Stream Miles Evaluated - Rocky River Basin (D-5)[a]
Total Stream Miles 166.3
Total Principal Stream Miles 48.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	15.4(9)	15.4(32)
Not expected to meet goals Prior to 1983	Major	21.0(13)	10.9(23)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		36.4(22)	26.3(55)
Total Not Evaluated		129.9(78)	21.7(45)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Cuyahoga River Basin (E)
Stream Miles Evaluated - Cuyahoga River Subbasins (E-1 and E-2)[a]
Total Stream Miles 385.7
Total Principal Stream Miles 100.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	14.8(4)	14.0(14)
Expected to meet goals Prior to 1983	Minor	11.8(3)	11.8(12)
Not expected to meet goals Prior to 1983	Major	109.1(28)	55.3(55)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		135.7(35)	81.1(81)
Total Not Evaluated		250.0(65)	19.0(19)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Chagrin River Basin (E-3)
Stream Miles Evaluated - Chagrin River Basin (E-3)[a]
Total Stream Miles 109.2
Total Principal Stream Miles 47.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	4.5(4)	--
Not expected to meet goals Prior to 1983	Major	4.1(4)	4.1(8)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		8.9(8)	4.1(8)
Total Not Evaluated		100.3(92)	43.8(92)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Grand River Basin (F)
Stream Miles Evaluated - Grand River Basin (F-1 and F-2)[a]
Total Stream Miles 454.6
Total Principal Stream Miles 127.3

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	15.2(3)	10.6(8)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		15.2(3)	10.6(8)
Total Not Evaluated		439.4(97)	116.7(92)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Grand River Basin (F)
Stream Miles Evaluated - Conneaut Creek Subbasin (F-3)[a]
Total Stream Miles 69.9
Total Principal Stream Miles 22.3

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	21.1(30)	21.1(95)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		21.1(30)	21.1(95)
Total Not Evaluated		48.8(70)	1.2(5)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Grand River Basin (F)
Stream Miles Evaluated - Ashtabula River Subbasin (F-3)[a]
Total Stream Miles 60.5
Total Principal Stream Miles 39.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	1.4(2)	--
Not expected to meet goals Prior to 1983	Major	9.4(16)	6.0(15)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		10.8(18)	6.0(15)
Total Not Evaluated		49.7(82)	33.7(85)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Minor Lake Erie Tributary Basins (D, E and F)
Stream Miles Evaluated - Minor Lake Erie Tributary
Basins (D-3, E-2 and F-3)[a]
Total Stream Miles 124.4[b]
Total Principal Stream Miles 0.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	8.8(7)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		8.8(7)	--
Total Not Evaluated		115.6(93)	--

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the minor Lake Erie tributary basins from Lorain County to the Pennsylvania state line.

Table IV-__: Wabash River Basin (G)
Stream Miles Evaluated - Wabash River Basin (G-7)[a]
Total Stream Miles 147.6
Total Principal Stream Miles 41.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	64.1(43)	32.7(78)
Expected to meet goals Prior to 1983	Minor	15.0(10)	6.3(15)
Not expected to meet goals Prior to 1983	Major	16.3(11)	2.7(6)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		95.4(65)	41.7(100)
Total Not Evaluated		52.2(35)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Upper Great Miami River
and Loramie Creek Subbasins (H-1 and H-2)[a]
Total Stream Miles 313.1[b]
Total Principal Stream Miles 89.8

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	7.8(2)	7.8(9)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		7.8(2)	7.8(9)
Total Not Evaluated		305.3(98)	82.0(91)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in subbasins from the Great Miami River headwaters up to and including Loramie Creek.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Upper Mad River Subbasin (H-3)[a]
Total Stream Miles 168.2[b]
Total Principal Stream Miles 50.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	34.7(21)	34.7(69)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	6.0(4)	6.0(12)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		40.7(24)	40.7(81)
Total Not Evaluated		127.5(76)	9.5(19)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in subbasins from the Mad River headwaters up to and including Buck Creek.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Middle Great Miami River
and Lower Mad River Subbasins (H-4 and H-5)[a]
Total Stream Miles 196.2[b]
Total Principal Stream Miles 54.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	25.0(13)	25.0(46)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		25.0(13)	25.0(46)
Total Not Evaluated		171.2(87)	29.0(54)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Mad River Subbasin from below Buck Creek to the Great Miami River confluence, and the Great Miami River mainstem from river mile 117.0 - 89.0.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Stillwater River Subbasin (H-6 and H-7)[a]
Total Stream Miles 290.9
Total Principal Stream Miles 107.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	10.0(3)	10.0(9)
Not expected to meet goals Prior to 1983	Major	10.4(4)	2.4(2)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		20.4(7)	12.4(11)
Total Not Evaluated		270.5(93)	95.3(89)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Twin Creek Subbasin (H-8)[a]
Total Stream Miles 139.4
Total Principal Stream Miles 46.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	22.3(16)	22.3(48)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		22.3(16)	22.3(48)
Total Not Evaluated		117.1(84)	23.9(52)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Lower Middle Great Miami River Subbasin (H-9)[a]
Total Stream Miles 172.9[b]
Total Principal Stream Miles 53.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (%)	Principal Streams Miles (%)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	6.0(3)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	53.0(31)	53.0(100)
Total Evaluated		59.0(34)	53.0(100)
Total Not Evaluated		113.9(66)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Middle Great Miami River Subbasin from the Great Miami River mainstem river mile 89.0 - 36.0. The Stillwater River, Mad River, Twin Creek and Fourmile Creek Subbasins are not included.

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Four Mile Creek Subbasin (H-10)[a]
Total Stream Miles 125.2[b]
Total Principal Stream Miles 70.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	13.1(10)	13.1(19)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	24.1(19)	24.1(34)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		37.2(29)	37.2(53)
Total Not Evaluated		88.0(71)	33.5(47)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Four Mile Creek is listed as Talawanda Creek in the Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960).

Table IV-__: Great Miami River Basin (H)
Stream Miles Evaluated - Lower Great Miami River Subbasin (H-11)[a]
Total Stream Miles 149.3[b]
Total Principal Stream Miles 66.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	28.9(19)	28.9(44)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	36.0(24)	36.0(54)
Total Evaluated		64.9(43)	64.9(98)
Total Not Evaluated		84.4(57)	1.3(2)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Great Miami River Subbasin from the Great Miami River mainstem river mile 36.0 - 0.0. The Fourmile Creek Subbasin is not included.

Table IV-__: Mill Creek Basin (J)
Stream Miles Evaluated - Mill Creek Basin (J-1)[a]
Total Stream Miles 65.8
Total Principal Stream Miles 28.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	28.1(43)	28.1(100)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		28.1(43)	28.1(100)
Total Not Evaluated		37.7(57)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Little Miami River Basin (K)
Stream Miles Evaluated - Upper Little Miami River Subbasin (K-1)[a]
Total Stream Miles 132.5[b]
Total Principal Stream Miles 55.3

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	4.5(3)	--
Not expected to meet goals Prior to 1983	Major	55.3(42)	55.3(100)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		59.8(45)	55.3(100)
Total Not Evaluated		72.7(55)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Upper Little Miami River Subbasin from the Little Miami River headwaters to below the confluence of Todd Fork. The Todd Fork and Caesar Creek Subbasins are not included.

Table IV-__: Little Miami River Basin (K)
Stream Miles Evaluated - Caesar Creek Subbasin (K-2)[a]
Total Stream Miles 119.8
Total Principal Stream Miles 33.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	3.0(2)	3.0(9)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		3.0(2)	3.0(9)
Total Not Evaluated		116.8(98)	30.9(91)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Little Miami River Basin (K)
Stream Miles Evaluated - Todd Fork Subbasin (K-3)[a]
Total Stream Miles 140.3
Total Principal Stream Miles 35.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	18.6(13)	18.6(53)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	16.9(12)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		35.5(25)	18.6(53)
Total Not Evaluated		104.8(75)	16.4(47)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Little Miami River Basin (K)
Stream Miles Evaluated - East Fork Little Miami River Subbasin (K-4)[a]
Total Stream Miles 293.3
Total Principal Stream Miles 81.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	3.5(1)	3.5(4)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		3.5(1)	3.5(4)
Total Not Evaluated		289.8(99)	78.2(96)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Little Miami River Basin (K)
Stream Miles Evaluated - Lower Little Miami River Subbasin (K-5)[a]
Total Stream Miles 116.1[b]
Total Principal Stream Miles 50.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	26.1(22)	26.1(52)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	24.1(21)	24.1(48)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		50.2(43)	50.2(100)
Total Not Evaluated		65.9(57)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Little Miami River Subbasin from below Todd Fork to the confluence with the Ohio River. The East Fork Little Miami River Subbasin is not included.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Upper Scioto River Subbasin (M-1)[a]
Total Stream Miles 210.7
Total Principal Stream Miles 124.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	66.0(31)	66.0(53)
Expected to meet goals Prior to 1983	Minor	29.6(14)	29.6(23)
Not expected to meet goals Prior to 1983	Major	7.7(4)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		103.3(49)	95.6(76)
Total Not Evaluated		107.4(51)	28.9(24)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Upper Scioto River Subbasin from the headwaters to and including the Little Scioto River Subbasin.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Lower Upper Scioto River Subbasin (M-2)[a]
Total Stream Miles 110.9[b]
Total Principal Stream Miles 22.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	14.8(13)	14.8(64)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	3.5(3)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		18.3(16)	14.8(64)
Total Not Evaluated		92.6(84)	8.1(36)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Upper Scioto River subbasins from below the Little Scioto River confluence to the Mill Creek confluence. Unnamed tributary at West Mansfield estimated at 3.5 miles in length.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Olentangy River Subbasin (M-3)[a]
Total Stream Miles 282.4
Total Principal Stream Miles 123.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	55.7(20)	55.7(45)
Not expected to meet goals Prior to 1983	Major	11.4(4)	11.4(9)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	44.1(16)	44.1(36)
Does not meet 1983 goals	Fair	--	--
	Poor	10.0(4)	10.0(8)
Total Evaluated		121.2(43)	121.2(98)
Total Not Evaluated		161.2(57)	2.3(2)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Big Walnut Creek Subbasin (M-4)[a]
Total Stream Miles 315.0 315.3
Total Principal Stream Miles 130.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	77.9(25)	77.9(60)
Expected to meet goals Prior to 1983	Minor	10.8(3)	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		88.7(28)	77.9(60)
Total Not Evaluated		226.6(72)	52.1(40)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Mill Creek and Middle Scioto River Subbasins (M-5)[a]
Total Stream Miles 122.3[b]
Total Principal Stream Miles 68.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	40.4(33)	40.4(59)
Does not meet 1983 goals	Fair	3.9(3)	3.9(6)
	Poor	14.4(12)	14.4(21)
Total Evaluated		58.7(48)	58.7(86)
Total Not Evaluated		63.6(52)	9.8(14)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Mill Creek and Middle Scioto River Subbasin from the confluence of Mill Creek to the confluence of the Olentangy River.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Upper Darby Creek Subbasin (M-6)[a]
Total Stream Miles 181.5[b]
Total Principal Stream Miles 82.6

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	38.0(21)	38.0(46)
Expected to meet goals Prior to 1983	Minor	44.6(24)	44.6(54)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		82.6(45)	82.6(100)
Total Not Evaluated		98.9(55)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Upper Darby Creek Subbasin from the headwaters to and including Little Darby Creek.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Deer Creek Subbasin (M-7)[a]
Total Stream Miles 169.8
Total Principal Stream Miles 67.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	62.3(37)	62.3(93)
Expected to meet goals Prior to 1983	Minor	12.0(7)	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		74.3(44)	62.3(93)
Total Not Evaluated		95.5(56)	4.8(7)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Middle Scioto River Subbasin (M-8)[a]
Total Stream Miles 130.4[b]
Total Principal Stream Miles 83.0

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	34.1(26)	34.1(41)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	48.9(37)	48.9(59)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		83.0(63)	83.0(100)
Total Not Evaluated		47.4(37)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Middle Scioto River Subbasin from the confluence of the Olentangy River to the confluence of Deer Creek, including the lower portion of Big Darby Creek. The Big Walnut Creek and Walnut Creek Subbasins are not included.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Walnut Creek Subbasin (M-9)[a]
Total Stream Miles 113.1
Total Principal Stream Miles 49.8

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	21.3(19)	21.3(43)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	16.3(14)	12.0(24)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		37.6(33)	33.3(67)
Total Not Evaluated		75.3(67)	16.5(33)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Salt Creek Subbasin (M-10)[a]
Total Stream Miles 189.2[b]
Total Principal Stream Miles 45.4

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	90.2(48)	45.4(100)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		90.2(48)	45.4(100)
Total Not Evaluated		99.0(52)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles does not include the Little Salt Creek Subbasin.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Lower Scioto River Subbasin (M-11 and M-15)[a]
Total Stream Miles 359.4[b]
Total Principal Stream Miles 77.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	51.2(14)	51.2(66)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		51.2(14)	51.2(66)
Total Not Evaluated		308.2(86)	26.5(34)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Scioto River Subbasin from the Salt Creek Confluence to the confluence with the Ohio River. The Salt Creek and Scioto Brush Creek Subbasins are not included.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Lower Paint Creek Subbasin (M-12)[a]
Total Stream Miles 229.5[b]
Total Principal Stream Miles 84.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	37.9(17)	37.9(45)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		37.9(17)	37.9(45)
Total Not Evaluated		191.6(83)	46.6(55)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Paint Creek Subbasin from Paint Creek Reservoir to the confluence with the Scioto River.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Upper Paint Creek Subbasin (M-13)[a]
Total Stream Miles 80.7[b]
Total Principal Stream Miles 58.6

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	22.2(28)	22.2(38)
Expected to meet goals Prior to 1983	Minor	7.6(9)	7.6(13)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		29.8(37)	29.8(51)
Total Not Evaluated		50.9(63)	28.8(49)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total mile of streams in the Upper Paint Creek Subbasin from the headwaters to the Rocky Fork confluence. The Rocky Fork and Rattlesnake Creek Subbasins are not included.

Table IV- : Scioto River Basin (M)
Stream Miles Evaluated - Rocky Fork and Rattlesnake Creek Subbasins (M-14)[a]
Total Stream Miles 203.5
Total Principal Stream Miles 69.8

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	7.5(4)	7.5(11)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		7.5(4)	7.5(11)
Total Not Evaluated		196.0(96)	62.3(89)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Little Salt Creek Subbasin (M-16)[a]
Total Stream Miles 108.9
Total Principal Stream Miles 49.8

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	57.2(53)	32.2(65)
Does not meet 1983 goals	Fair	14.7(13)	14.7(29)
	Poor	--	--
Total Evaluated		71.9(66)	46.9(94)
Total Not Evaluated		37.0(34)	2.9(6)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Scioto River Basin (M)
Stream Miles Evaluated - Scioto Brush Creek Subbasin (M-17)[a]
Total Stream Miles 223.2
Total Principal Stream Miles 54.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	54.2(24)	54.2(100)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		54.2(24)	54.2(100)
Total Not Evaluated		169.0(76)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Hocking River, Shade River and Leading Creek Basin (0)
Stream Miles Evaluated - Upper Hocking River Subbasin (0-1)[a]
Total Stream Miles 165.5[b]
Total Principal Stream Miles 71.4

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	51.5(31)	28.5(40)
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	42.9(26)	42.9(60)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		94.4(57)	71.4(100)
Total Not Evaluated		71.1(43)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Upper Hocking River Subbasin from the headwaters to and including Clear Creek.

Table IV-__: Hocking River, Shade River and Leading Creek Basin (0)
Stream Miles Evaluated - Middle Hocking River Subbasin (0-2)[a]
Total Stream Miles 286.3[b]
Total Principal Stream Miles 64.4

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	26.6(9)	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	62.2(22)	62.2(97)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		88.8(31)	62.2(97)
Total Not Evaluated		197.5(69)	2.2(3)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Middle Hocking River Subbasin from below the confluence of Clear Creek to below the confluence of Margaret Creek at Athens (RM 41.3).

Table IV-__: Hocking River, Shade River and Leading Creek Basin (0)
Stream Miles Evaluated - Lower Hocking River Subbasin (0-3)[a]
Total Stream Miles 237.5[b]
Total Principal Stream Miles 65.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[c]	0.0(0)[c]
Total Not Evaluated		237.5(100)	65.1(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Hocking River Subbasin from below the confluence of Margaret Creek to the confluence with the Ohio River.

c - Not enough data available to make an accurate evaluation.

Table IV-__: Hocking River, Shade River and Leading Creek Basin (0)
Stream Miles Evaluated - Shade River and Leading Creek Subbasins (0-4)[a]
Total Stream Miles 284.5
Total Principal Stream Miles 67.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[b]	0.0(0)[b]
Total Not Evaluated		284.5(100)	67.7(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Not enough data available to make an accurate evaluation.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Black Fork, Clear Fork and Lower Mohican River Subbasins (P-1 and P-2)[a]
Total Stream Miles 428.0
Total Principal Stream Miles 122.6

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	74.3(17)	29.2(24)
Expected to meet goals Prior to 1983	Minor	91.9(21)	79.4(65)
Not expected to meet goals Prior to 1983	Major	16.9(4)	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		183.1(43)	108.6(89)
Total Not Evaluated		244.9(57)	14.0(11)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Upper Killbuck Creek and a Portion of the Walhonding River Subbasin (P-3 and P-4)[a]
Total Stream Miles 328.0
Total Principal Stream Miles 105.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	17.0(5)	17.0(16)
Expected to meet goals Prior to 1983	Minor	47.0(14)[b]	47.0(45)[b]
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		64.0(19)	64.0(61)
Total Not Evaluated		264.0(81)	41.2(39)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Killbuck Creek stream segment estimated at 47.0 miles, from the Wooster STP to the mouth.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Middle Tuscarawas River, Sugar Creek, Upper Tuscarawas River and Sandy Creek Subbasins (P-5, P-6 and P-7)[a]
Total Stream Miles 644.4[b]
Total Principal Stream Miles 200.6

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	38.9(6)	38.9(19)
Expected to meet goals Prior to 1983	Minor	39.9(6)	31.0(15)
Not expected to meet goals Prior to 1983	Major	99.2(15)[c]	90.3(45)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		178.0(28)	160.2(80)
Total Not Evaluated		466.4(72)	40.4(20)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Tuscarawas River stream segment end estimated to be at the confluence of Conotton Creek (RM 62.9).

c - Swartz Ditch segment estimated at 6.9 miles.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Conotton Creek Subbasin (P-8)[a]
Total Stream Miles 161.4
Total Principal Stream Miles 38.7

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[b]	0.0(0)[b]
Total Not Evaluated		161.4(100)	38.7(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Not enough data available to make an accurate evaluation.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Stillwater Creek Subbasin (P-9)[a]
Total Stream Miles 329.5
Total Principal Stream Miles 97.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[b]	0.0(0)[b]
Total Not Evaluated		329.5(100)	97.2(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Not enough data available to make an accurate evaluation.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Lower Tuscarawas River Subbasin (P-10)[a]
Total Stream Miles 312.1[b]
Total Principal Stream Miles 55.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	24.9(8)	24.9(45)
Expected to meet goals Prior to 1983	Minor	30.3(10)	30.3(55)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		55.2(18)	55.2(100)
Total Not Evaluated		256.9(82)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Lower Tuscarawas River Subbasin from the confluence of Sugar Creek to the confluence with the Muskingum River. The Stillwater Creek Subbasin not included.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Upper Muskingum River Subbasin (P-11)[a]
Total Stream Miles 204.0[b]
Total Principal Stream Miles 70.1

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	22.6(11)	22.6(32)
Not expected to meet goals Prior to 1983	Major	4.9(2)	4.9(7)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		27.5(13)	27.5(39)
Total Not Evaluated		176.5(87)	42.6(39)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Total Stream Miles = total miles of streams in the Upper Muskingum River Subbasin from confluence of the Tuscarawas and Walhonding Rivers to Ellis Dam (RM 84.4). The Wills Creek Subbasin is not included.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Kokosing River Subbasin (P-12)[a]
Total Stream Miles 250.4
Total Principal Stream Miles 50.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	58.1(23)	38.9(77)
Expected to meet goals Prior to 1983	Minor	11.3(5)	11.3(23)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		69.4(28)	50.2(100)
Total Not Evaluated		181.0(72)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Licking River Subbasin (P-13)[a]
Total Stream Miles 286.5[b]
Total Principal Stream Miles 67.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	38.3(13)	38.3(57)
Expected to meet goals Prior to 1983	Minor	17.1(6)	17.1(25)
Not expected to meet goals Prior to 1983	Major	10.0(3)	10.0(14)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		65.4(23)	65.4(97)
Total Not Evaluated		221.1(77)	2.1(3)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - The South Fork Licking River Subbasin is not included.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - South Fork Licking River Subbasin (P-14)[a]
Total Stream Miles 126.3
Total Principal Stream Miles 61.4

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	56.4(45)	56.4(92)
Expected to meet goals Prior to 1983	Minor	5.0(4)	5.0(8)
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		61.4(49)	61.4(100)
Total Not Evaluated		64.9(51)	0.0(0)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Moxahala River Subbasin (P-15)[a]
Total Stream Miles 161.7
Total Principal Stream Miles 55.3

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	29.2(18)	29.2(53)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		29.2(18)	29.2(53)
Total Not Evaluated		132.5(82)	26.1(47)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Middle and Lower Muskingum River Subbasins (P-16 and P-19)[a]
Total Stream Miles 698.5
Total Principal Stream Miles 194.9

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[b]	0.0(0)[b]
Total Not Evaluated		698.5(100)	194.9(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Not enough data available to make an accurate evaluation.

Table IV-__: Muskingum River Basin (P)
Stream Miles Evaluated - Wills Creek Subbasin (P-17 and P-18)[a]
Total Stream Miles 326.3
Total Principal Stream Miles 154.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	--	--
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		0.0(0)[b]	0.0(0)[b]
Total Not Evaluated		326.3(100)	154.5(100)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

b - Not enough data available to make an accurate evaluation.

Table IV-__: Ohio River Tributaries Basins (L, N, R and S)
Stream Miles Evaluated - Ohio River Tributaries
Subbasins (L, N, R and S)[a]
Total Stream Miles 3282.6[b]
Total Principal Stream Miles 972.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	--	--
Expected to meet goals Prior to 1983	Minor	--	--
Not expected to meet goals Prior to 1983	Major	131.7(4)	119.4(12)[c]
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		131.7(4)	119.4(12)
Total Not Evaluated		3150.9(96)	852.8(88)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

(Footnote continued on next page)

Table IV-__: Ohio River Tributaries Basins (L, N, R and S)
Stream Miles Evaluated - Ohio River Tributaries
Subbasins (L, N, R and S)[a]
Total Stream Miles 3282.6[b]
Total Principal Stream Miles 972.2

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)

See data on previous page.

(Footnote: Continued)

b - Stream miles and percentages calculated from the following figures:

Subbasin	Basin Code	Tot. Miles	Prin. Miles
Whiteoak Creek	(L-1)	140.1	49.3
Ohio Brush Creek	(L-2)	257.6	78.6
Straight Creek/Eagle Creek	(L-3)	158.2	30.9
Upper Raccoon Creek	(N-1)	245.1	63.5
Lower Raccoon/L. Raccoon Creek	(N-2)	206.1	71.9
Symmes Creek	(N-3)	240.9	70.0
L. Scioto River/Pine Creek	(N-4)	318.5	89.5
Ice Creek/Indian Guyan Creek	(N-5)	108.2	31.5
Duck Creek	(R-1)	228.4	88.0
Little Muskingum River	(R-2)	302.7	69.7
Little Beaver Creek	(S-1)	218.4	110.4
Yellow Creek/Cross Creek	(S-2)	297.6	61.4
Short Creek/Leading Creek	(S-3)	237.1	59.6
McMahon Creek/Captina Creek/ Sunfish Creek	(S-4)	323.7	98.1

c - Middle Fork Little Beaver stream segment estimated at 53.9 miles.

Table IV-__: Mahoning River, Pymatuning Creek and Yankee Creek Basin (T)
Stream Miles Evaluated - Upper, Middle and Lower Mahoning River
Subbasins (T-1, T-2 and T-3)[a]
Total Stream Miles 419.4
Total Principal Stream Miles 181.5

Fishable/Swimmable EVALUATION	Status/Problem	All Streams Miles (% T)	Principal Streams Miles (% P)
PHYSICAL/CHEMICAL			
Currently meets 1983 goals	None	29.2(7)	29.2(16)
Expected to meet goals Prior to 1983	Minor	18.0(4)	18.0(10)
Not expected to meet goals Prior to 1983	Major	26.8(6)	26.8(15)
PHYSICAL/CHEMICAL/BIOLOGICAL			
Currently meets 1983 goals	Excellent	--	--
	Good	--	--
Does not meet 1983 goals	Fair	--	--
	Poor	--	--
Total Evaluated		74.0(18)	74.0(41)
Total Not Evaluated		345.4(82)	107.1(59)

a - Number of stream miles listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR 1960). The % T = Total stream miles evaluated divided by total stream miles present in the basin. The % P = Total principal stream miles evaluated divided by total principal stream miles present in the basin. Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

PART 2

Basin/subbasin segments are evaluated as meeting or not meeting goals based upon data in reference documents of this report, other information cited in each section, and criteria described in the Introduction of Part 2. Water quality standard violations frequency and the magnitude and extent of the problem(s) is(are) described whenever possible. A detailed description of the methods used are found in Part 2, Introduction, pages IV-P2-1 to IV-P2-21.

SUBBASIN REPORTS

1982 305(b) Report
Volume IV

Compiled by

Ohio EPA District Surveillance Personnel

NEDO

Ken Frase
Dave Stroud
Bob Wysenski

SEDO

Jim Grow
Martin Kuklis
Jerry Knapp
Larry Pennington

NWDO

Tom Balduf
Jack Schwartz

SWDO

Graham Mitchell
Tim Staiger
Mike Zimmerman

CDO

Rod Mehlhop
Jody Verkouille

Macrobenthic

Jeff DeShon
Jack Freda
Beth Lenoble
Martin Knapp

Editors
Gerald Myers
John Estenik

Ohio Environmental Protection Agency
Office of Wastewater Pollution Control
Division of Surveillance and Water Quality Standards
Columbus, Ohio 43216
March 1982

INTRODUCTION

This volume of the 305(b) report describes existing water quality and evaluates the status of Ohio's surface waters with regard to attainment of the goals established by the Clean Water Act of 1977. Additional information in this volume includes, wherever available: (a), projections of water quality conditions after implementation of pollution control programs; (b), an assessment of nonpoint source pollution problems; and (c), an evaluation of the effectiveness of existing pollution control programs.

The goal of the Act, commonly expressed as "fishable/swimmable waters" was defined in the Act as "... water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water..."(Section 101(a)(2) of PL 95-217). The Act further stated that this goal be achieved, wherever attainable, by July 1, 1983. "Fishable/swimmable" waters are difficult to define in precise and practical terms. Therefore, water quality standards (WQS) commonly serve as surrogates for the fishable/swimmable goal and are the enforceable components of the Act upon which many pollution abatement programs rest. States set water quality standards based on the criteria necessary to protect aquatic life and human health. Thus, compliance with water quality standards is one method of assessing progress towards attaining "fishable/swimmable" waters. However, it should not be the only measure of the condition of a water resource; a comprehensive evaluation encompassing physical, chemical and biological data is a better determination of whether or not the "fishable/swimmable" goal of the Act is being achieved.

Evaluations of the attainment of the 1983 goals in this report were made with information regarding compliance with physical/chemical water quality standards as well as information about the biological integrity of the stream. Biological evaluations were not included in the 1980 305(b) Basin Summary Volume IV; but are an integral part of this report. For the purpose of this report, data were compared to Warmwater Habitat(WWH) water quality standards (Chapter 3745-1 of the Ohio Administrative Code) and violations were noted. A supplemental document (Reference Document 2 to the 1982 305(b) report) contains tabular listings of water quality standards violations[1] recorded from October 1, 1978, through September 30, 1980. Ohio EPA water quality information predating October 1978 was frequently considered in the evaluation of the attainment of 1983 goals for stream segments where more recent information was inadequate. On occasion, published and unpublished information from outside of the Agency was also considered. The subbasin reports contain narrative descriptions of water quality, with reference to published and unpublished data made as accurately as possible. All reference material is available from the Ohio EPA upon request.

Streams and stream segments were classified with respect to the attainment of 1983 clean water goals as follows:

1) No problems, streams and stream segments that currently meet 1983 goals,

---

[1] Violations data include all persistant toxicants, all heavy metals and priority pollutants, and all standards violations which impacted subbasin mainstems or which occurred in subbasin mainstems.

2) Minor problems, streams and stream segments that are expected to meet 1983 goals after implementation of pollution controls (improvements completed prior to 1983), and

3) Major problems, streams and stream segments that are not expected to meet 1983 goals.

Many of the evaluations contained in this volume are tentative classifications because they are based only on physical/chemical data. Ohio EPA water quality evaluations are based on biological (fish and macroinvertebrate) community structure and health along with physical/chemical information. Biological and intensive water quality surveys are complex and detailed and therefore are presented as separate documents. (Volume VI; Intensive Survey's).

A large number of streams could not be evaluated because of insufficent data. Approximately nine percent of the 43,900[2] permanent stream miles in Ohio have been evaluated in this report; however, 32 percent of the "principal" rivers and streams in Ohio[3] were evaluated. The quantity of data needed to make an evaluation was not standardized, but consisted in most cases, of at least four samples per year at one or more stations. Segment delineation was usually based upon the location of sampling stations in relation to major point source dischargers and major tributary streams. Data were not extrapolated beyond significant point sources or major tributaries.

The subbasin reports were assembled by District Surveillance personnel of the Ohio EPA. Guidelines were provided for evaluating water quality and classifying streams with respect to the 1983 goals. However, a degree of subjectivity is inherent in the evaluations contained in this report. For example, if data revealed no WQS violations in a stream segment the evaluation ndicated that the segment currently meets 1983 goals. But when occasional[4] standards violations for parameters such as total iron, total lead, and fecal coliforms occurred, the segment may or may not have been classified as meeting 1983 goals. This decision depended upon the interpretation of the District Surveillance groups as to the severity of the problem and whether or not actual fishable/swimmable uses were being impaired. Wherever frequent[5] standard violations occurred for any parameter, the stream was classified in a category other than currently meeting 1983 goals.

---

2 Number of stream miles (excluding intermitent streams) listed in Gazetteer of Ohio Streams, (Division of Water, Ohio Department of Natural Resources).

3 Principal streams are all subbasin mainstems plus streams draining at least 100 square miles.

4 Occasionally - WWH standard(s) exceeded twice/year based upon a monthly sampling frequency; one/year based upon a quarterly sampling frequency; or 10% and 25% exceedence based upon some other sampling frequency (example - intensive survey sampling).

5 Frequently - WWH standard(s) exceeded three or more times/year based upon a monthly sampling frequency; twice or more/year based upon a quarterly sampling frequency; or 25% exceedence based upon some other sampling frequency (example - intensive survey sampling).

BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrates have been widely used to evaluate the quality of flowing water. These organisms have a number of qualities that make their use in pollution studies particularly advantageous. The species composition and community structure of benthic communities in a given stream are determined by environmental factors which have existed during the life span of the organisms. They are sensitive to most types of pollution and even a short term exposure to unfavorable conditions may alter the community structure.

The benthic community, therefore, is a reflection of past environmental conditions, as well as an indication of what is occurring at the moment the sample is taken. In addition, these organisms form permanent or semi-permanent stream communities, are less transient than fish, are less sporadic in occurrence than micro-organisms, and, regardless of stream size, usually occur in large enough numbers for statistical analysis.

Benthic macroinvertebrates can be defined by location, i.e., those organisms living on or interacting with a specific substrate, or by size, i.e., those organisms retained in a screen of a certain size. They cannot be defined by position in the trophic structure since they occupy virtually all levels. They may be omnivores, carnivores, or herbivores, and in a well balanced system, all types will likely be present. They include detritus feeders, parasites, scavengers, grazers, and predators. In streams exhibiting high water quality, a stable and diverse benthic community consisting of a great many species usually exists, but due to competition, no single species occurs in great numbers. When the water quality is adversely affected, the more pollution sensitive forms decline in number or are eliminated. The remaining pollution tolerant species increase, resulting in a population imbalance where fewer types exist but with some occurring in great numbers. The nature and magnitude of the community alteration depend upon the nature and severity of the environmental change.

II. METHODS

A. Field

The primary sampling equipment used for the collection of benthos was the modified Hester-Dendy multiple-plate artificial substrate sampler. The sampler was constructed of 1/8 inch tempered hardboard cut into three inch square plates and one inch square spacers. A total of eight plates and twelve spacers were used for each sampler. The plates and spacers were placed on a 1/4 inch eyebolt so that there were three single spaces, three double spaces, and one triple space between the plates. The total surface area of the sampler, excluding the eyebolt, was 145.65 square inches.

When the samplers were established in streams they were tied to a concrete construction block which anchored them in place and also prevented the multiple-plates from coming into contact with the natural substrate. In water deeper than four feet, a float (1 qt. cubitainer) was attached to the samplers to keep them within the upper four feet of the water column. The samplers were placed in runs rather than pools or riffles and an attempt was made to establish stations in as similar an ecological situation as possible. The samplers were exposed for a six week period. In streams greater than 60 feet in width, one set of multiple-plates was established approximately 20 feet from each bank. At National Ambient Monitoring Stations, a set of samplers

consisted of three multiple-plates (three square feet). At major discharger stations, a set of samplers consisted of five multiple-plates. Most biological field sampling was conducted from June 15 to September 15. Composite samples, i.e., subsamples from five multiple-plates, were used in station evaluations for routine monitoring. Replicate samples from three multiple-plates were analyzed for National Ambient Monitoring Network Stations.

When the samplers were retrieved, each was placed in a one quart plastic container while still submerged. The line was then cut and the plates removed from the stream. Formalin was added to each container to approximately equal a 10% solution. Qualitative samples were collected from the natural substrate at the time of retrieval of the multiple-plates. In shallow water, dip net samples were taken in a segment approximately 20 yards long in the area where the samplers were exposed. In deep water, samples were collected using Ekman or Peterson grab samplers. Qualitative sampling continued until, by gross examination, no new taxa were being taken.

B. Laboratory

The multiple-plates were dismantled in the laboratory and the material washed through a U.S. Standard Testing Sieve number 40 (0.425 mm openings). Larger organisms were hand picked from the screens; smaller material was washed into a jar containing 70% alcohol. Where the number of organisms collected was so large that identification of each individual was impractical, a Folsom sample splitter was used to obtain a subsample. Identifications and counts were made using dissecting and compound microscopes. Dipterans of the family Chironomidae were prepared following the methods described by Mason (1973). Identifications were made using the following taxonomic keys: Beck and Beck (1966), Brown (1972), Burch (1972), Burks (1953), Edmunds, et al (1976), rison (1935), Harman and Berg (1971), Hilsenhoff (1970), Hobbs (1972), Holsinger (1972), Klemm (1972), Lewis (1974), Merrit and Cummins (1978), Pennak (1953), Roback (1957), Ross (1944), Schuster and Etnier (1978), Usinger (1956), Walker (1958), Walker and Corbett (1975), Ward and Whipple (1959), Wiggins (1977), and Williams (1972). After the benthic organisms had been identified and counted, the Shannon diversity index ($\bar{d}$) was calculated using the formula:

$$\bar{d} = -\sum\left(\frac{ni}{n}\right)\log_2\left(\frac{ni}{n}\right)$$

In those cases where replicate analyses were conducted, coefficients of variation (CV) were determined following the procedures outlined by Li (1974) using the formula:

$$CV = \frac{\text{standard deviation}}{\text{mean}} \times 100$$

III. WATER QUALITY EVALUATION

The biological criteria used to evaluate water quality were: (1) the types of organisms present, (2) the number of taxa colonizing the artificial substrate samplers, and (3) the Shannon information theory derived diversity index ($\bar{d}$).

Certain types of organisms have been historically associated with good water quality areas. Examples of more pollution sensitive groups would include stoneflies, mayflies, and caddisflies. Organisms usually predominant in polluted stream segments include oligochaetes, pulmonate snails, and many types of diptera. Organisms are usually divided into three categories based on their sensitivity to pollution: tolerant, intermediate (facultative), or sensitive. These terms may be defined as follows:

> Tolerant - organisms usually associated with gross contamination and may be capable of thriving under very low dissolved oxygen concentrations.
>
> Intermediate - organisms having a wide range of tolerance and are frequently associated with moderate levels of contamination.
>
> Sensitive - organisms usually not found associated with even moderate levels of contamination and are generally intolerant of even moderate reductions in dissolved oxygen.

There are inherent problems in using aquatic organisms in this manner. Some species may be very tolerant to one type of stress and sensitive to another. For example, oligochaetes are tolerant of low levels of dissolved oxygen but are relatively sensitive to heavy metals. The environmental requirements of many species are not known and contrary opinions exist as to the pollution sensitivity of many others. In addition, many organisms must be identified to the species level and this is not always possible. Though no attempt was made to use the "indicator species" concept as such, the presence, or perhaps more importantly, the absence of some major taxonomic groups from particular stations was considered significant. While there are exceptions, an association of mayflies, stoneflies, and caddisflies in a stream is indicative of good water quality conditions, and their absence denotes the presence of contaminants, low dissolved oxygen concentrations, or both. Usually the presence or absence of other gill breathing organisms has similar indicator significance.

From numerous stream water quality investigations, we have found that the number of different taxa colonizing multiple-plate samplers ranges from three in grossly polluted areas, to over 40 in very high water quality stream segments. The analysis of many hundreds of multiple-plate samplers has shown that it is a rare occurrence that more than 20 taxa will be collected on samplers established in streams known to be grossly polluted. Likewise, in streams known to be pollution free, usually more than 30 taxa colonize the multiple-plates. These observations were based on the analysis of samples collected throughout the State of Ohio from streams greater than first order. All samples had an exposure period of six weeks, usually between mid June and mid September.

The Shannon index $\bar{d}$ is a function of the number of taxa, total number of individuals, and most importantly, the distribution of the individuals among the taxa. Unlike some diversity indices, $\bar{d}$ incorporates the distribution of individuals among the species. This index is a strong reflection of a population imbalance that, in some cases, may not be readily apparent in tabulated data. When a pollution stress such as organic enrichment is placed on an aquatic system, the macrobenthic community structure is usually disrupted resulting in a decreased number of taxa and an increased density. The diversity index decreases under these conditions. On occasion, however, a pollution stress causes decreases in both the number of taxa and the density. In this situation, the diversity index often remains the same or increases. Under these conditions the index can be seriously misleading and must be used with caution if an accurate evaluation of water quality is to be made. An example of this abnormality has been found in certain Ohio streams suspected of being contaminated with nonspecific toxicants. Under these circumstances, much less emphasis is placed on the diversity index in making a water quality evaluation. Previous investigations of Ohio's streams have revealed a range of index values from a low of 0.009, in a grossly polluted area, to 4.120 in a stream exhibiting very high water quality. Usually, the indices derived from data collected on multiple-plate samplers were greater than 3.5 in streams exhibiting high water quality and less than 2.3 in those areas known to be severely degraded.

For the purposes of this report, we have integrated the indicator concept and Shannon index with our observations upon the relationship between the number and type of taxa and degree of pollution. This enabled us to categorize stream water quality based on an analysis of the benthic data which was both qualitative and quantitative. The four categories are Class I (Excellent), Class II (Good), Class III (Fair), and Class IV (Poor). Table summarizes the criteria used in formulating these classifications. This table was modified from the original table of criteria presented in the 1980 305(b) document (Ohio EPA, 1980, Volume VI, Table VI-1). The modifications made were a result of a reevaluation of past and current data.

Class I streams have an abundance of sensitive species. Intermediate and tolerant species are present in low numbers. The number of taxa exceeds 30 and the Shannon index exceeds 3.5.

Class II streams have sensitive and intermediate species present in moderate numbers. Tolerant species may be present in low numbers. Usually, the number of taxa ranges from 25 to 30 and the Shannon index 2.9 to 3.5. Many Class II streams have mild organic pollution.

Class III streams have intermediate species present in abundance with tolerant species present in moderate numbers. Sensitive species may be present in low numbers. The number of taxa usually ranges from 20 to 25 and the Shannon index 2.3 to 2.9.

Class IV streams have tolerant species in abundance, intermediate species in low numbers or absent, and no sensitive species present. All types of organisms may be absent if extreme toxic conditions exist. The number of taxa will be less than 20 and the Shannon index less than 2.3.

The class assigned will usually be that in which all criteria are met. In some instances, a stream will meet some but not all criteria for a given classification. In these cases the evaluation will be made based on the experience and best professional judgment of the investigator.

There are inherent weaknesses in the above scheme. Interpretation for purposes other than an overview should be made with caution. The terms abundant, moderate, and low are relative and, due to intersite variations, past attempts to determine absolute values for these terms met with failure. The difference between stations assigned to successive classes, in some cases, may be slight. In addition, considerable variation in water quality may exist in segments assigned to the same class. This can be particularly misleading in stream segments where some degree of recovery has taken place, but the degree of recovery is not sufficient to justify a higher classification.

Table III-1. Criteria used to Formulate Stream Class Based on the Benthic Biota Collected from Five Multiple-Plate Artificial Substrate Samplers Exposed to a Six Week Colonization Period Between June 15 and September 15

Class I (Excellent)	Class II (Good)	Class III (Fair)	Class IV (Poor)
Pollution sensitive species abundant	Pollution sensitive species present in moderate numbers	Pollution sensitive species present in low numbers	Pollution sensitive species absent
Intermediate species present in low numbers	Intermediate species present in moderate numbers	Intermediate species abundant	Intermediate species present in low numbers or absent
Tolerant species present in low numbers	Tolerant species present in low numbers	Tolerant species present in moderate numbers	Tolerant species abundant (all types may be absent if extreme toxic conditions exist)
Number of taxa > 30	Number of taxa 25-30	Number of taxa 20-25	Number of taxa < 20
Exceptional diversity	High diversity	Moderate diversity	Low diversity
Shannon index > 3.5	Shannon index 2.9-3.5	Shannon index 2.3-2.9	Shannon index < 2.3

IV. RESULTS AND DISCUSSION

The benthic data presented and discussed in this section were collected from 1974 to 1980. One program element was designed to assess the impact of specific major dischargers on water quality determined by the benthic community. Stations were located upstream and downstream from entities selected from the Ohio Major Dischargers List by Ohio EPA District Surveillance personnel. The entities were chosen on the basis of a recognized pollution problem, and where, through the NPDES Permit system, improvement in waste treatment had been requested. Data generated from the stations measure the effectiveness of the Agency's water pollution control programs and the recovery of biological communities as degraded segments of streams are improved. A summary of the benthic data can be found after the discussion of each discharger. Tabulated data collected relative to these entities can be found in Reference Document (RD) 3 of the 1980 305(b) Report. An errata sheet of revisions made to the 1980 RD 3 can be found preceding RD 3 of this (1982) document.

Fixed single station monitoring was also conducted at various locations throughout the State of Ohio during this time. Some of these stations coincided with the National Stream Quality Accounting Network (NASQAN) and, therefore, were located at USGS gaging stations. Twenty of the sites are part of the National Water Quality Surveillance System (NWQSS) and are monitored for various biological parameters once each year. The analysis of data generated from these sites will contribute to long-term trend analysis and will provide a long-term measure of the effectiveness of State water quality standards in developing physical/chemical conditions satisfactory to support balanced indigenous aquatic communities. In most cases, the present biological data base from these stations is insufficient to warrant a detailed discussion. A summary of the benthic data can be found in Table . Tabulated data collected from stations during the 1979-1980 biennium can be found in RD 3 of this document. Tabulated data collected from stations sampled prior to 1979 can be found in RD 3 of the 1980 305(b) document. An errata sheet of revisions made to the 1980 RD 3 can be found preceding RD 3 of this (1982) document.

Other data collected during the reporting period but not yet available include sampling from 12 NASQAN stations in 1980 and intensive surveys from Big Darby Creek in 1979 and the Great Miami River in 1980. These data will be reported in a future 305(b) document.

TABLE III-2: Benthic Data Summary and Evaluation, Water Quality Monitoring Network Stations

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
			Great Miami River Basin					
Great Miami (H-9)	Dayton (87.1)[a]	11/79	3	22	20	1.97	1682	III
		10/78	3	28	19	3.02	706	III
		7/77	3	22	8	2.16	798	III
		9/76	5	17	16	2.22	5803	III
Great Miami (H-9)	Miamisburg (67.7)							
	West Bank	7/77	3	12	9	2.86	35	IV
	East Bank	9/76	5	7	9	1.22	929	IV
	West Bank	9/76	5	11	9	1.33	2264	IV
Great Miami (H-11)	New Baltimore (22.1)[a]							
		7/77	3	20	2	2.47	339	III
		9/76	5	15	11	2.51	1531	III
Mad (H-3)	West Liberty (54.9)	8/76	5	40	25	2.92	374	II
Mad (H-3)	Eagle City (30.6)[a]							
		10/79	3	41	20	3.65	651	II
Mad (H-4)	Dayton (9.9)	8/77	3	31	12	3.48	403	II
		10/76	5	20	9	2.95	450	III
Mud (H-4)	I-70 (1.4)	8/74	5	23	15	2.49	850	III
Stillwater (H-6)	Dayton (1.9)	7/77	5	23	12	3.27	353	II
		9/76	5	29	14	3.33	472	II
Sevenmile (H-10)	Eaton (23.2)	7/77	5	18	11	2.88	193	III
		8/75	5	21	12	3.48	137	III

(Continued on next page)

TABLE III-2: Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
			Mill Creek Basin					
Mill (J)	Cincinnati (0.6)	7/77	5	3	1	0.07	52	IV
			Little Miami River Basin					
Little Miami (K-1)	Oldtown (80.0)[a]	11/79	3	32	28	3.54	330	II
		8/78	3	32	9	3.46	239	II
		7/77	5	28	13	3.45	161	II
Little Miami (K-1)	Spring Valley (63.4)	7/77	3	30	11	3.87	325	III
Little Miami (K-5)	Milford (13.3)[a]	9/76	5	27	10	2.00	915	III
			Ohio Brush Creek Basin					
Ohio Brush Creek (L-2)	West Union (16.5)[a]	9/78	3	41	33	3.95	337	I
			Scioto River Basin					
Scioto (M-2)	Prospect (169.2)	9/77	3	25	11	3.06	436	II
		8/76	5	19	11	2.02	293	III
Scioto (M-5)	Dublin (147.8)	8/77	5	14	6	2.57	1547	IV
Scioto (M-5)	Above Southerly (119.2) East Bank	8/74	4	7	9	2.06	2110	IV

(Continued on next page)

TABLE III-2 Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
Scioto (M-8)	Below Southerly (117.3)							
	East Bank	8/77	5	14	-	2.78	164	IV
	West Bank	8/77	5	14	-	2.63	162	IV
	East Bank	8/74	4	5	6	0.11	986	IV
	West Bank	8/74	4	9	10	0.13	33101	IV
Scioto (M-8)	Below Walnut (116.8)							
	East Bank	8/74	5	7	6	0.10	4589	IV
	West Bank	8/74	5	7	8	0.10	42769	IV
Scioto (M-8)	Circleville (100.8)[a]							
	East Bank	8/77	3	17	-	1.30	1046	IV
	West Bank	8/77	3	20	-	2.21	475	IV
	West Bank	8/76	5	19	-	3.10	309	IV
	East Bank	8/74	5	9	14	2.29	870	IV
	West Bank	8/74	5	19	5	3.11	360	IV
Scioto (M-8)	Above Deer (85.4)							
	East Bank	8/74	5	14	12	2.61	227	IV
	West Bank	8/74	5	13	12	2.37	212	IV
Scioto (M-11)	Chillicothe (78.3)							
	West Bank	8/74	5	31	18	3.41	192	II
Scioto (M-11)	Richmondale (56.2)[a]							
	West Bank	11/79	3	34	15	3.75	365	II
	East Bank	9/78	3	28	12	2.40	1368	III
	East Bank	7/77	5	23	6	3.31	655	III
	West Bank	7/77	5	22	6	3.11	1344	III
	East Bank	8/76	5	20	13	2.55	464	III
Scioto (M-11)	Above Salt (52.1)							
	East Bank	8/74	5	34	14	3.56	189	II

(Continued on next page)

TABLE III-2: Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
Olentangy (M-3)	Worthington (12.3)[a]	11/79	3	37	24	3.16	741	II
		8/77	4	17	5	2.86	283	III
Olentangy (M-3)	Columbus (0.4)							
	East Bank	8/74	5	13	8	0.79	139	IV
	West Bank	8/74	5	8	10	0.28	144	IV
Little Walnut (M-9)	Mouth (0.7)	8/74	5	27	10	2.93	193	III
Paw Paw (M-9)	Baltimore (0.6)	8/74	5	19	8	2.04	416	IV
Big Darby (M-8)	Darbyville (13.2)[a]	8/77	5	26	14	3.54	247	II
Deer (M-7)	Mouth (1.1)	8/74	5	29	17	2.76	436	II
Paint (M-12)	Bourneville (21.6)	7/77	5	29	20	3.36	500	II
Paint (M-12)	Chillicothe (1.9)	8/74	5	11	7	0.53	2403	IV
Salt (M-10)	Mouth (0.1)	8/74	5	18	11	0.49	1413	III
Scioto Brush (M-17)	Mouth (0.2)	8/74	4	32	16	3.79	151	I

(Continued on next page)

TABLE III-2 Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
			Hocking River Basin					
Hocking River (O-1)	Lancaster (73.4)	8/74	5	13	12	0.73	1178	IV
Hocking (O-1)	Enterprise (47.0)	9/77	5	17	13	3.10	74	III
Hocking (O-1)	Athens (33.1)[a]	9/77	5	22	9	3.30	184	III
Clear Creek (O-1)	USGS Gage (2.1)	10/77	5	28	13	3.21	298	II
		10/76	5	36	15	3.55	707	II
			Muskingum River Basin					
Muskingum (P-11)	Coshocton (108.1)[a]	11/77	5	15	7	1.74	703	IV
Muskingum (P-11)	Dresden (91.1)							
	East Bank	9/77	5	20	11	2.50	2983	III
	West Bank	9/77	5	18	11	2.00	2830	III
	East Bank	9/76	5	22	15	3.30	708	III
Muskingum (P-16)	McConnelsville (47.7)[a]							
	East Bank	10/78	3	25	10	1.66	2708	III
	West Bank	10/78	2	22	11	2.44	346	III
	East Bank	9/77	3	23	13	2.51	3005	III
	West Bank	9/77	3	21	13	2.60	465	III
Muskingum (P-19)	Beverly (24.0)	9/76	10	14	15	2.17	613	III
Tuscarawas (P-5)	Massilon (87.4)[a]	9/77	3	17	7	1.20	451	IV

(Continued on next page)

TABLE III-2: Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
Sugar (P-5)	Dover (0.6)	10/76	5	18	19	2.92	353	III
Mohican (P-2)	Greer (16.7)[a]							
	East Bank	9/78	3	24	12	2.41	1828	II
	West Bank	9/78	3	31	12	2.70	1280	II
	West Bank	9/77	3	30	7	2.05	2002	II
Rocky Fork (P-1)	Mansfield (14.4)	8/74	5	7	3	2.21	814	IV
Black Fork (P-1)	Shelby (53.0)	8/74	5	14	10	2.52	87	IV
Wills (P-17)	Cambridge (58.5)	10/77	5	15	7	1.94	402	IV
Wills (P-17)	Wills Creek Dam (5.9)	9/76	4	13	16	2.07	603	IV
Crooked (P-17)	Cambridge (2.6)	8/75	5	14	10	2.94	93	IV
Licking (P-13)	Newark (25.6)[a]	11/79	3	42	10	3.82	552	II
			Maumee River Basin					
Maumee (A-11)	Waterville (21.0)[a]							
	East Bank	9/79	3	24	26	3.40	2164	III
	West Bank	9/79	3	26	21	3.02	1696	III
	East Bank	7/78	3	20	22	2.80	859	III
	West Bank	7/78	3	18	22	2.47	2340	III
	East Bank	9/77	3	22	12	2.13	1813	III
	West Bank	9/77	3	20	11	2.32	1642	III
	West Bank	8/76	5	19	10	2.79	3094	III

(Continued on next page)

TABLE III-2 Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
Town (A-2)	Van Wert (3.7)	9/77	5	16	10	2.19	121	IV
		8/74	5	11	15	1.73	381	IV
				Portage River Basin				
Portage (B-2)	Woodville (27.8)[a]	9/79	3	31	20	3.91	222	II
		7/78	2	25	20	3.08	270	II
		9/77	3	30	9	2.92	521	II
				Sandusky River Basin				
Sandusky (C-4)	Fremont (23.4)[a]	9/77	3	39	11	3.35	722	I
				Huron River Basin				
Huron (D-2)	Milan (12.2)[a]	8/79	3	36	16	3.17	977	II
				Black River Basin				
Black (D-4)	Elyria (14.9)[a]	8/79	3	17	6	3.04	259	IV
		8/78	3	18	9	2.71	291	IV
		7/77	5	14	6	2.54	77	IV
Black (D-4)	Below Elyria (9.4)	7/77	3	10	8	2.26	91	IV
				Cuyahoga River Basin				
Cuyahoga (E-2)	Independence (14.2)[a]	8/78	3	20	12	1.23	706	IV
		8/77	3	28	9	2.08	510	IV

(Continued on next page)

TABLE III-2: Continued

Stream (Basin Code)	Location (RM)	Sampling Date	Number of Samplers	Quantitative Taxa	Qualitative Taxa	Index	Average Organisms/Ft.^{2}	Class
			Grand River Basin					
Grand (F-2)	Painesville (8.3)[a]	8/79	3	42	21	3.66	504	I
			Conneaut Creek Basin					
Conneaut Creek (F-3)	Conneaut (6.7)[a]	8/79	3	36	32	3.18	644	II
			Mahoning River Basin					
Mahoning (T-3-1)	Lowellville (11.6)[a]							
	East Bank	9/79	3	8	5	1.24	1427	IV
	West Bank	9/79	3	7	6	0.78	6022	IV

(a) National Water Quality Monitoring Network Station.

Each subbasin report contains a summary which assesses overall water quality and water quality problems. Delineated streams or stream segments that are expected to meet 1983 goals after the implementation of pollution controls prior to 1983, or that are not expected to meet 1983 goals by 1983, include the following information, wherever available: problem type, location, source (by point or nonpoint source category), severity, extent, corrective measures being taken, and conditions expected after the implementation of pollution controls. An evaluation of water quality trends were presented, wherever possible, along with recommendations.

Summary

The evaluations with respect to the attainment of the "fishable/swimmable" goals in Ohio surface waters are summarized in Table III-3. Two important conclusions can be drawn from these findings. First, data were not available for many streams, thus limiting the stream miles evaluated to 3758, or only 9 percent of the 43,900 permanent stream miles in Ohio. Over 3048 stream miles were found to currently meet the "fishable/swimmable" goals, or are expected to achieve that goal prior to 1983. The small percentage of the total stream mileage actually evaluated and the non-representative method of selecting streams for evaluation (i.e., a bias towards selecting stream segments in problem areas) precludes any projection of the percentage of total stream miles in Ohio that will meet the 1983 clean water goals. Considerably more is known about the principal streams (32 percent of the 7086 miles of principal streams), reflecting the emphasis these areas receive in the Ohio Water Quality and Pollutant Source Monitoring Strategy (Monitoring Strategy). Of the principal streams evaluated, 1600 miles, were found to currently meet the "fishable/swimmable" goals, or are expected to achieve that goal prior to 1983. The substantial percentage of principal stream miles actually evaluated, and the fact that the Monitoring Strategy primarily addresses known point source water quality problem areas, suggests that 70 percent is a good estimate of the principal stream miles in Ohio that will meet the 1983 "fishable/swimmable" goal. It is important to point out that the degree of knowledge about the streams evaluated is quite variable and may not be sufficient in some cases to accurately assess water quality for other purposes. For example, the amount and kinds of information needed by Ohio EPA to determine water quality standard use designations in the future will probably be more extensive than the data utilized in some of the subbasin reports.

Table IV-1. Summary of the evaluations made in the 1982 305(b) subbasin reports.

Fishable/Swimmable Status	All Streams[a] miles (percent)	Principal streams[b] miles (percent)
Currently meets goals	2383.8 (56.2%)	1287 (18.2%)
Expected to meet goals prior to 1983	665.0 (15%)	315 (4.4%)
Not expected to meet goals prior to 1983	1186.5 (28%)	654 (9.2%)
Total evaluated	3758 (8.5%)	2256 (31.8%)

a Number of stream miles (excluding intermittent streams) listed in Gazetteer of Ohio Streams (Division of Water, Ohio DNR).

b Principal streams are all subbasin mainstems plus streams draining more than 100 square miles.

Secondly, the overall findings of the subbasin reports suggest that modifications to the Monitoring Strategy are in order. As described above, the fixed station network practically overlooks small streams, which are primarily evaluated with intensive surveys. Only 32 percent of the principal stream miles in Ohio have been evaluated with the fixed station network since 1972. It is clearly beyond the resources of the State to monitor all streams, but modifications to the present Monitoring Strategy and the development of computer software for data analyses could yield more information per sample analysis. A well designed sampling and data analysis program can provide useable information concerning existing ambient water quality and long term trends on a subbasin or regional basis without sampling every stream. Additional sampling in Ohio is needed to address the impact of watershed characteristics (i.e., land-use, soils, population density) on ambient water quality.[6] Such information can and will be obtained utilizing the fixed station network in conjunction with the intensive stream surveys and special non-point source monitoring. The reader is referred to Volume II of the 1980 305(b) report for details concerning the Monitoring Strategy.

The findings of several key subbasin reports with water quality problems are outlined below.

Ottawa River Subbasin. The Ottawa River below Lima is not expected to meet the fishable/swimmable goals prior to 1983 but recent studies revealed substantial improvements in water quality compared to 1960 conditions. Further improvement in the Ottawa River will be dependent on a reduction of the ammonia load entering the Ottawa River from the Standard Oil Refinery and the Vistron Corporation.

Cuyahoga River Subbasin. Analysis of water quality data from the Cuyahoga River revealed substantial improvements in dissolved oxygen concentrations over the past ten years. However, most of the Cuyahoga River and many of the major tributaries are not expected to achieve fishable/swimmable conditions prior to 1983. Water quality improvements are expected during the mid and late 1980's after completion of numerous pollution abatement projects that are under construction or in the design stages.

Great Miami Basin. A 95-mile stretch of the Great Miami River from Tipp City to the Ohio River is not expected to meet the 1983 clean water goals. The worst degradation exists between Dayton and Franklin where numerous municipal and industrial dischargers cause severe temperature and dissolved oxygen problems. Continued water quality problems are foreseen despite numerous wastewater treatment improvements under construction or planned. Several Intensive Biological and Water Quality Survey's are currently being completed in this basin.

---

[6] This need is demonstrated by numerous subbasin reports in this volume that suggest that elevated heavy metal concentrations (especially iron, also lead and cadmium) and high fecal coliform concentrations are attributable to widespread existing or natural background conditions. More specific data are clearly needed to fully understand these and similar problems.

Middle Scioto River Subbasin. Pollutant loading from the metropolitan Columbus area exceeds the assimilative capacity of the Scioto River, despite wastewater treatment improvements at several facilities. Warmwater Habitat (WWH) standards violations for dissolved oxygen, ammonia, fecal coliforms, and phenolics were observed. The diversion of upstream flows for public water supplies combined with the sheer volume of wastes generated in the metropolitan Columbus area will likely prevent the attainment of the 1983 clean water goals in the foreseeable future.

Upper and Middle Tuscarawas River Subbasin. The upper Tuscarawas River from the headwaters to below the Sandy Creek confluence is a very complex system. Over 290 point sources discharge to the river or its tributaries. The primary water quality problems in the Tuscarawas River mainstem are dissolved oxygen, ammonia, phenolics, and total dissolved solids. Improvements are expected in the Tuscarawas River above Barberton after completion of several pollution control projects. However, the river below Barberton is not expected to meet 1983 goals in the foreseeable future.

Mahoning River Subbasin. Urban and industrial land-use has a substantial impact on the water quality of the Mahoning River below the city of Warren. The sheer volume of wastewater generated combined with generally outdated wastewater treatment at municipal and industrial facilities creates a grossly polluted aquatic environment. Water quality improvements are anticipated following the termination of steel making operations at several plants in the Mahoning Valley, but 1983 clean water goals are not expected to be attainable within the foreseeable future.

The water quality problems discussed above result primarily from point source discharges and also urban nonpoint source runoff (including combined sewer overflows). Water quality degradation arising from mine drainage nonpoint pollution are prevalent in Southeast Ohio. Areas impacted by mine drainage include portions of the Hocking River Basin, the Raccoon Creek Basin, the Moxahala Creek Subbasin, and several minor Ohio River tributaries. The reader is referred to a separate document (Volume V of the 1980 305(b) report) compiled by the Industrial Coal Operations Group of the Ohio EPA for a detailed treatment of the mine drainage problem.

Little detailed information is available concerning the impact of agricultural nonpoint pollution on fishable/swimmable conditions in Ohio streams, although siltation, channelization, and riparian habitat alterations have had documented impacts on the fisheries of Ohio[7]. Intensive agricultural land-use exists in many areas of Ohio and potential water quality impacts were cited in subbasin reports from the Wabash, Maumee, Sandusky, Scioto, and Great Miami river basins. Impairment of the 1983 clean water goals was not attributed to agricultural non-point pollution in most instances. However, more comprehensive evaluations (i.e., encompassing in-depth physical/chemical and biological sampling) are needed to determine how intensive agricultural land-use affects fishable/swimmable conditions in many streams of northwestern and central Ohio.

7 Trautman, M.B. 1957. The fishes of Ohio. Ohio Univ. Press, Columbus, Ohio. 683 p.

MAUMEE RIVER BASIN

ST. MARYS RIVER SUBBASIN (A-1)

SUBBASIN SUMMARY

The physical/chemical water quality of the St. Marys River Subbasin was generally good, with the exception of Wierth Ditch and Kopp Creek below the village of New Bremen (RM 2.5), and the St. Marys River below the village of Rockford (RM 55.7). An estimated 15.7 stream miles in this subbasin had major physical/chemical problems. Major and minor water quality problems exist due to inadequate sewage treatment at the two villages (i.e., sewage bypasses during storm runoff events). Otherwise, there were no known serious problems in the subbasin. Hopefully, new facilities will be constructed at New Bremen by 1983 and possibly at Rockford by 1984-85.

SEGMENT REPORTS

CENTER BRANCH
ST. MARYS RIVER TRIBUTARY
CONFLUENCE AT RM 101.2

Segment Problem	Name Description	Use Designation Mile Points
A-1-5 NONE	Center Branch From the headwaters to Clear Creek (East Branch)	WWH 6.4-0.0

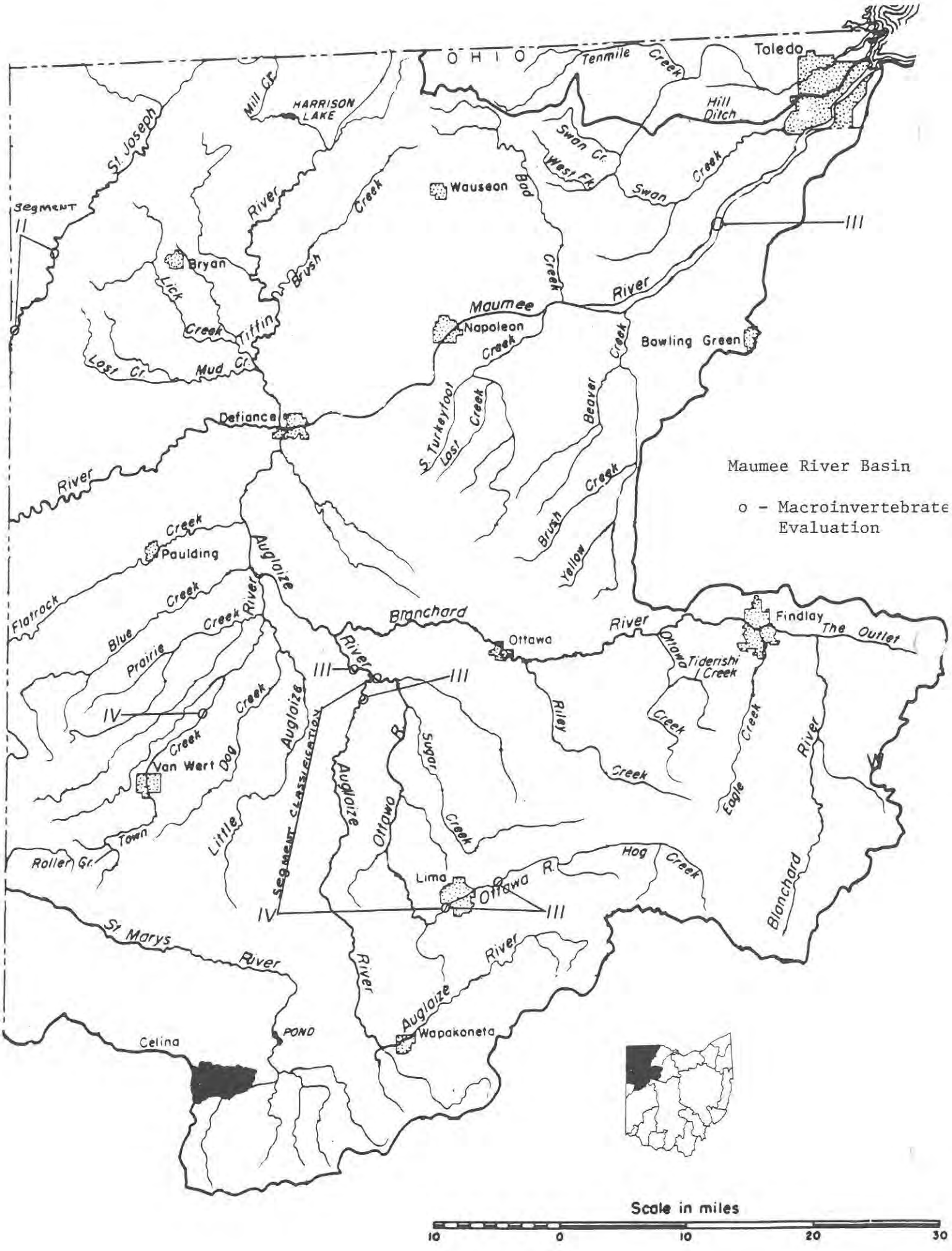
KOPP CREEK
ST. MARYS RIVER TRIBUTARY
CONFLUENCE AT RM 100.2

Segment Problem	Name Description	Use Designation Mile Points
A-1-4 MINOR	Kopp Creek From the Wierth Ditch confluence to the St. Marys River	WWH 7.2-0.0

WIERTH DITCH
KOPP CREEK TRIBUTARY
CONFLUENCE AT RM 8.0

Segment Problem	Name Description	Use Designation Mile Points
A-1-6 MINOR	Wierth Ditch From New Bremen to the confluence with Kopp Creek	WWH 2.5-0.0

This segment had frequent water quality standards violations for fecal coliform bacteria and ammonia. The most likely source of this pollution was the discharge from New Breman WWTP.


OHIO
Toledo
Tenmile Creek
Hill Ditch
Swan Creek
West Fk
Swan Cr.
Wauseon
Bad Creek
HARRISON LAKE
Mill Cr.
St. Joseph River
Segment II
Bryan
Lick Creek
Brush Creek
Tiffin River
Lost Cr.
Mud Cr.
Defiance
Maumee River
Napoleon
Maumee
Bowling Green
S. Turkeyfoot Creek
Lost Creek
Beaver Creek
Brush Creek
Yellow Creek
Paulding
Flatrock Creek
Blue Creek
Prairie Creek
Auglaize River
Van Wert
Dog Creek
Town Creek
Roller Cr.
Little Auglaize
Segment Classification
Blanchard River
Ottawa
Ottawa R.
Lima
Sugar Creek
Riley Creek
Findlay
The Outlet
Ottawa River
Tiderishi Creek
Eagle Creek
Hog Creek
Blanchard
St Marys River
Auglaize River
Wapakoneta
Celina
POND
Maumee River Basin
o - Macroinvertebrate Evaluation
Scale in miles
10 0 10 20 30

A biological and water quality survey was conducted in Wierth Ditch and Kopp Creek during 1981. The complete report is expected to be available from the Ohio EPA in the Spring of 1982.

ST. MARYS RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-1-3 MINOR	St. Marys River From the confluence of Kopp Creek to the village of St. Marys	WWH 47.7-45.2

Segments A-1-3 and A-1-4 were subject to fecal coliform and dissolved oxygen violations as a result of discharge of inadequately treated wastes from the New Bremen WWTP via Wierth Ditch (OEPA, NWDO data, 1978-1980). The community has applied for and received funds for construction of a new facility (Step III construction grant). The old plant will be abandoned when construction of the new facility is completed.

Segment Problem	Name Description	Use Designation Mile Points
A-1-2 MINOR	St. Marys River From St. Marys to Rockford	WWH 45.2-15.7

Water quality standards violations for fecal coliform bacteria, total iron and ammonia occured in this segment (OEPA, NWDO data, 1978-1979). The coliform ontamination was attributed to both the St. Marys and New Bremen WWTP's, the total iron violations appeared to originate from nonpoint sources.

Segment Problem	Name Description	Use Designation Mile Points
A-1-1 MAJOR	St. Marys River From Rockford to the Indiana-Ohio State Line	WWH 15.7-0.0

An ineffective, WWTP, serves the village of Rockford (population 1100). In September and October, 1979, a lift station breakdown caused raw sewage from the village to be discharged into the river.

The 1983 goals will probably not be met for this segment because of inadequate and unreliable sewage treatment at the Rockford WWTP (RM 55.7). The village of Rockford has not been certified for Step I planning, and it is unlikely that any improvements in the WWTP will be completed by 1983.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

MAUMEE RIVER BASIN

LITTLE AUGLAIZE RIVER SUBBASIN (A-2)

SUBBASIN SUMMARY

The physical/chemical water quality of the Little Auglaize River was good. Only one grab sample was collected in 1978; no follow up samples were collected. A number of samples were collected in 1976 and in 1977 with no water quality standards violations being detected (OEPA, NWDO data, 1976-1978). The Little Auglaize River had slightly lower background total nitrogen concentrations than surrounding river basins.

The absence of recent information for Town Creek prohibits an evaluation of water quality. Past observations indicated that the upper portions of Town Creek were adversely effected by the Van Wert WWTP. An estimated 5.1 of the 26.3 stream miles evaluated in the Town Creek drainage had major physical/chemical problems. Additional sampling is necessary to adequately evaluate this segment.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous monitoring in the subbasin consisted of two fixed station benthic samples collected in September, 1977, and August, 1974, from Town Creek below Van Wert (RM 3.7). In 1974, eleven taxa were collected with a diversity index of 1.73 (Ohio EPA, 1980, RD 3-98). In 1977, sixteen benthic taxa were collected with a diversity index of 2.19 (Ohio EPA, 1980, RD 3-97). Each station was dominated by midges, both in number of taxa (9 in 1977; 5 in 1974) and numbers of individuals (89 percent in 1977; 90 percent in 1974). Only three mayfly taxa, in very low densities, were present during both years. No caddisfly taxa were found. Evaluations of Class IV (Poor) water quality were indicated for each year.

SEGMENT REPORTS

LITTLE AUGLAIZE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-2-1 NONE	Little Auglaize River From Prairie Ditch to the Auglaize River	WWH 37.0-0.0

N/A

MIDDLE CREEK
LITTLE AUGLAIZE RIVER TRIBUTARY
CONFLUENCE AT RM 7.1

Segment Problem	Name Description	Use Designation Mile Points
A-2-2 NONE	Middle Creek From Town Creek-Maddox Creek confluence to the Little Auglaize River	WWH 6.9-0.0

N/A

TOWN CREEK
MIDDLE CREEK TRIBUTARY
CONFLUENCE AT RM 6.9

Segment Problem	Name Description	Use Designation Mile Points
A-2-4 MAJOR	Town Creek From Van Wert to Middle Creek	WWH 5.1-0.0

The Van Wert WWTP (RM 5.1) has tertiary treatment and phosphorus removal. The plant had major infiltration/inflow problems during storm events. The high wastewater flow during these periods drastically reduced treatment efficiency at the plant resulting in improperly treated or untreated wastewater being discharged. Discharge of municipal effluent was much greater than stream flow and caused dissolved oxygen (D.O.) problems and a degraded aquatic community in this stream segment (OEPA, NWDO data, 1977-1978). The community of Van Wert is currently in Step I of the construction grant process. A facility is being planned which will eliminate the present sanitary sewer system and existing septic tanks in the surrounding areas. The community is also developing a pretreatment program to comply with federal guidelines.

Previous improvements in the Van Wert WWTP (i.e., tertiary treatment and phosphorous removal) have substantially improved water quality in the downstream reaches of Middle Creek and the Little Auglaize River during normal flow conditions. However, the segment of Town Creek downstream from Van Wert is expected to continue to experience major water quality problems through 1983.

REFERENCES

Ohio Environmental Protection Agency. 1976-1978 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report. Reference Document 3. Biological Tables.

MAUMEE RIVER BASIN

UPPER AUGLAIZE RIVER SUBBASIN (A-3)
AND
LOWER AUGLAIZE RIVER SUBBASIN (A-7)

SUBBASIN SUMMARY

Based upon physical/chemical data collected by the Ohio EPA in 1978-79, the mainstem of the Auglaize River generally met Ohio water quality standards. Exceptions included: an eleven mile segment which includes the city of Wapakoneta (RM 84.5); Six Mile Creek below Spencerville (RM 4.1); and Jennings Creek below Delphos (RM 4.5). Construction of WWTP improvements for Wapakoneta will not be completed prior to 1983. The construction of the Delphos WWTP is expected to be completed prior to 1983.

Nonpoint source runoff from agricultural land was an equally important water quality problem in the Auglaize River Subbasin. Stream channelization, drainage and runoff from cultivated fields, and intensive cropping and loss of riparian vegetation result in increased sediment and nutrient loading throughout the subbasin.

SEGMENT REPORTS

AUGLIZE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-3-5 NONE	Auglaize River From the headwaters to Hengstler Road	WWH 101.9-85.2
A-3-4 Major	Auglaize River From Hengstler Rd. to Fisher Road	WWH 85.2-73.8

The most severe water quality problems in the upper Auglaize River resulted from combined sewer overflows and the municipal wastewater discharger in the city of Wapakoneta. The Wapakoneta WWTP (RM 84.5) significantly degraded water quality for several miles downstream. Ohio water quality standards violations in this segment included: dissolved oxygen (D.O.), high nutrient concentrations and elevated concentrations of total cadmium, total chromium and total nickel. Fecal coliform violations occurred at all five sampling sites (OEPA, NWDO data, 1977). Wapakoneta is currently upgrading (to include phosphorous removal) and expanding the existing treatment facility. The city is also establishing a pretreatment program and has received funds for Phase I (planning) work.

PUSHETA CREEK
AUGLAIZE RIVER TRIBUTARY
CONFLUENCE AT RM 77.9

Segment Problem	Name Description	Use Designation Mile Points
A-3-8 NONE	Pusheta Creek From the headwaters to the Auglaize River	WWH 13.7-0.0

AUGLAIZE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-3-3 NONE	Auglaize River From Fisher Road to the Ottawa River confluence	WWH 73.8-32.0

SIX MILE CREEK
AUGLAIZE RIVER TRIBUTARY
CONFLUENCE AT RM 59.0

Segment Problem	Name Description	Use Designation Mile Points
A-3-6 MAJOR	Six Mile Creek From Spencerville to the Auglaize River	WWH 4.1-0.0

A water quality survey of Six Mile Creek was conducted in 1976-1977. Ohio water quality standards violations were noted for dissolved oxygen, nitrogen ammonia, oil and grease, phenolics, total cyanide, total iron, total nickel, total copper, total chromium and MBAS. Very high concentrations of phosphorus, total aluminum and total dissolves solids (TDS) were also observed (OEPA, NWDO data, 1976). The source was presumed to be storm water runoff and intermittent discharge from a fertilizer supply plant in the area.

JENNINGS CREEK
AUGLAIZE RIVER TRIBUTARY
CONFLUENCE AT RM 45.0

Segment Problem	Name Description	Use Designation Mile Points
A-3-7 MAJOR	Jennings Creek From the Delphos WWTP to the Auglaize River	WWH 4.8-0.0

Ohio water quality standards violations for fecal coliforms, ammonia and dissolved oxygen were noted in this segment (OEPA, 1974). The source of the problem was thought to be inadequate sewage treatment at the city of Delphos WWTP (RM 4.8). A new facility is currently under construction and is expected to be completed prior to 1983.

AUGLAIZE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-3-2	Auglaize River	WWH
NONE	From the Ottawa River confluence to the Blanchard River confluence	32.0-26.0
A-7-1	Auglaize River	WWH
NONE	From the Blanchard River confluence to the Maumee River	26.0-0.0

The above segments meet 1983 goals based upon Ohio EPA sampling during 1978-1980 (OEPA, NWDO data, 1978-1980).

REFERENCES

Ohio Environmental Protection Agency. 1974. Auglaize River (draft) wasteload allocation report for the 303(e) continuing planning process for water quality management. Ohio EPA, Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1976-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1977 (unpublished). A Biological Assessment of the Water Quality in the Auglaize River Upstream and Downstream of Wapakoneta, Auglaize County, Ohio. Ohio EPA, Northwest District Office, Bowling Green, Ohio.

MAUMEE RIVER BASIN

OTTAWA RIVER SUBBASIN (A-4)

SUBBASIN SUMMARY

A biological and water quality survey of the Ottawa River was conducted by the Ohio EPA between 1974 and 1977 (Martin et al., 1979). The biological and chemical quality of the Ottawa River was evaluated in order to assess the impact of improvements in wastewater treatment from the city of Lima, and industrial dischargers located in Lima. The study area included a 45 mile segment of the Ottawa River from upstream from Lima to the mouth, as well as a segment of the Auglaize River upstream and downstream from the mouth of the Ottawa.

An estimated 39.5 stream miles in this subbasin had major physical/chemical problems. The evaluations showed that the Ottawa River was biologically healthy and that water quality was good upstream from Lima at river mile 46.0. Fish and macroinvertebrate communities were degraded from just upstream from the Lima WWTP (RM 37.7) to river mile 7.9. The river recovered to a near healthy biological condition near the mouth (RM 1.0). The water quality of the Auglaize River upstream and downstream from the Ottawa River confluence was good, as indicated by healthy and well-balanced, benthic macroinvertebrate communities (Martin et. al., 1979).

The most severe water quality problems found during the study were: low dissolved oxygen (D.O.) concentrations above the Lima WWTP (RM 37.7) due to combined sewer overflows and a series of dams in Lima; chlorine toxicity roblems immediately downstream from the Lima WWTP; and high ammonia and total chromium concentrations coupled with low dissolved oxygen concentrations downstream from the Sohio Oil Refinery (RM 37.4) and the Vistron petro-chemical plant (RM 36.9) in Lima (Martin et. al., 1979). The most severely polluted stretch of the Ottawa River was from river mile 36.8 to the Allentown Dam (RM 28.8). Fish populations were essentially devoid from this segment of the river; only two pollution tolerant species were collected by the Ohio EPA during the survey.

Despite the severe water quality problems mentioned above, a dramatic improvement in the chemical and biological quality of the Ottawa River below Lima has occurred since 1960. In 1960, fish were absent from the entire Ottawa River downstream from Lima, as well as in a portion of the Auglaize River downstream from its confluence with the Ottawa. Improvements were observed between 1974 and 1977, as a result of large scale expansion in the Lima WWTP, and the Sohio and Vistron facilities. Further improvements in water quality will be largely dependent on a reduction of the ammonia load entering the Ottawa River from the Standard Oil Refinery and the Vistron Corporation.

The Standard Oil Company published the Ottawa River Study in 1981. This volume contains useful background information (chemical, physical and biological) on water quality in the Ottawa River.

SEGMENT REPORTS

HOG CREEK
OTTAWA RIVER TRIBUTARY
CONFLUENCE AT RM 47.5

Segment Problem	Name Description	Use designation Mile Points
A-4-5 NONE	Hog Creek From the headwaters to the Ottawa River	WWH 14.2-0.0

The village of Ada recently completed construction of a new WWTP that discharges to Grass Run Creek (RM 2.1), a tributary of Hog Creek. Subsequent evaluations have not been conducted.

OTTAWA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-4-2 NONE	Ottawa River From the Hog Creek confluence to just above Lima	WWH 47.5- 40.5
A-4-4 MAJOR	Ottawa River From just above Lima to the Vistron Corp.	WWH 40.5-36.8

Ohio water quality standards violations for dissolved oxygen (D.O.) occured in this segment of the Ottawa River (Martin et al., 1979). Large diurnal fluctuations in D.O. probably resulted from high nutrient and organic matter loadings from combined sewer overflows (CSO) coupled with primary production by planktonic algae. A series of low head dams along this stream segment create pooling and favorable conditions for planktonic algal blooms, especially during low-flow periods. A program providing for the controlled release of combined sewer overflow has been completed in Lima and should reduce the severity of CSO impacts.

Segment Problem	Name Description	Use Designation Mile Points
A-4-3 MAJOR	Ottawa River From the Vistron Corp. to Putnam County Road 19	WWH 36.8-0.9

This segment had Ohio water quality standards violations for ammonia, D.O., MBAS, total chromium and phenolics. These pollutants were primarily attributable to the Standard Oil Company (RM 37.04) and the Vistron Corporation discharges (RM 36.9) (Martin et al., 1979). The city of Lima WWTP (RM 37.2) also discharges into this segment. The Standard Oil Company recently received approval of plans to construct a new activated sludge wastewater treatment plant, but construction is not expected to be completed prior to 1983.

The village of Kalida (RM 3.3) has a new lagoon-type WWTP. New sewers are being constructed and the entire system is expected to be operational by the end of 1982. The village of Elida (RM 24.4) recently submitted initial plans for a new WWTP. This facility will not be constructed prior to 1983.

LITTLE OTTAWA RIVER
OTTAWA RIVER TRIBUTARY
CONFLUENCE AT RM 33.0

Segment Problem	Name Description	Use Designation Mile Points
A-4-6 MINOR	Little Ottawa River From the Cridersville WWTP to the Ottawa River	WWH 4.2-0.0

This segment was degraded by effluent from the inadequate WWTP at the village of Cridersville (RM 0.9). Review of monthly operating reports from the Cridersville WWTP indicated frequent water quality standards violations for dissolved oxygen (D.O.) and fecal coliform bacteria (OEPA, NWDO data, 1977-1979). Construction of new facilities should begin in 1982 and may be completed as early as 1983.

SUGAR CREEK
OTTAWA RIVER TRIBUTARY
CONFLUENCE AT RM 6.0

Segment Problem	Name Description	Use Designation Mile Points
A-4-7 NONE	Sugar Creek From the Ford Motor Corp. to the Ottawa River	WWH 18.7-0.0

PLUM CREEK
OTTAWA RIVER TRIBUTARY
CONFLUENCE AT RM 2.7

Segment Problem	Name Description	Use Designation Mile Points
A-4-8 MINOR	Plum Creek From the Columbus Grove WWTP to the Ottawa River	WWH 10.7-0.0

Plumb Creek was degraded by overflows from Columbus Grove (RM 12.4), even though the WWTP produced excellent effluent (OEPA, NWDO monthly operating reports). It is possible that planned expansion of the facility will be completed prior to 1983.

OTTAWA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-4-1 NONE	Ottawa River From Putnam County Road 19 to the Auglaize River	0.9-0.0

REFERENCES

Martin, G.L., T.J. Balduf, D.O. McIntyre, and J.P. Abrams. 1979. Water Quality Study of the Ottawa River, Allen and Putnam counties, Ohio. Ohio Environmental Protection Agency, Office of Wastewater Pollution Control, Division of Surveillance. 35 pp.

Ohio Environmental Protection Agency. 1976 (unpublished). Draft 305(b) report available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

The Standard Oil Company. 1981. Ottawa River Study. Lima, Ohio.

MAUMEE RIVER BASIN

BLANCHARD RIVER SUBBASIN (A-5 and A-6)

SUBBASIN SUMMARY

Land use in the Blanchard River Subbasin is predominantly agricultural and physical/chemical water quality was generally good (OEPA, 1974). An estimated 23.4 stream miles in this subbasin had major physical/chemical problems. A 14 mile segment of the Blanchard River failed to meet water quality standards for dissolved oxygen and ammonia due to sewage bypasses and insufficient treatment at the Findlay WWTP (RM 54.6). Oil Ditch, a small stream traversing an industrial area in Findlay, was seriously affected by various industrial discharges. Shallow Run, a small stream draining the village of Dunkirk (RM 5.2), was affected by septic tank effluent which caused dissolved oxygen problems. These three segments are not expected to meet 1983 goals.

SEGMENT REPORTS

SHALLOW RUN
BLANCHARD RIVER TRIBUTARY
CONFLUENCE AT RM 93.7

Segment Problem	Name Description	Use Designation Mile Points
A-6-8 MAJOR	Shallow Run From Dunkirk to the Blanchard River	WWH 5.2-0.0

A biological investigation of Shallow Run, a small tributary to the Blanchard River, was conducted in 1976 (Martin, 1976). The stream was found to be grossly polluted between U.S. Route 68 (RM 5.2) and S.R. 81 (RM 3.7). Septic tank wastes from the village of Dunkirk (RM 5.2) caused the degradation. Bacteriological measurements (Fecal coliform counts) averaged greater than 10,000/100ml, and were frequently much higher. The average BOD_5 was found to be greater than 42 mg/l, and the average dissolved oxygen concentration was 3.3 mg/l. The stream bottom at U.S. Route 68 (RM 5.2) was covered with blue-green algae and sewage fungus (probably Sphaerotilus natans). A layer of black sludge several inches deep was found beneath this growth. The stream recovered somewhat by S.R. 81 (RM. 3.7). Pollution tolerant macroinvertebrates and profuse growths of algae occured from this point on. The impact of organic pollution on the Blanchard River appeared to be minimal.

A central WWTP is needed in Dunkirk, but it is unlikely that this goal will be accomplished prior to 1983.

BLANCHARD RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-6-3 NONE	Blanchard River From the headwaters to the Eagle Creek confluence	WWH 91.0-56.5
A-6-2 MAJOR	Blanchard River From the Eagle Creek confluence to the Ottawa Creek confluence	56.5-42.2

This segment was subject to dissolved oxygen, fecal coliform bacteria and ammonia violations from combined sewer overflows and bypasses of the Findlay WWTP (RM 54.6) (Balduf and Martin, 1978). A facility plan has been developed and is currently being reviewed by Ohio EPA. It is unlikely that improvements will occur before 1983.

OIL DITCH
BLANCHARD RIVER TRIBUTARY
CONFLUENCE AT RM 48.5

Segment Problem	Name Description	Use Designation Mile Points
A-6-7 MAJOR	Oil Ditch From the source to the Blanchard River	WWH 4.0-0.0

Oil Ditch originates at a catch basin which has six storm and sanitary sewer outfalls. Samples taken in 1976 from two of these outfalls indicated extremely high levels of total copper, total zinc, total lead, total iron, total cadmium, total aluminum, MBAS, phenolics, oil/grease, COD and BOD_5 (OEPA, NWDO data, 1976). The ditch was extremely polluted by several industrial dischargers downstream from this catch basin. The only aquatic life observed was sewage fungus.

Samples taken during a 1975 water quality survey of the Blanchard River indicated dissolved oxygen and fecal coliform bacterial violations at the mouth of Oil Ditch (OEPA, NWDO data, 1975). This survey also indicated that the discharge from Oil Ditch exerts a mildly toxic effect upon the macroinvertebrates in the Blanchard River. No significant improvements in the industrial discharges to Oil Ditch are expected to occur prior to 1983.

BLANCHARD RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-5-1 NONE	Blanchard River From the Ottawa Creek confluence to the Auglaize River	WWH 42.2-0.0

The village of Ottawa discharges to the mainstem of the Blanchard River at RM 21.2. Proposed upgrading of the Ottawa WWTP is being considered in a facility plan for the Ottawa Regional Planning area. This planning includes the village of Glandorf (RM 1.4 on Cranberry Creek). Water quality samples collected at RM 1.6 on Cranberry Creek indicated that degradation occurs below the village of Glandorf. Ohio water quality standards violations for dissolved oxygen and fecal coliforms occurred (Ohio EPA, NWDO data, 1975). Improvements in wastewater treatment and collection systems at Glandorf are not expected to occur prior to 1983.

RILEY CREEK
BLANCHARD RIVER TRIBUTARY
CONFLUENCE AT RM 28.0

Segment Problem	Name Description	Use Designation Mile Points
A-5-6 NONE	Riley Creek From the headwaters to Bluffton	WWH 22.2-14.0

Segment Problem	Name Description	Use Designation Mile Points
A-5-5 MINOR	Riley Creek From Bluffton to Felt Road	WWH 14.0-11.4

This section was affected by the Bluffton WWTP (RM 14.9) and collection system. Low dissolved oxygen concentrations below the Bluffton WWTP have been noted during field surveys (Ohio EPA, NWDO data, 1978). A facility plan for Bluffton is in the review process, but it is unlikely that proposed improvements to the Bluffton system will occur before 1983.

Segment Problem	Name Description	Use Designation Mile Points
A-5-4 NONE	Riley Creek From Felt Road to the Blanchard River	11.4-0.0

The Pandora WWTP (RM 3.5) had a minimal effect on the water quality of Riley Creek (Ohio EPA, NWDO field survey, 1975).

REFERENCES

Balduf, T., and G. Martin. 1978 (unpublished). An assessment of the water quality in the Blanchard River with emphasis on the effects of the Findlay Sewage Treatment Plant, Hancock County, Ohio. Ohio Environmental Protection Agency, Northwest District Office, Bowling Green, Ohio. mimeo. 48 pp.

Martin, G.L. 1976 (unpublished). Biological investigation of Shallow Run, Dunkirk (Hardin County). Ohio Environmental Protection Agency, Northwest District Office, Bowling Green, Ohio. mimeo. 2 pp.

Ohio Environmental Protection Agency. 1974 (unpublished). Draft 305(b) report. Available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

MAUMEE RIVER BASIN

UPPER MAUMEE RIVER SUBBASIN (A-7)

AND MIDDLE MAUMEE RIVER SUBBASIN (A-10)

SUBBASIN SUMMARY

The Maumee River from the Indiana State Line (RM 107.0) to just upstream from Napoleon, Ohio (RM 45.0), generally met physical/chemical Warmwater Habitat (WWH) standards. This subbasin had relatively high BOD_5, nutrients, and total dissolved solids (TDS) concentrations. Fecal coliform levels have improved in recent years and are now usually below 1000/100 ml. The somewhat higher BOD_5 and nutrient levels, and occasional violations of Ohio water quality standards for total copper, total lead, total mercury and total zinc at the Antwerp sampling station (RM 100.3; STORET station No. 500140) reflected the impact of the Fort Wayne, Indiana WWTP and metropolitan area. Total iron violations resulting from nonpoint sources were somewhat more common. All evaluations were based on current data (OEPA, NWDO data, 1977-1980).

SEGMENT REPORTS

MAUMEE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-7-2 MINOR	Upper Maumee River Indiana State Line to Defiance	WWH 107.0-60.4
A-10-3 NONE	Upper Maumee River From Defiance to Napoleon	WWH 60.4-45.0

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

MAUMEE RIVER BASIN

TIFFIN RIVER SUBBASIN (A-8)

SUBBASIN SUMMARY

Physical/chemical water quality in the Tiffin River Subbasin was generally good and should meet the 1983 goals. In previous years, routine samples were collected at four sampling stations (STORET station No's. 500160, 500300, 500330, 500340) on the Tiffin River and in Bean Creek (OEPA, NWDO data, 1974-1978). These stations have not been sampled by the Ohio EPA since mid-1978, but present water quality conditions are probably similar to those reported previously. Results from previous sampling were characterized by a high dissolved oxygen (D.O.) and a low biochemical oxygen demand (BOD_5) in 20 per cent of the samples (mainly during high water conditions). The nutrient level was slightly lower than in most of the other Maumee River Subbasins. Also, the water quality appeared to be somewhat degraded in the immediate area of Defiance (RM 61.6 on the Maumee River), although not to an extent that would impair attainment of the 1983 goals. The most significant water pollution problem in the Tiffin River Subbasin is nonpoint source runoff from agricultural lands. Stream channelization projects, drainage of agricultural land, intensive row cropping and loss of riparian vegetation significantly impacted water quality throughout the subbasin. No analytical data were available for the tributaries to the Tiffin River, other than Bean Creek, however, observations indicated that the quality was satisfactory in most tributaries.

SEGMENT REPORTS

BEAN CREEK
TIFFIN RIVER TRIBUTARY
CONFLUENCE AT RM 49.9

Segment Problem	Name Description	Use Designaton Mile Points
A-8-1 NONE	Bean Creek From the Michigan State line to the Tiffin River	WWH 9.4-0.0

TIFFIN RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-8-2 NONE	Tiffin River From the Bean Creek confluence to the Maumee River	WWH 49.9-0.0

REFERENCES

Ohio Environmental Protection Agency. 1974-1978 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

MAUMEE RIVER BASIN

ST. JOSEPH RIVER SUBBASIN (A-9)

SUBBASIN SUMMARY

The St. Joseph River met the 1983 goals, although fecal coliform bacteria and total iron concentrations were near the upper limits of the Ohio water quality standards for Warmwater Habitats (WWH) (OEPA, 1975a). A field survey in 1975 revealed a high diversity of macroinvertebrates and good water quality at three locations upstream and downstream from the city of Edgerton WWTP (RM 51.1)(OEPA, 1975b).

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous biological monitoring was conducted in July, 1975, at benthic stations on the St. Joseph River from Edgerton in Williams County (RM 51.3) to river mile 42.3 in Defiance County.

Three stations were established to monitor the effect of the Edgerton Metal Products discharge. These stations were located at river miles 51.3, 49.8 and 42.3. The Edgerton Metal Products discharge enters the St. Joseph River at river mile 50.92. A summary of the data can be found in Table III-1. The tabulated data can be found in Ohio EPA 1980 Biennial Water Quality Report, RD 3-88 (OEPA, 1980).

The data from all three stations demonstrated Class II (Good) water quality. Stations 51.3 and 49.8 had moderately high numbers of taxa (26 and 27, respectively) and an abundance of pollution sensitive taxa. Mayflies, stoneflies, and caddisflies comprised approximately 40 percent of the taxa from each station. The furthest downstream station (RM 42.3) displayed similar good water quality with a high number of taxa (32) and a high diversity index (3.19).

The results of this survey showed that the Edgerton Metal Products discharge did not have any detectable impact on the St. Joseph River.

SEGMENT REPORTS

ST. JOSEPH RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-9-1 NONE	St. Joseph River From the confluence with the West Branch to below Egerton	WWH 70.3-41.6
A-9-2 NONE	St. Joseph River From below Edgerton to the Ohio-Indiana Line	WWH 41.6-33.6

Table III-1: Summary of Benthic Data Collected from the St. Joseph River Relative to the Edgerton Metal Products Discharge, August, 1975[a]

	Station (RM)		
	51.3	49.8	42.3
Number of Samplers	5	5	5
Quantitative Taxa	26	27	32
Qualitative Taxa	15	10	12
Organisms/Ft^2	190	168	154
Index ($\bar{d}$)	3.14	3.54	3.19
Evaluation (Class)	II	II	II

(a) The Edgerton Metal Products discharge is located at RM 50.9.

REFERENCES

Ohio Environmental Protection Agency. 1975a (unpublished). Draft 305(b) report available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1975b (unpublished). Stream survey - St. Joseph River. Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report. Reference Document 3. Biological Tables.

MAUMEE RIVER BASIN

LOWER MAUMEE RIVER SUBBASIN (A-11)

SUBBASIN SUMMARY

An estimated 14.1 stream miles in the Lower Maumee River Subbasin had major physical/chemical problems. The segment between Napoleon, Ohio (RM 45.0), and the Interstate 75 Bridge (RM 14.1) generally met Ohio water quality standards for Warmwater Habitat (WWH). This segment had slightly lower BOD_5 and nutrient concentrations when compared to upstream segments. Fecal coliform bacteria violations may have occurred as a result of combined sewer overflows during storm events. No Ohio water quality standards violations were detected during periods of low flow. The Maumee River Estuary, below the Interstate 75 Bridge, has had frequent dissolved oxygen and fecal coliform bacteria violations in previous years. Minor water quality standards violations for total lead, total cadmium, total zinc and total mercury have been recorded at the U.S.G.S. monitoring station at Waterville (RM 20.8).

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the basin consisted of two sets of benthic samples (NASQAN) collected in September, 1979, from the Maumee River at Waterville in Lucas County (RM 21.0). Macroinvertebrates were sampled at both east bank and west bank stations (RD 3). Both stations were given a Class III (Fair) evaluation based on the benthic composition and number of taxa present (East Bank, 24; West Bank, 26). The benthic communities at each site were dominated by abnormally large numbers of organisms, especially caddisflies of the family Hydropsychidae. Eight genera of this family made up nearly 70 percent of the total numbers by individuals collected. Such large numbers of these net spinning caddisflies are often indicative of large amounts of suspended organic material. In this case, the large numbers and subsequent unbalanced communities did not warrant an evaluation better than Class III (Fair) at either station.

Previous sampling at this location was conducted at a west bank station in August, 1976, and east bank and west bank stations in September, 1977, and July, 1978 (Ohio EPA, 1980, RD 3-92, 3-93, 3-94, 3-95 and 3-96). On all occasions, the benthic community consisted of a large number of organisms, especially hydropsychid caddisflies. Benthic composition, number of taxa, and diversity index were quite similar each year. Evaluations of Class III (Fair) water quality were assigned to each data set.

The 1979 data tended to show some improvement in the benthic community, especially in the number of taxa. However, the same general pattern of large numbers of organisms of certain groups continued to be observed. The slight changes observed were not considered significant enough to justify a higher (Class II) evaluation in 1979.

SEGMENT REPORTS

MAUMEE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-11-1 NONE	Lower Maumee River From Napoleon to the Maumee-Perrysburg Bridge	WWH 45.0-14.1

Segment Problem	Name Description	Use Designation Mile Points
A-11-2 MAJOR	Lower Maumee River Estuary reach	WWH 14.1-0.0

Ohio water quality standards violations for D.O. and fecal coliforms occured in the Maumee River Estuary (Toledo-Lucas County Port Authority, 1974). Due to the nature of the estuary, extended periods with no outflow occurred. Organic materials accumulate near and on the river bottom during these periods because of poor water column mixing. Water quality problems (e.g., D.O. violations) in the estuary were most severe in the lower 2 feet of the water column. A number of WWTP's discharge into this estuary including: the Lucas Co. WWTP (RM 18.3), the Perrysburg WWTP (via Grassy Creek @ RM 9.5), and the Toledo WWTP (RM 0.5). Combined sewer overflows from Toledo, via Swan Creek (RM 5.0), also discharge into this segment.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report. Reference Document 3. Biological Tables.

Toledo-Lucas County Port Authority/W.W. Knight Foundation. 1974. The Maumee Bay Environmental Quality Study - Final Report.

MAUMEE RIVER BASIN

LOWER MAUMEE RIVER SUBBASIN AND

TEN MILE CREEK SUBBASIN (A-12)

SUBBASIN SUMMARY

The upstream reach of the Ottawa River above Secor Road (RM 11.3) has greatly improved since the Sylvania WWTP was abandoned, and sewage flow was diverted to the Maumee River WWTP. Similar improvements have been observed in Ten Mile Creek. Although no sampling has been performed since 1975, the segment above Secor Road is assumed to meet 1983 goals. The lower section of the Ottawa River is expected to meet 1983 goals upon completion of the various phases of the Ten Mile Creek Relief Sewer Project.

An estimated 14.0 stream miles in this subbasin had major physical/chemical problems. The upper reaches of Swan Creek should meet 1983 goals, while the lower section, particularly the segment through Toledo, is not expected to attain 1983 goals.

SEGMENT REPORTS

TEN MILE CREEK (OTTAWA RIVER) MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
A-12-1 NONE	Ten Mile Creek Secor Road to the Fulton Co. Line	WWH 34.6-11.9
A-12-2 MINOR	Ten Mile Creek (Ottawa River) From Secor Rd. to North Maumee Bay	WWH 11.9-0.0

The lower part of Tenmile Creek is known as the Ottawa River. Ohio water quality standards violations for this segment included dissolved oxygen and fecal coliforms. These problems should be eliminated upon completion of the Ten Mile Creek Relief Sewer Project.

SWAN CREEK
MAUMEE RIVER TRIBUTARY
CONFLUENCE AT RM 5.0

Segment Problem	Name Description	Use Designation Mile Points
A-12-4 MINOR	Swan Creek From the headwaters to Interstate-475	WWH 41.2-14.0

Fecal coliform violations occured in this segment, particularly during storm events. Nonpoint sources have may accounted for many of the bacterial violations, but discharge from WWTP upstream (e.g., Swanton, RM 31.0) may also have been responsible (Ohio EPA, NWDO data, 1981)

Segment Problem	Name Description	Use Designation Mile Points
A-12-3 MAJOR	Swan Creek From Interstate-475 to the Maumee River	WWH 14.0-0.0

Ohio water quality standards violations for dissolved oxygen and fecal coliform bacteria occured in Swan Creek upstream from Reynolds Road (RM 10.5), due to septic tank discharges and small public or commercial WWTP's (Jones and Henry, 1977). Swan Creek downstream from Reynolds Road was subject to periodic combined sewer overflows which contributed to the D.O. and fecal coliform bacterial violations. In addition, high phosphorus levels were also common in this segment. Improvements will not be made on this segment prior to 1983.

REFERENCES

Jones and Henry Engineers. 1977. Ten Mile Creek Facilities Plan. Prepared for the city of Toledo. Jones and Henry Engineers, Limited, Toledo, Ohio.

Ohio Environmental Protection Agency. 1977-1981 (unpublished). Data available from Ohio EPA. Ohio EPA Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency 1981. Upper Swan Creek Survey. Ohio EPA Northwest District Office, . Bowling Green, Ohio.

Toledo Area River and Stream Water Quality Data Reports. 1968-1974. Toledo Pollution Control Agency, Toledo, Ohio.

PORTAGE RIVER BASIN

UPPER PORTAGE RIVER SUBBASIN (B-1)
AND
LOWER PORTAGE RIVER SUBBASIN (B-2)

SUBBASIN SUMMARY

Physical/chemical water quality in the Portage River Subbasin was fair, being degraded in the upper reaches by point source discharges from the cities of Bowling Green (RM 8.5 on the North Branch) and Fostoria (RM 11.8 on the East Branch). Sediment loading from nonpoint sources was substantial during storm runoff events. An estimated 13.6 of the 104.7 stream miles evaluated in this basin had major physical/chemical problems. The two segments involved were low-flow streams which were degraded by WWTP discharges, resulting in Ohio water quality standards violations for dissolved oxygen (D.O.), ammonia, and fecal coliform bacteria.

BIOLOGICAL EVALUATIONS

Current Ohio EPA, macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in September, 1979, from the Portage River near Woodville in Sandusky County (RM 27.8). The sample consisted of 31 taxa with a diversity index of 3.91 (RD 3). The diverse sample was composed of a well balanced community of 9 taxa of mayflies and caddisflies and 14 taxa of midges, with no taxon dominating the community by numbers. An evaluation of Class II (Good) water quality was indicated by all biological criteria.

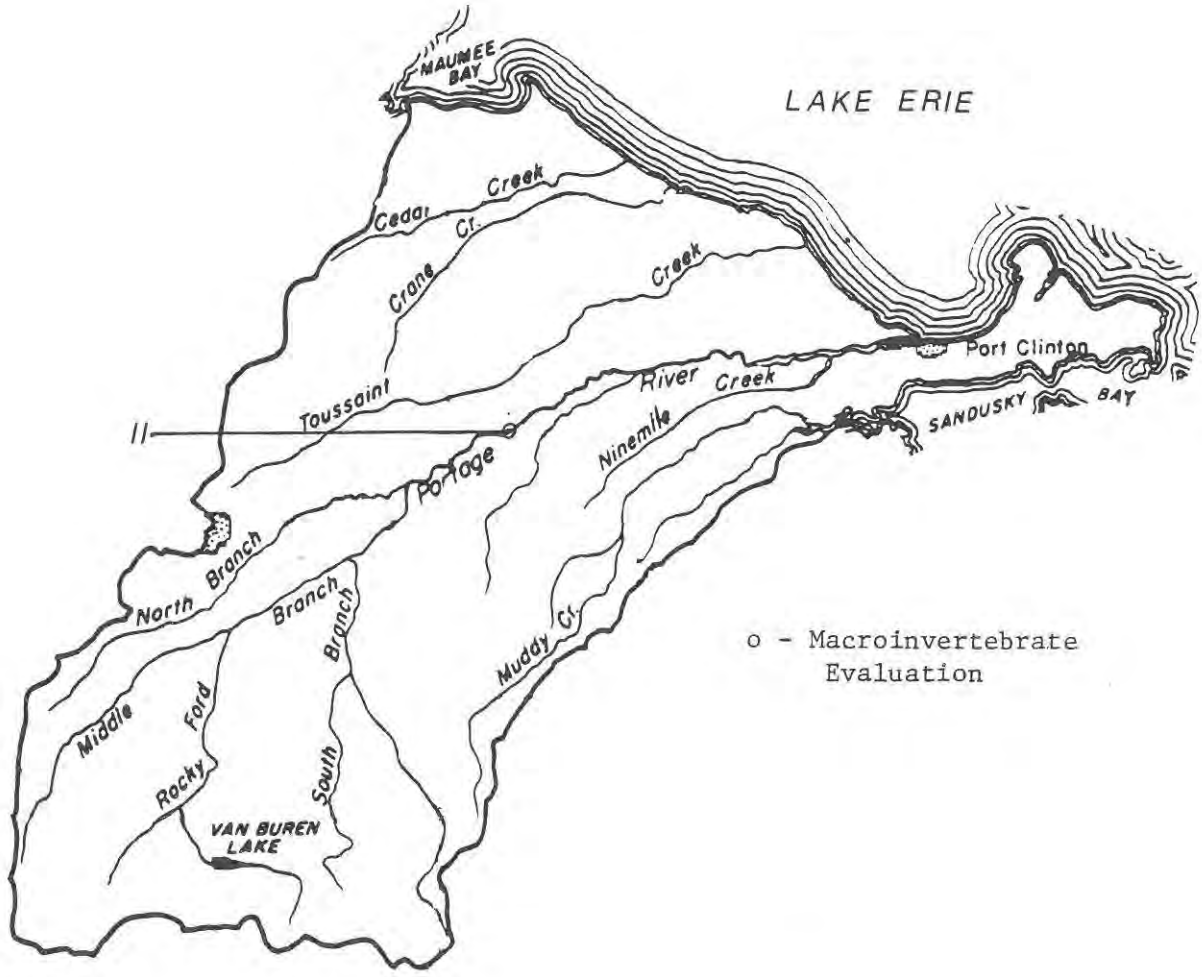
Previous sampling at this location was conducted in July, 1978, and September, 1977 (OEPA, 1980, RD 3-100 and 3-101). Twenty-five taxa were collected in 1978 (diversity index 3.08) and 30 taxa were collected in 1977 (diversity index 2.92). Water quality was Class II (Good) on both occasions based on the benthic composition, the number of taxa, and diversity index. The samples from both years were quite similar to the current data, indicating that little or no change in water quality had occurred.

SEGMENT REPORTS

NORTH BRANCH OF THE PORTAGE RIVER
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 33.2

Segment Problem	Name Description	Use Designation Mile Points
B-1-4 / NONE	North Branch From the source to the Poe Ditch confluence	WWH 20.0-8.5
B-1-3 MINOR	North Branch From Poe Ditch to the Portage River	WWH 8.5-0.0

Portage River Basin



During dry weather, flow in this segment originates at the Bowling Green WWTP (RM 8.5). Ohio water quality standards violations for D.O., fecal coliforms and ammonia, were attributable to the Bowling Green WWTP (OEPA, 1975). Construction of new facilities at Bowling Green, including nitrification and filtration, is expected to be completed in early 1982. This segment is expected to meet the 1983 goals when construction is completed.

EAST BRANCH OF THE PORTAGE RIVER
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 45.9

Segment Problem	Name Description	Use Designation Mile Points
B-1-8 MAJOR	Portage East Branch From to the Fostoria WWTP to the South Branch of the Portage River	WWH 11.4-0.0

The entire length of the East Branch was severly degraded by the discharge from the Fostoria WWTP (RM 11.4). Ohio water quality standards violations for dissolved oxygen (D.O.), ammonia, fecal coliforms, total copper and total lead were common. (Balduf and Martin, 1977). The D.O. sag reached its minimum at the Brandeberry Road area (RM 8.0) and showed nearly complete recovery at the Cygnet Road area (RM 3.7). Total copper, total lead and total aluminum are discharged from the Fostoria WWTP in relatively large amounts, with total copper and total lead at times in excess of Ohio water quality standards. Metals violations occurred as far downstream as Bays Road (RM 1.8). Ammonia violations were recorded as far downstream as Cygent Road.

The diversity of fish and aquatic macroinvertebrates was greatly decreased because of the D.O. sag caused by Fostoria. The population of aquatic animals did not improve significantly until the Cygnet Road area, where dissolved oxygen levels recovered and sludge deposits disappeared.

Due to adequate assimilation capacity of the East Branch, the Fostoria WWTP discharge probably has only minimal effects on the South Branch of the Portage River.

ROCKY FORD CREEK
PORTAGE RIVER MIDDLE BRANCH TRIBUTARY
CONFLUENCE AT RM 8.2

Segment Problem	Name Description	Use Designation Mile Points
B-1-9 MAJOR	Rocky Ford Creek From the Source to the Middle Branch	WWH 9.6-0.0

The flow in this section was low during dry weather and water quality was severely degraded by residential systems in the village of Cygnet and relatively poor quality WWTP effluent in the village of North Baltimore.

Frequent dissolved oxygen, ammonia, and fecal coliform bacterial violations occurred (OEPA, 1975). It is unlikely that any WWTP improvements that would improve water quality will be completed prior to 1983.

BULL CREEK
PORTAGE RIVER MIDDLE BRANCH TRIBUTRARY
CONFLUENCE AT RM 6.0

Segment Problem	Name Description	Use Designation Mile Points
B-1-4 MINOR	Bull Creek From Jerry City to Mermill Road	WWH 5.4-1.9

This zero flow stream appeared to have relatively good (physical/chemical) water quality from the headwaters (RM 14.3) to Jerry City (RM 5.4). Water quality downstream from Jerry City was degraded by discharges from residential systems, but substantial recovery occured before the confluence with the Middle Branch.

MIDDLE BRANCH OF THE PORTAGE RIVER
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 38.4

Segment Problem	Name Description	Use Designation Mile Points
B-1-5 NONE	Middle Branch From the Rader Creek confluence to the South Branch	WWH 15.7-0.0

Insufficient data exists to adequately evaluate water quality in this segment.

SOUTH BRANCH OF THE PORTAGE RIVER
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 33.2

Segment Problem	Name Description	Use Designation Mile Points
B-1-6 NONE	South Branch From the East Branch confluence to the Portage River	WWH 45.9-33.2

PORTAGE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
B-2-1 MINOR	Portage River From Woodville to the beginning of the estuary	WWH 28.2-15.7

This segment of the Portage River violated Ohio water quality standards (WWH) standards for fecal coliforms, dissolved oxygen, and total iron (RM 28.2; STORET station No. 500510) (OEPA, NWDO data, 1978-1980). The fecal coliform and D.O. violations were caused by the discharge from the city of Bowling Green's WWTP. The new Bowling Green WWTP is expected to be in operation during 1982. After the facility becomes operational, this section is expected meet WWH standards for all water quality parameters with the exception of total iron. Total iron will continue to exceed WWH standards due to background conditions and/or coal pile leachate from cement and lime plants in the Woodville area. A policy, currently being development by Ohio EPA, Industrial Wastewater Division, may lead to the elimination of total iron violations from coal pile leachate by 1983.

SUGAR CREEK
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 6.3

Segment Problem	Name Description	Use designation Mile Points
B-2-10 MINOR	Sugar Creek From the source to the Portage River	WWH 17.8-0.0

Although little information was available to make a determination of attainablity of the 1983 goals in this segment, it is likely that degradation is only minor. The segment drains a rural area except for the small community of Risingsun. Residential sewage from septic systems may slightly degrade water quality in this segment, but what impact this has on the attainability of 1983 goals is unknown.

WOLF CREEK
PORTAGE RIVER TRIBUTARY
CONFLUENCE AT RM 12.9

Segment Problem	Name Description	Use Designation Mile Points
B-2-11 MINOR	Wolf Creek From the source to the Portage River	WWH 14.0-0.0

Field surveys were conducted on Wolf Creek on 30 July and 9 October 1980. The purpose of this monitoring was to assess the effects of wastewater discharge from residential systems on water quality in this stream. Stream degradation was evident to at least RM 6.5. The benthic macroinvertebrate population appeared to have improved at RM 2.1, being dominated by mayfly larvae. Upstream stations were dominated by more pollution-tolerant organisms (Ohio EPA, NWDO data, 1977-1980). The village has received Federal funds to construct a WWTP and to survey its sewer system for needed changes. Improvements are expected to be completed prior to 1983.

PORTAGE RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
B-1-2 MINOR	Portage River From the North Branch confluence to Woodville	WWH 33.2-28.2

This section was affected even more severely by the Bowling Green WWTP than segment B-2-1 (OEPA, 1975). In addition to Ohio water quality standards violations for dissolved oxygen and fecal coliforms, there were several ammonia violations. All violations are expected to be eliminated by the construction of the Bowling Green WWTP. Occasional total iron violations slightly in excess of 1000 ug/l occurred, but these violations should be eliminated by 1983 through industrial control measures. A natural background iron concentration of approximately 0.5 mg/l exists throughout the Portage River Basin (Ohio EPA, NWDO data, 1977-1980).

REFERENCES

Balduf, T.J., and Martin, G.L. 1977 (unpublished). Water quality survey of the East Branch of the Portage River. Available from the Ohio EPA, Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1975. 303(e) report - modified waste load allocation report for the Portage River Basin. Available from the Ohio EPA, Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Ohio EPA, Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1980. Biological Survey of the Wolf Creek Sandusky and Ottawa Counties, Ohio. Ohio EPA, Columbus Ohio

SANDUSKY RIVER BASIN

TYMOCHTEE CREEK (C-1) AND SANDUSKY RIVER - (UPPER (C-2),

MIDDLE (C-3) AND LOWER (C-4) PORTIONS)

SUBBASINS

BASIN SUMMARY

The overall physical/chemical water quality of the Sandusky River Basin was fair to good. The major water quality problems were: high nutrient concentrations, high suspended solids load, high turbidity, excessive diurnal dissolved oxygen fluctuations associated with occasional, nuisance algal blooms, and high fecal coliform bacterial levels in many portions of the basin.

An estimated 73.8 stream miles in this basin had major physical/chemical problems. The water quality problems were primarily the result of nonpoint source pollution and the inadequate treatment of municipal wastes. Combined sewer overflows and agricultural runoff were the major nonpoint source problems within the basin.

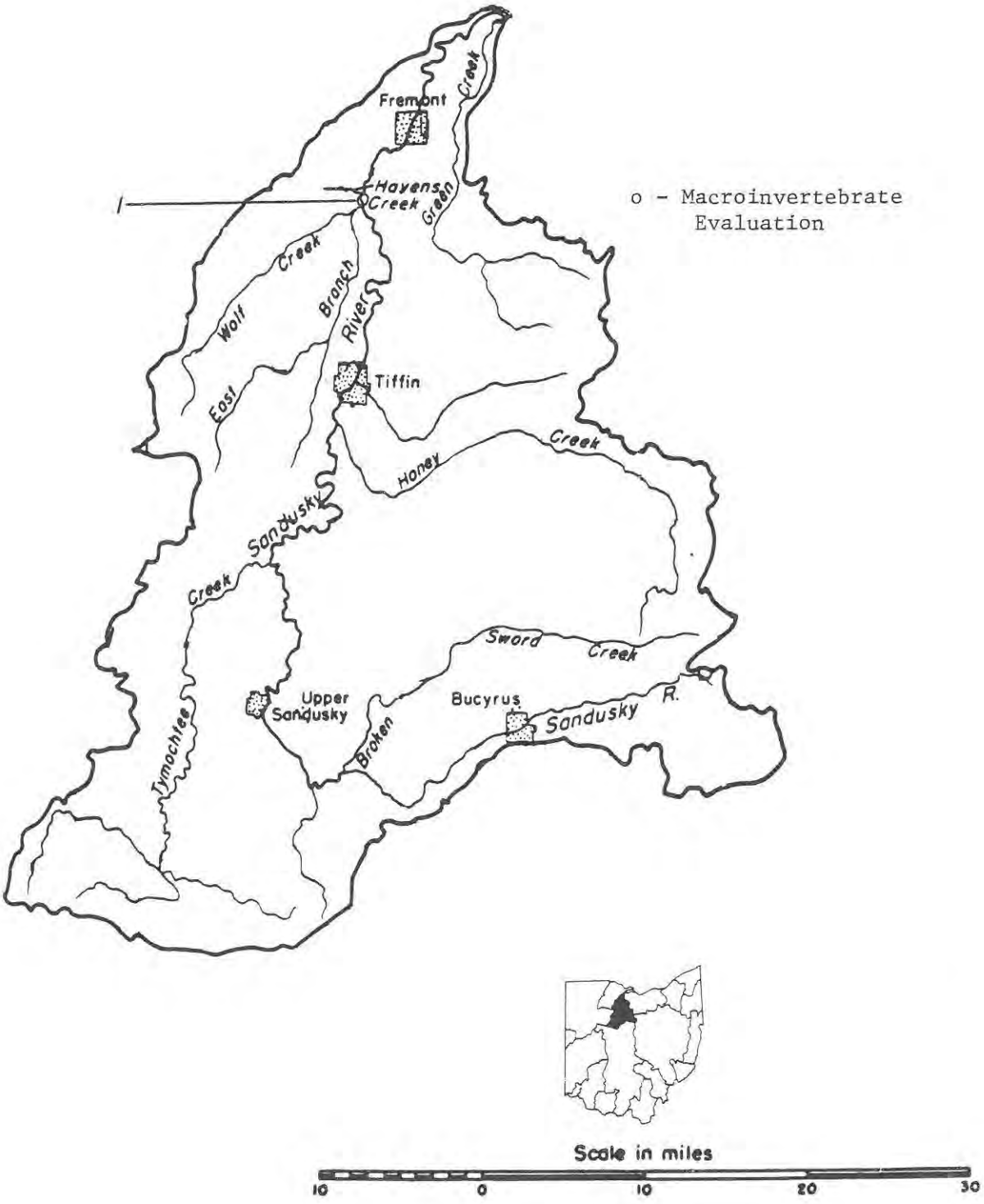
There was strong evidence that the Sandusky River from RM 112 to 109 was severely degraded due to combined sewer overflows and the Bucyrus WWTP. A subtantial reduction in the pollutant loading from these sources would be expected to improve the water quality in this zone of the Sandusky River, as well as in the recovery zone. Biological communities would be expected to recover rapidly in both zones once physical/chemical water quality improves because stream habitat conditions are favorable. The likelihood of biological recovery is further enhanced by the existence of healthy aquatic communities in adjacent non-polluted zones.

Many areas of the Sandusky River Basin were unsuitable for primary contact recreation at certain times because of high levels of fecal coliform bacteria. However, most areas sampled in the Sandusky River Basin appeared to have water quality capable of supporting a diverse community of warmwater fish. The Sandusky River from S.R. 30 N in Upper Sandusky (RM 82.7), to Roger Young Memorial Park in Tremont (RM 16.7) is designated as State and Natural Resource Waters. The river is used extensively for canoeing.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous sampling was conducted in September, 1977, at a NASQAN site on the Sandusky River near Fremont in Sandusky County (RM 23.4). Thirty-nine taxa were collected with a diversity index of 3.35 (OEPA, 1980, RD 3-102). Included were nine taxa of mayflies, one stonefly taxon, seven taxa of caddisflies, and ten taxa of midges. The predominant organisms at the site were the mayflies Stenacron and Stenonema and the caddisfly Cheumatopsyche. However, no single taxon was overwhelmingly abundant. The overall benthic community appeared healthy and diverse, indicative of Class I (Excellent) water quality.

Sandusky River Basin



An intensive physical, chemical and biological survey was conducted on this segment during 1979. Physical, chemical, fish, and benthic sampling revealed five zones of differing water quality characteristics along the upper Sandusky River.

SEGMENT REPORTS

PARAMOUR CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 130.2

Segment Problem	Name Description	Use Designation Mile Points
C-2-4 MAJOR	Paramour Creek From the Crestline WWTP to the Sandusky River	WWH 1.9-0.0

Water quality samples were taken in Paramour Creek in 1974 as part of the 303(e) report published in 1975 (OEPA). The major problem appeared to be inadequate sewage treatment at Crestline. Water Quality violations were recorded (Station at RM 1.5) for dissolved oxygen, ammonia, MBAS, phenolics, and fecal coliform bacteria. The dissolved oxygen concentration was measured at 0.3 mg/l or lower on several occasions, ammonia-nitrogen was measured at values greater than 6 mg/l on several occasions and fecal coliform bacterial levels were consistently greater than 15,000/100 ml. The problem of combined sewer overflows in Crestline has not been corrected. Some minor in-plant improvements have been made, but it is unlikely that the water quality of Paramour Creek will be improved before 1983.

SANDUSKY RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
C-2-2 GOOD	Sandusky River From the headwaters to the city of Bucyrus	WWH 130.2-114.0

The first zone, the headwaters, extended from RM 130.2 to approximately RM 114. This segment had good physical/chemical water quality: one violation of the ammonia water quality standards was observed at RM 129.8 and single violations for dissolved oxygen and fecal coliform bacteria were noted at RM 115.4. Total iron concentrations in excess of 100 ug/l (Ohio Water Quality Standard) were common in the headwater zone and all downstream zones. The fish community structure of the headwater zone showed the expected pattern of increasing number of species and higher composite index with increasing distance downstream. There was, however, some evidence of community stress immediately downstream of Leesville (RM 129.8 to 127.3), probably due to discharges in the vicinity of Crestline and/or septic tank leachate observed at Leesville. The benthos sampling also suggested that the Sandusky River immediately downstream from Paramour Creek (RM 129.9 to 125.4) was stressed, probably due to pollution from the Crestline area.

Segment Problem	Name Description	Use Designation Mile Points
C-2-3 GOOD	Bucyrus urban area	WWH 114.0-112.0

The second zone of the Sandusky River is the Bucyrus urban area (RM 114 to 112). At the times of sampling during this survey, physical/chemical water quality was not substantially degraded. Except for the chronic iron problem, the only water quality standards violation observed was for fecal coliform bacteria. Fish collections at two sites within the Bucyrus urban zone indicated a generally healthy community (i.e., high composite index and number of species). The number of benthos taxa collected in this zone was high and the collections included 8 to 12 species that are sensitive to pollution. Thus, despite the presence of numerous combined sewer overflow locations between RM 114 and 112, overall water quality in this zone was not substanitally degraded.

Segment Problem	Name Description	Use Designation Mile Points
C-2-4 POOR	From Aumiller Park to downstream from Shupp Road	WWH 112.0-109.0

A zone of severe degradation in the Sandusky River exists from approximately RM 112 to 109. Results of chemical analyses revealed substantial organic pollution from combined sewer overflows and the Bucyrus WWTP. Within this zone, fecal coliform contamination was excessive (counts greater than 100,000 per 100 ml), BOD_5 concentrations averaged 11.1 mg/l, dissolved oxygen concentrations were typically below 3 mg/l during hours of darkness, and the ammonia water quality standards was violated. The fish community in this zone was very unhealthy as indicated by the composite index and the number of species. There were fewer adult fish captured in this zone. Pollution tolerant species (white sucker, creek chub, and redfin shiner) dominated the catch, while the more sensitive species (smallmouth bass and crappie) were rare. Benthos collections made at RM 110.5 showed a low number of taxa and a predominance of pollution tolerant forms.

Segment Problem	Name Description	Use Designation Mile Points
C-2-5 GOOD	Downstream from Shupp Rd. to upstream from Broken Sword Creek	WWH 109.0-100.0

The Sandusky River downstream from Bucyrus (approximately RM 109.0 to 100.0) exhibits water quality characteristics of a pollution recovery zone. Chemical water quality in this zone met Warmwater Habitat criteria and steadily improved with increasing distance downstream as pollutants were degraded and became more dilute. Water quality standards violations for dissolved oxygen, ammonia, fecal coliform bacteria, and total iron were observed. The biological monitoring results were fairly typical of a recovery zone, that is, there tended to be a gradual increase in diversity and/or number of taxa with

increasing distance downstream from the pollution source. There were some minor irregularities in this trend for both the fish and benthos data, possibly due to habitat differences among stations. The results of this survey showed that chemical and biological recovery of the Sandusky River downstream from Bucyrus was nearly complete at RM 100.

Segment Problem	Name Description	Use Designation Mile Points
C-2-6 GOOD	Upstream from Broken Sword Creek to Tymochtee Creek	WWH 100.0-65.8

The Sandusky River downstream from RM 100 to the end of the study area (RM 65.8) was characterized by fairly uniform water quality conditions and is termed the post-recovery zone. Chemical sampling was not as intense in this zone but the available data suggest that point source pollution and combined sewer overflows in the city of Upper Sandusky had only minor impacts on water quality. Fish and benthos results indicated a healthy aquatic community throughout the post-recovery zone with a slight shift towards a more pollution tolerant community downstream from Upper Sandusky.

BROKEN SWORD CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 95.2

Segment Problem	Name Description	Use Designation Mile Points
C-2-10 NONE	Broken Sword Creek From the Red Run confluence to the Sandusky River	WWH 27.8-0.0

SANDUSKY RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
C-4-2 NONE	Sandusky River From below Upper Sandusky (Crane Twp. Rd. 121) Fremont (State Street Bridge)	WWH 78.7-15.4

Several water quality standards violations occurred at the sampling station at RM 20.3. Total iron, total lead, total zinc, total mercury and fecal coliform bacterial and dissolved oxygen standards were violated on numerous occasions (Ohio EPA, NWDO, 1977-1980). The dissolved oxygen violations downstream from Upper Sandusky probably arise both from diurnal fluctuations due to algal "blooms", and from combined sewer overflows in Crestline, Bucyrus and Upper Sandusky. High algal populations result from a combination of nonpoint source and municipal nutrient input. The fecal coliform bacterial violations were primarily caused by combined sewer overflows. There are no programs in the three municipalities which will lead to the construction of sewers, or sewage treatment improvements, prior to 1983. An investigation into the source of the pollutants is currently being completed. The complete results will appear in the final intensive survey report.

SPRING RUN
TYMOCHTEE CREEK TRIBUTARY
CONFLUENCE AT RM 4.3

Segment Problem	Name Description	Use Designation Mile Points
C-1-9 MINOR	From Carey WWTP discharge to the Sandusky River	WWH 3.9-0.0

Water quality samples were collected in Spring Run in 1974 as part of the 303(e) report published in 1975 (Ohio EPA). Ohio water quality standards for ammonia, MBAS, and fecal coliform bacteria were violated in Spring Run (Mott Road RM 1.5) downstream from Carey. Although no dissolved oxygen violations were recorded during the afternoon sampling sessions, it is assumed that violations probably occured at night and early morning. Inadequate sewage treatment at Carey appeared to be the main problem. No upgrading of wastewater treatment in Carey is expected before 1983.

TYMOCHTEE CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 66.1

Segment Problem	Name Description	Use Designation Mile Points
C-1-8 NONE	Tymochtee Creek From the headwaters to the Sandusky River	WWH 52.5-0.0

Two stations on the Tymochtee Creek were sampled as part of the 1979 Upper Sandusky River Basin intensive survey. No water quality standards violations were reported.

HONEY CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 43.9

Segment Problem	Name Description	Use Designation Mile Points
C-3-7 NONE	Honey Creek From the headwaters to the Sandusky River	WWH 27.0-0.0

Water quality monitoring at a single station on Honey Creek (RM 1.1) was collected as part of the Sandusky River intensive survey in 1981. The results from this monitoring program will be available in early 1982.

A preliminary water quality assessment of Upper Honey Creek was conducted in 1979 and 1980 (just upstream from the village of Tiro to the U.S.G.S gaging station 3.4 miles east of New Washington) by the Water Quality Laboratory of Heidelburg College, Tiffin, Ohio. Results from this study indicate "(1) large spatial and temporal variability of stream substrates and biological

communities, (2) in general, "good" stream quality at all stations, as reflected by the biological components, (3) fecal contamination at all stations, (4) an observable effect of septic tank effluents on the nutrient and bacteriological quality of the stream draining Tiro." (From abstract of W.Q.L. report, 1980).

The Ohio EPA also took part in a major nonpoint source pollution control project in the Honey Creek Watershed. The summary from this project is included in the nonpoint source volume of this 305(b) report.

EAST BRANCH OF WOLF CREEK
WOLF CREEK TRIBUTARY
CONFLUENCE AT RM 0.9

Segment Problem	Name Description	Use Designation Mile Points
C-4-6a NONE	East Branch of Wolf Creek From the headwaters to Wolf Creek	WWH 19.5-0.0

WOLF CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 22.9

Segment Problem	Name Description	Use Designation Mile Points
C-4-6b NONE	Wolf Creek From the headwaters to Bettsville	WWH 20.5-5.5
C-4-6c MAJOR	Wolf Creek From Bettsville to the Sandusky River	WWH 5.5-0.0

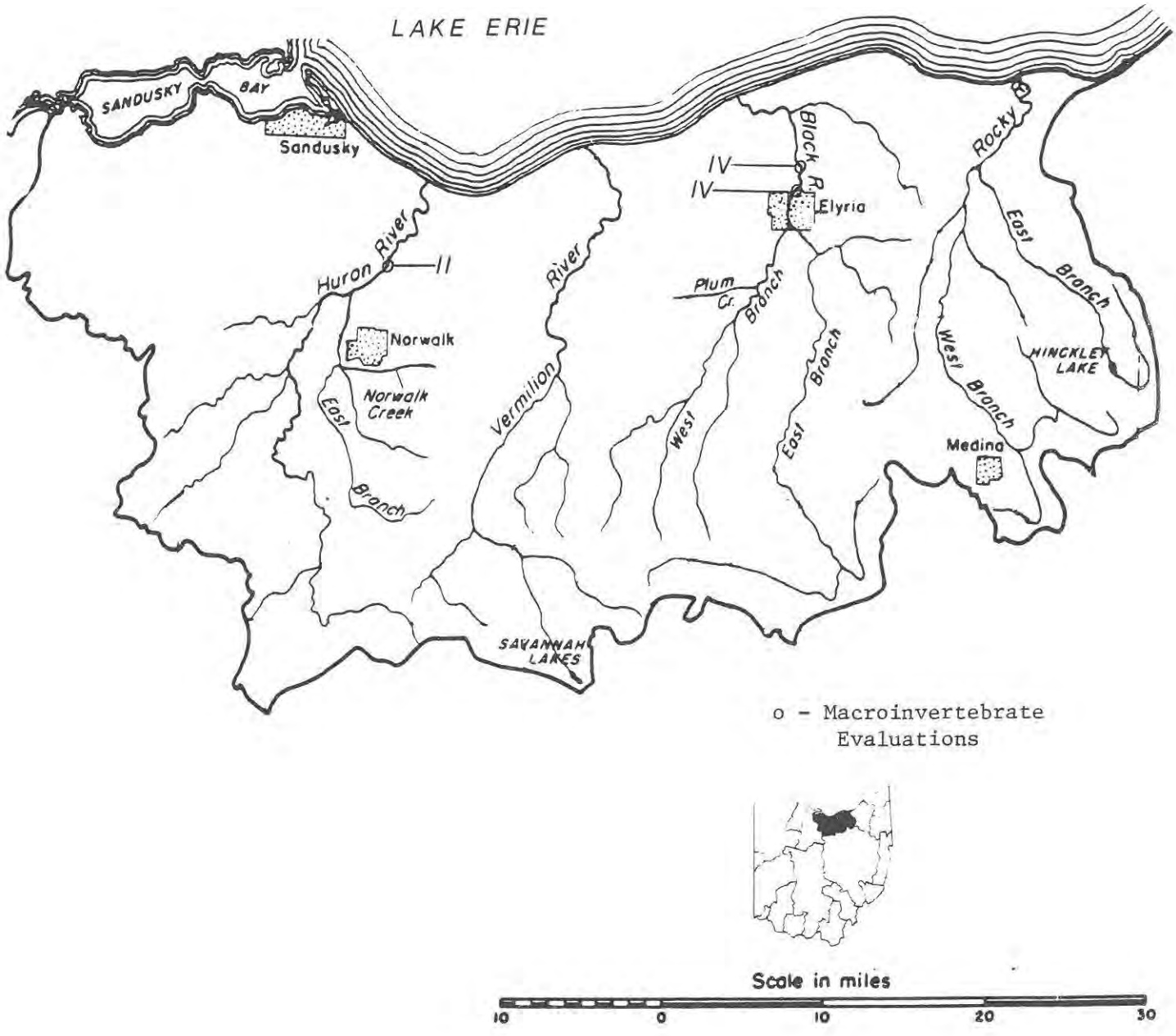
This segment was subject to dissolved oxygen and fecal coliform bacteria water quality standards violations resulting from septic tank discharges in the village of Bettsville (RM 5.5 to 0.0). Bettsville has no central treatment facilities (OEPA, 1974a). It is unlikely that Bettsville will be sewered prior to 1983.

SANDUSKY RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
C-4-1 MAJOR	Sandusky River From the State Street Bridge in Fremont to Lake Erie	WWH 15.4-0.0

This estuary region of the Sandusky River was subject to dissolved oxygen (D.O.) violations which generally occurred between June and mid-November. Water quality standards violations for fecal coliform bacteria and total iron

Huron, Vermilion, Black and
Rocky River Basin



also occurred (OEPA, NWDO, 1977-1979). The probable sources for both the D.O. and fecal coliform bacterial violations were the Fremont WWTP (RM 14.1) and combined sewer overflows from the city of Fremont. Although some improvement may be realized through operational modifications at the WWTP and some separation of sewers in Fremont, it is doubtful that significant improvements will occur before 1983. Also, nutrient enrichment from upstream sources will continue to be sufficient to create algal "blooms" and subsequent diurnal D.O. fluctuations in the often sluggish estuary region. The total iron violations were only slightly above the 1000 ug/l WWH limit and, due to the relatively high pH, are not considered toxic to aquatic life. Relatively high iron levels occurred throughout the basin.

MUSKELLUNGE CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 9.2

Segment Problem	Name Description	Use Designation Mile Points
C-4-4	Muskellunge Creek	WWH
NONE	From the headwaters to the Sandusky River	18.3-0.0

N/A

GREEN CREEK
SANDUSKY RIVER TRIBUTARY
CONFLUENCE AT RM 0.5

Segment Problem	Name Description	Use Designation Mile Points
C-4-5	Green Creek	WWH
NONE	From the headwaters to the Sandusky River	15.0-0.0

N/A

REFERENCES

Ohio Environmental Protection Agency. 1974 (unpublished). Draft 305(b) report available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1975. State of Ohio, Sandusky River Basin, modified 303(e) report. Ohio EPA, Columbus, Ohio. 201 pp.

Ohio Environmental Protection Agency. 1981. The Sandusky River Crawford and Wyandot counties Ohio. Ohio EPA, Columbus, Ohio. 79 pp.

Krieger, Kenneth A., R. Peter Richards, Phillip A. Kling, David A Baker. 1980. Environmental Quality of Upper Honey Creek: A Preliminary Assessment. Water Quality Laboratory, Heidelburg College. Tiffin, Ohio.

HURON, VERMILION, BLACK, AND ROCKY RIVER BASIN

HURON RIVER SUBBASIN (D-2)

SUBBASIN SUMMARY

The Huron River is one of the highest quality streams in Northwest Ohio. Overall physical/chemical water quality was good, although high nutrient concentrations and violations of the Ohio WQS for fecal coliform bacteria are common throughout the subbasin. An estimated 17.7 stream miles in this basin are known to have major physical/chemical problems. Several areas of localized degradation were evident in the basin; an unnamed tributary to the west branch, Jacob Creek, Holiday Lake and Rattlesnake Cr. The fecal contamination and nutrient loading occured during storm runoff events because of widespread nonpoint source pollution. Combined sewer overflows, agricultural runoff, construction area erosion, and rural septic system leachates were among the nonpoint sources problems in the Huron watershed.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA macrobenthic monitoring in the basin consisted of one fixed station benthic sample (NASQAN) collected in August, 1979, from the Huron River below Milan in Erie County (RM 12.2). The sample consisted of 36 taxa with a diversity index of 3.17 (RD 3). Twelve taxa of mayflies and caddisflies along with 13 taxa of midges made up the well balanced, diverse community. An evaluation of Class II (Good) water quality was based on all criteria.

No previous benthic data are available for the basin.

SEGMENT REPORTS

EAST BRANCH
HURON RIVER TRIBUTARY
CONFLUENCE AT RM 14.3

Segment Problem	Name Description	Use Designation Mile Points
D-2-1 NONE	East Branch From the headwaters to the Norwalk Creek confluence	WWH 26.3-6.3

NORWALK CREEK
EAST BRANCH HURON RIVER TRIBUTARY
CONFLUENCE AT RM 6.3

Segment Problem	Name Description	Use Designation Mile Points
D-2-6 MAJOR	Norwalk Creek From Old State Road to the East Branch	WWH 4.2-0.0

The heavy growth of periphytic algae in Norwalk Creek during the most recent sampling period suggested an abundant supply of nutrients in this stream (OEPA, NWDO data, 1974). These nutrients were thought to originate from storm water runoff from the city of Norwalk, combined sewer overflows, and septic tanks. The stream also received the backwash water from the Norwalk Water Treatment Plant (RM 2.4), and is the outflow stream for the Norwalk Reservoir east of the city.

UNNAMED STREAM
WEST BRANCH HURON RIVER TRIBUTARY
CONFLUENCE AT RM 61.0

Segment Problem	Name Description	Use Designation Mile Points
D-2-8 N/A MAJOR	unnamed stream From the Shiloh WWTP to the West Branch	WWH 3.2-0.0

The small tributary which receives Shiloh's wastewater had very poor physical/chemical water quality. WQS violations for dissolved oxygen and fecal coliforms occurred frequently (OEPA, NWDO data, 1974-1980). The stream flow often consisted entirely of wastewater and has had a deleterious impact on the West Branch during low-flow conditions. No improvements in water quality are expected to be made in the near future.

JACOB CREEK
WEST BRANCH HURON RIVER TRIBUTARY
CONFLUENCE AT RM 37.5

Segment Problem	Name Description	Use Designation Mile Points
D-2-7 MAJOR N/A	Jacob Creek Headwaters and including Holiday Lake to the confluence with the West Branch	WWH 7.7-0.0

A report by the National Eutrophication Survey indicated that Holiday Lake was eutrophic, with phosphorus limitations being indicated by the N:P ratios (U.S. EPA, 1975). Most of the lake's nutrient influx was from the Willard WWTP (RM 5.9 on Jacob Creek). The Willard WWTP was recently upgraded and improvements are expected to result in Jacob Creek and Holiday Lake prior to 1983. The bottom sediment of the lake may be extensively contaminated by oil and other wastewater transported substances. Further study of the sediments would be required to determine the extent of contamination and the potential for downstream impacts. The outflow of Holiday Lake had WQS violations for ammonia, fecal coliforms, MBAS and phenolics (OEPA, 1976).

WEST BRANCH
HURON RIVER TRIBUTARY
CONFLUENCE AT RM 14.3

Segment Problem	Name Description	Use Designation Mile Points
D-2-2 NONE	West Branch From the headwaters to the confluence with the East Branch	WWH 65.6-0

RATTLESNAKE CREEK
HURON RIVER TRIBUTARY
CONFLUENCE AT RM 12.6

Segment Problem	Name Description	Use Designation Mile Points
D-2-3 MAJOR	Rattlesnake Creek From the Norwalk WWTP to the Huron River	WWH 2.6-0.0

Rattlesnake Creek had WQS violations for ammonia, MBAS, total zinc, total copper, total lead, total cyanide, fecal coliforms, phenolics and total mercury (OEPA, NWDO data, 1977-1980). It also had high total phosphorus levels and occasional high nitrate levels. These violations were directly attributed to insufficient treatment at the Norwalk WWTP (RM 2.6) and inadequate industrial pretreatment in Norwalk. The problems were exaggerated during low-flow periods.

A facilities plan is being prepared for the city of Norwalk to evaluate and make recomendations to replace the existing sanitary sewer system, combined sewers and septic tanks. No new facilities are expected prior to 1983.

HURON RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
D-2-4 MINOR	Huron River From the confluence of the East and West Branches to to U.S. Route 6	WWH 14.3-0.6

Occasional WQS violations for phenolics, total mercury, total copper., total zinc and total lead were recorded in this segment. The source of these pollutants is thought to be Rattlesnake Creek.

Segment Problem	Name Description	Use Designation Mile Points
D-2-5 MINOR	Huron River Estuary From U.S. Rt. 6 to Lake Erie	WWH 0.6-0.0

The city of Huron (RM 0.8) discharges poor quality effluent into the lower Huron River. Low dissolved oxygen concentrations were common in the deeper waters of the Huron River Estuary, along with violations of the fecal coliform WQS (OEPA, 1976). The construction of improved secondary treatment facilities, and the elimination of combined sewer overflows, will substantially improve water quality in the Huron River Estuary and along the adjacent Lake Erie shoreline. WWTP improvements, including phosphorus removal and chlorination, are not expected to occur before 1983.

REFERENCES

Ohio Environmental Protection Agency. 1976 (unpublished). Draft State of Ohio Biennial Water Quality Report 305(b). Available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1974, 1977-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

United States Environmental Protection Agency. 1974. Report on Holiday Lake, Huron County, Ohio, National Eutrophication Survey working paper No. 402. U.S. EPA, Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

HURON, VERMILION, BLACK, AND ROCKY RIVER BASIN

VERMILION RIVER SUBBASIN (D-3)

SUBBASIN SUMMARY

The physical/chemical water quality in the Vermilion River Subbasin was generally good and has remained relatively unchanged for the last 10 years. There are few point source dischargers in the subbasin and none with a potential to create more than a localized problem. One segment (an estimated 5.6 miles) is not expected to meet 1983 goals due to inadequate treatment of municipal wastewater from the village of New London (RM 3.3).

SOUTHWEST BRANCH
VERMILION RIVER TRIBUTARY
CONFLUENCE AT RM 49.5

Segment Problem	Name Description	Use Designation Mile Points
D-3-3 NONE	Southwest Branch From the headwaters to the Vermilion River	WWH 10.4-0.0

EAST FORK
VERMILION RIVER TRIBUTARY
CONFLUENCE AT RM 16.6

Segment Problem	Name Description	Use Designation Mile Points
D-3-6 NONE	East Fork From the headwaters to the Vermilion River	WWH 9.3-0.0

SKELLINGER CREEK
EAST BRANCH VERMILION RIVER TRIBUTARY
CONFLUENCE AT RM 11.2

Segment Problem	Name Description	Mile Points
D-3-8 MAJOR	Skellinger Creek From the headwaters to the confluence with the East Branch	5.6-0

Dissolved oxygen, ammonia, and fecal coliform WQS violations occured frequently in Skellinger Creek and in the upper reaches of the East Branch (OEPA, NWDO data, 1977). Skellinger Creek received the discharge from the New London WWTP (RM 3.3). The East Branch was also degraded by this discharge. A physical, chemical and biological survey was conducted on this segment to determine what impacts the discharge has on water quality. The final report from this survey will be available in 1982.

The village of New London is in the initial stages (Step I Facilities Planning) of the Construction Grants Program. It is unlikely that the construction of WWTP improvements will begin prior to 1983.

VERMILION RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
D-3-2 NONE	Vermilion River From the headwaters to the confluence with the Southwest Branch	WWH 58.7-49.5
D-3-4 NONE	Vermilion River From the Southwest Branch confluence to the East Branch confluence	WWH 49.5-33.0
D-3-5 NONE	Vermilion River From the East Branch confluence to the East Fork confluence	WWH 33.0-16.6
D-3-7 NONE	Vermilion River From the East Fork confluence to Lake Erie	WWH 16.6-0.0

REFERENCES

Ohio Environmental Protection Agency. 1976 (unpublished). Draft 305(b) report from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

HURON, VERMILION, BLACK, AND ROCKY RIVER BASIN

BLACK RIVER SUBBASIN (D-4)

SUBBASIN SUMMARY

Water quality conditions in the upper Black River Subbasin are difficult to assess because of the lack of data. The East and West Branches of the Black River drain primarily rural land, and land use conditions have changed little in recent years. An estimated 19.3 stream miles in this basin are known to have major physical/chemical problems. Analysis of water quality samples collected in Plum Creek by Ohio EPA at the U.S. Rt. 20 bridge (RM 1.0) indicated that water quality problems exist downstream from Oberlin (Ohio EPA, NEDO data, 1975-1977)

The Oberlin WWTP (RM 1.9) was upgraded in 1976 to include tertiary treatment. Limited sampling indicated that improvements occurred in dissolved oxygen levels and reduced levels of nitrogen ammonia. Oberlin's facility operated efficiently most of the time. However, the sewer system had a severe infiltration and stormwater inflow problem which overloaded the WWTP during heavy rains. The inadequate treatment of sewage following storm events caused ammonia and fecal coliform bacterial violations in Plum Creek. Ohio EPA records indicated that similar situations may occur in Charlemont Creek downstream of Wellington (RM 26.6) and, downstream from in the East Branch and Grafton (RM 11.2) (OEPA, NEDO data, 1975).

Water quality degradation of the mainstem of the Black River began in Elyria (RM 10.4). In general, the industries that discharged into this river segment met their NPDES Permit limitations. However, there were discharges into Elyria's storm sewer system that were not under NPDES Permit. One storm sewer that empties into the river at East Bridge Street (RM 1.1) contained high concentrations of solids and a high chemical oxygen demand when sampled in 1978 (Ohio EPA, NEDO data, 1978). Besides urban runoff, other problems included combined sewer overflows and broken sewer siphons. The Elyria Health Department and the Ohio EPA have worked together to correct some of these problems.

The Black River was severely degraded by the Elyria WWTP discharge (RM 10.4). The impact of this discharge was indicated by numerous WQS violations at the Ohio EPA/USGS sampling station at Ford Road (RM 9.9; STORET station No. 501510). Problems at this site included occasional WQS violations for; total iron, total copper, total lead, total mercury, total nickel, total zinc, total cyanide and PCB's. In addition, more frequent WQS violations for fecal coliform bacteria and ammonia have occured.

Elyria has completed the Step 1 construction grant planning process. Although the plant portion of the plan has been certified, the sewer portion has not. The city has applied for Step 2 funding (detailed plans) for the plant portion of the project.

The lower 6.5 miles of the Black River form an estuary prior to discharging into Lake Erie. Water quality was degraded in this segment by several pollution sources. French Creek enters the Black River in the estuary zone at RM 5.1. This creek receives pollution from numerous schools, light industry,

and commercial establishments in and around the city of Avon (RM 7.1-5.7). Limited sampling indicated that the problems associated with the upper portion of French Creek are not detectable in the creek near its mouth (OEPA, NEDO data, 1975-1980). The Ohio EPA is currently in litigation with the city of Avon to construct sewers and to tie them into the under-loaded French Creek WWTP (RM 3.5). Detailed plans for the collection system have been submitted and approved. Installation is tied to the construction grants program, but Avon is not currently on the priority list.

Effluents from the U.S. Steel-Lorain Works (RM 5.0-2.5) and the Lorain WWTP (RM 3.5) discharge into the Black River Estuary. U.S. EPA chemical and biological sampling of the estuary documented the impacts of these discharges within this segment (U.S. EPA, 1980).

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the basin consisted of one fixed station benthic sample (NASQAN) collected in August, 1979, from the Black River at Elyria in Lorain County (RM 14.9). The sample consisted of 17 taxa with a diversity index of 3.04 (RD 3-). The benthic community was dominated by 12 taxa of midges. Only one taxon of mayflies and no caddisflies were present at this station. The pulmonate snail Physa, capable of thriving under very poor conditions, was also present in large numbers. The unhealthy, stressed aspects of the community indicated a Class IV (Poor) water quality classification.

Previous sampling at this location was conducted in August, 1978, and July, 1977 (OEPA, 1980, RD 3-103 and 3-104). Water quality was Class IV (Poor) on both occasions based on the benthic composition and the number of taxa. The samples from both years were quite similar to the samples collected in 1979 indicating that little or no improvement in water quality had occurred.

Another site on the Black River below the Elyria WWTP (RM 9.4) was sampled in July, 1977 (OEPA, 1980, RD 3-105). With only ten taxa collected and a diversity index of 2.26, this station was considered to have Class IV (Poor) water quality. This sample was quite similar to those collected at RM 14.9 indicating the possibility of a long segment with degraded water quality in the Black River.

An assessment of the fish community in the Black River basin was conducted in 1976 (White, 1978). The objective of this study was to establish the extent of degradation based on the comparison of the present fish community with the potential fauna that would exist in the absence of degradation. The summary of this assessment is available from NOACA.

SEGMENT REPORTS

BLACK RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
D-4-1 MAJOR	Black River From the Elyria City Limits to the Elyria WWTP	WWH 19.7-10.4

This segment of the Black River is expected to continue to violate Ohio WQS for fecal coliforms, total iron, total lead and phenolics (OEPA, NEDO data, 1977-1980). These violations were probably due to urban runoff, sanitary sewer overflows and industrial wastewater discharges. The industries in this segment under NPDES Permits were meeting their effluent limits. Permitted dischargers in this area include: Stanadyne-Western Division, Bendix Westinghouse, and GMC-Fisher Body Division. Elyria plans to eliminate these discharges and renovate portions of the sanitary sewers as funds become available.

Segment Problem	Name Description	Use Designation Mile Points
D-4-2 MAJOR	Black River From the Elyria WWTP to the Estuary	WWH 10.4-6.5

This segment is expected to continue to violate WQS for fecal coliforms, total copper, total iron, total mercury, total nickel, total zinc, total cyanide, MBAS, dissolved oxygen, ammonia and phenolics (OEPA, NEDO data, 1977-1980). The Elyria WWTP effluent was the principle cause of these violations. Although the treatment plant is not expected to be upgraded by 1983, a facilities plan for improving the entire system has been prepared by Havens & Emerson (1979). Construction will begin pending final Ohio EPA approval and grant confirmations.

Segment Problem	Name Description	Use Designation Mile Points
D-4-3 MAJOR	Black River Estuary	WWH 6.5-0.0

This segment is not expected to meet 1983 goals due to continuing WQS violations for total copper, total iron, total zinc, dissolved oxygen, ammonia, and total cyanide (based upon U.S. EPA sampling for the Black River Wasteload Allocation Report, 1980). The estuary receives discharges from the U.S. Steel-Lorain Works and the Lorain WWTP. Upstream discharges, lake water intrusion and the French Creek tributary complicate water quality evaluations in this segment.

REFERENCES

Havens and Emerson, Ltd. Environmental Consulting Engineers. 1979. Review Draft of Facilities Plan for Elyria, Cleveland, Ohio.

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished) State of Ohio Biennual Water Quality Report. Reference Document 3. Benthic Sampling Tables.

United States Environmental Protection Agency. 1980. Black River Waste Load Allocation Report, Eastern District Office. Westlake, Ohio.

White, A.M. 1978. Analysis of Stream Habitats. Technical Appendix A-21. NOACA 208 Report. Cleveland, Ohio.

HURON, VERMILION, BLACK, AND ROCKY RIVER BASIN

ROCKY RIVER SUBBASIN (D-5)

SUBBASIN SUMMARY

The Rocky River drains approximately 290 square miles of Northeastern Ohio before flowing into Lake Erie. Land use within the subbasin is primarily rural, suburban and urban residential. An estimated 22.0 of the 70 stream miles evaluated in this subbasin had major physical/chemical problems. Municipal point sources were the major sources of pollution in the subbasin.

The East Branch of the Rocky River generally met Ohio WQS upstream from the city of Berea (RM 5.1). The river is impounded at Berea and used for the city's drinking water supply. Water supply demands consume the majority of the river's flow during the summer months. Combined sewer overflows and the Berea WWTP (RM 3.2) discharge below the water supply dam creating water quality problems, odors and nuisance algal growth.

Leachates from the Montville Landfill (RM 32.5) degrade a small tributary to the West Branch of the Rocky River. Frequent WQS violations for many heavy metals and phenolics have been reported. Nuisance growths of fungus (Sphaerotillus) have been found. The Medina "500" WWTP (RM 26.5) and Strongsville "A" WWTP (RM 4.6) discharge to the West Branch of the Rocky River further downstream.

The Rocky River mainstem from the confluence of the East and West Branch is entirely within the boundaries of the Cleveland Metropolitan Park System. Upstream pollutant loadings from the East Branch, the West Branch and Abram Creek degraded the water quality of the Rocky River mainstem. Frequent fecal coliform violations within this highly used recreational area are of particular concern.

The water quality of the Rocky River Estuary is unknown due to insufficient sampling and the complex mixing of Lake Erie waters. Recreational uses of the river are heavy and include several boat launching ramps and marinas. The lower Rocky River is also used extensively for fishing, especially during the salmonid spawning runs.

BIOLOGICAL EVALUATIONS

An assessment of the fish community in the Rocky River Basin was conducted by White in 1976 (White, 1978). The objective of this study was to establish the extent of degradation based on the comparison of the present fish community with the potential fauna that would exist in the absence of degradation. The summary of this assessment is available from NOACA.

The Rocky River was the subject of an Ohio EPA physical, chemical and biological water quality survey during the summer of 1981. The final report is expected to be completed by July of 1982.

SEGMENT REPORTS

UNNAMED TRIBUTARY
WEST BRANCH ROCKY RIVER TRIBUTARY
CONFLUENCE AT RM 32.5

Segment Problem	Name Description	Use Designation Mile Points
D-5-2 MAJOR	Unnamed tributary at Montville From the Montville Landfill to the West Branch (RM 32.5)	WWH 1.0-0.0

This tributary to the West Branch drains the Montville Landfill (RM 1.0) in Medina County. Leachate from this landfill created water quality violations for dissolved solids, total iron, total zinc, total copper, total nickel, total chromium, total manganese, phenolics and ammonia. The Director of Environmental Protection (Ohio EPA) is currently writing findings and orders for more effective control of the leachate and resulting water quality problems.

WEST BRANCH ROCKY RIVER
ROCKY RIVER TRIBUTARY
CONFLUENCE AT RM 12.5

Segment Problem	Name Description	Use Designation Mile Points
D-5-1 MINOR	West Branch of Rocky River From near Weymouth Road to S.R. 303	WWH 40.4-25.0

WQS violations for dissolved oxygen, fecal coliforms, ammonia, phenolics, MBAS, total cyanide, total iron, total zinc, total copper, total lead and total cadmium.were recorded in this segment (RM 28; STORET station No. 501820)(OEPA, 1977-1980). A basin model prepared by Havens and Emerson (1975) predicated that some of these violations could extend downstream as far as river mile 25. The Medina No. 200 WWTP (RM 40.4) and Medina No. 100 WWTP (RM 36.0) were the sources of these violations. Sewage from both of these facilities has been diverted to the Medina No. 500 WWTP (RM 26.5). Water quality in this segment of the West Branch is expected to be substantially improved, thereby allowing the attainment of 1983 goals.

EAST BRANCH ROCKY RIVER
ROCKY RIVER TRIBUTARY
CONFLUENCE AT RM 12.5

Segment Problem	Name Description	Use Designation Mile Points
D-5-3 MAJOR	East Branch From the Baldwin Lake Dam to the Rocky River	WWH 5.1-0.0

The East Branch was severely degraded below the Berea water supply reservoir (RM 5.7). During the summer months, the flow in this stream segment was composed primarily of effluent from the Berea WWTP (RM 3.2) and back wash from the Berea Water Treatment Plant (RM 3.1). Instream sampling by Berea WWTP personnel revealed WQS violations for fecal coliforms, dissolved oxygen and ammonia. This plant will be upgraded or tied into Cleveland's southwest sewer interceptor, depending upon recommendations made in the facilities plan currently being prepared.

ABRAM CREEK
ROCKY RIVER TRIBUTARY
CONFLUENCE AT RM 10.4

Segment Problem	Name Description	Use designation Mile Points
D-5-5 MAJOR	Abram Creek From Sheldon Road to the Rocky River	WWH 4.0-0.0

Ohio WQS for ammonia, total iron, total lead, and phenolics were violated in Abram Creek during the reporting period (Ohio EPA, 1977 - 1980). The violations were caused by discharge from the Middleburg Heights WWTP (RM 4.0) and the Brookpark WWTP (RM 3.7). Runoff from foundry sand which was used as fill material near Grayton Road in the vicinity of Cleveland Hopkins International Airport also contributed to pollution problems. Due to the other pollution sources on this zero/low flow stream, 1983 water quality goals are not expected to be met.

ROCKY RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
D-5-4 MAJOR	Rocky River From the source to the estuary	WWH 12.4-0.5

According to Ohio EPA and USGS data, WQS in this segment were violated for fecal coliforms bacteria, phenolics, total iron and total lead (OEPA, NEDO data, 1977-1980; USGS, 1977-1978). The segment received pollution loadings from the East Branch of the Rocky River (RM 12.5), the North Olmstead WWTP (RM 11.4), Abram Creek (RM 10.4), and the Lakewood WWTP (RM 1.8). Pollution abatement programs will not be completed prior to 1983.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from the Northeast District Office, Ohio EPA, Twinsburg, Ohio.

Havens and Emerson Ltd. 1975. Water quality assessment and basin modeling; Rocky River and Tinkers Creek.

White, A.M. 1978. Analysis of stream habitat. Technical Appendix A-21. NOACA 208 Report. Cleveland, Ohio.

CUYAHOGA AND CHAGRIN RIVER BASIN

UPPER CUYAHOGA RIVER SUBBASIN (E-1)
AND
LOWER CUYAHOGA RIVER SUBBASIN (E-2)

SUBBASIN SUMMARY

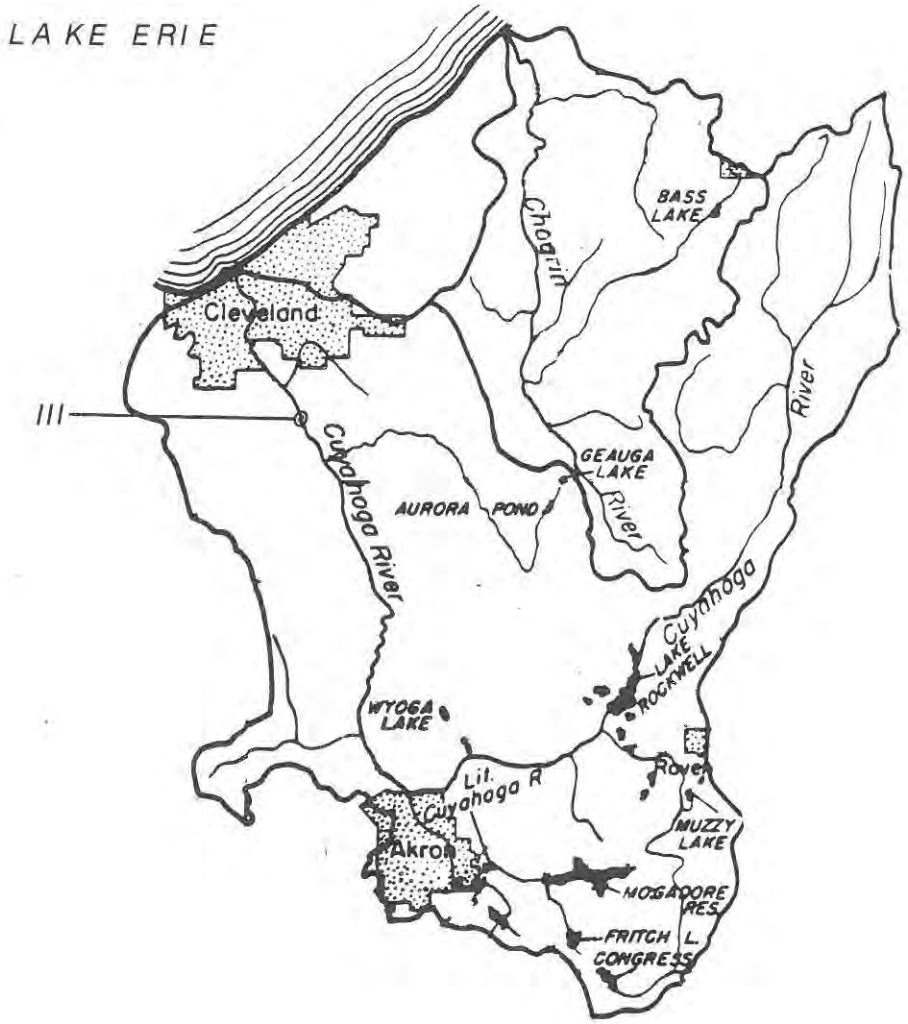
The Cuyahoga River Basin contains areas with excellent physical/chemical water quality, and areas where there are significant water quality problems. An estimated 96.9 stream miles in this basin have major physical/chemical problems. The headwaters and upper reaches flow through farmland and sparsely populated areas. Limited data indicated that there were occasional dissolved oxygen violations, but the overall water quality in these reaches was very good. The upper Cuyahoga River above Lake Rockwell (RM 61.0) has the capacity to assimilate wastes from the small, widely dispersed sources of pollution.

The middle and lower portions of the Cuyahoga River Basin are considerably more populated and industrialized than the upper portion. Cleveland and Akron, the two major metropolitan areas in the basin, greatly influence water quality of the Cuyahoga River. Numerous other smaller cities including Ravenna, Kent, Stow, Cuyahoga Falls, Hudson, Macedonia, Twinsburg, Solon, Bedford, Bedford Heights, Maple Heights, Walton Hills, Garfield Heights, Brookpark and Parma also influence stream quality. Water quality conditions begin to deteriorate at the Lake Rockwell Dam (RM 58.0) where the city of Akron diverts a substantial portion of the river for the city's drinking water supply. During dry weather periods, diversion leaves very little water in the river for dilution of point and nonpoint sources of pollution. Five dams between Kent (RM 54.9) and Cuyahoga Falls (RM 44.6) create long pools of very slow moving water. Increased BOD_5 loadings from the Ravenna, Franklin Hills, Kent, and Fish Creek WWTP's, coupled with the slow moving water in the dam pools caused low dissolved oxygen levels during the early moring hours of the summer months (OEPA data, 1975).

The city of Akron, located in the middle portion of the Cuyahoga River Subbasin, has a major impact upon the river. Numerous industrial dischargers and the Akron WWTP (RM 37.4) effluent make up approximately 75% of the Cuyahoga River flow during critical low-flow conditions. Urban runoff and combined sewer overflows are also a major problem in Akron.

The water quality showed some signs of recovery downstream from Akron as a result of dilution and organic assimilation, but there were some areas with low dissolved oxygen concentrations during low-flow periods. Further downstream, Tinkers Creek (RM 16.4), delivers additional pollutants to the Cuyahoga River. This loading comes from urban runoff, combined sewer overflows and several suburban municipal WWTP's. Due to the good reaeration capabilities of lower Tinkers Creek, most of the organic wastes are assimilated prior to reaching the Cuyahoga River. However, considerable amounts of nutrients, heavy metals and fecal coliform bacteria are carried downstream.

Cuyahoga and Chagrin
River Basin



o - Macroinvertebrate Evaluations

Scale in miles

10 0 10 20 30

The water quality continued to worsen as the Cuyahoga River flows through Cleveland. Two urban tributaries, Mill Creek (RM 11.5) and Big Creek (RM 7.2), have severe water quality problems. Industrial dischargers, urban runoff, and combined sewer overflows are the major sources of pollutants carried to the Cuyahoga River by these tributaries.

The lower portion of the Cuyahoga River (RM 8.4 to RM 3.6), receives major discharges from three steel mills (Jones and Laughlin Steel, Republic Steel, and United States Steel) and two chemical companies (DuPont and Harshaw). The 100 MGD Cleveland Southerly WWTP discharges just upstream from this area (RM 10.7).

Significant improvements in the water quality of the Cuyahoga River have occurred. Data collected downstream from the urban Akron area has shown an overall improvement since 1969, with a reduction of pollutants and an increase in dissolved oxygen levels. However, this improving trend appears to be leveling off. Further downstream, at Independence (RM 13.1), increasing dissolved oxygen concentrations were also evident during the 1970's. Aesthetic (i.e. visual, appearence, odors, etc.) improvements near the mouth of the Cuyahoga River have been noted. The oil and debris problems, the cause of the infamous fire in 1969, have been greatly minimized, if not eliminated.

Many major pollution abatement projects are currently under construction and many more are in the design stages throughout the subbasin. Water quality improvements are expected to occur during the 1980's as a result of these pollution control programs.

BIOLOGICAL EVALUATIONS

Current Ohio EPA macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in August, 1979, from the Cuyahoga River at Independence in Cuyahoga County (RM 14.2). The benthic community that was collected consisted of 26 taxa with a diversity index of 3.05 (RD 3). Six taxa of mayflies and caddisflies were collected, but numbers of individuals collected were not indicative of a thriving, diverse community of either group. The predominant organisms in the benthic community were dominated in numbers by nine taxa of midges, the blackfly Simulium, and the pulmonate snail Physa. These three groups of organisms accounted for 75 percent of all orgamisms collected. An evaluation of Class III (Fair) water quality was indicated by the number of taxa, the diversity index, and the benthic composition.

Previous sampling at this location was conducted in August of both 1978 and 1977 (OEPA, 1980, RD 3-106 and 3-107). Water quality was Class IV (Poor) on both occasions based on the benthic composition and the diversity index. Water quality seemed to have improved at the site in 1979 when compared to the previous two years of sampling. Caution must be used when making this statement, however, since high rates of flow may have had a decided ameliorating effect on water quality and, subsequently, the type of benthic community that flourished in 1979.

Additional biological assessments have been made by numerous investigations throughout the basin.

SEGMENT REPORTS

CUYAHOGA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-1-1 MAJOR	Cuyahoga River From the East Branch Reservoir Dam to Hiram Rapids	WWH 88.0-75.0

Occasional WQS violations for dissolved oxygen have been reported in this portion of the Cuyahoga River (OEPA, NEDO data, 1973, 1974, 1976). These violations occurred during low-flow, warm weather periods (OEPA, NEDO data, 1973, 1976, 1977). Low dissolved oxygen concentrations may be a natural phenomenon in the upper Cuyahoga River due to the low stream gradient and the high organic matter loading from the extensive marsh areas within the drainage basin. The possibility requires further investigation.

Point source dischargers within this segment include the Middlefield WWTP (RM 87.1), Sperry Pond WWTP (RM 1.8), the Burton WWTP (RM 85.3), and the Middlefield Swiss Cheese Company (RM 87.6, Tar Creek RM 1.4). Wastewater treatment improvements at the Burton WWTP and Middlefield Swiss Cheese Company during the late 1970's greatly reduced the organic loadings to this segment. Facility plans for upgrading the Middlefield WWTP should be certified by mid 1982. Even with these improvements, the 1983 clean water goals may not be totally achieved. Occasional dissolved oxygen violations during the low flow summer months may continue to occur due to natural conditions, but the frequency and severity of these violations should be greatly reduced.

Segment Problem	Name Description	Use Designation Mile Points
E-1-2 NONE	Cuyahoga River From Hiram Rapids to Lake Rockwell	WWH 75-61

Compliance with 1983 water quality goals is uncertain for the mainstem of the Cuyahoga River from Hiram Rapids (RM 75.3) to Lake Rockwell (RM 61.0). Based on limited data, it appears that many of these areas are meeting Warmwater Habitat (WWH) standards except for rare violations of total iron and fecal coliform bacteria standards (OEPA, 1974; OEPA, NEDO data, 1975-1977).

WAHOO DITCH
BREAKNECK CREEK TRIBUTARY
CONFLUENCE AT RM 4.6

Segment Problem	Name Description	Use Designation Mile Points
E-1-6 MAJOR	Wahoo Ditch From the Ravena WWTP to Breakneck Creek	WWH 1.5-0.0

Wahoo Ditch, a tributary of Breakneck Creek, receives the discharge from the Ravenna WWTP (RM 1.4). This intermittent stream experienced dissolved oxygen violations and high ammonia concentrations (OEPA, NEDO data, 1973, 1975, 1977). The Ravenna WWTP was upgraded in 1975; but the improvements did not include nitrification. Facilities plans currently being prepared for the city will address ammonia removal and improved sludge handling capabilities.

BREAKNECK CREEK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 56.8

Segment Problem	Name Description	Use Designation Mile Points
E-1-3 MAJOR	Breakneck Creek From the Wahoo Ditch confluence to the Cuyahoga River	WWH 4.0-0.0

Water quality in this segment of Breakneck Creek was degraded by Wahoo Ditch and the Franklin Hills WWTP (RM 2.1). WQS violations for dissolved oxygen and fecal coliforms occurred near the mouth of Breakneck Creek (OEPA, NEDO data, 1973, 1975). The Franklin Hills WWTP is presently at BAT treatment levels. Attainment of 1983 clean water goals is not expected prior to the upgrading of the Ravenna facility.

CUYAHOGA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-1-4 MINOR	Cuyahoga River From Kent to the Little Cuyahoga River confluence	WWH 54.0-42.2

The Cuyahoga River below Lake Rockwell has been greatly altered by man's activities. The city of Akron removes an average of 50 million gallons of water per day from Lake Rockwell for its drinking water supply. This rate of removal exceeded the total discharge of the Cuyahoga River during dry weather conditions. Thus, the flow of the Cuyahoga River below Kent often consisted entirely of treated wastewater with minor dilution from small tributaries. Water quality problems were further complicated by the presence of five dams within this river segment. Dissolved oxygen (D.O.) violations likely occured in all of these dam pools. Field surveys during July 1975, revealed D.O. violations at the Kent Main Street Dam (RM 54.9) and the Munroe Falls Dam (RM 50.0) (OEPA, NEDO data, 1975). A dissolved oxygen stream model predicted that D.O. violations occur at all five dams during the warmer summer months (OEPA, 1974). This same model also suggested that a minimum D.O. concentration of 5 mg/l is not attainable, even with advanced waste treatment levels (10 BOD_5, 2 mg/l NH_3-N) at the 3 MGD Kent WWTP (RM 53.8) and at the 2.5 MGD Fish Creek WWTP (RM 51.8).

The eighty feet high Ohio Edison Dam is located in the downstream reach of this river segment (RM 44.4). The reservoir pool is used by the Ohio Edison Company, Gorge Electric Generating Station (EGS) Plant, for cooling water. Temperature violations have occurred in the Cuyahoga River as a result of cooling water discharged by the Gorge Plant. A final decision on remedial measures for this thermal discharge has not been made. Attainment of water quality standards is not expected in the foreseeable future.

LITTLE CUYAHOGA RIVER
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 42.2

Segment Problem	Name Description	Use Designation Mile Points
E-1-5 MAJOR	Little Cuyahoga River From Akron to the Cuyahoga River	WWH 6.0-0.0

The Little Cuyahoga River flows through the densely populated urban and industrial area of Akron. Combined sewer overflows, urban nonpoint sources, and old sewers in need of repair create significant water quality problems. Ohio EPA data, collected at the Otto Street gage (RM 1.8), revealed WQS violations for phenolics, total iron, total lead, and fecal coliform bacteria during the past reporting period.

A Combined Sewer Overflow Study (CSOS) and several interim Sewer System Evaluation Studies (SSES) which address Akron's sewer problems have been completed. As a result, overflow retention basins have been constructed at Memorial Parkway and Martha Avenue. These two systems have greatly reduced the combined sewer overflows from these areas. Plans to construct a third retention basin at Kelly Avenue have been postponded due to financial constraints.

MUD BROOK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 39.8

Segment Problem	Name Description	Use Designation Mile Points
E-2-6 MAJOR	Mud Brook From the Summit County No. 6 WWTP to the Cuyahoga River	WWH 6.0-0.0

WQS violations for ammonia, dissolved oxygen, and fecal coliform bacteria occurred in the upper reaches of Mud Brook and near the mouth of Powers Brook (OEPA, NEDO data, 1975). These violations were caused by the 1.5 MGD Summit County No. 6 WWTP (RM 9.1, 6.0). This facility sustains plant upsets due to occasional discharges from industrial sources. The county has completed an industrial user survey and is initiating a pretreatment program as required by a Consent Decree. Further legal action is pending to force compliance with interim permit conditions. The Akron Facilities Plan recommends phasing out this wastewater treatment facility and pumping to the Fish Creek WWTP or the Akron WWTP. This will probably not occur prior to 1985.

CUYAHOGA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-2-7 MAJOR	Cuyahoga River From the Little Cuyahoga River confluence to the Akron WWTP	WWH 42.2-37.4

Data collected by the Akron Water Quality Management Section (1979-1980) upstream from the Akron WWTP revealed WQS violations for dissolved oxygen, fecal coliform bacteria, total zinc, and total lead during the past reporting period. The U.S. Geological Survey continuous water quality monitor at Old Portage (RM 40.2) indicated violations for temperature and dissolved oxygen (USGS 1979-1980). Combined sewer overflows to the Little Cuyahoga River and the thermal discharge from the Ohio Edison Gorge EGS were the major causes of degraded water quality in this segment of the Cuyahoga River.

Segment Problem	Name Description	Use Designation Mile Points
E-2-10 MAJOR	Cuyahoga River From the Akron WWTP to the Tinkers Creek confluence	WWH 37.4-16.3

This segment of the Cuyahoga River is degraded by the combined sewer overflows in Akron and the Akron WWTP (RM 37.4). Water quality violations include dissolved oxygen, fecal coliform bacteria, ammonia, and total lead (Akron Wastewater Quality Management Section, 1979-1980).

The Akron WWTP discharged an average of 75 million gallons of treated wastewater each day. This discharge accounted for more than sixty percent of the total flow of the Cuyahoga River during seven-day, once-in-ten-year low flows. Extensive by-passing of raw sewage occurred during the reporting period. This was partially due to construction of interim improvements at the plant, hydraulic overloads during daily peak flow, and infiltration/inflow during wet wether periods.

Several of the interim improvements which are now complete include chemical addition for improved solids settling and partial phosphorus removal, more efficient aeration, and stand-by power. Flow equalization to lessen primary by-passing is completed, but the plant is still experiencing operational problems. Bids for construction of Phase 1 final improvements are currently being received. These improvements will include expansion of primary and secondary treatment facilities and improvements in the sludge treatment and handling facilities. These improvements will not be completed prior to 1985.

This segment of the Cuyahoga River flows though the center of the Cuyahoga Valley National Recreational Area. The increased recreational use of the area should help to justify the expenditure of additional funds for advanced wastewater treatment in the area.

BRANDYWINE CREEK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 22.8

Segment Problem	Name Description	Use Designation Mile Points
E-2-8 MAJOR	Brandywine Creek From Hudson to the Cuyahoga River	WWH 8.1-0.0

Water quality violations for fecal coliforms, phenolics, and dissolved oxygen occurred in Brandywine Creek (OEPA, NEDO data, 1973, 1975). Three significant point sources, the Hudson Village WWTP (RM 8.1) and the Macedonia No. 15 WWTP (RM 3.9), and Tecumseh Corregated Box (RM 0.3) degrade this relatively small stream. Wastewater treatment facilities at the Macedonia No. 15 WWTP were upgraded during the summer of 1979. The plant now provides adequate treatment for BOD_5, phosphorus, and suspended solids removal, but does not provide nitrification. The Hudson Village WWTP is currently under construction to upgraded to secondary treatment by 1983. The facility plan for this area recommended that all of these facilities be phased out and tied into the Cuyahoga Valley Interceptor when it becomes available, possibly in 1990.

TINKERS CREEK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 16.4

Segment Problem	Name Description	Use Designation Mile Points
E-2-9 MAJOR	Tinkers Creek From Twinsburg to the Cuyahoga River	WWH 12.0-0.0

With a drainage area of 96 square miles Tinkers Creek is the largest tributary to the Cuyahoga River. Water quality is heavily influenced by suburban and industrial land uses and numerous point source discharges. The larger WWTP's include Twinsburg, Solon, Bedford Heights, Bedford, and Walton Hills.

Water quality is monitored at three sites on Tinkers Creek; Bedford (OEPA, STORET station No. 502220), Twinsburg (USGS station No. 04207100) and Independence (USGS station No. 04207300 RM 13.1). WQS violations for total iron, total lead, phenolics, total copper, dissolved oxygen, oil and grease, and fecal coliform bacteria have been reported (OEPA, NEDO data, 1979-1980; USGS, 1980).

The Twinsburg and Bedford WWTPs are still in the facilities planning stages. This work should be completed during 1982. Bedford Heights has received funding for the addition of nitrification facilities. Construction should begin during 1982. Complete renovation of the Solon WWTP, including nitrification, phosphorus removal, and rapid sand filters, was completed during 1981. Although some start up problems were experienced, this plant now provides tertiary treatment. The Cuyahoga Valley Interceptor will eliminate

discharges from the Walton Hills WWTP and numerous smaller sources in the lower Tinkers Creek Watershed. Construction problems on the main valley trunk line have postponed these tie-ins, but this work should be commpleted during 1982.

Numerous small county and private sewage treatment plants discharge to the upper portions of Tinkers Creek. Although stream water quality data from these areas are very limited, visual observations and complaints from local residents indicate localized problems. Regional WWTPs are planned for Aurora and Streetsboro. Aurora is expected to complete detailed plans by mid 1982 and has applied for Step III construction grant monies. Streetsboro has finished detailed plans and should receive Step III construction grant funds during 1982.

MILL CREEK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 11.8

Segment Problem	Name Description	Use Designation Mile Points
E-2-11 MAJOR N/A	Mill Creek From Maple Heights to the Cuyahoga River	WWH 9.0-0.0

Mill Creek is a relatively small tributary, but it carries substantial quantities of pollutants to the Cuyahoga River. Combined sewer overflows, industrial discharges, and leachate from several landfills along the banks of Mill Creek contribute to the pollution problems. WQS violations included ammonia, dissolved solids, phenolics, fecal coliforms, MBAS, total copper, total iron, and total lead (OEPA, NEDO data, 1979-1980).

The Mill Creek Segmental Facilities Plan evaluated infiltration/inflow and combined sewer overflows for the Mill Creek Interceptor area. The plan recommended construction of the Southeast Interceptor, parallel relief sewers, off-line storage reservoirs, in-line combined sewer control regulators, and rehabilitation of existing sewers. The availability of funds for these much needed improvements is uncertain.

CUYAHOGA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-2-12 MAJOR	Cuyahoga River From the Tinkers Creek confluence to the Cleveland Southerly WWTP	WWH 16.4-10.7

Data collected at Independence (STORET station No. 502020, RM 13.1) indicated WQS violations for temperature, ammonia, phenolics, fecal coliforms, total cyanide, total copper, total cadmium, total iron, total zinc and total lead during the past year (OEPA, NEDO data, 1979-1980). Dissolved oxygen violations also were recorded at this site by the USGS continuous water

quality monitor (USGS Station No. 04208000, 1979-1980). Based upon this very limited information, it appears that the degree of heavy metal contamination in this segment of the Cuyahoga River is greater than previous data indicated.

The concentration of metals and other conservative parameters in this river segment probably reflect the upstream point and non point loadings primarily from Akron and the Tinkers Creek watershed. Pollution abatement measures previously discussed should lessen the impact of numerous upstream point source dischargers on this segment of the Cuyahoga River. However, further study is needed to determine if the 1983 goals are attainable.

BIG CREEK
CUYAHOGA RIVER TRIBUTARY
CONFLUENCE AT RM 7.0

Segment Problem	Name Description	Use Designation Mile Points
E-2-13 MAJOR	Big Creek From Brook Park to the Cuyahoga River	WWH 4.0-0.0

Urban non point pollution, sewer overflows and several industrial discharges cause water quality problems in Big Creek. WQS violations were reported for phenolics, oil and grease, fecal coliforms, MBAS, total cadmium, total copper, total iron, total zinc and total lead (OEPA, NEDO data, 1979-1980).

Industrial dischargers during the reporting period included Ford Motor Company, General Motors Corporation, Harshaw Chemical, Ohio Drum and Cuyahoga Meat. By late 1980, Cuyahoga Meat and Ohio Drum ceased discharging and the Ford Motor Company tied its process water into sanitary sewers. Ford Motor Company and General Motors Corporation now discharge only treated storm water runoff. The continuous sanitary sewer overflow at Jennings Avenue has been repaired and a flow equalization tank has been installed to handle peak flows. Significant water quality improvements are anticipated as a result of these abatement activities.

CUYAHOGA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-2-14 MAJOR	Cuyahoga River From the Cleveland Southerly WWTP to Lake Erie	LCRS 10.7-0.0

The lower Cuyahoga River exhibited very poor water quality, especially during the low flow summer months. WQS violations for dissolved oxygen, ammonia, fecal coliforms, phenolics, total cyanide, total lead, total iron, total cadmium, total copper and total zinc were reported at one or both monitoring sites (lower Harvard Ave., STORET station No. 502130, RM 7.3; West Third St. Bridge, STORET station No. 502140) (OEPA, NEDO data, 1979-1980). Major discharges to this segment (RM 10.7-0.0) include United States Steel, Republic Steel, Jones and Laughlin Steel, Harshaw Chemical, DuPont Chemical and the Cleveland Southerly WWTP. All of the industries are presently meeting "Best

Practical Treatment" (BPT) as described by the Federal Effluent Guidelines. "Best Available Treatment" (BAT) levels, which are to be met by 1983, have not been established by the U.S. EPA for these types of industries. Until these limits are established, design and construction of advanced treatment facilities will be further delayed.

The Cleveland Southerly WWTP (RM 10.7) is still experiencing operational problems, and is occasionally not meeting interim permit conditions for BOD_5 and suspended solids. However, the frequency and severity of these violations are decreasing. Legal action against this entity is pending. However, extensive construction is underway for an advanced wastewater treatment plant and expansion from a 100 MGD plant to a 400 MGD plant. Phosphorus removal, nitrification and rapid sand filters should significantly improve the water quality of the lower Cuyahoga River. Completion of this project is scheduled for 1983 but may be delayed until 1984 due to construction problems.

HISTORICAL

Data used to assess water quality trends in the Cuyahoga River were furnished by the Arkon Wastewater Quality Management Field Group (1969-1980, unpublished data), the U.S. Geological Survey (USGS, 1968-1980) and the Ohio EPA (1974-1980). The Akron Wastewater Quality Management Field Group sampled the Cuyahoga River upstream and downstream of the Akron WWTP on a daily basis; USGS gages (four parameters, continuous monitor) recorded water quality at Old Portage, Independence and West Third Street; and Ohio EPA data was collected monthly at Independence.

Documented water quality problems in the Cuyahoga River at Old Portage (RM 40.2) included dissolved oxygen and temperature. The number of temperature violations fluctuates from year to year probably due to weather conditions, flow, and thermal loading does not indicate a significant trend. The situation is not likely to change until the Ohio Edison Gorge Electricity Generative facility implements some type of thermal control on their cooling water discharge. Dissolved oxygen concentrations do show improvement. In 1971, there were 41 days when dissolved oxygen levels fell below 4.0 mg/l, a violation of State Water Quality Standards. In 1980, there were only 2 days with dissolved oxygen violations (Table IV-I).

Table III-2: Dissolved Oxygen Data for the Cuyahoga River at Old Portage, RM 40.2 (from USGS continuous monitor, 1971-1980)

Year	No. of days with min. values below 4.0 mg/l	No. of days with min. values below 5.0 mg/l	No. of days missing data*	Avg. daily min. conc. mg/l **	Mean Flow (cfs)
1971	41	65	89	3.8	
1972	34	85	2	4.6	
1973	25	63	16	4.1	
1974	12	39	27	5.4	
1975	29	68	5	5.1	
1976	15	35	3	5.8	
1977	88	116	13	2.0	
1978	11	26	0	5.7	
1979	23	41	5	5.4	
1980	2	23	41	5.25	

* - June through October data only
** - July through September data only

The numbers of violations fluctuate from year to year but shows a definite improving trend. These fluctuations may be due to weather conditions (wetter/dryer or hotter/colder years) or due to BOD load fluctuations discharges. During the work year, 1977, the dissolved oxygen standard were violated 88 times. This can be attributed to the Akron sewer explosion which caused 14 million gallons of raw sewage to be discharged into the Little Cuyahoga River throughout the summer of 1977. Sewer System Evaluation Studies (SSES) and Combined Sewer Overflow Studies (CSOS) have resulted in improved maintainence and the elimination of some problems. Two storm flow equalization tanks have been constructed in Akron to lessen the frequency and magnitude of overflows. Additional sewer improvements are still needed in the Akron area.

The water quality of the Cuyahoga River further downstream near the Akron WWTP (RM 37.4) has improved since 1969. Table IV-2 shows annual averages for several key parameters and compares the upstream sampling site with the site located downstream from the Akron WWTP discharge.

Generally, the data presented here indicates that significant improvements have occurred in ammonia and phosphorus level. Figure IV-1 illustrates the improving trend downstream from the Akron WWTP since 1969. Graphs A and B show reductions in annual concentrations for ammonia and phosphorus. The reduction of phosphorus since 1972 can be attributed to the phosphate, resprectively detergent ban enacted in the Akron area. Graph C indicates that significant improvements have occurred percent saturation of dissolved oxygen since 1969.

The site located immediately downstream from the Akron WWTP is too close to the discharge to measure the full impact of the increased BOD load from the Akron WWTP discharge. During 1975, most parameters reached their highest (or lowest) level. Higher than normal river flows (more dilution) and more efficient operation at the Akron facility resulted in lower ammonia, total phosphorus, nitrates and BOD, and higher dissolved oxygen. Unfortunatly, the Akron WWTP has experienced numerous operational problems during the past few years. Frequent bypassing of raw or partially treated sewage and plant upsets have lowered water quality, as indicated by the data in Table IV-2. Some of these operational problems can be attributed to construction activity at the plant. Completion of interim improvements at the plant during 1981 should result in improved water quality.

The Cuyahoga River at Independence (RM 13.1) has also shown significant improvements in dissolved oxygen levels over the past decade. The frequency and severity of dissolved oxygen violations (values less than 4.0 mg/l) has greatly diminished since 1970 (Table IV-3). The daily average and minimum concentrations show an increase of almost 2 mg/l since the early seventies. BOD_5 reductions upstream from the Akron area, and also in Tinkers Creek, are probably responsible for these improvements. Although very limited in frequency of collection, Ohio EPA monthly data suggested that phosphorus loads from point sources have been declining since 1974 (Table IV-4). Ammonia loads seem to be fluctuating. Only data collected at or below the mean flow, (789 cfs) was used to evaluate nonpoint source impacts and the effectiveness of point source controls.

Table III-3. Cuyahoga River Water Quality Upstream (U) and Downstream (D) of the Akron Wastewater Treatment Plant.

	Dissolved Oxygen mg/l		Dissolved Oxygen % Saturation		Ammonia mg/l		Nitrates mg/l		BOD mg/l		Total Phosphorus mg/l		COD mg/l	
	U*	D**	U	D	U	D	U	D	U	D	U	D	U	D
1969	8.1	7.4	72.3	67.4	1.00	5.66	0.79	9.57	3.3	13.7	0.28	1.73	28	72
1970	8.3	7.7	73.9	69.8	1.01	4.02	0.90	0.76	3.6	9.5	0.22	1.46	32	64
1971	9.2	8.4	78.8	75.9	1.13	3.22	0.75	0.72	2.9	5.8	0.22	1.00	29	59
1972	8.9	8.6	78.8	77.8	0.56	2.35	0.67	0.98	3.2	7.9	0.59	1.55	43	62
1973	-	8.8	-	82.6	-	1.75	-	1.11	-	10.1	-	0.69	-	34
1974	9.2	9.1	91.5	85.8	0.25	2.02	0.77	0.94	2.9	8.5	0.34	0.63	24	34
1975	10.4	9.8	95.3	89.4	0.21	1.07	0.77	1.22	3.0	6.0	0.13	0.39	24	32
1976	9.8	9.5	87.8	85.7	0.29	0.88	0.90	1.56	3.0	6.0	0.15	0.43	21	25
1977	8.6	8.5	76.4	76.1	0.59	1.61	0.94	1.62	4.0	7.0	0.19	0.44	26	32
1978	10.1	9.3	89.9	83.4	0.39	2.09	0.93	1.04	2.0	5.0	0.11	0.32	22	31
1979	10.1	9.4	86.8	81.0	0.33	1.77	1.02	1.10	3.0	7.0	0.12	0.39	25	36
1980	9.1	8.5	82.6	77.7	0.32	1.65	.84	.93	4.0	9.0	0.14	0.40	23	34

Data furnished by the Akron Wastewter Quality Managment Field Group

* U - Upstream at Trunkline Bridge

** D - Downstream at Ira Road

Table III-4. Dissolved oxygen data for the Cuyahoga River and Independence, RM 13.1 (from USGS continuous monitor, 1970-1980).

Year	Number of days with min. values below 4.0 mg/l	Number of days with min. values below 5.0 mg/l	Number of days missing data*	Average daily min. concentration mg/l**
1970	60	93	20	3.8
1971	82	110	23	3.0
1972	42	104	11	4.6
1973	28	80	0	4.2
1974	54	91	9	4.2
1975	3	33	14	5.8
1976	3	7	0	6.5
1977	17	49	0	5.7
1978	1	28	48	5.4
1979	11	50	10	5.0
1980	5	29	28	5.2

* - June through October data only
** - July through September data only

Table III-5: Average annual pollutant loadings for the Cuyahoga River at Independence, 1974-1980 (Ohio EPA data collected at or below mean flows; 789 cfs)

Year	1974	1975	1976	1977	1978	1979	1980
average lbs. phosphorus	1712	1701	1435	1195	1019	859	1478
average lbs. ammonia	3116	2697	1800	3232	2484	2583	3000

Dissolved oxygen problems are severe in the lower Cuyahoga River through Cleveland. The deep slow moving waters of the navigation channel combined with the numerous discharges of cooling water and oxygen demanding substances create near anoxic conditions on many days. However since 1968, a slow but steadily improving trend has been detected at the West Third Street site (RM 3.3) (Table IV-5). Figure IV-2 illustrates this trend more clearly showing that the number of days per year where the minimum dissolved oxygen level fell below 4.0 mg/l has decreased from 237 in 1968 to 142 in 1980. When construction at Cleveland Southerly, the largest source of BOD_5 to this segment, is completed in 1983, significant improvements from the 1980 levels are anticipated. Table IV-5 also indicates that the pH problems that occurred during the late sixties have nearly been eliminated.

Table III-6: Dissolved oxygen and pH data for the Cuyahoga River at West Third Street, RM 3.3 (from USGS continuous monitor 1968-1980)

Year	No. of days with min. values less than 4.0 mg/l	No. of months with values less than 4.0 mg/l	No. of days missing data (D.O.)	pH No. of days with values less than 6.5	No. of days missing data (pH)
1968	235 (237)	12	13	78	95
1969	164 (205)	9	134	20	21
1970	215 (240)	10	100	28	85
1971	204 (206)	8	2	3	2
1972	188 (189)	8	4	0	3
1973	174 (174)	8	2	3	3
1974	188 (189)	8	1	0	6
1975	154 (154)	8	7	0	1
1976	172 (174)	9	2	0	43
1977	136 (174)	7	45	0	26
1978	170 (175)	7	31	3	52
1979	137 (154)	7 (8)	61	4	35
1980	110 (142) (Probable)	7	75	0	16

REFERENCES

Akron Water Quality Management Section. 1969-1980 (unpublished). Analyses of the Cuyahoga River for the years 1969 through 1980. Akron Wastewater Treatment Plant, Akron, Ohio.

Ohio Environmental Protection Agency. 1974. Cuyahoga River 303(e) study, wasteload allocation report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1973-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Biennial Water Quality Report. Reference Document 3. Benthic Sampling Tables.

United States Geological Survey. 1977. Water resources data for Ohio, Vol. II, St. Lawrence River Basin, USGS Water data report OH-77-2. USGS, Columbus, Ohio.

United States Geological Survey. 1978. Water resources data for Ohio, Vol. II St..Lawrence River Basin, USGS water data report, OH-78-2. USGS, Columbus, Ohio.

United States Geological Survey. 1979. (Provisional Data) USGS, Columbus, Ohio.

CUYAHOGA AND CHAGRIN RIVER BASIN

CHAGRIN RIVER SUBBASIN (E-3)

SUBBASIN SUMMARY

The Chagrin River, which is 48 miles long and drains 264 square miles, is one of the most scenic rivers in Northeast Ohio. Land use is primarily rural and low density residential housing. Chagrin Falls and several of Cleveland's eastern suburbs are the only major urban centers. As estimated 4.1 stream miles in this basin are known to have major physical/chemical problems.

The Aurora Branch had good physical/chemical water quality (Ohio EPA, NEDO data, 1975). The recently constructed McFahrland Creek WWTP (RM 3.7) should insure the maintenance of existing water quality by eliminating failing septic systems and package plants. This advanced secondary and tertiary treatment plant is operational and doing well. A good biological community, including game and pan fish, is also found within this segment (White, 1978).

The Chagrin River from the Aurora Branch confluence to the East Branch confluence flows primarily through residential and park lands. Samples analyzed for nutrients show that this stream reach had levels of nitrogen and phosphorus below Ohio WQS (Ohio EPA, NEDO data, 1975). The 1975 samples are assumed to reflect current nutrient conditions, because there have been no major changes within the subbasin since that time.

The nutrient status of the East Branch of the Chagrin River was also acceptable in 1975. The basin is comprised of parks, open land and low density residential housing. Only a few small point source dischargers occur within the watershed. Endangered species, Iowa Darter and game and pan fish, bluegill (game), crappie (game) and perch etc. inhabit the segment (White, 1978).

The river from the East Branch confluence to the estuary does not currently meet 1983 goals. Warmwater Habitat standards violations for fecal coliforms, total iron, total lead, total cadmium and phenolics were recorded at S.R. 84 (RM 5.0; STORET station No. 502400). Nutrient parameters were well within acceptable limits. Public water supply standards and exceptional warmwater habitat standards for phenolics and total nickel were also violated. The source of these pollutants is unknown but thought to be from nonpoint sources. Despite these violations, the river supports the most popular salmonid fishery in Ohio. Fishermen report taking brown trout, rainbow trout (steelhead), coho salmon and chinook salmon in the waters just below the Willoughby Water Treatment Plant Dam near S.R. 84 (RM 4.0).

The Ohio EPA does not have sufficient data to make an accurate water quality assessment of the Chagrin River Estuary. The estuary receives pollutant loading from upstream sources as well as industrial effluent via an unnamed tributary (confluence at RM 0.3). The industrial effluent may cause water quality violations in this low-flow tributary during dry weather conditions.

SEGMENT REPORTS
WILLEY CREEK
CHAGRIN RIVER TRIBUTARY
CONFLUENCE AT RM 4.5

Segment Problem	Name Description	Use Designation Mile Points
E-3-1 MINOR	Willey Creek From the Woodmere WWTP to the Chagrin River	WWH 4.5-0.0

Willey Creek currently violates WWH standards for fecal coliforms, dissolved oxygen and nitrogen ammonia due to the Woodmere WWTP discharge (RM 4.5). Plans for a tertiary treatment facility have been completed, and construction of the improvements at this plant is expected to be completed by 1983. According to the Ohio EPA wasteload allocation modeling, these improvements will insure the attainment of 1983 water quality goals.

CHAGRIN RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
E-3-2 MAJOR	Chagrin River From S.R. 84 to the estuary	WWH 5.0-0.9

This segment of the Chagrin River is not expected to meet the water quality standards for fecal coliforms, total iron, total lead, total cadmium and phenolics (OEPA, NEDO data, 1977-1980). The bacterial violations are probably due to upstream point sources and nonpoint source runoff. There are no point source discharges of heavy metals or phenolics, therefore, the problem is assumed to arise from nonpoint sources.

REFERENCES

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

White, A.M. 1978. Analysis of Stream Habitats. Technical Appendix A-21, NOACA 208 Report. Cleveland, Ohio.

GRAND RIVER BASIN

GRAND RIVER SUBBASIN (F-1 and F-2)

SUBBASIN SUMMARY

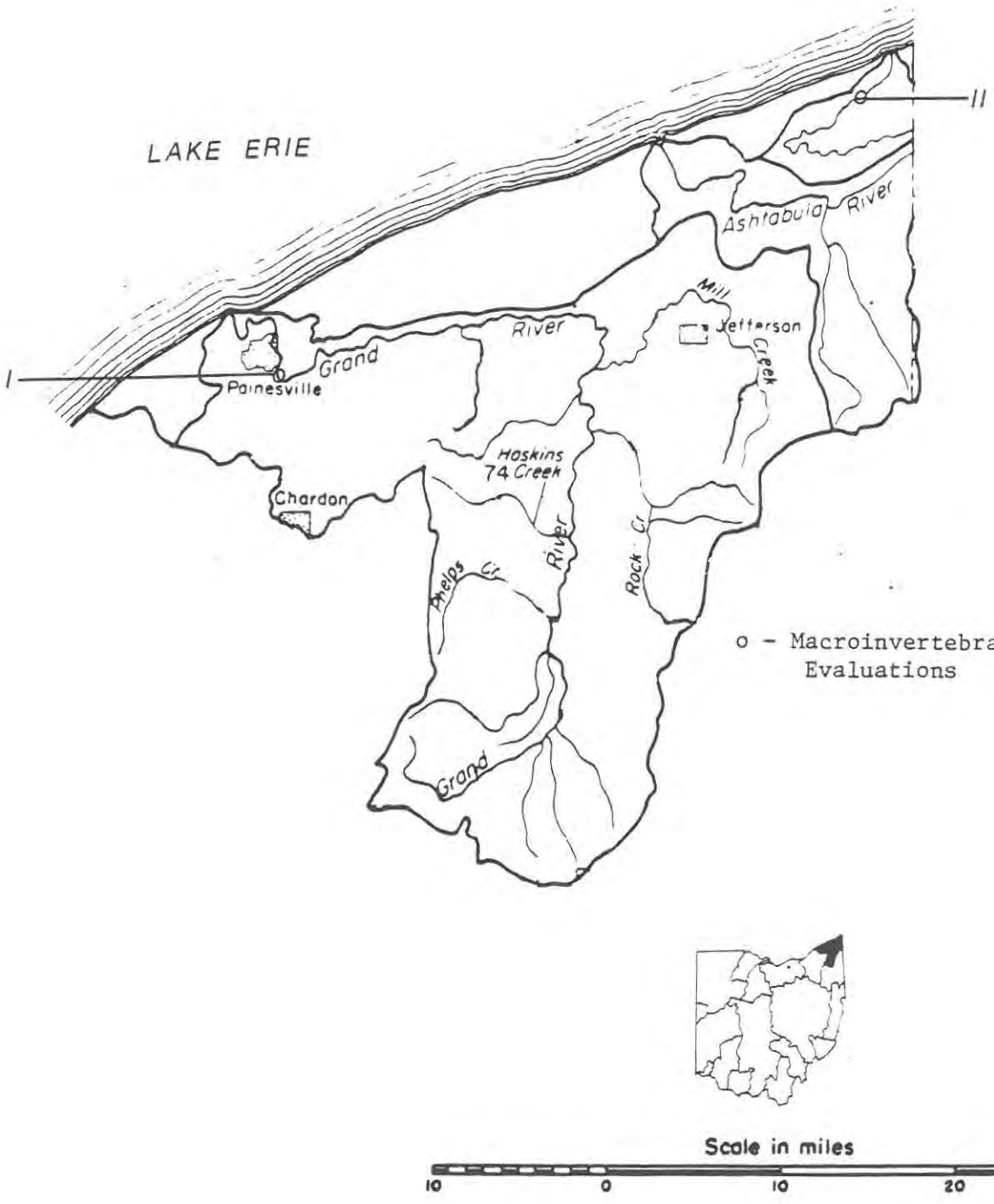
An estimated 15.2 stream miles in this subbasin had major physical/chemical problems. The Grand River flows for 98.5 miles through mostly wooded and agricultural lands before emptying into Lake Erie. The only major population center within the entire subbasin is Painesville (RM 4.0 to 2.2) near the river's mouth. The Grand River's natural and scenic qualities are reflected by the numerous parks located within the subbasin and by the Ohio Department of Natural Resources Wild and Scenic River designation for large segments of the mainstem (33 miles of the mainstem are classified as senic; 23 miles are classified as wild). The river also provides suitable habitat for game and pan fish and for several Ohio endangered plant and animal species including the four-toed salamander, and the Dryopteris intermedia fern (Ohio Department of Natural Resources, 1979). The endangered river red horse and silver chub have also been reported in the lower river segments (White, 1978).

The majority of the water quality problems that exist in the upper Grand River Subbasin are associated with sanitary sewer discharges to zero or low flow streams which include: Mill Creek (near Jefferson at RM 42.3); Cemetery Creek a tributary to Mill Creek (RM 8.3); Rock Creek (RM 51.8); and an unnamed tributary near Orwell (RM 62.4). The headwaters of the Grand River near Parkman were sampled by the Ohio EPA in 1978. The few grab samples analyzed showed excellent physical/chemical water quality, despite poor wastewater treatment systems located in the village of Parkman. Ohio EPA grab samples collected in 1978 and 1979 from Swine Creek, Big Creek, Phelps Creek, Paine Creek, Coffee Creek and Red Creek showed very low nutrient levels in these creeks (OEPA, NEDO data, 1978-1979).

Nutrient levels in the Grand River near Harpersfield (RM 32.3 to 31.7) were also very low (Ohio EPA, NEDO data, 1979). The Ohio Water Service Company (RM 31.9) withdraws a substantial portion of the rivers flow for drinking water supplies at Harpersfield. This leaves very little water for the dillution of any nutrients that might enter the waterway. Therefore, any future development in this segment should be carefully planned. There have been no water samples collected from the Grand River from Parkman to Harpersfield. The nutrient level in this reach is probably very low due to the absence of significant dischargers.

The lower Grand River from S.R. 2 (RM 5.4) to Lake Erie flows through an industrialized, urban area which causes degraded water quality. Point sources within this segment, which may contribute to WQS violations include: the Painesville WWTP (RM 2.9), Fairport Harbor WWTP (RM 2.5), Painesville Municipal Electric (RM 2.4), Republic Steel (RM 0.6) and Morton Salt (RM 0.4). The abandoned Diamond Shamrock properties are significant areas of nonpoint source pollution. Runoff samples from these areas contained concentrations of total chromium as high as 34,500 ug/l and dissolved solids as high as 108,000 mg/l. (OEPA, NEDO data, 1979). High concentrations of total chromium were evident at the monitoring site at S.R. 535 (RM 2.3) but no warmwater habitat standards violations have been recorded. The elimination of

Grand River Basin



several discharges and reduced loading from others within this segment in the last several years has resulted in improved water quality. These changes have been verified through chemical analyses, and reports from area residents and Ohio EPA officials.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in August, 1979, from the Grand River near Painesville in Lake County (RM 8.3). Forty-two benthic taxa were collected with a diversity index of 3.66 (RD 3-). The well-balanced, diverse community was composed of 12 taxa of mayflies, 2 taxa of stoneflies, 9 taxa of caddisflies, and 16 taxa of midges. No taxon totally dominated the community. The above conditions reflected Class I (Excellent) water quality.

No previous benthic data are available for the subbasin.

Additional biological monitoring within this basin included an assessment of the fish community conducted by White in 1976 (White, 1978). The objective of this study was to establish the extent of degradation based on comparison of the present fish community with the potential fauna that would be present in the absence of degradation. The summary of this work is available form NOACA.

SEGMENT REPORTS

UNNAMED TRIBUTARY
GRAND RIVER TRIBUTARY
CONFLUENCE AT RM 62.4

Segment Problem	Name Description	Use Designation Mile Points
F-1-1 MAJOR	Unnamed tributary near Orwell From the source to the Grand River	WWH 2.0-0.0

CEMETARY CREEK
MILL CREEK TRIBUTARY
CONFLUENCE AT RM 8.3

Segment Problem	Name Description	Use Designation Mile Points
F-2-4 MAJOR	Cemetary Creek Tributary to Mill Creek from the Jefferson WWTP to the Grand River confluence	WWH 1.7-0.0

Cemetery Creek, a zero or low-flow stream, currently violates Ohio WQS for ammonia, dissolved oxygen and phenolics (OEPA, NEDO data, 1975-1979). The primary source of these violations was the Jefferson WWTP discharge (RM 1.7). This plant is not expected to be upgraded prior to 1983. A small but

concentrated discharge from the Poplar Oil Company (also known as Laskin) (RM 1.4) also occurs in this stream segment. The company processed and burned waste oils prior to 1980. It has since ceased operation and monies from the hazardous waste uncontrolled site containment fund (Superfund) totalling more than $500,000 have been spent to correct immediate environmental threats. Seepage from storage lagoons and site runoff have been found to contain high levels of phenolics and occasionally high levels of PCB's (OEPA, NEDO data, 1977-1981). Additional clean up work is proceeding.

GRAND RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
F-2-5 MAJOR	Grand River From Big Creek confluence to Near Red Creek confluence	WWH 8.9-5.3

This segment of the Grand River violated WQS for fecal coliform bacteria, total iron, total lead and total mercury (OEPA, NEDO data, 1975-1980). The fecal coliform violations were probably due to the Heatherstone WWTP discharge just upstream from the sampling station (RM 8.9 on the mainstem) and the Chardon WWTP (RM 7.0 on Big Creek). The phenolics and metals sources are unknown; there are no industrial dischargers upstream from the sampling site.

ROCK CREEK
GRAND RIVER TRIBUTARY
CONFLUENCE AT RM 2.6

Segment Problem	Name Description	Use Designation Mile Points
F-1-2 MAJOR	Rock Creek From the Roaming Rock WWTP to the Grand River	WWH 2.6-0.0

GRAND RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
F-2-6 MAJOR	Grand River From Near Red Creek confluence to Lake Erie	WWH 5.3-0.0

This segment violated WQS for fecal coliform bacteria, dissolved oxygen, total iron, phenolics, and total dissolved solids (TDS). The Painesville and Fairport Harbor WWTPs contribute to the bacterial, dissolved oxygen and TDS violations. The Painesville WWTP was upgraded to provide tertiary treatment beginning in the fall of 1979. Plans are being considered to convert the Fairport Harbor WWTP to a lift station for the Lake County Regional Plant in Mentor (facility currently in planning stages). The application for Step 3 planning has been approved.

A major source of dissolved solids in the lower Grand River is an abandoned 350 acre waste lagoon formerly owned by the Diamond Shamrock Chemical Company. The lagoon and surrounding area is also a known source of iron and chromium (OEPA, NEDO data, 1979). Water quality is improving in this area. Surface runoff from chromium waste storage lagoons has been eliminated by the Diamond Shamrock Company. Work to isolate groundwater from 100 acres of chromium waste is expected to be complete by the fall of 1982. The lagoons are being filled with fly ash, capped with clay, covered with top soil and seeded with shallow rooting perennial grasses. Groundwater monitoring wells have been installed and Diamond Shamrock is expected to begin a surface water monitoring program in the near future.

HISTORICAL

The lower Grand River is one of the few systems in Northeastern Ohio which has had sufficient data collected to determine the effects of major dischargers on water quality. The Diamond Shamrock Painesville works produced soda ash from 1912 to 1976. Wastewater from this process contained high amounts of dissolved solids which were discharged to the Grand River. The USGS gaging station downstream at S.R. 535 (RM 2.3) has recorded the dissolved solids concentrations through conductivity measurements since 1966 (USGS, 1966-1978).

There have been substantial improvements in the physical/chemical water quality of the lower Grand River. The frequency and magnitude of violations of WQS for dissolved solids, dissolved oxygen, pH, MBAS and total copper have shown steady improvements over the past several years. The Painesville WWTP was upgraded to advanced secondary and tertiary levels in 1979. Process water from Glyco Corperation and Uniroyal that contained high levels of oxygen demanding substances, oil and grease, and phenolics was previoulsy discharged to the Grand River. This process water is now sent to the Lake County Regional WWTP in Mentor via a new intercepter sewer. Diamond Shamrock closed its chromium plant in 1971, and their soda ash plant in 1977. Improvements in water quality can be directly attributed to the upgrading of sewage treatment facilities and the elimination of these industrial point sources. Figure shows the dramatic decrease in the frequency of violations of the dissolved oxygen standard over the past ten years. Similarly dramatic decreases occurred in the frequency of pH, phenolics and ammonia violations (Figures).

Total iron violations in the 2000 to 4000 ug/l range continue. One unimproved source of the iron violations is coal-pile runoff at the Painsville Municipal Electric Company. There are no immediate plans to correct this sutuation. Chlorides continue to leach from a 350 acre soda ash process waste storage lagoon used by Diamond Shamrock until 1977. Specific conductance levels in the ajacent Grand River remain high but have decreased substantially since operation at the soda ash plant were discontinued. Ohio WQS violations for dissolved solids occured frequently when the flow of the Grand River fell below 150 cfs (based on specific conductance recordings at the USGS continuous monitoring station at S.R. 535).

FIGURE III-7 FREQUENCY OF DISSOLVED OXYGEN VIOLATIONS ON THE GRAND RIVER BETWEEN 1970 AND 1980 (June through October data only)[a]

YEAR	# days below 4ug/l	# days below 5ug/l	# days missing data	mean daily min. conc.
1970	68	85	26	1.2
1971	20	35	52	3.2
1972	34	46	12	1.8
1973	40	54	20	2.3
1974	76	100	18	1.6
1975	30	42	54	3.3
1976	45	67	2	2.3
1977	49	66	2	1.0
1978	77	99	3	1.7
1979	0	1	29	5.5
1980	0	2	8	7.0

a (U.S.G.S. continuous monitoring data. From: Water Resources for Ohio 1970 to 1980)

Table IV-7

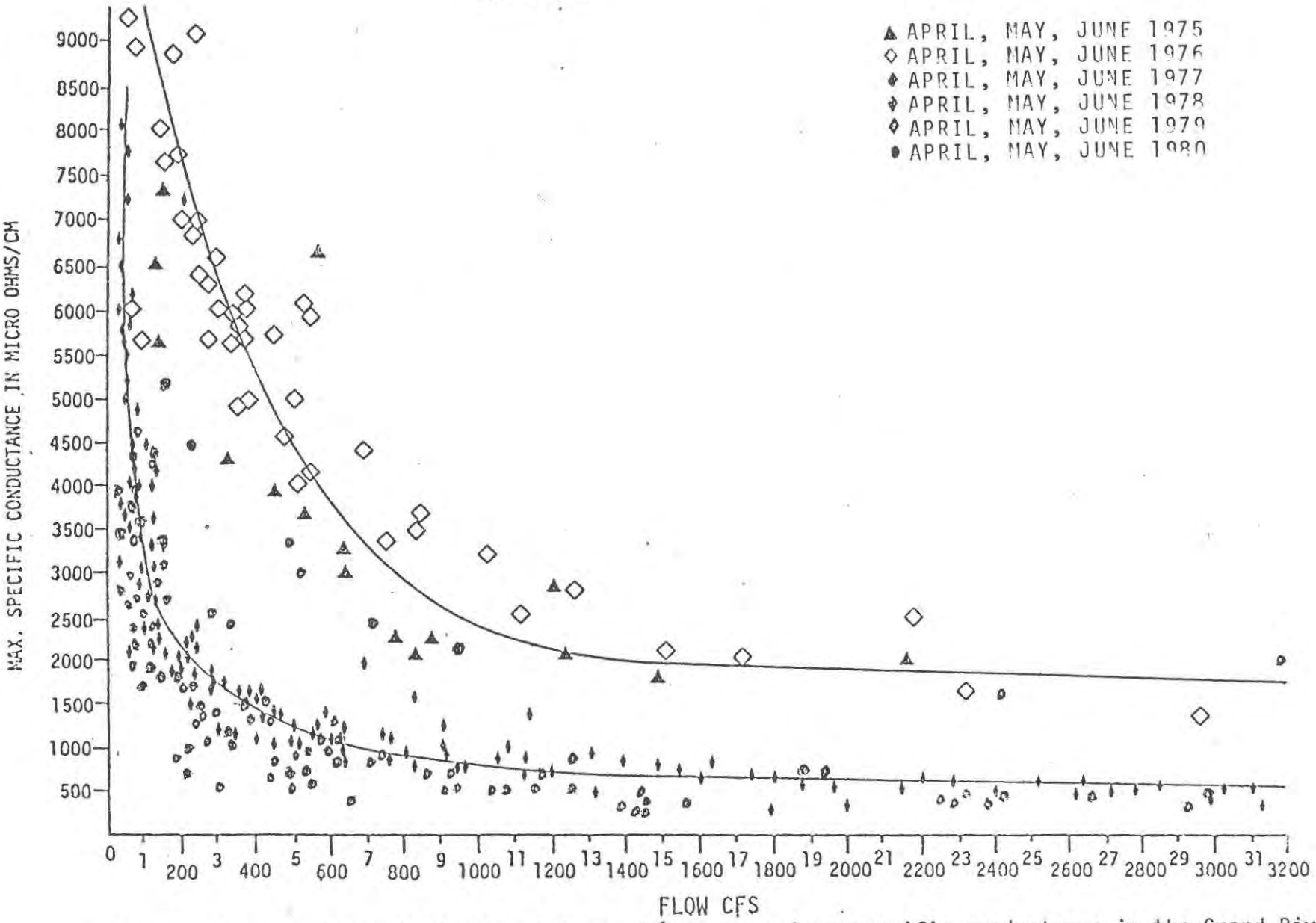
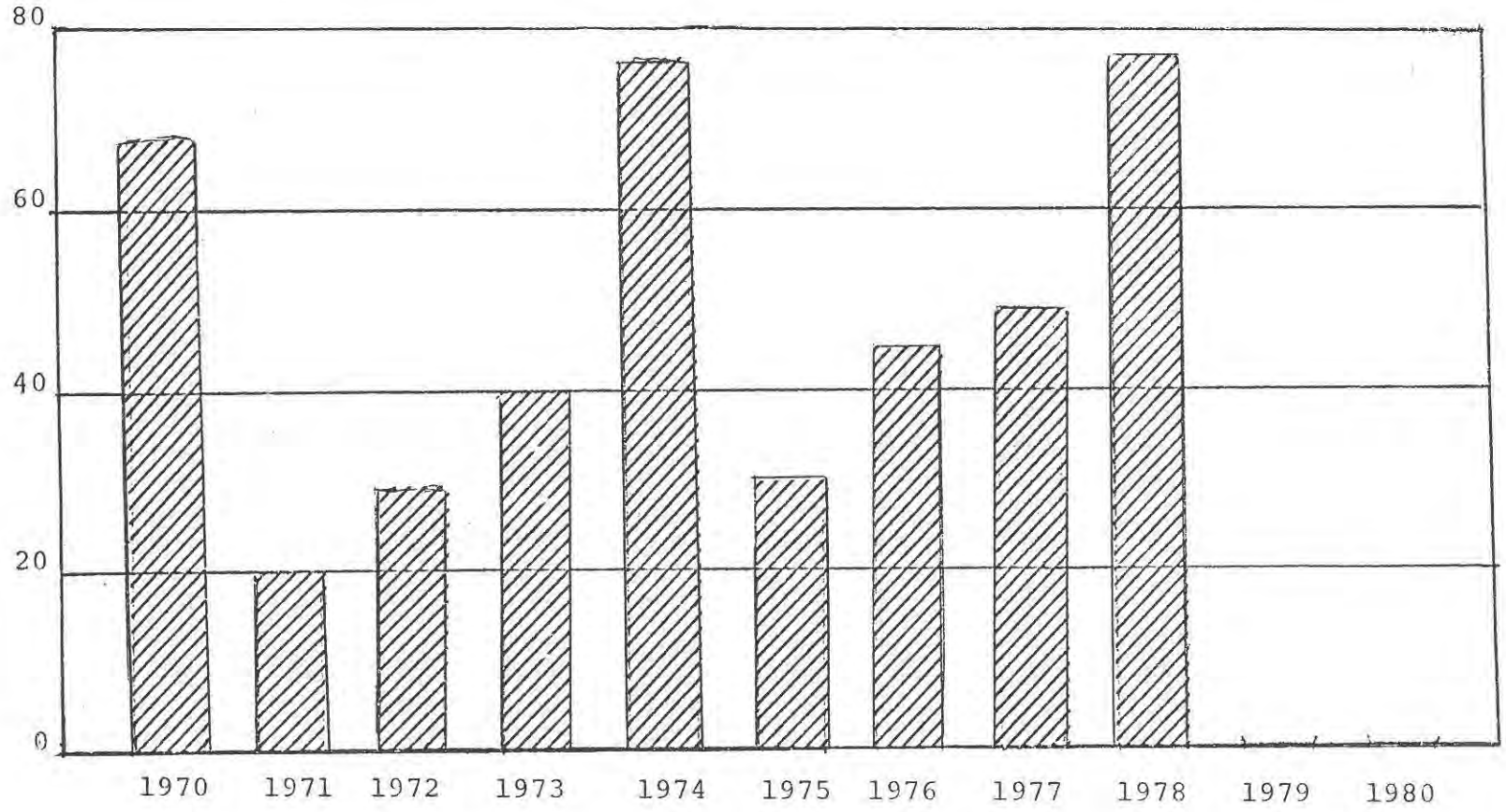


Figure IV - 7. The relationship between flow and maximum specific conductance in the Grand River near Painesville, Ohio, 1975 - 1979.

GRAND RIVER AT RT. 535

DISSOLVED OXYGEN

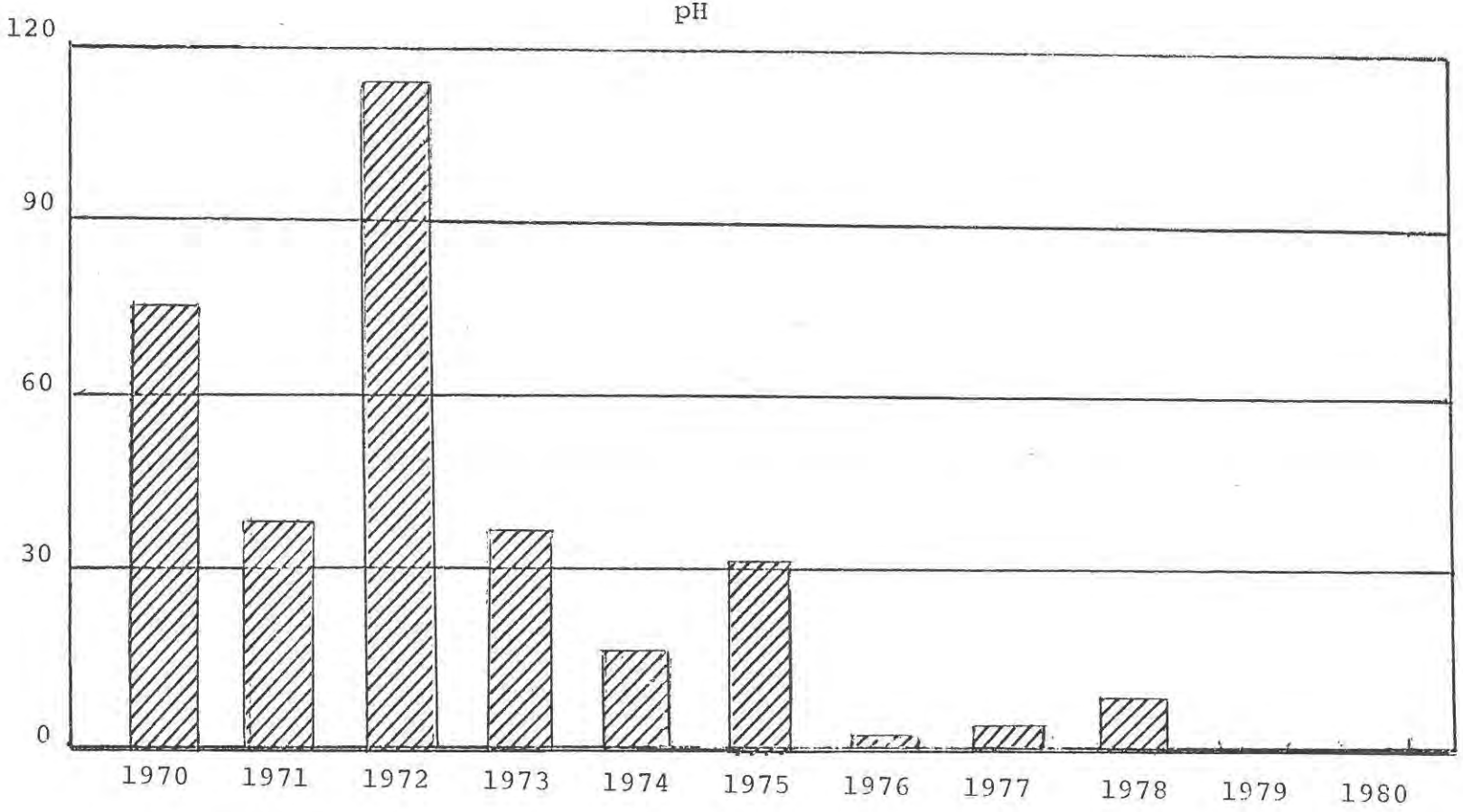


NUMBER OF DAYS WITH MINIMUM VALUES BELOW 4.0 mg/l.

USGS DATA JUNE-OCTOBER

GRAND RIVER AT RT. 535

pH



NUMBER OF DAYS IN VIOLATION OF WATER QUALITY STANDARDS

PER WATER YEAR

USGS DATA

THIS PAGE RESERVED FOR MAP

REFERENCES

Northeast Ohio Areawide Coordination Agency (NOACA). Water Quality Management Plan (DRAFT) Technical Appendix A21.

Ohio Department of Natural Resources. 1979. Grand Wild-Senic River Assistance Manual.

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

Ohio Environmental Protection Agency. 1974. Grand River Basin 303(e) wasteload allocation report. Ohio EPA, Division of Surveillance, Northeast District Office, Twinsburg, Ohio.

United States Geological Survey. 1966-1980. Water resources data for Ohio, Volume 2. St. Lawrence River Basin. U.S. Geological Survey water-data reports OH-66-2 to OH-79-2. U.S. Geological Survey, Columbus, Ohio.

White, A.M., 1978. Analysis of stream habitats. Technical Appendix A-21. NOACA 208 Report. Cleveland, Ohio

GRAND RIVER BASIN

CONNEAUT CREEK SUBBASIN (F-3)

SUBBASIN SUMMARY

An estimated 21.1 of the 22.3 total stream miles evaluated in this subbasin are known to have minor physical/chemical problems. The lands within the Conneaut Creek Subbasin are rural, except for the lakeshore area which contains the city of Conneaut and some suburban development. Physical/chemical water quality of Conneaut Creek above the city was generally good (Ohio EPA, NEDO data, 1977-1980). Occasional total iron and total lead violations occured from nonpoint sources in Ohio, or from dischargers and/or nonpoint sources in Pennsylvania. Samples from the monthly monitoring site at Keefus Road (RM 6.4; STORET station No. 502870) revealed Coldwater Habitat (CWH) violations for phenolics. These violations also occasionally exceeded Warmwater Habitat (WWH) standards.

Because of the complex nature of estuaries and the lack of data, no water quality determinations could be made for the Conneaut Creek Estuary. However, the estuary receives runoff from 438 acres of coal and ore storage. Discharge from these areas has low pH and high total iron concentration (500-1000 ug/l). This runoff often discolored the Conneaut Harbor. The Pittsburgh and Conneaut Dock Company, which owns the storage area (RM 0.5 to 0.0), is currently working on a treatment system to control the quality of this runoff. The treatment system, including collection, settling, and neutralization facilities, is expected to become fully operational in January of 1982. Five outfalls were combined into one, as a first step in implementing this plan.

Despite what appears to be adverse conditions in the estuary, Conneaut Creek supports a popular sport fishery, especially during the spring and fall salmonid migrations.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the basin consisted of one fixed station benthic sample (NASQAN) collected in August, 1979, from Conneaut Creek near Conneaut in Ashtabula County (RM 6.7). A total of 36 benthic taxa were collected with a diversity index of 3.18 (RD 3-). The benthic community consisted of 13 taxa of mayflies, 9 taxa of caddisflies, 1 stonefly taxon, and 13 taxa of midges. The midge taxa dominated the community by numbers (88 percent), but no one taxon was overwhelmingly abundant. The overall benthic community appeared healthy and diverse and indicated Class II (Good) water quality.

No previous benthic data are available for the basin.

SEGMENT REPORTS

CONNEAUT CREEK MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
F-3-5 MINOR	Conneaut Creek From the Ohio - Pa. Line to the Estuary	CWH 22.3-1.2

Conneaut Creek is not expected to meet 1983 water quality goals due to high, total iron concentrations. Frequent violations of the Ohio Cold Water Habitat (CWH) standard for phenolics occured. The Warm Water Habitat Standard (WWH) for phenolics was occasionally violated. Single WWH violations for total lead, total mercury, and nitrogen ammonia have also been recorded. Since there are no known dischargers in Ohio upstream from the Ohio EPA sampling location (RM 6.4), the violations are assumed to be from nonpoint sources, or from point and/or nonpoint sources in Pennsylvania.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

GRAND RIVER BASIN

ASHTABULA RIVER SUBBASIN (F-3)

SUBBASIN SUMMARY

Land use in the Ashtabula River Subbasin is primarily rural. The only significant population center is the city of Ashtabula located near the river's mouth. An estimated 10.8 stream miles in this subbasin had major physical/chemical problems. Major water quality problems were confined to the river mainstem (RM 6.0 to 0.0). The upper reaches of the Ashtabula River were relatively pollution free (OEPA, NEDO data, 1977-1980; USGS 1978, 1980), except for infrequent total iron, total lead and phenolics violations. The source of this contamination was undocumented, but nonpoint sources were suspected.

The physical/chemical water quality of Hubbard Run (tributary to the Ashtabula River at RM 5.1), Red Brook, and Indian Creek (tributaries to Lake Erie), which are near the city of Ashtabula, have been degraded by individual septic systems (OEPA, NEDO data, 1975, and Ashtabula Health Department sampling). Effluent from these septic systems will be diverted from these streams to a new facility recently approved, though not yet constructed. This is expected to eliminate the bacteria, ammonia, and dissolved oxygen problems in these segments.

Samples collected by the Ohio EPA, U.S. EPA, and the USGS indicated degraded physical/chemical water quality in the Ashtabula River Estuary. Discharges which contributed to water quality problems in this river segment include combined sewer overflows and industrial discharges to Fields Brook and Strong Brook. Sediments analyzed by the U.S. EPA in 1979 confirm water quality problems involving high concentrations of total zinc, total lead, total mercury, oil and grease, various organic contaminants and PCB's. Despite these water quality problems, the estuary of the Ashtabula River is an important spawning area for many important Lake Erie fishes. Local sport fishermen and the U.S. Coast Guard report salmonid migrations and large numbers of white bass in this segment.

SEGMENT REPORTS

ASHTABULA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
F-3-2 MAJOR	Ashtabula River Between the Ashtabula City Limits	WWH 6.0-1.7

This segment of the Ashtabula River violated WQS for total lead, total iron, total mercury and phenolics (OEPA, NEDO data, 1977-1980). The only known point sources affecting this segment were small package plants which discharge treated sanitary wastes. These wastes are not thought to contain any of the compounds listed, therefore, the source of these violations was presummed to be nonpoint.

STRONG BROOK
ASHTABULA RIVER TRIBUTARY
CONFLUENCE AT RM 1.8

Segment Problem	Name Description	Use Designation Mile Points
F-3-1 MINOR	Strong Brook From the headwaters to the Ashtabula River	WWH 1.4-0.0

Samples collected from Strong Brook revealed water quality violations for phenolics, total iron, total zinc and fecal coliform bacteria (OEPA, NEDO data, 1977, 1979). There were occasional reports of oil and organic odors as well, but these reports were not documented. Investigation by the Ohio EPA concluded that the sources of these violations probably were accidental spills and/or unauthorized discharges through floor drains into Ashtabula's storm sewers in the area of Benefit Avenue. Roller Reinforced Plastics Company was found to be one source of organic contamination in this area. Conrail and Rockwell International were determined to be contributing to the oil problem. The discharge from all of these facilities has since been eliminated. Although no data have been collected to document the findings, visual inspections by Ohio EPA personnel indicated ongoing sewage pollution problems.

FIELD'S BROOK
ASHTABULA RIVER TRIBUTARY
CONFLUENCE AT RM 1.7

Segment Problem	Name Description	Use designation Mile Points
F-3-3 MAJOR	Fields Brook From Cook Road to the Ashtabula River	WWH 3.4-0.0

Field's Brook will not meet 1983 water quality goals. However, significant progress has been made by the individual dischargers to Fields Brook since the early seventies. All of the major industries in this area have at least Best Practical Technology (BPT) treatment facilities for conventional pollutants. These facilities include: SCM Corp., Olin Corp., General Tire and Rubber CO., G & W Natural Resources, R.M.I. Co., Diamond Shamrock and IMC. IMC no longer discharges to Fields Brook and Olin Corp. has recently ceased operation due to economic conditions. General observations by Ohio EPA, NEDO staff and area industrial personnel indicate that pollution tollerent fish may have returned to parts of Fields Brook where they were previously absent.

During summer months, the combined discharge of the previously mentioned facilities comprise almost the entire flow of Fields Brook. This situation makes the task of meeting water quality standards economically impossible. The Fields Brook Subcommittee, formed from the 208 Public Advisory Committee, submitted a proposal with justifications to Ohio EPA requesting an increase in

the total dissolved solids (TDS) stream standard. Based upon economic analysis of treatment alternatives and an assessment of aquatic communities, a revision of the stream water quality standard for TDS has been granted. The stream beneficial use designation will remain warm water habitat. The current standard for TDS of 1500 ug/l has been increased to 3500 ug/l downstream of S.R. 11 (RM 1.4).

Other parameters occasionally exceeding water quality standards included total lead, total mercury, total iron, phenolics and water temperature. Work is continuing to locate and control the sources of these pollutants. Total mercury violations have decreased in frequency and severity from previous reporting periods (Ohio EPA, NEDO data, 1975-1980). In addition, no violations of the standard for total residual chlorine were detected during the current reporting period. This indicates a significant improvement in the chlorine problems detected during previous compliance monitoring surveys.

A new emphasis on toxics and hazardous materials, and improved laboratory capabilities have increased the concerns regarding chlorinated organics and other "priority" pollutants in this area. Chlorinated organics and several metals (mercury, cadmium, copper, lead and zinc) were found in relatively high concentrations in sediment samples collected from Fields Brook in 1979 (U.S. EPA, Great Lakes National Program Office, 1981). High concentrations of bioaccumulative organic compounds were identified in fish collected from the Ashtabula River near Fields Brook. These fish samples contained the greatest variety of chlorinated organic chemicals compared to fish collected in sixty other watersheds in the United States. The most abundant chemicals detected were hexachlorobutadiene, hexachlorobenzene and octachlorostylene. Polychlorinated biphenols (PCB's) were also detected, but were not found to be present in appreciable concentrations.

Ohio EPA monthly water quality monitoring in Fields Brook at 15th Street (RM 0.3) revealed occasional low levels of many of the previously mentioned organic compounds (carbon tetrachloride, chlorinated ethanes, chlorinated ethylenes and chloroform). Frequently, the concentratins reported were near laboratory minimum detection limits. (Water quality standards have not been established for many of these compounds.) Effulent samples indicated that these contaminants were not from current discharge but were probably the result of release from sediments and leaching from contaminated soils in the area.

The Fields Brook area is currently under study to determine the specific sources of these problem contaminants. "Superfund" monies are available for further study. Abatement measures being considered include dredging and disposal of contaminated sediments, relocation of the stream from contaminated areas, and securing suspected contaminants in chemical disposal facilities.

ASHTABULA RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
34110003-0006		
F-3-4	Ashtabula River	WWH
MAJOR	Ashtabula River Estuary	1.7-0.0

The Ashtabula River Estuary has had water quality violations for total dissolved solids and dissolved oxygen since 1970 (USGS 1970-1979). Since the Ashtabula River has periods of zero flow during most years, any waste water generated within the subbasin comprises the total flow of the river and collects in the estuary. Combined sewer overflows in Ashtabula (RM 6.0 to 0.0) will be eliminated with improvements to the city's sewer system, and should help to improve the dissolved oxygen levels within the estuary. Sediment samples taken from the Ashtabula River below Fields Brook were found to contain high concentrations of oil and grease, total lead and total zinc (USEPA data, 1981). Fish collected in the Ashtabula River were found to contain high concentrations of the known carcinogens polychlorinated styrenes and hexachlorobutadiene.

REFERENCES

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

United States Environmental Protection Agency. 1981. Great Lakes Program Office data. Chicago, Illinois.

United States Environmental Protection Agency. 1979. Environmental Research Laboratory data. Duluth Minnesota.

United States Geological Survey. 1970-1980. Water resources data for Ohio Vol. 2. St. Lawrence River Basin. U.S. Geological Survey Water Data Reports OH-70-2 through OH-79-2. U.S. Geological Survey, Columbus, Ohio.

Woodruff Inc. Consulting Engineers. 1979. Ashtabula Facilities Plan. Cleveland, Ohio.

LAKE ERIE MINOR TRIBUTARIES

(PORTIONS OF BASINS D-3; E-2; F-3)

SUMMARY

Data for the Lake Erie minor tributaries was limited to several grab samples and pollution complaint investigations. A few segments can be identified as water quality problem areas, but an accurate evaluation of many small Lake Erie tributaries is not possible due to insufficient data.

SEGMENT REPORTS

BEAVER CREEK (D-3)

Segment Problem	Name Description	Use Designation Mile Points
D-3-1 MAJOR N/A	Beaver Creek From the Amherst WWTP to the Estuary	WWH 2.2-0.8

Major physical/chemical problems in this segment of Beaver Creek included fecal coliform bacteria, ammonia, MBAS and phenolics (OEPA, NEDO data, 1977). The bacterial, ammonia and MBAS violations were caused by the Amherst WWTP (RM 2.2). The source of the phenolics is unknown. The city of Amherst is under a consent decree to upgrade its facility. The consent decree establishes a compliance schedule for meeting permit limitations. Construction grants monies are not involved with this upgrading

COWLES CREEK (F-3)

Segment Problem	Name Description	Use designation Mile Points
F-3-6 MAJOR N/A	Cowles Creek From the Geneva WWTP to the Estuary	CWH 4.2-0.7

During the summer of 1981 Cowles Creek was the subject of a low level qualitative physical, chemical and biological water quality survey. The objectives of the survey were to: document the impacts that the Geneva WWTP (RM 4.8) has on water quality in Cowles Creek; and determine if the warmwater habitat use designation is appropriate for this stream. The final results of this survey were not available at the time of this writing, but preliminary results confirm earlier Ohio EPA findings in 1975 and 1979 that this discharge does have an adverse effect on physical/chemical water quality and the biological community in Cowles Creek. The final report will identify use attainability and establish specific stream segment physical/chemical water quality standards. This information will eventually lead to a decision on whether or not additional wastewater treatment facilities are needed at the Geneva WWTP.

Scale in miles

10 0 10 20 30

EUCLID CREEK (E-2)

Segment Problem	Name Description	Use Designation Mile Points
E-2-15 MAJOR N/A	Euclid Creek From the West Tributary to the Estuary	WWH 3.1-0.5

Major physical/chemical problems in Euclid Creek included fecal coliform bacteria, phenolics, total lead and total iron (OEPA, NEDO data, 1977-1980). The bacterial violations were probably the result of combined sewer overflows, individual septic systems and/or the Scottish Highlands WWTP (RM 1.4) in Richmond Heights. The remaining violations were probably the result of seepage from a covered waste disposal site at Cleveland Metal Cleaning (RM 2.0). The city of Cleveland's Nottingham Water Filtration Plant (RM 1.8) occasionally released chlorinated backwash water into Euclid Creek. The elevated chlorine levels have caused numerous fish kills. The discharge has been the subject of several complaints as well. The facility is now under orders from the Director of Environmental Protection to eliminate all discharge into Euclid Creek. The city must submit general plans (by September of 1984) for tying into the Cleveland Easterly Sewage Treatment Plant or the Euclid Sanitary Sewer District by May of 1987.

TURKEY CREEK (F-3)

Segment Problem	Name Description	Use Designation Mile Points
F-3-7 MAJOR N/A	Turkey Creek From the Pennsylvania State Line to Lake Erie	CWH 1.3-0.0

Major physical/chemical problems in Turkey Creek included violation of Ohio WQS (CWH) for total iron, total cadmium, total zinc, total lead and phenolics (OEPA, NEDO data, 1977-1980). Only the total iron and total lead concentrations were high enough to violate Ohio's Warmwater Habitat (WWH) WQS. Since there are no point source discharges within this creek, the violations must orginate from nonpoint sources. Turkey Creek supports a successful salmonid stocking program run by The Ohio Department of Natural Resources.

REFERENCES

Ohio Environmental Protection Agency. 1975, 1977-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

WABASH RIVER BASIN (G)

BASIN SUMMARY

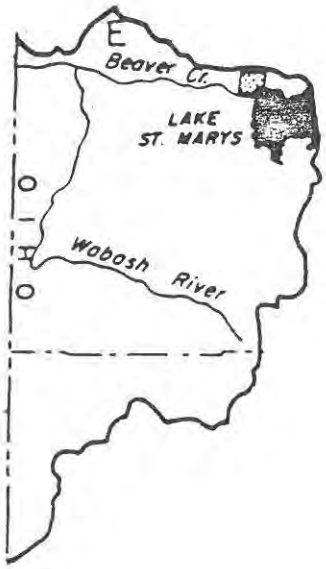
Physical/chemical water quality in the Ohio portion of the Wabash River Basin, with the exception of Beaver Creek, was generally good. Most areas had water quality capable of supporting diverse aquatic communities. The major water quality problem in the Wabash Basin were high nutrient concentrations. Violations of WQS (WWH) for fecal coliforms and total iron were also common.

Nonpoint source pollution was a major contributor to the enrichment of the Wabash River and to the eutrophication of Grand Lake St. Marys. Approximately 96% of the land within the basin is agricultural. This high percentage suggests that agricultural runoff is a significant nonpoint source of pollution. Periodically, large areas of Grand Lake St. Marys have had dense algal growths resulting in high turbidity, discoloration and a decreased, aesthetic value. Algal blooms also reduce water quality for public, industrial and agricultural water supplies. The diurnal fluctuations of dissolved oxygen associated with algal blooms in the lake were detrimental to other forms of aquatic life. The environmental and water quality problems contributing to the rapid eutrophication and degradation of Grand Lake St. Marys can be attributed to: (1) agricultural runoff, (2) shallowness of the lake, (3) periods of low water levels caused by lack of rainfall, (4) poorly constructed and/or maintained private and semi-public sewage systems, (5) large numbers of wild geese and ducks inhabitating the lake and (6) algal blooms.

HARDIN CREEK
BEAVER CREEK TRIBUTARY
CONFLUENCE AT RM 11.4

Segment Problem	Name Description	Use Designation Mile Points
~~G-7~~ NA MAJOR	Hardin Creek From the Coldwater WWTP to Beaver Creek	WWH 4.6-0.0

Hardin Creek was characterized as a low-flow, intermittent stream. During periods of lowest flow, it consists entirely of the effluent from the Coldwater WWTP (RM 4.4) and the cooling water from Pet Inc. (RM 4.6). Data from a previous report (OEPA, 1974) indicated ammonia and dissolved oxygen violations, along with high levels of BOD_5, phosphorous, total kjeldahl nitrogen and nitrates. The village of Coldwater (RM 4.4) is presently working on facility plans which would correct their sewer infiltration problems. It is unlikely that wastewater treatment improvements will be completed before 1983.



Scale in miles

10 0 10 20 30

BEAVER CREEK
WABASH RIVER TRIBUTARY
CONFLUENCE AT RM 2.7

Segment Problem	Name Description	Use Designation Mile Points
G-6- MAJOR 05120101-012	Beaver Creek From the Grand Lake St. Marys' Reservoir to the Wabash River	WWH 13.0-0.0

Beaver Creek had severe water quality problems. It was a low gradient, channelized stream with poor macroinvertebrate habitat diversity (OEPA, 1974). The substrate was mucky due to the sedimentation of solids discharged by the Celina WWTP (RM 12.7). These factors resulted in an extremely low assimilative capacity in Beaver Creek. Both Grand Lake St. Marys and Hardin Creek discharge to Beaver Creek at RM 13.0 and RM 11.4, respectively. There was rarely a flow contribution from the lake during dry periods of the summer.

There was no dilution of the Celina WWTP effluent during dry weather conditions. Beaver Creek experienced very high levels of nutrients and low levels of dissolved oxygen throughout its entire length during these periods. Ohio EPA wasteload allocation (WLAR) studies have indicated that the present permit for the Celina WWTP was not stringent enough to enable water quality standards to be met in Beaver Creek. Ammonia standard violations occurred downstream from the Celina WWTP to the confluence with the Wabash River. Dissolved oxygen WQS violations also occurred with a minimum D.O. concentration of less than 0.1 mg/l at the sag point (OEPA, 1978).

WABASH RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
G-1-1 NONE 05120101-011	Wabash River From the headwaters to four stream miles above Fort Recovery	WWH 41.7-20.0

Land use adjacent to segments G-1 and G-2 was entirely agricultural. There were no significant point sources of pollution within these segments, indicating that any water quality degradation was due to nonpoint sources (OEPA, 1974). There is little water quality information available for these segments.

Segment Problem	Name Description	Use Designation Mile Points
G-3- MINOR 05120101-011	Wabash River From 4 miles above Fort Recovery to the confluence with Toti Creek	WWH 20.0-13.7

Hartwig Poultry Farm (RM 20.0) discharges effluent with very high ammonia BOD_5 and suspended solids levels. Fort Recovery Industries (RM 16.0) has frequent permit violations for free cyanide, hexavalent chromium, total zinc, BOD_5, suspended solids, and oil and grease. The Schmitt Fur Farms (RM 18.0) presently discharges essentially untreated waste to the Wabash River. The farm plans to treat this waste by using spray irrigation techniques by 1983.

Segment Problem	Name Description	Use Designation Mile Points
G-4- NONE 05120101-011	Wabash River From the confluence with Toti Creek to the Beaver Creek confluence	WWH 13.7-2.7
G-5- MAJOR 05120101-010	Wabash River From the Beaver Creek confluence to the Ohio-Indiana Border	WWH 2.7-0.0

Water quality in the Wabash River declines downstream from Beaver Creek (RM 2.7) because of increased nutrient and suspended solids loading (OEPA, NWDO data, 1976b). The appearance of the river changes dramatically as it becomes more turbid, more sluggish and wider. The river bottom material becomes softer, and there are very few riffles. Water quality standard violations for dissolved oxygen occur at the Ohio State Line (OEPA, NWDO data, 1974-1977).

MISSISSINEWA RIVER
WABASH RIVER TRIBUTARY
CONFLUENCE IN INDIANA

Segment Problem	Name Description	Use Designation Mile Points
G-2 NONE 05120103-008	Mississinewa River From the headwaters to the Ohio State Line	WWH 31.4-0.0

COLDWATER CREEK
TO GRAND LAKE ST. MARY'S

Segment Problem	Name Description	Use Designation Mile Points
G-8 NA MINOR	Coldwater Creek From the headwaters to Grand Lake St. Marys	WWH 8.7-0.0

Coldwater Creek is characterized as a low-flow stream. During periods of lowest flow, it consists almost entirely of the wastewater from St. Henry's WWTP (located at the headwaters of Coldwater Creek at RM 8.7) and the cooling water from Avco New Idea (RM 4.8). Data from a previous report (OEPA, 1974)

indicated ammonia and dissolved oxygen WQS violations, along with high levels of suspended solids, BOD_5, phosphorus and nitrates. Ohio EPA wasteload allocation studies indicate that the present permit for the St. Henry WWTP is not stringent enough to enable Ohio WQS to be met in Coldwater Creek (OEPA, NWDO, 1978). Consequently, the village of St. Henry is planning to upgrade its facilities by changing its operation from contact stabilization to extended aeration, doubling the flow capacity, adding flow equalization at the head of the plant, and adding intermittent filtration at the end of the plant. With the high degree of treatment that is proposed, the St. Henry's WWTP effluent could meet the 1983 goals.

REFERENCES

Ohio Environmental Protection Agency. 1974-80 (unpublished). Data from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1974. State of Ohio-Wabash River (draft) waste load allocation report for the 303(e) continuing planning process for water quality management. Ohio EPA, Northwest District Office, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1976a (unpublished). Draft 305(b) report from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1976b (unpublished). Biological investigation field notes available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1978. Wabash River Basin waste load allocation report. Ohio EPA, Columbus, Ohio 31 pp.

GREAT MIAMI RIVER BASIN

UPPER GREAT MIAMI RIVER SUBBASIN (H-1)
AND
LORAMIE CREEK SUBBASIN (H-2)

SUBBASIN SUMMARY

The Upper Great Miami River was monitored at only one station during the reporting period. Prior to February 1980, the monitoring station was located at U.S. 33 (RM 156.5). In February, the station was moved to S.R. 274 (RM 153.5; STORET Station No. 610100) so that monitoring would include the effects of the combined sewer overflow from two seperate outlets from Indian Lake and the discharge from the Russells Point WWTP. The physical/chemical water quality at the S.R. 33 station was generally good except for several Warmwater Habitat WQS violations standards for fecal coliform bacteria and total iron. In contrast, physical/chemical water quality at the S.R. 274 station was relatively poor with WQS violations for dissolved oxygen, total iron, fecal coliforms and ammonia nitrogen.

Physical/chemical water quality in the Loramie Creek Subbasin was generally good. Some metals violations (total iron and total lead) and elevated nutrient concentrations were detected.

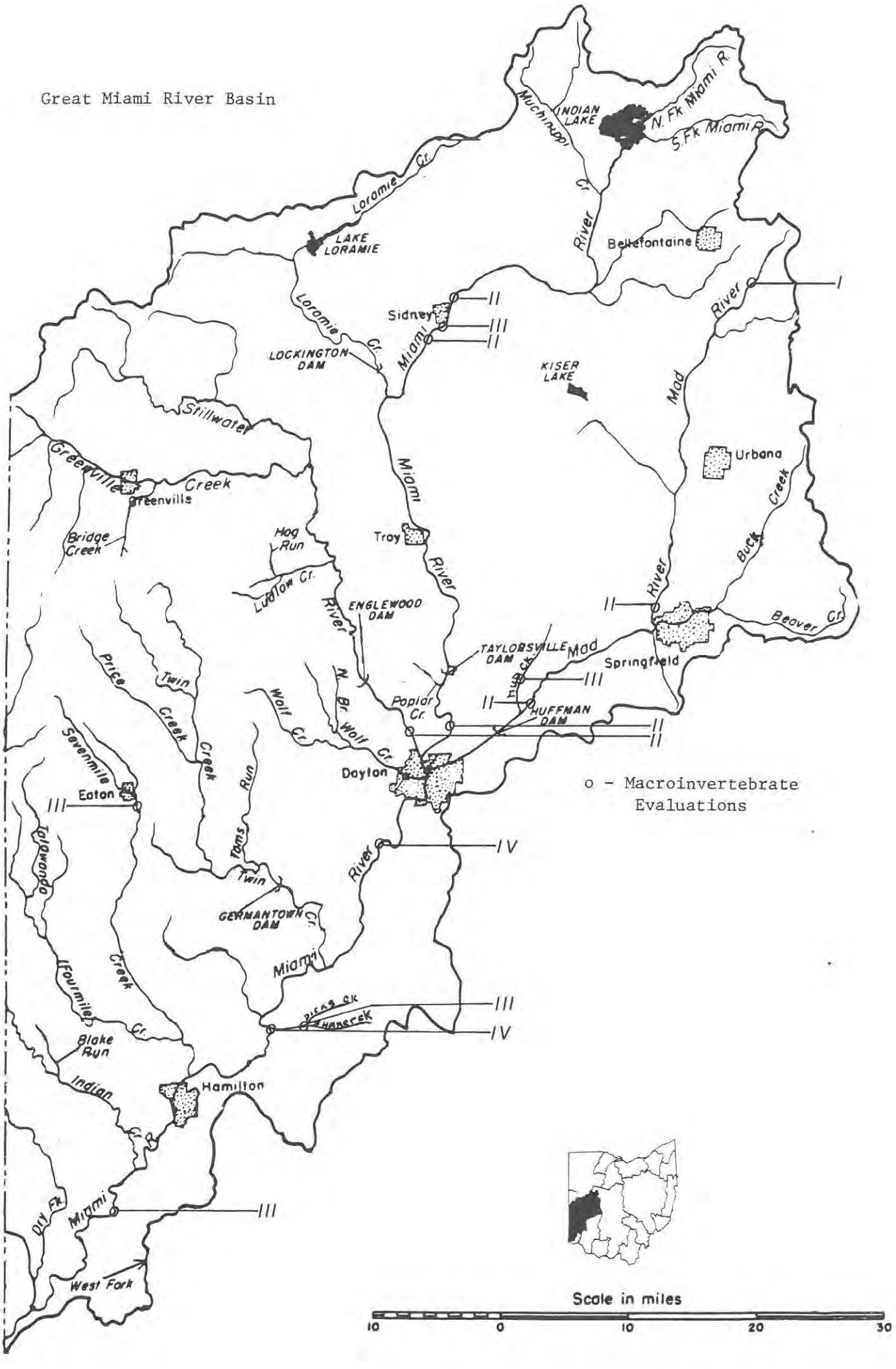
Bokengehalas Creek contributed high concentrations of total copper, total lead, total zinc, total nickel, total cadmium, and total chromium to the Great Miami River at RM 143.3. The most significant source of this pollution is the Bellefontaine WWTP which discharges to Possum Run (RM 0.5). Water quality standards violations for total lead and total nickel occurred in July, 1979, immediately downstream from the plant.

The Upper Great Miami River is receiving relatively high concentrations of ammonia nitrogen and total phosphorous from the Sidney WWTP (RM 126.3). Over the past several years water quality standards violations for ammonia nitrogen and fecal coliform have occurred immediately downstream from this plant (OEPA, SWDO Monthly Operating Report Data).

BIOLOGICAL EVALUATIONS

No recent data are available for the subbasin. Previous biological monitoring in the subbasin was conducted in October, 1974, at benthic stations on the Great Miami River at Sidney in Shelby County. Four stations were established at river miles 130.4, 130.0, 127.7 and 126.2, to determine what impacts the Sidney WWTP (RM 128.7) and Water Treatment Plants (RM 130.2) had on water quality. A summary of the data can be found in Table . The tabulated data can be found in RD 3.

The upstream station (RM 130.4) was found to have a diverse benthic community, as evidenced by the presence of 28 taxa and a diversity index of 3.89. The river at this station was considered to have Class II (Good) water quality. The station located immediately downstream from the water treatment plant at river mile 130.0 also exhibited Class II (Good) water quality, which indicated that this discharge had no measurable deleterious effect. The classification


Great Miami River Basin
Muchinippi
INDIAN LAKE
N. Fk Miami R.
S. Fk Miami R.
Loramie Cr.
LAKE LORAMIE
River
Bellefontaine
I
Sidney
II
III
II
Loramie Cr.
Miami
LOCKINGTON DAM
KISER LAKE
Mad
River
Stillwater
Urbana
Greenville Cr.
Greenville
Creek
Bridge Creek
Hog Run
Troy
Miami
River
Buck Creek
Ludlow Cr.
ENGLEWOOD DAM
II
River
Beaver Cr.
TAYLORSVILLE DAM
Mad
Springfield
Hub Crk.
III
Poplar Cr.
II
HUFFMAN DAM
II
II
Price Creek
Twin Creek
Wolf Cr.
N. Br. Wolf Cr.
Dayton
Sevenmile Cr.
Eaton
III
Toms Run
Twin
River
IV
Miami
GERMANTOWN DAM
Fourmile Creek
DICKS CK
HONEY CK
III
IV
Blake Run
Indian Cr.
Hamilton
Miami
III
Dut Fk.
West Fork
o - Macroinvertebrate Evaluations
Scale in miles
10
0
10
20
30

of the stream at river mile 127.7, located about one mile downstream from the WWTP, declined to a Class III (Fair) condition. This deterioriation was noted by a reduction in the number of mayfly and caddisfly taxa and by a slight decrease in the diversity index (3.20) and number of taxa (26) colonizing the artificial substrate samplers. The substrate was apparently degraded in this segment because no organisms were collected in the qualitative sample. The station located at river mile 126.2 reflected Class II (Good) water quality as demonstrated by the increase in pollution sensitive forms (mayflies, caddisflies and stoneflies) and a rise in the diversity index (3.33).

The Sidney WWTP had a deleterious effect on the water quality of the Great Miami River, as determined by the benthic biota. The stream apparently recovered from this effect less than 2.5 miles downstream.

Table III-8: Summary of Benthic Data Collected from the Great Miami River Relative to the Sidney Wastewater Treatment Plant (WWTP) and Water Treatment Plant (WTP) Discharges, October 1977[a]

	Station (RM)			
	130.4	130.0	127.7	126.2
Number of Samplers	5	5	5	5
Quantitative Taxa	28	32	26	26
Qualitative Taxa	13	12	0	10
Organisms/Ft^2	302	117	228	435
Index ($\bar{d}$)	3.89	3.97	3.20	3.33
Evaluation (Class)	II	II	III	II

(a) The Sidney WWTP discharge is located at RM 128.7. The Sidney WTP is located at RM 130.2.

GREAT MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-1-1 MAJOR	Great Miami River From Indian Lake to the confluence of Muchnippi Creek	WWH 156.7-151.6

05050001-033

High nitrogen and phosphorus loading from the Indian Lake area have caused occasional algal blooms which deplete oxygen levels below 5.0 mg/l (OEPA, SWDO data, 1977-1980). Agricultural runoff and faulty septic tanks are causes of the high nutrients levels. There are plans to construct a sewer system in the Indian Lake area, but it is not known whether the completion of this project will sufficiently reduce the nutrient levels to prevent, or lessen, the occurrence of algal blooms. Total iron and fecal coliform bacteria levels occasionally violate current WQS. Natural background conditions and nonpoint sources are probably the largest contributors of iron. Discharge of treated and untreated effluent from the Russells Point WWTP results in sludge deposits three fourths of a mile downstream at S.R. 235 (RM 154.3).

LORAMIE CREEK
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 117.0

Segment Problem	Name Description	Use Designation Mile Points
H-2-1 MAJOR	Loramie Creek From Hardin Road to the Great Miami River	WWH 1.7-0.0

05050001-03

In approximately 80% of all samples taken in this segment, the water quality standard for total iron has been violated. Natural background levels and nonpoint source pollution cause the elevated iron concentrations. One total lead violation was recorded in October of 1978 (Ohio EPA, SWDO data, 1977-1980).

Water quality is expected to improve in the distant future when wastewater treatment facilities currently planned (step 2 of the construction grant process) for the Indian Lake area and Russells Point are completed. Completion of these facilities will greatly improve water quality in the area and should be given high priority.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

GREAT MIAMI RIVER BASIN

UPPER MAD RIVER SUBBASIN (H-3)

SUBBASIN SUMMARY

There is one monthly monitoring station (RM 28.7; STORET Station No. 610040) in this subbasin and water quality at this point is generally excellent. The Ohio Department of Natural Resources has successfully stocked the Upper Mad River with fingerling rainbow and brown trout since the 1930's, thus supporting the Use Designation classification of this segment as Coldwater Habitat. Suspended solids are usually very low, with only minimal increases occurring during elevated flow periods.

BIOLOGICAL EVALUATIONS

Recent biological monitoring in the subbasin consisted of one fixed station (NASQAN) sample collected in October, 1979, from the Mad River at Eagle City in Clark County (RM 30.6). The sample consisted of 41 taxa with a diversity index of 3.65 (RD 3). The benthic composition was represented by diverse, numerically well balanced taxa including 6 taxa of mayflies, 1 stonefly taxon, 6 taxa of caddisflies and 15 taxa of midges. No one taxon dominated, but oligochaetes and the midge taxa comprised 81 percent of all organims collected. An evaluation of Class I (Excellent) water quality was indicated by all macrobenthos criteria.

Previous sampling in the subbasin was conducted on the Mad River in August, 1976, at a station located near West Liberty in Logan County (RM 54.9). Forty taxa with a diversity index of 2.92 were collected (Ohio EPA, 1980, RD 3-12). The benthic community was represented by 6 taxa of mayflies, 7 taxa of caddisflies, and 12 taxa of midges. The overall community appeared healthy and diverse and indicated Class II (Good) water quality.

SEGMENT REPORTS

MAD RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-3-1 NONE	Mad River From the headwaters to the confluence of Buck Creek	CWH 60.2 to 25.5

05080001-011 05080001-008 05080001-009 05080001-007 05080001-006 05080001-002

Data from this segment indicated one WQS violation for total lead and total iron, and a small number of fecal coliform bacterial violations (OEPA, SWDO data). The total lead violation exceeded the water quality standard by only 1 ug/l. Nutrient levels in this segment are generally low, with phosphorus removal by the Urbana WWTP (RM 38.3) possibly contributing the the low levels. Monthly operating reports submitted to the OEPA by the Urbana WWTP have indicated that relatively high concentrations of metals (total cadmium, total chromium, total copper, total lead, total nickel and total zinc) have been present in the effluent discharged into the Mad River. The Mad River is a cold water habitat stream in this segment and it is not known what effect the effluent has on water quality.

Past heavy metals problems (total cadmium, total chromium, total copper, total lead, total nickel and total zinc) in Dugan's Run at RM 0.4 were relieved by the recent connection of the ITE Imperial Company (Gould Inc.) to the Urbana WWTP in Janurary of 1979.

The city of West Liberty's WWTP (RM 55.1) continued to discharge lime sludge to the Mad River. This discharge has resulted in several citizen complaints regarding the deposition of lime sludge in the stream bed. Although the discharge and presence of this sludge in the stream is aesthetically unpleasing and is a violation of the facilities permit and water quality standards, it seems to have no readily apparent toxic effects. The stream bed is severely affected for a distance of about 15-100 meters and slight lime deposits are noticeable as far as one mile downstream from the outfall at RM 50.3.

BUCK CREEK
MAD RIVER TRIBUTARY
CONFLUENCE AT RM 25.5

Segment Problem	Name Description	Use Desingation Mile Points
H-3-2 MAJOR	Buck Creek From the Beaver Creek confluence to the Mad River	WWH 6.0-0.0

05080001-003

During the 1979 and 1980 water years, seven WQS violations occurred in this segment . Four violations were for excessive levels of fecal coliforms, two for total iron, and one for a slightly high total lead concentration (OEPA, SWDO data, 1978-1980). The high fecal coliform levels were probably caused by nonpoint sources and by combined sewer overflows in this area. The total iron standard violations probably resulted from natural background (i.e., groundwater infiltration) and nonpoint sources. The single total lead violation was only 1 ug/l higher than the WWH standard.

Since existing data are not sufficient to adequately assess the impact of the Urbana WWTP effluent on this segment of the Mad River, this would be a important location to perform a biological and water quality survey in the near future.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Bienial Water Quality Report - 305(b). Document 3. Biological Tables.

GREAT MIAMI RIVER BASIN

MIDDLE GREAT MIAMI RIVER SUBBASIN

AND LOWER MAD RIVER SUBBASIN (H-4, H-5)

SUBBASIN SUMMARY

There was one monthly ambient monitoring station on the Great Miami River in this segment located just below Taylorsville Dam (STORET Station No. 610050; RM 90.7).

Water quality in the Mad River below Springfield (RM 25.4 to 0.0) began to deteriorate due to numerous industrial and municipal point sources, combined sewer overflows, and urban runoff. Monthly monitoring reports from the Springfield WWTP (RM 24.7) showed frequent WQS violations for fecal coliform bacteria at the confluence of the Mad River and Buck Creek (RM 25.4) and downstream from the Springfield WWTP at Old Mill Road (RM 23.1). The reports also showed several ammonia violations at the same monitoring locations on the Mad River. Combined sewer overflows and municipal point source discharges were the most likely causes of the WQS violations. Pollution loadings in some of the lower Mad River tributaries will be reduced by the Southwest Regional Clark County WWTP (RM 12.9) which is expected to begin operation in Janurary of 1982. This project will eliminate many smaller plants (Park Layne, Green Meadows No. 1 and No. 2) which are currently overloaded.

BIOLOGICAL EVALUATIONS

No recent data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of three sets of benthic samples collected from two locations. The samples were collected between August, 1974, and August, 1977, from the Mad River and a tributary, Mud Creek.

The Mad River was sampled in August, 1977, and October, 1976, at a station located near Dayton in Greene County (RM 9.9). Thirty-one taxa were collected in 1977 with a diversity index of 3.48, and 20 taxa were collected in 1976 with a diversity index of 2.95 (Ohio EPA, 1980, RD 3-12 and RD 3-13). In 1977, the benthic community was composed of seven taxa of mayflies and caddisflies and ten taxa of midges. An evaluation of Class II (Good) water quality was made based on all macrobenthos criteria. In 1976, the benthic community was composed of six taxa of mayflies and caddisflies and eight taxa of midges. An evaluation of Class III (Fair) water quality was based primarily on the low number of taxa. The increase in the number of taxa collected and the overall healthy and diverse appearance of the community in 1977 seemed to indicate that an improvement in water quality had occurred.

Mud Creek was sampled in August, 1974, at a station located near I-70 in Montgomery County (RM 1.4). The sample consisted of 23 taxa with a diversity index of 2.49 (Ohio EPA, 1980, RD 3-14). Five taxa of mayflies and caddisflies were collected, but oligochaetes and 12 taxa of midges dominated the sample numerically, accounting for 96 percent of the individuals collected. An evaluatin of Class III (Fair) water quality was indicated based on all macrobenthic criteria.

GREAT MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-5-1 MAJOR	Great Miami River From Piqua to Troy	WWH 112-105

Water quality monitoring at Peterson Road (STORET Station No. 600090, RM 110.3) was discontinued after December, 1978. This was a low flow station located just downstream from the Piqua WWTP (RM 111.9). The plant is currently in the Construction Grant Program for upgrading, but no changes are expected prior to 1983. Water quality is expected to remain unchanged in this segment until the improvements are completed.

Segment Problem	Name Description	Use Designation Mile Points
H-5-2 MAJOR	Great Miami River From Tipp City to the Ohio Surburban WWTP	WWH 95.0-86.0

Results from monthly ambient water quality monitoring data (OEPA, SWDO data 1978-1980) and the Great Miami River Intensive Survey (OEPA, data 1980) showed total iron concentrations frequently exceed Warmwater Habitat (WWH) standards in this segment. The source of this metal is probably natural background and nonpoint source pollution. Fecal coliform standard violations will continue to occur in this segment due to the proximity of the Vandalia WWTP (RM 92.4). Plans are currently being developed to abandon this plant by tying into the proposed Miami Conservency District North Regional WWTP (RM 85.3). This project will also include diversion of the sewage from Huber Heights and Tipp City. Completion will not occur before 1983.

MAD RIVER
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 80.6

Segment Problem	Name Description	Use Designation Mile Points
H-4-4 MAJOR	Mad River From the Fairborn WWTP to Eastwood Park	WWH 9.0-0.0

The area drained by this segment consists of agricultural, residential and military land usage. A large portion of the the watershed of the Mad River is occupied by the Wright Patterson Air Force Base. Nonpoint source pollution such as urban runoff, natural background levels, and the point source of the Fairborn WWTP (RM 9.2) were the main contributing factors in numerous violations of the warmwater habitat standards for total iron and fecal coliform bacteria. Monitoring station on this segment was just downstream from the Huffman Dam (RM 5.8) at S.R. 444 (Storet Station No. 600190). No improvements in water quality were expected prior to 1983.

RECOMMENDATION

A biological and water quality survey should be conducted on the lower Mad River between Springfield and Dayton to assess what impact the Springfield WWTP and the new Southwest Regional Clark County WWTP have on biological condition and physical/chemical water quality in this segment.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

GREAT MIAMI RIVER BASIN

STILLWATER RIVER SUBBASIN (H-6, H-7)

SUBBASIN SUMMARY

The Stillwater River Subbasin was monitored at two sampling stations. One station was a quarterly site on Greenville Creek near Covington (RM 1.5; STORET Station No. 600060), and the other, a monthly ambient monitoring site located on the Stillwater River at Englewood Dam (RM 8.9; STORET Station No. 600110) (sampling began in October, 1978). Overall physical/chemical water quality in the Stillwater River upstream from Dayton was relatively good with a few water quality violations resulting from natural background, nonpoint sources and municipal wastewater discharges.

BIOLOGICAL EVALUATIONS

No recent data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic samples collected in July, 1977, and September, 1976, from one station on the Stillwater River at Dayton in Montgomery County (RM 1.9). Twenty-three taxa with a diversity index of 3.27 were collected in 1977, and 29 taxa with a diversity index of 3.33 were collected in 1976 (RD 3-15 and 3-16). Both samples consisted of thriving communities of mayflies, caddisflies, and midges with no one predominant group. Evaluations of Class II (Good) water quality were given to each sample based on the benthic composition and diversity index. However, the low number of taxa collected in 1977 made a Class II evaluation marginal and indicated the possibility of some degradation occurring.

SEGMENT REPORTS

GREENVILLE CREEK
STILLWATER RIVER TRIBUTARY
CONFLUENCE AT RM 32.2

Segment Problem	Name Description	Use Designation Mile Points
H-7-1 MINOR	Greenville Creek From Gettysburg to the Stillwater River	WWH 10.0-0.0

05080001-051

The area drained by this segment is primarily agricultural and physical/chemical water quality was generally good. Water quality data from the quarterly monitoring site, on Greenville Creek near Covington, showed one WQS violation for total lead. The violation was only 2 ug/l over the warmwater habitat standard and, therefore, was not considered to be a significant problem. WQS violations for total iron and fecal coliform bacteria were also recorded in this stream segment during the reporting period. The source of the pollutants is not known, but is thought to be the result of natural background levels or nonpoint sources. This segment is not expected to meet the 1983 goals due to the nonpoint source problems.

STILLWATER RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-6-1 MAJOR	Stillwater River From Martindale Road to the Englewood Dam	WWH 11.4-9.0

The monthly monitoring station in this segment is located at Englewood Dam (U.S. 40; RM 8.9; Storet Station No. 600110). Physical/chemical water quality in this segment was relatively good, with the exception of occasional WQS violations for total iron and fecal coliform bacteria. Sixty-seven percent of the samples collected in this segment were in violation of the standard for total iron. The source of the pollutant is thought to be natural background and nonpoint sources. The fecal coliform standards violations which occurred during the 1979 and 1980 water years are thought to have resulted from the Union WWTP (RM 1.6) discharge, and nonpoint sources. The segment is not expected to meet 1983 goals.

BRUSH CREEK
LUDLOW CREEK TRIBUTARY
CONFLUENCE AT RM 2.5

Segment Problem	Name Description	Use designation Mile Points
H-6-2 MAJOR	Brush Creek From the headwaters to Ludlow Creek	WWH 8.0-0.0

Water quality in Brush Creek has been severely degraded as a result of the discharge from the K&S Circuits Plant (RM 7.3, S.R. 49) in Phillipsburg. Total copper concentrations as high as 125,000 ug/l (monthly operation reports) have been discharged to Brush Creek via a storm sewer. A low level survey conducted by the Ohio EPA in the spring and summer of 1979 indicated obvious signs of biological damage and sediment contamination for at least 5.0 miles downstream (OEPA, SWDO data, 1979). Litigation against K&S Circuits is still in progress. Occasional discharges from the plant are still being detected, and little improvement has occurred. Significant improvements in water quality are not expected until this discharge is completely eliminated.

In addition to the problems caused by the K&S Circuits discharge, septic tank discharge and other nonpoint source pollution problems degrade water quality in this segment significantly enough to prevent attainment of the 1983 goals.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmenmtal Portection Agency. 1979. Water Quality Survey Report: An Evaluation of K&S Circuits Effluent and its Impact on Brush Creek. Ohio EPA, Division of Wastewater Pollution Control, Surveillance and Water Quality Standards Group.

GREAT MIAMI RIVER BASIN

TWIN CREEK SUBBASIN (H-8)

SUBBASIN SUMMARY

Physical/chemical water quality in the Twin Creek Subbasin was generally good, and the 1983 goals are expected to be met. However, heavy metal (total zinc and iron) pollution of undetermined origin will keep this stream from attaining Exceptional Warmwater Habitat (EWH) standards. Fecal coliform bacteria and phenolics violations were also noted in this subbasin. This subbasin is still largely rural, with agricultural runoff being a major source of nutrients. Point sources consist of small, secondary sewage treatment, plants such as Lewisburg WWTP (RM 32.4), West Alexandria WWTP (RM 24.6), and and Gratis WWTP (RM 17.7). There are no known point source dischargers of heavy metals.

SEGMENT REPORTS

TWIN CREEK
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 56.5

Segment Problem	Name Description	Use Designation Mile Points
H-8-1	Twin Creek	EWH
NONE	From the Bantas Fork confluence to the Great Miami River	22.3-0.0

In August, 1977, the Germantown WWTP (RM 6.2) was abandoned and sewage was diverted to the Franklin WWTP (Great Miami River; RM 58.5). The water quality for Twin Creek at Dayton-Oxford Road (RM 0.8) improved after this date. However, there have been EWH standards violations for metals (total iron and total zinc) and for phenolics (OEPA, SWDO data, 1978-1980). Fecal coliform bacteria and total iron WQS violations most likely result from nonpoint sources.

Twin Creek, from Bantas Fork (RM 22.3) to the mouth, is not expected meet EWH standards because of continued total zinc violations. However, Twin Creek should meet the 1983 goals.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

GREAT MIAMI RIVER BASIN (LOWER PART OF MIDDLE PORTION) (H-9)

SUBBASIN SUMMARY

An intensive physical, chemical, and biological survey of the Great Miami River from the Taylorsville Dam (RM 92.6) to the mouth (RM 0.0) was conducted during June - October, 1980. A comprehensive water quailty report (CWQR), which includes the results of the 1980 survey, wasteload allocation, and recommendations for water quality standards and NPDES permits should be available in the fall of 1982. Overall chemical/physical water quality in this part of the Great Miami River ranges from fair to poor. Water quality is fair upstream from the Dayton WWTP (RM 75.2), with occasional WQS violations resulting from the Ohio Suburban WWTP (RM 86.2) and urban runoff via the Dayton storm sewer system (RM 76.0 to RM 84.0). There are numerous municipal and industrial (paper, steel, manfacturing, RTC) discharges downstream from the Dayton WWTP. These discharges result in the most severe water quality degradation of any segment in the entire Great Miami Basin. Most of the degradation can be attributed to the Dayton WWTP (RM 75.2) which accounts for the majority of BOD_5 and ammonia loadings in the basin. The Dicks Creek (RM 47.6) is severely degraded as a result of persistent (zinc and cadmium) and non-persistent (ammonia, phenolics, cyanide) toxic substances discharged from the Armco-Middletown Steel Works (RM 3.0 to RM 5.0).

BIOLOGICAL EVALUATIONS

Recent biological monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in November, 1979, from the Great Miami River at Dayton in Montgomery County (RM 87.1). The sample consisted of 22 taxa with a diversity index of 1.97 (RD 3). Six taxa of mayflies, one stonefly taxon, and three taxa of caddisflies were collected. The sample was dominated by ten taxa of midges comprising 75 percent of the sample by numbers. Oligochaetes were also present in moderately high numbers at the site indicating that some organic enrichment was occurring. An evaluation of Class III (Fair) water quality was given based on the number of taxa, the diversity index, and, to some extent, the benthic composition. The November collection of the sample may have accounted for the presence of the more pollution sensitive taxa not expected to be found at a site dominated by midges and oligochaetes. Not enough is known about the potential effect of seasonal variation on the benthic community and, subsequently, the validity of the values of the criteria used to make the evaluation.

Previous sampling at this location was conducted in October, 1978; July, 1977; and September, 1976 (Ohio EPA, 1980, RD 3-4, 3-5, and 3-6). Evaluations of Class III (Fair) water quality were indicated for all years by the benthic composition, the number of taxa, and the diversity index. The station continued to be influenced by inflows of organic matter as reflected by the large numbers of midges and oligochaetes and occasional large numbers of hydropsychid caddisflies (particularly in 1976). Data from all three years were quite similar to the current 1979 data indicating little or no improvement in water quality.

A fixed station located on the Great Miami River at Miamisburg in Montgomery County (RM 67.7) was also sampled previously in the subbasin. Three sets of benthic data were collected, including a west bank station in July, 1977, and an east bank and west bank station in September, 1976 (Ohio EPA, 1980, RD 3-7 and 3-8). Evaluations of Class IV (Poor) water quality were indicated by each set of data. The benthic communities were characterized by low numbers of taxa, low diversity indices, and poor compositions, being dominated by midges and oligochaetes.

Dick's Creek, a tributary to the Great Miami River, was sampled at three stations near Middletown in August, 1975 and 1974, to determine the impact of five Armco Steel Corporation discharges. In 1974, these stations were located at river miles 5.0, 3.9, and 2.4. In 1975, the station at river mile 2.4 was replaced by a station at river mile 0.9. The five Armco Steel discharges were located at river miles 4.8, 3.9, 3.5, 2.7, and 2.5. A summary of the data can be found in Tables III-9 and III-10. The tabulated data can be found in RD 3-2 and RD 3-3 (Ohio EPA, 1980).

In 1974, sampling at the station at river mile 5.0 produced only 17 taxa and a low diversity index (1.94). The sample was devoid of pollution sensitive organisms which demonstrated that the water quality was Class IV (Poor). In 1975, this same station exhibited Class III (Fair) water quality, as determined by the presence of six taxa of mayflies and caddisflies, a diversity index of 3.21, and a total of 21 taxa. In both 1974 and 1975, the water quality at river mile 3.9 was found to be severely degraded. The numbers of taxa for 1974 and 1975 were six and two, respectively, and the diversity index for 1975 was 0.009, one of the lowest ever encountered by this work unit. In 1974, there was an inadequate number of individuals to calculate the diversity index. The 1974 station at river mile 2.4 and the 1975 station at river mile 0.9 showed similar results in diversity (0.37 and 0.36) and number of taxa (7 and 4). Both stations reflected Class IV (Poor) water quality.

The water quality of Dick's Creek, as determined by the benthic biota, was fair to poor above Armco Steel Corporation. However, the water quality underwent further degradation below the Armco discharges.

Water quality improvements should result from the addition of a clarifier and filtration unit on the 001 outfall of Armco-Middletown Works (RM 50.6) and the addition of a trickling filter to Crystal Tissue's wastewater treatment system (RM 47.0). However, the Miller Brewing Company is constructing a brewery which will discharge at river mile 42.6. The additional organic loading from this discharge may result in more frequent dissolved oxygen violations.

Parameters that will continue to violate WQS include dissolved oxygen, fecal coliforms, phenolics, total iron and total lead.

Table III-9: Summary of Benthic Data Collected from Dick's Creek Relative to the Armco Steel Corporation Discharges, August, 1975[a].

	Station (RM)		
	5.0	3.9	0.9
Number of Samplers	5	5	5
Quantitative Taxa	21	2	4
Qualitative Taxa	9	2	3
Organisms/Ft^2	111	34	68
Index ($\bar{d}$)	3.21	0.009	0.36
Evaluation (Class)	III	IV	IV

(a) The Armco Steel discharges are located at RM's 4.8, 3.9, 3.5, 2.7, and 2.5.

Table III-10: Summary of Benthic Data Collected from Dick's Creek Relative to the Armco Steel Corporation Discharges, August, 1974[a].

	Station (RM)		
	5.0	3.9	2.4
Number of Samplers	5	4	5
Quantitative Taxa	17	6	7
Qualitative Taxa	6	0	0
Organisms/Ft^2	65	3	59
Index ($\bar{d}$)	1.94	(b)	0.37
Evaluation (Class)	IV	IV	IV

(a) The Armco Steel discharges are located at RM's 4.8, 3.9, 3.5, 2.7, and 2.5.
(b) Inadequate number of individuals to calculate d.

SEGMENT REPORTS

GREAT MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Mile Points
H-9-1	Great Miami River From the Ohio Surburban WWTP to the Dayton WWTP	89.0 - 76.0

N/A

The areas drained by this segment are both rural and urban. The physical/chemical water quality in this segment was fair, with the main water quality problem resulting from the Ohio Suburban WWTP (RM 86.2). Urban runoff from the Dayton storm sewer network may also have been a substantial problem. WQS violations were noted for ammonia-N, fecal coliforms, and phenolics, iron, copper, lead, and zinc (OEPA, SWDO data, 1979-1980). Data from the U.S. Geological Survey (USGS continuous monitor in Dayton at RM 78.0) indicated that daily minimum dissolved oxygen concentrations were below the 5.0 mg/l 10% of the days the third quarter 1979 and 0% of the days during the same period of 1980 (USGS, 1979, 1980).

The Miami Conservancy District's North Regional WWTP (RM 86.2) is planned to replace the Ohio Suburban WWTP (RM 86.2) as well as the Vandalia (RM 92.4) and Tipp City WWTP's (RM 96.5)) which should result in reduced organic loadings. This project is entering Step II in the construcion grant process and is not expected to be completed until after 1982. Therefore, this segment will not meet 1983 goals.

Segment Problem	Name Description	Miles Points
H-9-2 MAJOR	Great Miami River From the Dayton WWTP to Franklin	76.0 - 60.0

N/A

Land-use within this segment is predominately urban. Water quality was severely degraded as a result of numerous municipal and industrial dischargers. Major municipal dischargers include the Dayton WWTP (RM 75.2) Montgomery County Western Regional WWTP (RM 71.0), Moraine WWTP, West Carrollton WWTP (RM 67.7), and Miamisburg WWTP (RM 65.1). Major industrial dischargers include the Glatfelter Paper Company (RM 71.4), Miami Paper Company (RM 68.7), Dayton Power and Light - Tait Station (RM 76.6), and Dayton Power and Light - Hutchings Station (RM 63.5). The high density of dischargers in this segment resulted in the poorest water quality of any segment in the Great Miami Basin. The majority of this degradation can be attributed to the Dayton WWTP which discharges 66% of the BOD_5 and 73% of the ammonia loading between Dayton and the mouth (RM 91.0 to 0.0)(Dayton WWTP, monthly operating reports - third quarter, 1980) WQS violations were noted for ammonia, fecal coliforms, phenolics, total iron, total lead, and total copper (OEPA, SWDO data, 1979-1980). Data from the USGS continuous monitor at Miamisburg (STORET Station No. 03271510; RM 66.4) indicated a severe dissolved oxygen problem in the past. During summer months, the daily maximum recorded D.O. value was frequently below 5.0 mg/l (USGS, 1977-1978). However, higher than normal flows during 1979-1980 reduced the number of violations to 5% of

the days during the third quarter 1979, and 11% of the days for the same period in 1980.

Water quality improvements were expected to occur in this segment in September, 1979, with the opening of the Montgomery County Western Regional WWTP (RM 71.0). The Montgomery County Plant, which provides tertiary treatment, replaced the Moraine WWTP (RM 72.8) which was severely overloaded and in deteriorated condition. The Dayton WWTP (RM 75.2) has applied for a Step III Grant to upgrade their treatment works to improve the existing secondary facilities. These planned improvements will not be completed prior to 1983. The abandonment of the Moraine WWTP may have resulted in a slight improvement in physical/chemical water quality with fewer dissolved oxygen, ammonia, and fecal coliform bacteria violations.

However, the wastewater treatment improvements cited above are insufficient, with respect to meeting 1983 goals. Until the Dayton WWTP is upgraded, water qualty in this segment will remain severely degraded. Parameters that will continue to violate water quality standards as a result of point sources include; ammonia, dissolved oxygen, temperature, fecal coliforms, and phenolics. Total iron and total lead WQS violations will continue to occur as a result of nonpoint sources.

GREAT MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-9-3 MAJOR	Great Miami River From Franklin to Hamilton	60.0-36.0

The area drained by this segment is both urban and rural. Major municipal dischargers include the Franklin Regional (RM 58.5), Middletown (RM 47.4), and LeSourdsville Regional (44.3) WWTP's. Major industrial dischargers include the Armco-Middletown Works (RM 50.6) and Crystal Tissue (RM 47.1). The Middletown WWTP contributes the majority of the loading of BOD_5, ammonia, and suspended solids. This discharge accounted for 12% of the BOD_5 loading for the entire survey area (Dayton to the mouth) during the third quarter in 1980. Data from the USGS continuous water quality monitor at Rockdale (RM 43.7) indicated that no dissolved oxygen violations (5mg/l) were noted during the third quarter of 1979 or 1980. This may be due to both improved water quality, and the above normal flows that occurred during the past two years.

BIOLOGICAL EVALUATIONS

DICKS CREEK
GREAT MIAMMI RIVER TRIBUTARY
CONFLUENCE AT RM 46.7

Segment Problem	Name Description	Use Designation Mile Points
H-9-4 MAJOR	Dicks Creek From the Armco Steel outfalls to the Great Miami River	WWH 6.0-0.0

N/A

This stream drains urban and rural areas surrounding the communities of Middletown and Monroe. Although the Monroe WWTP (RM 0.9 on Millers Creek) discharge results in localized degradation of Millers Creek (confluence at RM 4.1), the main water quality problem in Dicks Creek is due to the four outfalls from the Armco-Middletown Works (RM 5.0 to 3.0). These discharges resulted in WQS violations for total cyanide, phenolics, ammonia, total iron, total cadmium and total zinc (OEPA, SWDO data, 1977-1980).

Partial flow from the Monroe WWTP has been diverted to the LeSourdville Regional WWTP (RM 44.5), Final construction, eliminating all of the flow from the Monroe Plant should be completed in January, 1982. This is expected to eliminate localized degradation and reduce the number of point source related fecal coliform bacterial violations. Armco steel has upgrading wastewater treatment systems, as required in their compliance schedule. This should result in an overall improvement in water quality. However, spills in the coking area of the plant result in high levels of ammonia, phenolics and cyanide discharged at outfall 002 (cooling water outfall; RM 2.8). The combined effects of these point source discharges, nonpoint sources, and little natural dilution will prevent Dicks Creek from meeting 1983 goals. Ohio WQS for total cyanide, phenolics, ammonia, fecal coliforms, total iron and total zinc will continue to be exceeded.

Four MCD-USGS and one ORSANCO four-parameter (D.O., Temp, pH, Cond.) continuous water quality monitors are located within the biological and water quality survey study area. From upstream to downstream, these monitors are located: near Stewart Street in Dayton (RM 77.6); near Linden Avenue in Miamisburg (RM 67.0); near Rockdale north of Hamilton (RM 44.7); at New Baltimore south of Hamilton (RM 21.4), and at Lost Bridge near Elizabethtown (RM 5.6). Third quarter (July-September) dissolved oxygen, temperature, and flow data were analyzed for the past ten years to determine if water quality had changed. An attempt was made to determine if the improvements noted were due to actual improvements in wastewater treatment or to annual variations in the flow regime. The percentage of days that dissolved oxygen and temperature violations occurred (4.0 mg/l for dissolved oxygen and 31^{0}C for temperature) was noted and recorded in Table ___. These values are also displayed graphicaly with the mean third quarter flow for each station and year in figures ___ through ___. The results of the analyses from each monitoring station are summarized below.

Stewart Street in Dayton (RM 77.6) - This station is located upstream from the Dayton WWTP in a segment with few point source discharges. The graph comparing the number of temperature and dissolved oxygen violations to the mean third quarter flow (Fig. ___) indicates that the number of violations are inversely related to the flow. The lowest mean flows in 1971 and 1977 coincide with the highest percent dissolved oxygen violations. The occurence of D.O. concentrations less than 4 mng/l in this segment are likely due to diel fluctuations caused by algal respriatin and photosynthesis. Algal densities would be expected to be highest during low flow years. This effect is present at all stations, but should be emphasized here because it is more attributable to background nonpoint enrichment rather than depletion by point source BOD loads. It appears that water quality has not changed in the past ten years.

Linden Avenue in Miamisburg (RM 67.0) - This station is located downstream from Dayton where the the largest BOD_5 and ammonia loading of any segment in the study area occurred. Historically, this has been the most severely

RESERVED FOR TABLE

degraded area of the river. The number of dissolved oxygen violations (Fig. ___) once again appears to be inversely related to the flow. These data, in addition to increases in pollutant loading from upstream, indicate that water quality in this part of the river has not changed in the past 10 years. Apparent improvements noted in 1979-80 were probably only due to increased flow, since total BOD load to river has actually increased during this period. When flows return to the low levels measured in 1971 and 1977, the frequency of violations is likely to reach 80-90%.

Rockdale Upstream from Hamilton (RM 44.7) - This station is located downstream fom the Middletown area. This segment receives the second largest BOD_5 load in the study area. The number of dissolved oxygen violations again appears to be inversely related to the flow, although the 1977 low flow period resulted in only 27% violations, as compared to 86% in 1971-72. The BOD loading to this segment will be increasing in late 1981 with the opening of the Miller Brewery Plant at RM 43.5.

New Baltimore Downstream from Hamilton (RM 21.4) - This station is located downstream from the Hamilton area. The dissolved oxygen violations (Fig. ___) appear to be inversely related to the mean third quarter flow. Although some data from this station appear to indicate water quality improvement, most of the improvement can be attributed to increases in flow. Because of reduced loading in this area, it will be an important area to study in future low flow years to determine if water quality has improved.

Lost Bridge (RM 5.6) - This station is located near the mouth of the Great Miami River, and is operated by the Ohio River Sanitation Commission (ORSANCO). Data from this monitor was limited in the number of days values were recorded. Few violations were noted (Figs. ____).

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

United States Geological Survey. 1977. Water resources data for Ohio, water year 1977, Vol. 1. Ohio River Basin. Water Data Report OH-77-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1978. Water resources data for Ohio, water year 1978, Vol. 1. Ohio River Basin. Water Data Report OH-78-1. U.S. Geological Survey, Columbus, Ohio.

GREAT MIAMI RIVER BASIN

FOUR MILE CREEK SUBBASIN (H-10)

SUBBASIN SUMMARY

Physical/chemical water quality in this subbasin ranges from excellent to poor. An estimated 15.0 of the 21.4 stream miles evaluated in this subbasin are known to have major physical/chemical problems. Municipal wastewater treatment plants (WWTPs), package plants and agricultural runoff have major effects on water quality.

BIOLOGICAL EVALUATIONS

No recent data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic samples collected in July, 1977, and August, 1975, from one station on Sevenmile Creek below Eaton in Preble County (RM 23.2). Eighteen taxa with a diversity index of 2.88 were collected in 1977, and 21 taxa with a diversity index of 3.48 were collected in 1975 (Ohio EPA, 1980 RD 3-17 and 3-18). Both samples were dominated by midge taxa with few or no taxa of mayflies and caddisflies present. Evaluations of Class III (Fair) water quality were given to each sample based on all macronvertebrate criteria. In 1977, the low number of taxa collected along with the lack of caddisfly taxa and poor representation of mayfly taxa indicated that the Class III evaluation was marginal.

SEGMENT REPORTS

FOUR MILE CREEK
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 37.5

Segment Problem	Name Description	Use Designation Mile Points
H-10-1 NONE	Four Mile Creek From the Acton Lake Dam to the Oxford WWTP	WWH 19.8-15.0

The Ohio EPA does not routinely monitor water quality in the main stem of this segment. However, a stream survey was conducted during the summer of 1981. The final report is expected to be vailable during the summer of 1982.

The Square "D" company discharge (RM 1.8) containing chromium, copper, zinc and cyanide plating waste resulted in localized degradation of Elams Run, which is a tributary to Four Mile Creek at RM 18.8. Improved treatment of this waste has improved the water quality in Elams Run. This discharge does not appear to affect Four Mile Creek (OEPA, SWDO data, 1980).

Agricultural runoff contributes to moderate nutrient levels in this segment. Water quality may be degraded during low flow periods, because the Acton Lake Dam (RM 21.4) retains flow that would provide natural dilution.

SEVEN MILE CREEK
FOUR MILE CREEK TRIBUTARY
CONFLUENCE AT RM 3.7

Segment Problem	Name Description	Use Designation Mile Points
H-10-3 MAJOR	Seven Mile Creek From the Eaton WWTP to the Beasley Run confluence	WWH 24.6-15.5

05080002-#29
05080002-029

Physical/chemical water quality in this segment is poor due to ineffective sewage treatment at the Eaton WWTP (RM 24.0). A 1975 survey of Seven Mile Creek indicated that significant degradation occurred downstream from the Eaton WWTP discharge to S.R. 127 (RM 23.0) (OEPA, SWDO data, 1975). The survey results indicated WQS violations for fecal coliforms and ammonia. The city of Eaton (RM 25.4-24.4) has received a Step III Construction Grant for upgrading its WWTP to tertiary treatment (rapid sand filters and nitrification). This plant expansion and upgrading should be completed by early 1982. The improved wastewater treatment should result in the attainment of 1983 goals in this segment of Seven Mile Creek.

SEVEN MILE CREEK
FOUR MILE CREEK TRIBUTARY
CONFLUENCE AT RM 3.7

Segment Problem	Name Description	Use Designation Mile Points
H-10-2 NONE	Seven Mile Creek From the Big Cave Run confluence to Four Mile Creek	EWH 8.3-0.0

05080002-025

Physical/chemical water quality in this segment is generally good. Several isolated WQS violations of EWH for total cadmium, total lead, total cyanide, phenolics and fecal coliform bacteria have been recorded at Taylor School Road (RM 1.3; STORET Station No. 600340)(OEPA, SWDO data, 1978-1980). The total cadmium violation was 8 ug/l, a violation of EWH but not WWH standards. Most of this segment drains agricultural and rural areas, and these violations are most likely the result of nonpoint source pollution.

FOUR MILE CREEK
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 37.5

Segment Problem	Name Description	Use Designation Mile Points
H-10-4 MAJOR	Four Mile Creek From the Oxford WWTP to the Great Miami River	WWH 15.0-0.0

05080002-031

Physical/chemical water quality in this segment is generally good, however, localized problems in Oxford (RM 16.3) and New Miami (RM 0.5-0.0) will keep this segment from attaining 1983 goals. Water quality data for Four Mile

Creek at Jacksonburg Road (RM 0.4; STORET Station NO. 600260) indicated WQS violations for fecal coliforms, total iron, and total lead (OEPA, SWDO data, 1977-1980). The Cherokee Park WWTP (RM 0.5) in New Miami was the probable source of the fecal coliform bacterial violations. Upgrading of this plant will not occur before 1983.

The metals violations (total iron and total lead) were thoughht to be the result of nonpoint sources, as there are no known industrial dischargers of these parameters in this subbasin.

Water quality data for the upper portion of this segment are lacking, but problems occur as a result of the Oxford WWTP. During low flow periods, the WWTP discharge can result in depressed levels of dissolved oxygen and high concentrations of ammonia in Four Mile Creek. Upgrading of this plant will not occur before 1983.

This segment is not expected to meet the 1983 goals because of fecal coliform total lead, total iron and ammonia violations.

REFERENCES

Ohio Environmental Protection Agency. 1975, 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

GREAT MIAMI RIVER BASIN

LOWER GREAT MIAMI RIVER SUBBASIN (H-11)

SUBBASIN SUMMARY

A chemical/physical and biological survey of the Great Miami River from Dayton to the mouth (RM 92.0 to 0.0) was conducted during June - October 1980. A comprehensive water quality report (CWQR), which includes the results of the 1980 survey, waste load allocation, and recommendations for water quality standards and NPDES Permits should be available in the fall of 1982. Overall physical/chemical water quality in this portion of the Great Miami River Basin ranges from exceptional to poor. The water quality in the Great Miami River from Hamilton to the mouth is poor due to industrial, municipal and nonpoint source discharges. However, improvements in wastewater treatment at both industrial and municipal sources are resulting in an overall improvement in water quality. This improvement should continue with time. Physical/chemical water quality in the Indian Creek Subbasin and the Whitewater River is exceptional.

BIOLOGICAL EVALUATIONS

No recent data are available for the subbasin. Previous sampling in the subbasin consisted of two sets of benthic data collected from one NASQAN fixed station. The samples were collected in July, 1977, and September, 1976, from the Great Miami River at New Baltimore in Hamilton County (RM 22.1). Twenty taxa with a diversity index of 2.47 were collected in 1977, and 15 taxa with a diversity index of 2.51 were collected in 1976 (Ohio EPA, 1980 RD 3-9 and 3-10). Evaluations of Class III (Fair) water quality were made for each data set. The benthic community in 1976 consisted of abnormally large numbers of caddisflies and midges with three mayfly taxa present. The low number of taxa made the Class III evaluation marginal at best. In 1977, the community improved to some degree with a definite reduction in the density of the organisms and an increase in the number of taxa. However, since no mayfly taxa were present, the Class III evaluation was retained.

SEGMENT REPORT

GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 27.0

Segment Problem	Name Description	Use Designation Mile Points
H-11-1 NONE	Indian Creek From the Indiana/Ohio State Border to the Great Miami River	EWH 22.9-0.0

05080002-034

The area drained by this segment is mainly rural. Physical/chemical water quality in this subbasin over the past two years has been exceptional. Standards applied to this subbasin are more stringent than 1983 goals. During the past four years, the only violations of Exceptional Warmwater Habitat (EWH) water quality standards were for fecal coliform bacteria and phenolics (OEPA, SWDO data, 1977-1980). The source of these violations has not been determined. These minor violations do not interfere with 1983 goals.

A small number of minor, point sources discharge into Indian Creek. No improvements or changes are expected to occur before 1983.

WHITEWATER RIVER
GREAT MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 6.0

Segment Problem	Name Description	Use Designation Mile Points
H-11-2 NONE	Whitewater River From the Indiana/Ohio State Line to the Great Miami River	WWH 6.0-0.0

Physical/chemical water quality in this segment has been exceptional, with only three violation of water quality standards noted during the past two years (OEPA, SWDO data, 1978-1980). The violations were for fecal coliform bacteria (2) and total iron. The fecal coliform bacterial violations could be from the Harrison WWTP (8.0) or from nonpoint sources. The total iron violation is most likely the result of nonpoint source runoff.

GREAT MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
H-11-3 MAJOR	Great Miami River From Black Street Bridge to the Hamilton WWTP	36.2-33.0

Physical/chemical water quality in this segment is poor. The major point source discharger is the Armco - New Miami Works near Hamilton (RM ___). Water quality standards violations have been noted for phenolics, total cyanide, total iron, total lead and fecal coliforms (OEPA, SWDO data, 1977-1979). In mid-1979, Armco installed a biological treatment system to treat coke oven wastes. This system has reduced the overall loading of phenolics, cyanide, and ammonia to this segment resulting in an improvement in water quality.

Nonpoint sources, such as urban and agricultural runoff, are the most likely cause of lead, iron, and fecal coliform bacterial violations. Upstream municipal discharges, such as Middletown WWTP (RM 47.4), also contribute to fecal coliform loadings.

Although considerable improvements are expected, this segment is not expected to meet 1983 goals. Parameters that will continue to result in WQS violations include phenolics, total iron, total lead, and fecal coliforms.

Segment Problem	Name Description	Use Designation Mile Points
H-11-4 MAJOR N/A	Great Miami River From the Fairfield WWTP to the Gulf Oil Refinery	31.0-8.5

The drainage area of this segment is both urban and rural. Dischargers in this segment include the Hamilton (RM 33.2) and Fairfield (RM 31.0) WWTP's and the Department of Energy Feed Materials Production Center (RM 23.9). Data for this segment were collected by the OEPA (SWDO data, 1979-1980) and USGS at New Baltimore (STORET Station No. 600030; RM 20.8). Physical/chemical water quality in this segment is classified as poor, with WQS violations noted for ammonia-N, fecal coliforms, phenolics, cyanide, total iron, total lead, total copper, and total zinc. Municipal discharges are the most probable cause of the ammonia and fecal coliform bacterial violations. The data from the USGS continuous monitor indicates that the daily, minimum dissolved oxygen concentrations were below the 5.0 mg/l standard 2% of the days during the third quarter of 1979, and 0% of the days for the same period of 1980 (USGS, 1979, 1980).

Nonpoint runoff and/or natural background conditions are the most likely source of the total iron violations. A large number of total lead violations, one as high as 66 ug/l, have been noted by USGS at the New Baltimore station (USGS, 1979, 1980). However, OEPA detected no total lead violations in the 18 samples collected at the same site during the 1980 Great Miami River Survey. There is no known source of lead within this segment.

The Hamilton WWTP has undergone expansion in order to provide secondary treatment of the Champion Paper Company's 10 mgd industrial wastewater discharge, as well as to upgrade the treatment of municipal waste. This improvement has resulted in a significant reduction in the BOD_5 and suspended solids loading to the Great Miami River.

Although improvements in water quality are expected, this segment is not expected to meet 1983 goals. Water quality standards violations will continue to occur for total iron, total lead, fecal coliforms and phenolics.

Segment Problem	Name Description	Use Designation Mile Points
H-11-5 MAJOR N/A	Great Miami River From the Gulf Oil Refinery to the Ohio River	8.5-0.0

The area drained by this segment is mainly rural with isolated industrial development. The only major discharger in this segment is the Gulf Oil Refinery (RM 8.5). Physical/chemical water quality data for this segment were collected by the Ohio River Valley Water Sanitation Commission (1979) and the OEPA (1980). Water quality in this segment is classified as poor, with WQS violations noted for total cyanide, phenolics, fecal coliforms, total copper,

total iron, and total lead. The phenolics violations may be related to the Gulf Oil discharge, although levels do not exceed those found in upstream segments. The other violations are most likely related to upstream dischargers and nonpoint sources, such as agricultural and urban runoff.

No changes are anticipated in the wastewater treatment systems in this segment before 1983. Therefore, this segment is not expected to meet 1983 goals. Problem parameters include fecal coliforms, total iron, total lead and phenolics.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

United States Geological Survey. 1977. Water resources data for Ohio, water year 1977, Vol. 1. Ohio River Basin. Water Data Report OH-77-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1978. Water resources data for Ohio, water year 1978, Vol. 1. Ohio River Basin. Water Data Report OH-78-1. U.S. Geological Survey, Columbus, Ohio.

MILL CREEK BASIN (J)
BASIN SUMMARY

Overall physical/chemical water quality in the Mill Creek Basin ranged from fair to poor. Water quality in the upper segment was fair with WQS violations for dissolved oxygen, fecal coliform bacteria, various metals and phenolics. These violations were believed to have been the result of discharge from package sewage treatment plants and nonpoint sources. Water quality in the lower segment was severely degraded, primarily as a result of the combined sewer overflows of municipal and industrial wastes. Additional sources of pollutants includes urban runoff, and industrial and municipal dischargers.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the basin. Previous sampling was conducted in Mill Creek at Cincinnati in Hamilton County (RM 0.6) in July, 1977. The sample consisted of only three benthic taxa with a diversity index of 0.07 (Ohio EPA, 1980, RD 3-23). Extreme toxic conditions existed at this site. An evaluation of Class IV (Poor) water quality was indicated by all macroinvertebrate criteria.

SEGMENT REPORTS

MILL CREEK MAINSTEM

OHIO RIVER TRIBUTARY
CONFLUENCE AT RM 472.6

Segment Problem	Name Description	Use Designation Mile Points
J-1 Major N/A	Mill Creek From the headwaters to Sharon Rd.	WWH 28.1-16.8

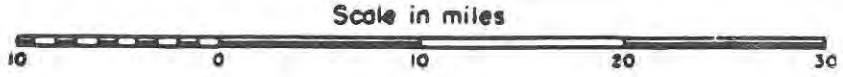
The area drained by this segment is primarily agricultural and residential. Land-use was rapidly being converted to residential housing during 1977-1978, however the recent slowdown in the housing market has reduced this trend. Nonpoint sources of pollution, such as urban and agricultural runoff, were probably contributing factors to the Warmwater Habitat (WWH) violations for total iron and fecal coliforms. Most of the package sewage treatment plants in this area were abandoned in the fall of 1980 with the opening of the Butler County Upper Mill Creek Regional WWTP (RM 1.1; East Fork-Mill Creek). This plant is expected to eliminate localized degradation and reduce the number of fecal coliform bacteria and phenolics violations of Ohio WQS.

Two dissolved oxygen violations were noted at the Sharon Road monitoring station (RM 16.8). The most likely source of these violations was the Glendale WWTP which discharged into an unnamed tributary about one mile from its confluence with Mill Creek (RM 17.0).

Although the overall water quality in this segment is expected to improve, pollutants from nonpoint sources and the natural low flow of the stream will result in this segment not meeting 1983 goals. Ohio WQS that will continue to be violated include total iron, dissolved oxygen and fecal coliforms.

Mill Creek Basin

o - Macroinvertebrate Evaluation



Segment Problem	Name Description	Use Designation Mile Points
J-2 Major	Mill Creek From Sharon Road to the Ohio River	WWH 16.8-0.0

w/A

The lower Mill Creek watershed is entirely urban, consisting of both residential and industrial developments. The stream was severely degraded as a result of combined sewer overflows, urban runoff, and minor industrial discharges (mostly cooling water).

Most of the lower Mill Creek drainage area is served by combined sewers which divert domestic and industrial wastewater to the Ohio River via the Mill Creek WWTP (Ohio River; RM 472.6). However, during storm events, these sewers become overloaded and discharge into Mill Creek. Combined sewer overflow occurrences contributed to WQS violations for dissolved oxygen, fecal coliforms, MBAS, ammonia, total cyanide, phenolics, total chromium, total copper, total iron, and total lead. In accordance with U.S. EPA program requirements, combined sewer overflow studies have been initiated by the Metropolitan Sewer District to determine the most cost effective method of treating the overflows. No overall change in physical/chemical water quality from combined sewers is expected before 1983, despite minor sewer improvements currently under construction.

Urban runoff from the Cincinnati area is the most likely cause of total lead, and oil and grease WQS violations. WQS violations from this source are expected to continue. Discharges from municipal and industrial sources contribute to WQS violations of phenolics, ammonia, oil and grease, and some metals. Proposed actions that are expected to result in improved physical/chemical water quality include:

1. The Formica Corporation (RM 15.3) is evaluating the type of phenolics in their effluent in order to determine appropriate NPDES Permit limitations.
2. Legal action against the Pristine Incineration Facility (RM 14.3) is resulting in a clean up of this hazardous waste storage/treatment site. A complete clean-up will eliminate a significant source of metals and organic compounds.
3. Discharge of ammonia and trichlorobenzene from the Phthalchem Facility (RM 5.8) will be eliminated, but may continue to leach into Mill Creek from fill material.

The overall physical/chemical water quality in the lower Mill Creek segment is not expected to change significantly due to the severity of the combined sewer overflow problem. This segment will not meet 1983 goals. Furthermore, because of the extremely high economic impact of seperating the combined sewers, it is unlikely that this segment will ever meet the 1983 goals.

As recommended in the 1980 305(b) Report to Congress, the monthly monitoring station located at Tylersville Road (STORET Station No. 600440; RM 24.5) was moved downstream to Sharon Road (RM 16.8). This move was made to better assess a larger portion of the headwaters of Mill Creek. The new station is located downstream from the Butler County Upper Mill Creek Regional WWTP which began discharging in the fall of 1980.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

LITTLE MIAMI RIVER BASIN

UPPER LITTLE MIAMI RIVER SUBBASIN (K-1)

BASIN SUMMARY

Overall physical/chemical water quality in the Upper Little Miami River Subbassin ranges from good to excellent. Occasional Warmwater Habitat violations occurred as a result of agricultural runoff. Very few point source dischargers exist within this segment.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobentic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in November, 1979, from the Little Miami River near Oldtown in Green County (RM 80.0). Thirty-two benthic taxa with a diversity index of 3.54 were collected at the station (RD 3).

A well balanced, diverse community existed comprised of 8 taxa of mayflies, 2 taxa of stoneflies, 4 taxa of caddisflies, and 15 taxa of midges. An evaluation of Class II (Good) water quality was indicated by the benthic community, although caution must be used because of the November collection of the sample. Not enough is known about the potential effect of seasonal variation on the benthic community and, subsequently, the validity of the values of the criteria used to make the evaluation.

Previous sampling at this location was conducted in August, 1978, and July, 1977 (Ohio EPA, 1980, RD 3-19 and 3-20). Thirty-two taxa with a diversity index of 3.46 were collected in 1978 and 28 taxa with a diversity index of 3.45 were collected in 1977. Both sites were evaluated as having Class II (Good) water quality and were quite similar in benthic composition to the 1979 sample. No apparent change in water quality had occurred over the three year period.

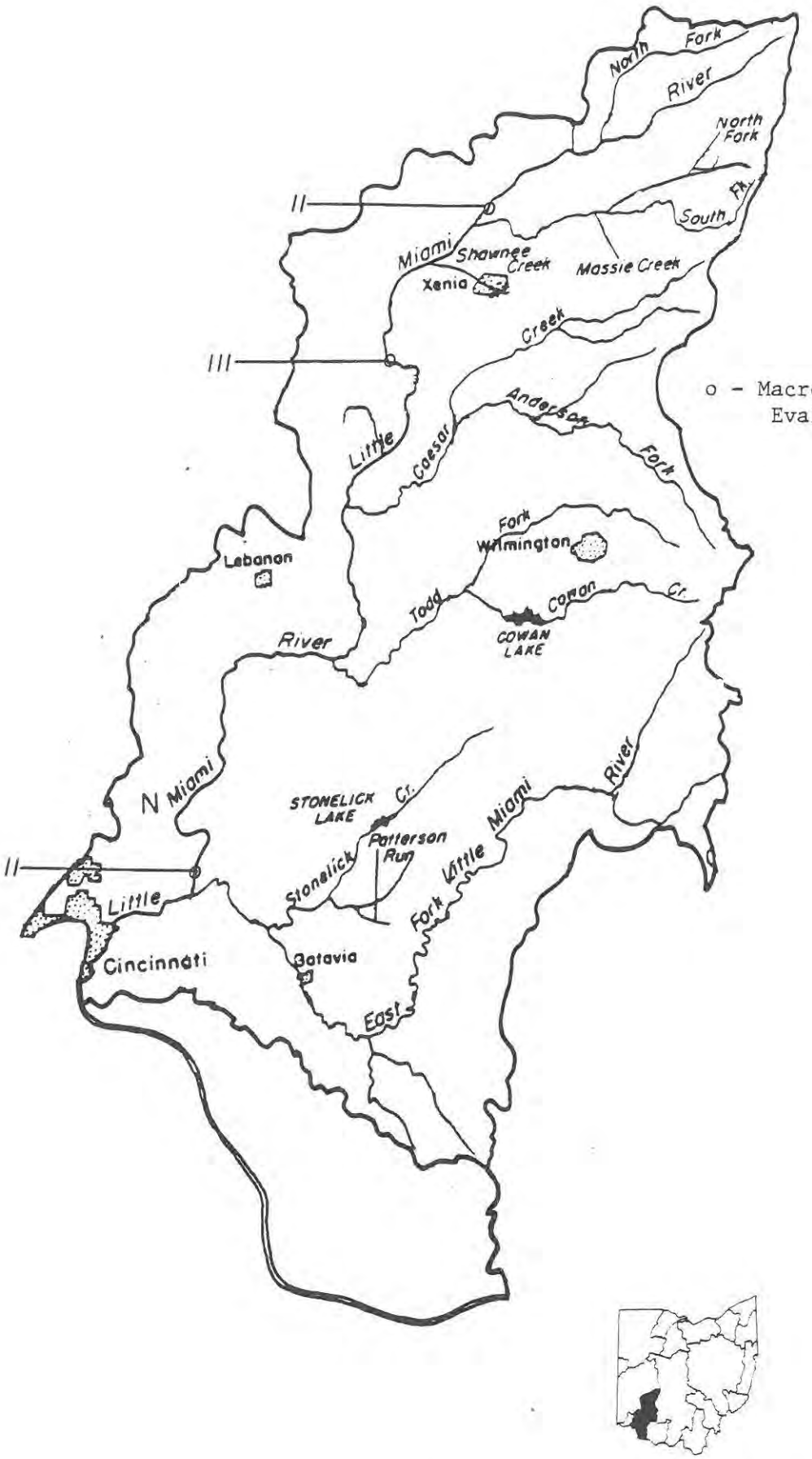
Another site on the Little Miami River at Spring Valley in Greene County (RM 63.4) was sampled in July, 1977 (Ohio EPA, 1980, RD 3-21). Thirty taxa (diversity index 3.87) were collected including 17 taxa of midges that comprised 81 percent of the sample by numbers. There were only two taxa of mayflies and no caddisflies. In spite of the high number of taxa and high diversity index, the benthic composition was degraded to a moderate degree and indicated Class III (Fair) water quality.

SEGMENT REPORTS

LITTLE MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
K-1-1 NONE N/A	Little Miami River From the headwaters to Fairgrounds Road	EWH 105.5-75.4

Little Miami River Basin



o - Macroinvertebrate Evaluation

Scale in miles

10 0 10 20 3

The Upper Little Miami River has been classified as an Exceptional Warmwater Habitat in the Ohio Water Quality Standards. The predominant land use in this subbasin is agricultural. There are a few point source dischargers within the basin, but these dischargers have little effect on water quality (OEPA, SWDO data, 1978-1980).

The physical/chemical water quality of the Little Miami River at U.S. RT 68 (RM 78.2; STORET Station No. 600570) has not changed significantly in the last two years. Fecal coliform bacteria and total iron violations persisted due to nonpoint source runoff. In addition to these violations, occasional violations of the water quality standards for total mercury, total lead and phenolics occurred. The source of the mercury violation has not been determined.

The South Charleston WWTP (RM 1.4) discharges into Gilroy Ditch, a tributary to the Upper Little Miami River. Water quality monitoring has revealed no WWH standards violations in Gilroy Ditch (OEPA, SWDO data, 1979), even though initial wasteload modeling indicated potential, dissolved oxygen (D.O.) and ammonia problems. Preliminary testing revealed high total residual chlorine concentrations in Gilroy Ditch below the WWTP; further study is needed to assess the degree of the problem.

Another area in this segment that should be investigated is Yellow Springs Creek. The Yellow Springs Creek WWTP (RM 0.5) discharges approximately 0.41 million gallons of treated sewage into Yellow Springs Creek each day. Monthly operating reports showed elevated levels of suspended solids, BOD_5, and ammonia during 1979-1980. The plant is currently in step I of the construction grant process. Based upon available data, it appears that this segment presently meets 1983 goals.

MASSIES CREEK
LITTLE MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 77.1

Segment Problem	Name Description	Use Designation Mile Points
K-1-2 MINOR	Massies Creek From the Central State University WWTP to the Little Miami River	WWH 4.5-0.0

Infrequent fecal coliform bacteria violations occurred in Massies Creek at RM 0.2 (STORET Station No. 600560) due to discharge from Central State University's overloaded WWTP (OEPA, SWDO data, 1976-1977). There are sludge deposits on the substrate from the plant's outfall (RM 0.3) to Wilberforce Clifton Road (RM 0.2). The plant was originally designed for an average daily flow of 250,000 gallons and currently receives an estimated 350,000 gpd. The city of Xenia and Greene County have received a Step III Construction Grant for the construction of the Oldtown Creek and Wilberforce Community Interceptor, which will go to the Xenia Ford Road WWTP. The completion of this project will eliminate the Central State University WWTP and most of the individual on-lot disposal systems in this area. The project should improve the water quality of Massies Creek from RM 4.5 to 0.0, as well as the Little Miami River. As of September 30, 1980, the interceptor project had not been completed.

LITTLE MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
K-1-3 MAJOR	Little Miami River From Fairgrounds Road to S.R. 725	WWH 75.4-64.1

This segment is affected by pollutant loading from three major municipal WWTPs, two of which discharge to tributaries. The Xenia Ford Road WWTP is located in the upper reach (RM 74.8) of this segment. Monthly operating reports for 1978-1980 showed that this plant has met interim NPDES Permit limits for total suspended solids and BOD_5.

In 1978, the Ohio EPA discontinued monitoring at the station on Little Beaver Creek at Factory Road (RM 0.1). This station was located below the Montgomery County Eastern Regional WWTP (RM 4.2). Warmwater habitat violations for dissolved oxygen, ammonia, total lead, pH, and phenolics occurred at this station in 1977. A compliance sampling inspection at the Eastern Regional Plant in 1979 showed substantial increases in nutrients and COD in Little Beaver Creek at Grange Hall Road (RM 3.2). The Ohio EPA has also investigated citizen complaints about the presence of sewage sludge in Little Beaver Creek. The Eastern Regional Plan is currently in the Step 1 phase of the Construction Grant Program.

During 1978-1980, Ohio WQS violations for total iron, fecal coliforms, ammonia nitrogen and total lead occurred at the Ohio EPA sampling station on Beaver Creek (RM 0.1; STORET Station No. 600510) (OEPA, SWDO, 1978-1980). The Greene County-Beaver Creek WWTP (RM 0.3) located upstream from this station, probably accounts for most of these violations. The plant has tertiary treatment capability (micro-strainers), but because of maintenance problems, it usually accomplishes only secondary treatment. The plant had a severe infiltration/inflow problem which necessitates frequent bypassing during storm events. The bypassed wastewater significantly degraded physical/chemical water quality in Beaver Creek. They are currently in the Step 1 phase of the Construction Grant Program.

Upstream municipal loading and nonpoint source runoff resulted in WQS violations for fecal coliforms, total lead and total iron at Upper Bellbrook Road (RM 68.2; STORET station No. 610550 (OEPA, SWDO, 1978-80).

Segment Problem	Name Description	Use Designation Mile Points
K-1-4 MAJOR	Little Miami River From S.R. 725 to confluence of Caesar Creek	WWH 64.1-50.2

Water quality in this segment is degraded from upstream loading, as well as from discharges from the Greene County Sugarcreek Regional WWTP (RM 63.1), the Xenia Glady Run WWTP (RM 4.8), and the Waynesville WWTP (RM 52.9). The Greene County Sugarcreek Regional WWTP, which went on-line in October, 1977, eliminated the Montgomery County Sugar Creek Regional WWTP (RM 5.3), the Winterhaven WWTP (RM 2.7), the Bellbrook WWTP (RM 0.25), and the Academy Heights WWTP (RM 0.3). The Greene County Sugarcreek WWTP has tertiary

treatment (Chemical addition; microstrainers, on-line June, 1979) but infiltration and inflow problems during periods of excessive flow caused non-compliance with their NPDES Permit. The U.S. EPA has funded a sewer system evaluation survey for Greene County to correct this problem.

The Xenia Glady Run WWTP was in compliance with its NPDES Permit for the period 1978-1980 for conventional parameters (BOD_5O, suspended solids and fecal coliforms) but frequent problems with total mercury and total lead occurred. In 1979, the city of Xenia initiated a sampling program to identify the sources of the mercury. The results of this study were inconclusive. This problem, fortunately, has subsided to only one permit violation for total mercury in 1980. Monthly operating reports indicated that total lead concentrations are at levels that warrant permit limitations.

Water quality data for the Little Miami River at Roxanna-New Burlington Road (RM 59.4; STORET Station No. 600600) showed Ohio WQS violations for total iron, fecal coliforms and total mercury (Ohio EPA, SWDO data, 1978-1980). The total mercury violation can possibly be attributed to sample or lab contamination. In addition to the Ohio EPA data, the U.S. Geological Survey (USGS) has a four parameter continuous water quality monitoring station at this location. USGS data showed that numerous dissolved oxygen violations occurred here during 1977 and 1978, however, no dissolved oxygen violations were recorded for 1979 and 1980. The absence of dissolved oxygen violations for these two years appeared to be due to increased flows rather than improved water quality (USGS, 1977-1980).

The village of Waynesville WWTP is in the Step 3 phase of the Construction Grant Program for expanding (0.4-0.71 MGD) and upgrading the present facility. Expansion is to include sewering Corwin, Harveysburg, and the Caesar Creek Reservoir Area, and construction of a relief sewer in Waynesville. This should improve overall physical/chemical water quality in this segment by eliminating many faulty on-lot disposal systems. Monthly Operating Reports indicated that the Waynesville WWTP consistently met its permit limitations (Ohio EPA, SWDO 1978-1980).

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report. Reference Document 3. Biological Tables.

United States Geological Survey. 1977. Water resources data for Ohio, water year 1977, Vol. 1. Ohio River Basin. Water Data Report OH-77-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1978. Water resources data for Ohio, water year 1978, Vol. 1. Ohio River Basin. Water Data Report OH-78-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1979. Water resources data for Ohio, water year 1979, Vol. 1. Ohio River Basin. Water Data Report OH-79-1, U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1980. Water resources data for Ohio, water year 1980 Vol. 1. Ohio River Basin. Water Data report OH-80-1. U.S. Geological Survey, Columbus, Ohio.

LITTLE MIAMI RIVER BASIN

CAESAR CREEK SUBBASIN (K-2)

SEGMENT REPORTS

CAESAR CREEK
LITTLE MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 50.1

Segment Problem	Name Description	Use Designation Mile Points
K-2-1 NONE	Caesar Creek Reservoir Dam to the Little Miami River	WWH 3.0-0.0

Physical/chemical water quality in this segment was good, based on data collected at Corwin Road (RM 0.2; STORET Station No. 600550) (OEPA, SWDO data, 1978-1980). Occasional WWH violations for total lead and total mercury occurred at this site. The source of the mercury violation is unknown. The most significant change in the Caesar Creek Subbasin was the completion of the Caesar Creek Reservoir (RM 3.1) in January, 1978. This project has not affected downstream physical/chemical water quality. In 1980, the Army Corps of Engineers installed a 10,000 gpd package plant south of S.R. 73 on the north shore of Caesar Creek Reservoir. This plant received wastewater from ODNR park headquarters and a bathhouse. The plant currently discharges to Caesar Creek Lake, tied into the expanded Waynesville WWTP prior to 1983. The Ohio EPA has not sampled the upper Caesar Creek Basin. The absence of any major point source discharges suggests the headwaters of the Caesar Creek Subbasin may meet 1983 goals.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

LITTLE MIAMI RIVER BASIN

TODD FORK SUBBASIN (K-3)

SUBBASIN SUMMARY

Physical/chemical water quality in the Todd Fork Subbasin remained good. However, localized degradation due to poor wastewater treatment occurred below the Wilmington WWTP on Lytle Creek and below the Blanchester WWTP on Second Creek. Industrial compliance with Wilmington's pretreatment ordinance should improve water quality in Lytle Creek.

SEGMENT REPORTS

TODD FORK
LITTLE MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 38.2

Segment Problem	Name Description	Use Designation Mile Points
K-3-1 NONE	Todd Fork From the confluence of Lytle Creek to the Little Miami River	WWH 18.6-0.0

Physical/chemical water quality in Todd Fork ranged from good to excellent, and the 1983 goals were being met. However, pollutant loading from Lytle Creek prevented this segment of Todd Fork from attaining the more stringent, Exceptional Warmwater Habitat (EWH) standards. Total zinc, and perhaps other heavy metals, occurred at slightly elevated concentrations due to the discharge from the Wilmington WWTP. Wastewater treatment improvements in the city of Wilmington are expected prior to 1983. This improvement should result in EWH Standards being maintained in Todd Fork.

LYTLE CREEK
TODD FORK TRIBUTARY
CONFLUENCE AT RM 38.2

Segment Problem	Name Description	Use Designation Mile Points
K-3-2 MAJOR	Lytle Creek From the Wilmington WWTP to Todd Fork	WWH 7.3-0.0

Water quality problems occurred in this segment because of discharge from the Wilmington WWTP and the concentration of industry in this area. Lytle Creek is severely degraded below the Wilmington WWTP, both chemically and biologically. A special study noted Ohio WQS violations for ammonia, total lead and total zinc below the WWTP discharge (OEPA, SWDO data, 1978). A total zinc violation of the Exceptional Warmwater Habitat standards also occurred at RM 0.2 of Todd Fork during this study. Quantitative benthic samples taken

below the WWTP contained low numbers of taxa and low diversity indices. Industrial users, such as the Randall Company, the Irwin Auger and Bit Company, and the Crysteco Company, are the major contributing sources of the metals. On August 20, 1978, the city of Wilmington implemented an industrial pretreatment ordinance to curb the high levels of metals entering the WWTP and, subsequently, into Lytle Creek. However, frequent permit violations for total lead and total zinc indicated that this program still has problems.

Wilmington also has an infiltration/inflow problem which results in frequent bypassing. U.S. EPA has funded a Sewer System Evaluation Survey for Wilmington. Wilmington is in the Step 1 phase of the Construction Grant Program. Water quality in this segment should meet 1983 goals when all of the industries in the Wilmington area are in compliance with their pretreatment requirements.

SECOND CREEK
TODD FORK TRIBUTARY
CONFLUENCE AT RM 2.8

Segment Problem	Name Description	Use Designation Mile Points
K-3-3 MAJOR	Second Creek From the Blanchester WWTP to Todd Fork	WWH 9.6-0.0

050 90702-017

Local water quality problems occurred in Second Creek below the Blanchester WWTP (RM 9.6). A special study showed that the plant effluent resulted in standards violations for dissolved oxygen, fecal coliforms and total copper at RM 9.4 (OEPA, SWDO data, 1978). Benthic samples taken at this location were dominated by oligochates and chironomids, indicating biological degradation. The Blanchester WWTP will not be incorporating any changes in their treatment processes before 1983.

RECOMMENDATIONS

A special sampling of Todd Fork and Lytle Creek is needed to evaluate improvements made to the Wilmington WWTP and to assess the need for regional monitoring station.

REFERENCES

Ohio Environmental Protection Agency. 1978 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

LITTLE MIAMI RIVER BASIN

EAST FORK OF LITTLE MIAMI RIVER SUBBASIN (K-4)

SEGMENT REPORTS

EAST FORK OF THE LITTLE MIAMI RIVER
LITTLE MIAMI RIVER TRIBUTARY
CONFLUENCE AT RM 11.7

Segment Problem	Name Description	Use Designation Mile Points
K-4-1 MAJOR	East Fork of Little Miami River From I-275 to the Little Miami River	WWH 3.5-0.0

050902C2-002

Physical/chemical water quality in this segment was generally good. Prior to November, 1977, Ohio EPA maintained a monthly monitoring station at I-275 (RM 3.5; STORET Station No. 600590) on the East Fork. Water quality data showed only fecal coliform bacteria violations from July 1977 to November 1977 (OEPA, SWDO data, 1977). The fecal coliform violations were probably the result of nonpoint sources. In February, 1978, the Ohio EPA began sampling at RM 0.8 near Terrace Park (RM 0.8; STORET Station No. 600530) in order to assess the impact of the Milford WWTP (RM 1.6) discharge. Water quality data for the East Fork indicated frequent WQS violations for fecal coliforms and total iron (OEPA, SWDO data, 1978-1980). The Milford WWTP is in the Step 1 phase of the Construction Grant Program.

On July 3, 1979, the Lower East Fork Regional WWTP (RM 5.0) went on-line and eliminated many package plants (Hall Run STP (RM 2.3), Summerside Estates, (RM 2.7), Viking Village, (RM 0.5), Sugar Camp Run (RM 6.7), and the Shayler Run (RM 6.7)). The Lower East Fork Regional WWTP has secondary treatment in the form of rotating biological contactors (RBC's), tertiary treatment via chemical addition (aluminum sulfate for phosphorus removal) and rapid sand filters. Significant operational problems existed at this facility resulting in permit violations for BOD_5, ammonia nitrogen, pH, and total phosphorus. In April 1980, a compliance sampling inspection performed by Ohio EPA showed permit violations for BOD_5 and ammonia nitrogen. Downstream data (I-275) showed increased levels of ammonia nitrogen and TKN but no water quality standards violations. BOD_5 and ammonia nitrogen permit violations were due to poorly functioning RBC units. WQS violations for pH were caused by high dosing rates of aluminum sulfate. The facility is working on solving these problems.

There were several water quality problems in the middle segment of the East Fork of the Little Miami River (RM 12.0 to RM 33.0) The majority of these problems were the result of inadequate sewage treatment at the municipal WWTPs at: Amelia-Batavia (RM 12.8); Batavia (RM 13.4); Bethel (Town Run RM 1.3); and Williamsburg (RM 32.9). All of these plants are in Step 1 of the Construction Grant Program. It is unlikely that water quality will significantly improve in this segment before 1983. The East Fork Reservoir (RM 20.3), also in this segment, was completed in February, 1978. The Bethel

and Williamsburg WWTPs probably affect water quality conditions in the East Fork Reservoir. Further studies should be conducted to assess the degree of degradation in the lower and middle segments of the East Fork of the Little Miami River.

REFERENCES

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

LITTLE MIAMI RIVER BASIN

LOWER LITTLE MIAMI RIVER SUBBASIN (K-5)

SUBBASIN SUMMARY

Physical/chemical water quality in the Lower Little Miami River Subbasin was generally fair. Upstream organic loadings from numerous WWTPs substantially affected water quality in the lower segments. The completion of several pollution abatement projects such as the Lower Little Miami River WWTP, the Obannon WWTP, and the Newtown Interceptor should improve water quality in the Lower Little Miami River.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previously, a NASQAN site on the Little Miami River at Milford in Clermont County (RM 13.3) was sampled in September, 1976 (Ohio EPA, 1980, RD 3-22). Twenty-seven taxa were collected with a diversity index of 2.00. The sample consisted of 5 taxa of mayflies, 6 taxa of caddisflies, and 11 taxa of midges. The predominant organisms at the site were the mayfly Baetis and the caddisfly Symphitopsyche. These two taxa comprised 84 percent of the community by numbers. The unbalanced benthic composition and low diversity index seemed to indicate moderate organic enrichment, and thus, a Class III (Fair) evaluation of water quality.

SEGMENT REPORTS

LITTLE MIAMI RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
K-5-1 NONE	Little Miami River From the Caesar Creek confluence to the Todd Fork confluence	WWH 50.2-38.3

Segment Problem	Name Description	Use Designation Mile Points
K-5-2 NONE	Little Miami River From the Todd Fork confluence to the Muddy Creek confluence	WWH 38.3-33.0

Physical/chemical Segment K-5-1 of the Little Miami River received pollutant loading from upstream, but recovers by this point. Water quality was generally good (OEPA, SWDO data, 1973, 1974). Additional physical/chemical water quality data should be collected in this segment.

Frequent WQS violations for fecal coliforms and total iron have occurred at Stubbs Mills Road (RM 35.7; STORET Station No. 610520) (OEPA, SWDO data, 1978-1980). Fecal coliform violations were most likely due to inadequate sewage treatment (on-lot disposal systems) in Morrow. Also noted at this station were occasional total lead and total mercury violations. These

violations were only slightly higher than WQS and probably did not impair the attainment of 1983 goals.

Also included in this segment is Turtle Creek (confluence RM 33.0). Turtle Creek had several water quality problems. There was severe degradation of Turtle Creek below Lebanon due to the discharge from the Lebanon WWTP (RM 6.0). The substrate of Turtle Creek was covered with sludge for over a mile downstream of the discharge. There have been numerous permit violations for BOD_5 and suspended solids (Monthly Operating Reports, 1978-1980). The plant experienced operation and maintenance problems throughout the reporting period. It is also hydraulically overloaded. This plant was supposed to be abandoned and tied into the proposed Southwest Warren County Regional WWTP upon its completion, but construction now seems unlikely. In addition, Cincinnati Milacron, Inc., discharged process water containing high concentrations of suspended solids, copper and widely fluctuating pH values (Monthly Operating Reports, 1979-1980). Turtle Creek is not expected to meet 1983 goals.

Segment Problem	Name Description	Use Designation Mile Points
K-5-3	Little Miami River	WWH
NONE	From the Muddy Creek confluence to the O'Bannon Creek confluence	33.0-24.1

Physical/chemical water quality in the upper part of this segment is influenced by Muddy Creek. Muddy Creek was severely degraded by the Mason WWTP (RM 3.2). The plant was hydraulically overloaded and frequently bypasses untreated wastewater. The city of Mason has planned on upgrading this facility but it will probably not take place before 1983. The Ohio EPA conducted a survey of Muddy Creek during the summer of 1981 to assess the degradation. The report from this survey will be available during 1982.

The Ohio EPA discontinued its monitoring station at Foster (RM 28.1; STORET Station No. 610510) in 1977. Limited sampling at this station during 1977 revealed no WQs violations (Ohio EPA, SWDO data, 1977). A short distance below this station (RM 28.0) Simpson Creek, a severely degraded creek, joins the Little Miami River. Simpson Creek receives poorly treated wastewater from the Landen Farms WWTP (RM 0.5). Landen Farms WWTP will tie into the new Lower Little Miami WWTP upon its completion. The Lower Little Miami WWTP will have secondary treatment (rotating biological contractors) and discharge approximately 1.5 MGD of wastewater to Simpson Creek (RM 0.1). The plant should be completed in the Spring of 1981.

Segment Problem	Name Description	Use Designation Mile Points
K-5-4	Little Miami River	WWH
MAJOR	From the O'Bannon Creek confluence to the East Fork confluence	24.1-11.7

Physical/chemical water quality in this segment was affected by package plants, municipal and industrial dischargers. In November 1979, the Loveland Harper Ave. WWTP (RM 24.2) was eliminated and converted into a pumping station to convey sewage to the Loveland Kemper Rd. WWTP (RM 21.9). The Harper Ave. plant was overloaded and bypassed untreated wastewater frequently, while the Kemper Rd. plant received flows slightly more than half its design capacity.

The city of Loveland has completed a Sewer System Evaluation Survey and has applied for Step 1 grant funding for upgrading the Kemper Road plant. One industry, Totes, Inc. (RM 22.4) occasionally bypasseed raw sewage to the Little Miami River due to operation and maintenance problems.

The Obannon Creek Subbasin is affected by package plant discharges and faulty on-lot disposal systems. The proposed Obannon Creek WWTP is in Step 3 of the Construction Grant Program and should be completed by 1983. The plant has a design capacity of 2 MGD. It will have secondary treatment (2 stage activated sludge) and will eliminate many package plants (Paxton Woods, RM 1.0 on unnamed tributary; Honeybrook, RM 5.2 on unnamed tributary; Green Acres, RM 4.7 on unnamed tributary, Vista Woods, RM 0.6 on unnamed tributary; Woodville Gardens, RM 4.3 on unnamed tributary; Gaslight Village, RM 0.1 on unnamed tributary; Goshen Schools, RM 0.4 on unnamed tributary).

The Ohio EPA discontinued its monitoring station at Milford (RM 12.7; STORET Station No. 600520) in 1977. USGS still maintains a monitoring station at this location. USGS data showed frequent WQS violations for fecal coliforms and occasional WQS violations for total lead, total iron and total mercury (USGS, 1978-1980). The fecal coliform bacteria violations were most likely due to increased flows. Water quality in this segment should continue to improve with the upgrading of the Loveland Kemper Road WWTP and the construction of the Obannon Creek WWTP.

Segment Problem	Name Description	Use Designation Mile Points
K-5-5 MAJOR 05090202-001	Little Miami River From the East Fork confluence to the Ohio River	WWH 11.7-0.0

The Ohio EPA no longer has a monitoring station in the lower segment of the Little Miami River, however, the Ohio River Valley Water Sanitation Commission (ORSANCO) has maintained monitoring stations near Beechmont Levy (RM 3.4) (ORSANCO Data, 1978-1979) and near Mariemont (RM 7.5) (ORSANCO data 1980). ORSANCO data for these stations showed WQS violations for fecal coliforms, total iron, total lead, total zinc, pH and phenolics. Violations at RM 3.4 are most likely the result of sewage bypasses and combined sewer overflows by the Metropolitan Sewer District's Little Miami WWTP. The planned Newtown Interceptor will eliminate this problem and will also eliminate a large number of septic tank systesm. This project should be completed prior to 1983. These improvements should enable water quality goals to be met in this segment.

HISTORICAL

Physical/chemial water quality in the Little Miami River Basin is generally good and has not changed significantly over the past several years. Stream degradation occurs near large urban areas (Dayton and Cincinnati), primarily resulting from the discharge of treated municipal sewage. The upper segment of the Little Miami River has continued to demonstrate good to excellent physical/chemial water quality, as exemplified by physical/chemical data collected at U.S. 68 near Oldtown (RM 79.2). A few WQS violations have occurred over the past seven years for phenolics, total copper, total iron, and fecal coliforms. The total copper violations and phenolics levels violated Exceptional Warmwater Habitat (EWH) standards but not Warmwater Habitat (WWH) standards. Total copper violations have not occurred since

water year 1978 at U.S. 68. The total iron and fecal coliform bacterial violations were probably the result of nonpoint source runoff, especially during high flow years.

Below Massie Creek (RM 77.2), physical/chemical water quality declines due to municipal wastewater loading from nearby Xenia, Montgomery County Eastern Regional WWTP, Greene County Beaver Creek WWTP, and Southeastern Dayton (Sugarcreek WWTP). Improvements in water quality have been demonstrated over the past five years at Roxanna-New Burlington Road near Spring Valley (RM 59.4), with a significant reduction in temperature, dissolved oxygen, and phenolics WQS violations. These improvements primarily reflect changes in flow conditions over the past seven years, but also can be attributed to wastewater treatment plant upgrading programs implemented under the Clean Water Act.

Table III-11 through III-14 illustrate the percent D.O. violations noted at Roxanna-New Burlington Road during the third quarter (July-September), 1973-1980, compared to third quarter mean flow. Nonpoint sources continue to contribute to fecal coliform bacteria and total iron violations and nutrient concentrations on tributaries as well as the mainstem of the Little Miami River.

Water quality data collected at U.S. 50 near Milford (RM 12.7) indicated that no significant changes have occurred in the middle and lower sections of the Little Miami River. Physical/chemical water quality was generally good as the stream recovered from discharges upstream. Temperature and dissolved oxygen violations have decreased since 1977, although these changes were probably related to increased stream flows. A few total lead violations occurred in 1978-1980, probably being attributed to local urban runoff during periods of heavy rainfall. Total iron and fecal coliform bacterial violations continued to occur as a result of nonpoint sources of pollution.

Table III-11. Number of dissolved oxygen violations noted in the Little Miami River at Roxanna-New Burlington Road (RM 59.4) continuous monitor station during the third quarter (July-September), 1973-1980, compared to third quarter mean flow.

Year	Percent DO Violations	Flow, cfs
1973	4.3	574*
1974	2.6	-
1975	13.0	299
1976	7.6	152
1977	69.6	107
1978	15.2	150
1979	0	717
1980	0	681

* Calculated from instantaneous data

Table III-12. NUMBER OF VIOLATIONS PER TOTAL NUMBER OF SAMPLES LITTLE MIAMI RIVER AT U.S. 68, NEAR OLDTOWN RM 79.2, STORET #600570, EWH

Parameter	1975	1976	1977	1978	1979	1980	1981
Mean Flow, cfs	200	104	49	117	192	228	133
D.O.	0/10	0/11	1/12	0/6	0/12	0/12	0/11
Phenolics	-	0/9	4/7	2/3	0/4	1/4	3/4
Total Copper	0/2	4/6	1/6	1/3	0/4	0/4	0/4
Total Iron	0/3	1/3	0/1	0/2	1/2	2/4	1/4
Fecal Coliform	-	1/4	0/9	1/9	0/12	2/11	2/10

Table III-13. LITTLE MIAMI RIVER AT ROXANNA-NEW BURLINGTON ROAD, NEAR SPRING VALLEY RM 59.4, STORET #600600, WWH

Parameter	1975	1976	1977	1978	1979	1980	1981
Mean Flow, cfs	575	301	165	367	556	626	760
Temperature	0/367	4/378	8/303	0/368	0/377	0/366	1/11
D.O.	12/367	17/378	85/303	25/366	2/377	1/353	0/11
Phenolics	-	0/9	2/8	1/4	0/4	0/4	0/4
Total Iron	0/5	0/4	-	2/2	1/2	2/4	2/4
Fecal Coliform	-	-	1/9	3/9	3/12	6/10	5/11

Table III-14. LITTLE MIAMI RIVER AT MILFORD, U.S. 50 RM 12.7, STORET #600520, WWH

Parameter	1975	1976	1977	1978	1979	1980	1981
Mean Flow, cfs	1940	942	477	1349	2187	1685	-
Temperature	34/164	12/353	33/366	14/378	0/359	3/362	-
D.O.		0/164	0/325	16/337	1/365	0/353	0/340
Total Iron	1/5	2/8	2/8	1/4	2/4	1/4	-
Total Lead	0/5	0/9	0/8	1/4	1/4	1/4	-
Total Mercury	1/6	0/9	1/8	1/4	1/4	0/4	-
Fecal Coliform	2/9	1/12	4/22	4/13	4/12	5/12	-

RECOMMENDATIONS

1. An updated certified wasteload allocation is needed for this segment. A major concern is nitrification justification for AST review.

2. The OEPA sampling station at Beechmont Levy (RM 3.4) should be reactivated to better determine water quality near the mouth of the Little Miami River.

REFERENCES

Ohio Environmental Protection Agency. 1973-1980 (unpublished). Data available from Southwest District Office, Ohio EPA, Dayton, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report. Reference Document 3. Biological Tables.

Ohio River Valley Water Sanitation Commission. ORSANCO Quality Monitor Data 1978-1980. ORSANCO, Cincinnati, Ohio.

United States Geological Survey. 1978. Water resources data for Ohio, water year 1978, Vol. 1. Ohio River Basin. Water Data Report OH-78-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1979. Water resources data for Ohio, water year 1979, Vol. 1. Ohio River Basin, Water Data Report OH-79-1. U.S. Geological Survey, Columbus, Ohio.

United States Geological Survey. 1980. Water resources data for Ohio, water year 1980, Vol. 1. Ohio River Basin, Water Data Report OH-80-1. U.S. Geological Survey, Columbus, Ohio.

SCIOTO RIVER BASIN

UPPER SCIOTO RIVER SUBBASIN (UPPER PORTION) (M-1)

SUBBASIN SUMMARY

The upper Scioto River Subbasin above the confluence with the Little Scioto River at Greencamp (RM 173.7) supported a well-balanced, aquatic community (Martin and Balduf, 1977). Sediment from nonpoint sources, along with channelization and siltation of substrates, has decreased the quality of the stream habitat. Cottonwood Ditch, a stream segment of approximately 5.5 miles, is not expected to meet the 1983 goals due to wastewater discharges from the villages of McGuffey (RM 1.2) and Alger (RM 5.5).

The Little Scioto River generally had good physical/chemical water quality above the confluence with Rock Swale Ditch (RM 2.9). Water quality deteriorated below the confluence with Rock Swale Ditch due to low dissolved oxygen levels (OEPA, NWDO data, 1977).

An estimated 16.4 of the 105.5 stream miles evaluated in this subbasin are not expected to meet 1983 water quality goals.

SEGMENT REPORTS

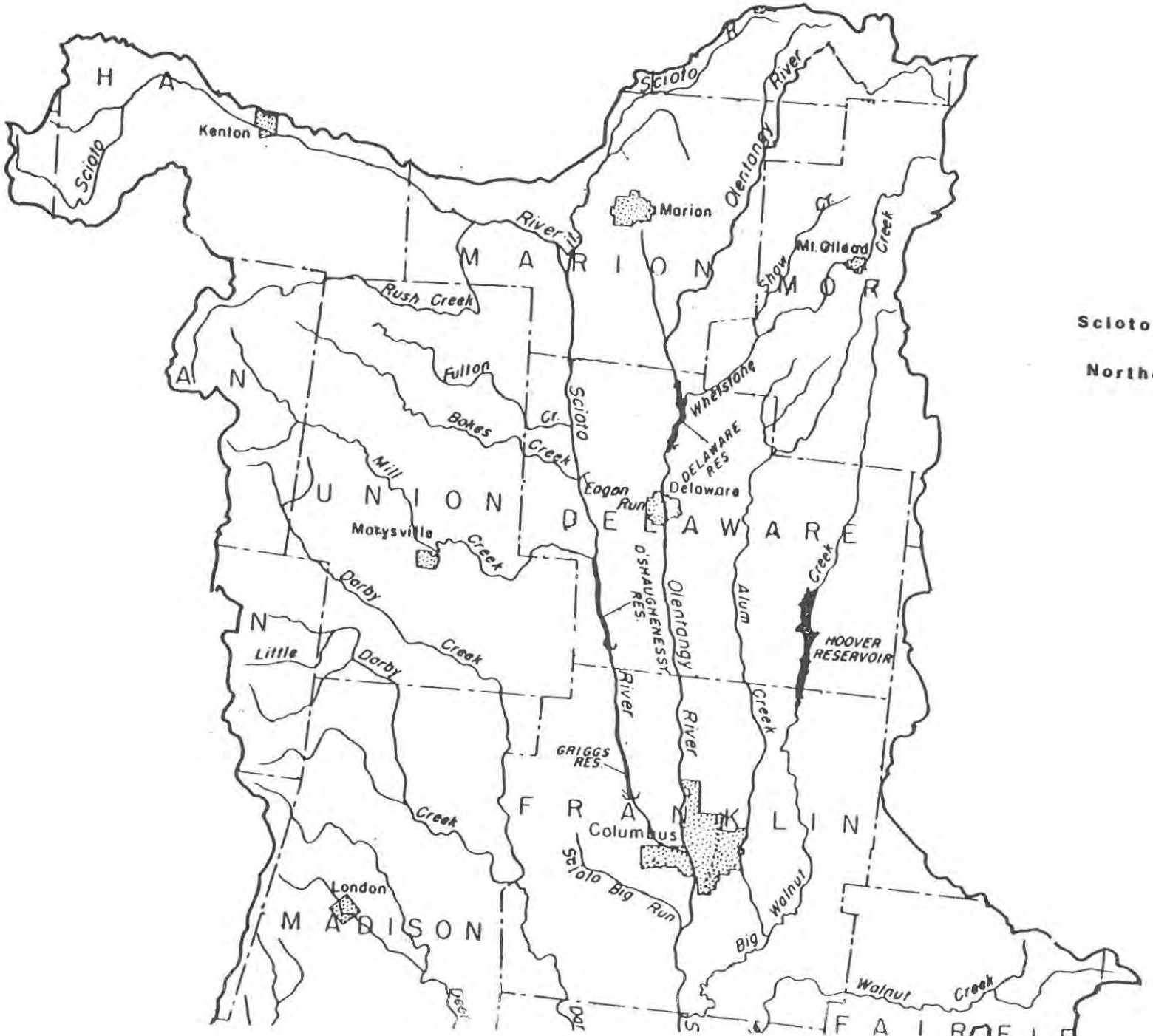
SCIOTO RIVER MAINSTEM
OHIO RIVER TRIBUTARY
CONFLUENCE AT RM 351

Segment Problem	Name Description	Use Designations Mile Points
M-1-2 NONE	Scioto River From the headwaters to Kenton	WWH 231.5-207.5

COTTONWOOD DITCH - SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 216.1

Segment Problem	Name Description	Use Designations Mile Points
M-1-3 MAJOR	Cotton Ditch From Alger to the Scioto River	WWH 5.5-0.0

This segment had dissolved oxygen violations due to the inadequate and poorly operated primary WWTP serving the village of McGuffey (RM 1.2) (OEPA, NWDO data, 1974, 1978). The village is uncooperative in efforts to remedy the situation, and significant efforts to improve the plant are not being made. It is unlikely that improvements will occur before 1983. The Director of Ohio EPA issued Findings and Orders to McGuffy on June 19, 1981, and a standard connection ban was applied.



Scioto River Basin

Northern Section

Scioto River Basin

Southern Section

Segment Problem	Name Description	Use Designations Mile Points
M-1-1 NONE	Scioto River From Kenton to two river miles downstream of Prospect	WWH 207.5-165.5

LITTLE SCIOTO RIVER
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 173.6

Segment Problem	Name Description	Use Designations Mile Points
M-1-4a MINOR	Little Scioto River From headwaters to confluence with Scioto River	29.6-0

The physical/chemical water quality of the Little Scioto River generally meets Ohio WQS. There was one dissolved oxygen violation detected downstream from the Marion WWTP (RM 6.5) discharge in 1980. Dissolved oxygen levels below the confluence with Rock Swale Ditch (RM 2.9) were frequently in violtion of Ohio WQS (OEPA, NWDO data, 1977).

ROCK SWALE DITCH
LITTLE SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 2.9

Segment Problem	Name Description	Use Designations Mile Points
M-1-4b MAJOR	Rock Swale Ditch From S.R. 65 to confluence with Little Scioto River	2.2-0

Rock Swale Ditch upstream from the confluence with Columbia Ditch (RM 1.7) originates as a common industrial sewer for several industries, some of which remain unknown. This effluent contained high concentrations of suspended solids, total zinc, total nickel, oil and grease, nutrients, and BOD_5. The quality of the ditch sediments and water was very poor with evidence of a deep, oily sludge and a very low diversity of aquatic life. Periodic discharges of highly toxic materials occured occasionally.

Rock Swale Ditch downstream from the confluence with Columbia Ditch (RM 1.7) showed slight recovery. A heavy growth of emergent vegetation seemed to function as a mechanism for removal of nutrients; the suspended materials were evidently stabilized in the muddy sediments.

Columbia Ditch originates in Sawyer Lake (RM 2.2), which was extremely eutrophic due to the addition of nutrients from unknown industrial sources (OEPA, NWDO data, 1976).

REFERENCES

Martin, G.L., and T.J. Balduf. 1977 (unpublished). A biological investigation of the effect of the Kenton STP on the Scioto River. Ohio Environmental Protection Agency, Northwest District Office. Mineo. 6 pp.

Ohio Environmental Protection Agency. 1974-1980 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

SCIOTO RIVER BASIN

UPPER SCIOTO RIVER SUBBASIN (LOWER PORTION) (M-2)

SUBBASIN SUMMARY

Land-use in the Upper Scioto River Subbasin is predominantly agricultural, with Marion being the only major urban center within the subbasin. Current water quality data for the streams in this subbasin are limited. Much of the present evaluation was based on previous 303(e) and 305(b) water quality reports (Ohio EPA 1974, 1976, 1978, 1979, 1980).

Physical/chemical water quality in the Upper Scioto River Subbasin is generally good, with the exception of a portion of the Little Scioto River below Marion which is only fair. A biological and water quality survey to assess the impact of nonpoint source agricultural runoff on receiving stream quality in the Upper Scioto River Subbasin is needed to determine attainability of the 1983 clean water goals.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data is available for this subbasin. Previous fixed station monitoring in the subbasin was conducted in September, 1977, and August, 1976, on the Scioto River at Prospect in Delaware County (RM 169.2).
The benthic sample collected in 1977 consisted of 25 taxa with a diversity index of 3.06 (Ohio EPA, 1980, RD 3-34). Diverse communities of mayflies, caddisflies, and midges were present at the site. No single taxon was numerically dominant. An evaluation of Class II (Good) water quality was assigned. The benthic sample collected in 1976 consisted of 19 taxa with a diversity index of 2.02 (Ohio EPA, 1980, RD 3-35). The major taxa at the site were similar to those present in 1977. The lower number of taxa collected and the low diversity index indicated conditions less favorable than in 1977 and, thus, an assignment of Class III (Fair) water quality. Not enough data were available to determine if the favorable changes in the benthic community in 1977 were caused by improved water quality or other environmental factors.

Three stations on the Little Scioto River were sampled during the years 1977, 1976 and 1974. The purpose of this monitoring was to determine what effects the Marion WWTP (RM 6.4) had on this stream. During this period, the Marion WWTP underwent treatment improvements, therefore, special attention was given to any possible change in the stream during the three year sampling period. Monitoring stations were located at river miles 9.3, 4.4, and 2.1. A summary of the data can be found in Tables - , - , and - . The tabulated data can be found in Ohio EPA (1980) RD 3-25, 3-26, and 3-27.

The condition of the stream at river mile 9.3 ranged from Class IV (Poor) in 1974 to Class III (Fair) in 1976 and 1977. The poor water quality in 1974 was reflected by the lack of pollution sensitive forms, a diversity index of 2.17, and a low number of taxa (12). In 1976 and 1977, the number of taxa (22 and 23, respectively) were similar, while the diversity indices (2.57 and 3.17, respectively) were different; both years data reflected Class III (fair) water quality. The reason for the change in water quality at this upstream station is not known. The station located immediately downstream from the Marion WWTP (RM 4.4) was considered to have Class IV (Poor) water quality for all three

sampling periods. However, some improvements were noted in the 1976 and 1977 samples at this site. The 1974 sample reflected very poor water quality as evidenced by the extremely low number of taxa (2) and diversity index (0.08). In 1976 and 1977, there were marked increases in both number of taxa (16 and 11, respectively) and diversity indices (1.19 and 2.27, respectively) indicating a definite improvement at this station. The furthest downstream station (RM 2.1) was also found to have Class IV (Poor) water quality throughout the three year sampling period, but again, improvement was noted. The 1974 data revealed very poor water quality, as evidenced by the low number of taxa (4) and low diversity index (0.35). Increases in the number of taxa (10 and 18, respectively) and diversity indices (2.76 and 3.12, respectively) were found in 1976 and 1977, respectively.

The Little Scioto River was considered to have Class III (Fair) water quality above the Marion WWTP but underwent notable stress below the plant, and did not appear to recover before reaching the confluence with the Scioto River. There were significant improvements in the two downstream stations in 1976 and 1977 as reflected by the benthic biota. It may be of interest to note that in 1976 and 1977, there was a curious reduction in the number of oligochaetes at the two downstream stations. In 1974, there were 356 oligochaetes collected at river mile 4.4 and 5052 at river mile 2.1. In 1976, the oligochaetes were completely absent at both stations, while in 1977, they were present in only limited numbers (23 at RM 4.4 and 37 at RM 2.1).

SEGMENT REPORTS

LITTLE SCIOTO RIVER
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 171.6

Segment Problem	Name Description	Use Designation Mile Points
M-2-2 MINOR	Little Scioto River From the Marion WWTP to the Scioto River	WWH 6.4-0.0

050 60001 - 033

The Little Scioto River receives effluent from the Marion WWTP (RM 6.4), as well as industrial effluent from the Whirlpool Corporation via Rockswale Ditch (RM 2.7). Previous surveys noted significant violations of water quality standards for dissolved oxygen, ammonia and fecal coliforms in this segment (OEPA, 1976). Recent reports have cited improvements in the water quality of the Little Scioto River. These improvements are attributed to a new tertiary wastewater treatment facility at Marion which came on line in 1977 (OEPA, 1979). However, a definitive statement concerning the water quality of this segment cannot be made without an intensive survey.

SCIOTO RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
M-2-1 NONE	Scioto River From Prospect to the Mill Creek confluence	WWH 165.5-150.7

050 60001 - 03

Table III-15: Summary of Benthic Data Collected from the Little Scioto River Relative to the Marion Wastewater Treatment Plant (WWTP), October, 1977[a]

	Station (RM)		
	9.3	4.4	2.1
Number of Samplers	5	5	5
Quantitative Taxa	23	11	18
Qualitative Taxa	11	5	12
Organisms/Ft^2	277	210	165
Index ($\bar{d}$)	3.17	2.27	3.12
Evaluation (Class)	III	IV	IV

(a) The Marion WWTP discharge is located at RM 6.4.

Table III-16: Summary of Benthic Data Collected from the Little Scioto River Relative to the Marion Wastewater Treatment Plant (WWTP), November, 1976[a]

	Station (RM)		
	9.3	4.4	2.1
Number of Samplers	5	5	5
Quantitative Taxa	22	16	10
Qualitative Taxa	9	5	4
Organisms/Ft^2	223	593	104
Index ($\bar{d}$)	2.57	1.19	2.76
Evaluation (Class)	III	IV	IV

(a) The Marion WWTP discharge is located at RM 6.4.

Table III-17: Summary of Benthic Data Collected from the Little Scioto River Relative to the Marion Wastewater Treatment Plant (WWTP), August, 1974[a]

	Station (RM)		
	9.3	4.4	2.1
Number of Samplers	5	5	5
Quantitative Taxa	12	2	4
Qualitative Taxa	15	3	7
Organisms/Ft^2	229	76	1069
Index ($\bar{d}$)	2.17	0.08	0.35
Evaluation (Class)	IV	IV	IV

(a) The Marion WWTP discharge is located at RM 6.4.

Physical/chemical water quality sampling conducted below the city of Prospect (RM 165.5) from 1975-1977 showed no standards violations (OEPA, CDO data, 1975-1977). Water quality is believed to meet Warmwater Habitat (WWH) standards from Prospect to the Mill Creek confluence since no significant discharges exist in this segment. The Scioto River is a primary drinking water supply for the city of Columbus (RM 150.7) below its confluence with Mill Creek.

UNNAMED TRIBUTARY
BOKES CREEK TRIBUTARY
CONFLUENCE AT RM 27.7

Segment Problem	Name Description	Use Designation Mile Points
M-2-3 MAJOR N/A	Unnamed tributary to Bokes Creek From West Mansfield to Bokes Creek	WWH Unknown-0.0

The localized impact of the West Mansfield WWTP plant on an unnamed tributary to Bokes Creek (RM 27.7) has been documented (OEPA, 1974, 1976). The situation has not changed, and Ohio WQS violations for dissolved oxygen, ammonia and fecal coliforms continue to occur. This plant was included in a biological and water quality survey of Bokes Creek by the Ohio EPA during the summer of 1981. The final report from this survey is expected to be completed during 1982.

REFERENCES

Ohio Environmental Protection Agency. 1974. Scioto River Basin 303(e) Wasteload Allocation Report. Ohio EPA, Division of Surveillance, Southeast District Office, Logan, Ohio.

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1976. Scioto River basin 305(b) annual water quality summary. Ohio EPA, Division of Surveillance and Lab Services, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978. State of Ohio 305(b) annual water quality summary. Ohio EPA, Office of Wastewater, Division of Surveillance and Lab Services, Columbus, Ohio.

Ohio Environmental Protection Agency. (1979). Chapter 1, Existing water quality. In: Scioto River basin water quality management plan, part III, preliminary report, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

SCIOTO RIVER BASIN

OLENTANGY RIVER SUBBASIN (M-3)

SUBBASIN SUMMARY

Physical/chemical water quality in the Olentangy River Subbasin ranged from good to poor. An estimated 25 of the 124 stream miles evaluated in this basin had major physical/chemical problems. The upper reach near Galion was severely degraded by the variable effluent quality of the WWTP (RM 84.4). Water quality in the lower reach was degraded by combined sewer overflows and urban runoff from the Columbus metropolitan area (RM 9.8 to 0.0). The middle reach of the Olentangy River generally had good water quality, except for an occasional problem downstream from the Delaware WWTP (RM 24.8).

Water quality in Whetstone Creek, a major tributary to the Olentangy River, was affected by municipal discharges from Mt. Gilead (RM 22-0) and Cardington (RM 13.8), as well as nonpoint source pollution. Water quality was generally good, except during extreme low flow conditions.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in November, 1979, from the Olentangy River near Worthington in Franklin County (RM 12.3). The sample consisted of 37 taxa with a diversity index of 3.16 (RD 3). The benthic community was represented by 7 taxa of mayflies, 3 taxa of stoneflies, 5 taxa of caddisflies, and 14 taxa of midges. No taxon was numerically dominant. The overall benthic community appeared healthy and diverse and indicated Class II (Good) water quality.

Previous sampling at this location in August, 1977, resulted in only 17 taxa with a diversity index of 2.86 (Ohio EPA, 1980, RD 3-52). There were no stoneflies present and the numbers of mayfly and caddisfly taxa collected were reduced from the 1979 total. An evaluation of Class III (Fair) water quality was assigned. Improvements in water quality may have been responsible for the change in the benthic community in 1979. However, the November collecting date may have been more responsible for the changes in the benthic fauna than changes caused by water quality.

Another fixed station previously sampled in the subbasin was located on the Olentangy River at Columbus in Franklin County (RM 0.4). The sample was collected in August, 1974, and included an east bank and west bank station (Ohio EPA, 1980, RD 3-53). Thirteen taxa (diversity index 0.79) were collected at the east bank station, while eight taxa (diversity index 0.28) were collected at the west bank station. Oligochaetes accounted for at least 90 percent of the total numbers of organisms collected at both sites. There were no mayfly or caddisfly taxa present. An evaluation of Class IV (Poor) water quality was assigned to each data set.

Two benthic surveys have also been conducted in the subbasin, one each on the Olentangy River at Delaware and on Whetstone Creek at Mt. Gilead.

In July 1977, three biological sampling stations were established on the Olentangy River to determine the impact of the Delaware WWTP (RM 24.85). These stations were located at river miles 28.3, 22.5, and 18.2. A summary of the data can be found in Table - . The tabulated data is listed in RD 3-30 (Ohio EPA, 1980).

The data from the upstream station at river mile 28.3 showed a relatively high diversity index (3.23) and a low number of taxa (21). The water quality at this site was considered Class III (Fair) due primarily to the number of taxa. The next station (RM 22.5) revealed a decline in the diversity index (2.46) and an increase in number of taxa (24). This data indicated a slight organic enrichment, but no significant change in water quality (Class III). The most downstream station (RM 18.3) displayed increases in both numbers of taxa (26) and diversity (3.44). These improvements indicated that the river had probably recovered from the slight enrichment it had received, but it was still considered to have only Class III (Fair) water quality at this point.

Based on this survey, the Delaware WWTP discharge had a negligible impact on the Olentangy River.

In September 1973, three stations were established on Whetstone Creek in an effort to determine the impact of the Mt. Gilead WWTP (RM 21.7) and Koering Corporation (RM 21.4) discharges. The stations were located at river miles 25.8, 21.2, and 16.2. A summary of the data can be found in Table - . The tabulated data can be found in RD 3-29 (Ohio EPA, 1980).

A high diversity index (3.71) was found at the station at river mile 25.8, but a marginal number of taxa (25) and low number of pollution sensitive organisms indicated Class III (Fair) water quality. The data from river mile 21.2, below the dischargers, suggested organic enrichment as reflected by the low diversity index (0.74). The cause of the low index was a marked increase in the number of oligochaetes, which skewed the balance of the community. Despite the large number of taxa (27), water quality was considered Class IV (Poor) due to the poor benthic composition, the presence of few pollution sensitive organisms, and the low diversity index. The sample from the downstream station (RM 16.2) contained 32 taxa with a diversity index of 2.67. This station was apparently recovering from the enrichment encountered at the previous site and was assigned a Class III (Fair) water quality evaluation.

Based on the benthic community sampled, Whetstone Creek did receive an enrichment effect from either the Mt. Gilead WWTP discharge, the Koering Corporation discharge, or both.

SEGMENT REPORTS

OLENTANGY RIVER MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 127.8

Segment Problem	Name Description	Use Designation Mile Points
M-3-1 MAJOR	Olentangy River From Galion to approximately RM 76.2	WWH 86.2-76.2

N/A

Table III-18: Summary of Benthic Data Collected from the Olentangy River Relative to the Delaware Wastewater Treatment Plant (WWTP) Discharge, August, 1977[a]

	Station (RM)		
	28.3	22.5	18.3
Number of Samplers	5	5	5
Quantitative Taxa	21	24	26
Qualitative Taxa	13	15	13
Organisms/Ft^2	250	561	365
Index ($\bar{d}$)	3.23	2.46	3.44
Evaluation (Class)	III	III	III

(a) The Delaware WWTP discharge is located at RM 24.85.

Table III-19: Summary of Benthic Data Collected from Whetstone Creek Relative to the Mt. Gilead Wastewater Treatment Plant (WWTP) and Koering Corporation Discharges, October, 1973[a]

	Station (RM)		
	25.8	21.2	16.2
Number of Samplers	5	5	5
Quantitative Taxa	25	27	32
Organisms/Ft^2	102	723	226
Index ($\bar{d}$)	3.71	0.74	2.67
Evaluation (Class)	III	IV	III

(a) The Mt. Gilead WWTP discharge is located at RM 21.7. The Koering Corporation discharge is located at RM 21.4.

Physical/chemical water quality in the upper reach near Galion was generally poor. A study conducted during the summer and fall of 1979 revealed dissolved oxygen, fecal coliform bacteria, total iron and total lead violations upstream and downstream of the Galion WWTP (RM 84.4)(OEPA, CDO data, 1979a). Total cadmium and total mercury violations also occurred downstream from the WWTP. This segment of the Olentangy River lacked adequate assimilative capacity to handle the organic loading from Galion. Dissolved oxygen violations extended for at least 1.9 miles downstream from the Galion WWTP outfall, but the point at which the river fully recovered is unknown. For this reason, the ending mile point of this segment was estimated. This segment is not expected to meet 1983 clean water goals because Adjusted Wasteload Limits will most likely be applied to the Galion WWTP.

Segment Problem	Name Description	Use Designation Mile Points
M-3-2 NONE	Olentangy River Below Galion to Near Delaware	WWH 76.2-32.1

Limited water quality data and the absence of any significant point source dischargers suggest that this segment did not have physical/chemical problems. Caledonia (population 700) (RM 60.8) is the only urban area located on this river segment. Wastewater treatment in the community consists of septic tank systems and home aeration systems. Limited data collected five miles below Caledonia (U.S. Geological Survey, Station No. 03223000) did not indicate degradation of water quality (USGS, 1975-1977).

Physical/chemical water quality in the Delaware Reservoir (RM 31.5) was good except for relatively high nutrient levels (U.S. EPA, 1975). Water leaving the reservoir also appeared to be of good quality; ammonia and total phosphorus concentrations were generally lower in the outflow than in the incoming water, suggesting that the reservoir acts as a nutrient trap. The BOD_5 concentrations usually ranged between 2 and 3 mg/l, but values as high as 4 mg/l have been recorded (OEPA, CDO data, 1977).

WHETSTONE CREEK
DELAWARE RESERVOIR - OLENTANGY RIVER TRIBUTARY
CONFLUENCE AT RM 35.5

Segment Problem	Name Description	Use Designation Mile Points
M-3-5 Minor	Whetstone Creek From the headwaters to Mt. Gilead	WWH 35.0-21.7

A review of the Mt. Gilead WWTP (RM 22.0) monthly operating reports indicated fair water quality (physcial/chemical) in Whetstone Creek above Mt. Gilead. This conclusion was substantiated by field observations made in June 1978 (OEPA, NWDO data, 1978).

Segment Problem	Name Description	Use Designation Mile Points
M-3-6 MINOR	Whetstone creek From Mt. Gilead to the Delaware Reservoir	WWH 21.7-0.0

050 60001-029

Ohio WQS violations for ammonia, dissolved oxygen, and fecal coliforms occurred in this stream segment during periods of low flow (OEPA, NWDO data, 1976). Municipal wastewater discharges at Mt. Gilead and Cardington were the major pollution sources during critical low flow periods. Timely implementation of the Construction Grants Program and the attainment of the 1979 Wasteload Allocation Limitations should eliminate these problems prior to 1983.

Segment Problem	Name Description	Use Designation Mile Points
M-3-3 MINOR	Olentangy River From near Delaware to near Worthington	SNRW-WWH 32.1-11.4

050 60001-025

Physical/chemical water quality in the Olentangy River below Delaware ranged from good to fair. Violations of the Ohio WQS for dissolved oxygen occurred at least 1.9 miles downstream of the Delaware WWTP in May 1977 (OEPA, CDO data, 1977). A review of the WWTP's monthly operating reports revealed occasional downstream violations for fecal coliforms. Monitoring at three sites further downstream revealed no Ohio WQS violations (OEPA, CDO data, 1977).

Wasteload modeling of the Olentangy River determined that BOD_5 and ammonia concentrations of 9 mg/l and 2 mg/l, respectively, would be required in the Delaware WWTP effluent to assure compliance with Ohio WQS (OEPA, 1979b). Because Adjusted Wasteload Limits are applicable for this discharger, BOD_5 and ammonia limits of 10 mg/l and 1.7 mg/l, respectively, were given to the Delaware WWTP. This means that if and when the Adjusted Wasteload Limits are attained, dissolved oxygen violations will still occur, only with less frequency. It is believed that future violations in the will not impair attainment of the 1983 clean water goals. The attainment of this level of wastewater treatment is contingent upon the completion of improvements at the Delaware WWTP, currently in Step 1 of the Construction Grants Program.

Segment Problem	Name Description	Use Designation Mile Points
M-3-4 MAJOR	Olentangy River From near Worthington to the Scioto River	WWH 11.4-0.0

050 60001-028

Physcial/chemical water quality in the lower Olentangy River was quite variable. Infrequent violations of the Ohio WQS for fecal coliforms (3 out of 22 samples), total iron (3/7) and total lead (1/8) occurred at the fixed monitoring station located near Worthington (RM 11.4; STORET Station No. 601290) (OEPA, CDO data, 1978-1980). The Worthington Hills service area was

tied into Columbus Sewage Collection System in April, 1979, and the WWTP was taken off line. Since that time, fecal coliform bacterial concentrations at the monitoring site mentioned above have generally not exceeded the Ohio WQS.

However, there were numerous combined sewer overflows in the remainder of this segment. Combined sewer overflows and urban runoff periodically degraded water quality. A Field survey conducted during 1978 and 1979 documented several violations of the fecal coliform standard (OEPA, CDO data, 1978-1979). It is very likely that the elevated fecal coliform levels were due to the combined sewer overflow and not an upstream discharger.

HISTORICAL REVIEW

The Delaware WWTP is a secondary stabilization facility, last upgraded in 1973. The plant discharges to the Olentangy River at mile point 24.8. An analysis of the data collected between 1974 and 1980 at RM. 21.2 by cooperative samplers at the Delaware WWTP revealed no improvements in ambient river quality for dissolved oxygen and BOD_5 (Fig. 1 and 3).

There was a noticeable decline in ambient ammonia-nitrogen levels in the river between 1974 and 1978 (Fig. 2). This coincides with a substanital reduction in effluent ammonia-nitrogen at the Delaware WWTP. Between 1976 and 1978, the mean effluent ammonia was reduced 58% (Table 1). The magnitude of the maximum stream ammonia concentration declined from a peak of 21 mg/l in 1974 to less than 1 mg/l in 1980.

Current instream water quality data is insufficient for further analysis.

Table III-20. Mean Effluent Ammonia-N 1976-1980
Delaware POTW

Year	Conc. (mg/l)
1976	14.2
1977	8.4
1978	6.0
1979	5.0
1980	5.8

THIS PAGE RESERVED

REFERENCES

Ohio Environmental Protection Agency. 1976, 1978 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1977 (unpublished). Survey of Olentangy River. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978-1979 (unpublished). Sanitary survey of lower Olentangy River. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979a (unpublished). Survey of upper Olentangy River. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979b (unpublished). Scioto River Basin - initial proposal for wasteload allocation. Ohio EPA, Office of Wastewater Pollution Control, Division of Water Quality Planning and Assessment, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979c (unpublished). Draft procedure for evaluating the impact of phosphorus removal from STP effluent on Ohio lakes. Ohio EPA, Division of Surveillance, Central Office, Columbus, Ohio. Mimeo. 15 pp.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

United States Geological Survey. 1975-1977. Water Resources data for Ohio, Volume 1. Ohio River basin. U.S. Geological Survey water-data reports, OH-75-1 through OH-77-1. U.S. Geological Survey, Columbus, Ohio.

United States Environmental Protection Agency. 1975. Report on Delaware Reservoir; Delaware County, Ohio, National Eutrophication Survey, working paper No. 399. U.S. EPA, Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

SCIOTO RIVER BASIN

BIG WALNUT CREEK SUBBASIN (M-4)

SUBBASIN SUMMARY

Physical/chemical water quality in the Big Walnut Creek Subbasin was good in the headwaters and upper portions area above the metropolitan Columbus area (RM 37.4 to 10.4). Two reservoirs, Alum Creek and Hoover, are located in this portion of the subbasin supplies drinking water for the cities of Columbus and Westerville. The central and lower portions of the subbasin were impacted by both urban point and nonpoint pollution. Further study is needed to accurately ascertain the extent of degradation of Alum and Big Walnut Creeks in the metropolitan Columbus area.

Blacklick Creek was seriously degraded below the Reynoldsburg and Blacklick Estates WWTP's. Numerous WQS violations for dissolved oxygen, ammonia and fecal coliforms occured in Blacklick Creek during low flow conditions.

SEGMENT REPORTS

ALUM CREEK
BIG WALNUT CREEK TRIBUTARY
CONFLUENCE AT RM 14.5

Segment Problem	Name Description	Use Designation Mile Points
M-4-1 NONE	Alum Creek From the headwaters to the Noble Run confluence	WWH 55.8-18.6

BIG WALNUT CREEK MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 113.1

M-4-2 NONE	Big Walnut Creek From the headwaters to the Columbus Morse Road Water Treatment Plant	WWH 74.2-33.5

Physical/chemical quality of the Big Walnut Creek Subbasin headwaters was very good (OEPA, 1979). There are two water supply reservoirs for the city of Columbus (Alum Creek Reservoir and Hoover Reservoir) located within the upper subbasin. Downstream of these reservoirs, the water quality of Alum Creek and Big Walnut Creek is degraded by both urban point source and nonpoint source pollution from the greater Columbus metropolitan area (OEPA, 1979). The attainment of 1983 goals cannot be ascertained for the lower segments of Alum Creek and Big Walnut Creek because of insufficient data. Previous sampling of lower Alum Creek revealed sporadic violations for dissolved oxygen and total iron (OEPA, CDO data, 1975-1980). A major stormwater overflow for the city of Columbus Combined Sewer System is located on Alum Creek at river mile 6.3.

Physical/chemical water quality data for lower Big Walnut Creek near the Scioto River indicated high nutrient levels and elevated levels of MBAS (OEPA, CDO data, 1977-1980). Although no WQS violations occurred, the data clearly reflected the impact of urban runoff from both point and nonpoint sources.

BLACKLICK CREEK
BIG WALNUT CREEK TRIBUTARY
CONFLUENCE AT RM 14.5

Segment Problem	Name Description	Use Designation Mile Points
M-4-3 MINOR	Blacklick Creek From the Reynoldsburg WWTP to Big Walnut Creek	WWH 10.8-0.0

Serious WQS violations for dissolved oxygen, ammonia and fecal coliforms, occured in this segment of Blacklick Creek (Ohio EPA 1974, 1976, 1978). Degradation resulted from the combined effluents of the Reynoldsburg WWTP (RM 13.3) and the Blacklick Estates WWTP (RM 4.9). The diversion of this sewerage to the Columbus Wastewater Collection System prior to 1983 should improve the chemical water quality of Blacklick Creek, thereby allowing attainment of 1983 clean water goals.

REFERENCES

Ohio Environmental Protection Agency. 1974. Scioto River basin 303(e) wasteload allocation report. Ohio EPA, Division of Surveillance, Southeast District office, Logan, Ohio.

Ohio Environmental Protection Agency. 1975-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1976. Scioto River basin 305(b) annual water quality summary. Ohio EPA, Division of Surveillance and Lab Services, Central District Office, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978 (unpublished). Litigation survey: Blacklick estates wastewater treatment plant. Data available from Ohio EPA, Division of Surveillance, Central District Office, Columbus, Ohio.

Ohio Environmental Protection Agency. (1979). Chapter 1, Existing water quality. In: Scioto River basin water quality management plan, Part III, preliminary report. Ohio EPA, Columbus, Ohio.

SCIOTO RIVER BASIN

MILL CREEK SUBBASIN
AND
A PORTION OF THE MIDDLE SCIOTO RIVER SUBBASIN (M-5)

SUBBASIN SUMMARY

Physical/chemical water quality and biological condition was monitored in a 30 mile section of Mill Creek (Union County) during June, July, and September, 1978 (Yoder et al., 1980). Based on the results of physical/chemical sampling, Mill Creek can be divided into four segments; 1) upstream from Marysville (RM 30.8 to 24.8) where no WQS violations were observed; 2) in Marysville upstream from the Marysville WWTP outfall (MP 19.4 to 18.4) where violations for total iron, total lead, total nickel, total cadmium and total zinc occurred; 3) downstream from the Marysville WWTP (RM 18.4) and Ray Lewis (RM 18.3) outfalls (RM 18.4 to 12.2) where values for dissolved oxygen, ammonia-nitrogen, total iron, and occasionally total cadmium and total lead, were found in violation of WQS; and 4) downstream from RM 11.8 where occasional violations of WQS for total iron, total cadmium, and total lead were detected. The observed violations for dissolved oxygen and ammonia-nitrogen were attributed to wastewater discharged by the Marysville WWTP, whereas violations for total iron, total lead, total nickel, and total zinc were attributed to urban nonpoint source runoff and possibly atmospheric transport and deposition. The bypassing of untreated and partially treated wastewater into Mill Creek during September, 1978, resulted in comparatively high ammonia-nitrogen (4.0-8.9 mg/l) and BOD_5 and a subsequent fish kill below the Marysville WWTP.

Water quality degradation was found to be limiting for aquatic life downstream from the Marysville WWTP and Ray Lewis outfalls. Recovery of the aquatic communities gradually took place with increasing distance downstream from the Marysville area. A reduction in the loadings of ammonia-nitrogen, oxygen demanding wastes, and toxic substances, should result in improved water quality conditions in Mill Creek. A facility plan to fund and build an advanced wastewater treatment plant at Marysville was approved in 1981. This facility will replace the outdated and undersized secondary treatment facility currently operating. Ray Lewis and Sons continue to batch dump electroplating wastes containing high concentrations of cyanide, nickel, zinc and cadmium. General plans to upgrade facilities at Ray Lewis and Sons have been discussed with the Industrial Wastewater Group (OEPA, CDO) but no construction has been planned to date.

Water quality of the Scioto River between Mill Creek and the Olentangy River was good and supported abundant fish populations in two impoundments. Nutrient levels are high in the Scioto River but the high flushing rates of the reservoirs reduces the severity of algal blooms.

BIOLOGICAL EVALUATIONS

No other recent Ohio EPA macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic data collected from two sampling sites. The benthic community was sampled in August, 1977, from the Scioto River near Dublin in Franklin County (RM 147.8) and in August, 1974, from the Scioto River above Columbus Southerly WWTP in Franklin County (RM 119.2).

The community at the Dublin station consisted of 14 taxa with a diversity index of 2.57 (Ohio EPA, 1980,RD 3-36). Seven taxa of midges along with oligochaetes and unidentified Turbellarians accounted for 99 percent of the number of organisms collected. An evaluation of Class IV (Poor) water quality was assigned based on all macroinvertebrate criteria.

The community at the station above Columbus Southerly consisted of seven taxa with a diversity index of 2.06 (Ohio EPA, 1980, RD 3-37). All taxa collected were organisms considered pollution tolerant. An evaluation of Class IV (Poor) water quality was assigned based on all criteria.

Six other stations were established in this subbasin on Mill Creek at Marysville in Union County in June, 1978. The purpose of the survey was to determine the impact of the Marysville WWTP and Ray Lewis and Sons, Inc. discharges. The six monitoring stations were located at river miles 24.8, 16.8, 12.2, 11.6, 7.1 and 1.7. The Marysville WWTP and Ray Lewis and Sons both discharge to Mill Creek at river mile 18.3. A summary of the data can be found in Table - . The tabulated data can be found in RD 3-28 (Ohio EPA, 1980).

The control station (RM 24.8) was considered to have Class II (Good) water quality based on a high number of taxa (34) and a high diversity index (3.90). The next two stations, river miles 16.8 and 12.2, were located below the two discharges and exhibited similar results with regard to numbers of taxa (21 and 20, respectively) and diversity indices (2.87 and 2.82, respectively). There was a marked difference in community composition between the two sites. The station at river mile 16.8 was almost completely dominated by chironomids, while the sample from river mile 12.2 contained large numbers of the intermediate mayflies Stenacron interpunctatum and Caenis sp. The predominance of tolerant taxa at river mile 16.8 was the primary reason for assigning this site an evaluation of Class IV (Poor) water quality. An evaluation of Class III (Fair) water quality was assigned to the station at river mile 12.2. The next two stations (RM 11.6 and RM 7.1) were also given a Class III (Fair) evaluation due primarily to the lack of pollution sensitive forms and the moderate number of taxa (25 and 20). The most downstream station (RM 1.7) had an increase in number of taxa (28) but a marked decrease in the diversity index (1.78). The poor diversity was caused by the presence of the intermediate mayfly Stenacron interpunctatum which accounted for 77% of the sample. This station was still regarded as having Class III (Fair) water quality.

This survey indicated that discharges from either the Marysville WWTP, Ray Lewis and Sons, Inc., or both had a definite impact on Mill Creek, as determined by the benthic biota. The river showed gradual improvement downstream, but at no point did it reach the water quality of the station sampled above Marysville. A more detailed account of this study can be found in Yoder, et al. (1980).

Table III-21: Summary of Benthic Data Collected from Mill Creek Relative to the Marysville Wastewater Treatment Plant (WWTP) Ray Lewis and Sons, Inc. Discharges, July 1978[a]

	Station (RM)					
	24.8	16.8	12.2	11.6	7.1	1.7
Number of Samplers	5	5	5	4	5	5
Quantitative Taxa	34	21	20	25	20	28
Qualitative Taxa	18	8	16	19	10	18
Organisms/Ft^2	187	350	110	278	47	212
Index ($\bar{d}$)	3.90	2.87	2.82	3.51	3.26	1.78
Evaluation (Class)	II	IV	III	III	III	III

(a) The Marysville WWTP and Ray Lewis and Sons, Inc. discharges are located at RM 18.3.

MILL CREEK MAINSTEM
SCIOTO RIVER CONFLUENCE AT RM 150.7

Segment Problem	Name Description	Use Designation Mile Points
M-5-1 NONE	Mill Creek From the headwaters to the Town Run confluence	SNRW-WWH 37.8-18.9

050 60001-037

The physical/chemical water quality of Mill Creek, sampled at two locations (RM 30.8 and 24.8) upstream from Marysville, was good. Physical/chemical data revealed no WQS violations and concentrations of all substances were well within accepted limits compatible with healthy communities of aquatic life. Biological sampling revealed that the aquatic communities were healthy and balanced. None of the downstream locations exhibited water quality equal to that found at these two locations. Physical/chemical sampling in the lower mile of this segment revealed violations for total iron, total lead and total cadmium. Further investigations are warranted to determine the source and significance of this low level contamination in the Mill Creek Subbasin and adjacent rural areas (Darby Creek Subbasin and other areas in Southwest Ohio).

Segment Problem	Name Description	Use Designation Mile Points
M-5-2 NONE	Mill Creek From Town Run confluence to the Marysville WWTP	WWH 18.9-18.3

050 60001-037

Physical/chemical water quality in this segment ranged from good to fair. Nutrient levels were significantly increased below the confluence with Town Run during critical flow conditions (OEPA, CDO data, 1977-1979) due to loadings from the urban/industrial watershed of Town Run. Total iron and total lead violations from nonpoint sources were found in this segment with increasing frequency (Yoder et al., 1980).

Segment Problem	Name Description	Use Designation Mile Points
M-5-3 MAJOR	Mill Creek From the Marysville WWTP to Hinton Mill Road	WWH 18.3-3.9

0506001-037

Ray Lewis and Sons, a plumbing part and fixture manufacturer, discharged a moderately toxic effluent containing nickel, cadmium, zinc and copper at RM 18.3 (Yoder et al., 1980). The company is currently planning to install a total water recycle system. Once these improvements are completed, water quality in this reach should improve. No construction has begun at this time . The Marysville WWTP (RM 18.3) caused frequent and severe WQS violations for dissolved oxygen and ammonia in this segment of Mill Creek (Yoder et al., 1980). The 1979 preliminary Wasteload Allocation indicated that attainment of the Adjusted Wasteload Limits by the Marysville WWTP will not eliminate WQS violations for dissolved oxygen and ammonia-nitrogen, but will reduce their frequency and severity (OEPA, 1979).

Segment Problem	Name Description	Use Designation Mile Points
M-5-4 MINOR	Mill Creek From the Blue Creek confluence to the Scioto River	WWH 3.9-0.0

050 6001-037

Nearly complete recovery from the organic pollution from the Marysville WWTP was observed in this segment of Mill Creek (Yoder et al., 1980). However, infrequent WQS violations for total iron, total cadmium, total lead, and phenolics did occur. Water quality may be expected to improve in this segment, and possibly upstream, upon completion of wastewater treatment improvements at Ray Lewis and Sons and the Marysville WWTP.

SCIOTO RIVER MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
M-5-5 NONE	Scioto River From the O'Shaugnessy Reservoir to the Olentangy River confluence	WWH 150.7-130.0

O'Shaugnessy Reservoir was rated the most eutrophic of 20 Ohio lakes sampled by the U.S. EPA in 1973 (U.S. EPA, 1975). Low levels of algal density were found despite relatively high nutrient loads, a condition that reflects the high flushing rate of O'Shaugnessy Reservoir. Physical/chemical water quality

below O'Shaugnessy Reservoir, including Griggs Reservoir, appeared to be good with the exception of relatively high nutrient levels (OEPA, CDO data, 1978). The Scioto River in Columbus was affected by urban stormwater runoff, but physical/chemical water quality remains generally good (OEPA, CDO data, 1979).

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979 (unpublished). Scioto River basin - initial proposal for wasteload allocation. Ohio EPA, Office of Wastewater, Division of Water Quality Planning and Assessment, Columbus, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

United States Environmental Protection Agency. 1975. Report on O'Shaughnessy Reservoir, Delaware County, Ohio. Working paper No. 407. U.S. Environmental Protection Agency, Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Yoder, C.O., J.P. Abrams, J.T. Freda, J. Hren, D.O. McIntyre, C.D. Webster, and J.D. Yonger. 1980. Water quality study of Mill Creek, Union and Delaware Counties, Ohio. Technical Report No. 80/1. Ohio EPA, Office of Wastewater Pollution Control, Division of Surveillance and Standards, Columbus, Ohio.

SCIOTO RIVER BASIN

UPPER BIG DARBY CREEK SUBBASIN (M-6)

SUBBASIN SUMMARY

The Big Darby Creek Subbasin was characterized by good physical/chemical water quality and areas of excellent stream habitat. The entire Big Darby Creek drainage area has been classified as Exceptional Warmwater Habitat (EWH) in the Ohio Water Quality Standards. Numerous endangered species are known to inhabit Big Darby Creek.

Land use in the subbasin is predominately row crop agriculture and the few point sources of pollution have only a minor impact on water quality. Concentrations of total lead, total cadmium and total iron violated EWH standards in 10%-15% of the samples collected during the intensive survey of 1979, but the degree of the problem will not prevent attainment of 1983 clean water goals.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous benthic sampling in the subbasin was conducted in August, 1975, at three stations located on Big Darby Creek at Plain City in Madison County. The purpose of the survey was to determine the impact of the Ranco Corporation discharge. The three monitoring stations were located at river miles 54.2, 53.2 and 52.4. The Ranco discharge is located at river mile 54.1. A summary of the data can be found in Table - . The tabulated data can be found in RD 3-31 (Ohio EPA, 1980).

The benthic samples at the upstream station (RM 54.2) and the station immediately below the Ranco discharge (RM 53.2) were quite similar in number of taxa collected (27 and 28, respectively) and diversity indices (3.37 and 3.72, respectively). These stations were evaluated as having Class III (Fair) water quality because of the sparsity of pollution sensitive organisms. The benthic community at river mile 52.4 decreased in both number of taxa (20) and diversity index (2.68). This seemed to indicate some degradation in water quality at the site, but an evaluation of Class III (Fair) was retained.

The Ranco Corporation discharge apparently had little or no impact on Big Darby Creek, as reflected by the benthic biota.

LITTLE DARBY CREEK
BIG DARBY CREEK TRIBUTARY
CONFLUENCE AT RM 34.1

Segment Problem	Name Description	Use Designation Mile Points
M-6-2 NONE	Little Darby Creek From the headwaters to Big Darby Creek	SNWR-EWH 38.0-0.0

Table III-22: Summary of Benthic Data Collected from Big Darby Creek Relative to the Ranco Corporation Discharge, August, 1975[a]

	Station (RM)		
	54.2	53.2	52.4
Number of Samplers	5	5	5
Quantitative Taxa	27	28	20
Qualitative Taxa	17	15	8
Organisms/Ft^2	105	113	61
Index ($\bar{d}$)	3.37	3.72	2.68
Evaluation (Class)	III	III	III

(a) The Ranco Corporation discharge is located at RM 54.1.

Total iron, total lead, and total cadmium Exceptional Warmwater Habitat standards violations were noted in this stream segment (OEPA, CDO data, 1979a). These heavy metals were present at elevated concentrations in a substantial portion of the Big Darby Creek, drainage as well as adjacent watersheds (see the Mill Creek Subbasin Report). There is no known point source within the basin for these metals. Atmospheric transportation and pesticide runoff are suspected sources.

Little Darby Creek receives some point source pollution loading, but sampling in 1979 revealed minimal impact during higher than normal discharge conditions (OEPA, CDO data, 1979a). Wasteload modeling has indicated potential water quality problems below the Mechanicsburg WWTP (RM 39.2) and the West Jefferson WWTP (RM 5.3) during low flow conditions (OEPA, 1979b). Advanced Waste Treatment was recommended for both these facilities, but no action has yet been taken. Isolated water quality problems existed in several drainage ditches in the Scenic Hills (RM 11.9) and Darby Crest (RM 8.3) subdivisions where numerous failing septic tank systems were found by Burgess and Niple (1978).

The city of West Jefferson is still in Step 1 of the Construction Grants Program. Water quality improvements in Little Darby Creek are expected upon completion of wastewater treatment improvements. The Scenic Hills and Darby Crest subdivisions may be connected to the West Jefferson WWTP. Until a final facilities plan is completed and approved by all interested parties, no improvements can be anticipated.

BIG DARBY CREEK
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 97.0

Segment Problem	Name Description	Use designation Mile Points
M-6	Big Darby Creek From the headwaters to the Little Darby Creek confluence	SNRW-EWH 81.0-34.1

05060001-015
05060001-043
05060001-041

An intensive physical, chemical and biological survey of Big Darby Creek was conducted in 1979 (OEPA, CDO data, 1979a). Preliminary findings suggested that agricultural land use had the greatest influence on physical/chemical water quality. Average nitrate concentrations increased from the headwaters to mile point 58.8. This stream segment drains an intensive agricultural area and tile drainage from such land use is characteristically high in nitrates (Omernik, 1976). In addition, a strong correlation of stream discharge with suspended sediment indicated that heavy rainfall and subsequent agricultural runoff were of primary importance in determining the concentrations of sediment and associated nutrients in Big Darby Creek (OEPA, 1979b). Fecal coliform bacterial concentrations were also elevated after rainfall events suggesting nonpoint sources of contamination.

Water quality impacts from urban areas were minimal within this stream segment. Ineffective septic tank systems in the village of Milford Center caused slightly higher concentrations of fecal coliforms, total Kjeldahl nitrogen, phosphorus, and chemical oxygen demand. The sewage effluent had no substantial influence on the biological communities in Big Darby Creek.

Exceptional Warmwater Habitat violations for total lead, total cadmium and total iron were recorded during the 1979 survey (OEPA, CDO data, 1979a). The cause of these heavy metal problems is unknown; further investigation is needed to assess the relative contributions from natural background sources, nonpoint pollution, and atmospheric transport.

REFERENCES

Burgess and Niple, Limited. 1978 (unpublished). West Jefferson Facilities Plan. Burgess and Niple, Columbus, Ohio.

Ohio Environmental Protection Agency. 1977-1980. (unpublished data). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979a (unpublished). Survey of Big and Little Darby Creeks. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. (1979b) Scioto River Basin water quality management plan, Part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

Omernik, J.M. 1976. The influence of land use on stream nutrient levels. U.S. Environmental Protection Agency, Office of Research and Development, Corvallis, Oregon. EPA-600/3-76-014. 105 pp.

SCIOTO RIVER BASIN

DEER CREEK SUBBASIN (M-7)

SUBBASIN SUMMARY

The Deer Creek Subbasin is predominantly a rural area, with approximately 96% of the total land classified as vacant or agricultural (MORPC, 1979). The principal population centers are London (RM 7.0 on Oak Run), Mt. Sterling (RM 34.5 on Deer Creek) and Williamsport (RM 14.2 on Deer Creek). Physical/chemical water quality problems are documented only for Oak Run below the London Correctional Institute.

In general, physical/chemical water quality is judged to be good, although an extensive data base was lacking. Sediment runoff with corresponding nutrient transport were the principal nonpoint source pollution problems. The impact of agricultural runoff on biological communties is uncertain, and further biological sampling is needed to fully assess the impact of this pollution source in relation to attainment of 1983 clean water goals. Limited field studies on sediment loads have already been conducted by the U.S. Geological Survey as part of the Deer Creek Reservoir Project. Based on available data, the entire subbasin is expected to meet the 1983 water quality goals on schedule.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of one sample collected in August, 1974, from Deer Creek near its confluence with the Scioto River in Ross County (RM 1.1). Twenty-nine taxa were collected with a diversity index of 2.76 (Ohio EPA, 1980, RD 3-57). The sample consisted of nine taxa of mayflies, seven taxa of caddisflies, and nine taxa of midges. The overall benthic community appeared healthy and diverse and indicated Class II (Good) water quality.

OAK RUN
DEER CREEK TRIBUTARY
CONFLUENCE AT RM 51.0

Segment Problem	Name Description	Use Designation Mile Points
M-7-2 MINOR	Oak Run From the London Correctional Institute WWTP to Deer Creek	WWH 12.0-0.0

Significant point source degradation of water quality occured in the headwaters of Oak Creek below the London Correctional Institute (LCI) WWTP (RM 11.9) and the city of London WWTP (RM 7.8) (Ohio EPA 1974, 1976, 1978a). Recent low flow water quality monitoring of Oak Run near LCI revealed substantial water quality degradation for nutrients, suspended solids and dissolved oxygen (Ohio EPA, CDO data, 1978b). The 201 Facility Plan for the area recommends that LCI connect to the existing London Sanitary System. The degraded segment of Oak Run may meet 1983 water quality goals if the recommendation is implemented.

DEER CREEK MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 81.8

Segment Problem	Name Description	Use Designation Mile Points
M-7-1	Deer Creek	WWH
NONE	From the Madison Lake outlet to the Scioto River	62.3-0.0

Recent physical/chemical water quality data for the majority of the Deer Creek Subbasin is not available. Monthly water quality sampling conducted between 1973-1977, near the confluence of Deer Creek with the Scioto River, revealed no significant WQS violations (OEPA, CDO data, 1973-1977). Conditions have not substantially changed in the reach below Deer Creek Reservoir and further investigation is not warranted.

Deer Creek, between the village of Mt. Sterling (RM 34.5) and the Deer Creek Reservoir, was recently sampled by the Army Corps of Engineers. The data indicated infrequent ammonia violations in this segment of Deer Creek (OEPA, 1979). The Mt. Sterling WWTP was the probable source of these violations. This municipality is currently completing facility plans for upgrading existing treatment facilities, but it is unlikely that any improvements will be completed prior to 1983. The discharge does not seriously impact stream quality, and the minor standards violations will not impair attainment of 1983 goals.

REFERENCES

Mid-Ohio Regional Planning Commission. 1979. Existing conditions report for the central Scioto water quality management planning area.

Ohio Environmental Protection Agency. 1973-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1974. Scioto River basin 303(e) wasteload allocation report. Ohio EPA, Division of Surveillance, Southeast District Office, Logan, Ohio.

Ohio Environmental Protection Agency. 1976. Scioto River basin 305(b) annual water quality summary. Ohio EPA, Division of Surveillance, Central District Office, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978a. State of Ohio 305(b) annual water quality summary. Ohio EPA, Office of Wastewater, Division of Surveillance and Lab Services, Columbus, Ohio.

Ohio Environmental Protection Agency. 1978b (unpublished). Special water quality survey, data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. (1979). Chapter 1, Existing water quality. In: Scioto River basin water quality management plan, part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

SCIOTO RIVER BASIN

MIDDLE SCIOTO RIVER SUBBASIN (M-8)

SUBBASIN SUMMARY

Physical/chemical water quality in the 50 mile segment of the Scioto River below Columbus remains poor. Pollutant loading from the metropolitan Columbus area (RM 125 to 114) and the city of Circleville (RM 96 to 91.8) exceeded the assimilative capacity of the Scioto River, despite wastewater treatment improvements at several facilities. Municipal and industrial point sources and urban nonpoint sources were significant in degrading this river segment. However, the diversion of upstream flow for public water supplies may be the single most important factor preventing the attainment of 1983 clean water goals in portions of the Scioto River.

Lower Big Darby Creek has excellent physical/chemical water quality and stretches of exceptional stream habitat. A biological and water quality survey of the Big Darby Creek drainage in 1979 (OEPA, CDO data) revealed that agricultural land use influenced water quality and that there were only minor point source pollution impacts (see the Big Darby Creek Subbasin report).

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of 14 sets of benthic data collected from five locations. Included were data from a station on the Scioto River below Columbus Southerly WWTP in Franklin County (RM 117.3), a station on the Scioto River below Big Walnut Creek in Pickaway County (RM 116.8), a NASQAN station on the Scioto River at Circleville in Pickaway County (RM 100.8), a station on the Scioto River above Deer Creek in Ross County (RM 85.4), and a NASQAN station on Big Darby Creek at Darbyville in Pickaway County (RM 13.2).

The Scioto River below Columbus Southerly WWTP was sampled at east bank and west bank stations in August, 1977, and August, 1974 (Ohio EPA, 1980, RD 3-38 and RD 3-39). The 1977 samples consisted of 14 taxa with a diversity index of 2.78 at the east bank and 14 taxa with a diversity index of 2.78 at the east bank and 14 taxa with a diversity index of 2.63 at the west bank. Four taxa of midges and the pulmonate snail Physa accounted for greater than 75 percent of the total numbers of organisms collected at each station. The 1974 samples consisted of five taxa with a diversity index of 0.11 at the east bank and ten taxa with a diversity index of 0.13 at the west bank. Oligochaetes overwhelmingly dominated the samples with extremely high densities found at the west bank. All four samples were assigned evaluations of Class IV (Poor) water quality. Some improvements in the benthic community were noted in 1977, but it was not known whether these changes reflected improved water quality.

The Scioto River below Big Walnut Creek was sampled at an east bank and west bank station in August, 1974 (Ohio EPA, 1980, RD 3-40). Seven taxa with a diversity index of 0.10 were collected at each bank. Again, oligochaetes overwhelmingly dominated the samples, reflecting very poor water quality. Evaluations of Class IV (Poor) were assigned.

The Scioto River at Circleville was sampled at an east bank and west bank station in August, 1977, a west bank station in August, 1976, and an east bank and west bank station in August, 1974 (Ohio EPA, 1980, RD 3-41, RD 3-42, RD 3-43, and RD 3-44). The number of taxa ranged from 9 at the east bank in 1974 to 20 at the west bank in 1977. Diversity indices ranged from 1.30 at the east bank in 1977 to 3.11 at the west bank in 1974. All samples were dominated by large numbers of midges, oligochaetes and flatworms. Increased numbers and kinds of mayflies and caddisflies collected in 1977 seemed to indicate improving water quality, although all sites were assigned evaluations of Class IV (Poor) water quality. The Scioto River above Deer Creek was sampled at an east and west bank station in August, 1974 (Ohio EPA, 1980, RD 3-45). Fourteen taxa with a diversity index of 2.61 were collected at the east bank and 13 taxa with a diversity index of 2.37 were collected at the west bank. Both samples were composed of large numbers of midges, oligochaetes and flatworms. Evaluations of Class IV (Poor) water quality were assigned.

Big Darby Creek at Darbyville was sampled in August, 1977 (Ohio EPA, 1980, RD 3-55). Twenty-six benthic taxa were collected (diversity index 3.54). The sample was composed of nine taxa of mayflies, three taxa of caddisflies, and nine taxa of midges. No one taxon dominated numerically. An evaluation of Class II (Good) water quality was assigned.

Other benthic monitoring previously conducted in the subbasin included data from three stations sampled in July, 1977, on Scippo Creek south of Circleville in Pickaway County. The purpose of the survey was to determine the impact of the PPG Industries discharge. Stations were established at river miles 4.9, 4.4, and 2.25. The PPG discharge enters Scippo Creek at river mile 4.7. The benthic data collected at the three stations can be found in RD 3-32 (Ohio EPA, 1980). A summary of the data can be found in Table - .

The number of taxa (27) and diversity index (3.48) found at river mile 4.9 located above the discharge indicated Class II (Good) water quality. The water quality at station 4.4, located below the discharge, was Class IV (Poor). The number of taxa was reduced to 12 and the diversity index was 2.50. There was also a reduction in both numbers and types of mayflies at this station. At river mile 2.25, the species composition was similar to that found at the station above the outfall, with 26 taxa present and a divesity index of 3.81. Class II (Good) water quality was again indicated.

The PPG Industries effluent had a major deleterious effect on the water quality of Scippo Creek, but the stream recovered approximately 2.4 miles below the discharge.

Table III-23: Summary of Benthic Data Collected from Scippo Creek Relative to the PPG Discharge, July 1977[a]

	Station (RM)		
	4.9	4.4	2.2
Number of Samplers	5	5	5
Quantitative Taxa	27	12	26
Qualitative Taxa	14	6	19
Organisms/Ft^2	294	64	364
Index ($\bar{d}$)	3.48	2.50	3.81
Evaluation (Class)	II	IV	II

(a) The PPG Industries discharge is located at RM 4.7.

SEGMENT REPORTS

BIG DARBY CREEK
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 97.0

Segment Problem	Name Description	Use Designation Mile Points
M-8-2 NONE	Big Darby Creek From the Little Darby Creek confluence to the Scioto River	SNRW-EWH 34.1-0.0

Physical/chemical water quality is much the same as in Upper Big Darby Creek (see separate subbasin report). A single WQS violation of the Exceptional Warmwater Habitat dissolved oxygen standard was observed in 61 samples (OEPA, CDO data, 1979a).

Segment Problem	Name Description	Use Designation Mile Points
M-8-1 MAJOR	Scioto River From the Olentangy River confluence to the Deer Creek confluence	WWH 130.0-81.1

Ohio WQS violations for dissolved oxygen, ammonia, phenolics, and fecal coliforms were reported in this segment (OEPA, CDO data, 1977-1979). Combined sewer overflows, urban storm runoff, and point source pollution caused this degradation of water quality (OEPA, 1979b). Major dischargers include the Columbus Jackson Pike WWTP (RM 123), the Columbus Southerly WWTP (RM 114), the Circleville WWTP (RM 95.3), the Container Corporation of America (RM 95.2), the DuPont Company (RM 91.8) and Pittsburgh Plate Glass Company (RM 86.1). Solids handling problems at both Columbus facilities limit treatment efficiencies resulting in sewage bypasses during periods of high incoming flow. To alleviate these sludge problems, a new incinerator has been introduced on line at the Jackson WWTP, and newly installed centrifuges were operational at the Southerly WWTP. In addition, the city has initiated a sludge composting operation at the Southwesterly site in cooperation with the Ohio Farm Bureau. The digested sludge is to be applied to farm land as a soil conditioner.

These and other pollution abatement programs can be expected to improve the quality of the middle Scioto River. However, the diversion of upstream flows for public water supplies combined with the sheer volume of wastes generated in the metropolitan Columbus-Circleville area will probably continue to prevent the scheduled attainment of 1983 clean water goals.

Studies of the water quality problems of the Middle Scioto River Basin have been conducted in recent years by Burgess and Niple and the U.S.G.S. The results have not yet been made public, but should provide additional information on the problems in this area.

HISTORICAL

Data from four sampling stations on the Scioto River, below Columbus were reviewed to determine if any improvements in water quality had occurred since the stations were established. The information, tabularized in table III-24 indicated that no patterns of improvement nor degradation exist (i.e., no increase or decrease in the frequency or magnitude of Ohio WQS violations).

A closer look at water quality patterns in the Scioto River below Columbus was made to determine if any substantial improvements could be noted.

The Scioto mainstem below Columbus is one area of the basin which has been continuously monitored for many years, not only by state and federal pollution control agencies but also local industrial and municipal water pollution control co-operators.

The Columbus metropolitan area accounted for some 70% of the total population in the Scioto River basin. It was the dominant pollution source in the Middle Scioto Basin. Wastewater from the Columbus Jackson-Pike and Southerly WWTPs accounts for a majority of the discharge of the Scioto River below Columbus during low flow. As a result, the quality of this effluent has a major impact upon ambient water quality in this stream segment.

An attempt was made to develop correlations between mean annual discharge for the U.S. Geological Gaging Site at Columbus, (RM 127), the U.S. Geological continuous dissolved oxygen recorder near Shadeville (RM 116.7), and the combined effluent total C-BOD_5 load for Jackson-Pike (RM 127.1) and Southerly WWTPs (RM 118.4). Even though various statistical analyses were used to review the data, no significance could be established (Tables III-24 through III-26).

Table III-28 is a summary from the entities self monitoring data of total C-BOD effluent loading per day for the individual Columbus WWTPs. The information is incomplete since no exact measure of raw or settled bypass discharge is available for Jackson Pike, and measurement of raw bypass at Southerly is only available from 1977 to the present. Estimates for Southerly bypass loadings were calculated using a percentage of the average hourly flow rate for the plant for the years 1972-1976. The data indicate an apparent significant decline in total C-BOD_5 loading from these facilities. The magnitude is on the order of 55% when the 1972-1976 mean combined loading is compared to the 1977-1980 mean combined loading.

These load reductions coincided with a substantial decline in the number of days per water year when the maximum daily dissolved oxygen at the continuous recorder near Shadeville (RM 116.7) was below 5 mg/l Table III-24. The percentage of days has declined from 27.4% for the period 1972-1975 to 4.4% for the period 1976-1980.

NPDES Permits for these facilities were initially issued in March, 1975. However, because of legal appeals, an effective permit was not in force for Jackson Pike until 1976, while the Southerly permit was not effective until 1977.

Incremental improvement in mean dissolved oxygen and ammonia-nitrogen for the Scioto River near South Bloomfield (RM 105.4) (Tables III-27-3-28) are further indication of improving chemical water quality for the period 1974-1980 the results indicate a general increase in mean dissolved oxygen. Coupled with a general decrease in mean ammonia-nitrogen. This apparent improvement in river quality is likely the direct result of the continuing improvements of the effluent quality at both of the Columbus WWTPs. Continued monitoring is needed to verify these apparent environmental improvements.

Table III-29: Mill Creek Below Marysville (RM 17.8)

Warmwater Habitat Water Quality Standard Violations/Total Number Samples

Parameter	1976	1977	1978	1979	1980	1981
Dissolved O_2 (5.0 mg/l)			3/9	1/12	1/12	4/11
Fecal Coliform			2/9	4/12	4/12	5/11
Phenolics			0/5	1/12	3/11	0/10
Cyanide			0/9	1/11	1/10	1/8
T. Iron			0/6	1/4	3/4	2/4
T. Lead			1/6	1/4	1/4	0/4
T. Zinc			0/6	0/4	0/4	0/4
T. Copper			0/6	0/4	0/4	0/4
T. Cadmium			0/6	0/4	0/4	0/4
T. Chromium			0/6	0/4	0/4	0/4
Ammonia-N			3/9	0/12	1/12	4/11
(Cal. Year) Q (Mean Annual) (Discharge)	89.9	129	167	242	-	-

Stream Classification: Warmwater Habitat

Table III-25: Big Darby Creek at Darbyville (RM 13.2)

Exceptional Warmwater Habitat Water Quality Standards
Violations/Total Number Samples

Parameter	1976	1977	1978	1979	1980	1981
Dissolved O_2	0/10	0/11	0/11	0/11	0/12	0/12
Fecal Coliform	0/10	0/11	0/11	2/10	2/11	1/12
Ammonia-N	0/10	0/11	0/11	0/2	0/12	0/12
Phenolics	1/8	0/3	0/3	0/4	0/4	0/4
T. Iron	1/4	0/4	-	2/4	2/4	-
T. Lead	0/4	1/4	0/4	0/4	0/4	0/4
T. Copper 5 mg/l max	1/4	0/4	0/4	0/4	0/4	0/4
T. Zinc	0/4	2/4	0/4	0/4	1/4	1/4
T. Cadmium 1.2 ug/l	0/4	0/4	0/4	0/4	0/4	0/4
T. Chromium 50 ug/l	0/4	0/4	0/4	0/4	0/4	0/4
(Cal. Year) Q (Mean Annual) (Discharge)	341	413	509	818	-	-

Stream Classification: Exceptional Warmwater Habitat
State - National Resource Waters

Table III-26: Scioto River at Florence-Chapel Bridge (RM 101.8)

Warmwater Habitat Water Quality Standards Violations/Total Number Samples

Parameter	1976	1977	1978	1979	1980	1981
Dissolved O_2 (5.0 mg/l)		0/3	3/11	4/12	2/12	1/11
Fecal Coliform		0/3	3/12	6/12	8/9	6/12
Ammonia-N		0/3	1/12	0/12	0/12	0/11
Phenolics		1/2	1/12	3/11	0/12	0/10
T. Iron		-	-	2/3	2/4	2/4
T. Lead		0/1	0/4	0/4	1/4	0/4
T. Copper		0/1	0/4	0/4	0/4	1/3
T. Zinc		0/1	0/4	0/4	0/4	0/3
T. Cadmium		0/1	0/4	0/4	0/4	0/3
T. Chromium		0/1	0/4	0/4	0/4	0/3
(Cal. Year) Q (Mean Annual) (Discharge)	1969	1919	2637	Gage Site Discontinued		

Stream Classification: Limited Warmwater Habitat

Table III-27: Olentangy River Near Worthington (RM 11.5)

Warmwater Habitat Water Quality Standards Violations/Total Number Samples

Parameter	1976	1977	1978	1979	1980	1981
Dissolved O_2	0/10	0/11	0/12	0/12	0/12	0/12
Fecal Coliform	3/9	3/10	5/11	2/.11	0/11	2/11
Ammonia-N	0/10	0/11	0/12	0/12	0/12	0/12
Phenolics	0/11	1/7	0/3	0/4	0/4	0/5
T. Iron	2/4	0/3	-	2/3	1/4	1/4
T. Lead	0/4	0/4	1/4	0/4	0/4	0/4
T. Copper	0/4	0/4	02/	0/4	0/4	0/4
T. Zinc	0/4	0/4	0/4	0/4	0/4	0/4
T. Cadmium	0/4	0/4	0/4	0/4	0/4	0/4
T. Chromium	0/4	0/4	0/4	0/4	0/4	0/4
(Cal. Year) Q (Mean Annual) (Discharge)	364	409	490	723	-	-

Stream Classification: Warmwater Habitat
State - National Resource Waters

Table III-28: City of Columbus: Final Effluent C-BOD_5 Loading to the Scioto River (lbs/day)

Calendar Year	Jackson Pike WWTP				Southerly WWTP		
	Bypass	Final	Total	Bypass	Final	Total	Combined
1972	NO	26286	26286	5064 (est.)	14784	19848	46134
1973	DATA	22175	22175	12957 (est.)	25515	38472	60647
1974	FOR	14175	14174	6187 (est.)	30540	36727	50902
1975	WHITTIER	13058	13058	17751 (est.)	7964	25715	38773
1976	STREET	8710	8710	10526 (est.)	11058	21584	30294
1977	STORM	7302	7302	2412	8229	10641	17943
1978	TANK	7910	7910	7200	5559	12759	20669
1979	DISCHARGE	8472	8472	11558	4642	16200	24672
1980		7292	7292	6575	3900	10475	17767

SCIOTO RIVER INTENSIVE SURVEY

The Ohio EPA conducted an intensive biological and water quality survey on the Scioto River during 1979. Following is the summary and conclusion from the final report. The entire text of the final report appears as a separate volume of this 1982 305(b) reports.

SUMMARY

The distribution and abundance of fishes in the lower 170.8 mile section of the Scioto River was studied during July-November, 1979. The principal objective of this study was to evaluate overall environmental and water quality as reflected by the distribution and relative abundance of the fish community and to establish a baseline against which future trends can be compared. Within the scope of this study we were able to determine the magnitude of point and nonpoint source impacts on the fish community and judge the effectiveness of existing water pollution control efforts.

The distribution and relative abundance of fishes in the 170.8 mile study area was determined through the use of a boat-mounted electrofishing device (pulsed d.c.) three times at each of 60 locations, 48 of which were located in the mainstem river and 12 in the lower sections of major tributaries. Grab water samples were collected at 53 locations for chemical/physical analysis. Water quality monitors operated by the U.S. Geological Survey (USGS) at three locations on the mainstem measured dissolved oxygen, temperature, pH, and specific conductance continuously. Of the 53 grab sample locations, 46 were sampled by Ohio EPA during the fish collections and 16 by industries, municipalities, and other government agencies. A total of 20 chemical/physical water quality parameters were measured at these locations during the study period.

River discharge (cfs) measured at three locations in the study area was at or well above normal during the study period. In mid-September river discharge reached its peak with flows at Columbus and Chillicothe being equivalent to the flow exceeded only 1.1% and 0.3% of the time, respectively. Mean monthly river discharge in September was 1150% above normal at Higby and 1230% above normal at Chillicothe. The observed trends in river discharge appeared to be closely related to trends in rainfall.

Chemical/physical water quality sampling revealed water quality standards violations for certain parameters. The greatest number of violations occurred for total iron (72%), fecal coliform bacteria (50%), and total lead (22%). The frequency and magnitude of these violations increased during periods of high runoff. Although frequent violations of both the dissolved oxygen and ammonia standards have been reported downstream from Columbus in previous years, few violations were observed for dissolved oxygen (5%) and none for ammonia. This was attributed to dilution caused by increased river discharge rather than improvements in municipal wastewater treatment. Despite the lack of violations, longitudinal trends for instream ammonia-nitrogen and BOD_5 indicated a substantial influence from major point sources. Nutrient levels (nitrate-nitrogen, total phosphorus) in the study area were affected by major municipal wastewater discharges downstream from Columbus and a distinct positive relationship with agricultural land use.

A total of 11,427 individual fish representing 70 species and 5 hybrids were encountered at the 60 electrofishing locations. Gizzard shad (Dorosoma cepedianum) and common carp (Cyprinus carpio) were the two most abundant species accounting for more than 30% of the total catch by number. During the course of this study pronounced, negative effects on the fish community resulting from changes in water quality attributable to point sources of wastewater were observed. Of the 46 point sources located along the 170.8 mile study area, which included the lower sections of major tributaries, only 5 were determined to have an appreciable impact on fish community structure. A consistent relationship between the magnitude of point source loadings and the condition of the fish community was demonstrated. Expected patterns in community diversity, abundance, and composition were interrupted for varying distances downstream from these point sources. Water quality standards violations for certain parameters affected by these point sources (e.g., D.O., NH_3-N) were rare or non-existent. This was, however, more a reflection of higher than normal river discharge rather than a genuine improvement in water quality. The most severe impact observed in the study area was in a 25 mile segment of the mainstem downstream from the Columbus Jackson Pike and Southerly wastewater treatment plants (WWTP), despite the potential mitigative effects of above normal river discharge. These two facilities contributed 85-98% of the total loadings of 5-day biochemical oxygen demand (BOD_5), ammonia-nitrogen (NH_3-N), nutrients, and toxic substances (metals, cyanide, phenolics, chlorine) attributable to point sources in the study area. The decline of the fish community in a 9.6 mile segment of the mainstem downstream from the Container Corporation of America and Circleville WWTP outfalls was pronounced, but of short duration with sustained recovery occurring very quickly. The total pollutional loading from these two sources was much less than those observed for the two Columbus facilities and was reflected in a quicker, more substantial recovery of the fish community. A large depression in the fish community occurred in a 18.4 mile segment of the mainstem beginning approximately 20 miles downstream from the Mead Corporation - Chillicothe Mills outfall. The effect, although detectable, was not judged to be particularly severe.

Predictions of maximum dissolved oxygen and ammonia stress by wasteload modeling performed in 1978 for the mainstem Scioto River downstream from Columbus was in general agreement with the results of this study. However, similar efforts to predict the impact of the Mead Corporation - Chillicothe Mills effluent on Paint Creek and the Scioto River contrasted sharply with the results of this study. The condition of the fish community indicated that the maximum stress occurred 20-40 miles downstream from Mead, whereas wasteload modeling predicted the maximum impact (i.e., D.O. depletion) to occur approximately one mile downstream in Paint Creek. Taking into account the nature of the Mead effluent (i.e., slow decaying substances) and the fact that lower Paint Creek supported a diverse and healthy fish community supports the conclusions of this study. There is also a possibility that the secondary breakdown of substances (i.e., tannins) present in the Mead effluent may have had a detrimental effect in the Scioto River. This possibility requires further investigation.

Comparisons were made between the results of this study and previous studies of the Scioto River. Although certain sections of the mainstem remain degraded, some improvements were evident, especially over the past 30-50 years. Comparisons with fairly recent evaluations did not always reveal

agreement, especially with those that were based largely on chemical/physical data. Some segments which were previously classified as degraded, based on chemical/physical data alone, were found to meet Clean Water Act goals by this study.

The impact of point sources on instream water quality was the principle reason for the degradation of the fish community in the mainstem Scioto River. Three major problem segments were identified by this study based on Ohio EPA biological (fish) criteria for determining the attainment of Clean Water Act goals:

1. The mainstem Scioto River downstream from the Columbus Jackson Pike and Southerly WWTPs to just upstream from Big Darby Creek (RM 127.1-102.0), a distance of 25.1 miles; rated "fair" (Class III).

2. The mainstem Scioto River downstream from the Circleville WWTP and Container Corporation of America (RM 99.6-90.0), a distance of 9.6 miles; rated "fair" (Class III).

3. The mainstem Scioto River beginning at a point approximately 20 miles downstream from the Mead Corporation - Chillciothe Mills (RM 45.1-26.7), a total distance of 18.4 miles; rated "fair" (Class III).

Minor problem segments were also identified and included less than 3-5 miles of river each. Some of these short segments were rated "good" (Class II), but were singled out because community diversity and abundance was lower than immediate flanking areas. One of these minor problem segments was attributed to effects from a nonpoint source. Community diversity, abundance, and composition in the mainstem adjacent to downtown Columbus was within acceptable limits (i.e., Class II or better), but the incidence of external lesions, tumors, and eroded fins among individual fish was by far the highest in the study area. Sublethal stresses apparently caused by inputs from the Columbus combined sanitary/storm sewer system were blamed in this case.

Near term prospects for the recovery of the Scioto River fish community are largely dependent on the success of programs aimed at reducing point source loadings, primarily for oxygen demanding wastes and ammonia. These two constituents were the principle causes of degradation observed in terms of fish community structure. A 14-year trend analysis of the relationship between dissolved oxygen, 5-day biochemical oxygen demand (BOD_5), D.O., and river discharge indicated that the significant improvement in dissolved oxygen levels monitored at Chillicothe (RM 70.9) and Higby (RM 56.1) was positively linked to upstream reductions in point source BOD_5 loadings. The most significant BOD_5 loading reductions were noted in the Mead Corporation - Chillicothe Mills and Circleville WWTP effluents. The results for the Shadeville monitor (RM 116.7), located downstream from Columbus, did not indicate a consistent improvement in either dissolved oxygen levels or BOD_5 loadings. These observations were consistent with the relative condition of the fish community adjacent to each monitoring location.

Efforts by the city of Columbus to upgrade wastewater pollution control facilities must have as a high priority the correction of the Southerly raw wastewater bypass, and secondly, the consistent attainment of the final effluent BOD_5 and ammonia-nitrogen limits consistent with water quality

standards for both facilities. The amount of bypassing of raw wastewater at Southerly substantially increased from 1976 through 1979 and made up 44.2% of the entire BOD_5 loading attributable to point sources in the study area during 1979. Although both Columbus facilities appeared to approach or even meet their current final 30-day average NPDES permit limits during 1978 and 1979, variable daily plant performance resulted in the doubling and tripling of the BOD_5 and ammonia loading on certain days. If frequent enough, these episodes could prevent recovery of the fish community even though 30-day average limits may be maintained. Adequate treatment facilities that will maintain a consistent effluent on a day to day basis are needed.

The potential for the full recovery of the Scioto River fish community is quite good, primarily because of the existence of several relatively undamaged tributaries and the apparent lack of residual effects. Recovery of the mainstem fish community is, however, dependent on the success of programs aimed at reducing point source loadings of BOD_5 and ammonia and the consistent attainment of water quality based effluent limits.

CONCLUSIONS

1. River discharge measured at three locations in the study area was at or well above normal during the study period. High runoff resulted in increased water quality standards violations for total iron (72%), fecal coliform bacteria (50%), and total lead (22%). Although violations of the dissolved oxygen and ammonia standards downstream from Columbus have been frequent during past years, few violations were observed for dissolved oxygen (5%) and none for ammonia. This was attributed to dilution caused by above normal river discharge rather than improvements in municipal wastewater treatment.

2. The heaviest loading of pollutants attributable to point sources in the study area occurred in segment 3 (RM 127.1-117.1) downstream from Columbus. This segment received the highest mean volume of wastewater (66.5% of the study area total), and the highest loading of BOD_5 (81.1%), ammonia-nitrogen (84.9%), toxic substances (metals, cyanide, phenolics, chlorine) (95.8%), and nutrients (93.9%) of any of the 11 segments in the study area. The only exception was with total suspended solids where segment 8 (RM 63.5-39.5) made up 54.9% of the total to segment 3's 30.1%. Nearly all of the loading in segment 3 was attributable to the Columbus Jackson Pike and Southerly WWTP effluents, and in segment 8 to the Mead Corportion - Chillicothe Mills.

3. Raw wastewater bypasses at the Columbus Southerly WWTP accounted for 44.2% of the BOD_5 loading in the study area (54.5% in segment 3), but only 2.4% of the volume. The elimination of this bypass would result in substantial water quality and aquatic life benefits.

4. A comparison of land use characteristics with instream ammonia-nitrogen, BOD_5, nitrate-nitrogen, total phosphorus, and specific conductance revealed a positive relationship between % agricultural land use and nitrate-nitrogen and total phosphorus. The effect of point sources on all of these parameters in the mainstem river was substantial, particularly for ammonia-nitrogen and BOD_5.

5. Based on the results of two previous studies it was estimated that the Columbus combined sanitary/storm sewer system could contribute 15-20% of the total BOD_5 loading attributable to point sources in segment 3 (RM 127.1-117.1). More than 90% of the total combined sewer loading can enter via the Whittier Street stand-by storm tanks at RM 129.8.

6. A total of 11,427 individual fish represented by 70 species and 5 hybrids were encountered at 60 electrofishing locations. This is roughly 60% of the 116 species that have been recorded as occurring in the study area since 1900.

7. Only 5 of the 46 point sources located in the 170.8 mile study area had any appreciable impact on fish community structure. Together these facilities made up 85-98% of the total BOD_5, ammonia-nitrogen, toxic substances (metals, cyanide, phenolics, chlorine), suspended solids, and nutrient loadings attributable to point sources in the study area.

8. The condition of the fish community in three separate segments of the mainstem was such that Clean Water Act goals were not met. These included; 1) a 25.1 mile segment of the mainstem downstream from Columbus RM 127.1-102.0), 2) a 9.6 mile segment of the mainstem downstream from Circleville (RM 99.6-90.0), and 3) an 18.4 mile segment of the mainstem (RM 45.1-26.7) beginning at a point 20 miles downstream from Paint Creek.

9. The incidence of external lesions, tumors, and eroded fins among individual fish in segment 2 (RM 133.0-127.5) was much higher than in any of the other 10 segments in the study area, and was attributed to intermittent inputs from the Columbus combined sanitary/storm sewer system. Community diversity, abundance, and composition were, however, within acceptable limits.

10. Although the frequency of violation of the water quality standards for total iron and lead was high (72% and 22% respectively), there was no apparent relationship between these two parameters and the condition of the fish community.

11. Comparisons made between the results of this study and studies conducted 20-80 years ago revealed an overall improvement in water quality and the fish community. Comparisons made with fairly recent evaluations did not always reveal agreement, particularly with those that were based on chemical/physical data alone. Some of the segments classified as degraded by these previous studies were classified as meeting Clean Water Act goals by this study.

12. Significant improvements in dissolved oxygen levels at Chillicothe (RM 70.9) and Higby (RM 56.1) during the period 1966-1979 were positively related to upstream reductions in point source BOD_5 loadings. The greatest reductions in effluent BOD_5 loadings during this time period occurred for the Mead Corporation - Chillicothe Mills and the Circleville WWTP. The trend in point source BOD_5 loadings downstream from Columbus was erratic and did not correlate well with dissolved oxygen levels monitored at Shadeville (RM 116.7). These observations were consistent with the relative condition of the fish community adjacent to each location.

13. An analysis of daily operating data for the Columbus Jackson Pike and Southerly wastewater treatment plants revealed highly variable effluent BOD_5 and ammonia-nitrogen values during 1978 and 1979. Standard deviations of the 30-day average effluent BOD_5 for both facilities during both years were 30-50% of the mean. Standard deviations for average effluent ammonia-nitrogen were 45-60% of the mean at Columbus Jackson Pike and 25-45% at Columbus Southerly during 1978. In 1979, variations about the mean were at times greater than 100%, although overall improvements in ammonia-nitrogen effluent values were observed.

14. Improvements in both BOD_5 and ammonia-nitrogen final effluent concentrations from 1978 to 1979 were evident at both facilities. The improvement at Columbus Southerly, however, was completely overshadowed by the increased raw wastewater bypass BOD_5 load. Both the bypassed BOD_5 loading and percent of the total load that was bypassed showed marked increases from 2941 kg/day and 30.4% in 1976 to 7295 kg/day and 78.5% in 1979.

15. The presence of good fish communities in the lower sections of most of the major tributaries coupled with the apparent lack of residual effects in the mainstem indicated that the recovery potential of the Scioto River is good. The rate of recovery in the mainstem is dependent on the success of programs aimed at reducing point source as well as bypassed BOD_5 and ammonia loadings.

REFERENCES

Ohio Environmental Protection Agency. 1976 (unpublished). Ohio Biennial Water Quality Report - 305(b) Scioto River Subbasin Report.

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979a (unpublished). Survey of Big and Little Darby Creeks. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. (1979b). Scioto River Basin water quality management plan, Part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1980 (unpublished). Ohio Biennial Water Quality Report - 305(b). Reference Document 3. Biological Tables.

Scioto River Basin, Report of Water Pollution, Study of Ohio Department of Health, 1961.

SCIOTO RIVER BASIN

WALNUT CREEK SUBBASIN (M-9)

SUBBASIN SUMMARY

Extensive water quality sampling in the Walnut Creek Subbasin has not been conducted. Recent water quality monitoring detected WQS violations for dissolved oxygen below the village of Baltimore on Walnut Creek. These violations were the result of the combined discharges of the Crown Zellarbach Corporation (RM 41.6) and the city of Baltimore WWTP (RM 40.0). Surburban residential development has been extensive in the basin's northwestern quadrant. Many moderate sized (0.08-0.15 MGD) package WWTPs discharge to the low flow tributaries of Sycamore and Georges Creeks. The localized water quality impact of these facilities has not been extensively studied. Areas of the subbasin which are not expected to meet 1983 goals include Sycamore Creek below Pickerington and Walnut Creek below Baltimore.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two benthic samples collected in August, 1974, from Little Walnut Creek near its confluence with the Scioto River in Pickaway County (RM 0.7) and from PawPaw Creek below Crown Zellerback at Baltimore in Fairfield County (RM 0.6).

The benthic sample from Little Walnut Creek consisted of 27 taxa with a diversity index of 2.93 (RD 3-54). An evaluation of Class III (Fair) water quality was assigned based primarily on the unfavorable benthic composition.

The benthic sample from PawPaw Creek consisted of 19 taxa with a diversity index of 2.04 (RD 3-56). Oligochaetes and six taxa of midges accounted for 70 percent of the total number of organisms collected. An evaluation of Class IV (Poor) water quality was assigned.

SEGMENT REPORTS

SYCAMORE CREEK
WALNUT CREEK TRIBUTARY
CONFLUENCE AT RM 29.2

Segment Problem	Name Description	Use Designation Mile Points
05060002-M-9 M-9-3 MAJOR	Sycamore Creek From the Pickerington WWTP to Walnut Creek	WWH 4.3-0.0

Dissolved oxygen, suspended solids and ammonia problems in the Pickerington reach of Sycamore Creek were the result of periodic overloads at the Pickerington WWTP (RM 4.5). These overloads resulted from excessive inflow and infiltration problems, an increase in service area, and the addition of industrial dairy processing wastes from the Dri-Milk Company (Mike Fox, pers. com. 1979). Alternatives to the present situation, which are being developed on a regional 201 planning basis for the municipalities of Pickerington, Canal

Winchester and Lithopolis, have not been satisfactory, due to allegedly inadequate plans prepared by the consultant. No plan has been adopted to date. The completion of pollution control projects necessary to meet 1983 goals is remote in light of the extensive political problems of regional development projects.

WALNUT CREEK
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 102.3

Segment Problem	Name Description	Use Designation Mile Points
M-9-2 MAJOR N/A	Walnut Creek From the Paw Paw Creek confluence to the Sycamore Creek confluence	WWH 39.0-27.0

Walnut Creek below the village of Baltimore receives a substantial loading of treated pulp mill waste from the Crown Zellarbach Corporation (a cardboard manufacturing company), as well as secondary effluent from the Baltimore WWTP.

The most recent water quality sampling below the village of Baltimore was conducted in September, 1979, as part of the low flow sampling program in the Scioto River Basin. Results indicated WQS violations for dissolved oxygen (OEPA, CDO data, 1979(b)). Wasteload modeling of this reach by the Ohio EPA has indicated that the Baltimore WWTP must meet a final effluent BOD_5 of less than 4.0 mg/l to achieve compliance with WWH Standards. Modeling has projected dissolved oxygen violations for approximately 12 miles before recovery (OEPA, 1979(a)).

The Crown Zellarbach Corporation at Baltimore discharges to Paw Paw Creek. Wells that will augment stream flow in Paw Paw Creek during critical low flow conditions have recently been constructed. The village of Baltimore has submitted a Step II, Detailed Facility Plan to upgrade its sewer and waste treatment systems. Continued levels of funding and completion of planned improvements will determine 1983 compliance for this entity.

Segment Problem	Name Description	Use Designation Mile Points
M-9-1 NONE	Walnut Creek From the Georges Creek confluence to the Scioto River	WWH 21.3-0.0

A water quality sampling station near the mouth of Walnut Creek was maintained from 1973 to 1977. The data showed no substantial WQS violations (OEPA, 1976, 1978(b)).

REFERENCES

Ohio Environmental Protection Agency. 1976. Scioto River Basin 305(b) report: water quality summary. Ohio EPA, Central District Office, Office of Wastewater, Division of Surveillance, Columbus, Ohio 87 p.

Ohio Environmental Protection Agency. 1978(a). State of Ohio 305(b) Annual Water Quality Report. Ohio EPA, Division of Surveillance, Columbus, Ohio. 205 p.

Ohio Environmental Protection Agency. 1978(b). (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979(a). Water quality management plan, recommended point source waste load allocation, Scioto River Basin. Office of Wastewater, Division of Water Quality Planning and Assessment, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979(b). Walnut Creek Intensive Survey Data Summary (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Personal Communication. 1979. Mike Fox, Supt., Pickerington Wastewater Treatment Plant, Pickerington, Ohio.

SCIOTO RIVER BASIN

SALT CREEK SUBBASIN (M-10)

SUBBASIN SUMMARY

The Salt Creek Subbasin is a forrested drainage basin with only two small urban areas (Tarlton and Laurelville). Wastewater treatment in these communities consists of individual septic tank systems. Some minor problems have been noted in the immediate vicinity of the septic tank outfalls, but there was no significant impact on Salt Creek. All streams in this subbasin meet 1983 goals based upon limited chemical/physical information. A single set of samples collected from each of the six segments listed below revealed no water quality standards violations (Ohio EPA, SEDO data, 1979).

The mainstem and all tributaries except Little Salt Creek and Pigeon Creek are designated Exceptional Warmwater Habitat. This use designation can not be substantiated due to lack of information.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic information is available for this subbasin. Previous fixed station monitoring in the subbasin was conducted in August, 1974, on Salt Creek near its confluence with the Scioto River in Ross County (RM 0.1). The benthic sample consisted of 18 taxa with a diversity index of 0.49 (RD 3-60). Five taxa of mayflies and five taxa of caddisflies were present in the sample which was totally overwhelmed in numbers by the midge taxon Calopsectra. An evaluation of Class III (Fair) water quality was assigned based on the presence of the diverse assemblage of mayflies and caddisflies. The evaluation was considered marginal because of the low number of taxa and the dominance of the one midge taxon.

SEGMENT REPORTS

PIKE RUN
SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-1 NONE	Pike Run From the headwaters to Salt Creek	SNRW-EWH 9.2-0.0

PRETTY RUN
SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-2 NONE	Pretty Run From the headwaters to Salt Creek	SNRW-EWH 5.9-0.0

QUEER CREEK
SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-3 NONE	Queer Creek From the headwaters to Salt Creek	SNRW-EWH 9.0-0.0

PINE CREEK
SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-4 NONE	Pine Creek From the headwaters to Salt Creek	SNRW-EWH 11.8-0.0

LAUREL RUN
SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-5 NONE	Laurel Run From the headwaters to Salt Creek	SNRW-EWH 12.9-0.0

SALT CREEK MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-10-6 NONE	Salt Creek From the headwaters to the Scioto River	SNRW-EWH 45.4-0.0

REFERENCES

Ohio Environmental Protection Agency. 1979 (unpublished). Data available From Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Protection Agency. 1974. Scioto River Basin 303(e) Wasteload Allocation Report. Ohio EPA, Division of Surveillance, Southeast Division Office, Logan, Ohio.

SCIOTO RIVER BASIN

LOWER SCIOTO RIVER SUBBASIN (M-11, M-15)

SUBBASIN SUMMARY

Forestry, agriculture, and urban development are the major land-uses in the lower Scioto River Basin. Population centers located along this portion of the Scioto River include Chillicothe, Waverly, Piketon and Lucasville. Wastewater treatment plants serving these municipalities, the Mead Paper Corporation, and two other industries were the major point source dischargers affecting water quality. In addition, pollutant loading from upstream sources (i.e., Circleville) continues to influence water quality in the lower Scioto River.

Physical/chemical water quality in the basin has been described as fair to poor (OEPA, 1974). Prior to 1978, the data indicated serious degradation in the Scioto River between Paint Creek and Salt Creek. WQS violations for dissolved oxygen, fecal coliforms, and phenolics were common at monitoring sites at Chillicothe (RM 70.8; STORET Station No. 601240) and at Higby (RM 56.3; STORET Station No. 600770) (USGS, 1973-1977). However, recent improvements in wastewater treatment at the Mead Paper Corporation have substantially reduced organic pollution in the lower Scioto River. No dissolved oxygen violations were noted at the above stations during 1978-1979 (USGS, 1980), but it is uncertain as to whether the improved wastewater treatment at Mead Paper will be sufficient to protect water quality standards during low flows. For this reason, the segment of the Scioto River between Paint Creek and Salt Creek cannot be classified with respect to the attainability of the 1983 clean water goals.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in November, 1979, from the Scioto River near Richmondale in Ross County (RM 56.2). Thirty-four taxa with a diversity index of 3.75 were collected from a west bank station (RD). The sample included 10 taxa of mayflies, 3 taxa of stoneflies, 6 taxa of caddisflies, and 12 taxa of midges. The overall benthic community appeared healthy and diverse and indicated Class II (Good) water quality.

Previous sampling at this location was conducted at an east bank site in September, 1978, east and west bank sites in July, 1977, and an east bank site in August, 1976 (RD 3-47, 3-48, and 3-49). The number of taxa ranged from 20 collected from the east bank in 1976 to 28 collected from the east bank in 1978. Diversity indices ranged from 2.40 at the east bank in 1978 to 3.31 at the east bank in 1977. An evaluation of Class III (Fair) water quality was assigned to each set of data. Except for lower numbers of taxa and diversity indices, these samples were quite similar to that of 1979, especially the benthic composition of the major groups (mayflies, caddisflies, midges). The gradual increase in number of taxa and diversity index over the four years may have been a reflection of improving water quality. However, the late collection in November of 1979 may have had a more pronounced effect on the

kinds and numbers of benthic organisms collected than the actual water quality. Two other fixed stations were previously sampled in the subbasin. Benthic samples were collected in August, 1974, from a west bank station located on the Scioto River above Chillicothe in Ross County (RM 78.3) and from an east bank station located on the Scioto River above Salt Creek in Ross County (RM 52.1).

The sample from the Scioto River above Chillicothe consisted of 31 taxa with a diversity index of 3.41 (RD 3-46). Included were four taxa of mayflies, six taxa of caddisflies, and nine taxa of midges. No one taxon dominated the sample numerically. An evaluation of Class II (Good) water quality was assigned based on the good benthic composition, the large number of taxa, and the high diversity index.

The sample from the Scioto River above Salt Creek consisted of 34 taxa with a diversity index of 3.56 (RD 3-50). Included were 6 taxa of mayflies, 6 taxa of caddisflies, and 13 taxa of midges. An evaluation of Class II (Good) water quality was assigned based on all criteria.

SEGMENT REPORTS

SCIOTO RIVER MAINSTEM
OHIO RIVER TRIBUTARY
CONFLUENCE AT RM 351.0

Segment Problem	Name Description	Use Designation Mile Points
M-15-1 NONE	Scioto River From the Salt Creek confluence to the Ohio River	WWH 51.2-0.0

Water quality information was limited to data collected at the USGS-ORSANCO sampling station located at Lucasville (RM 14.2; STORET Station No. 600800). Violations for fecal coliforms and lead have been noted (OEPA, SEDO data, 1978). Data from a previous report (OEPA, 1974) indicated no major water quality problems in this river segment. The lower Scioto River was assumed to meet 1983 clean water goals based upon this previous evaluation and knowledge that pollutant loading from upstream sources has declined.

For additional information on the lower Scioto River basin the reader is referred to the summary and conclusion section of the Basin M-8 report in this volume.

REFERENCES

Ohio Environmental Protection Agency. 1974. Scioto River basin 303(e) wasteload allocation report. Ohio EPA, Division of Surveillance, Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Protection Agency. 1978-1980 (unpublished). Data available from
Southeast District Office, Ohio EPA, Logan Ohio.

United States Geological Survey. 1973-1978. Water resources data for Ohio. Volume 1. Ohio River Basin. U.S. Geological Survey Water - data reports OH-73-1 through OH-80-1. U.S. Geological Survey, Columbus, Ohio.

SCIOTO RIVER BASIN

LOWER PAINT CREEK SUBBASIN (M-12)

SUBBASIN SUMMARY

Physical/chemical water quality was good in a 30 mile segment of Paint Creek between the Paint Creek Reservoir and the North Fork confluence. The quality of the North Fork is unknown. The Mead Paper Company discharges pulp mill wastes into Paint Creek at mile point 3.3 which degraded the lower 3 miles of Paint Creek and a segment of the Scioto River. The installation of advanced wastewater treatment facilities at Mead Paper has substantially reduced loadings of BOD_5 and total suspended solids (84 percent reduction based upon monthly operating reports). A chemical, physical and biological water quality survey was conducted in this subbasin in 1979 as part of the Scioto River survey. The results are presented under the Scioto River summary.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic data collected in July, 1977, from Paint Creek at Bourneville in Ross County (RM 21.6) and in August, 1974, from Paint Creek below Mead Paper at Chillicothe in Ross County (RM 1.9).

The benthic sample from Paint Creek at Bourneville consisted of 29 taxa with a diversity index of 3.36 (RD 3-58). Included were 6 taxa of mayflies, 1 stonefly taxon, 6 taxa of caddisflies, and 12 taxa of midges. The overall benthic community appeared healthy and diverse and reflected Class II (Good) water quality.

The benthic sample from Paint Creek below Mead Paper consisted of 11 taxa with a diversity index of 0.53 (RD 3-59). The sample was totally dominated by oligochaetes which accounted for 93 percent of the total number of organisms collected. There were no mayfly or caddisfly taxa. An evaluation of Class IV (Poor) water quality was indicated by all benthic criteria.

Four benthic stations on Paint Creek and one on the East Fork of Paint Creek were sampled in July, 1975 at Washington Court House in Fayette County. The purpose of the survey was to determine the impact of the Washington Court House WWTP and Armco Steel Corporation discharges.

The four stations in Paint Creek were located at river miles 81.7, 67.8, 63.5, and 59.8. The station in the East Fork was located at river mile 2.8. The Washington Court House WWTP and Armco Steel discharges enter Paint Creek at river miles 69.4 and 67.7, respectively. A summary of the benthic data can be found in Table - . The tabulated data can be found in RD 3-33.

There were two control stations: the upstream station in Paint Creek (RM 81.7) and the East Fork station (RM 2.8). The water quality at these stations was considered to be Class IV (Poor) based on the number of taxa collected (13 and 16) and the overall poor composition of the benthic community. The sample from the station at river mile 67.8, located below both discharges, consisted of only two taxa and a diversity index of 0.34. This reflected very poor water quality (Class IV). The next downstream station (RM 63.5) showed signs

of improvement as reflected by increases in both the number of taxa (15) and the diversity index (2.54). The lack of pollution sensitive organisms and abundance of oligochaetes, however, were the basis for the retention of a Class IV (Poor) water quality evaluation. In spite of the high diversity index (3.77), the station at river mile 59.8 exhibited only Class III (Fair) water quality due to the low number of taxa (22).

Based on the benthic community, Paint Creek underwent severe water quality degradation at river mile 67.8. This is attributable to discharges from either the Washington Court House WWTP, Armco Steel Corporation, or both. The river showed signs of recovery approximately eight miles below this point.

Table III-29: Summary of Benthic Data Collected from Paint Creek and East Fork Relative to the Washington Court House Wastewater Treatment Plant (WWTP) and Armco Steel Corporation Discharges August, 1975[a]

	Station (RM)				
	East Fork			Paint Creek	
	2.8	81.7	67.8	63.5	59.8
Number of Samplers	5	4	5	4	5
Quantitative Taxa	16	13	2	15	22
Qualitative Taxa	12	10	7	9	12
Organisms/Ft^2	53	48	975	999	101
Index ($\bar{d}$)	3.14	2.34	0.34	2.54	3.77
Evaluation (Class)	IV	IV	IV	IV	III

(a) The Washington Court House WWTP discharge is located at RM 69.4. The Armco Steel Corporation discharge is located at RM 67.7.

SEGMENT REPORTS

PAINT CREEK MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 618

Segment Problem	Name Description	Use Designation Mile Points
M-12-1 NONE	Paint Creek From the Paint Creek Reservoir to the North Fork confluence	EWH 37.9-7.9

Based on chemical/physical water quality, this segment currently meets 1983 goals. Chemical data from the monitoring station within this segment (STORET Station No. 601320; RM 22.1) indicated generally good physical/chemical water quality. Minor WQS violations of both the Warmwater Habitat and Exceptional Warmwater Habitat standards for pH, total copper, total lead, and total iron occurred (OEPA, SEDO data, 1977-79). All occurred during elevated flow conditions; the total iron violations were probably the result of nonpoint runoff, while the total copper and total lead violations may have come from industrial dischargers located on the upper reaches of Paint Creek or Rocky Fork Creek.

The minor standards violations noted above probably do not prevent the attainment of 1983 clean water goals.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (Unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

SCIOTO RIVER BASIN

UPPER PAINT CREEK SUBBASIN (M-13)

SUBBASIN SUMMARY

Upper Paint Creek is predominantly an agricultural land use area. Nonpoint source sediment runoff and associated nutrient transport had the greatest effect on stream quality. The Washington Court House (C.H.) WWTP (RM 65.9) is the major point source discharger in the Upper Paint Creek Subbasin. Physical/chemical water quality downstream from Washington C.H. was degraded by the outfall from this source. This entity is currently upgrading both the sewer system and the wastewater treatment plant. All areas within this subbasin should meet 1983 goals.

SEGMENT REPORTS

PAINT CREEK MAINSTEM
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 61.8

Segment Problem	Name Description	Use Designation Mile Points
M-13-2 MINOR	Paint Creek From the Washington C.H. WWTP to the Sugar Run confluence	WWH 65.9-58.3

Recent chemical/physical data collected below Washington C.H. revealed WQS violations for dissolved oxygen and total iron (OEPA, CDO data, 1977-1980). Previous studies by Ohio EPA noted these problems as well as violations for fecal coliforms and ammonia (OEPA, 1974, 1976).

Construction of a new sanitary sewer collection system for the city of Washington C.H. is 80 percent completed. A new tertiary wastewater facility is at Step III in the construction grant process. This facility, when completed, will replace an overloaded secondary wastewater plant. Construction of the new facility is expected to begin in early spring 1982.

Recent wasteload modeling by the Ohio EPA, found that even with tertiary treatment, WQS for dissolved oxygen and ammonia could not be maintained in Paint Creek below Washington C.H.

Further evaluation of the problem is not warranted until the new treatment facility is on line, at which time intensive physical, chemical and biological surveys should determine the water quality status. Until these suggested studies are completed, it is assumed that 1983 goals can be attained in this segment of Paint Creek.

An intensive survey to assess the impact of nonpoint agricultural runoff on receiving stream quality in the Upper Paint Creek Subbasin has not been done. Limited field surveys on sediment loads have been made by the U.S. Geological Survey as part of the Paint Creek Reservoir Project. However, further biological evaluation is needed to fully assess this pollution source as it relates to attainment of the 1983 clean water goals.

Segment Problem	Name Description	Use Designation Mile Points
M-13-1 NONE	Paint Creek From the Sugar Run confluence to the Rocky Fork confluence	WWH 58.3-36.1

Paint Creek at the Sugar Run confluence has recovered from the point source degradation below Washington C.H. Chemical/physical water quality in this stream segment was considered good based on limited data from the U.S. Geological Survey Greenfield station (USGS, 1977-1978).

REFERENCES

Ohio Environmental Protection Agency. 1974. Scioto River basin 303(e) wasteload allocation report. Ohio EPA, Division of Surveillance, Southeast District Office, Logan, Ohio.

Ohio Environmental Protection Agency. 1976. Scioto River basin 305(b) annual water quality summary. Ohio EPA, Office of Wastewater, Division of Surveillance, Central District Office, Columbus, Ohio.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

United States Geological Survey. 1977-1978. Water resources data for Ohio, Volume I, Ohio River Basin. U.S. Geological Survey water-data reports OH-77-1 and OH-78-1. U.S. Geological Survey, Columbus, Ohio.

SCIOTO RIVER BASIN

ROCKY FORK AND RATTLESNAKE CREEK SUBBASIN (M-14)

SUBBASIN SUMMARY

Chemical/physical water quality in this subbasin ranged from excellent to poor. Portions of the drainage are classified as Exceptional Warmwater Habitat. Limited physical/ chemical data substantiated this designation in the lower 7.5 miles of the Rocky Fork. Two reservoirs in this subbasin (Rocky Fork and Paint Creek) were sampled and were found to have good water quality (Tobin and Yonger, 1975). The reservoirs support game fish populations and are heavily used for recreational activities.

The Hillsboro WWTP discharges to Clear Creek, a tributary to the Rocky Fork Reservoir. Water quality degradation was suspected during low-flow conditions because of relatively high wastewater loading rates (565,000 gpd, average BOD 18.4 mg/l, average ammonia 6.5 mg/l). Further investigation is needed to assess the impact of the Hillsboro WWTP on water quality in Clear Creek and the Rocky Fork Reservoir.

A special study of Rattlesnake Creek was recently completed by the United States Geological Survey (Evans and Tobin, 1979), but the results were not evaluated for this report. Water quality may be influenced by the Sabina WWTP and the Rattlesnake Sewer District WWTP. Critical evaluation of available information is essential in light of the Exceptional Warmwater Habitat use designation of Rattlesnake Creek.

SEGMENT REPORTS

ROCKY FORK
SOUTH FORK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-14-1	Rocky Fork	WWH
NONE	From the Rocky Fork Reservoir to Paint Creek	7.5-0.0

Occasional minor WQS violations for total iron and total copper occurred in Rocky Fork (RM 2.8; STORET Station No. 610800) during the past two years (OEPA, SEDO data, 1977-1979). These violations did not substantially impair attainment the 1983 clean water goals.

REFERENCES

Evans, K.F. and R.L. Tobin. 1979. Water quality assessment of Rattlesnake Creek watershed, Ohio. Water Resources Investigations 79-17. Open-File Report. United States Geological Survey, Columbus, Ohio. 28 pp.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southest District Offices, Ohio EPA, Logan, Ohio.

Tobin, R.L., and J.D. Youger. 1977. Limnology of selected lakes in Ohio - 1975. Water Resources Investigations 77-105. United States Geological Survey, Columbus, Ohio. 205 pp.

SCIOTO RIVER BASIN

LITTLE SALT CREEK SUBBASIN (M-16)

SUBBASIN SUMMARY

Little Salt Creek is 28.6 miles long and drains 246.7 square miles in Jackson, Pike and Ross Counties. The city of Jackson is the only urban area in this otherwise forrested watershed. The overloaded Jackson WWTP (RM 22.1) frequently bypassed primary treated sewage and severely degraded an eleven mile stretch of Little Salt Creek. Wastewater treatment facilities are not expected to be upgraded prior to 1983. Total lead and total zinc contamination from nonpoint sources have been noted in Little Salt Creek above the Jackson WWTP. Data has shown that a reclassification of the upstream segment should be made (Exceptional Warmwater to Warmwater Habitat). The lower mainstem of Little Salt Creek and its tributaries appear to meet 1983 goals based upon limited physical/chemical information.

Parts of the Little Salt Creek watershed have been mined for coal. Large abandoned underground mines, and small surface mines occur throughout much of the watershed, but acid mine drainage does not appear to be a significant problem in the watershed.

SEGMENT REPORTS

LITTLE SALT CREEK
SALT CREEK TRIBUTARY
CONFLUENCE AT RM 4.5

Segment Problem	Name Description	Use Designation Mile Points
M-16-6 Minor N/A	Little Salt Creek From the Head Waters to RM. 23.5	EWH headwaters to 23.5

Total lead and total zinc contamination from unknown sources had been reported in the 1980 305(b) report (OEPA, 1980) in Little Salt Creek above the Jackson WWTP. The Intensive Survey conducted June through October 1980 (OEPA, 1980.) indicated elevated total zinc and iron concentrations at the upstream control station RM 26.7. The Goodyear Aerospace plant 001 discharge had elevated levels of total zinc, total copper and total nickel. The Goodyear 002 discharge had elevated levels of total copper in its effluent.

Other stations above the Jackson WWTP and below the Goodyear outfalls have shown elevated levels of total zinc and total iron. (OEPA, 1980). Based upon this sampling program, it appeared the levels of metals, which are not severe, can be attributed to Goodyear Aerospace outfalls.

According to the present WQS, the upstream portion of Little Salt Creek to the Jackson City limits is classified exceptional warmwater habitat. Recent data showed that to be incorrect. WQS violations and borderline violations occurred for metals. Dissolved oxygen violations occurred during the sampling for the intensive survey also. This segment should be reclassifed as WWH.

LITTLE SALT CREEK
SALT CREEK TRIBUTARY
CONFLUENCE AT RM 4.5

Segment Problem	Name Description	Use Designation Mile Points
MINOR	From the Jackson WWTP to S.R. 35	25.5-13.9

The Jackson WWTP had a major impact upon Little Salt Creek (OEPA 1974, 1980) which was characterized by a septic zone below the outfall and large sludge deposits as far as one mile below the plant. WQS violations included severe dissolved oxygen, fecal coliform, total iron and total zinc. Elevated levels of ammonia occurred for 10 miles downstream of the discharge. (OEPA, SEDO data 1979, 1980)

Since the closing of the R.J. Reynolds Foods plant in July 1981, the flow at the Jackson WWTP has been reduced approximately 300,000 gallons per day. Hydraulic and stream loading has been substantially reduced.

Other problem areas defined from the 1980 intensive survey report of Little Salt Creek were stations immediately above the Jackson WWTP outfall. WQS violations included dissolved oxygen at the station at RM 23.0. Elevated levels of ammonia, total zinc, total iron, and total lead were found. Sugar Run which enters Little Salt Creek (RM 23.4) just above these stations has been found to be the source of the high ammonia levels. One sample has shown ammonia concentrations of 2.75 mg/l at the mouth of Sugar Run. During the shutdown and clean-up operations at R.J. Reynolds Foods, it was determined that a floor drain went straight to Sugar Run. During this clean-up operation an ammonia spill from cooling units was flushed down the floor drain and a fish kill in Sugar Run occurred. This drain was the most likely source of previous elevated levels of pollutants which were detected in Sugar Run.

The city of Jackson has had their Step III Construction Grant approved. Detailed plans have also been approved and construction should begin during 1982. The 1983 goals may be met sometime during 1982 if all construction is completed and proper operation is accomplished.

Segment Problem	Name Description	Use Designation Mile Points
M-16-4 NONE	Little Salt Creek From S.R. 35 to to Salt Creek	WWH 11.0-0.0

PIGEON CREEK
MIDDLE FORK TRIBUTARY
CONFLUENCE AT RM 1.6

Segment Problem	Name Description	Use Designation Mile Points
M-16-2 NONE	Pigeon Creek From the headwaters to Middle Fork	WWH 14.0-0.0

MIDDLE FORK
LITTLE SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-16-1 NONE	Middle Fork From the headwaters to Little Salt Creek	WWH 21.2-0.0

BIG RUN
LITTLE SALT CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
M-16-3 NONE	Big Run From the headwaters to Little Salt Creek	WWH 11.0-0.0

REFERENCES

Ohio Environmental Protection Agency. 1974. Scioto River Basin 303(e) Wasteload Allocation Report. Ohio EPA, Division of Surveillance, Southeast District Office, Logan, Ohio.

Ohio Environmental Protection Agency. 1979 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Portection Agency 1980(unpublished). Water quality study of Little Salt Creek. Larry E. Pennington.

SCIOTO RIVER BASIN

SCIOTO BRUSH CREEK SUBBASIN (M-17)

SUBBASIN SUMMARY

The Scioto Brush Creek Subbasin is an area of low population density with a predominantly forested, unglaciated terrain. Only two industrial point source dischargers (Davon, Inc., Cedar Fork and Laboratory Furniture Inc., RM 3.4) are located in the subbasin. Water quality problems may develop in the subbasin if timber harvesting and the associated sawmill enterprises continue to expand at the current rate. Physical/chemical water quality problems are beginning to arise from the indiscriminant disposal of sawdust. Minor fish kills have reportedly occurred following sawdust discharge into the stream. Other water quality problems associated with timbering operations include increase sediment loading from clear cut areas. More sound environmental planning is needed to prevent further degradation.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic biological data is available for the subbasin. Previous fixed station monitoring in the subbasin consisted of one benthic sample collected in August, 1974, from Scioto Brush Creek near its confluence with the Scioto River in Scioto County (RM 0.2). Thirty-two taxa were collected with a diversity index of 3.79 (RD 3-61). Included were eight taxa of mayflies, one stonefly taxon, seven taxa of caddisflies, and nine taxa of midges. No one taxon was overwhelmingly abundant. The overall benthic community appeared healthy and diverse and reflected Class I (Excellent) water quality.

SEGMENT REPORTS

SOUTH FORK
SCIOTO BRUSH CREEK TRIBUTARY
CONFLUENCE AT RM 10.0

Segment Problem	Name Description	Use Designation Mile Points
M-17-2 NONE N/A	South Fork From the headwaters to Scioto Brush Creek	WWH 18.2-0.0

SCIOTO BRUSH CREEK
SCIOTO RIVER TRIBUTARY
CONFLUENCE AT RM 100

Segment Problem	Name Description	Use Designation Mile Points
M-17-1 NONE	Scioto Brush Creek From the headwaters to the Scioto River	36.0-0.0

Physical/chemical water quality sampling has been conducted by the U.S. Geological Survey (USGS 1973-1977) and the Ohio EPA (OEPA, 1979) on a limited basis in these two stream segments. No WQS violations were noted and very low concentrations of ammonia, nitrates, and phosphorus were found. Physical/chemical water quality appeared to be excellent but more extensive sampling of fish and benthic macroinvertebrate communities must be performed to justify the Exceptional Warmwater Habitat use designation.

REFERENCES

Ohio Environmental Protection Agency. 1979 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

United States Geological Survey. 1973-1980. Water resources data for Ohio, Volume 1. Ohio River Basin. U.S. Geological Survey reports OH-73-1 through OH-77-1. U.S. Geological Survey, Columbus, Ohio.

HOCKING RIVER, SHADE RIVER, AND LEADING CREEK BASIN

UPPER HOCKING RIVER SUBBASIN (O-1)

SUBBASIN SUMMARY

Water quality in the Hocking River above Lancaster (Headwaters to RM 93.0), Clear Creek and in Little Rush Creek is good and meets 1983 water quality goals. An estimated 37.2 stream miles in this subbasin are not expected to meet 1983 goals. Urban point and nonpoint source pollution degrades water quality in the Hocking River in and below Lancaster. Frequent standards violations for ammonia, dissolved oxygen and fecal coliforms have been reported during low flow conditions. Less frequent violations of the standards for total iron, total lead and total cyanide have also been recorded. The Lancaster Wastewater Treatment Plant (WWTP) (RM 88.2) currently receives a considerable load of unpretreated industrial wastewater which inhibits proper wastewater treatment. Rush Creek is degraded throughout its length by acid mine drainage. Brine pit pollution from oil well drilling and operation also contributes to degraded water quality in both Rush Creek and the Hocking River below Lancaster.

BIOLOGICAL EVALUATIONS

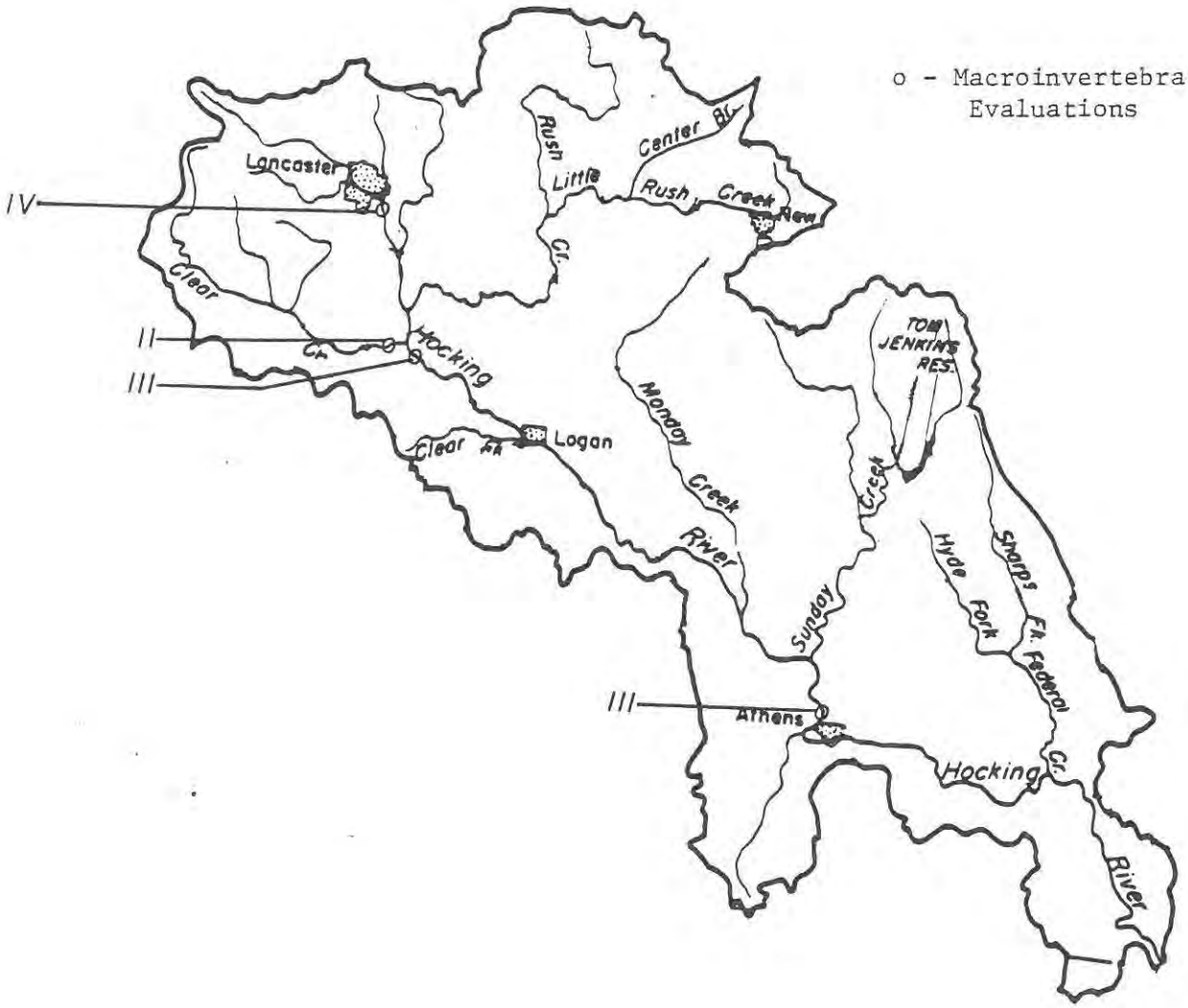
No recent Ohio EPA, macrobenthic data are available for the basin. Previous fixed station monitoring in the basin consisted of five sets of benthic samples collected from four data points. The samples were collected between August, 1974, and October, 1977, from the Hocking River and a tributary, Clear Creek. Hocking River sites were located at Lancaster in Fairfield County (RM 73.4), Enterprise in Hocking County (RM 47.0), and Athens in Athens county (RM 33.1). Clear Creek was sampled at RM 2.1 in Hocking County. The site at Athens was a NASQAN station.

The station at Lancaster was sampled in August, 1974, and consisted of a benthic sample composed of 13 taxa with a diversity index of 0.73 (RD 3-63). Oligochaetes dominated the sample numerically accounting for 90 percent of the organisms collected. There were no taxa of mayflies or caddisflies present. An evaluation of Class IV (Poor) water quality was indicated by all criteria.

The station at Enterprise was sampled in September, 1977, and consisted of a benthic sample composed of 17 taxa with a diversity index of 3.10 (RD 3-62). Six taxa of mayflies and two taxa of caddisflies were present with six taxa of midges dominating the sample numerically (70 percent). The low number of organisms collected at this site along with the elevated diversity index seemed to indicate the possibility of a toxicity problem. An evaluation of Class III (Fair) water quality was made based on the benthic composition and the diversity index, but this evaluation was considered marginal because of the low number of taxa.

The station at Athens was sampled in September, 1977, and consisted of a benthic sample composed of 22 taxa with a diversity index of 3.30 (RD 3-64). Included were five taxa of mayflies, three taxa of caddisflies, and six taxa of midges. No one group dominated the sample numerically. An evaluation of Class III (Fair) water quality was indicated by the benthic composition and the number of taxa.

Hocking River Basin



Clear Creek was sampled in October, 1977, and also, in October, 1976. Twenty-eight taxa with a diversity index of 3.21 were collected in 1977, while 36 taxa with a diversity index of 3.55 were collected in 1976 (RD 3-65 and 3-66). Each sample consisted of well balanced, diverse communities with mayflies, caddisflies, and midges present. In addition, stoneflies were present at the site in 1976. Evaluations of Class II (Good) water quality were indicated at each station based on all criteria.

SEGMENT REPORTS

HOCKING RIVER MAINSTEM
OHIO RIVER TRIBUTARY
CONFLUENCE AT RM 199.0

Segment Problem	Name Description	Use Designation Mile Points
0-1-3 NONE	Hocking River From the headwaters to the Hunter's Run confluence	WWH 94.9-84.4
0-1-4 MAJOR	Hocking River From the Hunters Run confluence to the Clear Creek confluence	WWH 84.4-78.7

This segment was the major water quality problem area in the Upper Hocking River Subbasin. Degradation results from urban point and nonpoint source pollution from the city of Lancaster. Water quality data from the Ohio EPA monthly monitoring site below Lancaster (RM 86.7; STORET Station No. 601550) showed WQS violations for fecal coliforms, dissolved oxygen and total iron (OEPA, CDO data, 1977-1980). Diurnal sampling conducted during low flow conditions in July 1978, resulted in WQS violations for fecal coliforms, dissolved oxygen and ammonia (OEPA, SEDO data, 1978b). Ambient water quality system monitoring revealed a substantial dissolved oxygen sag extending downstream of the Lancaster WWTP for approximately 7.0 miles. These results concur with previous conclusions about the same segment (Ohio EPA 1975, 1976). More recent sampling during the period of low flow revealed continued degradation of water quality and violations of dissolved oxygen and fecal coliform standards.

The Lancaster WWTP is periodically overloaded which results in the bypassing of untreated sewage to the river. The city has submitted a grant application for industrial pretreatment and is continuing with the development of plans for upgrading the existing facility (currently at Step II in the Construction Grant process). Significant improvements in existing water quality conditions are expected, if and when the Construction Grant process is completed. A second problem at the Lancaster WWTP is unpretreated industrial waste from some twenty industrial sources within the city including Anchor Hocking, Alten Foundry and Lancaster Glass. This waste, principally oils and heavy metals, substantially inhibits wastewater treatment efficiencies. A 1977 study conducted by the city of lancaster indicated that approximately 35% of the total wastewater flow was from these twenty dischargers.

LITTLE RUSH CREEK
RUSH CREEK TRIBUTARY
CONFLUENCE AT RM 15.8

Segment Problem	Name Description	Use Designation Mile Points
O-1-2 NONE	Little Rush Creek From the headwaters to Rush Creek	WWH 18.0-0.0
O-1-5 MAJOR	Rush Creek From the headwaters to Hocking River	WWH 37.2-0.0

The headwaters of Rush Creek are severely degraded by mine drainage as a result of strip mining activity prior to the Strip Mine Reclamation Act of 1977. Water quality samples collected between 1975-1977 on Rush Creek below Junction City typically had a pH of 3.4 S.U. (OEPA, 1976; OEPA, CDO data, 1975-1977). The neutralizing effect of the alkaline tributaries (Center Branch Creek, Little Rush Creek and Raccoon Run) downstream, near Bremen caused an increase in pH to a neutral or slightly acidic range. The mix of acid water with these tributaries caused extensive metallic hydroxide precipitates on the streambed throughout the entire length of the mainstem. A recent water quality survey near Bremen (RM)(OEPA, CDO 1981) indicated extensive degradation below the confluence of Rush and Little Rush Creeks.

Existing conditions in this stream (i.e., extensive nonpoint mine drainage) will not allow the 1983 goals to be achieved. Degradation is likely to continue well into the future.

CLEAR CREEK
HOCKING RIVER TRIBUTARY
CONFLUENCE AT RM 78.7

Segment Problem	Name Description	Use Designation Mile Points
O-1-1 NONE	Clear Creek From the headwaters to the Hocking River	WWH 23.0-0.0

Data from previous water quality reports (Ohio EPA 1975, 1976, 1978a) have shown Clear Creek, Little Rush Creek, and the Upper Hocking River to be of high quality. Little if any changes have occurred in these watersheds to warrant further survey work at this time.

Oil and gas well brine pit seepage has, at times, degraded surface waters in the Upper Hocking River Subbasin. Previous studies of Harper Run (Ohio EPA 1975, 1976) have shown high chloride levels due to brine pit seepage. The problem also arises from occasional operational and maintenance difficulties; it is a sporadic, rather than continuous, nonpoint pollution problem. Energy exploration activity in the Upper Hocking River Valley is expected to increase and, as a result, background chloride concentrations are expected to rise.

REFERENCES

Ohio Environmental Protection Agency. 1975. Hocking River Basin 303(e) report. Ohio EPA, Division of Surveillance, Central District Office. Columbus, Ohio.

Ohio Environmental Protection Agency. 1975-1981 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1976. Hocking River Basin 305(b) report water quality summary. Ohio EPA, Division of Surveillance, Central District Office. Columbus, Ohio.

Ohio Environmental Protection Agency. 1978a. State of Ohio 305(b) water quality summary. Ohio EPA, Office of Wastewater, Division of Surveillance and Lab Services. Columbus, Ohio.

Ohio Environmental Protection Agency. 1978b. (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

HOCKING RIVER, SHADE RIVER, AND LEADING CREEK BASIN

MIDDLE HOCKING RIVER SUBBASIN (O-2)

SUBBASIN SUMMARY

Nonpoint source pollution contributed to water quality degradation in portions of the Middle Hocking River Subbasin. Sunday Creek and Monday Creek were severely degraded by mine drainage (OEPA, 1979). Oldtown Creek has been contaminated by brine from oil and gas well drilling within the watershed (OEPA, SEDO data, 1975-1976). Seepage and spillage of brine elevates in-stream concentrations of dissolved solids and chlorides.

The Hocking River above Monday Creek generally had fair physical/chemical water quality. However, occasional WQS violations for total iron, total cadimum, and particularly total mercury, suggest that further study is warranted. Industrial sources in Lancaster and/or acid mine drainage in the Rush Creek watershed should be more thoroughly investigated. Point sources located within this subbasin (Logan WWTP (RM 63.) and Nelsonville WWTP (RM 52.3)) probably do not substantially impact water quality (OEPA, 1974).

Margaret Creek, a tributary to the Hocking River, is classified as Exceptional Warmwater Habitat. Limited data supported this classification (OEPA, SEDO data, 1973-1976), but further monitoring is necessary to accurately assess water quality in Margaret Creek.

SEGMENT REPORTS

HOCKING RIVER MAINSTEM
OHIO RIVER TRIBUTARY
CONFLUENCE AT RM 199.0

Segment Problem	Name Description	Use Designation Mile Points
O-2-1 NONE	Hocking River From the Clear Creek confluence to the Monday Creek confluence	WWH 78.7-51.1

Data from the monthly monitoring site at Enterprise (RM 72.5; STORET Station No. 601530) indicated infrequent WQS violations for total iron, total copper, total zinc, and total mercury. Pollutant loading from upstream sources (i.e., Lancaster, Rush Creek watershed) may have been responsible. The Logan WWTP (RM 63.2) and the Nelsonville WWTP (RM 52.3) discharge to this segment of the Hocking River, but only minor water quality impacts are thought to occur (OEPA, 1974).

A more extensive study of the heavy metal contamination in this river segment is needed to insure that 1983 goals are not being impaired.

Segment Problem	Name Description	Use Designation Mile Points
O-2-4 MAJOR	Hocking River From the Monday Creek confluence to RM 5.4	WWH 51.5-5.4

Physical/chemical water quality was degraded in this stream segment by mine drainage pollution from Monday Creek and Sunday Creek. WQS violations for total iron and total lead were noted from 1977 to 1978 at the U.S. Rt. 33 station located at Athens (RM 39.6; STORET Station No. 601650) (OEPA, SEDO data, 1977-1978). At the U.S. Geological Survey Station located below Athens, WQS violations for total iron, total lead, pH, and dissolved oxygen were recorded (USGS, 1977-1979). Organic loading from the city of Athens WWTP and the channelized morphology of the Hocking River through Athens created depressed dissolved oxygen levels. Chemical data for downstream reaches of the Hocking River was very limited; the point at which the river recovers from the pollutions effects cannot be determined with available data.

SUNDAY CREEK
HOCKING RIVER TRIBUTARY
CONFLUENCE AT RM 42.0

Segment Problem	Name Description	Use Designation Mile Points
O-2-2 MAJOR	Sunday Creek From the headwaters to the Hocking River	WWH 27.0-0.0

Sunday Creek is 27.2 miles long and drains an area of 139 square miles in Athens, perry, and Morgan Counties. Abandoned underground mines underlie most of the lower Sunday Creek watershed south of Glouster, but there are only a few surface mines. The northwestern portion of the basin, drained by the west branch of Sunday Creek, has been extensively mined by both surface and underground methods.

The mainstem of Sunday Creek was sampled over 80 times during the period of 1964 to 1980. Data sources include; the FWPCA (1968), Skelly and Loy (1973), USGS (1964-1978), Ohio EPA (1973-1977 and 1979-1980), U.S. Forest Service (1977-1978) and Army Corps of Engineers (1974-1975).

Sunday Creek and all of its tributaries except the East Branch are mine drainage affected. Sunday Creek had severe acid mine drainage problems, especially during periods of low flow. Seventy percent of the samples collected from Sunday Creek exceeded WQS for pH. Low pH values occurred consistently during the low flow months of June-Sepetember, while pH values in the range of 6.0 to 7.3 S.U. occur during the remainder of the year. Sulfate concentrations were relatively high while values for total iron and total manganese consistently exceeded WQS standards.

The East Branch of Sunday Creek and its tributaries, along with Burr Oak Reservoir have relatively good physical/chemical water quality. There are only a few abandoned mines present in the East Branch watershed. Burr Oak Reservoir is a source of public water supply for many surrounding communities. The only parameter detected in violation of WQS was total manganese.

The benthic macroinvertebrate fauna of Sunday Creek was sampled once in 1966. At all stations sampled, only one taxon was found. This limited aquatic community was thought to be due to the effects of acid mine drainage.

Fish kills in the Hocking River has been attributed to slugs of acid water entering the Hocking from Monday and Sunday Creeks (1957-1979).

Communities located within the basin are Glouster, Corning, Jacksonville, Shawnee, and Chauncey. Only the village of Chauncey had a centralized sewage system. The remaining entities are in the facility planning stage.

MONDAY CREEK
HOCKING RIVER TRIBUTARY
CONFLUENCE AT RM 47.9

Segment Problem	Name Description	Use Designation Mile Points
0-2-3 MAJOR	Monday Creek From the headwaters to the Hocking River	WWH 25.0-0.0

Mine drainage, and possibly organic pollution from the small urban areas within the watersheds, severely degrade this segment (Ohio EPA, 1973-1980).

REFERENCES

Ohio Environmental Protection Agency. 1974. Hocking River Basin 303(e) wasteload allocation report. Division of Surveillance, Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979. Hocking River Basin water quality management plan; Part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1973-1980 (unpublished). Data available from Southeast District Office, Logan, Ohio.

United States Geological Survey. 1977-1978. Water resources data for Ohio, Volume I. Ohio River Basin. U.S. Geological Survey water data reports OH-77-1 and OH-78-1. U.S. Geological Survey, Columbus, Ohio.

HOCKING RIVER, SHADE RIVER, AND LEADING CREEK BASIN

LOWER HOCKING RIVER SUBBASIN (O-3)

Recent physical/chemical water quality data for the lower Hocking River Subbasin is very limited, thus preventing an accurate assessment of conditions. The Hocking River below Athens was degraded and is not expected to meet 1983 goals (see discussion in the Middle Hocking River Subbasin report). There were no major point sources of pollution downstream from Athens, but mine drainage from the Federal Creek watershed may have influenced water quality in the lower Hocking River.

Federal Creek appears to be only moderately affected by mine drainage as no pH violations were detected during sampling by Ohio EPA in 1977 (OEPA, SEDO data, 1977). Observations during that survey suggested that Sulfur Run, Marietta Run and Opposum Run were more significantly influenced by mine drainage than other tributaries to Federal Creek. A dairy operation west of Amesville substantially degraded McDougall Run, a tributary to Federal Creek, by inappropriate management of feedlot runoff. Additional study of the Federal Creek watershed is needed to accurately establish use designations. The majority of Federal Creek was classified as Mine Drainage but the headwaters to the confluence of Sharps Fork were classified as Exceptional Warmwater Habitat. The Federal Creek watershed area is currently being considered for abandoned mine reclamation.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

HOCKING RIVER, SHADE RIVER, AND LEADING CREEK BASIN

SHADE RIVER AND LEADING CREEK SUBBASIN (O-4)

SUBBASIN SUMMARY

The Shade River mainstem, the Middle Branch, and the East Branch are classified Exceptional Warmwater Habitat, although supporting chemical/physical water quality data is very limited. A sample was collected a the low-flow monitoring site on the Shade River (RM 5.9; STORET Station No. 609170) in 1978; there were no Exceptional Warmwater Habitat WQS violations (OEPA, SEDO data, 1978).

U.S. Geological Survey monitoring at Chester, Ohio from 1975 to 1977 revealed WQS violations for dissolved oxygen, total copper, total zinc and total mercury (USGS, 1975-1978). The village of Chester is the only population center along the Shade River and there are no point source dischargers. A more thorough water quality investigation is needed to substantiate the Exceptional Warmwater Habitat use designation in the Shade River Subbasin.

The West Branch of the Shade River was affected by acid mine drainage (OEPA, 1979). Low pH values, high manganese loadings, and moderate sulfate loadings have been noted. The same report noted severe sedimentation problems in the upper reaches of the West Branch. The Ohio Department of Natural Resources has completed an 87 acre demonstration project in the area which was aimed at controlling the sedimentation problem. To our knowledge no data is presently available to verify water quality improvements.

Several portions of the Leading Creek watershed also showed indications of mine drainage degradation. The State Water Quality Management Plan listed Thomas Fork, Little Leading Creek, Parker Run, and Ogden Run as being affected by area coal mines (OEPA, 1979). Data from July 1978 revealed a pH of 3.7 in Thomas Fork, strongly suggesting acid mine drainage; data directly indicating mine drainage impacts in the other three streams is lacking. Samples taken near the mouth of Leading Creek by the U.S. Geological Survey revealed no Ohio WQS violations (USGS, 1976-1977). A sample from the low flow monitoring site (RM 1.4; STORET Station No. 609160) in 1978 indicated one violation of the total iron standard (OEPA, SEDO data, 1978).

The attainability of the 1983 goals in the Shade River and Leading Creek Subbasin is unknown becuse of insufficient data.

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (Unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Protection Agency. (1979). Southeast Ohio tributaries water quality management plan, Part III, preliminary report. Ohio EPA, Columbus, Ohio.

MUSKINGUM RIVER BASIN

BLACK AND CLEAR FORK SUBBASIN (P-1)
AND
LOWER MOHICAN RIVER SUBBASIN (P-2)

SUBBASIN SUMMARY

The Mohican River Subbasin is located in a scenic area of the state with rolling hills and swift flowing streams. The stream bed is sand or gravel, in most instances, resulting in an aesthetically pleasing appearance. Many of the stream segments are designated as State and National Resource Waters and are used extensively for canoeing.

An estimated 16.9 stream miles in these subbasins have major chemical/physical problems. The major water quality problem in the Mohican River Subbasin was persistent toxicants, primarily industrially generated heavy metals, which were present in the rivers below Mansfield, Ashland, and Shelby. Rocky Fork below Mansfield, is the most severely polluted stream segment. It is believed that stringent pretreatment requirements at these three cities, plus municipal WWTP improvements, will result in significant progress towards compliance with the 1983 goals. However, the Rocky Fork in and below Mansfield will continue to experience occasional WQS violations that will prevent attainment of 1983 goals.

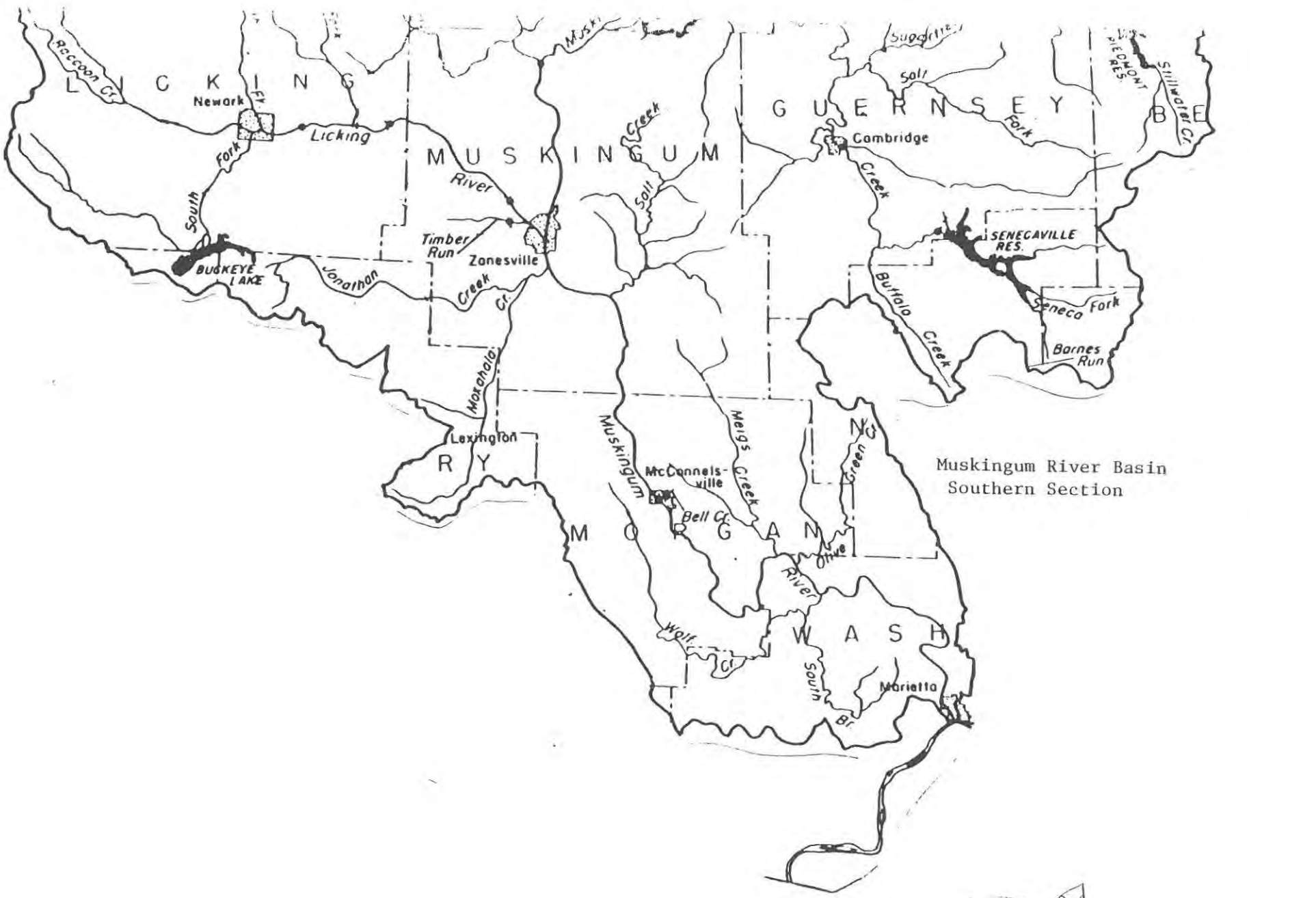
BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the Black Fork Subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic data collected from two data points. The samples were collected in August, 1974, from Rocky Fork at Mansfield downstream from Empire Detroit Steel (RM 14.4) and from Black Fork at Shelby downstream from Ohio Steel Tube (RM 53.0).

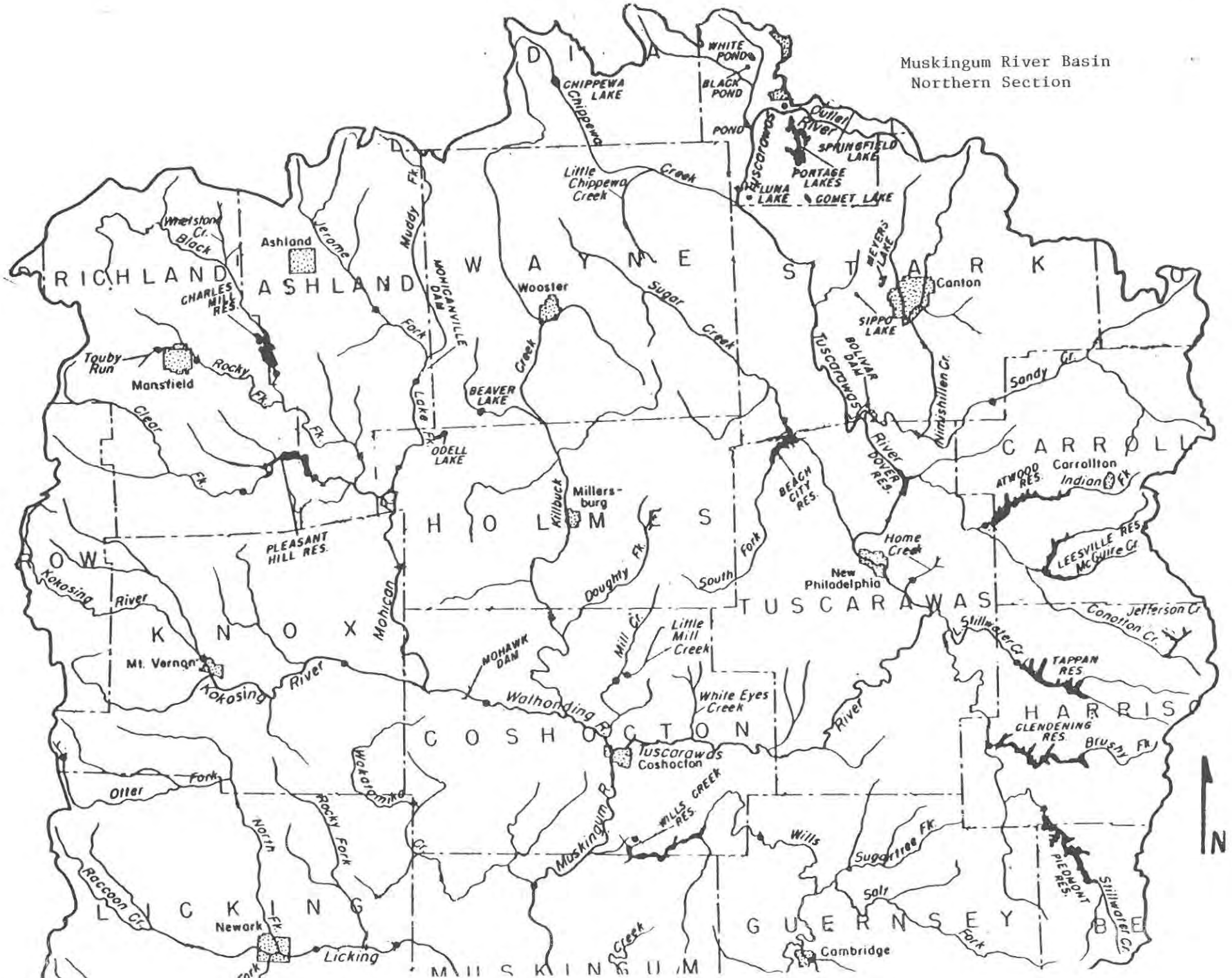
The benthic community at the station on Rocky Fork consisted of seven taxa with a diversity index of 2.21 (RD 3-83). Oligochaetes accounted for 93 percent of the total number of organisms collected. There were no mayfly or caddisfly taxa. The severe degradation in the benthic community at the site indicated Class IV (Poor) water quality.

The benthic community at the station on Black Fork consisted of 14 taxa with a diversity index of 2.52 (RD 3-82). Eight taxa of midges along with oligochaetes and the pulmonate snail Physa accounted for 95 percent of the total number of organisms collected. Severe degradation was apparent in the benthic community, possibly the result of a toxicity problem since the number of organisms collected was quite low. An evaluation of Class IV (Poor) water quality was assigned to this station.

No recent biological data was available for the Lower Mohican River Subbasin. Previous fixed station monitoring in the subbasin consisted of three sets of benthic data collected from a NASQAN station located on the Mohican River at Greer in Knox County (RM 16.7). The benthic community was sampled at an east bank and west bank station in September, 1978, and a west bank station in September, 1977 (RD 3-79, 3-80, and 3-81). All three samples indicated that thriving, diverse benthic communities existed. Mayflies, stoneflies, caddisflies, and midges were all present and well represented by taxa. Total



Muskingum River Basin
Southern Section


Muskingum River Basin
Northern Section
DIAMOND
WHITE POND
BLACK POND
POND
CHIPPEWA LAKE
Chippewa
Outlet River
SPRINGFIELD LAKE
PORTAGE LAKES
LUNA LAKE
COMET LAKE
Tuscarawas
Little Chippewa Creek
Creek
Wrenston Cr.
Black
Ashland
Jerome
Muddy Fk.
RICHLAND
ASHLAND
WAYNE
STARK
MEYERS LAKE
Canton
CHARLES MILL RES.
MOHICANVILLE DAM
Fork
Wooster
Sugar Creek
SIPPO LAKE
BOLIVAR DAM
Tuscarawas
Windshillen Cr.
Sandy Cr.
Touby Run
Mansfield
Rocky Fk.
Clear Fk.
Lake Fk.
BEAVER Creek
ODELL LAKE
CARROLL
Carrollton
ATWOOD RES.
Indian Fk.
BEACH CITY RES.
River
DOVER RES.
Killbuck
Millers-burg
HOLMES
PLEASANT HILL RES.
Home Creek
LEESVILLE RES.
McGuire Cr.
KNOX
Kokosing River
Monican
Doughty Fk.
South Fork
New Philadelphia
TUSCARAWAS
Jefferson Cr.
Conotton Cr.
Stillwater Cr.
Mt. Vernon
Kokosing River
MOHAWK DAM
Mill Cr.
Little Mill Creek
Walhonding
White Eyes Creek
TAPPAN RES.
HARRISON
COSHOCTON
GLENDENING RES.
Brushy Fk.
Tuscarawas
Coshocton
Walhonding River
Otter Fork
North Fork
Rocky Fork
Wakatomika Cr.
Muskingum R.
WILLS CREEK RES.
Wills Creek
Sugartree Fk.
PIEDMONT RES.
Stillwater Cr.
Raccoon Cr.
LICKING
Newark
Licking
Salt Fork
GUERNSEY
Cambridge
MUSKINGUM
N

number of taxa ranged between 24 and 31. Slight organic enrichment seemed to be indicated by the high density of organisms and the slightly depressed diversity indices. All three samples consisted of benthic communities indicative of Class II (Good) water quality.

Samples were also previously collected in the subbasin from Jerome Fork at Ashland in Ashland County. Sampling was conducted at three stations in August, 1977, to monitor the impact of the Ashland WWTP and other industrial dischargers in the Ashland area.

The three stations were located at river miles 14.0, 9.1 and 0.9. The Ashland WWTP and other industrial sources discharge to Lang Creek which enters Jerome Fork at river mile 12.3. A summary of the data can be found in Table - . The tabulated data can be found in RD 3-67.

The upstream station (RM 14.0) was found to have a high diversity index (3.67) but the benthic composition and marginal number of taxa (25) indicated Class III (Fair) water quality. The station at river mile 9.1, located below Lang Creek, exhibited a decrease in number of taxa (20), diversity (2.72), and number of pollution sensitive organisms. A moderate increase in the number of oligochaetes was noted while the number of mayflies decreased substantially. The water quality at this point was considered Class IV (Poor) with the data indicating a moderate degree of degradation. The station at river mile 0.9 had increases in both the number of taxa (30) and the diversity index (3.50) which indicated some apparent recovery. The mayfly population, however, remained depressed to some extent. An evaluation of Class III (Fair) water quality was indicated.

Lang Creek had a moderate deleterious impact on Jerome Fork with recovery apparently not occurring completely before the confluence with Mohicanville Reservoir.

Table III-30 Summary of Benthic Data Collected from Jerome Fork Relative to the Ashland Wastewater Treatment Plant (WWTP) and Numerous Industrial Discharges, September, 1977[a]

	Station (RM)		
	14.0	9.1	0.9
Number of Samplers	5	5	5
Quantitative Taxa	25	20	30
Qualitative Taxa	5	9	5
Organisms/Ft^2	274	107	210
Index ($\bar{d}$)	3.67	2.72	3.50
Evaluation (Class)	III	IV	III

(a) The Ashland WWTP discharge is located near the mouth of Lang Creek which enters Jerome Fork at RM 12.3. Other industrial dischargers are located along Lang Creek above the Ashland WWTP.

ROCKY FORK
BLACK FORK TRIBUTARY
CONFLUENCE AT RM 13.6

Segment Problem	Name Description	Use Designation Mile Points
P-1-9 MAJOR	Rocky Fork From Bowman Street to the Mansfield WWTP	WWH 16.2-11.2

This segment traverses the industrial section of Mansfield. Most of the industries were in compliance with their NPDES limitations, but problems still existed. Violations of WQS for total iron, total zinc, total lead, total chromium, total nickel, and fecal coliforms were recorded in this segment. The drainage area of Rocky Fork above this segment is small and delivers inadequate amounts of dilution water during low flow periods. The regulated discharges, plus occasional accidental discharges and storm runoff, will prevent this segment from meeting the 1983 goals (OEPA, NWDO data, 1978).

Segment Problem	Name Description	Use Designation Mile Points
P-1-8 MAJOR	Rocky Fork From the Mansfield WWTP to the Black Fork	WWH 11.2-0

Inadequate treatment by the Mansfield WWTP (RM 12.4) resulted in WQS violations for dissolved oxygen, fecal coliforms, phenolics, and ammonia (OEPA, NWDO data 1977-1980). Also, numerous metals violations can be traced to the Mansfield WWTP including; total chromium, total copper, total mercury, and total nickel. The metals violations were the result of inadequate industrial pretreatment prior to discharge into the municipal collection system. A new pretreatment ordinance will require compliance with federal guidelines by 1983, thus reducing the severity of metals contamination. However, dissolved oxygen and ammonia violations will persist until the Mansfield WWTP is upgraded. Eventually, this segment of the Rocky Fork may meet 1983 water quality goals, but WWTP improvements at Mansfield are not likely until 1985.

BLACK FORK
MOHICAN RIVER TRIBUTARY
CONFLUENCE AT RM 26.6

Segment Problem	Name Description	Use Designation Mile Points
P-1-5 MINOR	Black Fork From the source to the Charles Mill Reservoir	WWH 58.4-20.2

The physical/chemical water quality of this segment was generally good, but was subject to occasional, minor metals violations and low D.O. as a result of discharges from the Shelby WWTP (RM 56.7)(OEPA, NWDO data, 1978). Improvements to the WWTP plant and more stringent pretreatment standards should result in this segment meeting the 1983 goals.

Segment Problem	Name Description	Use Designation Mile Points
P-1-4 NONE	Black Fork From the Charles Mill Reservoir Dam to the Rocky Fork confluence	WWH 17.6-13.6

Segment Problem	Name Description	Use Designation Mile Points
P-1-3 MINOR	Black Fork From the Rocky Fork confluence to the Mohican River	WWH 13.6-0

During 1978-1979, WQS for total lead and total zinc were violated. These problems were probably the result of industrial discharges in Mansfield (OEPA, CDO and NWDO data, 1978, 1979). Improved treatment and pretreatment is expected from the industrial dischargers in the Rocky Fork watershed prior to 1983, and should result in the Black Fork meeting 1983 goals.

CLEAR FORK
MOHICAN RIVER TRIBUTARY
CONFLUENCE AT RM 26.6

Segment Problem	Name Description	Use Designation Mile Points
P-1-7 NONE	Clear Fork From Clear Fork Reservoir Dam to the Pleasant Hill Reservoir	WWH 28.6-9.2

Segment Problem	Name Description	Use Designation Mile Points
P-1-6 NONE	Clear Fork From the Pleasant Hill Reservoir Dam to the Mohican River	WWH 4.8-0.0

JEROME FORK
LAKE FORK TRIBUTARY
CONFLUENCE AT RM 14.7

Segment Problem	Name Description	Use Designation Mile Points
P-2-10 NONE	Jerome Fork From near the source to Lang Creek	WWH 17.4-12.0

NO-NAME CREEK
JAMISON CREEK TRIBUTARY
CONFLUENCE AT RM 0.10

Segment Problem	Name Description	Use Designation Mile Points
P-2-11 MAJOR	No-Name Creek From Cleveland Avenue to Jamison Creek	WWH 0.70-0.0

Heavy metals violations occurred in this segment, particularly for total copper, lead and zinc (OEPA data, 1976, 1977). The stream bottom was essentially devoid of periphytic growth indicating a toxicity problem. The metals violation were mainly from the Philway Company discharge. This industry has a hydraulically overloaded WWTP. New treatment facilities for the Philway Company, with final discharge to the Ashland collection system, are to be financed by Ohio Water Development Authority Revenue Bonds. The new facilities are expected to provide for attainment of 1983 goals.

Stream sections immediately downstream from the No-Name Creek discharge were subject to high concentrations of heavy metals. These sections consisted of parts of Jamison Creek (RM 0.10 - RM 0.0, confluence with Lang Creek at RM 0.4) and Lang Creek (RM 0.4 - 0.0, confluence with Jerome Fork at RM 12.0). The Ashland WWTP discharges to Lang Creek at RM 0.4. A field survey was conducted in these streams on April 28, 1979 by Ohio EPA personnel (NWDO). The substrate in Jamison Creek at the Lang Creek confluence was nearly devoid of attached algae, suggesting an upstream source of toxicity (e.g., No-Name Creek discharge). The WWTP discharge turned the Lang Creek water to a turbid grey color and aquatic invertebrates appeared to be absent in Lang Creek below the discharge.

Segment Problem	Name Description	Use Designation Mile Points
P-2-12 MINOR	Jerome Fork From the Lang Creek confluence to the Lake Fork	WWH 12.0-0.0

Numerous WQS violations occurred downstream from the Lang Creek confluence, as a result of overflows and bypassing at the Ashland Municipal WWTP. The WQS violations included dissolved oxygen, ammonia, total copper, total zinc, total mercury and fecal coliforms (OEPA, NWDO data, 1977-1980). A facility plan is nearing completion for the city of Ashland, and it is possible that improvements at the WWTP may be completed by 1983. In addition, the city has acquired a federal grant to develop a pretreament program.

LAKE FORK
MOHICAN RIVER TRIBUTARY
CONFLUENCE AT RM 22.6

Segment Problem	Name Description	Use Designation Mile Points
P-2-2 NONE	Lake Fork From the confluence of Jerome Fork and Muddy Fork to the Mohican River	WWH 14.7-0.0

MOHICAN RIVER MAINSTEM
WALHONDING RIVER TRIBUTARY
CONFLUENCE AT RM 22.1

Segment Problem	Name Description	Use Designation Mile Points
P-2-1 MINOR	Mohican River From the source to the Walhonding River	WWH 27.6-0

In 1977-1978, WQS violations were noted for total copper, total lead, total zinc and total iron (OEPA, NWDO data, 1977-1979). However, total iron was the only metal violation recorded in the 1978-79 sampling period. This improvement may be related to the initiation of industrial waste pretreatment requirements in the cities of Mansfield and Ashland. Additional wastewater treatment improvements by the various industries are anticipated by 1983. Dissolved oxygen concentrations in the Mohican River were generally excellent (above 7 mg/l), although a single value of 4.3 mg/l was recorded. Sporadic occurrences of dissolved oxygen concentrations below 5 mg/l are not expected to prevent attainment of 1983 goals.

MUDDY FORK
LAKE FORK - TRIBUTARY
CONFLUENCE AT RM 14.7

Segment Problem	Name Description	Use Designation Mile Points
P-2-11 NONE	Muddy Fork From the headwaters to the Lake Fork	WWH 25.0-0.0

The Upper Jerome Fork, above Lang Creek, and the Muddy Fork drain predominately agricultural land. No major WQS violations were noted in these segments (OEPA, NWDO data, 1977-1979). One violation of the total zinc standard was recorded in Jerome Fork above Lang Creek in 1980. The Lake Fork, Clear Fork, and Black Fork segments were also free of violations (OEPA, NWDO data, 1974-1980).

REFERENCES

Ohio Environmental Protection Agency. 1976. Biological investigation of effects of Ashland WWTP Discharge on Jerome Fork. Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1974-79 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1978-79 (unpublished). Field surveys, data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1981. Water Quality Study of the Rocky Fork of the Mohican River-Richland County, Ohio. Columbus, Ohio.

MUSKINGUM RIVER BASIN

UPPER KILLBUCK CREEK SUBBASIN (P-3)
AND
A PORTION OF THE WALHONDING RIVER SUBBASIN (P-4)

SUBBASIN SUMMARY

Land use in these subbasins is predominately agricultural. Moderate-sized population centers that contribute point source pollution include Creston, Westfield Center, Wooster, Shreve, Apple Creek, Millersburg and Killbuck. The discharge of the Wooster WWTP caused substantial degradation of Killbuck Creek (Havens and Emerson, 1975). Less severe degradation may occur downstream from the other WWTPs in the Killbuck Creek Subbasin, but additional monitoring is needed to assess the impacts. Additional monitoring of Apple Creek is especially needed in light of its Coldwater Habitat use designation.

Physical/chemical water quality in the Walhonding River was generally good and currently meets 1983 goals. Mill Creek, a tributary to the Walhonding River was classified as a Mine Drainage stream. Although no WQS violations have been reported (USGS, 1974-1977), but there is insufficient data to accurately assess water quality in Mill Creek.

SEGMENT REPORTS

KILLBUCK CREEK
WALHONDING RIVER TRIBUTARY
CONFLUENCE AT RM 6.5

Segment Problem	Name Description	Use Designation Mile Points
P-3-1 MINOR	Killbuck Creek Wooster WWTP to unknown	WWH 47.0-Unknown

Total iron, dissolved oxygen and total copper WQS violations have been noted in this stream segment at the low-flow monitoring site (RM 44.8; STORET Station No. 601880)(OEPA, NEDO data, 1977-1979). Killbuck Creek is expected to meet 1983 goals after the improvements to the Wooster WWTP are completed.

WALHONDING RIVER
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM 110.2

Segment Problem	Name Description	Use Designation Mile Points
P-4-1 NONE	Walhonding River From the source to the Killbuck Creek confluence	WWH 23.5-6.5

Infrequent WQS violations for total iron and total copper were reported at the monitoring sites at Nellie, Ohio (RM 14.7; STORET Station No. 601910)(OEPA, SEDO data, 1977-1980). These minor violations do not appear to interfere with the attainability of the 1983 clean water goals. Water quality conditions in the lower 6.5 miles of the Walhonding River cannot be assessed due to a lack of data.

REFERENCES

Havens and Emerson, Ltd. Environmental Consulting Engineers. 1975 (final document dated April 1976). Muskingum watershed water quality assessment and low flow analysis. Report prepared for Ohio EPA. n.p.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

MUSKINGUM BASIN

MIDDLE TUSCARAWAS RIVER AND
SUGAR CREEK SUBBASIN (P-5),
UPPER TUSCARAWAS RIVER SUBBASIN (P-6),
AND
SANDY CREEK SUBBASIN (P-7)

SUBBASIN SUMMARY

Physical/chemical water quality of the upper Tuscarawas River and its tributaries ranged from good to fair. Streams in the Sandy Creek Subbasin were degraded by point and nonpoint source pollution. Nimishillen Creek, a tributary to Sandy Creek, drains approximately 187 square miles of one of the most industrialized areas of Ohio. There are three municipal WWTP (Canton, East Canton and Louisville), eleven package plants operated by Stark County, and 58 private package plants under 25,000 GPD. Many headwater streams in the Nimishillen watershed had stream flows that were too low to assimilate this large volume of organic loading. Serious degradation of local water quality existed in the Nimishillen Creek watershed (NEFCO 1979).

Nonpoint source mine drainage pollution was another major water quality problem in the Sandy Creek Subbasin (NEFCO 1979). Approximately 20 percent of the watershed has experienced intensive strip mining activity (Havens and Emerson, 1975). Streams degraded by acid mine drainage include Little Sandy Creek, Muddy Fork, and Bear Run. Point source pollution impacts, other than those on Nimishillen Creek, were relatively minor (Havens and Emerson, 1975). Limited sampling of Sandy Creek above Waynesburg revealed only one WQS violation for total iron and one for fecal coliform (OEPA, NEDO data 1977-1980).

There were numerous water quality problems within the Chippewa Creek watershed (drainage area 188 sq. miles). Repeated channelization has created a stream morphology that severely limits the organic waste assimilative capacity of Chippewa Creek. Five municipal WWTP and two industrial discharges are located within the drainage basin. Agricultural land use and failing septic tank systems may also contribute to significant nonpoint source pollution. A detailed wasteload study (Havens and Emerson, 1975) determined that the Medina No. 1 WWTP was the most significant discharger in the subbasin, with respect to impact on dissolved oxygen. Other major discharges include: Rittman WWTP, Wadsworth WWTP, Orrville WWTP, Doylestown WWTP, Kopper's Corporation and the Packaging Corporation of America. The Kopper's Corporation discharges pentachlorophenol and was responsible for Warmwater Habitat (WWH) WQS violations for total chromium, total iron, oil and grease and phenolics in Little Chippewa Creek (OEPA, NEDO data, 1977-1979). In 1980, the Koppers Corporation phased out the pentachlorophenol process and put final cover material on their industrial landfill site. The results of these changes should be improved water quality.

Physical/chemical water quality in the Sugar Creek watershed was generally good. WWTPs at the villages of Smithville and Brewster were overloaded during wet weather periods because of infiltration problems. Only minor WQS violations occurred and no serious degradation of water quality exists. Every effort should be taken to maintain this good water quality because Sugar Creek recharges the aquifer supplying Canton's well field at Beach City.

The upper Tuscarawas River from the headwaters to the Sandy Creek confluence is a very complex system. Over 290 point sources discharge to the river or its tributaries. Previous reports have outlined the major stream segments impacted by point source discharges (Havens and Emerson, 1975; NEFCO, 1979). The primary water quality problems in the Tuscarawas River mainstem were dissolved oxygen, ammonia, phenolics, and total dissolved solids. Improvements in water quality are expected in the Tuscarawas River above Barberton upon completions of several pollution control projects. However, the river below Barberton is not expected to meet 1983 goals in the foreseeable future.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of two sets of benthic data collected from two data points. The samples were collected in September, 1977, from the Tuscarawas River at a NASQAN station located below the Massillon WWTP in Stark County (RM 87.4) and in October, 1976, from Sugar Creek near Dover in Tuscarawas County (RM 0.6).

The benthic community at the station in the Tuscarawas River consisted of 17 taxa with a diversity index of 1.20 (RD 3-77). Oligochaetes accounted for 82 percent of the total number of organisms collected. Only one taxon of mayflies and no caddisflies were present. The severe degradation in the benthic community at the site indicated Class IV (Poor) water quality.

The benthic community at the station in Sugar Creek consisted of 18 taxa with a diversity index of 2.92 (RD 3-78). Eight taxa of mayflies and caddisflies and six taxa of midges were present in the sample. The benthic composition and the diversity index indicated Class III (Fair) water quality. This evaluation was considered marginal because of the low number of taxa present.

SEGMENT REPORTS

TUSCARAWAS RIVER MAINSTEM
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM 110.2

Segment Problem	Name Description	Use Designation Mile Points
P-6-1 MINOR	Tuscarawas River From the headwaters to Barberton WWTP	WWH 130-106

Segment Problem	Name Description	Use Designation Mile Points
P-5-4 MAJOR	Tuscarawas River From the Barberton WWTP to the city of Navarre	WWH 106-80

Low flows combined with a large number of point source dischargers created severe WQS violations for dissolved oxygen, total iron, total lead, fecal coliforms, and phenolics in the upper Tuscarawas River (OEPA, NEDO data, 1977-1979). NEFCO (1979) reported that most tributary streams to the upper

Tuscarawas River violated the fecal coliform standard because of failing septic tank systems. Numerous small WWTPs and four major industrial dischargers are located on the river upstream from the Wolf Creek confluence. The city of Barberton has made application for phase I funding for a sanitary sewer evaluation survey. Barberton has completed the first phase of this evaluation process. Construction of the Springfield Township WWTP has eliminated four county plants and several package plants; however, as of February, 1982, only 200,000 gpd of the 4 mgd plant capacity was being used. As a result of public insistence, the Summit County Council of Governments has placed a three year moratorium on all new construction related to the Springfield Township phase II sewer collection system. It is unlikely that this project will ever be federally funded.

CHIPPEWA CREEK
TUSCARAWAS RIVER TRIBUTARY
CONFLUENCE AT RM 98.9

Segment Problem	Name Description	Use Designation Mile Points
P-6-3 MAJOR	Chippewa Creek From confluence of River Styx to the Tuscarawas River	WWH 8.1- 0.0

This segment of Chippewa Creek will continue to experience dissolved oxygen (D.O.) violations during low-flow conditions. Even after the application of stringent effluent criteria, minimal reaeration rates and natural organic loads in this segment will prevent the attainment of 1983 goals (Havens and Emerson, 1975). Limited sampling of Chippewa Creek near Easton has revealed D.O. fecal coliform, total iron, phenolics and ammonia violations during low-flow conditions (OEPA, NEDO data, 1978).

Segment Problem	Name Description	Use Designation Mile Points
P-5-3 MINOR	Tuscarawas River From Navarre at Riverland Avenue to the confluence of Sandy Creek	WWH 80-73

Limited sampling in this segment has revealed WQS violations for phenolics, total iron, dissolved oxygen, fecal coliform, total dissolved solids, and high phosphorus concentrations (OEPA, NEDO data, 1977). The upgrading of the primary WWTP at Navarre, and reduced pollutant loading from the upper Tuscarawas River and Chippewa Creek, is expected to improve water quality in this river segment.

EAST BRANCH NIMISHILLEN CREEK
NIMISHILLEN CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
P-7-1 MINOR	East Branch Nimishillen Creek From the J & L discharge to Middle Branch Nimishillen Creek	WWH 5.8-0.0

Violations of WQS for MBAS, fecal coliforms, total chromium, total nickle, and total iron are common in the East Branch of Nimishillen Creek (OEPA, NEDO data, 1977-1979). Two WWTPs operated by the city of Lousiville, the Jones and Laughlin Steel Plant, the Republic Steel Company, and the Ford Motor Company are the major discharges to this stream. WWTP improvements by all dischargers in this watershed should eliminate the above WQS violations by 1983.

NIMISHILLEN CREEK
SANDY CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
P-7-2 MAJOR	Nimishillen Creek From Canton WWTP to Sandy Creek	WWH 10.1-0.0

The Canton WWTP and the pollutant loading delivered by tributary streams (i.e., Middle Branch, East Branch, Sherrick Run, and Hurford Run) severely degraded Nimishillen Creek. Municipal and industrial discharges made up 82 percent of the stream flow in this segment during low-flow conditions. WQS violations for fecal coliforms, dissolved oxygen, total cyanide, total mercury, nitrogen ammonia, total iron, total lead, phenolics, oil and grease, and pH have been reported for Nimishillen Creek below Canton at the North Industry USGS gaging station (RM 8.2; STORET Station No. 601940) (OEPA, NEDO data, 1977-1979). Dissolved oxygen (D.O.) problems occurred farther downstream within this segment of Nimishillen Creek. A D.O. concentration of 3.7 mg/l was recorded in September 1979. This stream segment is not expected to meet 1983 goals in the foreseeable future.

Segment Problem	Name Description	Use Designation Mile Points
P-7-4 MAJOR	Hurford Run From the source to Nimishillen Creek	2.0-0.0

This small tributary receives discharges and runoff from a highly industrialized area. Warmwater Habitat standards violations for ammonia, total chromium, total iron, total lead, total mercury and phenolics occur (OEPA, NEDO data, 1977-1980). Although improvements have recently been made in the treatment of industrial wastewater (i.e., at the Timken Company), it is unlikely that the 1983 goals will be met in the foreseeable future.

SUGAR CREEK
TUSCARAWAS RIVER TRIBUTARY
CONFLUENCE AT RM 69.5

Segment Problem	Name Description	Use Designation Mile Points
P-5-1 NONE	Sugar Creek From the headwaters to the Beach City Reservoir	WWH 45-12.0

Only minor WQS violations for total iron and fecal coliforms have been reported at monitoring sites upstream and downstream of the village of Brewster (OEPA, NEDO data, 1977-1979). The Brewster WWTP experienced difficulties during wet weather when infiltration overloads the plant causing inadequate treatment of the effluent (NEFCO, 1979). The minor WQS violations and the WWTP difficulties do not substantially impair the 1983 clean water goals.

Segment Problem	Name Description	Use Designation Mile Points
P-5-2 NONE	Sugar Creek From the Beach City Reservoir to the Broad Run Confluence	WWH 12.0-6.1

A monitoring station below Strasburg (RM 7.3; STORET Station No. 611700) was sampled until 1977; only minor WQS violations for total iron and fecal coliforms were observed (OEPA, SEDO data, 1976-1977). These violations were not believed to impair the 1973 clean water goals.

Broad Run appeared to be degraded by mine drainage as total iron and pH violations were detected (OEPA, SEDO data, 1979). Further study is needed to assess the impact of Broad Run on Sugar Creek; the study should also investigate the source of chlorobenzenes that have been detected in the lower 6 miles of Sugar Creek (OEPA, SEDO data, 1978).

WOLF CREEK
TUSCARAWAS RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
P-6-2 MINOR	Wolf Creek From Norton Ave. to the Tuscarawas River	WWH 1.8-0.0

Wolf Creek receives industrial and municipal effluents, along with runoff from a highly industrialized area of Barberton. WQS violations for dissolved oxygen, nitrogen ammona, phenolics, total mercury, total dissolved solids, total iron, and total lead have occurred at the mouth of Wolf Creek (OEPA, NEDO data, 1977-1980). Bacterial contamination and elevated temperatures may cause problems in upstream segments (NEFCO 1979). It is assumed that pollution abatement activities completed prior to 1983 will alleviate the water quality violations in Wolf Creek.

SWARTZ DITCH
TUSCARAWAS RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
P-7-3 MAJOR	Swartz Ditch From the Hartville WWTP to Unknown	WWH 6.9-Unknown

This is an extremely low-flow stream segment. NEFCO (1979) reported that the dissolved oxygen standard is probably not attainable with the current level of wastewater treatment at Hartville. Upgrading of the Hartville WWTP is not likely prior to 1983.

TUSCARAWAS RIVER
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM 110.2

Segment	Name/Description	Mile Points
P-5-5	Tuscarawas River From the confluence of Sandy Creek to Unknown	73 - Unknown

w/A

The added pollutant loading from Canton (via Nimishillen Creek and Sandy Creek) contributes to the already degraded quality of the Tuscarawas River in this segment. WQS violations for dissolved oxygen, iron, phenolics, fecal coliforms, and total dissolved solids have been recorded (OEPA, NEDO data, 1977-1979). Further study is needed to more accurately delineate this degraded zone.

Segment Problem	Name Description	Use Designation Mile Points
P-S-4	Tuscarawas River From the Barberton WWTP to the City of Navarre	106 - 80

Major point source dischargers that degrade this segment of the Tuscarawas River include: Barberton WWTP, Canal Fulton WWTP, Massillon WWTP, the Pittsburgh Plate Glass Company (PPG) and the Republic Steel Company. Chippewa Creek and the abandoned PPG lagoons at Clinton also contribute pollutants. The Ohio EPA has monitored water quality upstream and downstream from the Barberton WWTP and PPG - 001 discharger. The following parameter were found in higher concentrations at the downstream site: hardness, nutrients, BOD_5, COD, TOC, MBAS, TDS, phenolics and fecal coliform. Further downstream, at Clinton, TDS increases due to the leaching of chlorides from the inactive PPG lime waste lagoons that are located adjacent to the river (OEPA, NEDO data, 1978-1980). Although water quality should improve due to wastewater treatment improvements, this segment of the Tuscarawas River is not expected to meet 1983 goals.

Segment Problem	Name Description	Use Designation Mile Points
P-5-5 MAJOR	Tuscarawas River From the confluence of Sandy Creek to Unknown	73-Unknown

The added pollutant loading from Canton (via Nimishillen Creek and Sandy Creek) contributes to the already degraded quality of the Tuscarawas River in this segment. Warmwater Habitat violations for total iron, phenolics and fecal coliforms have been recorded (OEPA, NEDO data, 1977-1980). Further study is needed to more accurately delineate this degraded zone.

REFERENCES

Havens and Emerson, Ltd., Environmental Consulting Engineers. 1975 (final report dated April 1976). Muskingum watershed water quality assessment and low flow analysis. Report prepared for Ohio EPA. Havens and Emerson, Ltd., Cleveland, Ohio. n.p.

Northeast Ohio Four County Regional Planning and Development Organization (NEFCO). 1979. Clean water plant revisions Part I and II. Report prepared for Ohio EPA.

Ohio Environmental Protection Agency. 1977-1979 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

MUSKINGUM RIVER BASIN

TUSCARAWAS RIVER SUBBASIN

CONOTTON CREEK SUBBASIN (P-8)

Conotton Creek, a major tributary to the Tuscarawas River at RM 62.9, is located in Tuscarawas, Carroll and Harrison counties. The upper several miles of this creek, from the source to the city of Jewett is classified as mine drainage affected. Little stream data is available to confirm this classification, but considerable mining has taken place in the basin. The mid-portion of the mainstem of Conotton Creek from just above Scio to Sherrodsville was sampled once in 1981 at six different sites. All sites were found to have good water quality. The site furthest upstream, between Jewett and Scio at the SR 151 bridge, had higher than normal sulfate concentrations. This was thought to be the result of mine drainage upstream from Jewett.

The site furthest downstream (Sherrodsville) had one total iron violation (1040 mg/l). Since no other metals were significantly high, the iron violation was probably not indicative of mine drainage or metal-related discharges. Information received from USGS and the Ohio DNR, Abandoned Mine Lands program indicates that Huff Run, a tributary to the mainstem of Conotton Creek at RM 1.4 was slightly degraded (low pH) around Lindentree and occasionally had high conductivities.

Other tributaries in the basin were also slightly acidic at times. These included; an unnamed tributary near Summerdale, and McGuire Creek. Mining of the Lower and Middle Kittanning coals in this watershed are responsible for the acid mine drainage problems. The coal seams is mined using both surface and underground mining techniques.

Leesville Reservoir on McGuire Creek, and Atwood Reservior on Indian Fork are both popular fishing and recreational lakes which are apparently affected to a minor degree by acid mine drainage (1980 305(b) Vol. 5).

In addition to the affects of acid mine drainage on these stream segments several WWTP's contribute to water quality degradation. The Mineral City WWTP discharges approximately 25,000 gpd of sewage to Huff Run near its mouth; the city of Scio WWTP discharges approximately 180,000 gpd of sewage to the mainstem of Conotton Creek. In addition, the city of Jewett does not have a complete sewer system. This was probably responsible for part of the water quality problems in the area. The extent of stream degradation resulting from these two entities was not determined. U.S. Geological Survey stream data at various sites on the mainstem indicated occasionally high sulfate concentrations but no WQS violations (USGS, 1971-1977). Streams in this subbasin cannot be evaluated with respect to meeting 1983 goals because of insufficient data.

REFERENCES

Ohio Environmental Protection Agency 1980. Biennial Water Quality Report 305(b) Report Vol. V. Mine Drainage. Ohio EPA, Columbus, Ohio.

United States Geological Survey. 1971-1977. Water resources data for Ohio, Volume 1. Ohio River Basin. U.S. Geological Survey water data reports OH 71-1 through OH 77-1. U.S. Geological Survey, Columbus, Ohio.

MUSKINGUM RIVER BASIN

TUSCARAWAS RIVER SUBBASIN

STILLWATER CREEK SUBBASIN (P-9)

Extensive coal mining operations are located throughout the southern and southeastern sections of the Stillwater Creek Subbasin. Significant point source discharges in the subbasin include the Consolidation Coal Company (RM 14.9 on Skull Fork), the Uhrichsville-Dennison Wastewater Treatment Plant (RM 3.1), and the Chessie System (RM 1.5 on Trail Run).

Ohio EPA collected water quality data on Stillwater Creek (RM 1.3; STORET station No. 611720) in 1976 and 1977 (OEPA, SEDO data, 1976-1977). Standards violations were noted for dissolved oxygen, fecal coliform, and total iron. Concentrations of ammonia, sulfate, and total manganese were observed to be relatively high, but not above standards. Dissolved oxygen and fecal coliform violations were attributable to the Uhrichsville-Dennison WWTP; total iron, sulfate and manganese concentrations reflected the influence of mine drainage in the watershed. The monitoring station was dropped from the ambient fixed station network in 1978.

Streams in this basin have not been adequately evaluated with respect to attainment of 1983 clean water goals.

The Stillwater Creek subbasin, located in Harrison and Tuscarawas Counties, drains an area of 485 square miles and contains five streams or stream segments believed to be mine drainage affected: Boggs Fork, Little Stillwater Creek, Piedmont Reservoir Tributaries, Skull Fork and Stillwater Creek.

Boggs Fork drains 36.6 square miles roughly 40% of which has been strip mined. Approximately 5% has been mined using underground techniques. Very little data is available for Boggs Creek, however, the available data shows values for iron ranging from 200 to 3500 ug/l and sulfates from 240 to 830 mg/l. No pH violations were noted but the high iron and sulfate concentrations definitely indicate the presence of mine drainage.

Little Stillwater Creek drains an area of 32 square miles containing 1.5 square miles of inactive surface mines and about 1 square mile of sub-surface mines. Most of the existing chemical data is from a U.S.G.S. monitoring station which recorded conductivity values from 640 to 760 u-mhos, pH values from 6.9 to 7.7 S.U., sulfates from 200 to 260 mg/l, total iron from 100 to 1700 ug/l, and manganese from 1100 to 2600 ug/l. From the aforementioned information, there seems to be only minor affects of acid mine drainage present, however, a more complete monitoring network would need to be established before a final judgement can be made.

Piedmont Reservoir's tributaries all exhibit high sulfate and elevated suspended solids concentrations. Ohio EPA stated in 1974, that the reservoir was unsuitable as a drinking water supply becuase of the abnormally high sulfate levels (Ohio EPA, SEDO unpublished data).

Skull Fork drains 46.4 square miles and contains 3 square miles of inactive surface mines. Limited water quality data notes sulfates from 800 to 1000

mg/l, total iron from 300 to 3900 ug/l, and total manganese from 900 to 1000 ug/l. These concentrations indicated that Skull Fork was affected by acid mine drainage.

The mainstem of Stillwater Creek has had water quality standards violations for total iron and sulfates according to the limited data available. These violations were believed to be the result of Boggs Fork, Piedmont Reservoir's overflow, and Skull Fork since no mining activity is located on the mainstem portion of Stillwater Creek.

REFERENCES

Ohio Environmental Protection Agency. 1976-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

United States Geological Survey. 1971-1980. Water Resources Data for Ohio. Vol. 1 Ohio River Basin. U.S. Geological Survey, Columbus, Ohio.

MUSKINGUM RIVER BASIN

TUSCARAWAS RIVER SUBBASIN

LOWER TUSCARAWAS RIVER SUBBASIN (P-10)

SUBBASIN SUMMARY

The physical/chemical water quality of the lower 45 miles of the Tuscarawas River ranges from good to fair. Pollutant loadings from the Newcomerstown, New Philadelphia-Dover, and Coshocton areas, along with contributions from upstream sources, resulted in WQS violations for dissolved oxygen, fecal coliforms, phenolics, and heavy metals. Recent water quality data is rather scant and the evaluations given below need to be substantiated by further investigations.

SEGMENT REPORTS

TUSCARAWAS RIVER MAINSTEM
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM 110.3

Segment Problem	Name Description	Use Designation Mile Points
P-10-2 MINOR	Tuscarawas River From the Sugar Creek confluence to the Stillwater Creek confluence	WWH 55.2-44.8

Data collected in 1976 and 1977 at New Philadelphia (RM 49; STORET Station No. 611710) revealed standards violations for dissolved oxygen, fecal coliforms, phenolics, and total iron (OEPA, SEDO data, 1976-1977). Industrial and municipal wasteloads from the Dover-New Philadelphia area were the primary cause of water quality problems in this segment.

Recent water quality improvements at the New Philadelphia WWTP and the Union Camp Corporation are expected to substantially improve water quality in this segment of the Tuscarawas River. Additional monitoring is needed to verify that 1983 clean water goals are being attained.

Segment Problem	Name Description	Use Designation Mile Points
P-10-1 NONE	Tuscarawas River From the Stillwater Creek confluence to the Newcomerstown WWTP	WWH 44.8-19.9

Monitoring at Newcomerstown (RM 21.3; STORET station No. 611790) revealed generally good water quality. Occasional iron violations, along with single violations for total copper, total lead, and total zinc, were noted during the past two years (OEPA, SEDO data, 1977-1980). These minor violations are not believed to interfere with the attainment of 1983 goals.

Segment Problem	Name Description	Use Designation Mile Points
P-10-3 MINOR	Tuscarawas River From the Newcomerstown WWTP to the Muskingum River	WWH 19.9-0.0

Data collected at the mouth of the Tuscarawas River (RM 0.0; STORET station No. 611730) revealed numerous standards violations for total iron, fecal coliforms, and phenolics (OEPA, SEDO data, 1976-1977). Concentrations of sulfates, chlorides, ammonia, suspended solids, and total zinc were also elevated. The Stone Container Corporation is a major discharger to the lower mile of the Tuscarawas River; pollutant loadings from the Newcomerstown WWTP and other upstream sources also influenced water quality in this river segment. Wastewater treatment improvements planned or under construction at Stone Container and the Newcomerstown WWTP may eliminate the WQS violations. Further study will be needed to ascertain the status of this segment with regard to 1983 clean water goals.

REFERENCES

Ohio Environmental Protection Agency. 1976-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

MUSKINGUM RIVER BASIN

UPPER MUSKINGUM RIVER SUBBASIN (P-11)

SUBBASIN SUMMARY

Historical information indicated that water quality in the upper Muskingum River was seriously degraded (OEPA, SEDO data, 1976-1977). Degradation appears to be the result of inadequate treatment of waste from the Stone Container's paper mill on the Tuscarawas River (Coshocton Plant RM 0.42-0.35). This facility manufactures the corrugated portion of cardboard (a brown craft process). The other significant dischargers to the Upper Muskingun River are the General Electric Company (RM 108.6) and the Coshocton WWTP (RM 107.6).

Water quality standards violations in the upper Muskingum River from its source (the confluence of the Walhonding and Tuscarawas Rivers) to Zanesville were substantially reduced between 1977-1980 (OEPA, SEDO data). It is presumed that the improvements were the result of improvements in wastewater treatment facilities within the subbasin. The Ohio EPA, SEDO conducted a chemical/physical water quality survey on the Upper Muskingum during the fall of 1979. Results from this study indicated that additional water quality problems existed but that the 1983 clean water goals are achievable in this stream segment.

BIOLOGICAL EVALUATIONS

No recent biological data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of four sets of benthic data collected from two data points. One sample was collected in November, 1977, from the Muskingum River at a NASQAN station (RM 107.6) located below the Coshocton WWTP in Coshocton County. The other three samples were collected from the Muskingum River at Dresden in Muskingum County (RM 91.1). Samples were collected at an east bank and west bank station in September, 1977, and an east bank station in September, 1976.

The benthic community at the station in the Muskingum River at Coshocton consisted of 15 taxa with a diversity index of 1.74 (RD 3-69). Oligochaetes and six taxa of midges accounted for 96 percent of the total number of organisms collected. Five taxa of mayflies were present but in very low numbers. An evaluation of Class IV (Poor) water quality was indicated by the benthic community.

The three sets of benthic samples collected from the Muskingum River at Dresden contained very high numbers of mayflies, caddisflies, and midges (RD 3-70 and 3-71). The number of taxa ranged from 18 to 22 while diversity indices ranged from 2.00 to 3.30. High density communities such as these are characteristically found in large, warmwater rivers with high levels of suspended organic matter. Based on the benthic communities, evaluations of Class III (Fair) water quality were assigned to each data set.

In addition to these Ohio EPA studies, other fish and macroinvertebrate studies have been conducted to determine the impact of cooling water discharge from the Conesville Electric Generating Plant (Columbus and Southern Ohio Electric Company, 1978), and general surveys of the mainstem fish communities (Gammon 1978, unpublished).

Segment Problem	Name Description	Use Designation Mile Points
P-11-1 MAJOR	Muskingum River From the source to RM 107.0	WWH 111.9-107.0

Segment Problem	Name Description	Use Designation Mile Points
P-11-2 MINOR	Muskingum River From RM 107.0-84.4 at the Ellis Dam	WWH 107.0-84.4

Chemical/physical data from monitoring stations at Coshocton (RM 107.3; STORET station No. 611740) and at Dresden (RM 91.3; STORET station No. 611750) indicated fair water quality during the past three years. Standards violations were noted for total iron, phenolics and fecal coliform (OEPA, SEDO data, 1977-1980).

Point source dischargers to this river segment include Stone Container via the Tuscarawas at RM .42-.35; Coshocton Water Treatment Plant via the Tuscarawas at RM .30; General Electric Corporation (RM 108.6); Coshocton WWTP (RM 107.6); St. Regis Paper Company (RM 107.1); Universal Cyclops Steel Company (RM 105.1); Columbus and Southern Ohio Electric Company, Conesville Plant (RM 102.0 via Wills Creek); and Dresden WWTP (91.0).

Previous to the OEPA, SEDO study in 1979, the chief sources of phenolic wastes and associated problems were thought to be from the General Electric Company's process discharge in Coshocton and some other minor upstream sources on the Tuscarawas River. Significant reductions in phenolics were expected since General Electric had phased out the process that generated phenolic waste, and the General Tire Company in Newcomerstown had eliminated a process that had also contributed phenolics. In contrast, the study indicated that the frequency of water quality standards violations remained the same. The study revealed that the Stone Container outfall contained phenolics in excess of 3,150 ug/l, and that the General Tire discharge still contained phenolics.

High concentrations of total iron and dissolved solids were also determined to be present in the effluent from the Coshocton Water Treatment Plant.

The Stone Container Company is developing plans to eliminate the phenolics waste. Improvements in water quality are expected to continue as construction of secondary treatment facilities currently underway at the Dresden WWTP, and the General Electric Company's phasing out of the operations that generated phenolic wastes are completed. These improvements, plus reduced pollutant loading via the Tuscarawas River (particularily the Stone Container Company) should result in the attainment of 1983 clean water goals.

Because of the high concentration of dischargers in this portion of the Upper Muskingum River Basin and the complexity of the situation, this segment has been recommended for further study by OEPA, SEDO.

REFERENCES

Ohio Environmental Protection Agency. 1976-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

MUSKINGUM RIVER BASIN

KOKOSING RIVER SUBBASIN (P-12)

SUBBASIN SUMMARY

Physical/chemical water quality in the Kokosing River Subbasin was good, although there were a few short sections (one mile or less) that showed limited degradation. Relatively steep stream gradients provide ample reaeration, thus reducing the zone of impact below pollution sources. New secondary treatment facilities at the village of Fredericktown (RM 5.5) have been completed, replacing the existing plant. Total chromium and copper discharged to the Mt. Vernon WWTP (RM 24.9) by the Hoover Universal Co. have been reduced. The electroplating division responsible for the heavy metal discharge has been relocated, leaving behind the molding industry. The division remains in compliance with NPDES permit limitations. These improvements should result in elimination of the several water quality violations that were previously noted (OEPA, NWDO data, 1976-1980).

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous biological monitoring in the subbasin was conducted in August, 1977, at four stations located on the Kokosing River at Mt. Vernon in Knox County. The purpose of the survey was to determine the impact of the Mt. Vernon WWTP on the Kokosing River.

Monitoring stations were located at river miles 29.6, 23.3, 20.6, and 11.6. The Mt. Vernon WWTP effluent enters the Kokosing River at river mile 24.9. A summary of the data can be found in Table - . The tabulated data can be found in RD 3-68.

The upstream station (RM 29.6) displayed Class I (Excellent) water quality illustrated by an abundance of pollution sensitive organisms, a large number of taxa (33), and a diversity index of 3.18. Below the Mt. Vernon WWTP the station at river mile 23.3 exhibited an increase in diversity (3.97) along with the same number of taxa (33) as the previous station. A reduction in the number of pollution sensitive taxa, however, was the basis for lowering the evaluation at this site to Class II (Good). A Class II (Good) water quality evaluation was retained at the next downstream station (RM 20.6) even though the benthic community was beginning to return to a composition similar to that at river mile 29.6. By river mile 11.6, the benthic composition, the number of taxa (34), and the diversity index (3.20) again reflected a healthy, diverse community indicative of Class I (Excellent) water quality.

The Mt. Vernon WWTP discharge had only a minor impact on the Kokosing River with good to excellent water quality occurring throughout the survey segment.

Table III-31: Summary of Benthic Data Collected from the Kokosing River Relative to the Mt. Vernon Wastewater Treatment Plant (WWTP) Discharge, September, 1977[a]

	Station (RM)			
	29.6	23.3	20.6	11.6
Number of Samplers	5	5	5	5
Quantitative Taxa	33	33	26	34
Qualitative Taxa	9	6	12	13
Organisms/Ft^2	857	188	558	1056
Index ($\bar{d}$)	3.18	3.97	3.34	3.20
Evaluation (Class)	I	II	II	I

(a) The Mt. Vernon WWTP discharge is located at RM 24.9.

SEGMENT REPORTS

KOKOSING RIVER MAINSTEM
WALDHONDING RIVER TRIBUTARY
CONFLUENCE AT RM 22.1

Segment Problem	Name Description	Use Designation Mile Points
P-12-1 NONE	Kokosing River From the headwaters to the North Branch confluence	WWH 50.2-29.1
P-12-2 MINOR	Kokosing River From the North Branch confluence to Gambier	WWH 29.1-17.8
P-12-3 NONE	Kokosing River From Gambier to the confluence with the Mohican River	WWH 17.8-0.0

NPDES permit limitations for fecal coliform and suspended solids were frequently exceeded in the Mt. Vernon WWTP effluent. As a result, WQS violations for fecal coliforms occurred occasionally in this segment. These problems are minor and should not impair attainment of the 1983 clean water goals.

JELLOWAY CREEK
KOKOSING RIVER TRIBUTARY
CONFLUENCE AT RM 6.6

Segment Problem	Name Description	Use Designation Mile Points
P-12-3 NONE	Jelloway Creek From the headwaters to the Kokosing River	WWH 8.9-0

LITTLE JELLOWAY CREEK
JELLOWAY CREEK TRIBUTARY
CONFLUENCE AT RM 0.65

Segment Problem	Name Description	Use Designation Mile Points
P-12-4 NONE	Little Jelloway Creek From the headwaters to Jelloway Creek	WWH 9.3-0

REFERENCES

Ohio Environmental Protection Agency. 1976-80 (unpublished). Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

Ohio Environmental Protection Agency. 1979 (unpublished). Monthly operating reports - Howard Sewer district. Data available from Northwest District Office, Ohio EPA, Bowling Green, Ohio.

MUSKINGUM BASIN

LICKING RIVER SUBBASIN (P-13)

SUBBASIN SUMMARY

Physical/chemical water quality in the Licking River Subbasin ranged from good to poor. The upper portion of the North Fork of the Licking River bad good quality. The discharge from the city of Utica WWTP (RM 17.2) degraded water quality to some degree, but the stream recovered by the time it reached the Newark Water Treatment Plant intake at RM 28.6.

Severe degradation occured below the city of Newark's WWTP. According to monthly operating reports from the WWTP, the fecal coliform standard was continually violated in this segment of the Licking River. The stream appeared to recover prior to entering Dillon Reservoir at RM 12.2.

Water quality in the lower segment remained good until the final 2.1 miles, where several industries discharge to the Licking River. Their impact on the mainstem is variable depending on flow conditions.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the subbasin consisted of one fixed station benthic sample (NASQAN) collected in November, 1979, from the Licking River at Newark in Licking County (RM 25.6). Forty-two taxa with a diversity index of 3.82 were collected at the station (RD 3-). The benthic community was composed of six taxa of mayflies, six taxa of caddisflies, and 24 taxa of midges. These taxa of midges along with oligochaetes accounted for 93 percent of the total number of individuals collected. No one taxon dominated the community. An evaluation of Class II (Good) water quality was indicated primarily based on the number of taxa and the diversity index. This evaluation was considered marginal because of the predominance of the midge taxa and because of the November sample collection. Not enough is known about the potential effect of seasonal variation on the benthic community, and subsequently, the validity of the values of the criteria used to make the evaluation may be in question.

No previous biological data are available for the subbasin.

SEGMENT REPORTS

NORTH FORK
LICKING RIVER TRIBUTARY
CONFLUENCE AT RM 28.5

Segment Problem	Name Description	Use Designation Mile Points
P-13-1	North Fork	WWH
NONE	From the headwaters to the Utica WWTP	38.4-17.1

Chemical/physical the water quality of the upper North Fork was good based on limited stream data in the Utica WWTP's monthly operating reports.

Segment Problem	Name Description	Use Designation Mile Points
P-13-2 MINOR	North Fork From the Utica WWTP to the confluence with the South Fork	WWH 17.1-0.0

Point source discharges from the Utica WWTP and the Prescott Estates WWTP degraded this river segment. The Utica facility was overloaded and discharged poor quality effluent. Several WQS violations for suspended solids and BOD_5 were recorded in this segment. In addition, the WQS for dissolved oxygen is not maintained in portions of this segment during low flow conditions (OEPA, CDO data, 1977-1980).

The city of Utica is currently at Step 1 of the Construction Grants Program, and completion of new wastewater treatment facilities should dramatically improve water quality. The Prescott Estates WWTP previously discharged to the North Fork at RM 7.7. This discharge resulted in frequent violations of the fecal coliform standard. Chemical/physical water quality in this reach improved after the Newark trunk sewer was completed and sewage diverted to the Newark North Fork Interceptor in February 1981. The city of Newark has since established industrial pretreatment regulations and continues to maintain its extensive industrial discharge monitoring program. These programs should aid in the attainment of 1983 clean water goals.

The city of Newark withdraws water from the North Fork at mile point 2.9. During dry weather there is virtually no flow downstream from this point due to the water demand. The lack of flow formerly posed a problem because Owens Corning had two outfalls located on the North Fork below the water treatment plant. The discharge from these outfalls is now diverted to the Newark WWTP. A third Owens Corning's outfall located on Log Pond Run, a small tributary that intersects the mainstem at mile point 0.86, has been permanently closed.

LICKING RIVER MAINSTEM
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM 73.7

Segment Problem	Name Description	Use Designation Mile Points
P-13-4 MAJOR	Licking River From the Newark WWTP to Toboso	WWH 28.6-18.6

The Newark WWTP received large volumes of complex wastes from several industries. These wastes reduce wastewater treatment efficiencies and have an adverse effect on effluent quality. WQS violations for total mercury, total iron, fecal coliform, nitrogen ammonia and phenolics have been recorded downstream from the Newark WWTP (RM 26.8; STORET station No. 601770) (OEPA, CDO data, 1977-1980).

Segment Problem	Name Description	Use Designation Mile Points
P-13-3 NONE	Licking River From the confluence of the North and South Forks to the Newark WWTP	WWH 29.1-28.6

Physical/chemical water quality in this segment was somewhat variable due to flow conditions and the effects of upstream dischargers. However, physical/chemical data indicate that this segment is generally of good quality (USGS, 1969-1976).

Segment Problem	Name Description	Use designation Mile Points
P-13-5 NONE	Licking River From Toboso to Zanesville	WWH 18.6-2.1

The mile point delineation of this segment is somewhat arbitrary because the zone of impact from the Newark WWTP is variable. The Dillon Reservoir, located in this river segment, was ranked the second most eutrophic lake of the 20 Ohio lakes sampled in 1973 (U.S. EPA, 1975). Dillon Reservoir experiences very high phosphorus loading from point and nonpoint sources. Further studies should be conducted to determine what benefits might be expected to result from the implementation of a phosphorus control programs.

Limited sampling below the reservoir outlet revealed no substantial WQS problems in the Licking River (USGS, 1965-1977).

HISTORICAL

A review of data collected from various sources over the past ten years revealed slow, but significant improvement in the water quality of the Locking River Subbasin. This trend was probably due to several factors: including WWTP improvements, and the gradual decline in the population of the City of Newark.

A dramatic decline in dissolved oxygen violations from 1970 to 1980 is illustrated in Table III-32. This information is compiled from data collected at the Ohio EPA ambient water quality monitoring station and the USGS Gaging Station at RM 26.8, which is downstream of the Newark WWTP. The frequency of WQS violations decreased from 66.7% (1971) to virtually zero (1978-1980). Violations of WQS for dissolved oxygen decreased from a maximum of 66.7% in 1971 to virtually zero in 1978-80.

Improvement in water quality may also be attributed to sewer system alterations. Prescott Estates WWTP, which previously discharged poor quality effluent to the North Fork Licking River, has been terminated. The Newark trunk sewer was recently completed, and the City of Newark has established industrial pretreatment regulations to ensure better wastewater processing. Tables III-32 illustrates evidence of this improved sewage treatment. The amount of dissolved oxygen in the Newark WWTP effluent has radically increased from 2.3 mg/l in 1970 to 8.6 mg/l in 1980. BOD_5 loadings have decreased

from 38,187 lbs/day in 1970 to 10,968 lbs/day in 1980. The percentage of fecal coliform violations shows a slight decline; in 1975 the WQS of 2000/100 ml was exceeded 66.7% of the time, as compared to a violation percentage of 50% measured in 1980 (Fig. III).

Several WWTP's in the Licking Subbasin have not demonstrated significant improvement. The Utica WWTP continues to degrade the North Fork Licking River, primarily due to overloading at the plant. The Johnstown WWTP discharges poor-quality effluent to Raccoon Creek, which results in a continually high number of WQS violations for fecal coliform and dissolved oxygen in Raccoon Creek (Table III-33). The Granville WWTP also contributes to the degradation of Raccoon Creek. However, all of these plants are presently involved in various stages of the Construction Grants program, and thus, future improvements are expected.

Several additional, unexplained water quality problems are still apparent in certain areas of this subbasin (Table I). A high level of mercury has been continuously detected in the Licking River since 1976, without significant imrpovement. Ammonia and total iron violations also persist. Occasional WQS violations of phenolics, MBAS, cyanide, and total phosphorus were noted during 1977. It is extremely difficult to pinpoint the actual source of these pollutants, therefore, precluding a quick solution to the problem. It is possible that the exceptionally high percentage of WQS violations in 1977 is due to the low flow water year.

Improvements in industrial discharges have contributed to better physical/chemical water quality in the Licking River. Kaiser Aluminum and Chemical Corporation connected its processed discharge wastewater to the Newark Sanitary system in 1980; Georgia Pacific Corporation has solved its problem of re-occuring phenol-formaldehyde reaction product spills, by connecting this contact discharge to the Newark WWTP; a specific containment area has been constructed to prevent future accidents. Owens-Corning Fiberglas Corporation, previously responsible for numerous formaldephye spills, now sends wastewater to the Newark WWTP for treatment.

Two stormwater overflow discharges in the North Fork Licking. A special containment area has recently been completed to prevent additional spills of formaldephyde.

TABLE III-32: Violations/Total Number of Samples For Licking River at Newark

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Iron	0/0	0/0	0/0	0/0	0/0	0/0	1/4	1/2	1/1	0/4	1/4
Fecal Coliform	0/0	0/0	0/0	0/0	0/0	8/12	6/8	9/12	5/12	3/11	6/12
NH_3	0/0	0/0	0/0	0/0	1/1	0/12	2/11	1/10	/12	0/12	2/12
Hg	0/0	2/2	0/2	0/2	0/0	0/0	4/4	2/2	1/1	4/4	0/2
Phenols	0/0	0/0	0/0	0/0	0/0	0/0	0/11	1/10	0/3	1/12	0/8
D.O.	5/8	8/12	7/12	6/12	6/11	6/12	5/12	5/12	0/12	0/12	0/12
Total P	0/0	0/0	0/0	0/0	0/0	0/0	0/9	1/10	0/3	0/11	0/7
Cyanide	0/0	0/0	0/0	0/0	0/0	0/0	0/11	1/9	0/0	0/0	0/1
MBAS	0/0	0/0	0/0	0/0	0/0	0/0	0/11	1/9	0/0	0/0	0/0
Avg. Q	1658.3	640.1	1079.1	1253.3	1341.1	491.5	483	539	765	1156	818
% Fecal Coliform Violations	-	-	-	-	-	66.7%	75%	75%	41.7%	27.3%	50%
% D.O. Violations	62.5%	66.7%	58.3%	50%	54.5%	50%	41.7%	41.7	0	0	0
BOD_5 Loadings	38,186	24,490	11,923	7,752	11,943	8,385	6,611	10,441	10,094	12,912	10,968

TABLE III-33: V/N FOR RACCOON CREEK AT JOHNSTOWN

	1972	1973	1974	1975	1976	1977	1978	1979
Fecal Coliform	0/0	0/0	0/0	0/0	10/10	10/12	12/12	1/11
D.O.	2/5	4/12	6/12	8/12	4/11	2/12	2/12	2/11
% D.O. Violations	40%	33.3%	50%	66.7%	36.4%	16.7%	16.7%	18.2%
% Fecal Violations	0/0	0/0	0/0	0/0	100%	83.3%	100%	100%

REFERENCES

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Central District Office, Ohio EPA, Columbus, Ohio.

United States Environmental Protection Agency. 1975. Report on Dillon Reservoir, Muskingum County, Ohio, National Eutrophication Survey Working Paper No. 400. U.S. EPA, Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

United States Geological Survey. 1969-1977. Water resources data for Ohio, Volume 1. Ohio River basin. U.S. Geological Survey water-data reports OH-65-1 through OH-77-1. U.S. Geological Survey, Columbus, Ohio.

MUSKINGUM RIVER BASIN

SOUTH FORK LICKING RIVER SUBBASIN (P-14)

SUBBASIN SUMMARY

Physical/chemical water quality in the larger streams of this subbasin (South Fork and Raccoon Creek) ranges from good to fair. Segments impacted by point source dischargers included the lower 13 miles of the South Fork, and Raccoon Creek below Johnstown. Localized degradation caused by point source discharges may occur in some of the small tributaries in the subbasin because of insufficient dilution water.

SEGMENT REPORTS

SOUTH FORK LICKING RIVER
LICKING RIVER TRIBUTARY
CONFLUENCE AT RM 28.5

Segment Problem	Name Description	Use Designation Mile Points
P-14-1 NONE	South Fork From the headwaters to the Licking River	WWH 33.9-0.0

The village of Pataskala is located near the headwaters of the South Fork. The Pataskala WWTP, discharged a relatively high quality effluent (i.e., exceeds secondary treatment levels). Wasteload modeling conducted by Ohio EPA, indicated that secondary treatment levels are adequate to insure compliance with Warmwater Habitat WQS (OEPA, 1979b). Data from 1974 (OEPA, CDO data, 1974) and the monthly operating reports of the Pataskala WWTP revealed no substantial physical/chemical water quality problems.

Numerous small dischargers are located along the lower 13 miles of the South Fork. Water quality was slightly degraded (compared to upstream quality) but 1983 clean water goals were not contravened. Water quality in this segment should improve if the point source dischargers are upgraded through the Construction Grants Program, as planned.

RACCOON CREEK
SOUTH FORK LICKING RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
P-14-2 NONE	Raccoon Creek From the headwaters to the Johnstown WWTP	WWH 27.5-23.8
P-14-3 MINOR	Raccoon Creek Johnstown WWTP to near Hazelton Corners	WWH 23.8-18.8

The Johnstown WWTP (RM 23.8) degraded water quailty in Raccoon Creek for five to ten miles, depending upon flow and operating conditions. A review of pertinent data from monthly operating reports indicated that WQS violations of the standard for fecal coliform have been continuous in this segment since 1978. In addition, there were several incidents of concentrated pollutants discharged to Raccoon Creek from the WWTP during 1976; less frequent incidents occurred in 1977, 1978, and 1979. A fish kill occurred below the WWTP in December 1974 when approximately 10,000 gallons of digested sludge was discharged. A study conducted during the summer of 1979 did not show any standards WQS violations below the Johnstown WWTP (OEPA, 1979a); however, it should be noted that flows were above average and only a limited number of parameters were sampled.

The Johnstown WWTP effluent violated the NPDES permit limitation, dissolved oxygen for 21% of the time during the two year monitoring period. The permit limit for dissolved solids was also exceeded. The Johnstown WWTP is currently in step 4 of the construction grant program. Hopefully the improvements will correct the problem this year.

Segment Problem	Name Description	Use Designation Mile Points
N/A P-14-4 NONE	Raccoon Creek From near Hazelton Corners to the South Fork Licking River	WWH 18.8-0.0

Physical/chemical water quality was these segments is generally good based upon stream data obtained from the Johnstown and Granville WWTPs monthly operating reports and Ohio EPA, 1979a. There was one violation of the NPDES permit limit for suspended solids at Granville; and high nutrient concentrations were recorded in this segment. A regular schedule of sampling on Raccoon Creek below Granville should be established to assess the impact of the Johnstown and Granville WWTP on the mainstem. These minor problems do not impair attainment of the 1983 clean water goals.

REFERENCES

Ohio Environmental Protection Agency. 1974 (unpublished). South Fork water quality survey. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979a (unpublished). Survey of Raccoon Creek. Data available from Central District Office, Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979b. Muskingum River basin - Initial proposal for wasteload allocation. Ohio EPA, Office of Wastewater Pollution Control, Division of Water Quality Planning and Assessment, Columbus, Ohio.

MUSKINGUM RIVER BASIN

MOXAHALA CREEK SUBBASIN (P-15)

SUBBASIN SUMMARY

Portions of the Moxahala Creek Subbasin have been characterized as some of the most severely impacted mine drainage streams segments in Ohio (OEPA, 1979). Upper Jonathan Creek is the only stream segment not seriously affected by mine drainage. The urban areas of Roseville (RM 10.6) and Crooksville (RM 16.78) may contribute point and nonpoint source pollution, but no data is available to assess the impact on water quality in Moxahala Creek.

Moxahala Creek has a drainage area of 301 square miles. It is affected by approximately 30 square miles of inactive surface mines, 5 square miles of inactive subsurface mines and 0.4 square miles of gob piles (Ohio EPA 1980 305(b) Vol V.; Ohio E.P.A. 1981).

It has been estimated that and 200 significant point (undergroupd mine portals) sources affect 90 miles of stream length the basin (USDA-FWPCA 1968).

Surface runoff from gob piles pose problems throughout the basin. Streams affected by gob piles include the mainstem, many small unnamed tributaries, Bear Creek, Riders Run, Dry Run, Black Fork and Jonathan Creek.

It should be noted that the headwaters of Jonathan Creek to the confluence of Turkey Run is classified as exceptional warmwater habitat. There has been no recent chemical, physical or biological monitoring to verify this classification nor any investigation to determine any mine drainage affects in upper Jonathan Creek. Very limited field data collected by Ohio EPA, SEDO (1979) indicated that there may be some small tributaries to the mainstem that are not mine drainage affected.

BIOLOGICAL EVALUATIONS

Moxahala Creek was sampled once for macroinvertebrates at two stations in 1966-67 by the FWPCA. At that time no benthic organisms were observed either at the confluence of Moxahala and Jonathan Creek or above the mouth of Moxahala Creek. The absence of benthic organisms in 1966-67 strongly supports chemical data which characterize Moxahala Creek as being severely degraded mine drainage.

In 1976, Moxahala Creek was sampled using Hester-Dendy multiple plate samplers by the Ohio EPA, Title X staff. Ninety-six percent of the taxa collected were pollution tolerant forms. Compared to 1966-67 FWPCA results, there were more taxa and a higher density of organisms. This difference between samples over the ten year period is probably the result of differences in sampling procedures. Data from 1976 supports the contention that Moxahala Creek is seriously affected by acid mine drainage.

SEGMENT REPORTS

MOXAHALA CREEK
MUSKINGUM RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
05040004-058 P-15-1 MAJOR	Moxahala Creek from the headwaters to the Muskingum River	29.2-0.0

Previous data revealed numerous WQS violations for pH, total iron, and total zinc in this stream segment (OEPA, 1979). Data collected by Ohio EPA, Southeast District Office in 1979, revealed WQS violations for the same three parameters (OEPA, SEDO data, 1979). Extremely high levels of total aluminum and total manganese were also noted. Field data indicated WQS violations for pH in Burley Run and Riders Run. Data collected in 1981 (OEPA, SEDO data 1981) showed WQS violations of these same parameters along with violations of dissolved solids standards. The pH standards was again violated in Riders Run and Burely Run. WQS violations in McClurey included pH, dossolved solids, total iron, and total zinc.

The severity of mine drainage pollution coupled with little or no reclamation effort will prevent attainment of 1983 clean water goals in the foreseeable future.

HISTORICAL

Moxahala Creek has been monitored sproadically since 1963. In 1963, the USDA (1968) study calculated a loading of 16,400 pounds per day of acid being discharged to the Muskingum River from Moxahala Creek. Low pH's were frequently noted.

Other mine drainage water quality data for Moxahala Creek consisted of one USGS continuous monitoring station at Roseville (1965-1975), eighteen Ohio EPA samples at 14 different locations, and 38 grab samples collected by Skelly and Lay during 1973.

The data substantiates the severe degradation of Moxahala Creek from mine drainage. Total iron, pH, total zinc, and total dissolved solids WQS violations were very frequent. Levels of total sulfate, specific conductance, total managanese, and total aluminum did not exceed WQS, but were higher than should be expected.

In addition to the aforementioned tributaries, the following have been degraded in some manner by mine drainage as measured by chemical analysis: Ogg Run, Bennett Run, Burley Run, Porter Run, Elk Run, McLundy Creek, Morrison Creek, Possum Hollow, and the reservoir north of Moxahala, Ohio.

Johnathan Creek is affected by approximately ten square miles of inactive strip mines, haul roads, sediment ponds, and sediment deposition. Subsurface

mines comprise about 0.5 square miles in this subbasin. All of these affected areas are contained in the downstream reach of Jonathan Creek below the confluence of Turkey Run.

Data indicates the tributaries of Buckeye Fork, Butcher Knife Creek and Turkey Run as being mine drainage affected. Very little data is available on the mainstem of Jonathan Creek and these tributaries affect on the mainstem. Samples collected near the mouth of Jonathan Creek have shown no violations of standards.

REFERENCES

Ohio Environmental Protection Agency. 1979 (unpublished). Data available from the Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Protection Agency. (1979). Muskingum River Basin water quality management plan. Part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1981 (unpublished). Data available from the Southeast District Office, Ohio EPA, Logan, Ohio.

MUSKINGUM RIVER BASIN

MIDDLE MUSKINGUM RIVER SUBBASIN (P-16)
AND
LOWER MUSKINGUM RIVER SUBBASIN (P-19)

These two subbasins include the Muskingum River mainstem from Zanesville (RM 73.8) to the Ohio River. An appraisal of water quality with regard to 1983 clean water goals was difficult because of the scarcity of data. Ohio EPA collected water quality data at only two locations during 1977-1980: McConnelsville (RM 48.2; STORET station No. 601860) and Beverly (RM 23.7; STORET station No. 611780). Frequent WQS violations for total iron were noted at both stations reflecting background conditions and nonpoint source pollution. Minor WQS violations for fecal coliforms and phenolics were recorded at Beverly. Occasional total lead, total cadmium, total mercury, and total zinc violations were observed at McConnelsville and may be attributable to the discharge of Gould Inc., Engine Parts Division (OEPA, SEDO data, 1976-1980).

In 1979, monitoring at the Beverly Station was discontinued and the McConnelsville Station was transferred to USGS. Review of the USGS data indicated that violations of the total iron standard continued throughout 1980.

Further data collection is necessary prior to assessing the attainability of the 1983 goals in the middle and lower Muskingum River. Major point source dischargers in the cities of Zanesville, Philo, McConnelsville, and Beverly may have substantial detrimental impacts on water quality. Agricultural and mining, nonpoint source pollution, may also substantially degrade water quality. The limited information available to Ohio EPA precludes evaluation these potential problem areas.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring in the subbasin consisted of four sets of benthic data collected from a NASQAN station located on the Muskingum River at McConnelsville in Morgan County (RM 47.7). The benthic community was sampled at east bank and west bank stations in September, 1977 and October, 1978 (RD 3-72, 3-73, 3-74, and 3-75). All four sets of samples, especially the east bank stations, were characterized by benthic communities consisting of large numbers of caddisflies and to a lesser extent mayflies and midges. The number of taxa ranged from 21 to 25 while diversity indices ranged from 1.66 to 2.60. High density communities such as these are characteristically found in large, warmwater rivers with high levels of suspended organic matter. Based on the benthic communities, evaluations of Class III (Fair) water quality were assigned to each location.

Additional biological data are available for the mainstem upstream and downstream from the Muskingum River Electric Generating Station at McConnelsville (Ohio Power). Thermal discharge studies which included fish population and macroinvertebrates were conducted during 1974-1978. In addition an assessment of the mainstem fish community was conducted during July-August 1977 and 1978.

REFERENCES

Ohio Environmental Protection Agency, 1976-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio

MUSKINGUM RIVER BASIN

WILLS CREEK SUBBASIN (P-17, P-18)

SUBBASIN SUMMARY

Wills Creek joins the Muskingum River near the Coshocton-Muskingum County line. The headwaters are located in northern Noble and southern Guernsey Counties. Wills Creek tributaries converge in Guernsey County south of the village of Byesville.

The Wills Creek Subbasin drains an area of 8532 square miles and has 3 mine drainage stream segments; lower Wills Creek, Buffalo Fork, and Buffalo Creek. In addition, it has two potential mine drainage tributaries: Crooked Creek and Leatherwood Creek.

Degraded water quality results from abandoned surface and underground mines in these tributaries. Total iron concentrations exceeded WQS occasionally.

The city of Cambridge uses Wills Creek as its drinking water supply. In the Cambridge area of Wills Creek, conductivity, total sulfate, total managanese and total dissolved solids exceed PWS Standards.

Wills Creek Reservoir is located in Coshocton County on the mainstem of Wills Creek, a proposed mine drainage affected stream. The reservoir also has numerous tributaries which are either proposed as mine drainage affected, or are potential mine drainage streams (lack of information). In spite of this, physical/chemical water quality in the reservoir relatively good. Total iron was the only mine drainage parameter which violates EWH standards and only managnese concentrations exceed PWS standards, however, periodic discharge of acid mine water is a definite consideration in classifying this reservoir.

Salt Fork Reservoir, is a public water supply and recreational reservoir. PWS standards are exceeded by total manganese concentrations most of the time and EWH standards are exceeded by total zinc concentrations all of the time. Some Salt Fork tributaries have no abandoned mines and still exceed PWS Standards. Salt Fork headwater tributaries on occasion have concentrations in excess of WQS for total iron and pH WWH. The region has many surface mines. Salt Fork, dwosntream from the reservoir does not appear to be severely affected by acid mine drainage.

Senecaville Reservoir is located on Seneca Fork of Wills Creek in Guernsey County. There are many abandoned surface mines in the watershed, particularly on Beaver Creek. Seneca Fork pH values violated WQS part of the time (EWH). In the South Fork of Seneca Fork total iron WQS were violated. There are no abandoned coal mines on South Fork. Total manganese concentrations exceeded PWS Standards in 16 out of 17 samples from the Seneca Fork and South Fork. More data is needed to determine if Senecaville Reservoir is affected by abandoned mine drainage.

Buffalo Creek drains 49.7 square miles and contains less than 2 square miles of strip mines and a few very small underground mines. Coal beds designated as having high pollution potential in the area are the Upper Freeport and Meigs Creek coals. Both types are mined using both surface and underground techniques. Degraded water quality resulted from drainage from abandoned coal

mines. WQS violations for pH and total iron occurred frequently. More information is needed to determine the extent, degree and source of mine drainage.

Seneca Fork, a tributary to Wills Creek, is approximately 30.3 miles in length. The latest physical/chemical data was collected in June and July of 1978 at the confluence with Buffalo Creek and reflected mine drainage impacts on this stream. Total iron concentrations were 2340 and 2470 ug/l. Total aluminum concentrations at the same site yielded concentrations as high as 1480 ug/l. The headwaters of Seneca Fork were sampled on June 15, 1978 yielding total aluminum concentrations of 2400, to 8500 ug/l, and total manganeses concentrations 830 ug/l. Field values for pH at both sites were within WQS.

Leatherwood Creek, a tributary of Wills Creek, is approximately 28.6 miles. Sampling was conducted in October, 1978, at three (3) sites on Leatherwood Creek, plus one tributary to Leatherwood Creek (Shannon Run). WQS violations for total iron occurred in this segment. Moderate sulfate concentrations, alkalinity concentrations near 100 mg/l and moderate TDS and conductivity levels, were also detected. The Quaker City public water supply intake is located on Leatherwood Creek. The sulfate and total manganese concentrations were in excess of PWS standards. TDS values have been as high as 754 mg/l, but it is not known if the monthly average value remains above 500 mg/l, which would violate PWS standards.

Samples taken from Leatherwood Creek west of Barnesville exceeded WQS for sulfate only. Samples taken at Quaker City (Route 513 bridge) resulted in violations of sulfate and zinc standards. The final sample on Leatherwood Creek was taken at Kiger mine, Guernsey County and WQS violations were detected for sulfate, total rion and total zinc.

Water quality data for Crooked Creek, a tributary to Wills Creek, consists of 5 Skelly and Loy, (1973) grab samples, one of which slightly violated the total iron WWH standards. Most of the abandoned mines are surface mines northeast of New Concord in the Peter's Creek drainage, but there are small abandoned coal mines and limestone quarries as far west as New Concord. There are no abandoned mines on the South Branch of Crooked Creek, although there are active strip mines in the Pittsburgh coal seam along the western divide of this watershed. The construction of I-70 between Cambridge and New Concord exposed the crop line of the Upper Freeport coal seam in many places, and resulted in the relocation of Crooked Creek.

In 1978, several sites were monitored in the Muskingum (New Concord) and Guernsey (Cambridge) County segments of Wills Creek. Sampling efforts resulted in only one WQS violation (total iron) at four sites.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the subbasin. Previous fixed station monitoring consisted of three sets of benthic data collected from three locations. One sample each was collected from Wills Creek at Cambridge (RM 58.5) in Guernsey County in October, 1977, from Wills Creek below Wills Creek Dam (RM 5.9) in Coshocton County in September, 1976, and from Crooked Creek, a tributary of Wills Creek, at Cambridge (RM 2.6) in Guernsey County in August, 1975.

The benthic community at the station on Wills Creek at Cambridge consisted of 15 taxa with a diversity index of 1.94 (RD 3-84). An evaluation of Class IV (Poor) water quality was indicated based on the poor benthic community.

he benthic community at the station on Wills Creek below Wills Creek Dam consisted of 13 taxa with a diversity index of 2.07 (RD 3-85). An evaluation of Class IV (Poor) water quality was assigned based on all criteria.

The benthic community at the station on Crooked Creek at Cambridge consisted of 14 taxa with a diversity index of 2.94 (RD 3-86). An evaluation of Class IV (Poor) water quality was indicated based on the low number of taxa and poor benthic composition.

REFERENCES

Ohio Environmental Protection Agency. 1974-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

OHIO RIVER TRIBUTARIES

BASINS L, N, R AND S
(See subbasin list below)

SUMMARY

An accurate assessment of water quality in the minor Ohio River Tributaries (Basins L, N, R, and S) was not possible because of insufficient data. A subjective evaluation of water quality conditions in the Ohio River tributaries was made based upon scant data and knowledge of pollution sources within the watershed. Subbasins not included in this report were not evaluated at all because of a complete lack of information.

General indications are that many Ohio River tributaries may currently meet 1983 goals, but insufficient data exists to fully substaniate this. Some streams are known to be impacted by mine drainage but the degree of degradation is uncertain. Further investigation may reveal stream segments that will not meet 1983 goals due to the mine drainage problems. For a more comprehensive evaluation of the mine drainage issue, the reader is referred to a document compiled by the Industrial Coal Operations Group of the Ohio EPA (Volume V of the 1980 305(b) report).

Ohio River Tributary Subbasins

Basin L

L-1	Whiteoak Creek Subbasin
L-2	Ohio Brush Creek Subbasin
L-3	Eagle Creek and Straight Creek Subbasin

Basin N

N-1	Upper Raccoon Creek Subbasin
N-2	Lower Raccoon Creek Subbasin
N-3	Symmes Creek Subbasin
N-4	Little Scioto River and Pine Creek Subbasin
N-5	Ice Creek and Indian Guyan Creek Subbasin

Basin R

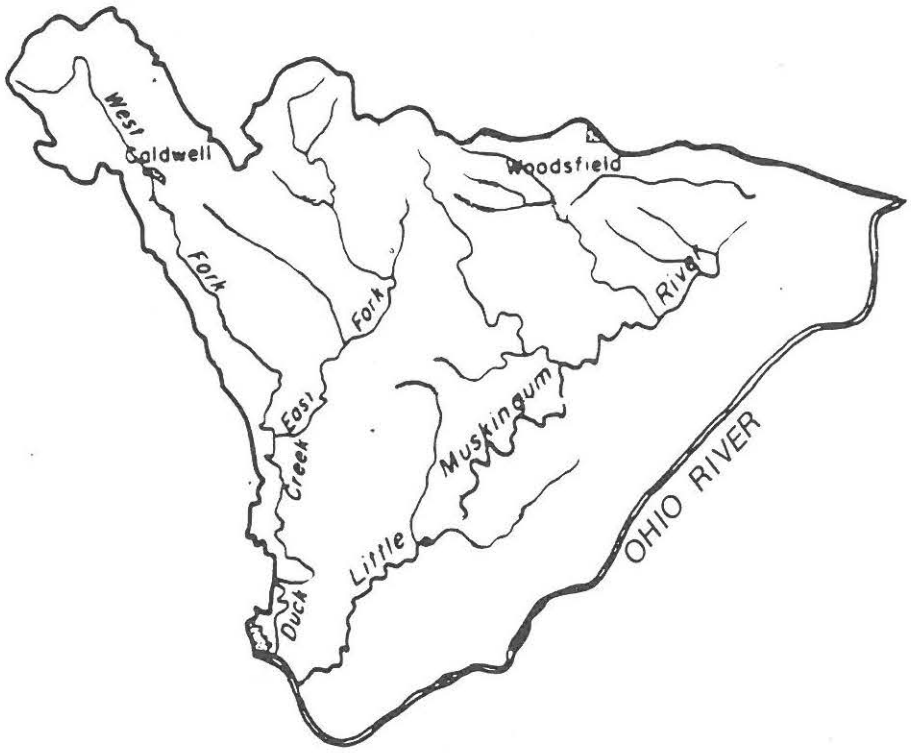
R-1	Duck Creek Subbasin
R-2	Little Muskingum River Subbasin

Basin S

S-1	Little Beaver Creek Subbasin
S-2	Yellow Creek, Cross Creek, and McIntyre Creek Subbasin
S-3	Short Creek and Wheeling Creek Subbasin
S-4	McMahon Creek, Captina Creek, and Sunfish Creek Subbasin

Ohio River Tributaries

Ohio River Tributaries

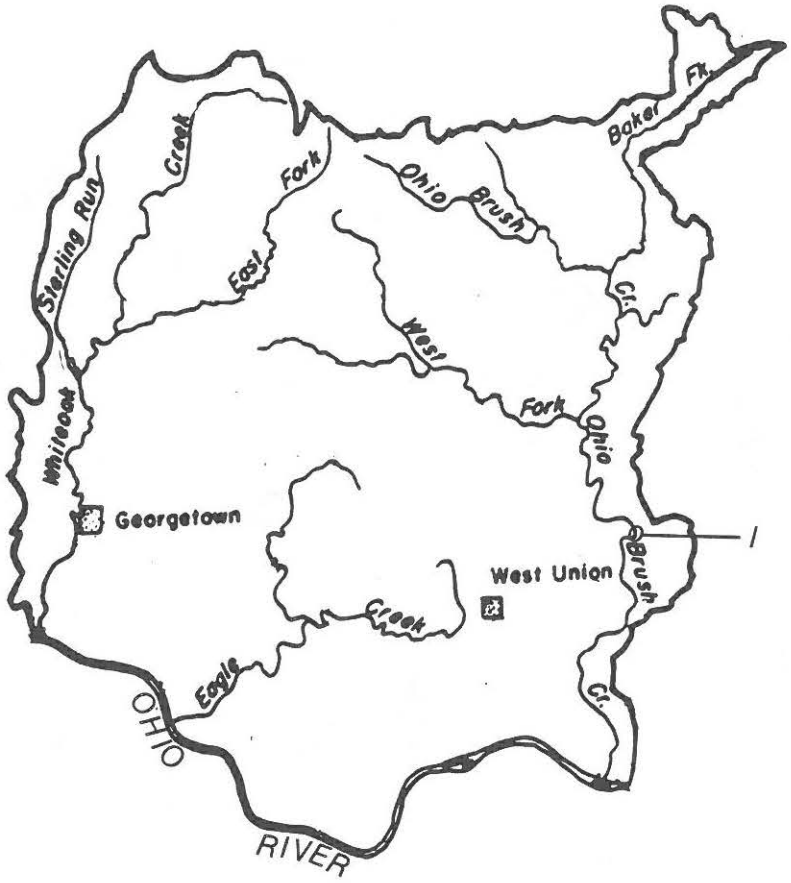


Scale in miles

10 0 10 20

Ohio River Tributaries

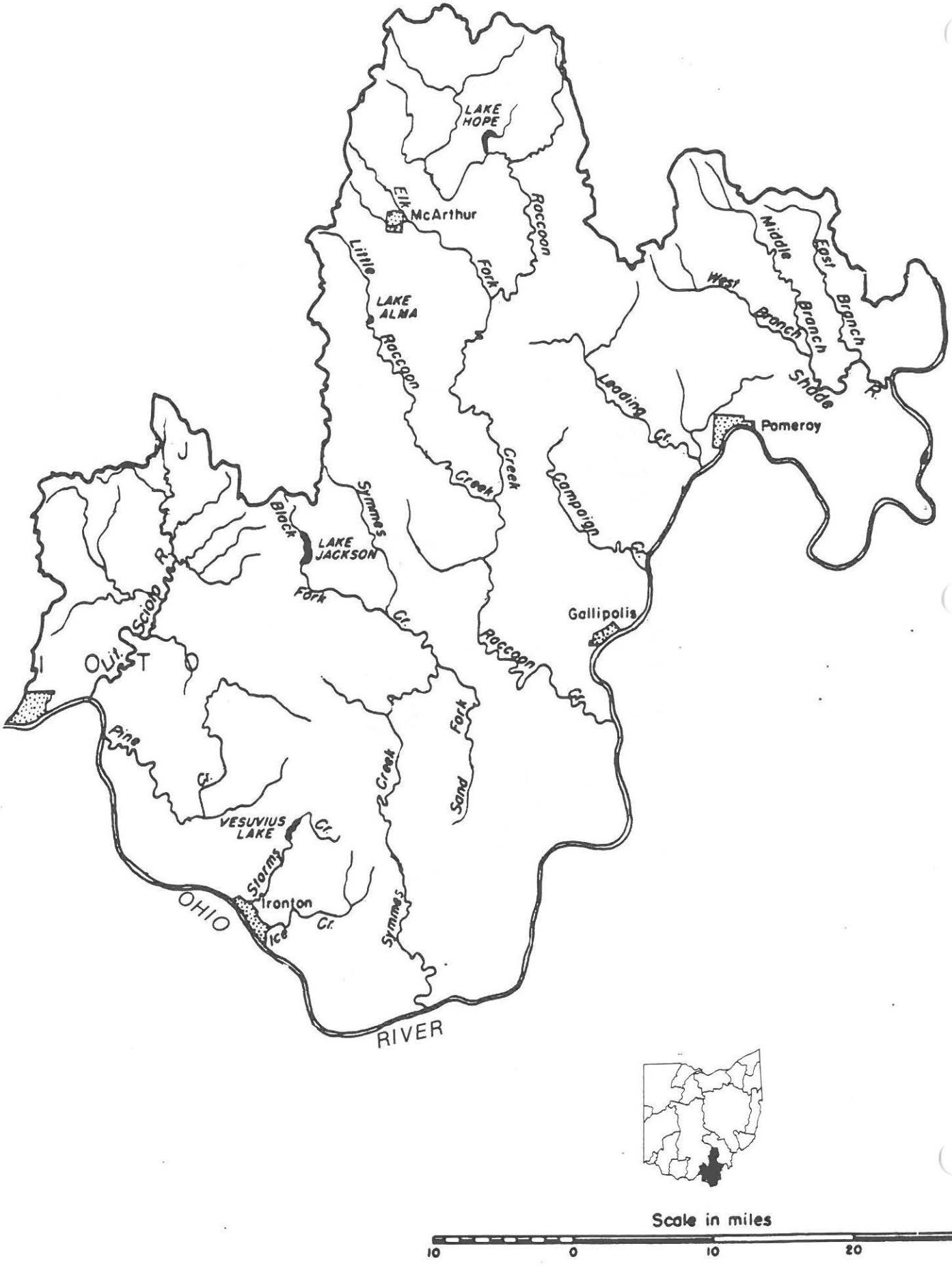
o - Macroinvertebrate Evaluations



Scale in miles

10 0 10 20 30

Ohio River Tributaries



WHITEOAK CREEK SUBBASIN (L-1)

Available physical/chemical water quality data was previously summarized in he State Water Quality Management Plan (OEPA, 1979a). Fecal coliforms and heavy metals (total copper, total zinc, total cadmium, total lead, total iron, total mercury, and total nickel) were cited as possible water quality problems. The available information is insufficient to assess the magnitude and sources of the fecal coliform and heavy metal contamination. There is no mine drainage in this subbasin. The status of Whiteoak Creek with respect to the 1983 clean water goals is unknown.

OHIO BRUSH CREEK SUBBASIN (L-2)

Overall physical/chemical water quality in the Ohio Brush Creek Subbasin appears to be excellent except for isolated stream segments degraded by municipal WWTP's at Seaman, Peebles, West Union and Winchester. The Seaman WWTP at RM 7.2 on the West Fork of Ohio Brush Creek and the Peebles WWTP on Shimmer Run, a tributary to Ohio Brush Creek at RM 30.9, both caused significant stream degradation due to inadequate wastewater treatment. The West Union WWTP (RM 6.1 on Beasley Fork) was recently upgraded to tertiary treatment. This has resulted in improved ammonia, phosphorous, BOD_5 and total suspended solids removal (TSS) (when sand filters at the plant have been operational).

In addition to degradation by WWTP discharge Beasley Fork is also degraded by leachate from the Adams County Landfill (RM 4.9). Leachate from the landfill results in high levels of total iron, total aluminum and slightly elevated evels of ammonia. Both of these entities (West Union WWTP and the Adams Co. Landfill) discharge to the headwaters of this tributary, resulting in further water quality problems due to the limited volume of water available for dillution. Sampling at the fixed monitoring site (RM 13.1; STORET station No. 600660) revealed WQS violations for ammonia, fecal coliforms and total iron prior to 1980. In 1980, sampling results revealed two violations for total iron, one violation for total nickel and one violation of the total zinc standard. Only the two total iron violations were exceeding high (7,600 and 36000 ug/l) (OEPA, SEDO data, 1974-1980). For the majority of the basin, the severity of the violations probably do not interfere with 1983 clean water goals. Additional physical, chemical and biological monitoring of Ohio Brush Creek is needed to determine if Exceptional Warmwater Habitat standards can be maintained in this basin.

BIOLOGICAL EVALUATIONS

No recent Ohio EPA, macrobenthic data are available for the basin. Previous sampling in the basin consisted of one fixed station benthic sample (NASQAN) collected in September, 1978, from Ohio Brush Creek near West Union in Adams County (RM 16.5). A total of 41 benthic taxa with a diversity index of 3.95 were collected (RD 3-24). The benthic community consisted of 10 taxa of mayflies, 2 taxa of stoneflies, 4 taxa of caddisflies, and 16 taxa of midges. No one taxon or group was overwhelmingly abundant. The overall benthic community appeared healthy and diverse and reflected Class I (Excellent) water quality.

EAGLE CREEK AND STRAIGHT CREEK SUBBASIN (L-3)

Recent data for Eagle Creek was limited to a single sample collected in August 1978 at the low-flow monitoring site (RM 3.7; STORET station No. 609120). There were no violations of the Exceptional Warmwater Habitat standards (OEPA, SEDO data, 1978). Data from 1972-1973 (OEPA, 1979a) showed WQS violations for total iron and total chromium in the vicinity of the Copeland Refrigeration Corporation; recent sampling detected total zinc violations below the Copeland discharge (OEPA, SEDO data, 1979). The Copeland Corporation used to operate a small package wastewater treatment plant, however, the facility now discharges to the West Union WWTP.

Physical/chemical Water quality data was collected in late 1979 in the Straight Creek drainage basin. This single set of samples revealed excellent water quality and no violations of the Exceptional Warmwater Habitat Standards (OEPA, SEDO data, 1979). No water quality problems are believed to exist because of the rural land use and the absence of any significant point source pollution. Additional physical, chemical and biological monitoring is needed to determine if 1983 goals are being met in these subbasins.

UPPER RACCOON CREEK SUBBASIN (N-1)

Mine drainage problems were prevalent in this subbasin. WQS violations for pH, total zinc, total iron, along with high total manganese and sulfate concentrations, were reported (USGS, 1976-1977; OEPA, SEDO data, 1974-1978). Severely degraded streams include Raccoon Creek from the East and West Branch confluence to the Little Raccoon Creek confluence, East Branch, Hewett Fork, Brushy Fork, Sandy Run, and Twomile Run. Streams affected by mine drainage to a lesser degree included the West Branch, Rockcamp Creek, Flatlick Run, Siverly Creek, Honey Fork, and Elk Fork.

The Lake Hope Mine Drainage Demonstration Project is located in the Sandy Run watershed. Underground mines are being sealed in an effort to reduce mine drainage pollution. At the present time, there is no information available to assess the effectiveness of this project.

A physical, chemical and biological survey was conducted on Elk Fork during 1981. The final report is expected to be available during 1982.

LITTLE RACCOON CREEK SUBBASIN (N-2)

SUBBASIN SUMMARY

Severe mine drainage pollution in the Little Raccoon Creek watershed has been documented (FWPCA, 1967; Skelly and Loy, 1974). Frequent violations of the pH standard have occurred, thus impairing the attainment of the 1983 clean water goals. Municipal point source pollution was also a problem in segments of the subbasin.

SEGMENT REPORTS

MEADOW RUN
LITTLE RACCOON CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
N-2-2 MAJOR	Meadow Run From the Wellston WWTP to Little Raccoon Creek	WWH 2.9-0.0

The low gradient segment of Meadow Run experiences severe dissolved oxygen problems due to the organic loading from the Wellston WWTP (OEPA, SEDO data, 1977). The city of Wellston recently sold the WWTP to Jeno's Pizza Co. Operation of the plant is to be transfered to Jeno's Pizza when production begins at their new facility. The city of Wellston is in the Construction rants Program. A facilities plan has been received by the Ohio EPA. Review nas not yet been completed but it appears that Wellston will receive funding. No wastewater treatment improvements are anticipated prior to 1983.

LITTLE RACCOON CREEK
RACCOON CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
N-2-1 MAJOR	Little Raccoon Creek From the headwaters to Raccoon Creek	WWH 36.5-0.0

Previous reports from the Federal Water Pollution Control Administration (1967) and Skelly and Loy (1974) listed WQS violations for pH, total iron and total zinc in Little Raccoon Creek.

These reports identified widespread mine drainage pollution in the following tributaries of Raccoon Creek: Sand Run, Meadow Run, Mulga Run, Flint Run, Buffer Run, Tarcamp Run, Goose Run, Dickason Run, Spring Run and Keetor Run. Urban point and nonpoint source pollution from the Wellston-Hamden area may also impact Little Raccoon Creek.

Recent sampling by Ohio EPA, SEDO staff indicated that the Little Raccoon Creek is adversely affected by mine drainage (Ohio EPA, SEDO data 1974-1979).

RACCOON CREEK
OHIO RIVER TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
05090101-021 / 05090101-020 N-2-3 MAJOR	Raccoon Creek From the Little Raccoon Creek confluence to U.S. Rt. 35	WWH 37-29.6

This segment was affected by mine drainage from upstream areas. Monthly physical/chemical water quality samples were collected at the lower end of this stream segment (RM 29.6; STORET station No. 601400). Frequent WQS violations for pH and total iron occurred as well as one violation each for total copper, total lead and total zinc (OEPA, SEDO data, 1977-1980).

Indian Creek, a major tributary to this segment, was degraded downstream from the city of Rio Grande WWTP. Nutrients and low dissolved oxygen were identified as the major problems (OEPA, SEDO data, 1979). The city of Rio Grande is preparing a facilities plan which should be submitted to Ohio EPA in 1982.

SYMMES CREEK SUBBASIN (N-3)

Very little data exists for the Symmes Creek mainstem or its tributaries, and therefore no determination can be made regarding attainability of 1983 water quality goals. Many segments in this basin are affected by mine drainage from both active and abandoned mines (Ohio EPA, SEDO data). The mainstem of Symmes Creek was sampled 20 times between 1968 and 1978 (Ohio EPA, SEDO; Skelly and Loy; FWPCA). Most observations were taken in the months of January, June, July and October representing both high and low flow conditions. Little or no information was collected on manganese, zinc, aluminum or TDS.

The buffering capacity of Symmes Creek is limited (mean alkalinity of 29.6 mg/l $CaCO_3$) but no net acidities were noted on the mainstem of Symmes Creek. Only one sample out of 16 exceeded the WQS standard for pH on the Symmes Creek mainstem.

Minor pH problems occurred on several tributaries to Symmes Creek including streams with no abandoned mines. Several tributaries which contain abandoned strip and underground mines, exhibited the most severe pH and net acidity problems in the basin. Most of the Symmes Creek tributaries for which data exists do not contain more than four abandoned strip mines. Physical/chemical water quality in most of these tributaries can be described as having no detectable or only minor effects from acid mine drainage. Pigeon Creek and Cackley Swamp are probably the main sources of acid mine drainage to Symmes Creek mainstem. This observation is based on one sample for each stream (Ohio EPA, SEDO data, 1973). Black Fork has suprisingly physical/chemical good water quality considering the number of abandoned mines in the drainage area, but degradation from "slugging" (i.e., periodic discharge of toxic materials) may occur during storm runoff events. Evidence for this are the fish kills attributed to acid mine drainage reported on 28 June 1976 and 8 September 1972

by the Ohio DNR, Division of Wildlife. Several of the tributaries to Symmes Creek have no abandoned mines within their drainage areas. A more complete discussion of mine drainage related problems on Symmes Creek appeared in the 1980 305(b) report.

In addition to the mine drainage related problems, several other water quality problems exist in this basin. The Oak Hill WWTP discharges to Huntingcamp Creek, a tributary to Symmes Creek. Occasional water quality monitoring both upstream and downstream the plant revealed water quality degradation. No WQS violations occurred upstream from the plant but TKN and ammonia levels downstream were ten to thirty times higher than ambient levels. An oxidation-ditch type plant is in the planning stages for Oak Hill. When completed this facility should significantly improve water quality in Symmes Creek.

LITTLE SCIOTO RIVER AND PINE CREEK SUBBASIN (N-4)

Preliminary observations and the results from one sample (OEPA, SEDO data, 1978) taken at mile point 2.2 on the Little Scioto River indicated good physical/chemical water quality. Two small WWTP's serving Purtee Acres (RM 6.2 on Wards Run) and the Tanglewood Subdivision (RM 1.7 on an unnamed tributary to the Little Scioto) may affect water quality in the Little Scioto River. The impact of these discharges, agricultural runoff, and failing septic tank systems on the water quality of the Little Scioto River is unknown.

Physical/chemical Water quality was probably affected to a minor degree by mine drainage in the Little Scioto River and its tributaries. Most of the abandoned mines are small, subsurface and sparsely distributed throughout the eastern portion of the main watershed. Minor WQS violations for pH occurred in the mainstem, Munn Run, Rocky Fork, Sugarcamp Creek and Brushy Fork. Buffering capacities for all reported streams were adequate. No net acidities were found in any segment.

As in the adjacent Little Salt Creek watershed, sulfate concentrations were lower than expected and appeared to be independent of the presence of abandoned mines. However, more data is required to establish if this is a true pattern.

Conductivity and alkalinity appeared to increase in downstream tributaries, but was not associated with any similar trend in other mine drainage constitutents. Total iron exceeded WQS on streams with and without abandoned mines (OEPA, SEDO, 1980a). A recent evaluation listed nine tributaries to Pine Creek as being influenced by mine drainage (OEPA, 1979b). A single grab sample collected by Ohio EPA revealed no physical/chemical problems (OEPA, SEDO data, 1978); however, monitoring by the U.S. Geological Survey revealed total iron and pH standards violations (USGS, 1972-1978).

No recent data is available for the Storm Creek watershed. Previous reports have indicated good water quality (physical/chemical) (OEPA, 1976; OEPA, 1979b).

Additional physical, chemical and biological monitoring to determine the impact of mine drainage will be required before an accurate evaluation of water quality, with respect to attainment of 1983 goals, can be made.

ICE CREEK AND INDIAN GUYAN CREEK SUBBASINS (N-5)

No determinations can be made concerning water quality in Ice Creek because of insufficient data.

A substantial portion of Indian Guyan Creek flows through the Wayne National Forest. There were no point source discharges in the subbasin but water quality may have been influenced by strip mining activity in the upper watershed and by a small amount of agricultural land use. Water quality appeared to be good; one of two Ohio EPA samples collected near the village of Bradrick showed a total iron violation (OEPA, SEDO data, 1978); additional sampling by the U.S. Geological Survey revealed no violations (USGS, 1974-1977).

DUCK CREEK SUBBASIN (R-1)

Portions of the Duck Creek Subbasin were degraded by mine drainage pollution. Severely impacted areas included the Middle Fork, the East Fork below the Middle
Fork, the West Fork, and lower Duck Creek. Based upon limited physical/chemical data, the upper East Fork and several smaller tributaries in the subbasin have acceptable water quality (OEPA, SEDO data, 1976). The Caldwell WWTP may have a substantial impact on water quality, but data is lacking.

LITTLE MUSKINGUM RIVER SUBBASIN (R-2)

The Little Muskingum River is classified as a State and National Resource Water and is considered one of the higher quality streams in Ohio. There were no point source discharges in the basin; two abandoned underground mines have a negligible impact on water quality. Two minor WQS violations were detected: a total iron violation on Rich Fork and a total lead violation on the mainstem above Mill Run (OEPA, SEDO data, 1978-1979).

This basin was sampled extensively in 1981. Fifteen permanent monitoring stations were developed and 45 water quality samples were taken throughout the watershed. Five total copper violations occured (2 violations on Fifteen Mile Creek; 1 violation on Archers Fork; 1 violation on Written Fork; 1 violation on the mainstem at Co. Rd. 9 bridge). These violations were all slightly above the detection limit for this metal except for the violation that occurred at Fifteen Mile Creek (50 ug/l). Additional WQS violations for total iron and total nickel also occurred.

The results of this extensive monitoring program indicated that the basin was in excellent physical/chemical condition. Other than infrequent sampling, no additional monitoring is planned for this basin.

LITTLE BEAVER CREEK SUBBASIN (S-1)

SUBBASIN SUMMARY

Physical/chemical water quality in the Little Beaver Creek Subbasin ranged from good to fair. The headwaters of the Middle Fork and segments of the East Branch and North Fork were degraded by municipal and industrial point source pollution. The urban areas of Salem, Leetonia, Washingtonville, Lisbon, East Palestine and New Waterford were responsible for localized water quality problems. Organic enrichment and fecal coliform contamination were the most widespread problems below these municipalities (OEPA, NEDO data, 1977-1979).

Stateline Creek and Chemline Run, tributaries to the North Fork and West Fork respectively, were impacted by industrial waste disposal operations. Ammonia, total iron, total lead, total cyanide, MBAS, pH, total dissolved solids, and phenolics WQS violations were among the problems resulting from discharges and leachates from the disposal facilities. Segments of the North Fork and West Fork were degraded below the disposal sites during low-flow conditions. Numerous coal mining activities within the Little Beaver Creek Subbasin may also influence water quality.

Little Beaver Creek and the lower portions of the West Fork, Middle Fork and North Fork were relatively free from degradation and near-stream development. Thirty-three miles in the lower watershed are designated as a National Scenic River. Under the State classification system, 20 miles of the Little Beaver Creek system is designated as a Wild River and 16 miles are designated as a Scenic River (Ohio DNR, 1979).

SEGMENT REPORTS

MIDDLE FORK LITTLE BEAVER CREEK
BEAVER CREEK TRIBUTARY

Segment Problem	Name Description	Use Designation Mile Points
03010 1-017 S-1-1 MAJOR	Middle Fork From the Salem WWTP to Unknown	WWH 53.9-Unknown

Dissolved oxygen, fecal coliform, total iron, total lead and phenolic WQS violations occurred at the Allen Road sampling site (OEPA, NEDO data, 1977-1979). These violations can be attributed to the effluent of the Salem WWTP, which is expected to be upgraded prior to 1983. Farther downstream, discharge from the Stone Mill Run causes WQS violations of for total iron, and elevated levels of total lead, total zinc, and total nickel in the Middle Fork (OEPA, NWDO data, 1980).

LITTLE BEAVER CREEK MAINSTEM

Segment Problem	Name Description	Use Designation Mile Points
S-1-2 MAJOR	Little Beaver Creek From the Source to the Ohio-Pennsylvania state line	WWH 14.8-1.5

03010 1-015

WQS violations for total iron, total lead, total mercury, phenolics and fecal coliforms were reported at the monthly monitoring site near East Liverpool (RM 4.6; STORET station No. 602000; OEPA, NEDO data, 1978-1980). Elevated fecal coliform concentrations can be attributed to upstream municipal WWTPs (Salem, Leetonia, Washingtonville, Lisbon, East Palestine, and New Waterford) along with nonpoint sources. The other violations may have been partially attributable to the industrial waste disposal sites locted within the subbasin. The extent of degradation in Little Beaver Creek appeared to be minimal, but further investigation is advisable. Attainment of 1983 clean water goals is dependent upon municipal WWTP improvements and pollution abatement programs at the industrial waste disposal site. The cities of Leetonia and Washingtonville jointly submitted Step I, facility planning application during 1981. No final action has been taken by Ohio EPA.

CHEMLIME RUN
WEST FORK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
S-1-5 MAJOR	Chemlime Run From the Chemline Corp. Outfall to the West Fork	WWH 0.4-0.0

Industrial effluent will continue to cause violations for total dissolved solids, pH, ammonia, MBAS, total iron, phenolics and total cyanide. The Chemlime Corporation stopped accepting waste for disposal in the working pit in December, 1980. Only sludge generated on-site (leachate collection and water treatment sludge) is disposed of. Closure plans have been prepared and are being implemented at the present time. No improvement in water quality is expected to occur in the foreseeable future.

WEST FORK
LITTLE BEAVER CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
S-1-4 MAJOR	West Fork immediately below the Chemlime Run confluence	WWH 12.8-11.8

Ammonia, total iron, total lead, and phenolic WQS violations were recorded in this stream segment (OEPA, NEDO data, 1977-1980). Concentrations of these parameters in the West Fork increased slightly below the Chemlime Run confluence, especially during cold weather and during low flow periods. Additional monitoring is needed to fully assess the impact of Chemlime Corporation's waste disposal on the West Fork.

EAST BRANCH
MIDDLE FORK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
S-1-3 MAJOR	East Branch From unknown point to the Middle Fork	WWH Unknown-0.0

This low gradient stream experienced dissolved oxygen problems (OEPA, NEDO data, 1977-1979) because of organic loading from the Leetonia WWTP and the Washingtonville WWTP. Additional monitoring is needed to better evaluate the problem area.

STATELINE CREEK
NORTH FORK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
S-1-7 MAJOR	Stateline Creek From the Cenco Corp. Outfall to the North Fork	WWH 1.5-0.0

WQS violations for total dissolved solids, ammonia, MBAS, total iron and phenolics occurred in this stream segment due to the discharges of the Cenco orporation and Brownings-Ferris Industries (OEPA, NEDO data, 1977-1980). , Browning-Ferris Industries stopped accepting waste at this facility as of January 1979. In addition, wastewater treatment improvements have resulted in reduced phenolic concentrations in the discharge. Improvements in water quality are expected to result from these changes.

NORTH FORK
LITTLE BEAVER CREEK TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
S-1-6 MAJOR	North Fork From the Stateline Creek confluence to Little Beaver Creek	WWH 7.3-0.0

Industrial dischargers in the Stateline Creek drainage impact this segment of the North Fork. Sampling at two sites revealed WQS violations for nitrogen ammonia, total dissolved solids, total lead, phenolics, and total iron (OEPA, NEDO data, 1977-1980). These water quality problems were most evident during low-flow conditions. Industrial pollutant abatement measures may allow attainment of 1983 water quality goals by 1983.

YELLOW CREEK AND CROSS CREEK SUBBASIN (S-2)

YELLOW CREEK SUBBASIN

Yellow Creek Subbasin drains 240 square miles in Jefferson, Carroll and Columbiana counties and empties into the Ohio River just south of Wellsville. There is extensive mining activity in the Yellow Creek watershed. The mainstem is classified as Mine Drainage Affected from RM 24.6 at the confluence with the Upper North Fork, to its confluence with the Ohio River. Ohio EPA, SEDO, established a low-flow sample site on the mainstem at RM 2.5. Only one WQS violation was detected before the monitoring station was discontinued in 1978.

Elkhorn Creek, a tributary to Yellow Creek at RM 26.3, is classified as Exceptional Warmwater Habitat. Although extensive physical, chemical and biological water quality data is not available, general observations, USGS benthic data and USGS chemical data on the mainstem of Elkhorn Creek and its tributaries, Strawcamp Run and Center Fork indicated that this subbasin has excellent water quality. Additional sampling is needed to validate this classification. According to USGS data (Coal Areas, Vol. 3. 1979-1980) all sites sampled in the watershed, except Wolf Run, had good to excellent water quality and benthic life.

An abandoned gob pile just northwest of East Springfield caused severe degradation of water quality throughout Wolf Run. The mainstem of Yellow Creek is significantly impacted by Wolf Run immediately below the confluence and probably extending down to Elkhorn Creek. Ohio EPA data from Yellow Creek above and below Wolf Run are drastically different. After mixing with Wolf Run, pH dropped from 7.38 S.U. to 4.45 S.U. in the Yellow Creek mainstem. Total acidity, total iron, total manganese, total aluminum, total zinc, dissolved solids and sulfates were much higher below this tributary than above it. Numerous sources of acid mine drainage also occurred throughout the Yellow Creek watershed, but the gob pile on Wolf Run was the largest single source.

Wolf Run is definitely impacted by acid mine drainage, but the rest of the Yellow Creek basin appears to be in good condition. Further sampling is needed to substantiate these observations.

CROSS CREEK SUBBASIN

Although sufficient stream data is lacking throughout this basin, the upper segment of Cross Creek, from the headwaters to its confluence with McIntyre Creek, is classified as Cold Water Habitat (CWH). There is considerable mining activity in the lower portion of this basin; high sulfates, total suspended solids, and conductivity, have been reported (USGS, 1974-1978). Two municipal wastewater treatment plants located in Winterville, discharge to Dry Fork, a small intermittent stream near the mouth of Cross Creek. The combined discharge from these facilities exceeds 110,000 gpd and frequently violated NPDES permit limits for biochemical oxygen demand (BOD_5) and total suspended solids.

SHORT CREEK AND WHEELING CREEK SUBBASIN (S-3)

Short Creek is 29.4 miles in length and drains 125 square miles in Jefferson and Harrison Counties. Approximately 80-95% of this subbasin has been ffected by mine drainage and historical data revealed high concentrations of sulfate, dissolved solids, total iron, total manganese, and total aluminum (OEPA, 1979c).

The Short Creek watershed is affected by alkaline mine drainage. There were only 3 observations in 83 total samples for the area which had pH values below 6.5 S.U. Another characteristic of mine drainage affected stream quality in the Short Creek watershed were the high sulfate concentrations often in excess of 1100 mg/l. Total iron was problematic in approximately 10 of 16 mine drainage affected streams, but the degree of the problem appeared to be independent of pH or sulfate levels. Manganese was a minor problem at most stations.

The Short Creek mainstem contains alkaline conditions and excellent buffering capacities. Stream concentrations of total alkalinity are among the highest reported in the coal region of Ohio. Noncarbonate hardness, although not presented, comprised from 80 to 90% of total hardness. Sulfate is probably the main constituent of non-carbonate hardness in these waters. Short Creek tributaries contain water quality similar to the mainstem. pH fell below the WWH standard once in Piney Fork and Sally Buffalo Creek, at all other times, pH values range between 6.5 and 8.5 S.U. Buffering capacities are excellent in all tributaries. (OEPA, 1980a).

Wheeling Creek is 30.2 miles long and drains an area of 108 square miles in Belmont, Harrison, and Jefferson counties. The entire watershed has been xtensively mineral using both surface and underground techniques.

Wheeling Creek empties into the Ohio River near Martins Ferry. Its headwaters are located near the small village of Flushing in northern Belmont County. The Flushing WWTP discharges Wheeling Creek via an unnamed tributary. From Flushing, Wheeling Creek continues east, through steeply sloping terrain, toward the Village of Bridgeport (population 29,130). Bridgeport is located south of Martins Ferry, on the flatlands along the Ohio River. The Belmont County Plum Street WWTP discharges directly into Wheeling Creek.

The general topography of the watershed has been significantly altered by widespread strip mining. As a result, nonpoint source pollution in the forms of acid mine drainage and surface runoff present problems in most of the watershed's streams. Wheeling Creek and all its tributaries are currently classified WWH.

Wheeling Creek has an excellent buffering capacity and very little to no acidity. Sulfate concentrations, however, are a severe problem, and total dissolved solids, iron, and manganese concentrations are minor problems. Aluminum concentrations are occasionally quite high.

Most of the tributaries to Wheeling Creek have the same general characteristics. They have excellent buffering capacities, zero acidities, and pH values above 6.5 S.U. However, they often have moderate to severe sulfate problems and minor to severe iron problems (OEPA, 1980a).

A low-flow sample collected by Ohio EPA showed standards violations for total iron and dissolved solids on Wheeling Creek (RM 1.5) (OEPA, SEDO data, 1978). Violations for total iron, total lead, and dissolved solids were observed at the low-flow monitoring site on Short Creek (RM 3.9)(OEPA, SEDO data, 1978).

MCMAHON CREEK, CAPTINA CREEK, AND SUNFISH CREEK SUBBASIN (S-4)

McMahon Creek is 28.1 miles long and drains 91.2 square miles in Belmont County. Approximately 50 strip mines, both active and abandoned, and 1 underground mine impact the water quality of McMahon Creek. The St. Clairesville WWTP discharges to Aults Run, a tributary to McMahon Creek at RM 0.0. This facility is overloaded, but plans are being prepared to convert it into a pump station for the new secondary treatment plant being planned in the Wheeling Creek Watershed.

Leachate from Buckeye Reclamation Company, a landfill in an abandoned strip mine on Kings Run (tributary to Little MaMahon Creek at RM 1.7) was sampled in December 1980. High concentrations of SO_4, ammonia nitrogen, total iron, total zinc, and low pH conditions were found in this tributary. Except for headwater areas, McMahon Creek and Little McMahon Creek are not expected to meet 1983 goals.

Captina Creek is significantly impacted by mine drainage for 22 miles from below the North American Coal Company #6 mine to the Ohio River. Coal refuse runoff, underground mine portal drainage, and active and inactive strip mines in the basin all combine to adversely affect water quality. The watershed contains 3 active underground mines, 6 active surface mines, 2 active deep mine portals and a coal preparation plant. An old gob pile, owned by Cravat Coal Company, is in the final stages of reclamation. The estimated completion date is late 1982. This gob pile has been a significant cause of mine drainage problems for many years. A good cover of clay, top soil, and plant growth should greatly reduce surface and sub-surface drainage problems. Current gob pile reclamation projects are expected to eliminate approximately 75% of the mine drainage problems in this basin. The Youghiogheny & Ohio Coal Company, located on Piney Creek, has little or no effect upon Piney Creek or the Captina Creek mainstem. The North American Coal Company should be in complete compliance with its discharge permit by 1983. The mainstem of Captina Creek is not expected to meet 1983 goals due to drainage from abandoned mines.

The Bethesda and Barnesville WWTP's also discharge to Captina Creek. The Barnesville WWTP (RM 10.5), located on the headwaters of the North Fork of Captina Creek, discharges an average of 1.0 MGD of secondary treated sewage. This plant is presently receiving almost twice the load it was designed to handle and, subsequently, has poor BOD and total suspended solids removal. Although stream data is not available, severe degradation during the summer months is likely. The Bethesda WWTP (RM 12.2), located in the headwaters of Bend Fork of Captina Creek, discharges an average of 179,000 gpd of secondary treated sewage. Storm water infiltration is a significant problem within this system. Physical/chemical data below the discharge is lacking, but general observations suggest a major impact; field inspections have revealed a septic zone and fish kills have been reported. Both of these facilities are currently at Step I in the construction grants process and are not expected to be upgraded prior to 1983 (OEPA, SEDO data, 1977-1981).

Sunfish Creek is 31.4 miles long and drains 113.8 square miles in Monroe County and Sunfish Creek generally has excellent water quality. There is no degradation due to mining activities within the watershed. Agricultural and logging activities result in minor degradation but the extent to which this occurs is not known. A total lead violation occurred at the ambient monitoring station (RM 6.8; STORET Station No. 609200) but was only 1 ug/l over the standard of 30 ug/l (OEPA, SEDO data, 1978). Standingstone Run receives effluent from Woodsfield WWTP (RM 3.2) and localized water quality problems may result from high organic loading to this low-flow stream. The Beallsville WWTP (RM 4.4) may cause similar degradation of the East Fork of Piney Fork, but water quality data sufficient to verify this is lacking.

REFERENCES

Federal Water Pollution Control Administration, 1967. Recommendations for water pollution control, Raccoon Creek Basin, Ohio U.S. Department of Interior, Wheeling Field Station.

Ohio Environmental Protection Agency. 1980a. 1980 305(b) report Volume V: Mine Drainage.

Ohio Environmental Protection Agency. 1974-1980 (unpublished). Data available from Southeast District Office, Ohio EPA, Logan, Ohio.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northeast District Offices, Ohio EPA, Twinsburg, Ohio.

Ohio Environmental Protection Agency 1979a. Little Miami River Basin/Southwest Ohio River tributaries water quality management plan, Part I, II, III. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979b. S.E. Ohio River tributaries, water quality management plan, Part III, preliminary report. Ohio EPA, Columbus, Ohio.

Ohio Environmental Protection Agency. 1979c. Central Ohio River tributaries, water quality management plan, Part I, II, III. Ohio EPA, Columbus, Ohio.

Ohio Department of Natural Resources. 1979 (unpublished). Designated rivers (July 3, 1979). Ohio DNR, Division of Natural Areas and Preserves, Scenic Rivers Program, Columbus, Ohio. Mimeo. n.p.

Skelly and Loy, 1974. The development of statewide coal mining objectives to reduce pollution from future coal mining operations. Ohio Department of Natural Resources, Columbus, Ohio. 195 pp.

United States Geological Survey. 1972-1978. Water resources data for Ohio, Vol 1. Ohio River Basin. U.S. Geological Survey water-data reports OH-72-1 through OH-78-1. U.S. Geological Survey, Columbus, Ohio.

MAHONING RIVER, PYMATUNING CREEK, AND YANKEE CREEK BASIN

UPPER, MIDDLE, AND LOWER MAHONING RIVER
SUBBASINS (T-1, T-2, T-3)

SUBBASIN SUMMARY

The water quality of the Mahoning River ranges from good to grossly polluted. The upper and middle subbasins appear to be in generally good condition, although water quality data is scant. Point source pollution from the cities of Alliance and Sebring degrade portions of the upper Mahoning River and the Berlin Reservoir. Further study is needed to accurately assess the degree of degradation, especially with regard to eutrophication problems in the reservoir. In addition to Berlin Reservoir, five other reservoirs (Mosquito Creek, Milton, Deer Creek, Meander Creek, and West Branch) in the Mahoning River drainage provide for stream flow augmentation, recreational uses, and/or public drinking water supplies. Eagle Creek, a tributary to the middle Mahoning River, receives effluent from municipal WWTP's in Hiram, Garrettsville, and Windham. Limited sampling of Eagle Creek (OEPA, NEDO data, 1977-1980) revealed no WQS violations; however, the data was insufficient to evaluate Eagle Creek with respect to the 1983 goals.

Urban and industrial land-use has a substantial impact on the water quality of the Mahoning River below the city of Warren. The sheer volume of wastewater generated, combined with generally outdated wastewater treatment at municipal and industrial facilities, creates a grossly polluted aquatic environment. Water quality improvements are anticipated following the termination of steel making operations at several plants in the Mahoning Valley, but the 1983 clean water goals are not expected to be attainable within the foreseeable future.

BIOLOGICAL EVALUATIONS

Recent Ohio EPA, macrobenthic monitoring in the basin consisted of two fixed station benthic samples (NASQAN) collected in September, 1979, from the Mahoning River at Lowellville in Mahoning County (RM 11.6). Macroinvertebrates were sampled at both an east bank and west bank station (RD 3- and 3-). Eight taxa were collected at the east bank station (diversity index 1.24) while seven taxa were collected at the west bank station (diversity index 0.78). Oligochaetes and the pulmonate snail Physa dominated the community of each side, together comprising over 90 percent of the populations by numbers. Large numbers of these two organisms are indicative of severe organic pollution. An evalation of Class IV (Poor) water quality was given to both east and west bank stations.

An extensive survey of the mainstem Mahoning River fish community from the confluence with Eagle Creek to the Beaver River downstream from New Castle, Pa. was conducted during July - October 1980. The results of this survey should be available in late 1982.

WEST BRANCH
MAHONING RIVER TRIBUTARY
CONFLUENCE AT RM 56.3

Segment Problem	Name Description	Use Designation Mile Points
T-2-1 NONE	West Branch From the headwaters to the Mahoning River	WWH 29.2-0.0

Limited data collected in 1977 (NEFCO, 1979) indicated no substantial water quality degradation in the West Branch. Fecal coliform concentrations were elevated at some locations, reflecting the increased housing development in the southeastern portion of the watershed. A single sample collected by Ohio EPA revealed no water quality standards violations (OEPA, NEDO data, 1979).

MAHONING RIVER MAINSTEM
BEAVER RIVER (Pa.) TRIBUTARY
CONFLUENCE AT RM

Segment Problem	Name Description	Use Designation Mile Points
T-2-2 MINOR	Mahoning River From Newton Falls to Main Street in Warren	Special Mahoning River Standards 56-38
T-3-1 MAJOR	Mahoning River From Warren to the Ohio/Pennsylvania state line	Special Mahoning River Standards 38-11.2

This segment of the Mahoning River is degraded by the Newton Falls WWTP and combined sewer overflows in the Newton Falls area. Sampling at Leavittsburg (RM 45.0; STORET station No. 602280) revealed standards violations for fecal coliforms, total iron, total lead, total cyanide, and phenolics (OEPA, NEDO data, 1977-1980). Pollution abatement programs in Newton Falls are expected to improve wastewater treatment and reduce the severity of the combined sewer overflow problem by 1983.

The urban and industrial centers of the Mahoning Valley generate a wastewater volume three to five times the normal Mahoning River discharge. Many of the industrial and muncipal wastewater treatment facilities in the Mahoning Valley are old or inadequate and produce poor quality effluent. The result is one of the most severely degraded stream segments in Ohio. Data from three monitoring sites (RM 37.4; STORET station No. 602400, RM 33.1; STORET station No. 602290, and RM 11.6; STORET station No. 602300) showed Warmwater Habitat standards violations for total iron, total lead, total mercury, total copper,

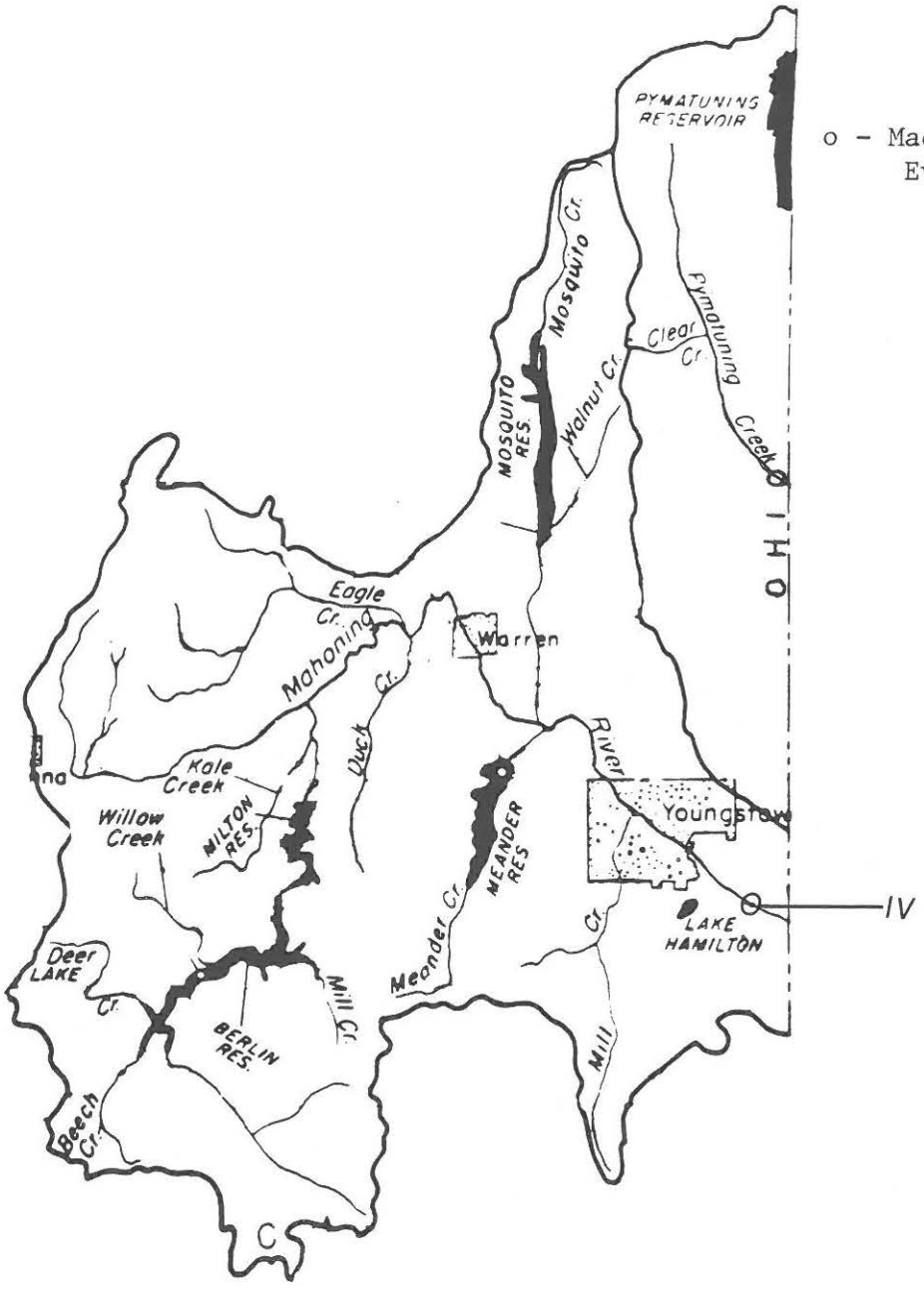
total zinc, phenolics, pH, cyanide, MBAS, fecal coliforms, total dissolved solids, nitrogen ammonia and dissolved oxygen (OEPA, NEDO data, 1977-1980). Eight municipal wastewater treatment plants, six steel plants, and a power plant were among the major point sources of pollution causing the degradation. The termination of production at several steel plant facilities will reduce the total pollutant loading to the Mahoning River. However, improved wastewater treatment by the remaining dischargers must occur before 1983 clean water goals can be realized.

HISTORICAL

The basic steel industry, and to a lesser extent muncipal wastewater treatment plants, have had a mjor influence on the water quality of the lower Mahoning River. Point source loadings from major industrial facilities were documented in the early 1950's (Ohio Department of Health, 1954). Pollution control in the Mahoning Valley during this time period was essentially non-existent, with the steel industry directly discharging untreated coke plant wastes, rudimentary solids removal for blast furnace gas wash water; scale pits with and without oil skimming for hot forming wastes; no treatment for emulsified cold rolling oils; direct discharge of spenk pickling acids; and no treatment for coating wastes (Amendola et al. 1977). Municipal wastewater treatment plants were not in operation until the late 1950's and early 1960's. The Youngstown Wastewater Treatment Plant (WWTP) which is the largest municipal treatment discharger to the Mahoning River, did not begin operations until 1965. Prior to this time, no treatment of Youngstown's municipal waste was provided.

Since the 1950's, significant loading reductions of wastewater volume, total suspended solids, oil and grease, total iron, and phenolics have occurred (Table 7). These reductions became possible with pollution control improvements at several steel mills and the partial to total shutdown since 1978 of five major steel producing facilities. During 1974, eight major steel mills were discharging directly into the Mahoning River with a combined wastewater volume of 627 MGD (91.4% of the total wastewater volume to the Mahoning River). This is an extremely large wastewater volume for a river the size of the Mahoning. It was estimated that for 1975 the major steel facilities may use the entire flow of the Mahoning River 5.6 times during winter critical flow and nearly 2.6 times during summer critical flow (Amendola et al. 1977). Pollutant loadings (kg/day) of total suspended solids, oil and grease, BOD_5, ammonia-nitrogen, nutrients, and toxic substances (heavy metals, total cyanide, phenolics, and residual chlorine) by river segments are given in Tables 5 and 6. From 1974-1980, significant loadings of suspended solids, oil and grease, and toxic substances (metals, cyanide,, phenolics, chlorine) have been recorded for segments 3, 4, and 5, (RM 37.8 - 13.5), a 24 mile reach of the Mahoning River. Of these three segments, segment 5 (RM 25.7 - 13.5) has received a larger amount of wastewater volume, BOD_5, oil and grease, ammonia-nitrogen, and nutrients than all other segments combined. Segments 3 and 5, and to a lesser extent, segment 4, have received substantial loadings of total suspended solids from 1974 to 1980. In weight, total suspended solids has been the most significant pollutant into the Mahoning River. Segment 5, although receiving the greatest amount of pollutant loadings of any other segment during 1980, has achieved a significant reduction since 1974. Between 1974 and 1980, segment 5 received 73.3% less total suspended solids, 91.6% less oil and grease, 93.6% less toxic substances (metals, cyanide, phenolics, chlorine) and 60.5% less wastewater flow (Table 6). This reduction is mainly attributable to a partial to total

Mahoning River Basin



o - Macroinvertebrate Evaluations

Scale in miles

10 0 10 20 30

shutdown of the Youngstown Sheet and Tube Company's Brier Hill Works, Campbell Works, and Struthers Division and to the total shutdown of United States Steel Corporation's - Ohio Works. These major steel plants between 1974 and 1977 represented 75% of the effluent flow into segment 5.

Segment 2, (RM 42.5 - 38.0) which receives a majority of its pollutant loadings from Copperweld Steel Company, has shown a substantial reduction in wastewater volume and toxic substances (metals, cyanide) loadings. Although fluctuations in suspended solids and oil and grease loadings occurred in segment 2 between 1974 and 1980, and overall reduction in both has been achieved. Wastewater flow, suspended solids and toxic substances (metals, cyanide, phenolics, chlorine) loadings have been greatly reduced in segment 4 (RM 31.1 - 26.2) since 1974 (Tables 5 and 6). These reductions were mainly influenced by the shutdown of the United States Steel Corp. - McDonald Mills during mid-1980. The difference in third quarter loadings (kg/day) and annual loadings (kg/day) during 1980 for segment 4 is largely attributable to the McDonald Mill shutdown. Segment 3 (RM 37.8 - 31.2) receives most of its pollutant loadings from the Republic Steel Corporation - Warren Plant and the Warren WWTP. Notable reductions in total suspended solids and oil and grease were observed in segment 3, where wastewater flows (69-72 MGD) have remained farily constant between 1974 and 1980. Segment 1 (RM 48. 5 - 42.6) does not receive any point source pollutant loadings and segment 6 (RM 12.8 - 0.8) receives only and insignificant amount from the Lowellville WWTP.

Municipal wastewater treatment within the Mahoning River study area was non-existent during the mid-1950's. This resulted in raw sewage being directly discharged into the Mahoning River and adjacent tributaires. Biochemical oxygen demand (5-day) loadings from 1952 to 1954 averaged 20,769 kg/day (Table 8). Currently, the Mahoning Valley Municipal Wastewater Treatment Plants provide primary treatment, with the exception of the Meander Creek WWTP, which is a secondary treatment facility with phosphorus removal capability. Small reductions in BOD_5 loadings between the early 1950's and 1974 was noted, and was attributed to the installation of primary wastewater treatment facilities. Little change in BOD_5 loadings has occurred for the Mahoning River with regard to municipal inputs between 1974 and 1980.

REFERENCES

Northeast Ohio Four County Regional Planning and Development Organization (NEFCO). 1979. Clean water plan revisions Part I and II. Report prepared for Ohio EPA.

Ohio Environmental Protection Agency. 1977-1980 (unpublished). Data available from Northeast District Office, Ohio EPA, Twinsburg, Ohio.

Ohio Environmental Protection Agency. Unpublished. Draft intensive biological and water quality survey of the Mahoning River. Ohio EPA. Central Office, Columbus, Ohio.

PART 3

Municipal entities in the Construction Grants Program are listed and the following information is provided: entity name, Facility and NPDES Permit numbers, receiving stream and river mile location, Grant Permit Number, Construction Grant Step, and treatment level.

Basin: Maumee (A)
Subbasin: St. Marys River (A-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Willshire	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		
Mendon	----------	-----	----------	------	----------	-	-------
	----------	---	----		----------		
Chickasaw	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		

Basin: Maumee (A)
Subbasin: St. Marys River (A-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Rockford	2PD00001001	Mercer	St. Marys River	------	C391430010	1	Adv. S.
	OH0022446AY	273	57.84		C391430020	2	
					C391430030	3	
St. Marys	2PD00026001	Auglaize	St. Marys River	------	----------	-	-------
	----------	310	98.60		----------		
New Bremen	2PB00034001	Auglaize	Unnamed Trib.	------	C391313020	4	Adv. W.
	OH0020346AY	345	2.50		----------	-	
Wren	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		

Basin: Maumee (A)
Subbasin: Little Auglaize(A-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Convoy	2PB00005001 OH0023493AY	Van Wert 203	North Creek 17.20	------	C391565020 C391565030	2 3	Adv. S.
Van Wert	2PD00006001 OH0027910AY	Van Wert 204	Town Creek 13.87	------	C391368020 C391368030	2 3	Adv. W.
Haviland	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Scott	---------- ----------	----- ---	---------- ----	------	---------- ----------	-	-------
Grover Hill	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Middlepoint	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Venedocia	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Little Auglaize (A-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Ohio City	2PB00030001 OH0023396AY	Van Wert 239	Long Prairie Crk 7.90	------	C391572010 C391572020 C391572030	1 2 3	Adv. S.

Basin: Maumee (A)
Subbasin: Headwaters Auglaize (A-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Delphos	2PD00029001 OH0024929AY	Van Wert 24	Jennings Creek 5.10	------	C390858050 ----------	4	Adv. W.
Wapakoneta	2PU00019001 OH0027952AY	Auglaize 312	Auglaize River 85.10	------	C391182050 ----------	4	Adv. S.
Spencerville	2PC00000001 OH0020087AY	Allen 276	Six Mile Creek 3.50	------	C391395020 C391395030	2 3	Adv. S.
Ft. Jennings	---------- ----------	-------- ---	---------- ----	------	---------- ----------	-	-------
Buckland	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Uniopolis	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Auglaize (A-2, A-3, A-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Payne	2PA00019001 OH0021326AY	Paulding 168	Flatrock Creek 25.07	------	C391330020 C391330030	2 3	Adv. S.
Paulding	2PD00027001 OH0020338AY	Paulding 134	Flatrock Creek 12.30	------	C391319020 C391319030	2 3	Adv. S.
Continental	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Latty	---------- ----------	--------- ---	-------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Ottawa (A-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Columbus Grove	2PC00004001 OH0024759AY	Putnam 208	Plum Creek 12.80	------	C391340010 C391340020 C391340030	1 2 3	Adv. S.
Elida	2PB00046001 OH0024996AY	Allen 242	Ottawa River 24.20	------	C391405020 C391405030	2 3	Adv. S.
Ada	2PB00050001 ----------	Hardin 245	Grass Creek 2.38	------	---------- ----------	-	-------
Indian Brook	2PG00018001 ----------	Allen 277	Kessler Run 2.70	------	---------- ----------	-	-------
Shawnee #2	2PK00002001 ----------	Allen 277	Ottawa River 32.50	------	---------- ----------	-	-------
Cridersville	2PB00048001 ----------	Allen 277	Unnamed Trib. 0.90	------	---------- ----------	-	-------
Lima	2PE00000001 OH0026069AY	Allen 277	Ottawa River 37.67	------	C391178020 C391178030	2 3	Adv. S.
Sharon Utilities	2PU00000001 ----------	Allen 277	Ottawa River 31.50	------	---------- ----------	4	-------
Kalida	---------- ----------	--------- ---	------------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Ottawa (A-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Gomer	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		
Cairo	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		

Basin: Maumee (A)
Subbasin: Blanchard River (A-5, A-6)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Findlay	2PD00008001	Hancock	Blanchard River	------	C391175020	2	Adv. S.
	OH0025135AY	176	56.95		C391175030	3	

Basin: Maumee (A)
Subbasin: Blanchard River (A-5, A-6)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Ottawa	2PD00028001 OH0026921AY	Putnam 173	Blanchard River 22.16	------	C391173020 C391173030	2 3	Adv. W.
Pandora	2PB00029001 OH0021148AY	Putnam 209	Riley Creek 5.35	------	C391338020 C391338030	2 3	Adv. S.
Forest	2PB00044001 OH0025151AY	Hardin 247	Unnamed Trib. 1.50	------	C391308020 C391308030	2 3	Adv. S.
Bluffton	2PC00005001 OH0020351AY	Allen 209	Riley Creek 15.40	------	C391312020	4	Adv. W.
Rawson	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Mt. Cory	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Mt. Blanchard	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Wharton	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Dunkirk	---------- ----------	----- ---	---------- ---	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Upper Maumee (A-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Hicksville	2PB00042001 OH0025771AY	Defiance 97	Mill Creek 2.00	------	C391192020 C391192030	2 3	Adv. S.
Defiance	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Cecil	---------- ----------	----- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Tiffin River (A-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
West Unity	2PB00021001 OH0020303AY	Williams 37	Walnut Run 3.75	------	C390995010 C390995020 C390995030	1 2 3	Adv. S.
Stryker	2PB00009001 OH0022497AY	Williams 37	Tiffin 33.95	------	C391269010 C391269020 C391269030	1 2 3	Adv. S.
Archbold	2PD00017001 OH0020796AY	Fulton 38	Brush Creek 13.90	------	C391183010 C391183020 C391183030	1 2 3	Adv. S.
Bryan	2PD00018001 OH0020532AY	Williams 64	Prairie Creek 10.80	------	C391152030 ----------	3	Adv. S.
Alvordton	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Ney	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Fayette	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: St. Joseph River (A-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Montpelier	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Edon	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Blakeslee	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Bad Creek-Defiance (A-10, A-12)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Delta	2PB00003001 OH0041823AY	Fulton 40	Bad Creek 13.85	------	C390860020 C390860030	2 3	Adv. S
Wauseon	2PD00016001 OH0023400AY	Huron 39	Unnamed Trib. 0.10	------	C390577020 C390577030	2 3	Adv. W.
Napoleon	2PD00000001 OH0020893AY	Henry 68	Maumee River 46.05	------	C390839020 C390839030	2 3	Adv. S.
Defiance	2PD00013001 pH0024500AY	Defiance 101	Maumee River 62.05	------	C390850030 ----------	3	Adv. S.
Hamler	2PB00043001 OH0021105AY	Henry 138	Turkeyfoot Crk. 21.40	------	C391406010 C391406020 C391406030	1 2 3	Adv. S.
Florida	---------- ----------	------- ---	---------- ----	------	---------- ----------	-	-------
Malinta	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
New Bavaria	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Maumee (A)
Subbasin: Beaver Creek/Maumee (A-11)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Leipsic	2PB00040001 OH0020326AY	Putnam 174	L. Yellow Creek 6.38	------	C391322020 C391322030	2 3	Adv. S.
Deshler	2PC00002001 OH0022471AY	Henry 139	Brush Creek 5.10	------	C391382020 C391382030	2 3	Adv. S.
McClure	---------- ----------	--------- ---	---------- ----	------	---------- ----------	 -	-------
Weston	---------- ----------	--------- ---	-------- ----	------	---------- ----------	-	-------
Milton Center	---------- ----------	----- ---	-------- ----	------	----------	-	-------

Basin: Maumee (A)
Subbasin: Beaver Creek/Maumee (A-11)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Custar	----------	---------	----------	------	----------	-	-------
	----------	---	----		----------		

Basin: Maumee (A)
Subbasin: Maumee (Waterville - Maumee Bay) (A-11, A-12)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permti #	Step	Treatment Level
Swanton	2PB00025001	Fulton	Ai Creek	------	C390989010	4	Adv. W.
	OH0020524AY	41	3.50		----------		
Perrysburg	2PA00043001	Wood	Maumee River	------	C390879020	2	Adv. S.
	OH0021008AY	43	18.22		C390879030	3	
					C390879050	3	
Toledo	2PF00000001	Lucas	Maumee River	------	C391095040	3	Adv. S.
	OH0027740AY	22	1.40		C391095050	3	

Basin: Maumee (A)
Subbasin: Ten Mile Creek (A-12)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Lyons	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Metamord	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------
Berkey	---------- ----------	--------- ---	---------- ----	------	---------- ----------	-	-------

Basin: Sandusky River (B)
Subbasin: Lake Erie Direct (B-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Sandusky	2PF00001001 OH0027332AY	Erie 79	Sandusky Bay 16.75	----------	C390883020 C390883030	2 3	Adv. S.
Clyde	2PD00004001 OH0024686AY	Sandusky 112	Raccoon Creek 11.10	----------	C391334020 C391334030	2 3	Adv. W.
Bellevue	2PD00037001 OH0020672AY	Erie 113	Snyder's Ditch 3.40	----------	C391362020 C391362030	2 3	Adv. S.

Basin: Sandusky River (B)
Subbasin: Muddy Creek (B-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Lindsey	---------- ----------	------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Portage (B)
Subbasin: Portage Mainstem and Muddy Creek Basin (B-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Port Clinton	2PD00014001 ----------	Portage 49	Portage River ----	----------	---------- ----------	-	Adv. S.
Woodville	2PB00052001 OH0020591AY	Sandusky 74	Portage River 27.60	----------	C391446010 C391446020 C391446030	1 2 3	Adv. S.
Elmore	2PB00051001 OH0021261AY	Ottawa 74	Portage River 22.00	----------	C391397010 C391397020 C391397030	1 2 3	Adv. S.
North Baltimore	2PB00033001 No Permit	Wood 141	Rocky Ford Creek 10.60	----------	C391561010 C391561020 C391561030	1 2 3	Adv. S.
Fostoria	2PD00031001 OH0052744AY OH0052744AY	Wood 143	East Branch Portage River 10.20	----------	C391317020 C391317030	2 3	Adv. S.

Basin: Portage (B)
Subbasin: Portage Mainstem and Muddy Creek Basin (B-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Oak Harbor	2PB00032001 OH0026841AY	Ottawa 47	Portage River 12.00	----------	C391349010 C391349020 C391349030	1 2 3	Adv. S.

Basin: Portage (B)
Subbasin: Lake Erie Tributaries Maumee Basin (B-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Harborview	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Oregon	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Walbridge	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Genoa	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Rocky Ridge	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Luckey	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Sandusky River (C)
Subbasin: Wolf Creek (C-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Bettsville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
New Riegel	----------	-------	----------	----------	----------	-	-------
	----------	---	----				

Basin: Sandusky River (C)
Subbasin: Tymochtee Creek (C-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Carey	2PD00038001 OH0020206AY	Wyandot 214	Unnamed Trib. 0.30	----------	C391524020 C391524030	2 3	Adv. W.

Basin: Sandusky River (C)
Subbasin: Headwaters Sandusky (C-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Nevada	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
N. Robinson	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Harpster	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Morral	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Sandusky River (C)
Subbasin: Headwaters Sandusky (C-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Crestline	2PC00006001 OH0020664AY	Crawford 253	Unnamed Trib. 0.50	----------	C391350010 C391350020 C391350030	1 2 3	Adv. W.
Bucyrus	2PD00012001 OH0052922AY	Crawford 252	Sandusky River 111.00	----------	C390827030	3	Adv. W.
Upper Sandusky	2PD00039001 OH0020001AY	Wyandot 249	Sandusky River 80.02	----------	C391511010 C391511020 C391511030	1 2 3	Adv. S.

Basin: Sandusky River (C)
Subbasin: Honey Creek (C-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Bloomville	2PB00053001 OH0021032AY	Seneca 181	Unnamed Trib. 0.40	----------	C391616010 C391616020 C391616030	1 2 3	Adv. S.
Attica	2PB00001001 OH0023957AY	Seneca 182	Unnamed Trib. 0.95	----------	C391614010 C391614020 C391614030	1 2 3	Adv. S.
N.W. Washington	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Tiro	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Sandusky River (C)
Subbasin: Mouth of Sandusky (C-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Lindsey	----------	Sandusky	Muddy Creek	----------	C391545020	2	Adv. S.
	OH0022489AY	75	15.05		C391545030	3	
Shorewood Village	2PW80001001	Sandusky	Sandusky River	----------	----------	-	-------
	----------	76	8.10		----------		
Fremont	2PD00007001	Sandusky	Sandusky River	----------	C391336020	2	Adv. S.
	OH0025291AY	111	13.85		C391336030	3	
Green Springs	2PB00026001	Sandusky	Flag Run	----------	C391607010	1	Adv. S.
	OH0022578AY	111	1.20		C391607020	2	
					C391607030	3	
Republic	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Tiffin	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Chatfield	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Huron (D)
Subbasin: Lake Erie Direct Huron and Vermillion Rivers (D-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Erie Co. E. Erie SD Sawmill Creek	2PB00056001 OH0029823AY	Erie 80	Sawmill Creek 0.20	----------	C390869050 C390869070	3 3	Adv. S.
Sawmill Lodge	2PG00000001 ----------	Erie 80	Sawmill Creek 0.70	----------	---------- ----------	-	-------
Mitiwanga-Ruggles Beach	2PH00011001 OH0053961AY	Erie 116	Cranberry Creek 0.23	----------	C391324020 C391324030	2 3	Adv. S.

Basin: Huron (D)
Subbasin: Huron (D-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Shiloh	2PB00017001 OH0027405AY	Richland 220	Unnamed Trib. 3.50	----------	C391648010 C391648020 C391648030	1 2 3	Adv. W.
Willard	2PD00005001 ----------	Huron 184	Unnamed Trib. 1.34	----------	---------- ----------	-	-------
Plymouth	2PB00014001 OH0027065AY	Huron 184	West Branch Huron River 40.55	----------	C391639010 C391639020 C391639030	1 2 3	Adv. S.
Monroeville	2PB00004001 OH0020095AY	Huron 149	West Branch Huron River 7.45	----------	C391562020 C391562030	2 3	Adv. S.

Basin: Huron (D)
Subbasin: Huron (D-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Milan	2PB00037001 OH0022641AY	Erie 115	Huron River 12.06	----------	C391399020 C391399030	2 3	Adv. S.
Norwalk	2PD00024001 OH0052604AY	Huron 115	Unnamed Trib. 2.35	----------	C391396020 C391396030	2 3	Adv. W.
Erie County, E. S.D.	2PC00001001 OH0029823AY	Erie 80	Huron River 0.80	----------	C390869050 C390869070	3 3	Adv. S.

Basin: Vermilion River (D-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
New London	2PB00058001 OH0020737AY	Huron 186	East Branch Vermilion River 14.20	----------	C391632020 C391632030	2 3	Adv. S.
Greenwich	2PB00059001 OH0020486AY	Huron 185	Southwest Branch Vermilion River 4.95	----------	C391649010 C391649020 C391649030	1 2 3	Adv. S.
Vermillion	2PD00032001 OH0023612AY	Erie 82	Vermilion River 1.00	----------	C391154040 C391154050	3 3	Adv. S.
Wakeman	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Savannah	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Black River (D)
Subbasin: Black River (D-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
French Creek	2PB00015001 ----------	Lorain 84	French Creek 3.23	----------	---------- ----------	-	-------
Elyria	2PD00034001 OH0025003AY	Lorain 84	Black River 10.65	----------	C390941020 C390941030	2 3	Adv. S.
Avon Lake	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Sheffield Lake	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Avon	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
North Ridgeville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Lorain	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Amherst	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
S. Amherst	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Black River (D)
Subbasin: Black River (D-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Oberlin	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Grafton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
LaGrange	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Wellington	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Lodi	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Rocky River (D)
Subbasin: Rocky River (D-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Rocky River	3PL00000001 ----------	Cuyahoga 86	Rocky River 0.40	----------	---------- ----------	-	-------
Lakewood	3PE00004001 OH0026018AY	Cuyahoga 86	Rocky River 1.76	----------	C391184040 ----------	3	Adv. W.
Brook Park	3PD00012001 ----------	Cuyahoga 86	Abrams Creek 3.70	----------	---------- ----------	-	-------
Berea	3PD00007001 ----------	Cuyahoga 86	East Branch Rocky River 3.20	----------	---------- ----------	-	-------

Basin: Rocky River (D)
Subbasin: Rocky River (D-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
North Olmstead	3PD00016001 OH0026778AY	Cuyahoga 85	Rocky River 11.39	----------	C391665030 ----------	3	Adv. S.
North Royalton	3PC00018001 OH0026824AY	Cuyahoga 121	Unnamed Trib. 1.09	----------	C391664020 C391664030	2 3	Adv. S.
Buckeye School District SD #9	3PG00036001 ----------	Medina 155	Mallet Creek 2.35	----------	---------- ----------	-	-------
Medina Co. SD #200	3PK00008001 ----------	Medina 156	Bradway Creek 0.50	----------	---------- ----------	-	-------
Bay Village	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Westlake	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Strongsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Cuyahoga (E)
Subbasin: Little Cuyahoga (E-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Akron	---------- ----------	--------- ---	---------- ----	--------	---------- ----------	-	-------
Tallmadge	---------- ----------	--------- ---	---------- ----	--------	---------- ----------	-	-------

Basin: Cuyahoga River (E)
Subbasin: Mouth Cuyahoga (E-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Macedonia	3PK00001001 ----------	Summit 123	Brandywine Creek 4.33	----------	---------- ----------	-	-------
Bedford	3PD00005001 OH0024040AY	Cuyahoga 123	Unnamed Trib. 0.50	----------	C391667020 C391667030	2 3	Adv. S.
Independance Pleasant Valley	3PA00019001 ----------	Cuyahoga 123	Unnamed Trib. 0.48	----------	---------- ----------	-	-------
Solon Central	3PD00019001 OH0027448AY	Cuyahoga 124	Unnamed Trib. 1.18	----------	C390795020 C390795030	2 3	Adv. S.
Twinsburg	3PD00039001 OH0027863AY	Summit 124	Tinkers Creek 15.65	----------	C391663020 C391663030	2 3	Adv. S.
Akron	3PF00000001 OH0023833AY	Summit 158	Cuyahoga River 37.45	----------	C390884098 C390884099 C390884040 C390884050	2 3 2 3	Adv. S.
Oakwood	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Broadview Heights	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Cuyahoga River (E)
Subbasin: Lake Erie (Cuyahoga-Chagrin) (E-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Euclid	3PE00003001 OH0031062AY	Cuyahoga 53	Lake Erie 1175.29	----------	C391167020 C391167030	2 3	Adv. S.
Timberlake	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Lakeline	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Eastlake	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Cleveland	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Cuyahoga River (E)
Subbasin: Mouth Cuyahoga (E-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Bedford Heights	3PD00006001 ----------	Cuyahoga 88	Tinker's Creek 7.78	----------	---------- ----------	-	-------
Brecksville SD #13	3PK00005001 ----------	Cuyahoga 123	Cuyahoga River 20.55	----------	---------- ----------	-	-------

Basin: Chagrin River (E)
Subbasin: Chagrin River (E-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Willoughby - Eastlake	3PD00024001 OH0031097AY	Lake 26	Unnamed Lake 0.50	----------	C390803020 C390803030	2 3	Adv. S.
Willoughby	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Chagrin River (E)
Subbasin: Chagrin River (E-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Kirtland						-	
Waite Hill						-	
Willoughby Hills						-	
Chardon						-	
Moreland Hills						-	
S. Russell						-	
Chagrin Falls						-	
Bentleyville						-	
Solon						-	

Basin: Chagrin River (E)
Subbasin: Chagrin River (E-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Aurora	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Burton	3PA00001001	Geauga	Cuyahoga River	----------	C390716020	2	Adv. S.
	OH0021580AY	91	82.55		C390716030	3	
Kent	3PD00031001	Portage	Cuyahoga River	----------	----------	-	-------
	----------	160	53.85		----------		
Mantua	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Ravenna	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Hartville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Grand River Basin (F)
Subbasin: Grand River (F-1, F-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Jefferson	3PC00021001 OH0025887AY	Ashtabula 31	Unnamed Trib. 1.65	----------	C391379010 C391379020 C391379030	1 2 3	Adv. S.
Lakeside Utilities	3PU00005001 ----------	Ashtabula 31	Rock Creek 2.60	----------	---------- ----------	-	-------
Orwell	3PB00041001 OH0026913AY	Ashtabula 58	Unnamed Trib. 2.00	----------	C390975020 C390975030	2 3	Adv. S.
Fairport Harbor	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Perry	---------- ----------	----- ---	---------- ----	----------	----------	-	-------
Rock Creek	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Chardon	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
West Farmington	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Ashtabula (F)
Subbasin: Ashtabula (F-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Conneaut	3PD00002001 OH0024767AY	Ashtabula 3	Conneaut Creek 0.30	---	C391197020 C391197030	2 3	Adv. S.
Geneva on the Lake	3PC00020001 ---	Ashtabula 7	Lake Erie 0.18	---	--- ---	-	---
Ashtabula	--- ---	--- ---	--- ---	---	--- ---	-	---
N. Kingsville	--- ---	--- ---	--- ---	---	--- ---	-	---

Basin: Ashtabula (F)
Subbasin: Ashtabula (F-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Geneva	3PD00000001 ---	Ashtabula 7	Cowles Creek 4.57	---	--- ---	-	---

Basin: Wabash River (G)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Celina	2PD00033001 ----------	Mercer 309	Beaver Creek 10.38	----------	---------- ----------	-	-------
St. Henry	2PB00027001 OH0020028AY	Mercer 343	Coldwater Creek 9.27	----------	C391571020 C391571030	2 3	Adv. S.
Ft. Recovery	2PA00030001 OH0025160AY	Mercer 342	Wabash River 482.00	----------	C391645010 C391645020 C391645030	1 2 3	Adv. S.
Coldwater	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Southmoor Shores	2PA00008001 ----------	--------- ---	Grand Lake 18.30	----------	---------- ----------	-	-------

Basin: Great Miami River (H)
Subbasin: Great Miami Headwaters (H-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Waynesfield	2PB00022001 OH0028029AY	Auglaize 314	Unnamed Trib. 2.29	----------	C391558010 C391558020 C391558030	1 2 3	Adv. S.
Russells Point	1PK00002001 ----------	Logan 349	Great Miami 157.95	----------	---------- ----------	-	-------
Jackson Center	1PB00018001 OH0025861AY	Shelby 348	Jackson Center 2.30	----------	C391377020 C391377030	2 3	Adv. S.
Quincy	1PB00036001 OH0035882AY	Logan 384	Great Miami 143.05	----------	C391729010 ----------	1	Adv. S.
Bellfontaine	1PD00000001 OH0024066AY	Logan 385	Oppossum Run 0.50	----------	C391219020 C391219030	2 3	Adv. W.

Basin: Great Miami River (H)
Subbasin: Great Miami Headwaters (H-1, H-2, H-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Botkins	1PB00007001 OH0022217AY	Shelby 347	Loramie Creek 35.42	----------	C391385020 C391385030	2 3	Adv. W.
Anna	1PB00004001 OH0023370AY	Shelby 347	Clay Creek 4.55	----------	C391311020 C391311030	2 3	Adv. S.
Sidney	1PD00009001 OH0027421AY	Shelby 382	Great Miami 128.63	----------	C390831030 ----------	3	Adv. S.
West Lake Village	1PV00006001 ----------	Shelby 381	Lake Loramie 22.91	----------	---------- ----------	-	-------
Minster	2PB00036001 ----------	Auglaize 345	Miami-Erie Canal 1.74	----------	---------- ----------	-	-------
Piqua	1PD00008001 OH0027049AY	Miami 417	Great Miami 114.15	----------	C391153040 C391153060	3 3	Adv. S.
Troy	1PD00019001 OH0047228AY	Miami 451	Great Miami 105.67	----------	C391180020 C391180030	2 3	Adv. S.
Tipp City	1PC00008001 OH0049646AY	Miami 485	Unnamed Trib. 1.70	----------	C390896020 C390896030	2 3	Adv. S.
Vandalia	1PD00012001 OH0049646AY	Montgomery 485	Great Miami 94.20	----------	C390922020 C390922030	2 3	Adv. S.

Basin: Great Miami River (H)
Subbasin: Great Miami Headwaters (H-1, H-2, H-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Ohio Suburban	1PS00000001 ----------	Montgomery 519	Great Miami 87.45	----------	---------- ----------	-	-------
New Carlisle	1PD00018001 OH0020044AY	Clark 486	Honey Creek 8.72	----------	C391000010 ----------	3	Adv. W.
Monnin Estates	1PG00058001 ----------	Miami 417	Rush Creek 2.45	----------	---------- ----------	-	-------
Belle Center	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Huntsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Christianburg	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Russia	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Mad River (H-3, H-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Park Layne	1PJ00003001 ----------	Clark 486	Mud Creek 3.15	----------	---------- ----------	-	-------
Green Meadows	1PH00002001 ----------	Clark 521	Mad River 5.62	----------	---------- ----------	-	-------
Fairborn	1PD00002001 OH0025062AY	Montgomery 520	Mad River 9.62	----------	C391174020 C391174030	2 3	Adv. S.
Springfield	1PE00007001 OH0027481AY	Clark 488	Mad River 25.58	----------	C390986020 C390986030	2 3	Adv. S.
Catawba	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
S. Vienna	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
N. Hampton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Mad River (H-3, H-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
West Liberty	1PC00012001 OH0022098AY	Logan 420	Unnamed Trib. 0.20	----------	C391372010 C391372020 C391372030	1 2 3	Adv. W.
Urbana	1PD00011001 ----------	Champaign 454	Dugan Run 0.75	----------	---------- ----------	-	-------
St. Paris	1PB00029001 OH0021806AY	Champaign 419	Unnamed Trib. 2.90	----------	C391371020 C391371030	2 3	Adv. S.
Northridge	1PJ00002001 ----------	Clark 488	Kenton Creek 3.08	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Stillwater River (H-6, H-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Ansonia	1PB00005001 OH0023884AY	Darke 413	North Fork Stillwater 0.20	----------	C391380010 C391380020 C391380030	1 2 3	Adv. S.
Union City	1PB00031001 ----------	Darke 412	Dismal Creek 3.85	----------	---------- ----------	-	-------
Bradford	1PB00008001 OH0020192AY	Miami 415	Ballinger Run 1.30	----------	C391363020 C391363030	2 3	Adv. W.
Pleasant Hill	1PB00026001 ----------	Miami 450	Stillwater River 26.24	----------	---------- ----------	-	-------
Covington	1PB00013001 ----------	Miami 450	Stillwater River 32.20	----------	---------- ----------	-	-------
Greenville	1PD00005001 OH0025429AY	Darke 448	Greenville Creek 19.35	----------	C390887050 ----------	3	Adv. W.
Pitsburg	1PT00007001 ----------	Darke 483	Unnamed Trib. 0.51	----------	---------- ----------	-	-------
West Milton	1PC00011001 OH0021857AY	Miami 484	Stillwater River 16.57	----------	C391353020 C391353030	2 3	Adv. S.
Union Village	1PB00061001 No Permit	Montgomery 484	Stillwater River via ditch 11.74	----------	C390726020 C390726030	2 3	Adv. S.

Basin: Great Miami (H)
Subbasin: Stillwater River (H-6, H-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Englewood	1PD00001001 OH0025011AY	Montgomery 518	Stillwater River 8.86	----------	C390904020 C390904030	2 3	Adv. S.
Gettysburg	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Arcanum	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Stillwater River (H-6, H-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Versailles	1PB00033001 No Permit	Darke 415	Swamp Creek 2.12	----------	C391239020 ----------	2 3	Adv. S.
Rolin Acres	1PW0000G001 ----------	Darke 414	Boyd Creek 1.53	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Twin Creek (H-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Eldorado	1PA00014001 ----------	Preble 481	Price Creek 13.34	----------	---------- ----------	-	-------
Lewisburg	1PB00019001 OH0042005Ay	Montgomery 516	Twin Creek 35.20	----------	C391202010 C391202020 C391202030	1 2 3	Adv. S.
W. Alexandria	1PB00035001 No Permit	Preble 549	Twin Creek 26.82	----------	C391203010 C391203020 C391203030	1 2 3	Adv. S.
Farmersville	1PB00010001 OH0020770AY	Montgomery 550	Unnamed Trib. 0.45	----------	C390874020 C390874030	2 3	Adv. S.
Germantown	1PB00016001 ----------	Montgomery 584	Twin Creek 6.62	----------	---------- ----------	-	-------
Verona	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Indian Creek (H-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Proposed Clayton	1PB00040001 No Permit	Montgomery 518	North Branch Wolf Creek 6.22	----------	C390833020 C390833030	2 3	Adv. W.
Brookville Lake Estates	1PV00035001 ----------	Montgomery 517	Unnamed Trib. 0.46	----------	---------- ----------	-	-------
Brookville	1PC00000001 ----------	Montgomery 517	Wolf Creek 14.93	---------	C391691020 C391691030	2 3	Adv. W.
New Lebanon	1PB00021001 OH0026697AY	Montgomery 550	Bear Creek 10.43	---------	C3914560201 C391456030	2 3	Adv. W.
Moraine	1PK00004001 ----------	Montgomery 552	Great Miami 73.69	---------	---------- ----------	-	-------
Payton	1IC00028001 ----------	Montgomery 552	Great Miami 76.12	---------	---------- ----------	-	-------
W. Carrollton	1PD00014001 OH0020133AY	Montgomery 551	Great Miami 68.85	---------	C391004020 C391004030	2 3	Adv. S.
Montgomery Reg. W.	1PL00002001 No Permit	Montgomery 551	Great Miami 71.49	---------	C390702030 ----------	3	-------
Franklin Reg.	1PD00004001 ----------	Warren 584	Great Miami 59.65	---------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Indian Creek (H-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Sycamore Creek	2PB00000001 ----------	Warren 585	Unnamed Trib. 1.98	---------	---------- ----------	-	-------
Garden Manor	1PT00022001 ----------	Butler 615	Dicks Creek 0.44	---------	---------- ----------	-	-------
Monroe	1PB00020001 ----------	Butler 616	Millers Creek 1.13	---------	---------- ----------	-	-------
Lesourdsville Reg.	1PK00011001 ----------	Butler 615	Great Miami 45.65	---------	---------- ----------	-	-------
Lesourdsville Lake	1PR00043001 ----------	Butler 615	Gregory Creek 0.15	---------	---------- ----------	-	-------
Lesourdsville Valley	1PV00016001 ----------	Butler 615	Gregory Creek 0.43	---------	---------- ----------	-	-------
Middletown	1PE00003001 OH0026522AY	Butler 615	Great Miami 48.18	---------	C390944020 C390944030	2 3	Adv. S.
Alamo Heights	1PG00045001 ----------	Butler 614	Two Mile Creek 3.85	---------	---------- ----------	-	-------
Queen Acres	1PG00043001 ----------	Butler 613	Unnamed Trib. 0.10	---------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Indian Creek (H-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Fairfield	1PD00003001 ----------	Butler 645	Great Miami 0.32	---------- ----------	---------- ----------	-	-------
Hamilton	1PE00002001 OH0010588AY	Butler 645	Great Miami 34.00	---------- ----------	C390701030 ----------	3	Adv. S.
Miamisburg	1PD00017001 OH0026492AY	Montgomery 584	Great Miami 65.05	---------- ----------	C391103020 ----------	3	Adv. S.
Dayton	---------- ----------	--------- ---	---------- ----	---------- ----------	---------- ----------	-	-------
Carlisle	---------- ----------	--------- ---	---------- ----	---------- ----------	---------- ----------	-	-------

Basin: Great Miami (H)
Subbasin: Four Mile/Seven Mile Creek (H-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Eaton	1PC00001001 ----------	Preble 548	Seven Mile Creek 25.17	----------	---------- ----------	-	-------
Lake Lakengren	1PJ00009001 ----------	Preble 548	Sugar Run 0.19	----------	---------- ----------	-	-------
Greenview	1PG00014001 ----------	Butler 614	No D/C, Unnamed Trib. 0.69	----------	---------- ----------	-	-------
Oxford	1PD00007001 OH0026930AY	Butler 613	Four Mile Creek 16.30	----------	C390932030 ----------	3	Adv. S.
Woodland Terrace	1PG00044001 ----------	Butler 581	Unnamed Trib. 0.94	----------	---------- ----------	-	-------
New Miami	1PB00023001 ----------	Butler 614	Unnamed Trib. 0.21	----------	---------- ----------	-	-------
Camden	1PB00009001 OH0024317AY	Preble 581	Seven Mile Creek 15.52	----------	C390997020 C390997030	2 3	Adv. W.
New Paris	1PB00024001 OH0021113AY	Preble 514	Whitewater River 40.43	----------	C391141020 C391141030	2 3	Adv. S.

Basin: Great Miami (H)
Subbasin: Mouth, Great Miami (H-11)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Oakview Estates	1PG00028001 ----------	Hamilton 674	Unnamed Trib. 3.09	----------	---------- ----------	-	-------

Basin: Mill Creek (J)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Morris Hill	1PH00016001	Butler	Mill Creek	----------	----------	-	-------
	----------	646	25.30		----------		
Lakota Heights	1PT00006001	Butler	Unnamed Trib.	----------	----------	-	-------
	----------	646	0.74		----------		

Basin: Mill Creek (J)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Brookside Estates	1PH00015001	Butler	East Fork	----------	----------	-	-------
	----------	647	6.27		----------		
Cincinnati	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Mill Creek (J)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Mill Run Farms	1PG00048001 ----------	Butler 646	Unnamed Trib. 2.38	----------	---------- ----------	-	-------
Beckett Ridge	1PH00020001 ----------	Butler 646	Unnamed Trib. 0.86	----------	---------- ----------	-	-------
Glendale	1PB00012001 No Permit	Hamilton 646	Unnamed Trib. 0.92	----------	C390849020 C390849030	2 3	Adv. S.
Westchester Woods	1PH00017001 ----------	Butler 646	Unnamed Trib. 1.69	----------	---------- ----------	-	-------
S.W. Union Township	1PH00018001 ----------	Butler 646	Mill Creek 22.20	----------	---------- ----------	-	-------
Rolling Knolls	1PG00052001 ----------	Butler 646	Unnamed Trib. 0.60	----------	---------- ----------	-	-------
Highland Greens	1PH00003001 ----------	Butler 646	Unnamed Trib. 0.50	----------	---------- ----------	-	-------
Northeast Knolls	1PG00037001 ----------	Hamilton 647	Unnamed Trib. 0.92	----------	---------- ----------	-	-------
The Woods	1PG00054001 ----------	Butler 647	Sharon Creek 5.24	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: Little Miami River (K-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Beaver Creek	1PK00003001	Greene	Beaver Creek	----------	----------	-	-------
	----------	553	0.40		----------		
Bellbrook	1PA00002001	Greene	Little Miami	----------	----------	-	-------
	----------	553	67.57		----------		
Sugar Creek Regional	1PK00014001	Greene	Little Miami	----------	----------	-	-------
	----------	586	64.43		----------		
Academy Heights	1PT00001001	Greene	Little Sugar Crk.	----------	----------	-	-------
	----------	553	0.57		----------		
Waynesville	1PB00032001	Warren	Little Miami	----------	----------	-	-------
	----------	586	54.30		----------		
Glady Run	1PD00016001	Greene	Glady Run	----------	----------	-	-------
	----------	554	4.93		----------		
Ford Road	1PD00015001	Greene	Little Miami	----------	----------	-	-------
	----------	554	77.05		----------		
Winterhaven	1PG00035001	Greene	Sugar Creek	----------	----------	-	-------
	----------	553	3.95		----------		
Xenia	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Little Miami River (K)
Subbasin: Upper Little Miami (K-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
S. Charleston	1PB00028001 OH0025879AY	Clark 523	Gilroy Ditch 1.40	----------	C391447010 C391447020 C391447030	1 2 3	Adv. S.
Yellow Springs	1PC00013001 OH0028215AY	Greene 521	Yel. Springs Crk. 0.44	----------	C391404020 C391404030	2 3	Adv. S.
Cedarville	1PB00006001 OH0020010AY	Greene 555	Massies Creek 9.03	----------	C391307010 C391307020 C391307030	1 2 3	Adv. S.
Central State	1PT00034001 ----------	Greene 554	Massies Creek 4.60	----------	---------- ----------	-	-------
Montgomery County East Regional	1PL00001001 No Permit	Greene 553	Little Beaver 4.58	----------	C391195020 C391195030	2 3	Adv. S.

Basin: Little Miami River (K)
Subbasin: Caesar Creek (K-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Jamestown	1PB00015001 OH0025879AY	Greene 556	S. Branch Caesar Creek 9.00	----------	C391444010 C391444020 C391444030	1 2 3	Adv. S.
Bowersville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: Todd Fork, Little Miami (K-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Wilmington	1PD00013001 OH0028134AY	Clinton 620	Unnamed Trib. 6.90	----------	C391238020 C391238030	2 3	Adv. W.
Blanchester	1PB00003001 No Permit	Clinton 650	Second Creek 10.10	----------	C391200020 C391200030	2 3	Adv. W.
Morrow Plaza	1PR00031001 ----------	Warren 648	Little Miami 38.60	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: East Fork Little Miami River (K-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Orchard Lake	1PV00009001 ----------	Clermont 676	Unnamed Trib. 2.80	----------	---------- ----------	-	-------
Milford	1PC00005001 OH0020451AY	Clermont 676	E. Fork, L. Miami 1.51	----------	C391327020 C391327030	2 3	Adv. S.
Lower E. Fork Reg.	1PK00009001 OH0020451AY	Clermont 676	E. Fork, L. Miami 5.00	----------	---------- ----------	-	-------
Pleasant Hill	1PB00026001 ----------	Clermont 677	Sugarcamp Run 3.20	----------	---------- ----------	-	-------
Stonelick Creek	1PH00012001 ----------	Clermont 677	Stonelick Creek 5.00	----------	---------- ----------	-	-------
Monterey Estates	1PV00029001 ----------	Clark 704	Patterson Run 3.00	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: East Fork Little Miami River (K-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Williamsburg	1PB00034001 ----------	Clark 704	E. Fork, L. Miami 35.25	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: East Fork Little Miami River (K-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Batavia	1PB00001001	Clermont	E. Fork, L. Miami	----------	----------	-	-------
	----------	703	13.50		----------		
Amelia	1PK00010001	Clermont	E. Fork, L. Miami	----------	----------	-	-------
	----------	703	12.60		----------		
Shayler Run	1PJ00004001	Clermont	Shayler Run	----------	----------	-	-------
	----------	703	4.06		----------		
Bethel	1PB00002001	Clermont	Town Run	----------	----------	-	-------
	----------	726	1.37		----------		
Stonelick Park	1PH00012001	Clermont	Stonelick Creek	----------	----------	-	-------
	----------	678	16.32		----------		
St. Martin	OPA00008001	Brown	Solomon Run	----------	----------	-	-------
	----------	679	3.30		----------		
Fayetteville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Owensville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Amelia	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Little Miami River (K)
Subbasin: East Fork Little Miami River (K-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
New Richmond	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Hamersville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Little Miami River (K)
Subbasin: Lower Little Miami River (K-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Lebanon	1PC00003001	Warren	Turtle Creek	----------	C390927040	4	Adv. S.
	No Permit	617	6.19		----------		
Camp Fire-Fly	1PR00068001	Warren	Little Miami	----------	----------	-	-------
	----------	618	44.33		----------		
S. Lebanon	1PK00012001	Warren	Dry Run	----------	C390837010	2	Adv. S.
	OH0027456AY	648	0.30		C390837020	3	
Mason	1PC00004001	Warren	Muddy Creek	----------	C391245050	2	Adv. S.
	OH0020494AY	647	3.25		C391245050	3	
Kings Mills	1PG00051001	Warren	Little Miami R.	----------	----------	-	-------
	----------	648	31.80		----------		

Basin: Little Miami River (K)
Subbasin: Lower Little Miami River (K-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Morrow Plaza	1PR00031001 ----------	Warren 648	Little Miami R. 38.60	----------	---------- ----------	-	-------
London Farms	1PH00019001 ----------	Warren 648	Bear Run 0.42	----------	----------	-	-------
Loveland/Kemper Road	1PD00006001 OH0026191AY	Hamilton 647	Little Miami 21.80	----------	C391423020 C391423030	2 3	Adv. S.
Loveland/Harper Avenue	1PB00017001 ----------	Hamilton 647	Little Miami 24.20	----------	---------- ----------	-	-------
Hopewell Meadows	1PG00060001 ----------	Hamilton 647	Unnamed Trib. 0.20	----------	---------- ----------	-	-------
Arrowhead Park	1PH00014001 ----------	Hamilton/ Clermont 676	Little Miami 21.00	----------	----------	-	-------
Indian Lookout	1PG00041001 ----------	Clermont 676	Unnamed Trib. 1.00	----------	---------- ----------	-	-------
Millwood	1PG00022001 ----------	Hamilton 676	Unnamed Trib. 0.28	----------	---------- ----------	-	-------
Sycamore Creek	1PK00005001 ----------	Hamilton 676	Sycamore Creek 0.30	----------	---------- ----------	-	-------

Basin: Little Miami River (K)
Subbasin: Lower Little Miami River (K-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Wayside Hills	1PG00032001	Hamilton 701	Unnamed Trib. 1.95	----------	----------	-	-------
Dry Run	1PH00000001	Hamilton 702	Unnamed Trib. 0.60	----------	----------	-	-------
Riverview Subdivision	1PG00062001	Hamilton 702	Unnamed Trib. 0.21	----------	----------	-	-------
Washington Hills	1PG00030001	Hamilton 702	Unnamed Trib. 0.36	----------	----------	-	-------
Oak Knolls Estates	1PG00040001	Clermont 648	Unnamed Trib. 0.20	----------	----------	-	-------
Paxton Woods	1PG00065001	Clermont 648	Unnamed Trib. 0.54	----------	----------	-	-------
O'Bannon Creek Regional	1PK00017001	Clermont 648	O'Bannon Creek 1.70	----------	----------	-	-------
Montgomery	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Milford	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Southwest Ohio River Tributaries (K)
Subbasin: S. W. Tributaries (Whiteoak/Little Miami) (K-6)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
New Richmond	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Moscow	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Felicity	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Higginsport	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southwest Ohio River Tributaries (K)
Subbasin: S. W. Tributaries (Whiteoak/Little Miami) (K-6)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Martinsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southwest Ohio River Tributaries (L)
Subbasin: Whiteoak Creek (L-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Mt. Orab	OPB00027001 OH0031488AY	Brown 705	Sterling Run 5.35	----------	C391505010 C391505020	1 4	Adv. S.
Georgetown	OPB00016001 OH0008800AY	Brown 747	Town Run 0.83	----------	C391445010 C391445020	1 4	Adv. S.
Sardinia	---------- ----------	--------- ---	---------- -----	----------	---------- ----------	-	-------

Basin: Southwest Ohio River Tributaries (L)
Subbasin: Ohio Brush Creek/S.W. Ohio Tributaries (L-1, L-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Winchester	OPB00050001 OH0028142AY	Adams 729	Elk Fork 2.83	----------	C391608010 C391608020	1 4	Adv. S.
Seaman	OPC00016001 OH0027341AY	Adams 730	Unnamed Trib. 0.70	----------	C391525010 ----------	1	Adv. S.

Basin: Southwest Ohio River Tributaries (L)
Subbasin: S.W. Tributaries (Brush-Whiteoak) (L-1, L-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Manchester	OPB00024001 OH0020842AY	Adams 765	Ohio River 583.71	----------	C391633010 C391633020	1 4	Adv. S.
Russellville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southwest Ohio River Tributaries (L)
Subbasin: S.W. Tributaries (Brush-Whiteoak) (L-1, L-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Ripley	OPB00036001 OH0020966AY	Adams 763	Ohio River 564.30	----------	C391642010 C391642020	1 4	Adv. S.
Aberdeen	OPB00000001 OH0023825AY	Adams 763	Ohio River 572.56	----------	C391628020 ----------	4	Adv. S.

Basin: Southwest Ohio River Tributaries (L)
Subbasin: Ohio Brush Creek/S.W. Ohio Tributaries (L-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Peebles	OPB00030001 OH0026964AY	Adams 731	Shimer Run 2.20	----------	C391515020 ----------	4	Adv. S.
West Union	OPB00049001 ----------	Adams 750	Beasley Fork 6.65	----------	---------- ----------	-	-------

Basin: Upper Scioto (M)
Subbasin: Upper Scioto Headwaters (M-1, M-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Alger						-	
Larue						-	
Mt. Victory						-	
Ridgeway						-	
Green Camp						-	
West Mansfield						-	
Dublin						-	

Basin: Upper Scioto (M)
Subbasin: Upper Scioto Headwaters (M-1, M-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
McGuffy	2PA00006001 ----------	Hardin 280	Cottonwood Ditch 1.10	----------	---------- ----------	-	-------
Kenton	2PD00020001 OH0025925Ay	Hardin 282	Scioto River 211.40	----------	C391325020 C391325030	2 3	Adv. S.
New Bloomington	2PA00065001 OH0054038AY	Marion 319	Unnamed Trib. 0.85	----------	C390800020 C390800030	2 3	Adv. S.
Marion	2PD00011001 OH0026352AY	Marion 320	Little Scioto 6.39	----------	C391344020 C391344030	2 3	Adv. W.
Rushsylvania	1PB00025001 OH0020575AY	Logan 351	Rush Creek 37.10	----------	C391501010 C391501020	1 2	Adv. S.
Marysville	4PC00002001 ----------	Union 424	Mill Creek 18.26	----------	C391735010 C391735020	2 3	Adv. S.
Scioto Village	4PP80000001 ----------	Delaware 425	Oshaughnessy 151.40	----------	---------- ----------	-	-------
Sunbury	4PB00010001 OH0030686AY	Delaware 428	Prairie Run 0.30	----------	C390934020 C390934030	2 3	Adv. S.
Richwood	4PB00018001 OH0027260AY	Union 354	Fulton Creek 9.60	----------	C391348020 C391348030	2 3	Adv. S.

Basin: Upper Scioto (M)
Subbasin: Olentangy River (M-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Marion #7	2PJ00002001 ----------	Marion 321	Grave Creek 3.16	----------	---------- ----------	-	-------
Mt. Gilead	2PB00035001 OH0020362AY	Morrow 323	Whetstone Creek 21.70	----------	C390954030 ----------	4	Adv. S.
Delaware	4PD00004001 OH0024911AY	Delaware 391	Olentangy River 24.85	----------	C390981020 C390981030	2 3	Adv. S.
Worthington Hills	4PH00001001 ----------	Franklin 460	Olentangy River 12.4	----------	---------- ----------	-	-------
Fountain Place	2PG00035001 ----------	Marion 321	Qu Qua Creek 5.50	----------	---------- ----------	-	-------
Caledonia	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------
Edison	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------
Waldo	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Upper Scioto (M)
Subbasin: Olentangy River (M-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Galion	2PD00030001 OH0025313AY	Crawford 288	Olentangy 86.20	----------	C391331030 ----------	3	Adv. W.

Basin: Upper Scioto (M)
Subbasin: Big Walnut/Alum Creek (M-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Minerva Park	4PB00014001 ----------	Franklin 461	Unnamed Trib. 0.90	----------	---------- ----------	-	-------
Fulton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Marengo	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
New Albany	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Big Walnut/Alum Creek (M-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Sunbury	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Huber Ridge	4PV00000001	Warren	Alum Creek	----------	----------	-	-------
	----------	461	17.50		----------		
Blacklick Estates	4PU00002001	Franklin	Blacklick Creek	----------	----------	-	-------
	----------	496	4.85		----------		
Reynoldsburg	4PD00005001	Franklin	Blacklick Creek	----------	----------	-	-------
	----------	496	13.30		----------		
Fairfield Co. (Chevington Woods)	4PH00009001	Fairfield	Unnamed Trib.	----------	----------	-	-------
	----------	496	2.70		----------		

Basin: Lower Scioto (M)
Subbasin: Big Darby (M-6, M-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Mechanicsburg	1PB00037001 OH0022209AY	Champaign 456	Little Darby 39.20	----------	C391420020 C391420030	2 3	Adv. S.
North Lewisburg	1PB00039001 OH0023582AY	Champaign 422	Spain Creek 1.50	----------	C391439010 C391439020 C391439030	1 2 3	Adv. S.
Timberbrook Estates	4PH00002001 ----------	Franklin 458	Unnamed Ditch 3.00	----------	---------- ----------	-	-------
Plain City	4PB00016001 ----------	Madison 458	Big Darby Creek 52.10	----------	---------- ----------	-	-------
West Jefferson	4PB00024001 OH0054321AY	Madison 492	Little Darby Crk 5.30	----------	C391156020 C391156030	2 3	Adv. S.
Oakhurst Knolls	4PH00000001 ----------	Franklin 493	Hellbranch Run 5.82	----------	---------- ----------	-	-------
Quail Hollow	4PH00004001 ----------	Franklin 493	Hellbranch Run 9.10	----------	---------- ----------	-	-------
Lake Darby Estates	4PU00001001 ----------	Franklin 493	Big Darby Creek 39.75	----------	---------- ----------	-	-------
Pickaway Co. 5D #2	4PG00140001 ----------	Pickaway 527	Spring Creek 1.54	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Big Darby (M-6, M-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
New California	4PG00010001	Union	Sugar Run	----------	----------	-	-------
	----------	425	1.09		----------		
Milford Center	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Upper Scioto (M)
Subbasin: Upper Scioto Mainstem (M-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Columbus South	4PF00001001	Franklin	Scioto River	----------	C391718020	3	Adv. W.
	OH0024741AY	528	118.40		----------		
Jackson Pike	4PF00000001	Franklin	Scioto River	----------	----------	-	-------
	----------	494	127.10		----------		
Columbus	----------	---------	----------	----------	----------		-------
	----------	---	----		----------	-	
Grove City	----------	---------	--------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Upper Scioto (M)
Subbasin: Upper Scioto Mainstem (M-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
West Grove	4PA00007001	Franklin	Unnamed Trib.	----------	----------	-	-------
	----------	494	5.73		----------		
Commercial Point	4PB00029001	Pickaway	Grove Run	----------	----------	-	-------
	----------	528	3.20		----------		
Indian Trails	4PW80001001	Franklin	Unnamed Trib.	----------	----------	-	-------
	----------	528	1.94		----------		

Basin: Upper Scioto (M)
Subbasin: Walnut Creek (M-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Fairfield Co. (Huntington Hills)	4PG00027001	Fairfield	Sycamore Creek	----------	----------	-	-------
	----------	497	8.90		----------		
Pickerington	4PB00017001	Fairfield	Sycamore Creek	----------	----------	-	-------
	----------	496	4.50		----------		
Franklin Truro SD#1 Groveport	4PG00016001	Franklin	Walnut Creek	----------	C391217010	1	Adv. S.
	OH0041696AY	529	18.90		C391217020	2	
					C391217030	3	

Basin: Upper Scioto (M)
Subbasin: Walnut Creek (M-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Canal Winchester	4PB00012001 OH0021491AY	Franklin 530	Walnut Creek 24.20	----------	C391171020 C391171030	2 3	Adv. S.
Jefferson Woods	4PG00026001 ----------	Fairfield 530	Sycamore Creek 1.00	----------	---------- ----------	-	-------
Baltimore	4PB00011001 OH0023990AY	Fairfield 531	Walnut Creek 40.04	----------	C391176030 ----------	3	Adv. S.
Ashville	4PC00005001 OH0054445AY	Pickaway 562	Walnut Creek 4.43	----------	C391302020 C391302030	2 3	Adv. W.
Carroll	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
S. Bloomfield	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Lower Scioto Mainstem (M-11)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Circleville	4PD00003001 OH0024465AY	Pickaway 595	Scioto River 99.20	----------	C391384020 C391384030	2 3	Adv. S.
Circle Hill	4PG00013001 ----------	Pickaway 595	Hominy Creek 1.27	----------	---------- ----------	-	-------
Knollwood Village	4PG00025001 ----------	Pickaway 595	Hargus Creek 4.22	----------	---------- ----------	-	-------
Chillicothe Easterly	OPD00003001 ----------	Ross 658	Scioto River 68.10	----------	---------- ----------	-	-------
Chillicothe C 1	OPP00003001 OH0024406AY	Ross 658	Scioto River 72.40	----------	C391159020 ----------	4	Adv. S.
Piketon	OPB00031001 OH0027031AY	Pike 712	Scioto River 30.80	----------	C391610010 C391610020	1 4	Adv. S.
Towpath	OPU00005001 ----------	Pike 712	Crooked Creek 0.40	----------	---------- ----------	-	-------
Waverly	OPC00011001 ----------	Pike 713	Scioto River 39.08	----------	---------- ----------	-	-------
Rosemont	OPH00001001 ----------	Scioto 755	Scioto River 4.80	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Salt Creek (M-10, M-16)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Adelphi	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Sugar Grove	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Lower Scioto (M)
Subbasin: Salt Creek (M-10, M-16)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Coalton	----------	-----	----------	----------	----------	-	-------
	----------	---	----		----------		
Jackson	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Lower Scioto (M)
Subbasin: Lower Scioto Mainstem (M-11)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Lucasville	OPK00000001 ----------	Scioto 755	Candy Run 1.00	----------	---------- ----------	-	-------
Kingston	OPB00021001 OH0025941AY	Pickaway 627	Blackwater Creek 5.90	----------	C390958020 ----------	4	Adv. S.
Stoutsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Beaver	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Paint Creek (M-12, M-13, M-14)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Jeffersonville	4PB00013001	Fayette	Sugar Creek	----------	----------	-	-------
	----------	557	27.20		----------		
Octa	4PH00007001	Fayette	Rattlesnake Crk.	----------	----------	-	-------
	----------	590	36.27		----------		
Bloomingburg	4PD00005001	Fayette	E.Fork/Paint Crk	----------	----------	-	-------
	----------	591	6.32		----------		
Washington C.H.	4PD00002001	Fayette	Paint Creek	----------	----------	-	-------
	----------	591	69.45		----------		
Frankfort	OPB00014001	Ross	N.Fork/Paint Crk	----------	C391328020	4	Adv. S.
	OH0021482AY	625	14.26		----------		
Greenfield	OPD00006001	Highland	Paint Creek	----------	----------	-	-------
	----------	654	49.60		----------		
Chillicothe	OPB00008001	Ross	Paint Creek	----------	C391159020	4	Adv. S.
	OH0024406AY	657	5.85		----------		
N. Fork Village	OPU00001001	Ross	N.Fork/Paint Crk	----------	----------	-	-------
	----------	657	1.80		----------		
Pleasant Valley	OPQ00002001	Ross	N.Fork/Paint Crk	----------	----------	-	-------
		657	4.00		----------		

Basin: Lower Scioto (M)
Subbasin: Paint Creek (M-12, M-13, M-14)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Sabina	1PB00038001 OH0022128AY	Clinton 621	Wilson Creek 2.85	----------	C391436020 C391436030	2 3	Adv. S.
Hillsboro	OPC00004001 OH0008346AY	Highland 682	Clear Creek 6.73	----------	C391194020 ----------	4	Adv. S.
S. Solon	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Leesburg	---------- ----------	--------- ---	-------- ----	----------	---------- ----------	-	-------
Bainbridge	---------- ----------	----- ---	-------- ----	----------	---------- ----------	-	-------

Basin: Lower Scioto (M)
Subbasin: Sunfish Creek (M-15)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
----------	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Lower Scioto (M)
Subbasin: Brush Creek (M-17)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
----------	----------	-----	--------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Lower Scioto (M)
Subbasin: Deer Creek (M-17)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
London	4PC00003001 OH0023779AY	Madison 491	Oak Run 8.05	----------	C391116020 C391116030	2 3	Adv. S.
Mt. Sterling	4PB00015001 OH0026654AY	Madison 559	Unnamed Trib. 0.20	----------	C391160030 ----------	3	Adv. S.
Clarksburg	OPA00001001 OH0021547AY	Delaware 593	Hay Run 3.90	----------	C391341020 ----------	4	Adv. S.

Basin: Southwest Ohio River Tributaries (M)
Subbasin: Turkey Creek/S.W. Ohio Tributaries (M-17)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Shawnee Park	OPP80000001 ----------	Scioto 768	Turkey Creek 11.88	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Raccoon Creek (N-1, N-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
McArthur	OPB00080001 OH0048241AY	Vinton 662	Elk Fork 14.75	----------	C391619020 ----------	4	Adv. W.
Wellston	OPD00018001 OH0059056AY	Jackson 716	Meadow Run 2.10	----------	C390963020 ----------	2	Adv. S.

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Raccoon Creek (N-1, N-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Rio Grande	OPB00035001 OH0027278AY	Gallia 739	Indian Creek 1.50	----------	C391588020 ----------	4	Adv. S.
Wilkesville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Vinton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Campaign Creek (N-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Middleport	OPB00025001 OH0026514AY	Meigs 742	Ohio River 726.70	----------	C391136020 ----------	4	Adv. S.

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Campaign Creek (N-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Tara Development	OPW00001001 ----------	Gallia 741	Campaign Creek 1.97	----------	---------- ----------	-	-------
Gallipolis	OPD00001001 OH0020478AY	Gallia 761	Ohio River 713.20	----------	---------- ----------	-	-------
Meadowlook	OPG00011001 ----------	Gallia 761	Paint Creek 2.20	----------	---------- ----------	-	-------
Cheshire	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Silver Bridge	OPG00022001 ----------	Gallia 761	Ohio River 715.39	----------	---------- ----------	- -	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Symmes Creek (N-3, N-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Oak Hill	OPB00055001 OH0026859AY	Jackson 738	Huntingcamp Creek 1.70	----------	C391617020 ----------	4	Adv. S.
Brentwood Estates	OPG00024001 ----------	Lawrence 787	Symmes Creek 2.54	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Indian Guyan Creek (N-3, N-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Crown City	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Pine Creek/S.E. Ohio River Tributaries (N-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
South Point	OPB00041001 ----------	Lawrence 786	Ohio River 663.80	----------	---------- ----------	-	-------
Ironton	OPD00007001 OH0025852AY	Lawrence 780	Ohio River 665.39	----------	C391337020 C391337030	2 3	Adv. S.
Chesapeake	OPB00007001 ----------	Lawrence 787	Ohio River 671.98	----------	---------- ----------	-	-------
Wheelersburg	OPK00001001 ----------	Scioto 771	Pine Creek 1.05	----------	---------- ----------	-	-------
Lawrence County SD #1	OPH00003001 OH0050717AY	Lawrence 787	Ohio River 670.40	----------	---------- ----------	3	Adv. S.
South Webster	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Coal Grove	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Little Scioto/S.E. Ohio Tributaries (N-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Portsmouth	OPD00013001 OH0027197AY	Scioto 770	Ohio River 627.40	----------	C391133010 C391133020 C391133030	1 2 3	ADV. S.
New Boston	OPD00011001 ----------	Scioto 770	Ohio River 629.49	----------	---------- ----------	-	-------

Basin: Southeast Ohio River Tributaries (N)
Subbasin: Little Scioto/S.E. Ohio Tributaries (N-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Purtee Acres	OPW00002001 ----------	Scioto 756	Wards Run 6.20	----------	---------- ----------	-	-------
Sciotoville	OPC00018001 ----------	Scioto 755	Ohio River 632.13	----------	---------- ----------	-	-------

Basin: Hocking (O)
Subbasin: Upper Hocking (O-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Somerset	OPB00040001 OH0023566AY	Perry 534	Somerset Creek 6.45	-------	C391596010 ----------	1	Adv. S.
Colonial Estates	4PY80000001 ----------	Fairfield 564	Unnamed Trib. 0.30	-------	---------- ----------	-	-------
Lancaster	4PD00001001 OH0026026AY	Fairfield 565	Hocking R. 90.05	-------	C391146020 C391146030	2 3	Adv. S.
Bremen	4PB00002001 OH0021491AY	Fairfield 566	Rush Cr. 14.88	-------	C390930020 C390930030	2 3	Adv. S.
New Lexington	OPC00008001 OH0023931AY	Perry 568	Rush Cr. 27.50	-------	C391431020 ----------	4	Adv. S.
Sugar Grove	4PA00001001 OH0020401AY	Fairfield 598	Hocking River 82.66	-------	C391534010 C391534020 C391534030	1 2 3	Adv. S.
Amanda	---------- ----------	--------- ---	---------- ----	-------	---------- ----------	-	-------
Junction City	---------- ----------	--------- ---	---------- ----	-------	---------- ----------	-	-------

Basin: Hocking (0)
Subbasin: Middle Hocking (0-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Logan	OPD00009001 OH0023388AY	Hocking 599	Hocking River 67.58	-------	C391386020 C391386030	2 3	Adv. W.
Nelsonville	OPC00006001 OH0020541AY	Athens 633	Hocking River 52.08	-------	C391428010 C391428020	1 4	Adv. S.
Chauncy	OPB00006001 OH0024368AY	Athens 633	Hocking River 43.25	-------	C391623010 C391623030	1 4	Adv. S.
Plains	OPJ00005001 ----------	Athens 665	Hocking River 40.27	-------	---------- ----------	-	-------
Athens	OPD00000001 OH0023931AY	Athens 665	Hocking River 32.52	-------	C391551020 C391551030	2 3	Adv. S.
Shawnee	---------- ----------	--------- ---	---------- ----	-------	---------- ----------	-	-------
N.W. Straitsville	---------- ----------	--------- ---	---------- ----	-------	---------- ----------	-	-------
Renoville	---------- ----------	--------- ---	---------- ----	--------	---------- ----------	-	-------
Corning	---------- ----------	--------- ---	---------- ----	-------	---------- ----------	-	-------

Basin: Hocking (O)
Subbasin: Middle Hocking (O-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Murray City						-	
Glouster						-	
Trimble						-	
Jacksonville						-	
Albany						-	

Basin: Hocking (O)
Subbasin: Lower Hocking (O-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Coolville						-	

Basin: Southeast Ohio River Tributaries (O)
Subbasin: Leading Creek (O-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Rutland	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Southeast Ohio River Tributaries (O)
Subbasin: Shade River (O-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
----------	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Southeast Ohio River Tributaries (O)
Subbasin: Shade River/Ohio River (O-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Pomeroy	OPB00032001	Meigs	Ohio River	----------	----------	-	-------
	----------	720	731.40		----------		
Middleport	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Walhonding River (P)
Subbasin: Mohican River (P-1, P-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Illinois Aup.	2PE10000001 ----------	Richland 291	Rocky Fork 11.18	----------	---------- ----------	-	-------
Imperial Estates	2PG00006001 ----------	Richland 256	Unnamed Trib. 1.61	----------	---------- ----------	-	-------
Crestwood	2PW80000001 ----------	Richland 256	Unnamed Trib. 0.45	----------	---------- ----------	-	-------
Eastview	2PH00005001 ----------	Richland 256	Unnamed Trib. 0.10	----------	---------- ----------	-	-------
Shelby	2PD00036001 OH0023540AY	Richland 219	Bl. Fork Mohican 50.07	----------	C391404020 C391404030	2 3	Adv. S.
Butler	OPA00044001 ----------	Richland 326	Clr. Fork Mohican 13.90	----------	---------- ----------	-	-------
Bellville	2PB00057001 ----------	Richland 325	Clr. Fork Mohican 19.17	----------	---------- ----------	-	-------
Lexington	2PB00019001 OH0020257AY	Richland 290	Clr. Fork Mohican 27.48	----------	C391604010 C391604020 C391604030	1 2 3	Adv. S.
Shiloh	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Walhonding River (P)
Subbasin: Mohican River (P-1, P-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Polk						-	
West Salem						-	
Bailey Lakes						-	
Jeromesville						-	
Hayesville						-	
Mansfield						-	
Ontario						-	
Nashville						-	

Basin: Walhonding River (P)
Subbasin: Mohican River (P-1, P-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Cinnamon Lake	2PR00009001 ----------	Ashland 223	Muddy Fork 25.50	----------			-------
Ashland	2PD00010001 OH0023906AY	Ashland 222	Lang Creek 0.42	----------	C391124020 C391124030 C391124040 C391124050	2 3 2 3	Adv. S.
Loudonville	2PD00023001 OH0030996AY	Ashland 293	Bl. Fork Mohican 1.75	----------	C391503010 C391503020 C391503030	1 2 3	Adv. S.
Perrysville	2PA00004001 ----------	Ashland 292	Bl. Fork Mohican 7.53	----------	---------- ----------	-	-------
Lucas	2PB00038001 OH0021041AY	Richland 291	Rocky Fork 3.65	----------	C391556010 C391556020 C391556030	1 2 3	Adv. S.
Hillsdale	2PG00007001 ----------	Richland 256	Unnamed Trib. 1.50	----------	---------- ----------	-	-------

Basin: Walhonding River (P)
Subbasin: Killbuck Creek (P-3, P-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Westfield	3PB00023001 ----------	Medina 190	Camel Creek 2.47	----------	---------- ----------	-	-------
Creston	3PB00012001 OH0021172AY	Wayne 225	Killbuck Ditch 1.00	----------	C391625010 C391625020 C391625030	1 2 3	Adv. S.
Shelmar	3PV00016001 ----------	Wayne 260	Cedar Creek 2.00	----------	---------- ----------	-	-------
Wooster	3PD00013001 OH0027839AY	Wayne 260	Apple Creek 0.61	----------	C390962020 C390962030	2 3	Adv. S.
Apple Creek	3PB00004001 OH0023892AY	Wayne 261	Apple Creek 8.70	----------	C391611010 C391611020 C391611030	1 2 3	Adv. S.
Millersburg	OPL00005001 OH0020168AY	Holmes 330	Killbuck Creek 30.50	----------	C391520010 C391520020	1 4	Adv. S.
Shreve	3PB00021001 OH0045373AY	Wayne 294	Shreve Creek 3.36	----------	C391624020 C301624030	2 3	Adv. S.
Holmesville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Carrollton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Walhonding River (P)
Subbasin: Killbuck Creek (P-3, P-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Killbuck	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Walhonding River (P)
Subbasin: Sugar Creek (P-5)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Brewster	3PG00006001	Tuscarawas	Sugar Creek	----------	C390923020	2	Adv. S.
	OH0020567AY	298	19.04		C390923030	3	
Beach City	3PB00036001	Stark	Sugar Creek	----------	----------	-	-------
	----------	298	13.80		----------		
Sugar Creek	OPB00007001	Tuscarawas	South Fork Sugar	----------	C391410020	4	Adv. S.
	OH0027618AY	332	14.15		----------		
Strasburg	OPB00043001	Tuscarawas	Sugar Creek	----------	----------	-	-------
	----------	333	7.45		----------		
Mt. Eaton	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Tuscarawas River (P)
Subbasin: Tuscarawas River (P-5, P-6, P-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Wadsworth	3PD00022001	Medina	Styx River	----------	----------	-	-------
	----------	191	3.34		----------		
Summit County #10	3PG00021001	Summit	Unnamed Trib.	----------	----------	-	-------
	----------	227	0.87		----------		
Frasure Park	3PX00032001	Summit	Unnamed Trib.	----------	----------	-	-------
	----------	193	1.00		----------		
Brentwood	3PH00006001	Summit	Van Hying Run	----------	----------	-	------
	----------	192	2.34		----------		
Norton Acres	3PH00008001	Summit	Van Hying Run	----------	----------	-	-------
	----------	193	0.78		----------		
Zebrary Park Util.	3PU00004001	Summit	West Reservoir	----------	----------	-	-------
	----------	228	3.75		----------		
Country Club Village	3PJ00000001	Summit	Unnamed Trib.	----------	----------	-	-------
	----------	229	2.87		----------		
Woodmoor	3PG00084001	Stark	Unnamed Trib.	----------	----------	-	-------
	----------	228	2.33		----------		
New Philadelphia	OPD00012001	Tuscarawas	Tuscarawas River	----------	----------	-	-------
	----------	369	53.63		----------		

Basin: Tuscarawas River (P)
Subbasin: Tuscarawas River (P-5, P-6, P-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Tuscarawas	OPA00006001	Tuscarawas	Tuscarawas River	----------	----------	-	-------
	----------	369	44.73		----------		
Gnadenlitten	OPB00017001	Tuscarawas	Tuscarawas River	----------	----------	-	-------
	----------	404	38.55		----------		
Newcomerstown	OPC00007001	Coshocton	Tuscarawas River	----------	----------	-	-------
	----------	402	19.80		----------		
West Lafayette	OPB00048001	Coshocton	Tuscarawas River	----------	----------	-	-------
	----------	402	11.20		----------		
Lochraven Estates	3PG00023001	Summit	Pidgeon Creek	----------	----------	-	-------
	----------	192	7.15		----------		
Babcox & Wilcox	3PG00016001	Summit	Pidgeon Creek	----------	----------	-	-------
	----------	192	6.95		----------		

Basin: Tuscarawas River (P)
Subbasin: Tuscarawas River (P-5, P-6, P-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Dover	OPD00005001 OH0024945AY	Tuscarawas 334	Tuscarawas River 58.40	----------	C390781020 C390781030	2 3	Adv. S.
Massillon	3PE00007001 OH0020516AY	Stark 263	Tuscarawas River 88.87	----------	C391110010 C391110020 C391110030	1 2 3	Adv. S.
Doylestown	3PE00014001 OH0021342AY	Wayne 227	Silver Creek 3.16	----------	C390812030	3	Adv. S.
Marshallville	3PB00032001 OH0022624AY	Wayne 227	Unnamed Trib. 2.70	----------	C391653010 C391653020 C391653030	1 2 3	Adv. S.
Rittman	3PC00010001 OH0021822AY	Wayne 226	Styx River 0.60	----------	C391518020 C391518030	2 3	Adv. W.
Orrville	3PD00017001 No Permit	Wayne 261	Little Chippewa 10.25	----------	C390959020 C390959030	2 3	Adv. S.
Seville	3PB00044001 ----------	Medina 191	Chippewa 15.87	----------	---------- ----------	-	-------
Seville	3PY00001001 ----------	Medina 191	Chippewa 16.29	----------	---------- ----------	-	-------
Barberton	3PD00004001 OH0024007AY	Summit 228	Tuscarawas River 109.14	----------	C390722030 C390722040 C390722050	2 3 3	Adv. S.

Basin: Tuscarawas River (P)
Subbasin: Tuscarawas River (P-5, P-6, P-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Briarwood Beach	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Chippewa Lake	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Gloria Glens Park	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Canal Fulton	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
N. Lawrence	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Dalton	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Navarre	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Zoar	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Medina Co. #1	3PH00017001	Medina	Unnamed Trib.	----------	C390788020	2	Adv. W.
	OH0026395AY	190	0.15		C390788030	3	

Basin: Walhonding River (P)
Subbasin: Tuscarawas River (P-5, P-6, P-10)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
----------	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Tuscarawas River (P)
Subbasin: Sandy Creek (P-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Stark County Bob-O-Link	3PG00082001	Stark	Nimishillen Creek	----------	----------	-	-------
	----------	229	9.78		----------		
Stark County Sherwood Village	3PX00023001	Stark	Sulphur Creek	----------	----------	-	------
	----------	265	5.38		----------		

Basin: Tuscarawas River (P)
Subbasin: Sandy Creek (P-7)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Canton	3PE00800001 ---------- OH0024350AY	Stark 265	Nimishillen Creek 10.00	----------	C390996040 C390996050 C390996060 C390996070	2 3 2 3	Adv. S. Adv. W.
Alpine Village	3PG00081001 ----------	Stark 230	Main Branch Nimishillen Creek 7.25	----------	---------- ----------	-	-------
Glenhaven Village	3PG00086001 ----------	Stark 265	Unnamed Ditch 2.22	----------	---------- ----------	-	-------
Waynesburg	3PB00022001 ----------	Stark 300	Sandy Creek 16.60	----------	---------- ----------	-	-------
Minerva	3PC00023001 OH0021849AY	Carroll 302	Sandy Creek 29.06	----------	C391374010 C391374020 C391374030	1 2	Adv. S.
North Canton	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Hartville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Walhonding River (P)
Subbasin: Conotton Creek (P-8)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Carrollton	OPB00001001 OH0020931AY	Carroll 337	Unnamed Trib. 0.10	----------	C390871020 ----------	4	Adv. S.
Mineral City	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Leesville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Bowerston	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Scioto	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Jewett	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Tuscarawas River (P)
Subbasin: Stillwater Creek (P-9)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Twin City	OPD00015001 OH0020079AY	Tuscarawas 370	Stillwater Creek 3.08	----------	C391132020 ----------	4	Adv. S.
Urichsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Freeport	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Flushing	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Barnesville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Lower Muskingum (P)
Subbasin: Lower Muskingum (P-11, P-16)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Frazeysburg	OPB00015001 OH0020800AY	Muskingum 467	Wakatomika Creek 12.32	----------	C390715020 ----------	4	Adv. S.
Dresden	OPB00012001 OH0024953AY	Muskingum 468	Muskingum 91.70	----------	C391143020 ----------	4	Adv. S.
Spring Hill Subdivision	OPG00016001 ----------	Muskingum 503	Unnamed Trib. 4.42	----------	---------- ----------	-	-------
Duncan Falls	OPX00000001 ----------	Muskingum 537	Muskingum 67.36	----------	---------- ----------	-	-------

Basin: Walhonding River (P)
Subbasin: Kokosing River (P-12)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Danville	2PC00003001 OH0024872AY	Knox 362	East Branch 1.97	----------	C391553010 C391553020 C391553030	1 2 3	Adv. S.
Gambier	2PB00016001 OH0025321AY	Knox 396	Kokosing River 17.76	----------	C391542010 C391542020 C391542030	1 2 3	Adv. S.
Mt. Vernon	2PD00012001 OH0026662AY	Knox 361	Kokosing River 24.90	----------	C390593020 C390593030	2 3	Adv. S.
Fredericktown	2PB00015001 ----------	Knox 360	North Branch Kokosing River 5.55	----------	---------- ----------	-	-------
Chesterville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Sparta	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Martinsburg	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Lower Muskingum (P)
Subbasin: Licking River (P-13)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Johnstown	4PC00001001 ----------	Licking 429	Raccoon Creek 23.78	----------	---------- ----------	-	Adv. S.
Heath	4PC00007001 OH0025763AY	Licking 465	South Fork 2.20	----------	C391677010 C391677020	2 3	Adv. W.

Basin: Lower Muskingum (P)
Subbasin: Licking River (P-13)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Buckeye Lake SD #1	4PJ00000001	Licking 499	Unnamed Trib. 1.30	----------	----------	-	-------
Jardin Manor SD #5	4PE00019001	Licking 497	South Fork Licking River 25.30	----------	----------	-	-------
Prescott Estates	4PG00002001	Licking 431	North Fork Licking River 7.68	----------	----------	-	-------
Licking County Home	4PG00001001	Licking 465	Log Round Run 4.30	----------	----------	-	-------
Utica	4PB00022001 OH0027898AY	Licking 431	North Fork Licking River 17.14	----------	C390928020 C390928030	2 3	Adv. S.
Pataskala	4PB00009001 OH0020273AY	Licking 497	South Fork Licking River 28.16	----------	C391599020 C391599030	2 3	Adv. S.
Stonehenge	OPG00037001	Muskingum 468	Unnamed Trib. 0.73	----------	----------	-	-------
Crestmont Estates	OPG00002001	Muskingum 468	Bartlett River 4.61	----------	----------	-	-------
Vistaview Village	OPG00035001	Muskingum 468	Bartlett River 4.77	----------	----------	-	-------

Basin: Lower Muskingum (P)
Subbasin: Licking River (P-13)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Oakwood North	OPG00014001	Muskingum	Joe's Run	----------	----------	-	-------
	----------	468	5.90		----------		
Newark	4PE00001001	Licking	Licking River	----------	C391684010	2	Adv. W.
	OH0026671AY	Newark 466	28.55		C391684020	3	
Granville	4PC00006001	Licking	Raccoon Creek	----------	C391679010	2	Adv. S.
	OH0023345AY	464	9.04		C391679020	3	
Centerburg	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
St. Louisville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Alexandria	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Hanover	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Kirkersville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Millersport	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Lower Muskingum (P)
Subbasin: Licking River (P-13)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Thornville	----------	---	----	----------	----------	-	-------
Hebron	----------	---	----	----------	----------	-	-------
Martinsburg	----------	---	----	----------	----------	-	-------

Basin: Lower Muskingu[illegible])
Subbasin: Lower Muskingum (P-16, P-19)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
McConnelsville	OPC00000001 OH0021466AY	Morgan 571	Muskingum 48.10	----------	C391402020 ----------	4	Adv. S.
Zanesville	OPE00000001 OH0028240AY	Muskingum 502	Muskingum 74.07	----------	C391714040 C391714050	2 3	Adv. S.
Muskingum Co., Rodgers Subdivision	OPG00005001 ----------	Muskingum 502	Unnamed Trib. 0.63	----------	---------- ----------	-	-------
Stockport	OPA00005001 OH0020249AY	Morgan 604	Muskingum 39.26	----------	C391609010 C391609020	1 4	Adv. S.
Beverly	OPB00002001 OH0020648AY	Washington 605	Muskingum 23.25	----------	C391591010 C391591020	1 4	Adv. S.
Washington Co., Frontier SD #1	OPG00019001 ----------	Washington 639	Muskingum 4.36	----------	---------- ----------	-	-------
Lowell	OPB00022001 OH0020311AY	Washington 606	Muskingum 13.73	----------	C391437020 ----------	4	-------
Philo	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Cannelville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Lower Muskingum (P)
Subbasin: Wills Creek (P-17, P-18)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Coshocton	OPD00004001 OH0024775AY OH0024775AY	Coshocton 436	Muskingum 108.56	----------	C391343010 C391343020 C391343020	1 2 3	Adv. S.
Cambridge	OPD00020001 OH0024309AY	Guernsey 472	Wills Creek 62.07	----------	C391726010 C391726020	2 3	Adv. W.
Quaker City	OPA00003001 OH0021351AY	Guernsey 508	Leatherwood Crk. 21.85	----------	C391583010 C391583020	1 4	Adv. S.
Byesville	OPB00004001 OH0024287AY	Guernsey 506	Wills Creek 69.44	----------	C391725010 ----------	4	Adv. W.
New Concord	OPB00028001 ----------	Guernsey 505	N. Crooked Creek 2.88	----------	---------- ----------	-	-------
Colonial Heights	OPG00017001 ----------	Guernsey 505	Unnamed Trib. 0.62	----------	---------- ----------	-	-------

Basin: Lower Muskingum (P)
Subbasin: Wills Creek (P-17, P-18)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Conesville						-	
Kimbolton						-	
Old Washington						-	
Lore City						-	
Salesville						-	
Senecaville						-	
Cumberland						-	

Basin: Lower Muskingum (P)
Subbasin: Lower Muskingum (P-19)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Malta	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Marietta	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Central Ohio River Tributaries (R)
Subbasin: Duck Creek (R-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Caldwell	OPB00005001 OH0020559AY	Noble 573	West Fork Duck Creek 23.00	----------	C391417020 ----------	4	Adv. S.
Dexter City	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Macksburg	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (R)
Subbasin: Little Muskingum (R-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin	Grant Permit #	Step	Treatment Level
----------	---------- ----------	--------- ---	---------- ----	---------- ----------	----------	-	-------

Basin: Central Ohio River Tributaries (R)
Subbasin: Ohio River Tributaries (R-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Matamoras	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Newport	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Little Beaver (S)
Subbasin: Little Beaver (S-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level*
Salem	3PD00027001 OH0027324AY	Columbiana 233	Middle Fork Little Beaver 38.10	----------	C391521010 C391521020 C391521030	1 2 3	Adv. S.
Washingtonville	3PB00091001 ----------	Columbiana 234	Cherry Run 2.40	----------	---------- ----------	-	-------
Lisbon	3PC00025001 OH0021067AY	Columbiana 269	Middle Fork Little Beaver 10.63	----------	C391391020 C391391030	2 3	Adv. S.

Basin: Little Beaver (S)
Subbasin: Little Beaver (S-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Leetonia	3PB00017001 OH0021652AY	Columbiana 269	East Branch Middle Fork Little Beaver 1.94	----------	C391669010 C391669020 C391669030	1 2 3	Adv. W.
Guilford Lake SD #2	3PS80001001 ----------	Columbiana 269	Middle Fork Little Beaver 23.75	----------	---------- ----------	-	-------
East Palestine	3PC09002001 OH0021784AY	Columbiana 271	Leslie Run 3.10	----------	C390965020 C390965030 C390965040 C390965050	2 3 2 3	Adv. S.
New Waterford	3PB00059001 OH0026735AY	Columbiana 271	Bull Creek 7.28	----------	C391590010 C391590020 C391590030	1 2 3	Adv. S.
Rogers	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Cross Creek (S-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Stratton	OPB00054001 ----------	Jefferson 341	Ohio River 926.41	----------	---------- ----------	-	-------
Toronto	OPD00017001 OH0020214AY	Jefferson 376	Ohio River 921.30	----------	C390931020 ----------	4	Adv. S.
Wintersville	OPA00050001 ----------	Jefferson 410	Dry Fork 1.00	----------	---------- ----------	-	-------
Wintersville	OPA00049001 ----------	Jefferson 410	Dry Fork 5.50	----------	---------- ----------	-	-------
Jefferson Co. #1	OPH00000001 ----------	Jefferson 410	Unnamed Ditch 2.10	----------	---------- ----------	-	-------
Wintersville	OPB00066001 OH0022144AY	Jefferson 410	Unnamed Trib. 2.50	----------	C391329020 ----------	4	Adv. S.
Mingo Junction	OPD00010001 OH0026565AY	Jefferson 411	Cross Creek 0.40	----------	C391351020 ----------	4	Adv. S.
Steubenville	OPD00014001 OH0027511AY	Jefferson 411	Ohio River 913.40	----------	C390967020 C390967030	2 3	Adv. s.
Wintersville	OPA00047001 ----------	Jefferson 375	Unnamed Trib. 1.00	----------	---------- ----------	-	-------
Wintersville	OPA00048001 ----------	Jefferson 375	Wills Creek 5.20	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Cross Creek (S-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Mellwood Acres	OPR00051001	Jefferson 375	Unnamed Trib. 4.16	----------	----------	-	-------
Empire	----------	---------	----------	----------	----------	-	-------
Richmond	----------	---------	----------	----------	----------	-	-------
Bloomingdale	----------	---------	----------	----------	----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Yellow Creek (S-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Richmond	----------	---------	----------	----------	----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Yellow Creek (S-2)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Wellsville	3PD00023001	Columbiana 340	Ohio River 932.80	----------	----------	-	-------
Amsterdam	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Bergholz	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Irondale	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
E. Liverpool	----------	--------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Central Ohio River Tributaries (S)
Subbasin: Short Creek (S-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Cadiz	OPB00009001 OH0024295AY	Harrison 443	Sally Buffalo Ck. 0.10	----------	C391547010 C391547020 C391547030	1 2 3	Adv. S.
Rayland	OPB00034001 ----------	Jefferson 445	Ohio River 899.92	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Wheeling/McMahon Creek (S-3, S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Flushing	OPB00013001 OH0025143AY	Belmont 442	Unnamed Trib. 0.55	----------	C391634010 C391634020	1 4	Adv. S.
Belmont County WWTP	OPJ00003001 OH0050113AY	Belmont 478	Wheeling Creek 1.60	----------	C391356020 ----------	4	Adv. W.
Yorkville	OPB00052001 ----------	Belmont 445	Deep Run 0.30	----------	---------- ----------	-	-------
Tiltonsville	OPB00046001 OH0020435AY	Jefferson 445	Ohio River 898.90	----------	C390891020 ----------	4	Adv. S.
Belmont Co. Sewer Authority	OPQ00000001 ----------	Belmont 513	Ohio River 889.30	----------	---------- ----------	-	-------
Penwood Estates	OPG00029001 ----------	Belmont 477	McMahonies Run 2.10	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Wheeling/McMahon Creek (S-3, S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
St. Clairsville						-	
Pine Lake	OPG00009001	Belmont 476	Unnamed Trib. 1.35			-	
New Athens						-	
Belmont						-	
Martins Ferry						-	
Bellaire						-	

Basin: Central Ohio River Tributaries (S)
Subbasin: Captina Creek (S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Powhatan Point	OPB00033001 OH0027219AY	Belmont 546	Ohio River 871.90	----------	C351606020 ----------	4	Adv. S.
Shadyside	OPC00009001 ----------	Belmont 513	Ohio River 883.72	----------	---------- ----------	-	-------
Bethesda	OPB00001001 OH0021121AY	Belmont 509	Bend Fork 12.20	----------	C390870020 ----------	4	Adv. W.
Barnesville	OPC00001001 OH0024015AY	Belmont 574	N. Fork Captina 10.50	----------	C391137030 ----------	4	Adv. W.
Beallsville	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Captina Creek (S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Adena	OPB00050001 OH0021644AY	Jefferson 444	Short Creek 18.87	----------	C391370020 ----------	4	Adv. S.
Brilliant	OPB00003001 ----------	Jefferson 410	Ohio River 905.72	----------	---------- ----------	-	-------
Hopedale	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------
Smithfield	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Sunfish Creek (S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
St. Clairsville	OPB00064001 ----------	Belmont 477	Town Run 3.05	----------	---------- ----------	-	-------

Basin: Central Ohio River Tributaries (S)
Subbasin: Sunfish Creek (S-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
ST. Clairsville	OPB00038001	Belmont 477	Aults Run 3.00	----------	----------	-	-------
Lewisville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Woodsfield	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Clarington	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Wilson	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		
Beallsville	----------	---------	----------	----------	----------	-	-------
	----------	---	----		----------		

Basin: Mahoning (T)
Subbasin: Mahoning (T-1)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Alliance	3PD00000001 OH0023868AY	Stark 232	Beech Creek 0.35	----------	C390968030 C390968040	2 3	Adv. W.
Sebring	3PC00011001 OH0020443AY	Mahoning 232	Unnamed Trib. 4.08	----------	C391355020 C391355030	2 3	Adv. S.
Beloit	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Mahoning (T)
Subbasin: Mahoning/Milton Pa. (T-2, T-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Hiram	3PB00020001 ----------	Portage 126	Unnamed Trib. 1.43	----------	---------- ----------	-	-------
Brookshire	3PX00004001 ----------	Portage 127	South Fork 0.35	----------	---------- ----------	-	-------
Garrettsville	3PB00016001 ----------	Portage 127	Eagle Creek 18.01	----------	---------- ----------	-	-------
Mosquito Creek	3PK00009001 ----------	Trumbull 129	Mosquito Creek 7.31	----------	---------- ----------	-	-------
Cortland	3PB00011001 ----------	Trumbull 130	Mosquito Creek 14.80	----------	---------- ----------	-	-------
Columbiana	3PC00000001 OH0021776AY	Columbiana 235	Mill Creek 19.45	----------	C390787010 C390787020	2 3	Adv. S.
Youngstown	3PE00006001 OH0028223AY	Mahoning 200	Mahoning 18.16	----------	C390736080 C390736090	2 3	Adv. S.
Boardman	3PK00020001 ----------	Mahoning 200	Mill Creek 9.59	----------	---------- ----------	-	-------
West Branch Charleston	3PX00008001 ----------	Portage 161	Hinkley Creek 0.72	----------	---------- ----------	-	-------

Basin: Mahoning (T)
Subbasin: Mahoning/Milton Pa. (T-2, T-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Newton Falls	3PD00015001 OH0022110AY	Portage 163	Mahoning 55.13	----------	C390723030 ----------	4	Adv. S.
Milton Subdistrict	3PH00030001 ----------	Mahoning 163	Mahoning 61.80	----------	---------- ----------	-	-------
Warren	3PE00008001 OH0020796AY	Trumbull 164	Mahoning 33.52	----------	C391101020 C391101040 C391101050	2 3 3	Adv. S.
Girard	3PD00010001 OH0025364AY	Trumbull 165	Little Squaw Crk. 0.40	----------	C391698010 C391698020 C391698030	1 2 3	Adv. S.
McDonald	3PC00008001 ----------	Trumbull 165	Mahoning 25.10	----------	---------- ----------	-	-------
Niles	3PD00036001 ----------	Trumbull 165	Mahoning 27.13	----------	----------	-	-------
Campbell	3PD00008001 ----------	Mahoning 201	Mahoning 14.26	----------	---------- ----------	-	-------
Lakeview	3PV00020001 ----------	Trumbull 349	Mosquito Creek 12.40	----------	---------- ----------	-	-------
Windham	---------- ----------	--------- ---	---------- ----	----------	---------- ----------	-	-------

Basin: Mahoning (T)
Subbasin: Mahoning/Milton Pa. (T-3)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Windham						-	
Struthers						-	
Lowellville						-	

Basin: Mahoning River (T)
Subbasin: Shenango River (T-4)

Facility (Priority Grant Projects) Stream Network	Facility & NPDES Nos.	County Quad #	Receiving Stream/RM	Basin Code	Grant Permit #	Step	Treatment Level
Hubbard	3PD00028001	Trumbull 166	Crab Creek to Little Yankee 4.59			-	
Pymatuning Lake	3PH00029001	Ashtabula 33	Shenango River 73.18			-	
Andover						-	
Orangeville						-	

OHIO'S WETLANDS

1982 305(b) Report
Volume V

Prepared by
J.H. Albrecht

Ohio Environmental Protection Agency
Division of Wastewater Pollution Control
Section of Surveillance and Standards

January, 1982

RECOMMENDATIONS

In order to properly protect and manage Ohio's wetland resources, the following recommendations are made:

-Enact legislation recognizing wetlands as a unique resource and providing for the conservation, protection and management of these areas;

-Develop and maintain coordination among State resource agencies concerned with the protection and management of wetlands in order to fully utilize available monies;

-Enter a cost sharing agreement with the U.S. Fish and Wildlife Service to complete the wetland inventory currently in progress in Ohio;

-Develop and refine evaluation methodologies and techniques in order to more accurately assess wetland values and the effects these areas have on the environment.

INTRODUCTION

Historically, wetlands have been considered useless, or even dangerous areas that should be drained and filled. Only recently has it been realized that they are a valuable resource. This chapter offers a brief overview of the State's wetlands in terms of quantity, quality, values and efforts undertaken by the State to protect and manage them.

DEFINITION/ VALUES

Wetlands in Ohio are defined as areas where the water table is at, near, or above the land surface long enough each year to support the growth of water dependent vegetation and to result in the formation of characteristic wet soil types. Included in this term are areas commonly known as marshes, swamps and bogs.

While existing data is somewhat limited, wetlands are known to be ecologically important areas due to the various functions that they serve, including:

-maintaining and improving water quality. As water flows through a wetland the velocities are slowed and sediments drop from the water column. Substances such as nitrogen compounds and phosphorus, as well as limited amounts of metals, either in the water column or adsorbed on sediment particles, are utilized by wetland vegetation as nutrients. It has been shown by Jones et al. (1976) that a slight increase in the percentage of wetlands in an agricultural watershed reduced the amount of nitrates (NO_3-N) in waters leaving the watershed. In wetlands where little sediment reworking occurs, deposition of sediments can effectively result in permanent removal of most potential pollutants (Boto and Patrick, 1978).

-primary production. Wetlands are unique habitat for plant species vital to the food web at its lowest level. Among the most productive areas in the biosphere are emergent wetlands and few natural communities in the Great Lakes states annually transform as much solar energy into live biomass (Tilton and Schwegler, 1978).

-habitat. Wetland ecosystems provide habitat for spawning, nesting, rearing, feeding and various other functions important to many species of fish and wildlife. The degradation and loss of wetland habitat leads to the loss of species and the reduction of genetic diversity among the surviving species (Darnell, 1978).

-flood control. Wetlands possess the ability to moderate flooding by slowing the water velocities and reducing the flood peak. Niering (1966) has shown that 1.5 million gallons of water can be stored with only a six inch increase in water level in a ten acre riverine wetland.

-shoreline protection. Emergent wetlands are efficient in absorbing and dissipating wave energy, consequently reducing shoreline erosion.

-other functions. Included are environmental education and research, recreational areas for activities such as hunting, fishing and photography and the aesthetic values of flora, fauna and open space.

INVENTORIES

Several inventories of Ohio's wetlands have been conducted. In 1954, the U.S. Fish and Wildlife Service determined that approximately 60,000 acres of wetlands, types 3 through 8, existed in Ohio (Rounds, 1955). This was not a complete statewide inventory due to the fact that only areas of large waterfowl populations were inventoried. The Ohio Department of Natural Resources conducted an inventory in 1974, with the result totaling approximately 77,600 acres of wetlands, types 3 through 8 (Weeks, 1974). There was a shift in type dominance of Lake Erie wetlands from 1954 to 1977, as high water levels resulted in the reduction of emergent hydrophytes and the subsequent increase in open water.

Within the past several years, the U.S. Fish and Wildlife Service has undertaken a national wetlands inventory. While the purpose of past inventories was to assess the amounts and types of waterfowl habitat, this inventory, according to the U.S. Fish and Wildlife Service (Cowardin et al., 1979), will provide "basic data on the characteristics and extent of the Nation's wetlands...and should facilitate the management of these areas on a sound, multiple-use basis". One of the first steps taken was to develop a new national wetland classification system. The classification system used previously, Circular 39 (Shaw and Fredine, 1956), tended to oversimplify critical ecological differences in its definitions. Additionally, our understanding of wetland ecology has improved since 1954. In the new U.S. Fish and Wildlife Service classification (Cowardin et al., 1979), wetlands are defined by vegetation, soils and frequency of flooding rather than the water depth and permanence criteria on which Circular 39 is based. The new classification is a hierarchy, advancing from systems and subsystems to more specific classes, subclasses and dominance types. In Ohio, three systems

exist and they are defined by Cowardin et al. as follows:

Riverine system: Includes all wetlands and deepwater habitats contained within a channel, except for wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens.

Lacustrine system: Includes all wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage, and (3) total area exceeds 8 ha (20 acres).

Palustrine system: Includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and wetlands lacking vegetation but with all of the following characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline feature lacking; and (3) water depth in the deepest part of the basin less than 2m at low water.

Table WET-1 depicts the hierarchy of the U.S. Fish and Wildlife Service classification system.

The end product of this inventory will be wetland maps. The U.S. Fish and Wildlife Service will prepare maps superimposing wetlands on U.S. Geological Survey (USGS) topographic maps. Overlays will also be available for use with USGS topographic quadrangle maps. No acreage totals will be generated from the inventory at this time.

Approximately one-third of Ohio has been inventoried, with maps available in either draft or final form. Figure WET-1 shows the portions of the State presently inventoried. Other portions of the State are in various stages of completion; however, sufficient funds do not exist to complete the inventory without a State cost-sharing program. Approximately $100,000 is needed from the State if the inventory is to be completed (personal communication, Ron Erickson, U.S. Fish and Wildlife Service, 1981). With a cost-sharing agreement, the inventory could be completed within three years.

LAKE ERIE WETLANDS

The coastal wetlands of Lake Erie are the most extensive in Ohio, and the most studied. Along the south shore of Lake Erie, the extensive coastal wetlands were a part of the Black Swamp that once covered the majority of northwest Ohio. Drainage projects since the mid-1800's, and subsequent growth and development of urban areas have converted many of the wetlands to various other land uses. The wetlands inventory conducted in 1954 estimated that 30,000 acres of wetlands existed adjacent to Lake Erie. By 1974, only 15,000 acres of wetlands existed, a reduction of 50 percent. Table WET-2 presents geographical data for the majority of the coastal wetlands (Modified from Herdendorf and Hartley, 1980).

Destruction of the coastal wetlands is largely attributable to development. Wetlands have been, and continue to be, drained, dredged or filled for agricultural, industrial and residential expansion. Those that do survive

Table WET-1: U.S. Fish and Wildlife Service Classification System (Modified from Cowardin, et al., 1979)

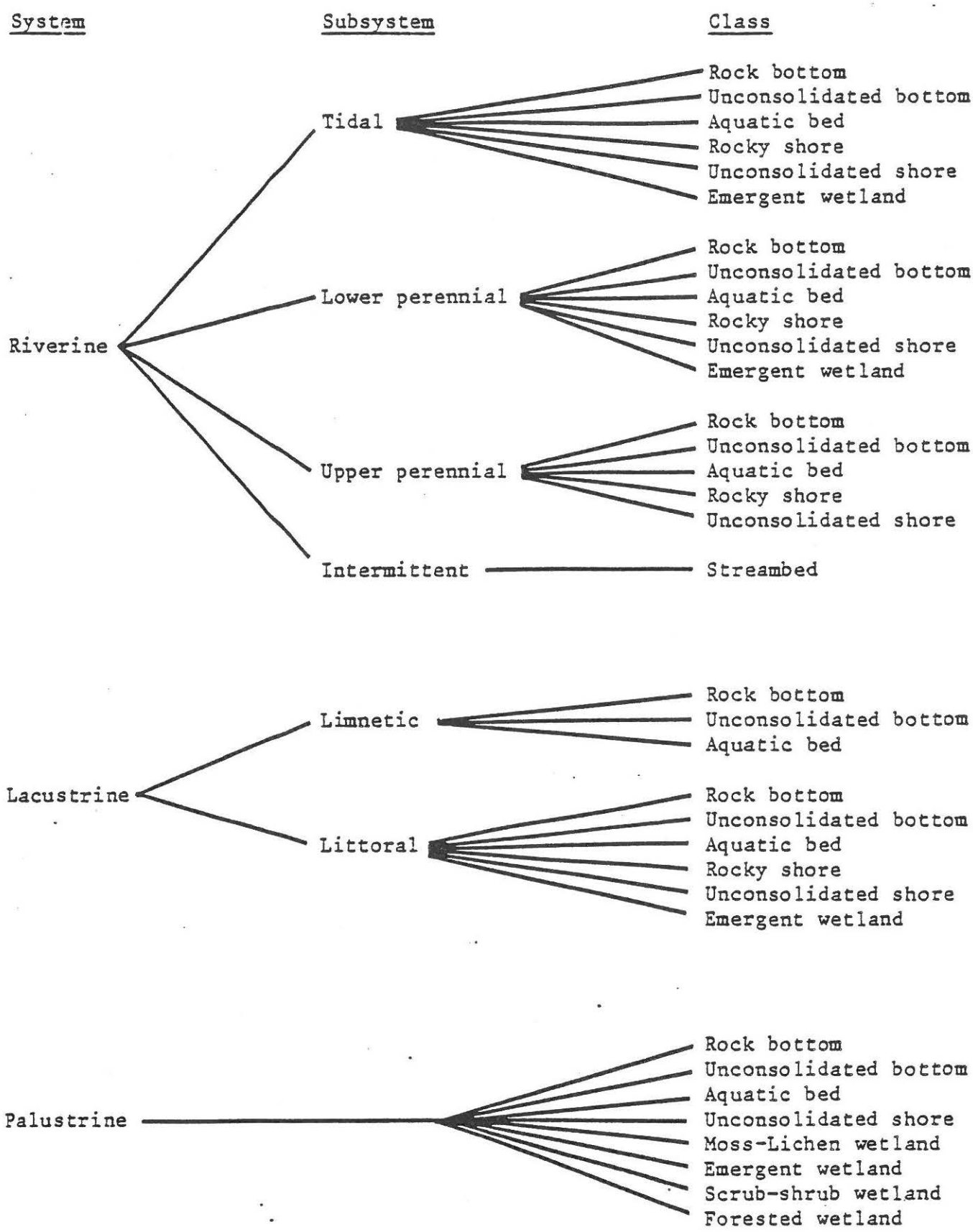
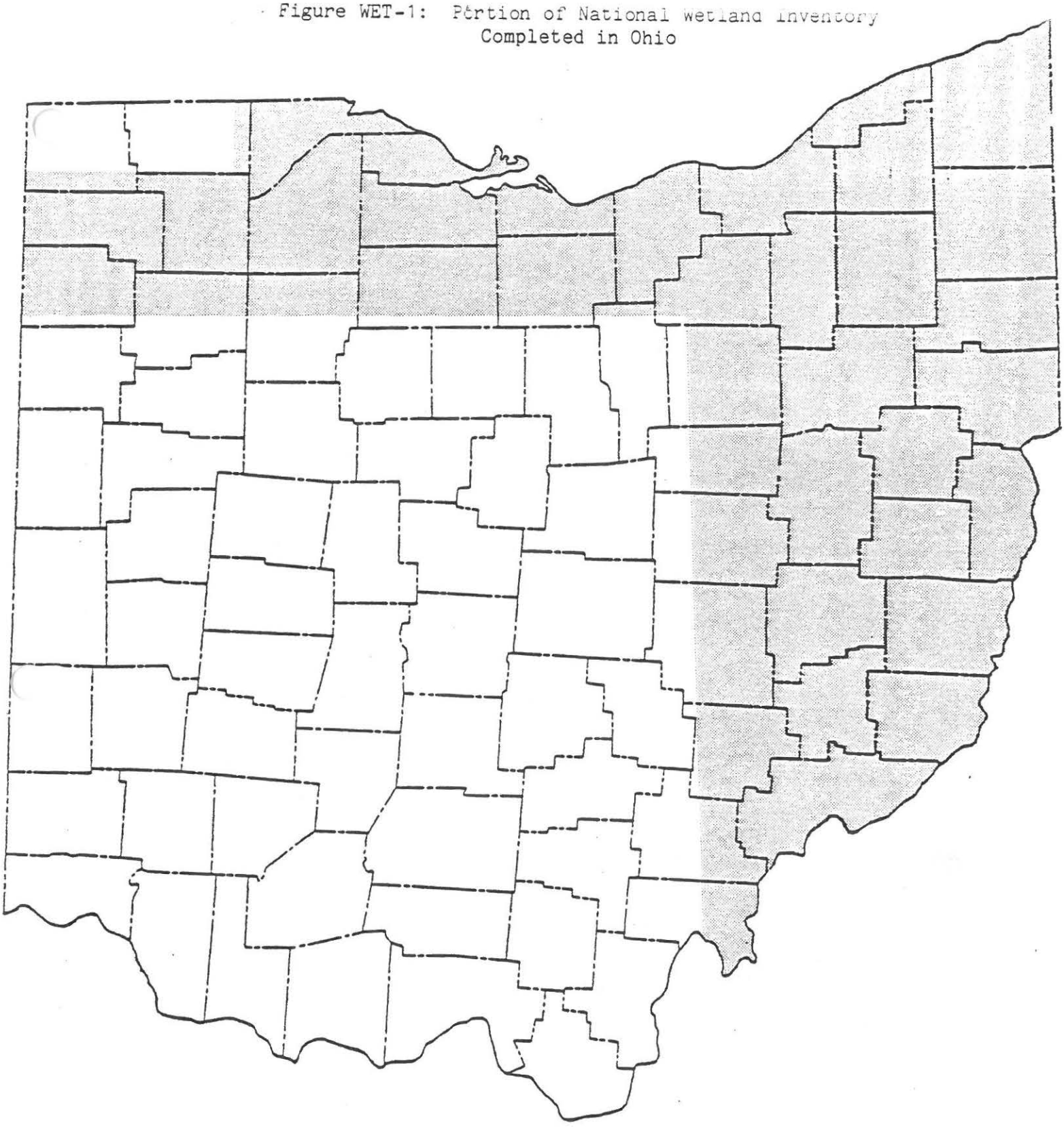


Figure WET-1: Portion of National Wetland Inventory Completed in Ohio



Shaded area represents area inventoried

developmental pressures are generally degraded. Lake Erie wetlands in particular are subject to these pressures, due mainly to the high demand for lakefront development. Table WET-3 summarizes potential pressures on the continued existence of the coastal wetlands (Modified from Herdendorf and Hartley, 1980). Figure WET-2 shows the locations of the wetlands described in Tables WET-2 and 3.

One pressure on the Lake Erie coastal wetlands is high lake levels. Water level fluctuation is necessary to maintain long term productivity and diversity in coastal wetlands. Occasional variability in water levels prevents plant succession and the formation of thick growths of emergent hydrophytes. This cyclic occurrence rejuvenates the coastal wetlands, causing them to not exhibit the aging process associated with inland wetlands. For this natural rejuvenation to occur, the coastal wetlands must be able to advance or retreat with the water levels. However, on the Ohio shoreline of Lake Erie, inland advancement of wetlands is often not possible due to encroaching coastal development. Without the opportunity to advance landward, the wetlands may be lost to a deepwater habitat. Physical protection of wetlands is often beneficial when in conjunction with an acceptable management plan. Water levels can be maintained and managed within a dike, generally providing optimum conditions. It must be noted, however, that diked wetlands are generally much more vulnerable to development pressure than are undiked wetlands, due to the fact that they are easily drained and converted to other uses.

STATE PROGRAMS

Approximately 10,000 acres of wetlands are protected and maintained by Federal and State governments and private shooting clubs. While Ohio has no State regulatory programs, several programs do exist that can be used to protect and manage wetlands.

The Ohio Department of Natural Resources has the majority of the wetland protection programs, and these programs are summarized below:

The Critical Areas program, administered by the Division of Soil and Water Conservation, defines and identifies critical resource areas, including wetlands, and makes recommendations that serve as guidelines for land use management.

The Forest Tax Reduction program, administered by the Division of Forestry, permits land that is devoted exclusively to forestry or timber production to be taxed at fifty percent of the local tax rate upon its assessed value. Wooded wetlands are included in this program.

The Ohio Conservation Easement Law, administered by the Division of Real Estate, imposes limitations in the use or development of lands, water or wetlands for various purposes including the maintanence of diminishing habitat.

The Nature Preserve program, administered by the Division of Natural Areas and Preserves, provides for the protection and management of natural areas which are representative of significant natural features of the State. Twenty-two wetlands, or partial wetland areas, have been acquired through this program and are shown in Figure WET-2.

Table WET-2: Lake Erie Coastal Wetlands Geographical Data
(Modified From Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Latitude	Longitude	Subasin Code	Acreage/ Classification[b]
1	Conneaut Creek	41°57'51"	80°32'39"	F-3	2.5/P
2	Ashtabula River	41°54'12"	80°48'19"	F-3	6.5/P
3	Geneva-on-the-Lake	41°51'18"	80°58'28"	F-3	16.0/P
4	Mentor complex				
	Mentor Marsh	41°43'56"	81°18'56"	F-2	717.0/P
	Mentor Lagoons	41°43'40"	82°20'48"	F-2	9.0/P
5	Beaver Creek	41°54'12"	82°14'33"	D-3	9.0/P
6	Old Woman Creek	41°22'32"	82°30'50"	D-3	158.0/P,L
7	Huron River	41°23'19"	82°33'20"	D-2	10.0/P
8	Sawmill Creek complex				
	#1	41°24'57"	82°35'32"	D-1	17.5/P
	#2	41°24'55"	82°35'48"	D-1	56.5/P
	#3	41°25'07"	82°36'00"	D-1	10.0/P
9	Cedar Point	41°29'22"	82°41'20"	D-1	10.0/P
10	Plum Brook complex				
	#1	41°25'22"	82°37'13"	D-1	7.5/P
	#2	41°25'43"	82°37'40"	D-1	45.5/P
	Creek area	41°25'37"	82°38'21"	D-1	38.5/P
11	East Bay complex				
	#1	41°25'53"	82°37'32"	D-1	1.0/L
	#2	41°26'13"	82°38'13"	D-1	35.0/L
12	Hemming Ditch	41°26'06"	82°39'22"	D-1	177.5/P,L
13	Big Island complex				
	Big Island	41°26'47"	82°40'12"	D-1	184.0/P,L
	Pipe Creek	41°26'22"	82°40'47"	D-1	72.0/P,L
14	Bay View	41°27'30"	82°48'18"	D-1	640.0/P

a. Refer to Figure WET-2.
. Classification based on Cowardin, 1979.
System codes: P-palustrine; L-lacustrine; R-riverine.

Table WET-2, con't.: Lake Erie Coastal Wetlands Geographical Data
(Modified From Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Latitude	Longitude	Subasin Code	Acreage/ Classification[b]
15	Willow Point complex				
	Willow Point	41°26'19"	82°52'39"	D-1	205.0/P
	Whites Landing	41°25'50"	82°53'50"	D-1	10.0/P
16	Pickerel Creek	41°25'16"	82°56'48"	D-1	10.0/P
17	Muddy Creek Bay	41°26'58"	83°00'33"	D-1	3122.0/P,L,R
18	Port Clinton	41°28'30"	82°56'58"	D-1	150.0/P
19	Lockwood Road	41°29'19"	82°53'33"	D-1	72.0/P
20	Portage	41°29'51"	82°51'30"	D-1	70.0/P
21	Danbury	41°29'52"	82°49'18"	D-1	15.0/P
22	Bay Point	41°29'50"	82°42'40"	D-1	45.0/P
23	Kelley's Island	41°36'39"	82°42'08"	D-1	17.0/P
24	East Harbor complex				
	#1	41°32'25"	82°47'12"	D-1	1.5/P
	#2	41°32'30"	81°47'30"	D-1	12.5/P
	#3	41°33'10"	81°48'04"	D-1	1.5/P
25	Middle Bass Island	41°41'26"	82°48'14"	D-1	17.0/P
26	North Bass Island complex				
	#1	41°42'44"	82°49'37"	D-1	34.0/P
	#2	41°42'33"	82°48'31"	D-1	5.0/P
27	Perry Street	41°30'51"	82°56'04"	D-1	33.0/P,L
28	Ottawa National Wildlife Refuge				
	Ottawa W/L Refuge	41°31'54"	82°59'28"	B-2	554.0/P
	Camp Perry area	41°32'37"	83°00'43"	B-2	5.0/P

a. Refer to Figure WET-2.
b. Classification based on Cowardin, 1979.
System codes: P-palustrine; L-lacustrine; R-riverine.

Table WET-2, con't.: Lake Erie Coastal Wetlands Geographical Data
(Modified From Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Latitude	Longitude	Subasin Code	Acreage/ Classification[b]
29	Toussaint River complex				
	River area	41°35'10"	83°04'43"	B-3	2600.0/P
	Long Beach	41°36'38"	83°06'43"	B-3	60.0/P
30	Ottawa Wildlife Refuge complex				
	Magee Marsh	41°37'00"	83°09'24"	B-3	1916.0/P
	Ottawa NWR	41°37'18"	83°12'56"	B-3	1814.0/P
	Metzger Marsh	41°38'32"	83°14'25"	B-3	128.0/P
31	Cedar Point National Wildlife Refuge	41°40'48"	83°19'14"	B-3	1591.0/P
32	Niles Beach area	41°41'05"	83°21'30"	B-3	48.0/P
33	Otter Creek	41°41'06"	83°27'30"	A-12	70.0/P
34	Detwiler area	41°41'59"	83°28'40"	A-12	20.0/P,L

a. Refer to Figure WET-2.
b. Classification based on Cowardin, 1979.
System codes: P-palustrine; L-lacustrine; R-riverine.

Table WET-3: Lake Erie Coastal Wetlands - Potential Pressures
(Modified from Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Adjacent Land Use	Adjacent Pollution Sources	Ownership/ Development Pressure	Endangered Species Observed	Environmental Quality/Comments
1	Conneaut Creek	commercial	NPDES - none	private/severe	No	insufficient data
2	Ashtabula River	industrial	NPDES - none	private/severe	Yes	good
3	Geneva-on-the-Lake	residential	NPDES - none	State/moderate	No	insufficient data, State has proposed a small boat harbor for this site
4	Mentor Area complex	residential	NPDES - 1	private/moderate	Yes	good, attempt made in 1979 to fill wetland at Mentor Lagoons
5	Beaver Creek	residential	NPDES - none	private/moderate	No	insufficient data
6	Old Woman Creek	residential	NPDES - none	private-public/moderate	No	good, first to be named a National Estuarine Sanctuary on the Great Lakes
7	Huron River	residential	NPDES - 3	private/severe	No	insufficient data
8	Sawmill Creek	residential	NPDES - 2	private/severe	Yes	insufficient data, piecemeal filling has occurred in the past
9	Cedar Point	commercial	NDPES - none	private/moderate	No	insufficient data
10	Plum Brook area	residential	NPDES - none	private/moderate	No	insufficient data, low level radioactive waste discharged by NASA in the 1960's
11	East Bay complex	rural open space	NPDES - none	public/minimal	No	insufficient data
12	Hemming Ditch	residential	NPDES - none	private/severe	No	insufficient data
13	Big Island complex	residential	NPDES - none	private/severe	No	insufficient data

a. Refer to Figure WET-2.

Table WET-3 continued: Lake Erie Coastal Wetlands - Potential Pressures
(Modified from Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Adjacent Land Use	Adjacent Pollution Sources	Ownership/ Development Pressure	Endangered Species Observed	Environmental Quality/Comments
14	Bay View	rural open space	NPDES - none groundwater heavily contaminated due to underground disposal of sewage	private/moderate	No	insufficient data
15	Willow Point	residential	NPDES - none	private/moderate	No	insufficient data
16	Pickerel Creek	rural open space	NPDES - none	private/minimal	No	insufficient data
17	Muddy Creek Bay	rural open space	NPDES - 3	private/minimal	Yes	good
18	Port Clinton	residential	NPDES - none	private/moderate	No	insufficient data
19	Lockwood Road	residential	NPDES - none	private/moderate	No	insufficient data
20	Portage	rural open space	NPDES - none	private/moderate	No	insufficient data
21	Danbury	rural open space	NPDES - none	private/moderate	No	insufficient data
22	Bay Point	rural open space	NPDES - none	private/moderate	No	insufficient data
23	Kelleys Island	rural open space	NPDES - none	State/minimal	No	insufficient data
24	East Harbor complex	rural open space	NPDES - none	State/minimal	Yes	insufficient data
25	Middle Bass Island	rural open space	NPDES - none	private/minimal	No	insufficient data
26	North Bass Island	rural open space	NPDES - none	private/minimal	No	insufficient data
27	Perry Street	residential space	NPDES - 1 Davis-Besse thermal discharge nearby	private/severe	No	insufficient data

a. Refer to Figure WET-2.

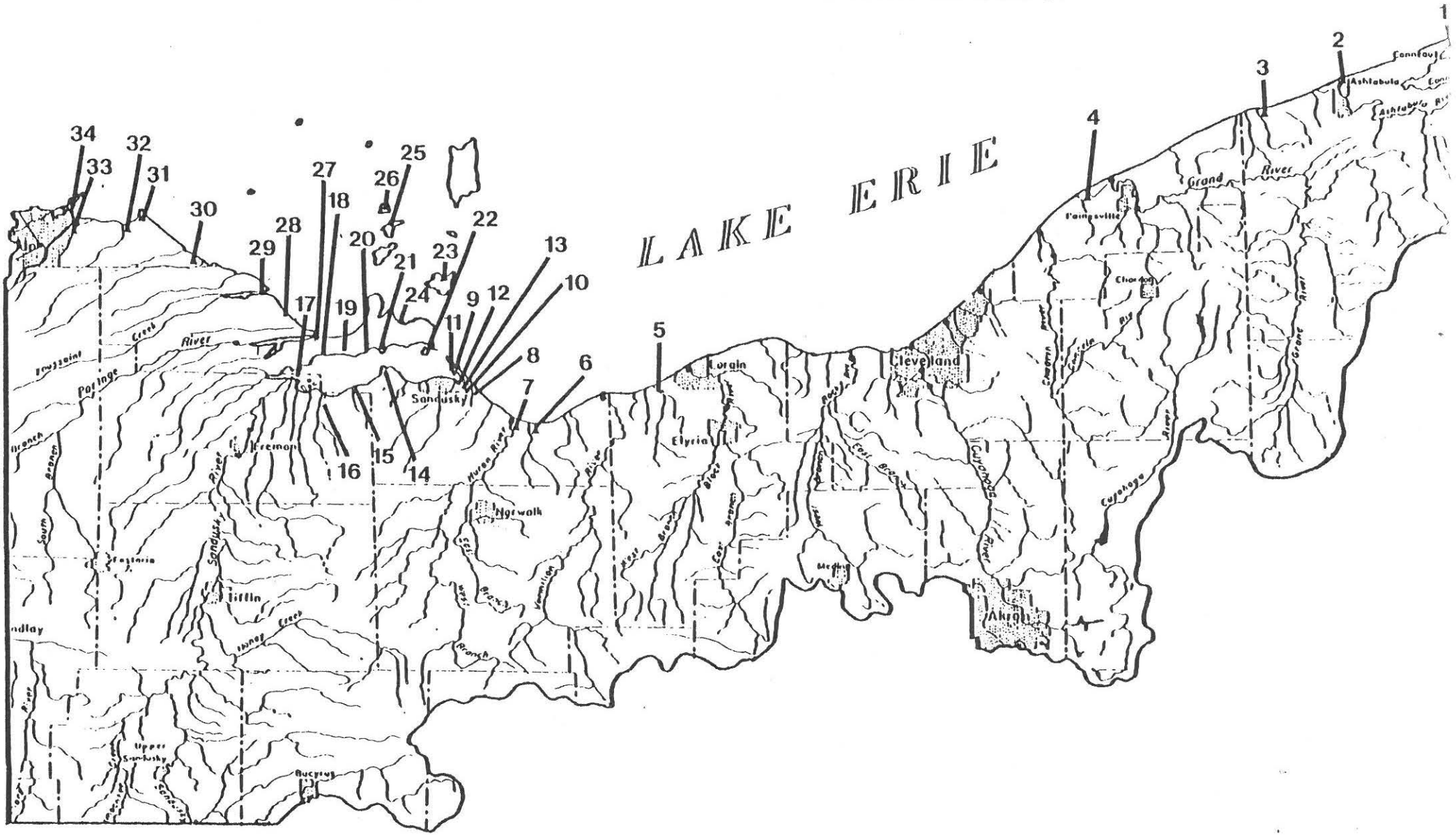
Table WET-3 continued: Lake Erie Coastal Wetlands - Potential Pressures
(Modified from Herdendorf and Hartley, 1980)

Map Code[a]	Wetland	Adjacent Land Use	Adjacent Pollution Sources	Ownership/ Development Pressure	Endangered Species Observed	Environmental Quality/Comments
28	Ottawa National Wildlife Refuge	rural open space	NPDES - 1	Federal/minimal private portion/severe	No	insufficient data
29	Toussaint River complex	rural open	NPDES - 2	private/moderate	No	insufficient data
30	Ottawa complex	rural open space	NPDES - 1 nearby commercial developement	Federal-private/minimal	Yes	good
31	Cedar Point National Wildlife Refuge	rural open space	NPDES - none	Federal/minimal	No	insufficient data
32	Niles Beach area	rural open space	NPDES - none	private/minimal	Yes	insufficient data
33	Otter Creek	commercial	NPDES - 6 area is heavily industrialized	private/severe	Yes	insufficient data
34	Detwiler area	residential	NPDES - none agricultural runoff problems	private/severe	Yes	insufficient data, water quality in area is poor

a. Refer to Figure WET-2.

Figure WET-2: Locations of Lake Erie Wetlands

Numbers represent locations of wetlands listed in Tables WET-2 and 3.



The Wetlands and Waterfowl Habitat Stamp, approved in 1981 by the Ohio Legislature, gives the Division of Wildlife the authority to issue a $5.00 stamp to waterfowl hunters, generating approximately $200,000 annually. Forty percent, or $80,000 of this fund will go to a conservation group for the purpose of purchasing wetlands. The remaining $120,000 is designated for wetland development in Ohio. While the monies can be used to acquire wetlands, they will first be spent on developing and maintaining existing State property. The first priority is to develop the Willow Point Marsh on the south shore of Sandusky Bay.

The Wildlife Area program, administered by the Division of Wildlife, gives the State the authority to acquire lands for various purposes including fish and game management. While many of these wildlife areas contain some wetlands, twelve of the areas contain an appreciable amount. Figure WET-3 shows the State wildlife areas with a notable amount of wetland areas.

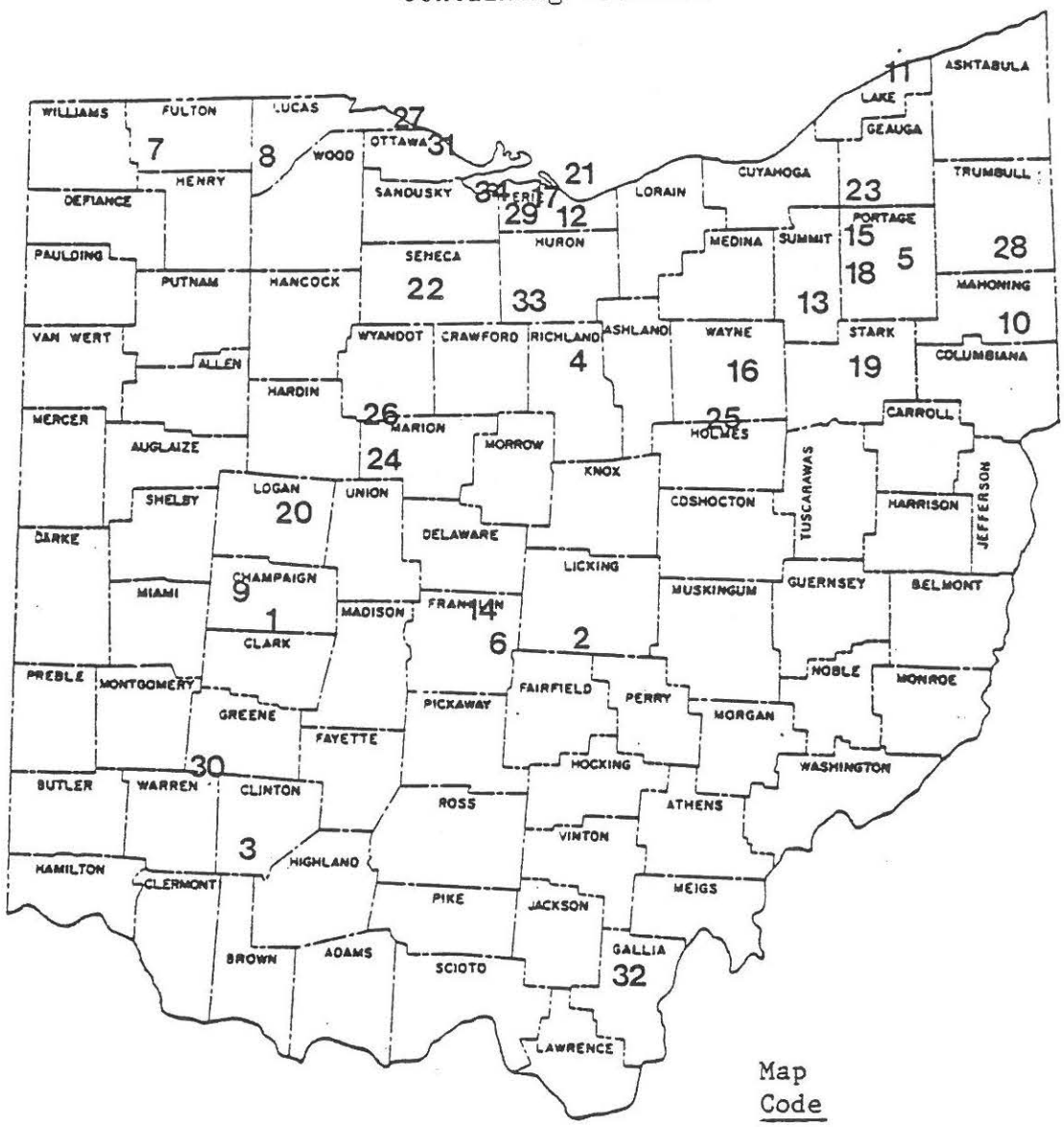
The Ohio Environmental Protection Agency (Ohio EPA) is also involved with the protection of wetlands. Pursuant to Section 401 of the Clean Water Act of 1977, Ohio EPA reviews U.S. Army Corps of Engineers permit applications for action on water quality certification. Section 401 water quality certification allows the State to assure that the chemical and biological integrity of the waters of the State, including wetlands, is protected from unreasonable and excessive discharges of dredged or fill material. Over 500 requests for certification have been reviewed during the past two years, and many of these requests have involved activities in wetlands.

Since the issuance of a wetlands policy by Ohio EPA in 1973, various regulatory and program changes have occurred resulting in increased focus on wetlands protection. Recent litigation, determining wetlands to be implicitly included as waters of the State and thus obligating Ohio EPA to protect, has reinforced the Agency's role in wetland protection. Additionally, increased knowledge of wetlands and public awareness have mandated the adoption of an updated policy. In 1980, Ohio EPA revised its wetland policy, which is presented in Appendix 1.

SUMMARY

An awareness and understanding of wetlands is rapidly developing within Ohio, but much is still not known about these areas. We know that a reduction of approximately 50 percent of the Lake Erie wetlands occurred between 1954 and 1974, yet original acreage estimates are uncertain and we are still in the process of determining the number of acres currently existing throughout the State. We also know that the seemingly insignificant loss of small portions of wetlands is an important incremental loss to wetland systems and the functions that they serve, but more needs to be known about the expendability of wetlands. As resource managers, we must strive to develop a more complete understanding of these areas. A comprehensive wetland program is needed within the State, showing Ohio's commitment to the preservation and management of wetlands.

Figure WET-3: Nature Preserves and Wildlife Areas
Containing Wetlands



Map Code	NATURE PRESERVES	Map Code	
1	Cedar Bog	20	Liberty Fen
2	Cranberry Bog	21	Sheldon Marsh
3	Dean A. Culbertson	22	Springville Marsh
4	Fowler Woods		
5	Eagle Creek		WILDLIFE AREAS
6	Gahanna Woods		
7	Goll Woods	23	Auburn Marsh
8	Irwin Prairie	24	Big Island
9	Kiser Lake Wetlands	25	Killbuck Marsh
10	Kyle Woods	26	Killdeer Plains
11	Mentor Marsh	27	Metzger Marsh
12	Old Woman Creek	28	Mosquito Creek
13	Portage Lake Wetlands	29	Resthaven
14	Edward S. Thomas	30	Spring Valley
15	Tinkers Creek	31	Toussaint
16	Browns Lake Bog	32	Tycoon Lake
17	DuPont Marsh	33	Willard Marsh
18	Gott Fen (Streetsboro Marsh)	34	Willow Point
19	Jackson Bog		

REFERENCES

Boto, K.G. and W.H. Patrick, Jr. 1978. Role of wetlands in the removal of suspended sediments. In: Wetland Functions and Values: The State of Our Understanding (P.E. Greeson, J.R. Clark, J.E. Clark, eds.), pp 479-489. American Water Resources Association, Minneapolis.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service. 103pp.

Darnell, R.M. 1978. Impacts of human modification on the dynamics of wetland systems. In: Wetland Functions and Values: The State of Our Understanding (P.E. Greeson, J.R. Clark, J.E. Clark, eds.), pp 200-209. American Water Resources Association, Minneapolis.

Herdendorf, C.E. and S.M. Hartley (eds.). 1980. Fish and Wildlife Resources of the Great Lakes Coastal Wetlands Within the United States. Volumes I and III. Center for Lake Erie Area Research, Ohio State University. Technical Report 170-3.

Jones, R.B., B.P. Borofka and R.W. Bachmann, 1976. Factors affecting nutrient loads in some Iowa streams. Water Reseach, 10: 117-122.

Niering, William A., 1966. The Life of the Marsh: The North American Wetlands.

Rounds, Burton W. 1955. Wetlands Inventory of Ohio. Office of River Basin Studies, U.S. Department of Interior, Fish and Wildlife Service.

Shaw, S.P. and C.G. Fredine. 1956. Wetlands of the United States. U.S. Fish and Wildlife Service, Circular 39. 67pp.

Tilton, D.L. and B.R. Schwegler. 1978. The values of wetland habitat in the great lakes basin. In: Wetland Functions and Values: The State of Our Understanding (P.E. Greeson, J.R. Clark, J.E. Clark, eds.) pp 267-277. American Water Resources Association, Minneapolis.

Weeks, John L. 1974. Ohio Wetlands Inventory. Federal project W-104-R-16, Ohio Department of Natural Resources, Division of Wildlife, Columbus. 51pp.

APPENDIX 1

OHIO EPA WETLANDS POLICY

The purpose of this policy is to conserve, protect, and manage Ohio's wetlands. Ohio EPA acknowledges the reduction of wetlands throughout the State and realizes the necessity of adopting a policy statement which addresses these concerns.

Wetlands are areas of land where the water table is at, or near, or above the land surface long enough each year to result in the formation of characteristic wet soil types, and to support the growth of water dependent vegetation. These will include marshes, swamps, bogs, and other such low-lying areas.

It shall be this Agency's policy to:

Recognize:
- the sensitive nature of wetland areas
- the irreversible loss resulting from damage to these areas
- primary and secondary adverse impacts resulting from activities in or near wetlands
- the unique ecological significance of wetlands

Prevent:
- the violation of Water Quality Standards
- the damaging misuse of wetlands including but not limited to adverse dredge and/or fill activities, interference with ground water recharge, impairment of natural water circulation and flow within wetlands
- piecemeal alterations to wetlands resulting in cumulative impacts to wetland systems

Provide:
- review guidelines to ensure consistency in project evaluation
- information and technical assistance to the public

Recommend:
- mitigation whenever there are no practicable alternatives to a proposed project
- restoration, whenever practicable, of wetlands severely damaged by unlawful alterations

Implementation of this policy will assure that particular attention and extensive evaluation is given to all projects which may potentially have direct or indirect adverse impacts on Ohio's wetlands.

Ohio EPA will apply this policy to the extent of its authorities in conducting all program activities, including but not limited to regulatory activities, research, development and demonstration, technical assistance, and review of Environmental Impact Statements.

PARAGRAPH FOR EXECUTIVE SUMMARY

This seventeen page section defines wetlands and their values, discusses previous and current wetland inventories, highlights the Lake Erie wetlands and summarizes State programs that help protect and manage wetlands.

LAKE ERIE BEACHES

1982 305(b) Report

Prepared by
Gerald R. Myers

Ohio Environmental Protection Agency
Office of Wastewater Pollution Control
Division of Surveillance and Water Quality Standards

Water Quality At Lake Erie Beaches

SUMMARY

The majority of Lake Erie beaches had good to excellent bathing water quality between 1978 and 1981. The only reported pollution related beach closings were at Port Clinton during 1979, 1980 and 1981; Vermilion in 1980; Lakeview in 1980 and 1981; and Lakeside in 1981. Six of the twenty-five beaches surveyed by the Ohio Department of Health in 1978 and 1979 were classified as having poor water quality, while four were reported to have excellent water quality. During 1980 and 1981, twelve of the twenty-eight beaches surveyed were classified as having poor water quality. Five had excellent water quality. This apparent deterioration over 1978/79 may be attributed to numerous causes including weather conditions and differences in monitoring programs.

Insufficient monitoring may have been one reason that so few beach closings occurred prior to 1980. Many local Boards of Health relied entirely upon the monitoring programs of the Ohio Department of Health for bathing water quality information. The beaches that were reported closed for a portion of the 1978-1980 seasons all had additional monitoring. Some of these extra monitoring programs were implemented in response to previously detected problems. Local communities along the Lake Erie shoreline should be encouraged to expand their Health Department programs to include more extensive water quality monitoring at Lake Erie beaches.

INTRODUCTION

In Ohio, the local Board of Health has primary responsibility for protecting public health at bathing beaches. However, the Ohio Department of Health conducts the water quality monitoring program at bathing beaches along the Lake Erie shore. In the event of a water quality standard violation, the Ohio Department of Health contacts the local Board of Health and informs them of the conditions. The final decision to take remedial action or close a beach is the responsibility of the local Board of Health.

Bacteriological data for this report was obtained from the Ohio Department of Health (ODH), Bureau of Environmental Health (1978, 1979, 1980 and 1981). Information concerning beach closings was obtained through a survey of local county and city Boards of Health having authority over Lake Erie beaches. The Ohio Department of Natural Resources (ODNR), Division of Parks and Recreation was contacted regarding the status of State Park beaches (Table LEB-1).

Bathing waters are defined in Rule 3745-1-08(E) of the Ohio Administrative Code (OAC) as "... all water segments directly related to existing swimming areas where bathhouses and/or lifeguards are provided." Bathing waters receive a special use designation in the Ohio Water Quality Standards. Lake Erie, outside of specifically excepted areas listed in OAC 3745-1-11(c), is designated bathing water. The fecal coliform standard for bathing water is:

> "Geometric mean fecal coliform content (either MPN or MF), based on not less than five samples within a 30 day period shall not exceed 200 Fecal coliforms per 100 ml sample; and shall not exceed 400 Fecal coliforms per 100 ml sample in more than ten percent of the samples taken during any 30 day period." (OAC 3745-1-07).

The Ohio Department of Health bathing water quality standard is slightly different from the Ohio EPA standard. The Ohio Department of Health states that the geometric mean, based on at least five samples, shall not exceed 200 fecal coliforms per 100 ml sample; nor shall more than ten percent of all samples in a month exceed 400 fecal coliforms per 100 ml sample. However, high counts which were predicted due to unusual weather conditions (heavy rainfall, high water) shall not be judged in the ten percent over 400 portion of the standard provided that the beach was closed for 24 hours after such conditions prevailed.

The Ohio Department of Health monitored water quality at Lake Erie Beaches once a week from mid-May through the first week of September. Additional samples were collected only in response to unusual conditions (e.g., complaints, heavy rain). Several communities along the Lake Erie Shore augment this water quality monitoring with additional samples collected by the city water department (Lorain) or the county Board of Health (Ottawa and Erie).

Several popular Lake Erie beaches are adjacent to or contained within areas specifically excepted from the bathing water quality standards (OAC 3745-1-11). In these areas the water quality standards for primary contact recreation are applicable. The fecal coliform standard for primary contact recreation is worded as above with limits of 1000/100 ml and 4000/100 ml replacing the 100/100 ml and 400/100 ml standards respectively. For the purposes of this report bacteriological data was compared to the OEPA bathing water quality standard only.

As noted in the Ohio EPA 1980 305(b) report, many beaches along the Lake Erie shore have lost popularity as bathing beaches due to extensive erosion. Erosion problems continued to threaten Lake Erie beaches all along the Ohio shoreline. Remedial action is being undertaken at one Lake Erie bathing beach (construction of a breakwall at Cleveland Lakefront State Park).

BEACH CLOSINGS

Several beaches included in this survey were reportedly closed as a result of pollution incidents. The Beach at Port Clinton was closed for a portion of the 1978 and 1979 recreational seasons. The beaches at Port Clinton, Vermilion and Lakeview Park were closed for several days during 1980 (telephone survey). Port Clinton Beach, Lakeview Park and Lakeside Beach were closed for 24 hours following pollution incidents on numerous occasions during 1981. White City Beach, Avon Lake Park, Century Park and Sheffield Lake Park were permanently posted as closed in 1981 due to pollution incidents (ODH 1981) (Table LEB-2).

The criteria for closing beaches employed by local boards of health has not been standardized. The fact that one beach was closed numerous times during the recreational season while another stayed open does not necessarily indicate poorer water quality, but rather that the local authorities dedicated more time and effort to health protection. In some areas, close proximity to sewage treatment plants or combined sewer overflows increases the potential for violations of the water quality standard during specific conditions (e.g., White City Beach).

Many communities depend on Lake Erie for a variety of uses. Several communities combine a bathing water quality monitoring program with their drinking water quality monitoring program. Both Ottawa and Erie County Boards of Health conducted extensive bathing water quality testing programs (samples collected weekly). The City of Lorain collected water quality samples several times each week (local beaches are in close proximity to the Lorain Wastewater Treatment Plant and Combined Sewer Overflow). These more extensive monitoring programs may have been responsible for more frequent detection of violations of the water quality standards, and subsequently, more frequent beach closings. Some agencies indicated that beaches would not be closed for any pollution incidents and, therefore, further monitoring would be useless. The lack of consistency in beach closing criteria and local monitoring programs has existed since water quality evaluations began.

VIOLATIONS

Twenty-five Lake Erie beaches were surveyed by the Ohio Department of Health in 1978 and 1979. Twenty-eight beaches were surveyed in 1980 and 1981. The majority of beaches had good to excellent water quality during the sampling period (Tables LEB-3 & LEB-4).

During 1978 a total of 42 violations of the Ohio EPA water quality standard occurred at Lake Erie beaches. Cleveland Lakefront State Park recorded the highest number of violations with 12. Considerable improvement occurred during 1979 with a reduction in the total number of violations to 34. Violations in 1980 and 1981 increased to 66 and 88 respectively. Beaches reporting frequent violations were Port Clinton, Avon Lake and White City Beach. (White City Beach is located just west of the Cleveland Easterly Sewage Treatment Plant of the Northeast Regional Sewer District. This facility provides primary treatment of excess combined sewage and stormwash. Violations of the bathing water standard would be expected to be more frequent during periods of inclement weather.)

During 1978-79, four of the Lake Erie beaches surveyed had excellent water quality. (No violations of the 200/100 ml or 400/100 ml standard over two years). Six beaches had poor water quality (three or more violations of the 200/100 ml standard and four or more violations of the 400/100 ml standard over two years). Based on the same criteria, five of the beaches surveyed in 1980 had excellent water quality (Table LEB-3).

All beaches classified as having poor water quality are located near urban centers (Table LEB-3 and Fig. LEB-1). The impact of high population densities are reflected by degraded water quality and frequent violations of the Ohio bathing water quality standard. Moderate fecal contamination at Lake Erie beaches is still geographically widespread but generally coincides with urban development.

Bathing water quality cannot be adequately assessed by the current monitoring program carried out by the Ohio Department of Health. In many of the violation situations, improvements in water quality would depend on reducing the impact of combined sewer overflow during periods of heavy rain. Local Boards of Health cannot assure safe bathing conditions based on five samples momthly, but need to adapt water quality monitoring programs in such a way as to meet their specific needs. Several communities have recognized the current inadequacy and have initiated programs to deal with this problem.

The Erie, Lorain and Ottawa County Health Departments carry out a more frequent sampling program (which accounts for more frequent beach closings). The other Lake Erie shore communities should be encouraged to undertake similar monitoring programs.

REFERENCES:

Ashtabula County Board of Health. 1978, 1979, 1980 (unpublished data).

City of Lorain Department of Water. 1978, 1979, 1980 (unpublished data).

Cuyahoga County Board of Health. 1978, 1979, 1980 (unpublished dat).

Erie County Board of Health. 1978, 1979, 1980 (unpublished data).

Lake County Board of Health. 1978, 1979, 1980 (unpublished data).

Lorain County Board of Health. 1978, 1979, 1980 (unpublished data).

Ohio Department of Health, Division of Environmental Health. 1978, 1979, 1980, 1981 (unpublished data) Bacteriological Monitoring at Lake Erie Beaches

Ohio Department of Natural Resources. 1953. Lake Erie Pollution Survey, Final Report. ODNR-Division of Water. Columbus, Ohio 201 pp.

Ohio Department of Natural Resources, Division of Parks and Recreation. 1978, 1979, 1980 (unpublished data).

Ohio Environmental Protection Agency. 1980. Biennial 305(b) Report to Congress.

Ottawa County Board of Health. 1978,1979, 1980 (unpublished data).

Sandusky County Board of Health. 1978, 1979, 1980 (unpublished data).

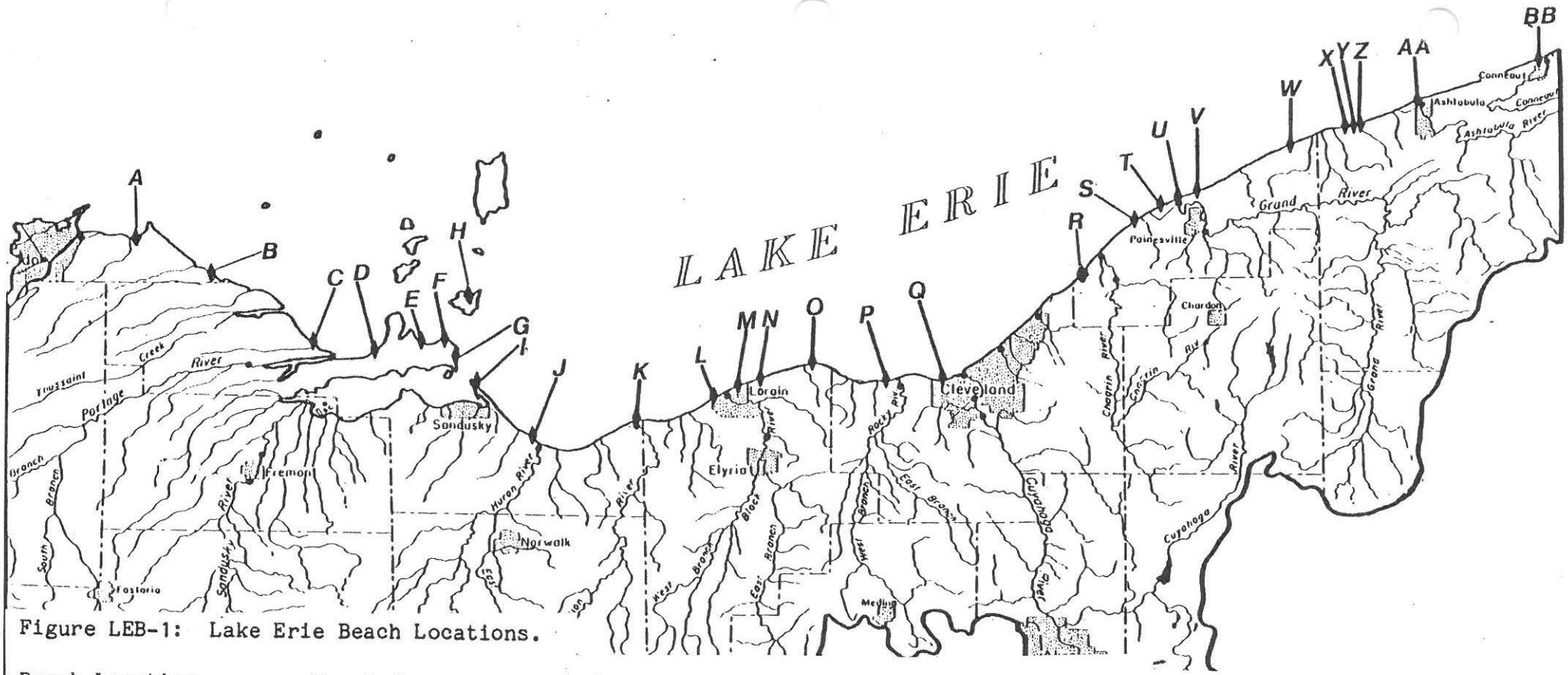


Figure LEB-1: Lake Erie Beach Locations.

Beach Location	Map Code
Maumee Bay St. Park	A
Crane Creek	B
Camp Perry	C
Port Clinton	D
East Harbor	E
Lakeside	F
Bay Point	G
Kelly's Island	H
Cedar Point	I

Beach Location	Map Code
Nickle Plate	J
Vermilion	K
Lakeview Park	L
Century Park	M
Sheffield	N
Avon Lake	O
Huntington	P
Cleveland Lakefront St. Park	Q
White City Beach	R
Mentor-on-the-Lake	S

Beach Location	Map Code
Headlands State Park	T
Fairport Harbor	U
Tuttle	V
Madison Township	W
Geneva St. Park	X
Geneva Township	Y
Saybrook	Z
Walnut	AA
Conneaut Township	BB

Table LEB-1: Agencies Responsible for Operation of Lake Erie Beaches.

County/Beach	Map Key	Operating Agency
Lucas County		
Maumee Bay State Park	A	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Crane Creek State Park	B	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Ottawa County		
Camp Perry	C	Ohio National Guard
Port Clinton	D	City of Port Clinton
East Harbor State Park	E	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Lakeside Beach	F	United Methodist Church
Bay Point Beach	G	Bay Point Association
Erie County		
Kelly's Island	H	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Cedar Point Causway	I	Cedar Point Amusement Park
Nickle Plate Beach	J	City of Huron
Vermilion	K	City of Vermilion
Lorain County		
Lakeview Park	L	City of Lorain
Century Park	M	City of Lorain
Sheffield Lake Community Park	N	Village of Sheffield Lake
Avon Lake Park	O	Village of Avon Lake
Cuyahoga County		
Huntington Park	P	Cleveland Metropolitan Parks District
Cleveland Lakefront	Q	Ohio Dept. of Natural Resources, Division of Parks and Recreation
White City Beach	R	City of Cleveland, Division of Parks and Recreation

Table LEB-1 continued: Agencies Responsible for Operation of Lake Erie Beaches.

Lake County		
Mentor Park	S	City of Mentor
Headlands Beach St. Park	T	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Fairport Harbor	U	City of Fairport Harbor
Tuttle Park	V	Madison Township
Madison Township Park	W	Madison Township
Ashtabula County		
Geneva State Park	X	Ohio Dept. of Natural Resources, Division of Parks and Recreation
Geneva Township Park	Y	Board of Commissioners Geneva Township Park
Saybrook Township Park	Z	Board of Commissioners Saybrook Township Park
Walnut Beach Park	AA	City of Ashtabula Recreation Dept.
Conneaut Township Park	BB	Conneaut Twp. Park Board of Trustees

Table LEB-2: Reported Beach Closings in 1980-1981.

Beach	Map Key	1980 Closings	1981 Closings	Additional Monitoring
Maumee Bay St. Park	A	0	0	No
Crane Creek	B	0	0	No
Camp Perry	C	0	0	Yes
Port Clinton	D	2	5	Yes
East Harbor	E	0	0	Yes
Lakeside	F	0	4	Yes
Bay Point	G	0	0	Yes
Kelly's Island	H	0	0	Yes
Cedar Point	I	0	0	No
Nickle Plate	J	0	0	Yes
Vermilion	K	4	0	Yes
Lakeview Park	L	4	1	Yes
Century Park	M	0	**	No
Sheffield	N	0	**	No
Avon Lake	O	0	**	No
Huntington	P	0	0	No
Cleveland Lakefront St. Park	Q	0	0*	No
White City Beach	R	0	**	No
Mentor-on-the-Lake	S	0	0	No
Headlands State Park	T	0	0	No
Fairport Harbor	U	0	0	No
Tuttle	V	0	0	No
Madison Township	W	0	0	No
Geneva St. Park	X	0	0	No
Geneva Township	Y	0	0	No
Saybrook	Z	0	0	No
Walnut	AA	0	0	No
Conneaut Township	BB	0	0	No

* "Poor Water Quality - Swim at Own Risk" signs posted on bad water quality days, but lifeguards remain on duty because people are always there to swim.

** Beaches permanently posted as closed due to high bacterial counts (ODH, 1981).

Table LEB-3: Water Quality Classifications at Lake Erie Beaches.

Beach	Map Key	1950/51[a]	1978/79[b]	1980/81
Maumee Bay St. Park	A	-	-	G
Crane Creek	B	-	G	E
Camp Perry	C	-	G	G
Port Clinton	D	-	P	P
East Harbor	E	A	E	G
Lakeside	F	A	G	P
Bay Point	G	-	E	E
Kelly's Island	H	-	-	E
Cedar Point	I	A	G	E
Nickle Plate	J	-	G	G
Vermilion	K	D	P	G
Lakeview Park	L	D	G	G
Century Park	M	U	P	P
Sheffield	N	-	P	P
Avon Lake	O	-	P	P
Huntington	P	U	G	G
Cleveland Lakefront St. Park	Q	U	P	P
White City Beach	R	-	-	P
Mentor-on-the-Lake	S	D	G	G
Headlands State Park	T	A	G	E
Fairport Harbor	U	A	E	G
Tuttle	V	A	G	G
Madison Township	W	A	G	G
Geneva St. Park	X	D	G	P
Geneva Township	Y	-	E	P
Saybrook	Z	A	G	P
Walnut	AA	D	G	P
Conneaut Township	BB	A	G	P

(a) Based on summary and evaluation by ODNR (1953)

Criteria: A - Acceptable; Monthly average total coliforms less than 1000/100ml

D - Doubtful; Seasonal average total coliforms less than 1000/100ml

U - Unacceptable; Seasonal average total coliforms greater than 1000/100ml

(b) Based on the ODH survey and evaluation by Ohio EPA

Criteria: E - Excellent; No violations of the 400/100ml standard over two years.

G - Good; No more than two violations of the 200/100ml standard and no more than four violations of the 400/100ml standard over two years.

P - Poor; three or more violations of the 200/100ml standard and four or more violations of the 400/100ml standard over two years.

Table LEB-4: Number of State Bathing Water Quality Standard violations at Lake Erie beaches 1978, 1979, 1980, and 1981 based on fecal coliform, geometric means, exceeding 200/100ml; or greater than 10% over 400/100 ml sample

Beach	Map Key	1978	1979	1980(a)	1981
Maumee Bay St. Park	A	0	-	0	4
Crane Creek	B	0	0	0	0
Camp Perry	C	0	0	0	1
Port Clinton	D	6	6	12	12
East Harbor	E	0	0	0	1
Lakeside	F	0	0	6	6
Bay Point	G	0	0	0	0
Kelly's Island	H	-	-	0	0
Cedar Point	I	0	0	0	0
Nickle Plate	J	0	2	1	1
Vermilion	K	4	4	2	3
Lakeview Park	L	0	1	0	2
Century Park	M	4	2	0	5
Sheffield	N	8	1	0	6
Avon Lake	O	6	7	3	9
Huntington	P	0	2	0	4
Cleveland Lakefront St. Park	Q	12	3	5	10
White City Beach	R	-	6	5	10
Mentor-on-the-Lake	S	0	0	1	4
Headlands State Park	T	0	0	0	0
Fairport Harbor	U	0	0	2	0
Tuttle	V	0	0	1	0
Madison Township	W	0	0	3	0
Geneva St. Park	X	0	0	6	3
Geneva Township	Y	0	0	2	4
Saybrook	Z	2	0	10	7
Walnut	AA	0	0	2	5
Conneaut Township	BB	0	0	5	1

(a) Based on 2-5 samples collected between 5/12/80 and 7/12/80.

OHIO'S LAKES

1982 305(b) Report

Prepared by
John Youger

Ohio Environmental Protection Agency
Division of Wastewater Pollution Control
Section of Surveillance and Standards

April, 1982

TABLE OF CONTENTS

SUMMARY 1

INTRODUCTION 2

DISCUSSION 3

Trophic Level Classification and Nutrients 8

Trophic State 8
Limiting Nutrients 10

Toxic and Undesirable Substances 11

Sanitary Water Quality 11

Bacteria 11
Sewerage Bypasses 12

Problem Areas 12
General 12
Regional 13

RECCOMENDATIONS 14

REFERENCES 15

APPENDIX A A-1
APPENDIX B B-1
APPENDIX C C-1
APPENDIX D D-1
APPENDIX E E-1
APPENDIX F F-1
APPENDIX G G-1
APPENDIX H H-1

INDEX OF TABLES AND FIGURES

Table 1.	Ohio's Priority Lakes Ranked in Specific Funding Groups.	7
Table 2.	A Comparison of Carlson's Trophic State Index to Standard Trophic State Terminology	9
Table 3.	Ohio's Most Severely Affected Problem Lakes	13
Figure 1.	Distribution of Inventoried Lakes	4
Figure 2.	Major and Minor Basins of Lake Erie and the Ohio River	5
Figure 3.	Distribution of Mesotrophic and Hypereutrophic Lakes	6

SUMMARY

One hundred-nineteen, or 54% of the lakes listed in Ohio EPA's public lake inventory have been classified according to trophic state using Carlson's (1977) lake classification scheme; 73 percent of the lakes were classified as eutrophic, 16 percent were classified as mesotrophic and 11 percent were classified hypereutrophic.

Lakes in southeastern Ohio tended to have lower trophic state index values than lakes in other sections of the state. This is believed to be due to the underlying nutrient poor sandstone bedrock and the low population density of the area.

Nitrogen and phosphorus concentrations were generally high in Ohio Lakes. The total nitrogen concentration at the two feet depth ranged from 0.8 mg/l in Hammertown Lake (summer) to 7.5 mg/l in Madison Lake (spring). Total phosphorus concentration at the two feet depth ranged from below the level of detectibility (2.0 ug/l) in Lake Hope (spring), Hammertown Lake (spring), and Dow Lake (summer) to 0.16 mg/l in West Fork Mill Creek Lake (summer).

As indicated by nitrogen-phosphorus (N-P) ratios, the majority of the lakes for which data is available were phosphorus limited or potentially phosphorus limited. The N-P ratios ranged from 5.1 to 1 in Sharon Lake to 400 to 1 in Dow Lake.

Sedimentation was a severe problem in many Ohio lakes. Van Buren Lake and Newport Lake have silted in to such an extent that recreational use of these lakes has been impaired

Lake depth has a major influence on water quality in Ohio lakes during the summer months. Lakes of 15 feet or greater depth usually developed distinct thermal gradients which restricts vertical water circulation and results in the degradation of water quality in the hypolimnion. Stable thermal gradients did not develop in wind-exposed shallow lakes (depths less than 15 feet). These lakes (e.g., Buckeye, Charles Mill, Tycoon, Madison and Clark Lakes) remained generally mixed and did not exhibit degraded water quality in their near bottom waters.

Fecal coliform counts were generally within Ohio Water Quality Standards (Ohio WQS). Counts in excess of Ohio WQS (fecal coliform and fecal streptococcus) were recorded after storm runoff events. The highest counts were recorded in the West Fork of Mill Creek Lake.

INTRODUCTION

Section 314 of Public Law 92-500 passed in 1972, amended in 1977 and elaborated on in subsequent Federal Registers, required all states to inventory their freshwater lakes and reservoirs and classify them according to trophic state (USEPA, 1978; USEPA, 1979; USEPA, 1980a). In addition, the states were to submit a 'priority list' of freshwater lakes with degraded water quality in need of improvement or lakes in which existing good water quality lakes was in need of protection, to the United States Environmental Protection Agency (USEPA) by January 1, 1982. The Act provided funds for these programs in the form of matching grants to qualifying states. The grants were of three types: 1) Phase 1 grants to fund feasibility studies into restoring or protecting lakes, 2) Phase 2 grants to assist in carrying out the recomendations of the feasibility studies, and 3) classification grants to assist in collecting sufficient information for determining the trophic state of the states lakes. Before December 31, 1981, the Phase 1 grants and Phase 2 grants were available to all states. After January 1, 1982, grants were available only to states that had classified their lakes and submitted a priority lake list.

The first step in the development of Ohio's priority lake list by the Ohio Environmental Protection Agency (Ohio EPA) was the completion of an inventory of all publicly owned lakes greater than 15 acres and the compilation of a list of references to previous studies. The completed inventory contains approximately 220 lakes and includes several lakes smaller than 15 acres, but of special interest. Appendix A contains a list of the inventoried lakes and reservoirs in alphabetical order, with a key to the drainage basins in which they are located. Figure 1 shows the distribution of the lakes and reservoirs by county. Appendix B contains the location, selected morphometric characteristics, use, and origin of the inventoried lakes. The lakes are listed by drainage basin with the major and minor basins of the Ohio River and Lake Erie watersheds grouped separately and are presented in the order from west to east (Figure 2).

The Ohio Department of Natural Resources (ODNR) has compiled another inventory which includes both publicly and privately owned lakes with a surface area greater than five acres (Bowell, 1980). Information provided for each lake includes, latitude and longitude, location by county and township, lake type, drainage basin, use, and surface area.

Winner, in 1962 reported the availability of published water quality data for two Ohio lakes: Buckeye Lake and Atwood Lake (Winner et al., 1962). Between 1962 and 1972 limnological studies in Ohio were limited and generally associated with university research. In 1972, a federally sponsored program known as the National Eutrophication Survey was initiated. The purpose of the survey was to collect information on various nutrient related parameters and to determine the trophic classification of selected lakes on a national basis. Twenty-one Ohio lakes were sampled through this program in 1973 and 1974.

In 1975, in order to collect water quality information on additional lakes, a cooperative program between Ohio EPA and the United States Geological Survey (USGS) was initiated. The project was designed to provide baseline water quality data for a wide range of parameters from routine field measurements to heavy metal concentrations. This program resulted in the collection of water quality data on 85 lakes and reservoirs between 1975 and 1980. The results of the program for the years 1975-1977 have been reported in two publications (Tobin and Youger, 1977 and 1979); a third publication, covering 1978 and 1979, is in preparation. Appendices C through H summarize most of the information collected as part of this survey as well as additional information reported in other sources.

In 1980 and 1981, meetings were held between Ohio EPA and ODNR to compile a list of priority lakes in need of restoration or protection for submittal to the USEPA. Table 1 is the finalized list of priority lakes with their rankings. Discription and rationale of the prioritization scheme can be found in the Ohio EPA Section 314 Report (Ohio EPA, 1982).

Simultaneously, with the compilation of the tentative priority list, the Ohio EPA applied for and subsequently received a classification grant from the USEPA. The grant was intended to provide funding for a field survey of all unsampled lakes on the prioritized list and the sampling of additional lakes as time and money permitted. Unfortunately the grant was received at a time when fiscal problems were occurring in Ohio and the program was scaled down and delayed. Only six lakes were sampled in 1980, 20 lakes were sampled in 1981.

In December of 1981, the Ohio EPA applied for and received (tentatively) an extension of the grant so that additional lakes could be sampled and classified. This survey will be conducted during 1982 using classification grant funds not expended in 1980 and 1981.

DISCUSSION

General Water Chemistry

Most lakes were found to be of the hard to very hard water type, although many soft water lakes were found in southeastern Ohio. Calcium, bicarbonate, and sulfate were the principal constituents. Specific conductance ranged from 42 micromhos in Lake Katharine (spring, near bottom) to 3890 micromhos in Essington Lake (summer, photic zone). Lakes in southeastern Ohio generally had lower specific conductances than those lakes surveyed in other sections of the state.

Seasonal thermal gradients developed in most lakes greater than 17 feet in depth. Zero or near zero oxygen levels were observed in the bottom waters (i.e., anerobic hypolimnions) of all lakes having stable thermal gradients during the summer sampling period. Hydrogen sulfide and ammonia were frequently present in lakes with anaerobic hypolimnions.

Dissolved oxygen supersaturation was common in the photic zone of the lakes sampled. The maximum dissolved oxygen level recorded was 20.8 mg/l (229% saturation) in Paint Creek Lake. Oxygen depletion with depth was noted at the summer sampling in all lakes sampled.

Figure 1. Distribution of Inventoried Lakes

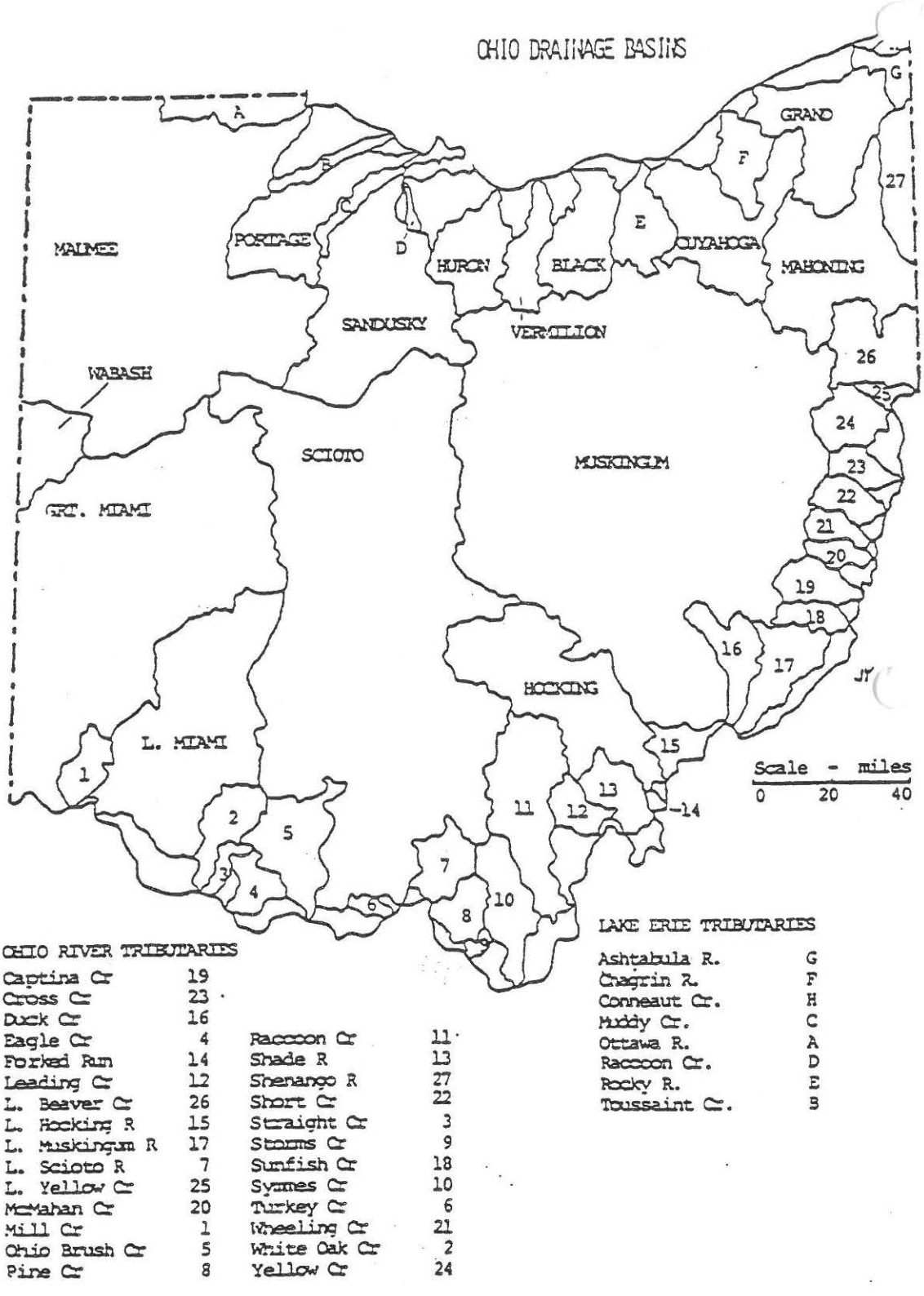


Figure 2. Major and Minor River Basins of Ohio.

Figure 3. Distribution of Mesotrophic (M) and Hypereutrophic (H) Lakes.

Table 1. Ohio's priority lakes ranked in specific funding groups.

RANK	NAME (Priority Points)
	A Group[1]
1	Springfield Lake (64)
2	Old Reid Park Ponds (58)
3	Snyder park Lagoons (55)
4	Sharon Lake (52)
	B Group[2]
1	Sippo Lake (65)
2	Mosquito Creek Lake (64)
3	Lake Isabella (62)
4	Newport Lake (60)
5	Lower Shaker Lake (59)
6	Miami Whitewater Lake (57)
7	Sunny Lake (56)
8	Brady Lake (55)
9	Acton Lake (54)
10	Winton Lake (51)
11	Van Buren Lake (49)
	C Group[3]
1	Punderson Lake (75)
2	Wolf Run Lake (68)
3	Buckeye Lake (67)
	Grand Lake St. Marys
4	Lake Snowden (65)
5	Lake Alma (64)
	Guilford Lake
	Nimisila Reservoir
6	Jackson Lake (62)
	Paint Creek Lake
7	Dow Lake (61)
8	Lake Hope (59)
	Pine Lake
9	Belmont Lake (58)
	Lake Park
10	Dillon Lake (57)
	Findley Lake
	Piedmont Lake
	C Group
11	East Fork Lake (56)
	Harrison Lake
	New Lexington Reservoir
12	Cutler Lake (55)
13	Rocky Fork Lake (54)
14	Lake White (52)
15	Adams Lake (51)
	Indian Lake
	Mt. Gilead Lake #2
	Richwood Lake
16	Essington Lake (50)
	Stonelick Lake
17	Clouse Lake (49)
18	Charles Mill Lake (47)
	Madison Lake
19	Mt. Gilead Lake #1 (46)
20	Lake Loramie (45)
21	Firestone Reservoir (41)
	Forty Acre Pond
22	Grant Lake (39)
	D Group[4]

Meadowbrook Lake has received Phase I funding.
Summit Lake has received Phase II funding.

1 A GROUP Those priority lakes for which local matching funds are available or might be available in the near future, and for which Phase I or Phase II applications are believed to be forthcoming.

2 B GROUP Those priority lakes where there is a viable interest in applying for Phase I or Phase II funding, but where local matching funds are not available.

3 C GROUP Those priority lakes recommended for inclusion on the prioritization list but for which active local support has not been identified.

4 D GROUP Those priority lakes for which Phase I or Phase II grants have been received or are being processed.

The pH of surface waters (upper 4 feet) ranged from 2.8 S.U. in Essington Lake to 9.8 S.U. in Guilford Lake. pH values of less than 7.0 S.U. were common in the hypolimnion of deeper lakes; values above 9.0 S.U. were frequently observed in photic zones during algal blooms.

Five-day BODs ranged from 0.4 mg/l Lake Hope (spring, bottom), to greater than 26 mg/l in West Fork Mill Creek Lake (summer, bottom).

Secchi disk transparency ranged from 0.33 feet/0.10 meters in Van Buren Lake (summer) to 21 feet/6.5 meters in Willard Reservoir (spring). Forty-three, or 37 per cent, of the lakes surveyed had Secchi disk transparency values greater than the 4 feet recommended for water bodies where swimming occurs. The lowest Secchi disk transparency values, such as those observed in Van Buren and Acton Lakes, appeared to be the result of high non-algal, suspended material.

Trophic State Classification and Nutrients

Trophic State

A Trophic State Index (TSI), developed by Carlson (1977), was used to determine the trophic state of Ohio lakes and reservoirs. A numerically based scheme was selected rather than a nomenclatural one because of the larger number of categories available and the greater sensitivity and objectivity in making determinations.

Carlson's TSI is based on the interrelationships of chlorophyll a concentration, Secchi disk transparency, and total phosphorus concentration. The index has a theoretical range of 0 to 100 and is defined so that for each doubling of algal biomass the index increases 10 units. The reciprocal relationship between algal biomass concentration and Secchi disk transparency also exists (i.e. each doubling in algal biomass results in a halving of Secchi disk transparency).

To formulate the TSI equations, Secchi disk values were transformed to the logarithm base 2 and a scale was developed so that the zero point was at a Secchi disk value greater than that ever recorded. The completed scale theoretically begins at TSI = 0 at a Secchi disk (SD) value equal to 64 meters and ranges to TSI = 100 at a SD equal to 0.062 meters (Table 2.). An equation was formulated to express this mathamatical relationship and regression equations were used to express similar relationships for chlorophyll a concentration and total phosphorus concentration. Table 2 relates the calculated TSI values to traditional trophic state terminology (Vallentyne, 1974).

Equations

The equations below are the ones developed by Carlson and used to determine TSI values:

a) Chlorophyll a (Chl a) concentration (mg/m^3) -
$TSI\ (Chl\ a) = 10\ (6-(2.04-0.68\ \ln Chl\ a)/\ln 2)$

b) Secchi disk (SD) transparency (meters) -
$TSI\ (SD) = 10(6-\ln SD/\ln 2)$

c) Total phosphorus (TP) concentration (mg/m^3) -
$TSI\ (TP) = 10\ (6-\ln(48/7P)/\ln 2)$

Table 2. A Comparison of Carlson's Trophic State Index to Standard Trophic State Terminology.

TSI VALUE	SD (meters)	TP (mg/m^3)	CHL a (ug/l)	TROPHIC STATE CLASSIFICATION
0	64	0.75	0.04	Oligotrophic
10	32	1.5	0.12	Oligotrophic
20	16	3	0.34	Oligotrophic
30	8	6	0.94	Oligotrophic
40	4	12	2.6	Mesotrophic
50	2	24	6.4	Eutrophic
60	1	48	20	Eutrophic
70	0.5	96	56	Hypereutrophic
80	0.25	192	154	Hypereutrophic
90	0.12	384	427	Hypereutrophic
100	0.062	768	1,183	Hypereutrophic

Except where noted in Appendix C, summer chlorophyll a concentrations at 2 feet, summer Secchi disk transparency, and the spring total phosphorus concentrations at 2 feet were used in conjunction with Carlson's equations to determine TSI values.

Sufficient data was available to allow classification of 119 or 54 percent of Ohio's inventoried lakes and reservoirs. Eighty-five (73%) are classified as eutrophic, 18 (16%) mesotrophic, and 13 (11%) hypereutrophic.

Nutrient data and TSI determinations for several years are available for 21 lakes (Appendix C). Changes in TSI values of greater than 10 percent were noted for five of these lakes. Comparison of data for Buckeye Lake from 1930 and several recent years indicates only slight differences in TSI values between 1930 and 1973. However, between 1973 and 1978 the TSI values decreased 12% . Lake Hope and Guilford Lake had increases in their TSI values of 56% and 11%, respectively during similar time periods. It is not yet apparent whether the observed differences in TSI values are indicative of trends or are normal biological variability.

Most of the lakes classified as mesotrophic are located in southeastern Ohio. This is due possibly to the nutrient poor nature of the sandstone bedrock which underlies much of the area. In addition, the low population densities in this part of the state may result in less nutrient enrichment. The hypereutrophic lakes were generally shallow and unstratified and included four of the old Ohio Canal feeder lakes, Buckeye, Indian, Loramie, and Grand Lake Saint Marys. These lakes were constructed when extensive private ownership of the shoreline was allowed. This permitted large numbers of permanent and vacation homes to be constructed along the lake shorelines. Such situations have traditionally been responsible for high nutrient levels. Figure 3 shows the distribution of lakes classified as mesotrophic or hypereutrophic, by county.

Limiting Nutrients

The requirements of essential nutrients can be expressed in ratios relative to a given dry weight of algal cells. Comparison of the ratios of these nutrients in the dry algal tissue with the ratios observed in lakes can be used as an indicator as to which nutrient(s) might be limiting or potentially limiting to a plant community. Vallentyne (1974) considered phosphorus and nitrogen the principle nutrients that limit algal growth and reported they are present in the ratio of 7N:1P:100 dry weight of algal tissue. This 7:1 ratio is used in this report with respect to the ratio of total nitrogen and total phosphorus (N-P) in determining which of these nutrients is limiting algal growth.

Lakes with N-P ratios greater than 7:1 were considered phosphorus limited or potentially phosphorus limited, while lakes with N-P ratios less than 7:1 were considered nitrogen limited or potentially nitrogen limited. Of the lakes listed in Appendix C, the spring N-P ratio was above eight to one in all but Sharon Lake (5.1 to 1). Sippo Lake and Forty Acre Pond had N-P ratios of 8.4 to 1 and 9.4 to 1 respectively and are considered borderline situations. All other lakes were considered to be phosphorus limited.

It is emphasized that this technique is a general indicator of nutrient limitation, is less useful as the 7:1 ratio is approached, and will vary with the algal species present in the lake. Other investigators use differant forms of nitrogen and phosphorus and other ratios in making their limiting nutrient determinations (Chiaudani and Vighi, 1974; Lee and Jones, 1979; Schindler, 1978; USEPA, 1974).

Toxic and Undesirable Substances

Toxic and undesirable substances are substances in water which, when present at critical levels, can produce harmful or degrading effects on organisms that live, in or use the water. The Ohio EPA (OAC, 1978), established the following criteria for selected constituents in water:

CONSTITUENT	WATER QUALITY STANDARD
Ammonia	varies with pH
Cadmium	1.2 ug/l
Chromium	50 ug/l
Copper	5 ug/l
Cyanide (free)	0.005 mg/l
Foaming agents (MBAS)	0.5 mg/l
Iron (dissolved)	1.0 mg/l
Lead	30 ug/l
Mercury	0.2 ug/l
Nickel	25 ug/l
Oil and grease (hexane soluble)	5.0 mg/l
Phenols	1 ug/l
Zinc	30 ug/l

Metal concentrations that exceded standards were observed in 34 lakes (Appendix F). Copper was the metal that most frequently exceeded Ohio WQS (21 lakes). The use of copper herbicides for the control of algae in these lakes could be a contributing factor to these high values. Nine public water supply reservoirs, (Berlin, Clear Fork, Hoover, Meander Creek, M.J. Kirwan and West Branch Reservoirs and Lakes Rockwell, Alum Creek, and Milton) had elevated copper concentrations, however, none exceeded public water supply standards.

Sanitary Water Quality

Bacteria

The sanitary water quality of Ohio lakes as determined by bacteriological measurements during the Ohio EPA-USGS cooperative survey was generally within Ohio WQS (Tobin and Youger, 1977, 1979 and unpublished data). High fecal coliform and/or fecal streptococcus counts were associated with storm runoff events or increases in lake water level. Counts that exceeded applicable Ohio WQS were never found during both the spring and summer samplings during the Ohio EPA-USGS cooperative program, (Appendix H). Fecal coliform counts taken at monthly intervals during the summer at state park beaches during 1980 and 1981 by the Ohio Department of Health (Ohio Department of Health, unpublished data 1980 and 1981) are in agreement with Ohio EPA data. Breithaupt noted that certain lakes more often exceed water quality standards after storms (Breithaupt, 1981).

Below is a list of reported sewerage bypasses that affected public lakes in Ohio between 1978 and 1980 (OEPA, Emergency Response Section). This list is not considered to be complete, and is included for general information purposes only. Information is lacking on the effects of bypasses. Sizes of the bypasses are estimated.

Date	Lake Affected	Size	Type	Ohio EPA Spill #
VI-28-78	Pleasant Hill Lake	L	Sewerage	78-06-1039
IX-13-78	Berlin Reservoir	L	Raw sewerage	78-09-1440
VI-19-79	Indian Lake	S	Sewerage	79-06-1163
III-6-80	Griggs Reservoir	S	Raw sewerage	80-03-0343
IV-2-80	Pleasant Hill Lake	S	Sewerage sludge	80-04-0503
VI-23-80	Sharon Woods Lake	S	Raw sewerage	80-06-1160
VII-10-80	Winton Woods Lake	L	Sewerage	80-07-1312
XII-21-80	Grand Lake St. Marys	L	Sewerage	80-12-2594

Problem Areas

General

A widespread and severe problem occurring in Ohio's lakes is sedimentation (Hahn, 1955). Although sedimentation was not measured directly during the Ohio EPA-USGS cooperative survey or the Ohio EPA classification survey, the problem was observed while on reconnaissance of the lakes. Submerged silt deposits and developing marshy areas were observed at the inflows of nearly all impounded lakes. Erosion problems which occur in varying degrees in most watersheds of the state are of special concern because most (80%) of Ohio's lakes and reservoirs are impoundments. Very few Ohio lakes have watersheds in which there is not some disturbance to the soil. This disturbance may be tillage, building construction, or resource extraction. All of these activities increase sedimentation above the normal rate. Newport and Van Buren Lakes have silted in to such an extent that wet lands are developing near their inflows and certain areas of these lakes have been 'permanently' removed from recreational use.

Because erosion is generally considered to be a nonpoint source problem complete control of all the 'sources' of sediment in a large watershed is difficult. It is encouraging to note that a program has been initiated within the Ohio EPA to identify critical nonpoint source areas and to work with

local soil conservationists in an attempt to bring the sedimentation problem under control (Ohio EPA, 1981).

Another impairment to the use of lakes for water recreation and/or water supply is the excessive growth of aquatic plants, both rooted aquatics and phytoplankton. Rooted aquatics frequently interfere with boating, fishing and swimming. The surface of Clark Lake was 80 percent covered by rooted aquatics. This type of vegetation tends to be the greatest problem in water of high transparency, which is generally very desirable, but which allows light penetration onto the lake bottom. This permits the growth of rooted aquatics plants in the extensive littoral zones common to impounded lakes.

Phytoplankton, i.e. algal blooms, are generally the greatest problem in shallower lakes such as Lake Loramie and Sharon Lake. Secchi disk transparency in these lakes is usually less than one meter. Algal blooms should decrease to some extent as advanced agricultural practices, such as targeted fertilizer applications, become more widespread resulting in decreased nutrient inputs from agricultural areas. Regional waste water treatment plants (WWTPs) are coming on-line in certain areas and will alleviate the nutrient enriching effects of septic tank leachate inflow and/or erratically functioning package plants.

Regional

The problems associated with resource extraction are most prevalent in southeastern Ohio. These problems include sedimentation, cited earlier, and the inflow of a variety of chemical substances which, when present in excessive amounts prevent use of the lake for its intended purpose. The best example of lake seriously degraded by the results of resource extraction is Essington Lake in Perry County. This lake receives runoff from unreclaimed coal strip mined areas and is nearly devoid of those organisms normally found in Ohio lakes. Measured values for pH levels were 3 S.U. or below throughout the water column; concentrations of total aluminum, total copper, total iron, total manganese, total nickel, and total zinc were the highest observed during the classification survey.

Detailed information on specific public water supply watersheds affected by coal mine drainage can be found in Recommendations for Reclamation in Watersheds of Surface Public Water Supplies Affected by Abandoned Coal Mine Drainage (Ohio EPA, 1981b)

Table 3. Ohio's Most Severely Affected Problem Lakes.

NAME	PROBLEM
LAKE VAN BUREN	Severe sedimentation
NEWPORT LAKE	Severe sedimentation
WINTON LAKE	Extensive sedimentation, sewerage bypasses
LAKE CLARK	Extensive growths of aquatic macrophytes
ESSINGTON LAKE	pH below 3, no alkalinity, inflow of low pH water from strip mine areas
LAKE HOPE	Inflow of low pH water from deep mines
SHARON LAKE	Frequent algal blooms

RECOMMENDATIONS

Intensive monitoring of a few important lakes and watersheds should be initiated. The monitoring effort should be directed toward the development of lake nutrient budgets so that predictive capability is developed for more lakes in the state. Different lakes should be selected annually so that gradually nutrient budgets will be available for a majority of Ohio's lakes.

The collection of baseline data for unsampled lakes should be continued. Lakes previously sampled should be resampled on an 5-10 year interval. Priority should be to sampling those lakes with watersheds likely to experience significant changes, e g. lakes in strip mining areas.

A review of available information on lake sedimentation in Ohio should be initiated. Monitoring of the appropriate parameters should be incorporated into the ongoing lake sampling program so that some quantitative knowledge of the problem can be achieved.

The staff of the Lake Monitoring Group of the Ohio EPA Division of Surveillance should be increased so that the lake monitoring effort can become more organized and less reliant on field assistance from outside of the work group.

REFERENCES

Anttila, P. W., and R. L. Tobin. 1978. Fluvial sediment in Ohio. Geological Survey Water-supply Paper 2045. U.S. Department of the Interior, U.S. Geological Survey.

Bowell, D. F. 1980. Inventory of Ohio's Lakes, Ohio Water Inventory Report No. 26. Ohio Department of Natural Resources, Division of Water, Columbus, Ohio. 281pp.

Carlson, R. E. 1977. A trophic state index for lakes. Limnol. Oceanogr. 22:361-369.

Chiaudani, G. and M. Vighi 1974. The N:P Ratio and tests with Selenastrum to predict eutrophication in lakes. Water Res. 8:1063-1069.

Clark, C. F. 1945. Lotus and cat-tail control-Lake St. Marys, Lake Loramie. Ohio Cons. Bull. 8(8): 18-19.

_____ 1960. Lake St. Marys and its management. Ohio Dept. Nat Res. Div. Wild. Pub. W-324. 107pp.

DeShon, J.E. 1979. Phytoplankton of Summit Lake. Unpublished M.S. Thesis. Un. of Akron, Akron, Ohio.

Detmers, F. 1912. An ecological study of Buckeye Lake. A contribution to the phytogeography of Ohio. Proc. Ohio Acad. Sci. Special Paper 19. 138pp.

Federal Water Pollution Control Act Amendments of 1972. US Code Vol 33, Sec 1151.

Fisher, J. E. 1960. The metazoan plankton of Acton Lake (Ohio). Unpublished M.S. Thesis. Miami Univ., Oxford, Ohio. 35pp.

Hahn, C. L. 1955. Reservoir sedimentation in Ohio. Ohio Dept. Nat. Res. Div. of Water Bulletin 24. 87pp.

Handley, D. E. 1946. A summary of four years of chemical control of aquatic vegetation at Buckeye Lake, Ohio. Ohio Dept of Nat. Res., Div. of Wild. Bull. 244. 12pp.

Harris, E. F. 1973. Feasibility study of Lake Hope mine drainage demonstration project. U.S. EPA, Office of Research and Monitoring. 97pp.

Judd, J. B. 1971. The effects of ecological changes on the largemouth bass in Buckeye Lake, Ohio. Unpublished M.S. Thesis. The Ohio State Univ., Columbus, Ohio. 86pp.

Judd, J. B., and S. H. Taub. 1973. The effects of ecological changes on Buckeye Lake, Ohio, with emphasis on largemouth bass and aquatic vascular plants. Ohio Biological Survey, Biological Notes No. 6. The Ohio State Univ., Columbus, Ohio.

Studies Report for Dept. of Zoology, Ohio Univ., Athens, Ohio.

Koehrsen, L.G. 1969. Lake Hope acid mine drainage abatement program. Stanley Consultants Rept. 38pp.

Lee, G.F., and R.A. Jones. 1979. An approach for assessing the water quality significance of chemical contaminants in urban lakes. Paper presented at the Urban Stormwater and Combined Overflow-Impact on Receiving Water Bodies Conference, November 26-28, 1979. Orlando, Fla.

Moore, D. J. 1960. Ecological study of Dow Lake 1959-1960. Report submitted to Ohio Univ., Athens, Ohio.

Ohio EPA. 1978. Water Quality Standards. Chapter 3745.1 Ohio Administrative Code (OAC).

Ohio EPA. 1981a. Agricultural water quality problem areas. Report of the Ohio EPA, Office of Planning Coordinator. Columbus, Ohio.

Ohio EPA. 1981b. Recommendations for Reclamation in Watersheds of Surface Public Water Supplies Affected by Abandoned Coal Mine Drainage. Industrial Coal Operations Group, Ohio EPA. Columbus, Ohio.

Ohio EPA. 1982. 314 Report for the State of Ohio. Unpublished report submitted to the U.S. EPA in January, 1982.

Olive, J. H., and B. P. Karn. 1980. Trophic assessment of ten publicly-owned northeastern Ohio lakes. Ohio J. Sci. 80(5):223-231.

Porter, F.T. 1949. A limnological investigation of Van Buren Lake, Van Buren, Ohio. Unpublished M.S. Thesis No. 143. Bowling Green Univ., Bowling Green, Ohio.

Schindler, D.W. 1978. Factors regulating phytoplankton production and standing crop in the worlds freshwaters. Limnol. Oceanogr. 23:478-486.

Tobin, R. L., and J. D. Youger. 1977. Limnology of selected lakes in Ohio 1975. Water-Resources Investigations 77-105. U.S. Department of the Interior, U.S. Geological Survey.

Tobin, R. L., and J. D. Youger. 1979. Chemical and biological quality of selected lakes in Ohio - 1976 and 1977. Water-Resources Investigations 78-109. U.S. Department of the Interior, U.S. Geological Survey. 29pp.

Tressler, W., L. H. Tiffany, and W. P. Spencer. 1940. Limnological studies of Buckeye Lake. Ohio Jour. Sci. 40:262-290.

U.S. Environmental Protection Agency. 1974. An approach to a relative trophic index system for classifying lakes and reservoirs. Working Paper No. 24. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon. 36pp.

U.S. Environmental Protection Agency. 1975a. Report on Buckeye Lake. Working Paper No. 396. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975b. Report on Charles Mill Reservoir. Working Paper No. 397. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975. Report on Berlin Lake. Working Paper No. 400. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975d. Report on Grand Lake Saint Marys. Working Paper No. 411. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975e. Report on Grant Lake. Working Paper No. 401. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975f. Report on Indian Lake. Working Paper No. 404. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975g. Report on Lake Loramie. Working Paper No. 405. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975h. Report on Mosquito Creek Reservoir. Working Paper No. 406. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975i. Report on Rocky Fork Lake. Working Paper No. 409. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975n. Report on Delaware Lake. Working Paper No. 399. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975q. Report on O'Shaughnessy Reservoir. Working Paper No. 407. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975r. Report on Pleasant Hill Reservoir. Working Paper No. 408. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975t. Report on Berlin Lake. Working Paper No. 395. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975x. Report on Pymatuning Reservoir. Working Paper No. 425. U.S. EPA Pacific Northwest Envir. Research Center, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1978. Availability of clean lakes grants assistance. Fed. Reg. 43:29617-29619. July. 10, 1978.

U.S. Environmental Protection Agency. 1979. Grants for restoring publicly owned freshwater lakes-state local assistance. Fed. Reg. 44:5685-5693. Jan. 29, 1979.

protecting and restoring publicly owned freshwater lakes. Rules and Regulations. Fed. Reg. 45:7788-7800. Feb. 5, 1980.

U.S. Environmental Protection Agency. 1980b. Clean Lakes Guidance Manual. Office of Water Regulation and Standards, U.S. EPA. Washington, D.C., 20460.

Vallentyne, J. R. 1974. The Algal Bowl (Lakes and Man). Miscellaneous Publication 22. Dept. of the Environment, Fisheries and Marine Service, Ottawa. 186pp.

Vollenweider, R.A., and P.J. Dillon. 1974. The application of the phosphorus loading concept to eutrophication research. NRC Associate Committee on Scientific Criteria for Environmental Quality, Canada Centre for Inland Waters. Burlington, Ontario. 42pp.

Vorhies, A. L. 1967. A plankton study of Dow Lake, Athens County, Ohio. M.S. Thesis. Ohio Univ., Athens, Ohio.

Ward, R. W. and H. C. Seibert. 1963. Investigations into the limnology of Dow Lake, Athens County, Ohio. Ohio Jour. Sci. 63:128-144.

Winner, R. W., and J. F. Haney. 1967. Spatial and seasonal distribution of planktonic Cladocera in a small reservoir (Acton Lake). Ohio Jour. Sci. 67:274-288.

Winner, R. W., R. L. Strecker, and E. M. Ingersoll. 1962. Some physical and chemical characteristics of Acton Lake, Ohio. Ohio Jour. Sci. 62:55-61.

APPENDIX A

Lake to drainage basin key.

NAME (Synonym)	BASIN
ACTON LAKE	Great Miami River Basin
ADAMS LAKE	Ohio Brush Creek River Basin
ALDRICH POND	Portage River Basin
ALMA LAKE	Raccoon Creek Basin
ALUM CREEK LAKE	Scioto River Basin
AMANN RESERVOIR	Scioto River Basin
AMICKS RESERVOIR	Scioto River Basin
ANTRIM QUARRY LAKE	Scioto River Basin
AQUILLA LAKE	Cuyahoga River Basin
ARCHBOLD RESERVOIR #1	Maumee River Basin
ARCHBOLD RESERVOIR #2	Maumee River Basin
ATWOOD LAKE	Muskingum River Basin
BALDWIN LAKE	Cuyahoga River Basin
BARBERTON RESERVOIR	Muskingum River Basin
Barkcamp Lake see BELMONT LAKE	McMahon Creek Basin
BARNESVILLE RESERVOIR #1	Captina Creek Basin
BARNESVILLE RESERVOIR #3	Captina Creek Basin
BASS LAKE	Great Miami River Basin
BEACH CITY RESERVOIR	Muskingum River Basin
Beaver Creek Reservoir see CLYDE RESERVOIR	Sandusky River Basin
BELMONT LAKE (Barkcamp Lake)	McMahon Creek Basin
BERLIN LAKE	Mahoning River Basin
Blue Rock Lake see CUTLER LAKE	Muskingum River Basin
BRESLER RESERVOIR (Spencerville Reservoir)	Maumee River Basin
Buck Creek Lake see C.J. BROWN RESERVOIR	Great Miami River Basin
BUCKEYE LAKE	Muskingum River Basin
BUCYRUS RESERVOIR #1	Sandusky River Basin
BUCKRUS RESERVOIR #2	Sandusky River Basin
BURR OAK LAKE (Tom Jenkins Reservoir)	Hocking River Basin
CAESAR CREEK LAKE	Little Miami River Basin
CALDWELL LAKE	Duck Creek River Basin
CAMBRIDGE CITY RESERVOIR	Muskingum River Basin
CELERYVILLE RESERVOIR	Huron River Basin
CHARLES MILL RESERVOIR	Muskingum River Basin
C.J. BROWN RESERVOIR (Buck Creek Lake)	Great Miami River Basin
CLARK LAKE	Great Miami River Basin
CLEAR FORK RESERVOIR	Muskingum River Basin
CLENDENING LAKE	Muskingum River Basin
CLOUSE LAKE	Hocking River Basin
CLYDE RESERVOIR	Raccoon Creek Basin
CLYDE RESERVOIR (Beaver Creek Reservoir)	Sandusky River Basin
COE LAKE	Rocky River Basin
LAKE COHASSET	Mahoning River Basin

NAME (Synonym)	BASIN
CORNING RESERVOIR (Dotson Run Reservoir)	Hocking River Basin
COWAN LAKE	Little Miami River Basin
CROOKSVILLE RESERVOIR	Muskingum River Basin
CRYSTAL LAKE	Mahoning River Basin
CUTLER LAKE (Blue Rock Lake)	Muskingum River Basin
DALE WALBURN RESERVOIR	Mahoning River Basin
DEER CREEK LAKE (Pickaway County)	Scioto River Basin
DEER CREEK RESERVOIR (Stark County)	Mahoning River Basin
DELAWARE LAKE	Scioto River Basin
DELTA RESERVOIR	Maumee River Basin
DESHLER RESERVOIR	Maumee River Basin
DILLON LAKE	Muskingum River Basin
Dotson Run Reservoir see CORNING RESERVOIR	Hocking River Basin
DOW LAKE	Hocking River Basin
EAST BRANCH RESERVOIR	Cuyahoga River Basin
EAST FORK LAKE	Little Miami River Basin
EAST RESERVOIR (a Portage Lake)	Muskingum River Basin
EASTWOOD LAKE	Great Miami River Basin
ECHO LAKE	Great Miami River Basin
ENGLEWOOD RESERVOIR	Great Miami River Basin
ESSINGTON LAKE	Hocking River Basin
FERGUSON LAKE	Maumee River Basin
FINDLAY RESERVOIR #1 ('Old Reservoir')	Maumee River Basin
FINDLAY RESERVOIR #2 ('New Reservoir')	Maumee River Basin
FINDLEY LAKE	Black River Basin
FIRESTONE RESERVOIR	Muskingum River Basin
FORKED RUN LAKE	Forked Run Basin
FORTY ACRE POND	Maumee River Basin
Fostoria Reservoir #5 see LAKE LACOMTE	Portage River Basin
FOX LAKE	Hocking River Basin
FRIENDSHIP PARK LAKE	Yellow Creek Basin
FULTON POND	Maumee River Basin
GEAUGA LAKE	Cuyahoga River Basin
GENEVA LAKE	Grand River Basin
LAKE GLACIER	Mahoning River Basin
GORGE METRO PARK LAKE	Cuyahoga River Basin
GRAND LAKE SAINT MARY'S	Maumee River Basin
GREENFIELD LAKE	Hocking River Basin
GRIGGS RESERVOIR	Scioto River Basin
GUILFORD LAKE	Little Beaver Creek Basin
HAMMERTOWN LAKE (Jackson City Reservoir)	Scioto River Basin
HARGUS LAKE	Scioto River Basin
Harmon's Pond see SUNNY LAKE	Cuyahoga River Basin
HARRISON LAKE	Mahoning River Basin

NAME (Synonym)	BASIN
HIGHLANDTOWN LAKE	Little Yellow Creek Basin
HILLSBORO RESERVOIR	Scioto River Basin
HINCKLEY LAKE	Rocky River Basin
Hocking Lake see LAKE LOGAN	Hocking River Basin
HODGSON LAKE (Muddy Lake)	Portage River Basin
HOOVER RESERVOIR	Scioto River Basin
LAKE HOPE	Raccoon Creek Basin
HOSTERMAN LAKE	Great Miami River Basin
HUFFMAN RESERVOIR	Great Miami River Basin
INDEPENDANCE DAM	Maumee River Basin
INDIAN LAKE	Great Miami River Basin
LAKE ISABELLA	Little Miami River Basin
JACKSON LAKE	Symmes Creek Basin
Jackson City Reservoir see HAMMERTOWN LAKE	Scioto River Basin
JEFFERSON LAKE	Yellow Creek Basin
Jefferson Reservoir see LAMPSON RESERVOIR	Grand River Basin
LAKE KATHERINE	Scioto River Basin
KILLDEER PONDS	Sandusky River Basin
KILLDEER RESERVOIR	Sandusky River Basin
KIPTON RESERVOIR	Vermilion River Basin
KISER LAKE	Great Miami River Basin
KNOX LAKE	Muskingum River Basin
LA DUE RESERVOIR (Lake LaDue)	Cuyahoga River Basin
LAKE LACOMTE (Fostoria Reservoir #5)	Portage River Basin
LAKE LOGAN (Hocking Lake)	Hocking River Basin
LAKE LORAMIE	Great Miami River Basin
LAKE LAMBERJACK	Portage River Basin
LAMPSON RESERVOIR (Jefferson Reservoir)	Grand River Basin
LEESVILLE LAKE	Muskingum River Basin
LEIPSIC RESERVOIR	Maumee River Basin
LIMA LAKE RESERVOIR	Maumee River Basin
LIME KILN LAKE	Muskingum River Basin
LONG LAKE (a Portage Lake)	Muskingum River Basin
M.W.C.D. - CHIPPEWA SUBDIVISION RESERVOIR	Muskingum River Basin
MADISON LAKE	Scioto River Basin
MARGARET CREEK CONSERVANCY DISTRICT STRUCTURE # 4	Hocking River Basin
MEADOWBROOK LAKE	Cuyahoga River Basin
MEANDER CREEK RESERVOIR	Mahoning River Basin
MEDINA LAKE	Rocky River Basin
METZGER RESERVOIR	Maumee River Basin
MIAMI-WHITEWATER LAKE	Great Miami River Basin
LAKE MILTON	Mahoning River Basin
M.J. Kirwan Reservoir see WEST BRANCH RESERVOIR	Mahoning River Basin

APPENDIX A (continued)

NAME (Synonym)	BASIN
MOGADORE RESERVOIR	Cuyahoga River Basin
MOLANDER LAKE	Ottawa River Basin
MONROE LAKE	Sunfish Creek Basin
LAKE MOSIER	Portage River Basin
MOSQUITO CREEK LAKE	Mahoning River Basin
MOUNT GILEAD LAKE #1 (the upper lake)	Scioto River Basin
MOUNT GILEAD LAKE #2 (the lower lake)	Scioto River Basin
Muddy Lake see HODGSON LAKE	Portage River Basin
MUNROE BASIN	Muskingum River Basin
LAKE NESMITH	Cuyahoga River Basin
NETTLE LAKE	Maumee River Basin
NEW LEXINGTON RESERVOIR 'New Reservoir'	Hocking River Basin
NEW LEXINGTON RESERVOIR 'Old Reservoir'	Hocking River Basin
NEW LONDON RESERVOIR	Vermilion River Basin
NEW WILMINGTON RESERVOIR	Little Miami River Basin
NEWPORT LAKE	Mahoning River Basin
NIMISILA RESERVOIR	Muskingum River Basin
NORTH BALTIMORE RESERVOIR	Portage River Basin
NORTH BRANCH KOKOSING	Muskingum River Basin
NORTH RESERVOIR (a Portage Lake)	Muskingum River Basin
NORWALK RESERVOIR #1 (Upper Reservoir)	Huron River Basin
NORWALK RESERVOIR #2 (Lower Reservoir)	Huron River Basin
NORWALK RESERVOIR #3 (Memorial Reservoir)	Huron River Basin
O'SHAUGHNESSY RESERVOIR	Scioto River Basin
OAKHILL RESERVOIR	Symmes Creek Basin
OAKTHORPE RESERVOIR (Rush Run Conservancy District Structure #VI-D)	Hocking River Basin
OBERLIN RESERVOIR	Black River Basin
OLD REID MEMORIAL PARK PONDS	Great Miami River Basin
OTTAWA RESERVOIR	Maumee River Basin
OXBOW LAKE	Maumee River Basin
PAINT CREEK LAKE	Scioto River Basin
LAKE PARK	Mahoning River Basin
PAULDING RIVER	Maumee River Basin
PIEDMONT LAKE	Muskingum River Basin
PINE LAKE	Scioto River Basin
LAKE PIPPEN	Cuyahoga River Basin
PLEASANT HILL RESERVOIR	Muskingum River Basin
PORTAGE LAKES	Muskingum River Basin
EAST RESERVOIR	Muskingum River Basin
LONG LAKE	Muskingum River Basin
NORTH RESERVOIR	Muskingum River Basin
TURKEY FOOT LAKE	Muskingum River Basin
WEST RESERVOIR	Muskingum River Basin
POWERS RESERVOIR	Scioto River Basin
PROVIDENCE DAM	Maumee River Basin
PUNDERSON LAKE	Cuyahoga River Basin
PYMATUNING RESERVOIR	Shenango River Basin

NAME (Synonym)	BASIN
RICHWOOD LAKE	Scioto River Basin
RILEY RESERVOIR	Sandusky River Basin
ROCK MILL LAKE (Hunters Run Conservancy District Structure #2)	Hocking River Basin
ROCKY FORK LAKE	Scioto River Basin
LAKE ROCKWELL	Cuyahoga River Basin
ROOSEVELT LAKE	Turkey Creek Basin
ROSE LAKE	Hocking River Basin
ROSS LAKE	Scioto River Basin
LAKE RUPERT	Raccoon Creek Basin
RUSH RUN LAKE	Great Miami River Basin
RUSH CREEK CONSERVANCY DISTRICT STRUCTURES IV-A IV-C V-A VII-C	Hocking River Basin
SALEM RESERVOIR	Little Beaver Creek
SALT FORK RESERVOIR	Muskingum River Basin
SAULISBERRY PARK LAKE	Maumee River Basin
SCHOONOVER LAKE	Maumee River Basin
SENECAVILLE LAKE (Seneca Lake)	Muskingum River Basin
SHARON LAKE	Mill Creek Basin
SHREVE LAKE	Muskingum River Basin
SIPPO LAKE	Muskingum River Basin
SNOWDEN LAKE (Margaret Creek Conservancy District Structure #2)	Hocking River Basin
SNYDER PARK LAGOONS	Great Miami River Basin
SPARROW RESERVOIR	Short Creek Basin
SPENCER LAKE	Black River Basin
SPENCERVILLE RESERVOIR	Maumee River Basin
SPRING VALLEY LAKE	Little Miami River Basin
SPRINGFIELD LAKE	Cuyahoga River Basin
STATE FISH HATCHERY LAKE	Maumee River Basin
STONELICK LAKE	Little Miami River Basin
SUMMIT LAKE	Cuyahoga River Basin
SUNNY LAKE (Harmons Pond)	Cuyahoga River Basin
SWANTON RESERVOIR	Maumee River Basin
SWIFT RUN LAKE	Great Miami River Basin
TAPPAN LAKE	Muskingum River Basin
Tom Jenkins Reservoir see BURR OAK LAKE	Hocking River Basin
TURKEY CREEK LAKE	Turkey Creek Basin
TURKEYFOOT LAKE (a Portage Lake)	Muskingum River Basin
TWIN LAKES RESERVOIR	Maumee River Basin
TYCOON LAKE	Raccoon Creek Basin
UPPER SANDUSKY RESERVOIR	Sandusky River Basin

NAME (Synonym)	BASIN
VAN BUREN LAKE	Portage River Basin
VAN WERT CITY RESERVOIR #1	Maumee River Basin
VAN WERT CITY RESERVOIR #2	Maumee River Basin
LAKE VESUVIUS	Storms Creek Basin
VETO LAKE	Little Hocking River Basin
WABASH RIVER CONSONSERVANCY DISTRICT RESERVOIR #1	Wabash River Basin
WALLACE LAKE	Rocky River Basin
WASHINGTON COURT HOUSE RESERVOIR	Scioto River Basin
WAUSEON RESERVOIR #1	Maumee River Basin
WAUSEON RESERVOIR #2	Maumee River Basin
WELLINGTON RESERVOIR (Upper Resevoir)	Black River Basin
WELLINGTON UPGROUND RESERVIOR (Lower Reservoir)	Black River Basin
WELLSVILLE RESERVOIR	Little Yellow Creek Basin
WEST BRANCH RESERVOIR (M.J. Kirwan Reservoir)	Mahoning River Basin
West Fork Mill Creek see WINTON LAKE	Mill Creek Basin
WEST RESERVOIR (a Portage Lake)	Muskingum River Basin
WESTERVILLE RESERVOIR	Scioto River Basin
WESTVILLE RESERVOIR	Mahoning River Basin
LAKE WHITE	Scioto River Basin
WILLARD CITY RESERVOIR	Vermilion River Basin
WILLS CREEK	Muskingum River Basin
WILMINGTON RESERVIOR	Little Miami River Basin
WINTON LAKE (West Fork Mill Creek Lake)	Mill Creek Basin
ZEPERNICK LAKE	Little Beaver Creek Basin

APPENDIX B Inventory of Selected Ohio Lakes and Reservoirs with Locations and Morphometric Characteristics.

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE[3]	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD[1] RATIOS W/A V/I	DEVELOPMENT[2] Shoreline Volume	USE YEAR CONSTRUCTED
			MAJOR BASINS TO THE OHIO RIVER						
			Wabash River Basin						
WABASH RIVER CONSERVANCY RESERVOIR #1									
Rossburg	40°18'57"	Wabash River	140	-	-	984	-	-	FR
Darke (D) I	84°38'05"		-		-	-	-	-	1964
			Great Miami River Basin						
ACTON LAKE									
Oxford	40°18'57"	Fourmile Creek	625	8	15.0	9400	101	2.3	R
Butler (H-10) I	84°38'05"		99		31	71600	0.13	1.5	1964
BASS LAKE									
Fairborn	39°49'50"	Dugout	40	-	-	-	-	-	R
Greene (H-4) D	84°03'10"		12		-	7990	-	-	-
CLARENCE J. BROWN RESERVOIR (Buck Creek Lake)									
New Moorfield	39°57'02"	Buck Creek	2120	11	17.5	36900	25	1.7	FR
Clark (H-3) I	83°44'50"		82		40	46480	0.79	1.3	1974
CLARK LAKE									
New Moorfield	39°56'53"	Sinking Creek	100	3	4.6	456	45	2.1	R
Clark (H-3) I	83°39'38"		7		9	4850	0.09	1.5	1957
EASTWOOD LAKE									
Dayton North	39°47'00"	Mad River	125	-	-	-	-	-	FR
Montgomery (H-4) I	84°08'20"		-		-	-	-	-	-
ECHO LAKE									
Piqua East	40°09'22"	Unnamed	15	-	-	-	-	-	RW
Miami (H-2) I	84°15'37"		2.1		-	1240	-	-	-
ENGLEWOOD RESERVOIR (a dry dam)									
Trotwood	39°52'13"	Stillwater River	130	-	-	-	-	-	FR
Montgomery (H-6) I	84°17'08"		651		-	416640	-	-	1922
GRAND LAKE SAINT MARY'S	See Maumee River Basin								
HOSTERMAN LAKE									
Donnelsville	39°54'44"	Unnamed	-	-	-	-	-	-	R
Clark (H-4) I	83°54'16"		-		16	-	-	-	1938
HUFFMAN RESERVOIR (a dry dam)									
Fairborn	39°37'50"	Mad River	43	-	-	-	-	-	FR
Greene (H-4) I	84°05'26"		671		-	446600	-	-	1922

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Great Miami River Basin (continued)									
INDIAN LAKE									
Russells Point	40°28'03"	North Fork Great	6134	29	12.3	46300	11	2.6	R
Logan (H-1) I	83°52'32"	Miami River	110		16	61540	0.75	2.3	1853
KISER LAKE									
St. Paris	40°11'50"	Mosquito Creek	380	5	8.5	3215	165	1.8	R
Champaign (H-2) I	83°58'55"		98		12	5590	0.58	2.1	1940
LAKE LORAMIE									
Fort Loramie	40°21'27"	Loramie Creek	785	30	4.9	13000	63	7.6	R
Shelby (H-2) I	84°21'32"		70		7	48570	0.27	2.1	1844
MIAMI-WHITEWATER LAKE									
Shandon	39°15'35"	Unnamed	85	4.5	3.6	935	26	3.5	R
Hamilton (H-11) I	84°44'45"		3.4		8.9	2170	0.43	1.2	1967
OLD REID RARK PONDS (several lagoons, total acreage given)									
Springfield	39°56'43"	Dugout	7.2	-	-	-	-	-	R
Clark (H-3) I	83°45'30"		-		-	-	-	-	1896
RUSH RUN LAKE									
West Elkton	39°35'42"	Rush Run	54	-	-	820-	-	-	R
Preble (H-10) I	84°36'46"		-		-	-	-	-	1969
SNYDER PARK LAGOONS (several lagoons, total acreage given)									
Springfield	39°55'54"	Dugout	5.9	-	7.2	4.8	-	-	R
Clark (H-3) D	83°50'20"		-		7.9	-	-	2.7	-
SWIFT RUN LAKE									
Piqua West	40°10'35"	Patterson Run	40	2.1	-	-	117	2.4	RW
Miami (H-2) I	85°15'48"		7.3		-	4300	-	-	1950
Little Miami River Basin									
CAESAR CREEK LAKE									
Oregonia	39°29'10"	Caesar Creek	2830	40	36	102000	54	5.4	FRW
Warren (K-3) I	84°03'35"		237		100	170630	0.60	1.1	1977
COWAN LAKE									
Clarksville	39°23'18"	Cowan Creek	720	17	16.7	120000	-	-	R
Clinton (K-3) I	83°55'30"		51		38	43800	-	1.3	1948
EAST FORK LAKE									
Batavia	39°01'23"	East Fork	2120	34	43	90400	103	5.3	FRW
Clermont (K-4) I	84°08'59"	Little Miami River	342		95	264480	0.34	1.4	1978

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Little Miami River Basin (continued)									
LAKE ISABELLA									
Madeira	39°14'37"	Dugout	23	1	9.2	210	0.08	1.5	R
Hamilton (K-5) D	84°18'18"		0.03		21.0	21	10.0	1.3	-
NEW WILMINGTON RESERVOIR									
Wilmington	39°24'32"	Upground	54	-	-	1013	-	-	W
Clinton (K-3) U	83°48'30"		NA		-	-	-	-	1963
SPRING VALLEY LAKE									
Waynesville	39°33'50"	Unnamed	79	2	-	87	-	-	R
Warren (K-1) I	84°01'14"		-		-	-	-	-	1936
STONELICK LAKE									
Newtonsville	39°12'57"	Stonelick Creek	171	9.5	10.2	1750	86	5.2	R
Clermont (K-4) I	84°05'01"		23		21	18900	0.09	1.5	1949
WILMINGTON RESERVOIR									
Wilmington	39°24'33"	Upground	-	-	-	276	-	-	W
Clinton (K-3) U	83°49'00"		NA		-	-	-	-	1945
Scioto River Basin									
ALUM CREEK LAKE									
Galena	40°11'03"	Alum Creek	3387	46	24.1	81700	23	5.6	FRW
Delaware (M-4) I	82°57'50"		123		60	80400	1.02	1.2	1975
AMANN RESERVOIR									
Galion	40°42'45"	Rocky Fork of	24	-	-	200	-	-	RW
Morrow (M-3) I	82°49'21"	Olentangy	11		-	7300	0.03	-	1943
AMICKS RESERVOIR									
Galion	40°42'11"	Upground	49	-	-	1515	-	-	RW
Morrow (M-3) U	82°49'22"		NA		-	-	-	-	1968
ANTRIM QUARRY LAKE									
Columbus	40°04'38"	Dugout	-	-	-	-	-	-	R
Franklin (M-3) D	83°02'02"		-		-	-	-	-	-
DEER CREEK LAKE									
Clarksburg	39°36'20"	Deer Creek	1277	19.4	16.5	21029	139	3.9	FRW
Pickaway (M-7) I	83°14'42"		278		44	196900	-	1.1	1968
DELAWARE RESERVOIR									
Delaware	40°21'30"	Olentangy River	1300	35	10.8	14000	188	6.9	R
Delaware (M-3) I	80°04'08"		381		31	224330	0.06	1.0	1951

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Scioto River Basin (continued)									
GRIGGS RESERVOIR									
Northwest Columbus	40°00'56"	Scioto River	385	15	11.9	4563	1749	5.5	WR
Franklin (M-5) I	83°05'38"		3.1		25	556760	0.01	1.4	1905
HAMMERTOWN LAKE									
Jackson	39°03'23"	Unnamed	186	8.4	22.6	4200	11	4.4	WR
Jackson (M-16) I	82°41'05"		3.1		50	2430	1.73	1.4	1955
HARGUS LAKE									
Ashville	39°37'36"	Hargus Creek	146	5	15.9	2325	28	3	R
Pickaway (M-8) I	82°53'15"		6.5		47	4330	0.55	1.0	1956
HILLSBORO RESERVOIR									
Hillsboro	39°14"46"	Spring Brook	22	-	-	212	-	-	RW
Highland (M-16) I	83°36'00"		1.0		-	768	0.28	-	1947
HOOVER RESERVOIR									
Northeast Columbus	40°05'58"	Big Walnut Creek	2825	45	21.3	60340	43	-	RW
Franklin (M-4) I	82°52'53"		190		60	131800	0.46	1.1	1954
LAKE KATHERINE									
Jackson	39°05'05"	Rock Run	51	-	-	-	-	-	A
Jackson (M-16) I	82°40'22"		-		20	-	-	-	1940
MADISON LAKE									
Walnut Run	39°51'58"	Deer Creek	106	4	5.6	594	345	2.8	R
Madison (M-7) I	83°22'35"		57.2		7	32260	0.02	2.4	1946
MOUNT GILEAD LAKE #1 (the upper lake)									
Mount Gilead	40°32'57"	Sams Creek	-	-	-	-	-	-	R
Morrow (M-3) I	82°48'40"		-		-	-	-	-	1930
MOUNT GILEAD LAKE #2 (the lower lake)									
Mount Gilead	40°32'57"	Sams Creek	-	-	-	-	-	-	R
Reverse Morrow (M-3) I	82°49'01"		-		-	-	-	-	1930
O'SHAUGHNESSY RESERVOIR									
Shawnee Hills	40°09'12"	Scioto River	829	17	15.7	13120	770	4.2	RW
Delaware (M-5) I	83°07'33"		997		51	531700	0.02	0.92	1925
PAINT CREEK LAKE									
Bainbridge	39°15'03"	Paint Creek	1190	30	17.1	20300	308	6.2	FR
Highland (M-13) I	83°21'15"		573		45	422100	0.05	1.1	1973

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W-(sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Scioto River Basin (continued)									
PINE LAKE									
Laurelville	39°23'03"	Tar Hollow Creek	5.7	0.9	9.8	134	110	1.7	R
Ross (M-3) I	82°44'57"		2.4		15.1	1675	0.08	1.9	1938
POWERS RESERVOIR									
Galion	40°43'05"	Upground	29	-	-	460	NA	-	W
Crawford (M-3) U	82°48'12"		NA		-	-	-	-	1957
RICHWOOD LAKE									
Richwood	40°25'44"	Dugout	15	1	-	-	-	1.8	R
Union (M-2) D	83°17'56"		-		9.8	-	-	-	1940's
ROCKY FORK LAKE									
Rainsboro	39°10'45"	Rocky Fork Creek	2020	30	16.9	34100	36	4.8	FR
Highland (M-14) I	83°33'06"		114		49	86900	0.39	1.0	1952
ROSS LAKE									
Chillicothe	39°20'05"	Unnamed	140	3.3	12.5	1745	17	-	R
Ross (M-11) I	82°54'20"		3.8		29	2850	0.61	1.3	1968
WASHINGTON COURT HOUSE RESERVOIR									
Washington Court House	39°32'29"	Upground	32	1	-	614	-	1.3	W
Fayette (M-13) U	83°27'22"		NA		-	-	-	-	1955
WESTERVILLE RESERVOIR									
Galena	40°09'31"	Unnamed	53	-	-	780	33	-	W
Delaware (M-4) I	82°56'25"		2.7		28	1800	0.43	-	1960
LAKE WHITE									
Piketon	39°06'05"	Pee Pee Creek	337	8.3	11.1	3734	70	3.2	R
Pike (M-15) I	83°00'50"		37		25	27050	0.14	1.3	1935
Hocking River Basin									
BURR OAK RESEVOIR									
Corning	39°45'54"	East Branch	664	20	14.0	9300	32	5.5	FR
Athens (O-2) I	82°18'12"	Sunday Creek	33		35	23900	0.39	1.2	1952
CLOUSE LAKE									
Somerset	39°45'54"	Center Branch Little	42	1.5	4	234	113	1.7	R
Perry (O-1) I	82°18'12"	Brush Creek	7.4		11.3	5722	0.04	1.1	1948

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Hocking River Basin (continued)									
CORNING RESERVOIR (Dotson Run Reservoir)									
Corning	39°35'47"	Dotson Run	16	-	-	-	-	-	W
Perry (O-2) I	82°04'19"		-		-	-	-	-	-
DOW LAKE									
Athens	39°20'07"	Strouds Run	153	7.0	15	1844	31	4.0	R
Athens (O-3) I	82°01'04"		7.3		43	5940	0.31	1.0	1884
ESSINGTON LAKE									
Fultonham	39°45'28"	Unnamed	16	-	7.5	-	28	-	S
Perry (O-1) I	82°12'32"		-		22	-	-	-	-
FOX LAKE									
The Plains	39°18'00"	Unnamed	48	-	9.7	465	53	-	R
Athens (O-2) I	82°11'32"		4.0		25	3264	0.14	1.0	1967
GREENFIELD LAKE									
Carroll	39°46'15"	Unnamed	14	-	-	80	41	-	FR
Fairfield (O-1) I	82°37'57"		0.9		-	620	0.13	-	-
LAKE LOGAN (Hocking Lake)									
Logan	39°32'03"	Clear Fork	341	10	9.2	3140	26	3.9	R
Hocking (O-2) I	82°27'03"		14.0		24	10800	0.51	1.2	1955
MARGARET CREEK CONSERVANCY DISTRICT STRUCTURE #4									
Athens	39°15'10"	Biddle Creek	28	-	-	105	-	-	F
Athens (O-2) I	82°07'28"		4.2		-	3280	0.03	-	1971
NEW LEXINGTON RESERVOIR ('New' Reservoir)									
New Lexington	-	Unnamed	47	-	-	-	18	-	R
Perry (O-1) I	-		1.2		-	880	-	-	1975
NEW LEXINGTON RESERVOIR ('Old' Reservoir)									
New Lexington	39°44'00"	Unnamed	36	-	9.6	344	14	-	RW
Perry (O-1) I	82°12'55"		0.8		34	590	0.58	0.85	1936
OAKTHORPE RESERVOIR (Rush Run Conservancy District Structure #VI-D)									
Rushville	39°48'33"	Unnamed	43	-	-	795	-	-	FR
Fairfield (O-1) I	82°26'55"		-		-	-	-	-	1975
ROCK MILL LAKE (Hunters Run Conservancy District Structure #9)									
Amanda	39°44'20"	Unnamed	20	-	-	150	256	-	FR
Fairfield (O-1) I	82°41'56"		8.0		-	5500	0.03	-	1960

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W-(sq mi)	PERIMETER Lake-L-(miles)	DEPTH Mean Maximum (feet)	CAPACITY-V-(ac ft) INFLOW-I-(ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER (continued)									
Hocking River Basin (continued)									
ROSE LAKE									
South Bloomingville	39°25'27"	Unnamed	17	-	-	-	-	-	R
Hocking (O-1) I	82°32'20"		-		-	-	-	-	1970
RUSH CREEK CONSERVANCY DISTRICT STRUCTURE IV-A									
New Lexington	-	Unnamed	44	-	-	536	17	-	F
Perry (O--) I	-		1.2		-	860	0.62	-	1975
RUSH CREEK CONSERVANCY DISTRICT STRUCTURE IV-C									
-	-	-	32	-	-	-	-	-	F
Perry (O--) I	-		-		-	-	-	-	-
RUSH CREEK CONSERVANCY DISTRICT STRUCTURE V-A									
Junction City	39°44'09"	Unnamed	20	-	-	85	-	-	F
Fairfield (O-1) I	82°22'26"		2.3		-	1650	0.05	-	1970
RUSH CREEK CONSERVANCY DISTRICT STRUCTURE VII-C									
Bremen	-	Raccoon Run	15	-	-	-	-	-	F
Fairfield (O-1) I	-		-		-	-	-	-	-
SNOWDEN LAKE (Margaret Creek Conservancy District Structure #2)									
Albany	39°15'00"	Unnamed	137	6.9	15.5	2120	19	4.2	FRW
Athens (O-2) I	82°11'17"		4.0		44	3230	0.66	1.1	1970
Muskingum River Basin									
ATWOOD LAKE									
Mineral City	40°31'36"	Indian Fork	1540	27.6	15.3	23600	29	5.0	FR
Tuscarawas (P-8) I	80°18'03"		70	-	30	51100	0.46	1.5	1937
BARBERTON RESERVOIR									
Akron West	41°02'54"	Wolf Creek	196	-	-	2056	88	3.2	W
Summit (P-6) I	81°32'38"		27	-	-	15500	0.13	-	1927
BEACH CITY RESERVOIR									
Navarre	-	Sugar Creek	420	-	3.9	1700	457	-	F
Tuscarawas (P-5) I			-		10	-	-	1.2	-
BUCKEYE LAKE									
Millersport	39°55'40"	South Fork of	3140	32	6.4	19940	9.6	4.1	R
Licking (P-14) I	82°29'18"	Licking River	49.2		13	30700	0.65	1.5	1832

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
			MAJOR BASINS TO THE OHIO RIVER						
			Muskingum River Basin (continued)						
CAMBRIDGE CITY RESERVOIR									
Cambridge	40°00'17"	Unnamed	26	-	-	614	-	-	W
Guernsey (P-18) I	81°33'31"		0.7	-	-	520	1.18	-	-
CHARLES MILL RESERVOIR									
Perrysville	40°44'27"	Black Fork	1350	33	5.5	7400	102	6.4	R
Ashland (P-2) I	82°21'58"		-		30	-	0.06	2.4	
CLEAR FORK RESERVOIR									
Mansfield	40°41'53"	Clear Fork	977	14	11.0	10740	22	3.2	RW
Richland (P-1) I	82°36'23"		33.7		23	23320	0.46	1.4	1949
CLENDENING LAKE									
Tippecanoe	40°16'08"	Brushy Fork	1800	44	29.0	26500	25	7.4	FR
Harrison (P-9) I	81°16'36"		69		35	52200	0.51	2.5	1939
CROOKSVILLE RESERVOIR #3									
Deavertown	39°42'05"	Black Fork	15	-	-	142	-	-	W
Perry (P-15) I	82°04'28"		-	-	-	-	-	-	1956
CUTLER LAKE									
Salt Creek	39°49'02"	Salt Creek	18	1.2	8.9	163	57	2.0	R
Muskington (P-16) I	81°51'00"		1.6	-	16	1200	0.14	1.7	1937
DILLON LAKE									
Zanesville West	40°00'00"	Licking River	1325	21.2	21.1	27900	139	4.2	FR
Muskingum (P-13) I	82°07'30"		748	-	46	567600	0.05	1.4	1960
EAST RESERVOIR (a Portage Lake)									
Canal Fulton	41°00'04"	Natural Lake	243	5.6	14.8	UD	UD	2.6	R
Summit (P-6) N	81°31'53"		UD	-	28	UD	UD	-	Natural
FIRESTONE RESERVOIR									
Akron West	41°00'39"	Tuscarawas River	98	-	4.9	491	227	-	RW
Summit (P-6) I	81°30'52"		34.8		10	22300	0.02	1.5	1957
KNOX LAKE									
Fredericktown	40°29'47"	East Branch of	495	12	6.6	3280	41	3.8	R
Knox (P-12) I	82°31'36"	Kokosing River	31.4		25	23900	0.14	0.79	1954
LEESVILLE LAKE									
Bowerstown	40°28'07"	McGuire Creek	1000	27.6	19.5	19500	31	6.2	FR
Carroll (P-8) I	81°11'41"		48.3		38	37900	0.51	1.5	1936

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W-(sq mi)	PERIMETER Lake-L-(miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
			MAJOR BASINS TO THE OHIO RIVER						
			Muskingum River Basin (continued)						
LIME KILN LAKE									
Dover	40°36'50"	Unnamed	30	-	-	76	-	-	R
Tuscarawas (P-5) I	81°24'57"		-		-	-	-	-	-
LONG LAKE (a Portage Lake)									
Akron West	41°00'54"	Natural Lake	166	2.3	-	-	-	1.3	R
Summit (P-6) N	81°32'36"		-		38	-	-	-	Natural
MUNROE BASIN									
Conesville	40°09'12"	Wakatomika Creek	17	-	-	-	-	-	R
Muskingum (P-4) I	81°57'18"		-		-	-	-	-	-
M.W.C.D. - CHIPPEWA SUBDIVISION RESERVOIR									
Rittman	40°53'05"	Little Chippewa Creek	34	-	-	141	-	-	F
Wayne (P-6) I	81°47'50'		14.4		-	8300	0.017	-	1974
NIMISILA RESERVOIR									
Fulton	40°55'28"	Nimisila Creek	811	16	11.6	9400	13	4.0	R
Summit (P-6) I	81°30'56"		17		30	11400	0.82	1.2	1938
NORTH BRANCH RESERVOIR									
Bellville	40°30'23"	North Branch	154	3.4	6.5	1000	183	2.0	FR
Knox (P-12) I	82°34'31"	Kokosing River	44		16	11400	0.03	1.2	1972
NORTH RESERVOIR (a Portage Lake)									
Akron West	41°00'06"	Natural Lake	160	-	-	-	-	-	R
Summit (P-6) N	81°32'34"		-		-	-	-	-	Natural
PIEDMONT LAKE									
Piedmont	40°11'25"	Stillwater	2310	36.5	14.9	34500	24	5.4	FR
Harrison (P-9) I	81°12'48"	Creek	-		32	69900	0.49	1.4	1937
PLEASANT HILL RESERVOIR									
Jelloway	40°37'22"	Clear Fork	850	11.4	15.7	13500	148	3.3	FR
Ashland (P-2) I	82°19'30"		197		36	127300	0.11	1.3	1936
SALT FORK LAKE									
Cambridge	40°06'17"	Salt Fork	2952	-	14.3	42085	35	-	FR
Guernsey (P-17) I	81°33'26"		-		38	124000	0.33	1.1	1968
SENECAVILLE LAKE (Seneca Lake)									
Senecaville	39°55'30"	Seneca Fork	3550	47	12.3	43500	22	5.6	FR
Guernsey (P-18) I	81°25'56"		-		29	94800	0.46	1.3	1937
SHREVE LAKE									
Shreve	40°41'03"	Unnamed	58	-	-	174	12	-	R
Wayne (P-4) I	82°02'37"		1.1		-	680	0.26	-	1966

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TO THE OHIO RIVER									
Muskingum River Basin (continued)									
SIPPO LAKE									
Canton West	40°47'52"	Natural Lake	88	-	-	-	-	-	R
Stark (P-8) N	81°27'29"		-		14	-	-	-	Natural
TAPPAN LAKE									
Deersville	40°21'33"	Little Stillwater	2350	41	14.9	35100	19	6.0	FR
Harrison (P-9) I	81°13'34"	Creek	71		28	54200	0.65	1.6	1936
TURKEYFOOT LAKE (a Portage Lake)									
Canal Fulton	40°58'09"	Natural Lake	318	6.1	-	-	-	2.4	R
Summit (P-6) N	81°32'38"		-		60	-	-	-	Natural
WEST RESERVOIR (a Portage Lake)									
Canal Fulton	40°58'49"	Natural Lake	115	-	-	-	-	-	R
Summit (P-6) N	81°32'07"		-		-	-	-	-	Natural
WILLS CREEK LAKE									
Wills Creek	40°09'26"	Wills Creek	900	16.2	6.7	6000	599	3.9	FR
Coshocton (P-17) I	81°51'02"		842		15	657000	0.01	1.3	1939
Mahoning River Basin									
BERLIN LAKE									
Deerfield	41°02'02"	Mahoning River	2200	21	16.1	35400	72	3.2	FRW
Portage (T-1) I	80°59'51"		249		50	163600	0.22	0.97	1943
LAKE COHASSET									
Youngstown	41°04'55"	Mill Creek	28	-	-	-	-	-	R
Mahoning (T-3) I	80°40'51"		-		-	-	-	-	-
CRYSTAL LAKE									
Ravenna	41°07'59'	Unnamed	25	-	-	-	10	-	RW
Portage (T-2) I	81°14'02"		0.4		-	280	-	-	-
DALE WALBURN RESERVOIR									
Limaville	40°58'23"	Deer Creek	670	-	-	5860	31	-	W
Stark (T-1) I	81°10'40"		32		-	22500	0.26	-	1971
DEER CREEK RESERVOIR									
Alliance	40°58'07"	Deer Creek	303	8	10.1	3070	76	3.3	RW
Stark (T-1) I	81°07'00"		36		20	25560	0.12	1.5	1954

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
			MAJOR BASINS TO THE OHIO RIVER						
			Mahoning River Basin (continued)						
LAKE GLACIER									
Youngstown	41°05'52"	Mill Creek	44	-	-	-	-	-	R
Mahoning (T-3) I	80°40'29"		-		-	-	-	-	-
MEANDER CREEK RESERVOIR									
Warren	41°09'12"	Meander Creek	2010	-	15.3	30675	27	-	W
Trumbull (T-3) I	80°48'45"		-		50	53200	0.58	0.92	1932
MICHAEL J. KIRWAN LAKE (West Branch Reservoir)									
Windham	41°09'21"	West Branch	2650	20	20.0	52900	19	2.8	RW
Portage (T-1) I	81°04'58"	Mahoning River	80.5		50	77460	0.68	1.2	1966
LAKE MILTON									
Newton Falls	41°07'38"	Mahoning River	1685	21	17.3	29200	106	3.7	FRW
Mahoning (T-1) I	80°58'40"				35	187000	0.16	1.5	1916
MOSQUITO CREEK LAKE									
Champion	41°18'06"	Mosquito Creek	7850	40.0	8.8	69400	8	3.2	RW
Trumbull (T-3) I	80°45'68"		98		24	71600	1.03	1.1	1944
NEWPORT LAKE									
Youngstown	41°03'52"	Mill Creek	105	-	-	920	408	-	R
Mahoning (T-3) I	80°40'43"		17		16.1	41450	-	-	1928
LAKE PARK									
Youngstown	40°54'43"	Unnamed	8.1	0.23	2.5	50	7	1.9	R
Mahoning (T-1) I	81°03'52"		0.23		3.6	150	0.33	2.1	1900's
West Branch Reservoir see MICHAEL J. KIRWAN LAKE									
WESTVILLE RESERVOIR									
Alliance	40°53'28"	Naylor Ditch	90	-	-	934	55	-	W
Columbiana (T-1) I	81°00'20"		7.8		-	5600	0.17	-	1913
			Shenango River Basin						
PYMATUNING RESERVOIR									
-	41°31'01"	Pymatuning River	20580	-	12.1	200000	4.9	-	FR
Ashtabula (T-4) I	80°30'05"		158		25	143000	1.4	1.5	1933

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MINOR BASINS TRIBUTARY TO THE OHIO RIVER									
Mill Creek Basin									
SHARON WOODS LAKE (Sharon Lake)									
Glendale	39°16'57"	Unnamed	38	2.8	3.9	152	83	3.2	R
Hamilton (J) I	84°23'23"		4.9		7.9	3040	0.05	1.5	1936
WINTON LAKE (West Fork Mill Creek Lake)									
Glendale	39°15'29"	West Fork Mill	183	10.4	8.5	1531	105	5.0	R
Hamilton (J) I	84°29'42"	Creek	30		20.0	19200	0.08	1.3	1952
White Oak Creek Basin									
GRANT LAKE									
Mt. Orab	38°55'13"	Sterling Creek	181	7.9	6.2	1140	88	4.2	R
Brown (L-1) I	83°55'44"		25		26.6	19000	0.06	0.70	1948
Ohio Brush Creek Basin									
ADAMS LAKE									
West Union	38°48'50"	Lick Fork	38	2.5	7.9	300	758	2.9	R
Adams (L-2) I	83°30'58"		2.5		19.8	3600	0.08	1.2	1947
Turkey Creek Basin									
ROOSEVELT LAKE									
Pond Run	38°43'33"	Turkey Creek	16	16	-	-	640	-	R
Scioto (M-17) I	83°10'32"		16		-	12800	-	-	1935
TURKEY CREEK LAKE									
Pond Run	38°44'00"	Turkey Creek	51	-	-	-	-	-	R
Scioto (M-17) I	83°11'22"		-		-	-	-	-	1967
Storms Creek Basin									
LAKE VESUVIUS									
Ironton	38°36'23"	Storms Creek	105	6.4	-	-	66	4.5	R
Lawrence (N-5) I	82°37'50"		10.9		24	8700	-	-	1937
Sunfish Creek Basin									
MONROE LAKE									
Lewisville	39°49'05"	Sunfish Creek	39	3.0	15.4	600	44	3.4	R
Monroe (R-4) I	81°08'17"		2.7		45	2448	2.5	1.0	1957

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MINOR BASINS TRIBUTARY TO THE OHIO RIVER (continued)									
Symmes Creek Basin									
JACKSON LAKE Oak Hill Jackson (N-3) I	38°53'30" 82°36'09"	Black Fork Creek	243 19	11	7.0 18	1700 15200	50 0.11	5.0 1.2	R 1940
OAKHILL RESERVOIR - Jackson (N--) U	-	Upground	27 -	-	- -	- NA	NA NA	- -	- -
Raccoon Creek Basin									
LAKE ALMA Hamden Vinton (N-2) I	39°08'40" 82°31'05"	Pigeon Creek	63 0.8	113	12.3 20	774 619	8 1.25	1.2 1.8	RW 1901
LAKE HOPE Mineral Vinton (N-1) I	39°19'12" 82°21'23"	Sandy Run	126 9.9	5.4	12.3 20	1555 7750	50 0.20	3.4 1.8	R 1939
LAKE RUPERT Hamden Vinton (N-2) I	39°10'35" 82°31'15"	Little Raccoon Creek	325 22.2	8.5	7.4 25	2400 17170	44 0.14	3.4 0.89	R 1968
TYCOON LAKE Vinton Gallia (N-2) I	38°55'18" 82°21'12"	Raccoon Creek	204 -	3.5	- 13	- -	- -	1.7 -	R 1960
Forked Run Basin									
FORKED RUN LAKE Portland Meigs (O-4) I	39°05'30" 81°46'04"	Forked Run	107 -	8.5	16 40	19940 7590	53 0.65	5.9 1.2	R 1952
Little Hocking River Basin									
VETO LAKE . Little Hocking Washington (P-19) I	39°20'42" 81°38'48"	Little Hocking River	158 20	6.0	- 20	- 17700	81 -	3.4 -	R 1953
Duck Creek Basin									
CALDWELL LAKE Caldwell North Noble (R-1) I	39°46'32" 81°31'39"	Dog Run	27 4.8	-	- -	343 3800	- 0.09	4.2 -	RW 1935

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MINOR BASINS TRIBUTARY TO THE OHIO RIVER (continued)									
Duck Creek Basin (continued)									
WOLF RUN LAKE									
Caldwell North	39°47'26"	Wolf Run	208	8.5	34.6	7200	18	4.2	RW
Noble (R-1) I	81°32'54"		5.7		50	4290	1.68	2.1	1966
Captina Creek Basin									
BARNESVILLE RESERVOIR #1									
Barnesville	39°57'52"	Unnamed	23	1.0	11.3	263	-	-	W
Belmont (S-4) I	81°10'00"		1.0		-	800	0.33	-	1904
BARNESVILLE RESERVOIR #3									
Barnesville	39°54"32'	Slope Creek	98	5.1	15.2	1491	37	3.7	RW
Belmont (S-4) I	81°09"37'		5.1		60	4864	0.31	0.76	1965
McMahon Creek Basin									
BELMONT LAKE (Barkcamp Lake)									
Bethesda	40°02'01"	Barkcamp Creek	117	6.1	16.5	1935	26	4.0	R
Belmont (S-4) I	81°59'51"		6.1		47	4010	0.48	1.1	1961
Short Creek Basin									
SPARROW RESERVOIR									
Cadiz West	40°16'23"	Tanback Creek	20.8	-	-	-	-	-	W
Harrison (S-1) I	80°58'30"		1.2		-	900	-	-	1949
Yellow Creek Basin									
FRIENDSHIP PARK LAKE									
Smithfield	40°17'02"	Town Fork	85	-	-	-	-	-	R
Jefferson (S-2) I	80°45'55"		3.1		-	2280	-	-	1972
JEFFERSON LAKE									
Richmond	40°27'38"	Town Fork	25	1.0	8	200	192	1.4	R
Jefferson (S-2) I	80°47'40"		7.5		15	5760	0.035	1.6	1935
Little Yellow Creek Basin									
HIGHLANDTOWN LAKE									
Wellsville	40°38'16"	Little Yellow	170	6.5	7.2	1230	23	3.6	R
Columbiana (S-1) I	80°44'55"	Creek	-		28	4480	0.27	0.77	1968

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W-(sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MINOR BASINS TRIBUTARY TO THE OHIO RIVER (continued)									
Little Yellow Creek Basin (continued)									
WELLSVILLE RESERVOIR East Liverpool Columbiana (S-1) I	40°37'16" 80°41'35"	Little Yellow Creek	25 -	-	- -	- -	- -	- -	W 1926
Little Beaver Creek Basin									
GUILFORD LAKE Hanoverton Columbiana (S-1) I	40°47'42" 80°52'20"	West Fork Little Beaver Creek	396 11.2	6.4	7.0 23	2510 7340	20 0.34	2.3 0.91	R 1932
SALEM RESERVOIR Lisbon Columbiana (P-7) I	40°48'47" 80°50'10"	Unnamed	97 -	-	- -	1100 -	- -	- -	W -
ZEPERNICK LAKE Hanoverton Columbiana (P-7) I	40°47'19" 80°58'42"	Unnamed	36 0.1	1.0	- -	180 70	- 2.6	- -	R 1950

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE									
Maumee River Basin									
ARCHBOLD RESERVOIR #1									
Archbold	41°31'15"	Upground	20	-	-	233	NA	-	RW
Fulton (A-8) U	84°17'38"		NA		-	NA	NA	-	1951
ARCHBOLD RESERVOIR #2									
Archbold	41°31'06"	Upground	49	-	-	853	NA	-	RW
Fulton (A-8) U	84°17'38"		NA		-	NA	NA	-	1961
BRESLER RESERVOIR (Spencerville Reservoir)									
Cridersville	40°43'47"	Upground	610	3.1	-	15222	NA	1.1	W
Allen (A-4) U	84°14'10"		NA		-	NA	NA	-	1969
DELTA RESERVOIR									
Delta	41°35'22"	Upground	39	1.1	-	331	NA	-	RW
Fulton (A-11) U	84°00'44"		NA		-	NA	NA	-	1933
DESHLER RESERVOIR									
Deshler	41°12'03"	Unnamed	20	-	-	-	-	-	W
Henry (A-11) I	83°54'04"		-		-	-	-	-	-
FERGUSON LAKE									
Lima	40°43'55"	Upground	304	3.0	-	7672	NA	1.2	1958
Allen (A-4) U	84°02'43"		NA		-	NA	NA	-	
FINDLAY RESERVOIR #1 ('Old Reservoir')									
Arcadia	41°00'30"	Upground	186	2.0	-	4143	NA	1.0	AW
Allen (A-4) U	83°33'45"		NA		-	NA	NA	-	1950
FINDLAY RESERVOIR #2 ('New Reservoir')									
Arcadia	41°00'36"	Upground	640	4.5	25.6	16879	NA	1.3	RW
Hancock (A-6) U	83°34'18"		NA		27	NA	NA	2.8	1970
FORTY ACRE POND									
Saint Marys	40°34'58"	Dugout	106	-	-	-	-	-	R
Auglaize (A-1) D	84°23'24"		NA		-	-	-	-	-
FULTON POND									
Swanton	41°35'48"	Dugout	15	-	-	-	-	-	R
Fulton (A-12) D	83°55'34"		-		-	-	-	-	-

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Maumee River Basin (continued)									
GRAND LAKE SAINT MARYS									
Celina	40°31'17"	Unnamed	13440	60	6.8	92000	5.3	3.7	RW
Auglaize (A-1) I	84°25'18"		106		8	59000	1.2	2.6	1845
HARRISON LAKE									
Fayette	41°38'22"	Mill Creek	97	3.5	10.2	991	245	2.5	R
Fulton (A-8) I	84°21'40"		37		17	18600	0.05	1.8	1941
INDEPENDENCE DAM (a low head dam)									
Defiance East	-	Maumee River	600	-	-	2000	-	-	W
Defiance (A-10) I	-		56		-	26900	0.07	-	-
LEIPSIC RESERVOIR									
Leipsic	41°06'23"	Upground	27	-	-	130	NA	-	W
Putnam (A-11) U	83°55'44"		NA		-	NA	NA	-	-
LIMA LAKE RESERVOIR									
Lima	40°45'12"	Upground	85	-	-	428	NA	-	RW
Allen (A-4) U	84°02'52"		-		-	NA	NA	-	1947
METZGER RESERVOIR									
Lima	40°44'18"	Upground	167	2	-	3682	NA	1.1	W
Allen (A-4) U	84°02'50"		-		-	NA	NA	-	1946
NETTLE LAKE									
Nettle	41°40'37"	Natural Lake	94	-	-	-	-	-	R
Williams (A-9) N	84°43'41"	on Nettle Creek	-		30	-	-	-	Natural
OTTAWA RESERVOIR									
Ottawa	41°00'40"	Upground	20	-	-	-	NA	-	W
Putnam (A-5) U	84°01'14"		NA		-	NA	NA	-	-
OXBOW LAKE									
Defiance West	41°20'38"	Upground	36	1.5	-	145	NA	1.8	R
Defiance (A-5) U	84°26'30"		NA		-	NA	NA	-	1953
PAULDING RESERVOIR									
Latty	41°07'12"	Upground	62	-	-	-	NA	-	W
Paulding (A-7) U	84°35'16"		-		-	NA	NA	-	1965
PROVIDENCE DAM (a low head dam)									
Grand Rapids	-	Maumee River	80	-	-	-	-	-	R
Lucas (A-11) I	-		6058		-	2900000	-	-	-

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Maumee River Basin (continued)									
SAULISBERRY PARK LAKE									
Silver Creek	40°37'04"	Dugout	50	-	-	-	-	-	R
Hardin (M-1) D	83°38'13"		-	-	-	-	-	-	-
SCHOONOVER LAKE									
Lima	40°44'50"	Upground	22	-	-	50	NA	-	R
Allen (A-4) U	84°05'50"		-		-	NA	NA	-	1937
Spencerville Reservoir see BRESLER RESERVOIR									
STATE FISH HATCHERY LAKE									
Saint Marys	40°31'24"	Upground	56	-	-	-	NA	-	-
Auglaize (A-1) U	84°25'06"		-		-	NA	NA	-	-
SWANTON RESERVOIR									
Swanton	41°34'08"	Upground	25	-	-	270	NA	-	-
Lucas (A-12) U	83°52'26"		-	-	-	NA	NA	-	1937
TWIN LAKES RESERVOIR									
Lima	40°44'28"	Upground	26	-	-	426	NA	-	RW
Allen (A-4) U	84°05'00"		-		-	NA	NA	-	1886
VAN WERT CITY RESERVOIR #1									
Van Wert	40°50'14"	Upground	60	1.3	-	215	NA	1.2	RW
Van Wert (A-2) U	84°34'30"		-	-	-	NA	NA	-	1952
VAN WERT CITY RESERVOIR #2									
Van Wert	40°50'30"	Upground	60	-	-	184	NA	-	RW
Van Wert (A-2) U	84°34'24"		-		-	NA	NA	-	1960
WAUSEON RESERVOIR #1									
Wauseon	41°30'42"	Upground	49	-	-	215	NA	-	RW
Fulton (A-10) U	84°09'00"		NA		-	NA	NA	-	1938
WAUSEON RESERVOIR #2									
Wauseon	41°30'41"	Upground	17	-	-	-	NA	-	RW
Fulton (A-10) U	84°09'00"		NA		-	NA	NA	-	1921
Portage Basin									
ALDRICH POND									
Elmore	41°24'20"	Upground	35	-	-	-	NA	-	R
Sandusky (B-2) U	83°15'02"		NA		-	NA	NA	-	-

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Portage Basin (continued)									
LAKE LACOMTE (Fostoria Reservoir No. 5)									
Alvada	41°08'20"	Upground	128		-	2256	NA	-	RW
Hancock (B-1) U	83°25'55"		NA	-	-	NA	NA	-	1958
LAKE LAMBERJACK									
Fostoria	41°09'23"	Upground	30	-	-	400	NA	-	RW
Hancock (B-1) U	83°25'55"		NA		-	NA	NA	-	1919
LAKE MOSIER									
Fostoria	41°08'20"	Upground	91	-	-	924	NA	-	RW
Hancock (B-2) U	83°25'40"		NA		-	NA	NA	-	1941
NORTH BALTIMORE RESERVOIR									
North Baltimore	40°10'05"	Upground	29	-	-	430	NA	-	RW
Wood (B-1) U	83°40'10"		NA		-	NA	NA	-	1969
VAN BUREN LAKE									
North Baltimore	41°08'02"	Rocky Ford	53	-	1.6	85	278	2.3	R
Hancock (B-1) I	83°38'40"	Creek	23		4.8	12500	0.007	1	1939
Sandusky River Basin									
BUCYRUS RESERVOIR #1									
Bucyrus	40°49'38"	Unnamed	31	-	-	215	72	-	RW
Crawford (C-2) I	82°56'18"		3.5		-	2060	0.10	-	1900
BUCYRUS RESERVOIR #2									
Bucyrus	40°49'12"	Unnamed	36	-	-	218	50	-	RW
Crawford (C-2) I	82°55'35"		2.8		-	1600	0.14	-	1919
CLYDE RESERVOIR (Beaver Creek Reservoir)									
Watson	41°14'08"	Upground	110	-	-	-	-	-	W
Seneca (C-4) U	83°01'13"		NA		-	-	-	-	1970
KILLDEER RESERVOIR									
Marseilles	40°41'55"	Upground	253	2.3	-	6674	-	1.0	RW
Wayandot (C-1) U	83°22'46"		NA		-	-	-	-	1972
RILEY RESERVOIR									
Bucyrus	40°49'38"	Upground	30	-	-	450	-	-	RW
Crawford (C-2) U	82°56'00"		NA		-	-	-	-	1955
UPPER SANDUSKY									
Upper Sandusky	40°49'13"	Unnamed	33	-	-	344	-	-	RW
Wayandot (C-1) I	83°16'19"		NA		-	-	-	-	1957

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Huron River Basin									
BELLEVUE RESERVOIR #5									
Flat Rock	41°12'42"	Upground	86	1.3	-	-	-	-	RW
Huron (D-2) U	82°46'35"		NA		-	NA	-	-	1946
CELERYVILLE RESERVOIR									
Shelby	40°59'22"	Upground	75	-	-	1050	-	-	W
Crawford (D-2) U	82°44'05"		NA		-	-	-	-	1963
NORWALK RESERVOIR #1 (Upper Reservoir)									
Norwalk	41°14'18"	Norwalk Creek	28	-	-	-	-	-	AW
Huron (D-2) I	82°35'24"		7.3		-	4500	-	-	-
NORWALK RESERVOIR #2 (Lower Reservoir)									
Norwalk	42°14'02"	Norwalk Creek	51	-	-	-	-	-	-
Huron (D-2) I	82°34'58"		7.3		-	4500	-	-	-
NORWALK RESERVOIR #3 (Memorial Reservoir)									
Norwalk	41°14'04"	Norwalk Creek	96	-	-	-	-	-	-
Huron (D-2) I	82°35'26"		7.3		-	4500	-	-	1953
WILLARD CITY RESERVOIR									
Willard	41°03'26"	Upground	215	2.6	36	7740	-	1.1	RW
Huron (D-2) U	82°39'55"		NA		40	-	-	2.7	1975
Vermilion River Basin									
KIPTON RESERVOIR									
Kipton	41°15'15"	Unnamed	200	-	-	-	-	-	RW
Lorain (D-3) U	82°18'22"		-		-	-	-	-	1950
NEW LONDON RESERVOIR									
New London	41°03'58"	Upground	221	2.6	-	-	-	1.2	RW
Huron (D-3) U	82°25'30"		-		-	-	-	-	1975
Black River Basin									
FINDLEY LAKE									
Wellington	41°08'15"	Wellington Creek	83	4.0	9.1	760	50	3.1	R
Lorain (D-4) I	82°12'30"		6.5		26	4160	0.11	1.0	1956
OBERLIN RESERVOIR									
Oberlin	41°16'30"	Upground	56	-	-	-	-	-	RW
Lorain (D-4) U	82°10'42"		NA		-	-	-	-	1960

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Black River Basin									
SPENCER LAKE									
Lodi	41°05'27"	Unnamed	5.1	1.9	-	136	-	1.9	W
Medina (D-4) I	82°07'31"		-		-	-	-	-	1958
WELLINGTON RESERVOIR (Upper Reservoir)									
Wellington	41°08'34"	Unnamed	31		-	-	-	-	W
Lorain (D-4) U	82°14'01"		-		-	-	-	-	1931
WELLINGTON UPGROUND RESERVOIR (Lower Reservoir)									
Wellington	41°08'55"	Upground	185	-	-	-	-	-	RW
Lorain (D-4) U	82°14'23"		NA		-	-	-	-	1972
Rocky River Basin									
BALDWIN LAKE (a low head dam)									
Berea	41°21'47"	East Branch	32	1.3	1.3	40	-	1.6	RW
Cuyahoga (D-5) I	81°51'20"	Rocky River	65		6.6	41600	0.001	0.59	1930
COE LAKE									
Berea	41°21'40"	Dugout	15	-	-	-	-	-	-
Cuyahoga (D-5) D	81°51'06"		NA		-	-	-	-	-
HINCKLEY LAKE									
West Richfield	41°13'35"	East Branch	88	2.8	7.9	616	160	2.1	R
Medina (D-5) I	81°43'13"	Rocky River	22		20	1600	0.38	1.2	1938
MEDINA LAKE									
Medina	41°08'21	Unnamed	109	0.7	-	1770	4	-	RW
Medina (D-5) I	81°49'20"		0.7		-	460	3.8	-	1966
WALLACE LAKE									
Berea	41°21'52"	Dugout	15	33	5.6	83	-	6.1	RW
Cuyahoga (D-5) D	81°51'30"		-		18	-	-	0.93	-
Cuyahoga River Basin									
AQUILLA LAKE									
Chardon	41°32'46"	Natural Lake	25	1.2	9.8	246	282	1.7	R
Geauga (F-1) N	81°10'12"		11		15	10600	0.02	2.0	Natural
BRADY LAKE									
Kent	41°09'53"	Natural Lake	28.3	-	-	-	-	-	R
Portage (E-1) N	81°18'54"		-		-	-	-	-	Natural

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Cuyahoga River Basin (continued)									
EAST BRANCH RESERVOIR									
East Claridon	41°32'46"	East Branch	416	7.6	11.2	4559	27	2.7	RW
Geauga (E-1) I	81°10'12"	Cuyahoga River	17		20	13720	0.34	1.7	1940
GEAUGA LAKE									
Aurora	41°20'54"	Unnamed	50	-	-	-	5	-	R
Geauga (E-2) I	81°22'06"		0.39		-	400	-	-	Natural
GORGE METROPOLITAN PARK LAKE									
Akron East	-	Cuyahoga River	34	-	-	589	-	-	R
Summit (E-2) I	-		-		-	-	-	-	1932
HODGSON LAKE (Muddy Lake)									
Kent	41°08'18"	Unnamed	190	-	17	-	-	2.0	W
Portage (E-1) I	81°17'26"		-		56	-	-	0.91	1840's
LADUE RESERVOIR									
Burton	41°24'25"	Bridge Creek	1500	20	13	14000	15	3.7	W
Geauga (E-1) I	81°11'12"		35.1		28	13100	0.64	1.4	1960
MEADOWBROOK LAKE									
Hudson	41°12'03"	Powers Brook	24	1.3	3.7	88	149	1.9	R
Summit (E-2) I	81°27'18"		5.6		9	4181	0.02	1.2	1948
MOGADORE RESERVOIR									
Akron East	41°03'28"	Little Cuyahoga	900	19	7.8	7040	9.2	4.5	RW
Portage (E-1) I	81°22'50"	River	13		23	9090	.76	1.0	1938
MUZZY LAKE									
Suffield	41°06'51"	Natural Lake	82	-	-	-	-	-	W
Portage (E-1) N	81°15'04		1.7		-	1200	-	-	Natural
LAKE NESMITH									
Akron West	41°01'26"	Natural Lake	80	-	-	-	-	-	R
Summit (E-1) N	81°33'05"		-		-	-	-	-	Natural
LAKE PIPPEN									
Kent	41°10'26"	Natural Lake	96	-	-	-	3.0	-	-
Portage (E-1) N	81°18'42"		0.5		-	360	-	-	Natural
PUNDERSON LAKE									
Burton	41°26'51"	Natural Lake	101	2.6	-	-	8	1.8	R
Geuaga (E-1) H	81°12'27"		1.27		50	960	-	-	Natural

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
MAJOR BASINS TRIBUTARY TO LAKE ERIE (continued)									
Cuyahoga River Basin (continued)									
LAKE ROCKWELL									
Kent	41°10'58"	Cuyahoga River	769	10.6	9.2	7060	172	2.7	W
Portage (E-1) I	81°19'52"		207		-	157000	.04	-	1914
LOWER SHAKER LAKE									
Shaker Heights	41°29'24"	Doan Brook	7.0	1.0	3.3	96	-	1.8	R
Cuyahoga (E-2) I	81°34'54"		-		9.8	-	-	1.0	1850's
SPRINGFIELD LAKE									
Akron East	41°04'44"	Natural Lake	200	-	-	-	-	-	R
Summit (E-1) N	81°25'54"		-		-	-	-	-	Natural
SUMMIT LAKE									
Akron West	41°02'54"	Natural Lake	92	1.6	18	1669	-	1.8	RW
Summit (P-6) N	81°32'38"		5.4		-	15682	-	1.4	Natural
SUNNY LAKE (Harmons Pond)									
Aurora	41°17'53"	Natural Lake	63	-	-	-	-	-	R
Portage (E-2) N	81°18'55"		-		-	-	-	-	Natural
Grand River Basin									
GENEVA LAKE (a low head dam)									
Geneva	-	-	-	-	-	-	-	-	-
Ashtabula (F-3) I	-		-		-	-	-	-	1900's
LAMPSON RESERVOIR (Jefferson Reservoir)									
Ashtabula	41°45'08"	Upground	22	1.0	-	200	NA	1.5	RW
Ashtabula (F-3) U	80°47'50"		NA		-	NA	NA	-	1950

NAME 7-1/2' TOPO MAP COUNTY (MAP CODE) TYPE	LATITUDE LONGITUDE	IMPOUNDED STREAM	AREA Lake-A-(ac) Watershed-W- (sq mi)	PERIMETER Lake-L- (miles)	DEPTH Mean Maximum (feet)	CAPACITY-V- (ac ft) INFLOW-I- (ac ft)	STANDARD RATIOS W/A V/I	DEVELOPMENT Shoreline Volume	USE YEAR CONSTRUCTED
			MINOR BASINS TO LAKE ERIE						
			Raccoon Creek Basin						
CLYDE RESERVOIR (Raccoon Creek Reservoir)									
Clyde	41°17'15"	Upground	35	0.9	-	-	NA	1.1	W
Sandusky (D-1) U	82°58'35"		NA		-	NA	NA	-	1950
			Ottawa River Basin						
MOLANDER LAKE									
Sylvania	41°41'26"	Dugout	20	-	-		NA	-	R
Lucas (A-12) D	83°41'32"		NA		-	NA	NA	-	-

1 STANDARD RATIOS

W/A Watershed area of lake divided by the surface area of lake.

V/I Volume of lake divided by the average annual inflow of lake.

2 DEVELOPMENT

Development of shoreline is the ratio of the length of a lake's shoreline to the perimeter of a circle of area equal to that of the lake.

The equation is $D_L = L / 2(pi \times A)^{1/2}$

Development of volume is the ratio of the volume of a lake to that of a cone with a basal area equal to the area of the lake and a height equal to the maximum depth of the lake. Development of volume can be calculated by dividing the mean lake depth by the by the maximum lake depth and multipling by three.

The equation is $D_V = 3 \times z_{(mean)} / z_{(max)}$.

3 MAP CODE

Map code refers to specific "Underground Water Resource Map" on which the lake is located. See the publications booklet, Division of Water, Ohio Dept of Natural Resources, Columbus, Ohio, 43224.

TYPE

Type of lake/reservoir. I - impoundment, D - dugout, U - upground, N - natural.

4 Recorded at submerged barrow pit; maximum depth near the dam is 6.6 feet.

APPENDIX C

Trophic state classification and nitrogen and phosphorus concentrations in selected Ohio lakes.[1]

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
ACTON LAKE														
above dam														
IV-22/VIII-18-60	1.6	0.51	-	-	-	-	-	-	-	-	-	70	-	Hypereutrophic/210
Winner et al., 1962					-		-	-						
IV-30/IX-9-75	0.13	0.71	-	-	6.5	1.2	0.21	0.06	31	20	-	65	81	Hypereutrophic/219
Tobin and Youger, 1977					4.8	9.9	0.54	0.55						
VIII-10-81	-	0.52	-	121.7	-	6.0	-	0.09	-	67	77	69	69	Hypereutrophic/215
OEPA Classification Survey, unpublished[2]					-	6.7	-	0.74						
ADAMS LAKE														
above dam														
V-1/VIII-18-80	0.33	0.76	8.2	9.3	1.1	0.31	0.06	0.04	18	7.8	52	64	63	Eutrophic/179
OEPA/USGS, unpublished					1.6	3.1	0.06	0.05						
LAKE ALMA														
South of island														
V-1/VIII-18-80	4.4	2.0	9.6	6.2	0.45	0.17	0.01	0.02	45	8.5	48	50	37	Mesotrophic/135
OEPA/USGS, unpublished					0.71	4.8	0.01	0.10						
ALUM CREEK LAKE														
above dam														
IV-13/VIII-27-76	2.6	3.4	-	-	2.1	1.3	0.03	0.04	70	34	-	43	53	Mesotrophic/144
Tobin and Youger, 1977					2.1	2.2	0.02	0.15						
AQUILLA LAKE														
area of max depth														
VIII/23-77	-	0.1	-	10.9	-	2.3	-	0.34	-	6.7	54	93	55	Eutrophic/202
Olive and Karn 1980[2]					-	-	-	-						
ATWOOD LAKE														
above dam														
IV-20/VII-30-73[5]	1.7	1.2	10.3	8.1	1.3	0.58	0.02	0.02	65	29	51	57	47	Eutrophic/155
USEPA, 1975j					1.2	1.6	0.02	0.07						
V-17/VIII-30-76	1.2	0.91	-	-	0.90	0.41	0.03	0.04	30	10	-	61	53	Eutrophic/171
Tobin and Youger, 1979					1.1	1.6	0.07	0.28						
BALDWIN LAKE														
above dam														
VIII/23-77	-	0.1	-	10.9	-	2.3	-	0.34	-	6.7	54	93	55	Eutrophic/202
Olive and Karn 1980[2]					-	-	-	-						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
BARNESVILLE RESERVOIR #3														
above dam														
V-15/VIII-21-80	0.96	1.2	8.5	17.1	0.43	0.74	0.03	0.04	14	19	58	57	53	Eutrophic/168
OEPA/USGS, unpublished					1.3	1.3	0.05	0.11						
BEACH CITY RESERVOIR														
above dam														
IV-20/VII-30-73[5]	0.3	0.2	4.3	19.4	3.6	2.9	0.09	0.28	40	10	60	83	69	Eutrophic/212
USEPA, 1975k					3.1	-	0.08	-						
BELMONT LAKE														
above dam														
V-8/VIII-7-80	1.1	0.86	15.4	49.7	0.95	0.46	0.02	0.09	48	5.1	69	62	47	Eutrophic/178
OEPA/USGS, unpublished					1.5	2.7	0.02	0.04						
BERLIN LAKE														
above dam														
IV-20/VII-30-73[5]	0.94	0.97	14.7	12.2	1.7	1.1	0.03	0.03	57	37	55	60	53	Eutrophic/168
USEPA, 1975t					1.7	1.0	0.03	0.03						
V-28/VIII-27-75	0.49	0.76	-	-	0.84	0.61	0.02	0.03	42	20	-	64	47	Eutrophic/166
Tobin and Youger, 1977					1.1	1.7	0.03	0.08						
BRADY LAKE														
center of lake														
VIII-8-80	-	0.91	-	98.5	-	1.4	-	0.15	-	9.3	76	61	76	Hypereutrophic/213
OEPA Classification Survey, unpublished[2]				-	2.1	-	0.55							
BUCKEYE LAKE														
at midpoint														
spring/summer-30	0.75	0.30	-	-	-	-	-	-	-	-	-	77	-	Hypereutrophic/231
Tressler et al., 1940					-	-	-	-						
IV-4/VII-7-73[5]	0.2	0.30	258.6	161.9	2.7	2.7	0.15	0.15	18	18	80	77	76	Hypereutrophic/233
USEPA, 1975a					-	2.5	-	0.17						
V-2/VIII-16-75	1.5	0.43	-	-	1.7	2.5	0.10	0.10	17	25	-	72	71	Hypereutrophic/210
Tobin and Youger, 1977					1.9	2.6	0.10	0.14						
V-16/VIII-22-78	0.55	1.1	92.2	60.8	1.7	2.2	0.15	0.10	11	22	71	59	76	Eutrophic/205
OEPA/USGS, unpublished					2.2	2.1	0.13	0.08						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
BURR OAK RESERVOIR														
above dam														
IV-22/IX-30-76	2.0	1.4	-	-	0.46	0.41	0.03	0.05	15	8.2	-	55	53	Eutrophic/162
Tobin and Youger, 1979					0.66	2.73	0.03	0.11						
CAESAR CREEK LAKE														
above dam														
IV-25/VIII-26-78	1.5	4.3	5.1	8.5	4.7	4.0	0.12	0.01	39	400	52	39	73	Eutrophic/164
OEPA/USGS, unpublished					4.4	3.6	0.15	0.16						
CHARLES MILL RESERVOIR														
above dam														
IV-20/VII-27-73[5]	0.61	0.30	41.7	85.5	1.2	1.8	0.06	0.17	20	11	74	77	63	Hypereutrophic/214
USEPA, 1975b					-	-	-	-						
V-12/VIII-8-78	0.46	0.34	90.2	68.8	1.1	1.4	0.11	0.14	10	10	72	76	72	Hypereutrophic/220
OEPA/USGS, unpublished					5.4	1.4	0.14	0.12						
CLARENCE J. BROWN RESERVOIR (Buck Creek Lake)														
above dam														
IV-7/VIII-2-77	1.2	1.5	-	32.3	2.1	1.1	0.04	0.04	53	28	65	54	57	Eutrophic/176
Tobin and Youger, 1979					2.0	5.7	0.04	0.55						
CLARK LAKE														
above dam														
V-29/VIII-13-79	1.7	2.1	11.2	2.4	0.80	0.56	0.01	0.01	80	56	39	49	37	Eutrophic/125
OEPA/USGS, unpublished					2.2	7.8	0.03	0.31						
CLEAR FORK RESERVOIR														
above dam														
V-23/VIII-20-75	1.0	1.0	-	-	0.86	0.62	0.04	0.03	22	21	72	60	57	Eutrophic/189
Tobin and Youger, 1977					0.88	1.6	0.04	0.21						
CLENDENING LAKE														
above dam														
IV-27/IX-3-76	1.0	1.0	-	-	0.56	0.51	0.04	0.06	14	8.5	-	60	57	Eutrophic/176
Tobin and Youger, 1979					0.79	3.2	0.05	0.42						
CLOUSE LAKE														
above dam														
V-29/VIII-5-80	0.86	0.41	20.3	46.6	-	1.1	0.04	0.07	UD	16	68	73	57	Eutrophic/198
OEPA/USGS, unpublished					-	1.9	0.04	0.05						
COWAN LAKE														
above dam														
IV-29/IX-10-75	0.28	0.58	-	-	2.2	1.1	0.12	0.06	18	18	-	68	73	Eutrophic/211
Tobin and Youger, 1977					2.3	7.0	0.14	0.24						

APPENDIX C (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters)		CHLOROPHYLL a (ug/l)		TOTAL N (mg/l)		TOTAL P (mg/l)		TN/TP RATIO Photic Zone		TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll	Secchi Disc	Total Phosphorus	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Su	Su	Sp	
CUTLER LAKE														
above dam														
VII-22-81	-	0.55	-	36.9	-	0.89	-	0.04	-	22	66	69	57	Eutrophic/192
OEPA Classification Survey[2]					-	2.6	-	0.22						
DEER CREEK LAKE (Pickaway County)														
above dam														
IV-28/VIII-1-73[5]	0.45	1.2	14.4	9.9	4.9	3.1	0.10	0.04	49	77	53	57	70	Eutrophic/180
USEPA, 1975m					3.1	3.3	0.11	0.10						
IV-25/IX-12-75	0.48	0.46	-	-	2.7	1.3	0.07	0.06	39	22	-	71	65	Eutrophic/204
Tobin and Youger, 1977					2.9	1.4	0.12	0.06						
DEER CREEK RESERVOIR (Stark County)														
above dam														
IV-23/VIII-16-77	0.91	0.73	-	25.0	1.8	0.80	0.04	0.03	45	27	62	65	57	Eutrophic/184
Tobin and Youger, 1979					1.8	3.3	0.06	0.06						
DELAWARE LAKE														
above dam														
IV-26/VIII-1-73[5]	0.61	0.46	14.9	4.1	3.1	4.0	0.08	0.07	39	57	44	71	67	Eutrophic/182
USEPA, 1975n					2.8	3.8	0.08	0.13						
DILLON LAKE														
above dam														
IV-26/VII-30-73[5]	0.51	0.61	25.9	20.0	2.5	2.7	0.12	0.11	21	25	60	67	73	Eutrophic/200
USEPA, 1975c					2.7	2.8	0.20	0.23						
IV-11/VIII-12-77	0.46	0.67	-	40.9	2.8	1.7	0.09	0.07	31	24	67	66	69	Eutrophic/202
Tobin and Youger, 1979					2.3	2.1	0.11	0.23						
DOW LAKE														
above dam														
V-8/VIII-31-78	1.7	3.0	9.9	6.2	0.43	0.32	0.01	BD	43	UD	48	44	37	Mesotrophic/129
OEPA/USGS, unpublished					0.86	1.7	0.03	0.23						
EAST BRANCH RESERVOIR														
above dam														
IV-26/VIII-15-77	0.85	0.91	-	28.8	0.73	0.82	0.04	0.05	18	16	64	61	57	Eutrophic/182
Tobin and Youger, 1979					0.77	2.3	0.04	0.11						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
EAST FORK LAKE														
above dam														
VI-/VIII-21-79	1.2	1.1	8.5	47.0	1.6	2.3	0.08	0.04	20	58	68	59	67	Eutrophic/194
OEPA/USGS, unpublished					1.8	1.6	0.10	0.21						
EAST RESERVOIR														
near east shore														
V-23/IX-2-80	0.76	1.0	85.0	46.9	0.80	0.75	0.06	0.14	13	5.4	68	60	63	Eutrophic/191
OEPA/USGS, unpublished					1.1	13	0.45	1.5						
ESSINGTON LAKE														
above dam														
VII-23-81	-	3.5	-	2.1	-	0.92	-	0.02	-	46	38	42	47	Mesotrophic/127
OEPA Classification Survey, unpublished[2]				-	2.03	-	0.02							
FINDLAY CITY RESERVOIR														
near east shore														
VI-27/VIII-31-79	3.4	1.5	3.9	18.3	1.6	1.0	0.01	0.03	160	33	59	54	37	Eutrophic/150
OEPA/USGS, unpublished					1.2	1.1	0.02	0.04						
FINDLEY LAKE														
above dam														
VIII/16-77	-	1.2	-	44.6	-	1.9	-	0.07	-	27	68	57	66	Eutrophic/191
Olive and Karn 1980[2]					-	-	-	-						
VI-3/VIII-12-80	3.4	1.5	4.2	33.8	0.80	0.58	0.07	0.03	11	19	65	54	65	Eutrophic/184
OEPA/USGS, unpublished					2.0	5.0	0.03	0.47						
FIRESTONE RESERVOIR														
above dam														
VII-14-81	-	0.70	-	55.2	-	1.1	-	0.01	-	11	70	65	71	Eutrophic/206
OEPA Classification Survey, unpublished[2]				-	1.8	-	0.24							
FORKED RUN LAKE														
above dam														
V-4/VIII-25-78	1.4	2.3	3.7	-	0.76	0.41	0.01	0.01	76	41	-	48	37	Mesotrophic/127
OEPA/USGS, unpublished					1.1	3.0	0.01	0.07						
FORTY ACRE POND														
at outfall														
VII-29-81	-	-	-	127.6	-	2.8	-	0.30	-	9.3	78	-	86	Hypereutrophic/246
OEPA Classification Survey, unpublished[2]				-	-	-	-							

APPENDIX C (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
FOX LAKE														
above dam														
V-2/VIII-19-80	2.1	1.6	3.3	17.5	0.61	0.32	0.02	0.10	31	3.2	59	53	47	Eutrophic/159
OEPA/USGS, unpublished					1.3	4.1	0.03	0.11						
GRAND LAKE SAINT MARYS														
near midpoint														
V-04/VIII-01-73[5]	0.08	0.46	127.3	69.7	2.9	2.8	0.30	0.13	9.7	22	72	71	86	Hypereutrophic/229
USEPA, 1975d					-	-	-	-						
V-16/VIII-12-75	0.43	0.33	-	-	1.3	2.5	0.15	0.13	8.7	19	-	76	76	Hypereutrophic/228
Tobin and Youger, 1977					1.3	3.3	0.19	0.16						
GRANT LAKE														
above dam														
VIII-1-73	-	0.45	-	45.2	-	2.0	-	0.13	-	15	68	71	74	Hypereutrophic/213
USEPA, 1975e[2,5]					-	-	-	-						
GRIGGS RESERVOIR														
above dam														
V-24/VIII-6-79	0.91	0.66	5.7	40.2	3.8	5.3	0.05	0.09	76	59	67	66	61	Eutrophic/194
OEPA/USGS, unpublished					4.3	13	0.08	1.2						
GUILFORD LAKE														
above dam														
V-21/VIII-26-75	0.86	0.91	-	-	1.7	0.86	0.04	0.05	43	17	-	61	57	Eutrophic/177
Tobin and Youger, 1977					1.7	8.6	0.04	0.34						
VIII-24-81	-	0.73	-	62.9	-	1.1	-	0.05	-	22	71	65	60	Eutrophic/196
OEPA Classification Survey, unpublished[2]				-	9.8	-	0.89							
HAMMERTOWN LAKE (Jackson City Reservoir)														
above dam														
VI-14/VIII-6-79	4.9	4.8	3.2	2.7	0.24	0.08	BD	0.01	UD	8.0	40	37	UD	Mesotrophic/115
OEPA/USGS, unpublished					0.60	1.5								
HARGUS LAKE														
above dam														
IV-20/VIII-4-78	1.1	1.8	8.6	3.6	2.0	1.6	0.05	0.01	40	160	43	52	61	Mesotrophic/156
OEPA/USGS, unpublished					2.4	2.5	0.04	0.07						
HARRISON LAKE														
at East end														
V-30/VIII-22-75	0.64	0.51	-	-	3.9	2.5	0.09	0.05	43	50	-	70	69	Eutrophic/208
Tobin and Youger, 1977					3.0	2.5	0.21	0.04						
VIII-19-81	-	0.55	-	23.9	-	3.1	-	0.08	-	39	62	69	67	Eutrophic/198
OEPA Classification Survey, unpublished[2]				-	5.7	-	0.72							

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
HIGHLANDTOWN LAKE														
above dam														
V-15/VIII-21-78	1.8	1.8	7.5	42.5	0.80	0.49	0.02	0.01	40	49	67	52	47	Eutrophic/166
OEPA/USGS, unpublished					0.74	2.20	0.02	0.04						
HINCKLEY LAKE														
above dam														
VIII/19-77	-	0.3	-	30.8	-	2.1	-	0.18	-	12	64	77	78	Hypereutrophic/219
Olive and Karn 1980[2]					-	2.0	-	0.13						
HODGSON LAKE														
pt of max depth														
VIII/12-77	-	1.9	-	5.8	-	0.33	-	0.12	-	2.8	48	51	73	Eutrophic/172
Olive and Karn 1980[2]					-	0.10	-	0.47						
HOOVER RESERVOIR														
at dam														
IV-26/VIII-1-73[5]	0.91	0.93	36.3	7.6	2.6	2.6	0.05	0.03	52	87	50	61	61	Eutrophic/172
USEPA, 1975p					2.4	1.7	0.04	0.04						
V-09/VIII-29-75	0.46	1.2	-	-	2.3	1.8	0.10	0.03	23	60	-	57	71	Eutrophic/196
Tobin and Youger, 1977					2.3	1.5	0.10	0.09						
LAKE HOPE														
above dam														
V-14/IX-3-75	1.0	2.9	-	-	0.53	0.25	0.01	0.03	53	8.3	-	45	37	Mesotrophic/123
Tobin and Youger, 1977					0.46	2.4	0.03	0.01						
IV-27/VIII-1-78	2.7	0.76	2.3	30.1	0.47	0.51	BD	0.01	UD	51	64	64	UD	Eutrophic/192
OEPA/USGS, unpublished					0.48	1.2	BD	0.01						
HOSTERMAN LAKE														
above dam														
VII-17-81	-	0.70	-	58.1	-	3.8	-	0.08	-	48	70	65	67	Eutrophic/202
OEPA Classification Survey, unpublished[2]				-	5.8	-	0.28							
INDIAN LAKE														
near Shawnee Island														
V-04/VIII-02-73[5]	0.22	0.43	59.4	114.2	1.8	3.1	0.05	0.15	36	21	77	72	61	Hypereutrophic/210
USEPA, 1975f					-	-	-	-						
IV-21/VIII-18-77	0.55	0.46	71.6	92.5	2.4	2.30	0.10	0.12	24	19	75	71	71	Hypereutrophic/217
Tobin and Youger, 1979					2.9	2.70	0.14	0.14						

APPENDIX C (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters)		CHLOROPHYLL a (ug/l)		TOTAL N (mg/l)		TOTAL P (mg/l)		TN/TP RATIO Photic Zone		TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll	Secchi Disc	Total Phosphorus	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Su	Su	Sp	
LAKE ISABELLA														
pt. of max. depth														
VII-8-81	-	4.8	-	3.3	-	0.2	-	0.03	-	6.7	42	37	53	Mesotrophic/132
OEPA Classification Survey, unpublished[2]				-	1.9	-	0.24							
JACKSON LAKE														
above dam														
V-1/VIII-18-78	1.5	1.1	15.8	10.2	0.46	0.76	0.02	0.03	23	25	53	59	47	Eutrophic/159
OEPA/USGS, unpublished					0.63	3.1	0.02	0.08						
JEFFERSON LAKE														
above dam														
V-9/VIII-8-80	1.7	1.5	3.4	10.6	0.76	1.4	0.01	0.03	76	47	54	54	37	Eutrophic/145
OEPA/USGS, unpublished					1.1	1.1	0.02	0.08						
LAKE KATHARINE														
pt of max. depth														
III-22-79	1.2	-	6.1	-	0.23	-	lt.05	-	UD	-	-	-	-	-
OEPA, special survey, unpublished[3]					0.49	-	lt.05	-						
KILLDEEER RESERVOIR														
at SW corner														
V-5/VIII-4-77	5.8	1.9	-	5.4	2.0	1.4	0.01	0.01	200	140	47	51	37	Mesotrophic/135
Tobin and Youger, 1979					1.6	2.0	0.01	0.02						
KISER LAKE														
above dam														
IV-22/VIII-19-77	0.64	0.37	39.0	149.0	1.4	2.4	0.07	0.12	20	20	80	74	65	Hypereutrophic/219
Tobin and Youger, 1979					1.4	4.3	0.07	0.12						
KNOX LAKE														
above dam														
V-3/VIII-30-77	0.88	0.61	-	35.3	2.1	0.86	0.03	0.08	70	11	66	67	53	Eutrophic/186
Tobin and Youger, 1979					2.9	11	0.07	0.85						
LADUE RESERVOIR														
above dam														
V-11/VIII-7-78	1.7	1.8	7.6	11.1	0.90	0.73	0.05	0.02	18	37	54	52	61	Eutrophic/167
OEPA/USGS, unpublished					1.0	0.78	0.07	0.02						
LEESVILLE LAKE														
above dam														
V-18/VIII-31-76					0.75	0.39	0.03	0.04	25	10	-	53	53	
Tobin and Youger, 1979	1.4	1.6	-	-	1.0	2.3	0.04	0.24						Eutrophic/159

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
LAKE LOGAN														
above dam														
IV-15/IX-14-76	1.1	0.61	-	-	0.93	0.91	0.04	0.11	23	8.3	-	67	57	Eutrophic/186
Tobin and Youger, 1979					0.86	5.81	0.04	0.23						
LONG LAKE														
at midpoint														
IV-19/VIII-9-77	0.85	0.73	77.3	62.7	1.2	0.83	0.07	0.06	17	14	71	65	65	Eutrophic/201
Tobin and Youger, 1979					1.8	5.7	0.05	0.77						
LAKE LORAMIE														
above dam														
V-4/VIII-01-73[5]	0.15	0.15	50.6	104.2	3.9	3.3	0.18	0.21	22	16	76	87	79	Hypereutrophic/242
USEPA, 1975g					-	-	-	-						
V-17/VIII-13-75	0.28	0.20	-	-	1.8	2.0	0.24	0.23	7.5	8.7	-	83	83	Hypereutrophic/249
Tobin and Youger, 1977					0.86	2.3	0.25	0.22						
VII-29-81	-	0.27	-	71.2	-	2.3	-	0.17	-	14	72	79	78	Hypereutrophic/229
OEPA Classification Survey, unpublished[2]				-	2.3	-	0.18							
MADISON LAKE														
above dam														
VI-5/VIII-7-79	0.36	0.51	47.3	26.3	7.5	2.8	0.09	0.08	83	35	63	70	69	Eutrophic/201
OEPA/USGS, unpublished					6.9	2.7	0.06	0.08						
MEADOWBROOK LAKE														
above dam														
VI-2/VIII-29-80	1.2	1.2	25	58.9	0.90	0.90	0.11	0.13	8.2	6.9	71	57	72	Eutrophic/199
OEPA/USGS, unpublished					-	3.7	0.16	0.41						
MEANDER CREEK RESERVOIR														
above dam														
VI-22/VIII-17-79	2.1	1.7	3.9	9.7	0.87	0.57	0.01	0.01	87	57	53	52	37	Eutrophic/142
OEPA/USGS, unpublished					1.7	2.2	0.05	0.32						
MIAMI-WHITEWATER LAKE														
above dam														
VII-7-81	-	0.73	-	21.5	-	0.71	-	0.07	-	10	61	65	65	Eutrophic/191
OEPA Classification Survey, unpublished[2]				-	1.2	-	0.33							
MICHAEL J. KIRWAN RESERVOIR (West Branch Reservoir)														
above dam														
IV-18/VIII-29-77	1.1	1.4	4.6	6.4	1.1	0.56	0.01	0.01	110	56	49	55	37	Eutrophic/141
Tobin and Youger, 1979					1.1	0.64	0.01	0.04						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
LAKE MILTON														
above dam														
VI-21/VIII-16-79	1.6	1.1	9.3	15.4	1.7	1.2	0.02	0.02	85	60	57	59	47	Eutrophic/163
OEPA/USGS, unpublished					1.9	2.4	0.06	0.22						
MOGADORE RESERVOIR														
above dam														
V-4/VIII-23-76	6.4	1.6	-	-	0.63	0.46	0.03	0.03	21	15	-	53	53	Eutrophic/159
Tobin and Youger, 1979					0.63	0.76	0.03	0.17						
MONROE LAKE														
above dam														
V-16/VIII-22-80	1.5	1.8	4.9	16.0	0.42	0.50	0.02	0.02	21	25	58	52	47	Eutrophic/157
OEPA/USGS, unpublished					1.6	2.5	0.04	0.10						
MOSQUITO CREEK LAKE														
above dam														
IV-21/VII-30-73[5]	0.99	0.81	25.7	40.2	0.89	1.2	0.03	0.05	30	24	67	63	53	Eutrophic/183
USEPA, 1975h					1.1	1.1	0.04	0.08						
V-12/VIII-24-76	0.82	0.61	-	-	0.70	0.74	0.06	0.07	12	11	-	67	63	Eutrophic/195
Tobin and Youger, 1979					0.77	0.98	0.06	0.08						
MOUNT GILEAD LAKE #1 the upper lake														
VIII-4-80	-	-	-	17.6	-	5.2	-	0.34	-	15	59	-	88	Hypereutrophic/220
OEPA Classification Survey, unpublished[2]				-	5.2	-	0.27							
MOUNT GILEAD LAKE #2 the lower lake														
VIII-4-80	-	0.12	-	2.6	-	3.7	-	0.22	-	17	40	91	82	Hypereutrophic/213
OEPA Classification Survey, unpublished[2]				-	4.8	-	0.22							
NESMITH LAKE														
pt of max. depth														
IV-11/IX-26-79	0.82	0.82	63.9	83.0	0.76	1.8	0.06	0.20	13	9.0	74	63	81	Hypereutrophic/218
OEPA, special survey, unpublished					0.76	0.42	0.10	0.08						
NETTLE LAKE														
near midpoint														
V-22/VIII-14-78	1.1	1.2	19.5	19.5	1.5	1.6	0.04	0.04	38	40	60	57	57	Eutrophic/164
OEPA/USGS, unpublished					1.6	3.3	0.05	0.30						
NEW LEXINGTON RESERVOIR ('Old Reservoir')														
above dam														
V-6/VIII-4-80	1.4	1.2	6.8	4.3	0.51	1.1	0.02	0.03	26	37	45	57	47	Mesotrophic/149
OEPA/USGS, unpublished					0.88	1.7	0.04	0.70						

APPENDIX C (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
NEWPORT LAKE														
above dam														
V-22/VIII-28-80	0.41	0.56	73.2	155.2	3.0	1.3	0.43	0.23	7.0	5.7	80	68	92	Hypereutrophic/240
OEPA/USGS, unpublished					10	2.3	2.6	0.65						
NIMISILA RESERVOIR														
above dam														
V-2/VIII-8-77	0.67	0.91	41.4	43.6	1.2	1.1	0.05	0.05	24	22	68	61	61	Eutrophic/190
Tobin and Youger, 1979					1.9	7.3	0.09	0.60						
NORTH BRANCH RESERVOIR														
above dam														
VI-12/VIII-14-79	0.51	0.51	14.1	48.4	2.9	1.0	0.04	0.06	73	17	69	70	57	Eutrophic/196
OEPA/USGS, unpublished					2.2	1.9	0.08	0.11						
OLD REID PARK POND														
at outfall														
VII-17-81	-	-	-	2.2	-	0.82	-	0.03	-	27	38	-	53	Mesotrophic/136
OEPA Classification Survey, unpublished[2]				-	-	-	-							
O'SHAUGHNESSY RESERVOIR														
at dam														
IV-26/VIII-2-73[5]	0.46	0.46	9.6	3.5	3.7	5.8	0.17	0.22	22	26	43	71	78	Eutrophic/192
USEPA, 1975q					3.8	3.4	0.21	0.21						
PAINT CREEK LAKE														
above dam														
V-6/IX-05-75	0.66	0.91	-	-	4.3	1.0	0.14	0.04	31	25	-	61	75	Eutrophic/204
Tobin and Youger, 1977					5.2	3.2	0.17	0.14						
LAKE PARK														
pt. of max. depth														
VII-15-81	-	0.34	-	26.0	-	1.9	-	0.16	-	12	63	76	77	Hypereutrophic/216
OEPA Classification Survey, unpublished[2]				-	-	-	-							
PIEDMONT LAKE														
above dam														
IV-12/VIII-11-77	1.4	0.85	16.1	33.3	0.88	0.72	0.02	0.02	44	36	65	62	47	Eutrophic/174
Tobin and Youger, 1979					0.76	1.7	0.02	0.09						
PINE LAKE														
above dam														
III-12-80	-	-	1.6	-	0.36	-	0.005	-	72	-	35	-	27	Mesotrophic/93
OEPA, special survey, unpublished[3]					-	-	-	-						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
PLEASANT HILL RESERVOIR at dam														
IV-20/VII-30-73[5]	1.4	1.1	41.7	10.0	1.2	1.0	0.02	0.04	60	25	53	59	47	Eutrophic/159
USEPA, 1975r					1.1	1.1	0.03	0.05						
PUNDERSON LAKE at midpoint														
V-27/VIII-19-75	2.3	1.3	-	-	0.79	0.75	0.03	0.03	26	25	-	56	53	Eutrophic/163
Tobin and Youger, 1977					2.0	3.2	0.29	0.55						
VIII-7-80	-	2.1	-	9.8	-	0.40	-	0.04	-	10	53	49	57	Eutrophic/159
OEPA Classification Survey, unpublished[2]				-	2.7	-	1.52							
PYMATUNING RESERVOIR 41 33 00.0 080 30 36														
IV-21/VII-31-73[5]	1.7	0.61	7.7	43.1	1.0	1.2	0.02	0.05	50	24	67	67	61	Eutrophic/195
USEPA, 1975x					1.2	1.0	0.03	0.05						
RICHWOOD LAKE near west edge														
VII-31-80	-	0.91	-	21.8	-	1.0	-	0.06	-	17	61	61	63	Eutrophic/185
OEPA Classification Survey, unpublished[2]				-	1.4	-	0.11							
ROCKY FORK LAKE above dam														
IV-28/VIII-01-73[5]	0.71	0.86	74.4	41.6	1.4	1.0	0.06	0.06	23	17	67	62	63	Eutrophic/192
USEPA, 1975i					1.7	4.0	0.20	0.10						
V-7/IX-6-75	0.64	0.86	-	-	1.3	0.64	0.05	0.04	26	16	-	62	61	Eutrophic/184
Tobin and Youger, 1977					1.0	9.1	0.05	0.18						
VIII-12-81	-	0.79	-	83.9	-	0.97	-	0.04	-	24	74	63	57	Eutrophic/194
OEPA Classification Survey, unpublished[2]				-	6.3	-	0.14							
LAKE ROCKWELL above dam														
V-11/VIII-20-76	1.2	1.0	-	-	0.54	0.78	0.05	0.06	11	13	-	60	61	Eutrophic/182
Tobin and Youger, 1979					0.49	1.4	0.05	0.16						
ROSS LAKE above dam														
VI-7/VIII-10-79	2.0	3.1	-	4.3	0.56	0.34	0.02	0.01	28	34	45	44	47	Mesotrophic/136
OEPA/USGS, unpublished					1.5	3.6	0.05	0.22						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
LAKE RUPERT														
above dam														
VI-15/IX-4-79	2.1	1.6	3.5	7.3	0.34	0.33	0.01	0.01	34	33	50	53	37	Mesotrophic/140
OEPA/USGS, unpublished					1.1	2.6	0.01	0.08						
SALT FORK LAKE														
above dam														
V-20/VIII-15-75	1.6	0.91	-	-	0.56	0.64	0.02	0.03	28	21	-	61	47	Eutrophic/162
Tobin and Youger, 1977					0.69	1.8	0.03	0.13						
SENECAVILLE LAKE (Seneca Lake)														
above dam														
IV-20/VIII-17-76	0.98	0.79	-	-	0.74	0.56	0.04	0.04	19	14	-	63	57	Eutrophic/180
Tobin and Youger, 1979					0.64	1.1	0.07	0.11						
LOWER SHAKER LAKE														
above dam														
VIII-17-77	-	0.60	-	21.6	-	1.3	-	0.17	-	7.6	61	67	78	Eutrophic/206
Olive and Karn 1980[2]					-	1.6	-	0.05						
SHARON LAKE														
above dam														
VII-8-81	-	0.53	-	64.6	3.3	-	0.66	-	-	5.0	71	69	98	Hypereutrophic/238
OEPA Classification Survey, unpublished[2]				2.6	-	0.92	-							
SIPPO LAKE														
above dam														
VII-15-81	-	0.82	-	23.3	-	0.73	-	0.08	-	9.1	61	63	67	Eutrophic/191
OEPA Classification Survey, unpublished[2]				-	2.9	-	0.31							
LAKE SNOWDEN														
above dam	3.2	1.8	-	17.0	0.60	0.43	0.01	0.02	60	22	58	52	37	Eutrophic/146
VI-8/IX-5-79					1.0	2.6	0.02	0.20						
OEPA/USGS, unpublished														
SNYDER PARK LAGOON														
west lagoon														
VII-10-81	-	0.61	-	17.5	-	1.0	-	0.05	-	20	59	67	61	Eutrophic/187
OEPA Classification Survey, unpublished[2]				-	-	-	-							
SPENCER LAKE														
above dam														
VIII/29-77	-	0.4	-	58.9	-	4.3	-	0.31	-	14	70	73	87	Hypereutrophic/230
Olive and Karn 1980[2]					-	4.2	-	0.28						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
SPRINGFIELD LAKE														
pt. of max. depth														
VIII-4-81	-	0.82	-	50.4	-	1.3	-	0.04	-	32	69	63	57	Eutrophic/189
OEPA Classification Survey, unpublished[2]				-	5.3	-	0.67							
STONELICK LAKE														
above dam														
IV-14/IX-1-77	0.24	1.1	53.7	21.2	2.4	0.61	0.13	0.06	18	10	61	59	74	Eutrophic/194
Tobin and Youger, 1979					2.3	12	0.15	3.2						
SUMMIT LAKE														
near midpoint														
V-3/VIII-19-76	0.85	0.64	-	-	1.0	1.2	0.07	0.09	14	13	-	66	65	Eutrophic/196
Tobin and Youger, 1979					2.4	12	0.10	0.74						
VIII-5-81	-	0.82	-	36.8	-	0.88	-	0.07	-	13	66	63	65	Eutrophic/194
OEPA Classification Survey, unpublished[2]				-	5.4	-	0.72							
SUNNY LAKE														
near center														
VIII-07-80	-	0.61	-	54.1	-	1.7	-	0.24	-	7.1	70	67	83	Hypereutrophic/220
OEPA Classification Survey, unpublished[2]				-	-	-	-							
TAPPAN LAKE														
above dam														
IV-21/VII-30-73[5]	0.97	0.99	28.3	27.4	1.1	1.4	0.02	0.03	55	47	63	60	47	Eutrophic/170
USEPA, 1975s					0.9	1.7	0.02	0.14						
IV-26/IX-2-76	1.1	1.1	-	-	0.49	0.46	0.04	0.05	12	9.2	-	59	57	Eutrophic/174
Tobin and Youger, 1979					0.49	1.7	0.04	0.26						
TURKEYFOOT LAKE														
at midpoint														
IV-19/VIII-9-77	0.64	1.1	62.1	33.6	1.4	0.85	0.09	0.05	16	17	65	59	69	Eutrophic/193
Tobin and Youger, 1979					2.4	4.2	0.45	0.71						
TYCOON LAKE														
near midpoint														
V-2/VIII-24-78	2.0	1.8	6.7	10.1	0.45	0.65	0.02	0.02	23	33	53	52	47	Eutrophic/152
OEPA/USGS, unpublished					0.46	0.63	0.02	0.03						
VAN BUREN LAKE														
above dam														
IV-29/VIII-11-80	0.33	0.10	76.0	6.4	4.2	1.7	0.08	0.21	53	8.1	49	93	67	Eutrophic/209
OEPA/USGS, unpublished					3.7	2.4	0.12	0.29						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
LAKE VESUVIUS														
above dam														
V-13/IX-2-75	0.81	2.8	-	-	0.61	0.23	0.02	0.02	31	12	-	45	47	Mesotrophic/138
Tobin and Youger, 1977					0.61	0.48	0.05	0.05						
VETO LAKE														
above dam														
V-9/VIII-17-78	0.46	0.46	20.1	14.4	0.58	0.69	0.05	0.05	12	14	57	67	61	Eutrophic/185
OEPA/USGS, unpublished					1.0	3.4	0.07	0.49						
WALLACE LAKE														
pt of max depth														
VIII/29-77	-	2.0	-	3.5	-	1.5	-	0.022	-	68	43	50	49	Eutrophic/142
Olive and Karn 1980[2]					-	1.4	-	0.044						
WESTERVILLE RESERVOIR														
above dam														
IV-1-80	0.91	-	17.6	-	1.4	-	0.04	-	35	-	-	-	57	Eutrophic/171
OEPA, special survey, unpublished					1.4	-	0.06	-						
WILLARD CITY RESERVOIR														
northeast quadrant														
VI-22/VIII-30-79	6.5	1.6	1.9	8.8	1.8	1.3	0.01	0.01	180	130	52	53	37	Eutrophic/142
OEPA/USGS, unpublished					0.93	1.7	0.03	0.16						
LAKE WHITE														
above dam														
V-31/VIII-20-79	1.3	1.6	3.9	10.3	0.86	0.36	0.01	0.01	86	36	53	53	37	Eutrophic/143
OEPA/USGS, unpublished					0.79	2.5	0.04	0.04						
WILLS CREEK LAKE														
above dam														
V-6/IX-7-76	0.46	0.46	-	-	0.74	0.77	0.08	0.08	9.3	9.6	-	71	67	Hypereutrophic/207
Tobin and Youger, 1979					0.91	0.85	0.12	0.11						

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	SECCHI DISK TRANSPARENCY (meters) Sp	 Su	CHLOROPHYLL a (ug/l) Sp	 Su	TOTAL N (mg/l) Sp	 Su	TOTAL P (mg/l) Sp	 Su	TN/TP RATIO Photic Zone Sp	 Su	TROPHIC STATE INDEX POINTS (Carlson 77) Chlorophyll Su	Secchi Disc Su	Total Phosphorus Sp	TROPHIC STATE CLASSIFICATION/ TOTAL TSI POINTS
WINTON LAKE (West Fork Mill Creek Lake)														
above dam														
IV-24/VII-25-78	0.61	0.56	62.2	35.7	1.2	1.4	0.11	0.16	11	8.8	66	68	72	Eutrophic/207
OEPA/USGS, unpublished					9.5	16	0.19	0.95						
WOLF RUN LAKE														
above dam														
IV-19/VIII-16-76	2.0	3.4	-	-	0.58	0.29	0.02	0.01	29	29	UD	42	47	Mesotrophic/135
Tobin and Youger, 1979					0.57	1.0	0.02	0.05						
VIII-13-81	-	2.9	-	2.9	-	0.23	-	lt 0.02	-	UD	41	45	UD	Mesotrophic/129
OEPA Classification Survey, unpublished					-	1.7	-	0.04						

1. Chlorophyll a values collected at 0.61 meter depth. Total nitrogen and total phosphorus concentrations collected at 0.61 meters and 0.30 meters from the bottom, 0.61 meter values listed above, near bottom values listed below. Dashes indicate information unavailable. Sp - spring measurement, Su - summer measurement.
2. TSI value determined using summer total phosphorus concentration.
3. TSI value determined using spring chlorophyll a concentration.
4. UD - value undeterminalble, BD - below detectibility, lt - less than.
5. Nitrogen and phosphorus photic zone samples determined from surface samples

APPENDIX D

Summary of physical characteristics, field parameters, and selected chemical parameters in selected Ohio lakes.

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
ACTON LAKE															
above dam	Partial	Yes	Yes	9.8	8.2	7.9	7.9	377	337	1.7	4.0	18	20	6.3	4.8
IV-30/IX-9-75				9.4	0.0	7.7	6.5	227	502	3.2	gt 7.9	28	27	15	11
Tobin and Youger, 1977															
VIII-10-81	-	Yes	-	-	9.8	-	8.8	-	393	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	0.3	-	7.4	-	468	-	-	-	-	-	-
ADAMS LAKE															
above dam	Yes	Yes	Yes	7.3	9.7	7.8	8.3	260	259	2.2	1.7	26	21	4.2	9.6
V-1/VIII-18-80				0.2	0.2	5.2	6.8	314	301	1.9	7.1	33	38	8.2	13
OEPA/USGS, unpublished															
LAKE ALMA															
South of island	Partial	Yes	Yes	9.3	7.5	7.4	6.8	181	155	0.3	0.1	16	20	7.6	6.6
V-1/VIII-18-80				10.1	0.2	7.2	6.4	180	348	1.0	2.4	21	97	5.7	19
OEPA/USGS, unpublished															
ALUM CREEK LAKE															
above dam	No	Yes	Yes	11.2	8.0	8.3	7.9	435	460	1.0	0.7	13	20	6.8	5.8
IV-13/VIII-27-76				10.2	0.0	8.1	7.1	435	492	1.1	1.1	16	28	7.1	8.1
Tobin and Youger, 1979															
ATWOOD LAKE															
above dam	Slight	Partial	Yes	10.2	8.1	8.0	8.0	222	225	1.6	2.5	10	12	6.2	6.1
V-17/VIII-30-76				4.3	0.0	6.6	6.7	220	285	2.4	1.9	12	22	5.1	11
Tobin and Youger, 1979															
BARNESVILLE RESERVOIR #3															
above dam	Yes	Yes	Yes	10.4	12.8	8.2	8.5	185	141	.7	1.7	12	11	4.3	3.8
V-15/VIII-21-80				0.4	0.3	7.0	6.8	214	214	1.0	2.3	22	19	2.7	2.7
OEPA/USGS, unpublished															
BELMONT LAKE															
above dam	Yes	Yes	Yes	11.8	11.8	8.9	9.1	330	244	1.8	3.9	13	21	3.9	6.1
V-8/VIII-7-80				3.6	0.1	7.2	7.0	344	364	0.9	6.7	16	23	6.8	5.5
OEPA/USGS, unpublished															
BERLIN LAKE															
above dam	Yes	No	Yes	8.2	6.7	8.3	7.5	357	403	1.1	1.4	12	15	16	10
V-28/VIII-27-75				4.0	0.0	6.9	6.8	382	415	0.5	3.5	4	26	4.2	-
Tobin and Youger, 1977															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
BRADY LAKE															
area of max. depth	-	Yes	-	-	11.6	-	9.4	-	428	-	-	-	-	-	-
VII-6-80				-	0.0	-	8.6	-	325	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
BUCKEYE LAKE															
at midpoint	Partial	No	No	12.3	7.0	9.0	8.2	320	285	5.0	7.4	34	51	7.5	11
V-2/VIII-16-75				4.5	4.2	7.9	7.6	310	287	6.1	6.7	36	47	9.8	9.2
Tobin and Youger, 1977															
V-16/VIII-22-78	No	No	No	11.5	8.8	8.4	8.1	318	325	6.1	3.7	30	30	9.2	8.6
OEPA/USGS, unpublished				7.8	7.4	7.9	7.8	328	330	4.9	2.3	40	37	9.3	8.6
BURR OAK RESERVOIR															
above dam	Yes	Partial	Yes	12.9	9.4	8.7	8.5	190	198	1.2	3.0	7	15	3.4	6.9
IV-22/IX-30-76				2.3	0.0	6.9	6.5	180	160	-	2.5	4	33	6.0	12
Tobin and Youger, 1979															
CAESAR CREEK LAKE															
above dam	Slight	Yes	No	10.5	7.5	7.8	7.9	355	472	1.2	0.8	15	18	9.4	9.1
IV-25/III-26-78				7.0	0.0	7.0	7.0	300	365	0.6	0.9	15	23	9.3	8.5
OEPA/USGS, unpublished															
CHARLES MILL RESERVOIR															
above dam	No	Slight	No	14.5	10.6	8.7	8.3	435	450	6.6	4.3	30	24	11	8.0
V-12/VIII-8-78				11.2	4.4	8.4	7.6	450	450	5.4	3.1	30	44	10	8.6
OEPA/USGS, unpublished															
CLARK LAKE															
above dam	Yes	Slight	Yes	12.0	8.4	9.4	9.3	305	324	1.3	0.6	12	9	4.5	0.6
V-29/VIII-13-79				3.6	1.1	7.7	6.7	430	790	3.8	6.9	20	150	3.8	24
OEPA/USGS, unpublished															
CLARENCE J. BROWN RESERVOIR (Buck Creek LAKE)															
above dam	No	Yes	Yes	11.3	7.2	8.3	8.0	565	470	2.1	4.2	13	15	6.0	4.2
IV-7/VIII-2-77				10.9	0.0	8.3	7.1	565	620	1.8	7.5	12	20	4.1	7.7
Tobin and Youger, 1979															
CLEAR FORK RESERVOIR															
above dam	Yes	Partial	Yes	13.2	8.5	9.1	8.2	262	297	5.7	2.3	23	15	11	2.6
V-23/VIII-20-75				0.0	0.0	7.1	6.7	310	347	1.1	2.5	12	27	4.0	9.2
Tobin and Youger, 1977															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
CLENDENING LAKE															
above dam	Slight	Partial	Yes	11.7	8.0	8.6	8.5	605	718	2.7	2.5	11	14	6.9	6.1
IV-27/IX-3-76				1.5	0.0	7.2	7.1	655	810	1.7	8.8	8	18	10	12
Tobin and Youger, 1979															
CLOUSE LAKE															
above dam	Yes	Yes	Yes	11.6	9.9	8.6	7.7	575	451	2.0	3.2	23	3	5.6	8.1
V-29/VIII-5-80				0.4	0.3	7.0	6.6	1084	435	3.3	1.8	40	18	6.0	6.8
OEPA/USGS, unpublished															
COWAN LAKE															
above dam	No	Yes	Yes	9.9	8.8	8.2	8.1	358	311	1.6	4.4	12	18	6.6	5.7
IV-29/IX-10-75				8.7	0.0	7.9	6.7	358	458	1.4	4.4	12	20	11	9.1
Tobin and Youger, 1979															
CUTLER LAKE															
above dam	-	Yes	-	-	6.1	-	8.1	-	380	-	-	-	-	-	-
VII-22-81				-	0.3	-	7.2	-	305	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
DEER CREEK LAKE (Pickaway County)															
above dam	No	No	No	11.0	5.0	8.2	7.4	510	450	1.9	2.0	14	12	8.0	4.8
IV-25/IX-12-75				9.7	3.7	7.7	7.3	510	452	1.2	1.0	16	16	8.5	5.7
Tobin and Youger, 1977															
DEER CREEK RESERVOIR (Stark County)															
above dam	Yes	Slight	Yes	11.5	7.7	8.5	7.9	340	370	3.4	1.9	22	20	5.7	7.0
IV-23/VIII-16-77				0.2	0.0	6.8	7.0	365	400	1.6	2.3	20	30	4.1	6.4
Tobin and Youger, 1979															
DILLON LAKE															
above dam	Slight	Slight	Yes	8.7	10.1	7.5	8.2	320	475	1.0	6.0	17	20	4.6	7.3
IV-11/VIII-12-77				7.8	0.0	7.3	6.9	295	398	1.4	3.6	21	25	5.2	8.1
Tobin and Youger, 1979															
DOW LAKE															
above dam	Slight	Yes	Yes	10.9	9.9	7.7	8.0	258	260	1.0	0.9	10	27	5.8	8.3
V-8/VIII-31-78				0.9	0.0	6.8	6.8	265	285	1.2	3.1	15	10	4.9	4.4
OEPA/USGS, unpublished															
EAST BRANCH RESERVOIR															
above dam	No	Partial	Yes	9.1	10.5	7.1	8.4	185	235	2.0	3.5	12	20	2.1	8.2
IV-26/VIII-15-77				9.0	0.0	7.1	6.4	185	167	1.6	4.8	15	35	5.7	9.1
Tobin and Youger, 1979															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
EAST FORK LAKE															
above dam	Yes	Yes	Yes	7.8	7.2	8.5	8.5	270	261	1.1	2.5	44	27	7.6	7.7
VI-1/VIII-21-79				4.0	0.3	7.7	7.2	250	269	0.5	1.2	44	27	7.1	6.5
OEPA/USGS, unpublished															
EAST RESERVOIR															
near east shore	Yes	Yes	Yes	10.4	9.4	8.6	8.2	395	375	5.0	3.9	31	22	2.8	8.7
V-23/IX-2-80				0.3	0.3	7.3	7.0	435	498	5.0	7.8	24	65	2.4	17
OEPA/USGS, unpublished															
ESSINGTON LAKE															
above dam	-	Yes	-	-	6.0	-	2.8	-	3890	-	-	-	-	-	-
VII-23-81				-	1.6	-	3.0	-	3280	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
FINDLAY CITY RESERVOIR															
near east shore	Slight	Slight	No	7.2	8.0	9.0	8.6	430	415	0.7	2.0	59	9	7.6	7.0
VI-27/VIII-31-79				1.6	3.2	8.0	7.6	450	430	1.1	1.1	35	3	9.2	9.4
OEPA/USGS, unpublished															
FINDLEY LAKE															
above dam	Yes	Yes	Yes	7.6	10.4	7.8	9.3	361	288	1.3	2.6	22	34	5.8	9.1
VI-3/VIII-12-80				0.4	0.3	6.8	6.4	330	384	3.7	6.7	37	90	5.2	23
OEPA/USGS, unpublished															
FIRESTONE RESERVOIR															
above dam	-	No	-	-	12.3	-	8.6	-	520	-	-	-	-	-	-
VII-14-81				-	0.5	-	7.4	-	540	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
FORKED RUN LAKE															
above dam	Yes	Yes	Yes	11.3	8.4	7.4	7.6	125	140	1.2	0.6	8	14	5.1	8.7
V-4/VIII-25-78				2.5	0.0	6.3	6.3	150	200	0.9	4.5	10	-	11	5.6
OEPA/USGS, unpublished															
FORTY ACRE POND															
at outfall	-	-	-	-	6.8	-	7.8	-	365	-	-	-	-	-	-
VII-29-81															
OEPA Classification Survey, unpublished															
FOX LAKE															
above dam	Yes	Yes	No	9.8	9.3	7.7	7.4	170	164	0.7	1.2	33	29	2.0	3.7
V-2/VIII-19-80				0.6	0.2	6.7	5.8	180	304	0.9	7.5	20	65	4.9	16
OEPA/USGS, unpublished															

NAME SAMPLING SITE SAMPLING DATES	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
DATA SOURCE	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
GRAND LAKE SAINT MARYS															
near midpoint	No	No	No	9.6	10.2	9.3	8.9	304	311	7.9	15.0	64	63	12	12
V-16/VIII-12-75				8.2	5.4	9.0	8.4	304	308	8.0	7.5	71	76	20	13
Tobin and Youger, 1977															
GRIGGS RESERVOIR															
above dam	Yes	Yes	Yes	8.2	7.5	7.2	8.6	605	460	1.2	3.8	13	35	7.6	12
V-24/VIII-6-79				0.8	1.2	6.7	7.3	590	585	1.5	4.4	18	45	7.0	10
OEPA/USGS, unpublished															
GUILFORD LAKE															
above dam	Yes	Yes	Yes	15.8	8.2	9.8	8.5	220	243	7.2	3.5	15	23	6.8	9.5
V-21/VIII-26-75				0.0	0.0	7.3	6.5	295	335	1.7	2.5	15	18	3.5	7.4
Tobin and Youger, 1977															
VIII-24-81	-	No	-	-	9.2	-	9.2	-	250[4]	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	1.5	-	7.0	-	373	-	-	-	-	-	-
HAMMERTOWN LAKE															
(Jackson City RESERVOIR)															
above dam	Yes	Yes	Yes	7.4	6.7	8.4	8.8	105	105	0.6	0.8	16	13	-	3.6
VI-14/VIII-6-79				3.4	1.7	7.3	6.6	105	150	0.7	0.9	23	27	2.0	9.6
OEPA/USGS, unpublished															
HARGUS LAKE															
above dam	Yes	Yes	Yes	10.3	8.9	8.1	8.2	383	388	0.8	0.9	15	16	7.3	5.6
IV-20/VIII-4-78				4.7	0.0	7.3	7.2	450	445	-	0.8	15	20	9.0	17
OEPA/USGS, unpublished															
HARRISON LAKE															
at East end	Yes	Partial	No	13.6	11.7	8.8	8.3	405	435	5.8	4.3	36	27	9.5	10
V-30/VIII-22-75				0.0	0.0	7.0	7.0	336	465	3.5	6.5	28	34	12	13
Tobin and Youger, 1977															
VIII-19-81	-	Slight	-	-	8.6	-	8.5	-	365	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	0.5	-	7.1	-	370	-	-	-	-	-	-
HIGHLANDTOWN LAKE															
above dam	Slight	Yes	Yes	13.0	9.0	7.0	9.2	172	155	1.3	2.4	15	13	8.5	6.3
V-15/VIII-21-78				11.7	0.0	6.4	6.5	177	240	0.7	1.2	15	39	8.1	6.6
OEPA/USGS, unpublished															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
HOOVER RESERVOIR															
at dam	Partial	Yes	No	11.6	6.8	8.3	7.6	296	363	3.3	1.3	23	13	7.9	9.8
V-09/VIII-29-75				9.4	0.0	7.3	6.4	270	305	0.9	3.1	19	23	5.9	7.6
Tobin and Youger, 1977															
LAKE HOPE															
above dam	Yes	Yes	Yes	9.5	11.6	5.1	6.3	137	134	0.4	1.1	12	12	4.0	4.7
V-14/IX-3-75				3.2	0.0	4.2	5.0	128	199	0.3	0.5	12	29	7.1	13
Tobin and Youger, 1977															
IV-27/VIII-1-78	No	Yes	Yes	10.4	9.9	4.9	7.5	158	155	0.5	1.8	8	25	4.8	6.2
OEPA/USGS, unpublished				6.6	0.0	4.7	5.2	168	188	0.4	0.8	8	31	6.9	10
HOSTERMAN LAKE															
above dam	-	Yes	-	-	8.9	-	8.1	-	464	-	-	-	-	-	-
VII-17-81				-	0.0	-	7.2	-	444	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
INDIAN LAKE															
near Shawnee Island	No	Slight	No	9.5	9.3	8.3	8.3	395	425	7.6	6.1	41	40	5.2	7.4
IV-21/VIII-18-77				9.1	5.4	8.2	7.7	395	430	7.5	5.5	42	45	4.7	8.1
Tobin and Youger, 1979															
LAKE ISABELLA															
pt. of max. depth	-	Yes	-	-	8.2	-	8.2	-	600	-	-	-	-	-	-
VII-8-81				-	0.1	-	7.2	-	550	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
JACKSON LAKE															
above dam	Slight	Yes	No	15.7	7.6	7.7	7.0	160	140	2.1	1.4	10	15	6.7	5.2
V-1/VIII-18-78				11.7	0.0	6.2	6.5	165	310	1.4	1.6	15	85	9.2	8.3
OEPA/USGS, unpublished															
JEFFERSON LAKE	Partial	Yes	Yes	10.2	10.1	8.0	7.9	565	439	0.5	1.1	7	9	5.0	2.5
above dam				7.9	0.2	7.6	6.7	580	620	0.6	2.7	22	23	1.3	3.4
V-9/VIII-8-80															
OEPA/USGS, unpublished															
LAKE KATHARINE															
pt. of max. depth	Yes	-	-	12.1	-	5.9	-	47	-	3	-	5	-	6.1	-
III-22-79				5.1	-	5.6	-	42	-	2	-	5	-	6.1	-
OEPA special survey, unpublished															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
KILLDEER RESERVOIR															
at SW corner	Slight	Yes	Yes	9.5	8.2	8.0	8.2	480	473	0.7	1.1	9	15	4.2	5.0
V-5/VIII-4-77				2.3	0.0	7.4	7.1	498	510	1.0	2.3	9	15	3.6	8.4
Tobin and Youger, 1979															
KISER LAKE															
above dam	No	Slight	No	12.8	10.9	8.5	8.4	370	368	6.3	8.8	27	45	4.2	7.9
IV-22/VIII-19-77				12.7	4.2	8.5	7.5	370	380	6.3	7.6	32	40	4.4	10
Tobin and Youger, 1979															
KNOX LAKE															
above dam	Yes	Partial	Yes	12.2	12.5	8.7	8.7	240	275	4.0	4.8	10	30	6.3	6.0
V-3/VIII-30-77				0.0	0.0	6.7	7.0	222	350	3.2	4.2	12	60	8.2	8.1
Tobin and Youger, 1979															
LADUE RESERVOIR															
above dam	No	Slight	No	10.8	9.3	7.8	8.2	265	275	1.7	1.2	20	34	14	5.9
V-11/VIII-7-78				10.7	0.0	7.7	7.0	265	310	1.6	1.3	20	36	17	6.2
OEPA/USGS, unpublished															
LEESVILLE LAKE															
above dam	Yes	Partial	Yes	9.9	8.3	7.8	8.1	155	170	1.6	2.1	8	1t 10	4.4	4.1
V-18/VIII-31-76				3.0	0.0	6.5	6.5	158	202	0.8	1.6	7	15	3.3	8.5
Tobin and Youger, 1979															
LAKE LOGAN															
above dam	Yes	Yes	Yes	10.9	9.2	8.0	8.2	130	162	1.9	4.9	6	20	5.4	7.9
IV-15/IX-14-76				8.0	0.0	7.0	6.8	130	287	1.5	4.9	6	48	2.5	11
Tobin and Youger, 1979															
LONG LAKE															
at midpoint	Yes	Yes	Yes	18.6	10.9	8.8	8.4	475	470	6.4	3.7	29	15	2.8	7.2
IV-19/VIII-9-77				0.8	0.0	7.3	6.8	555	595	1.9	4.2	33	25	3.6	6.5
Tobin and Youger, 1979															
LAKE LORAMIE															
above dam	No	No	No	10.9	8.1	8.6	8.2	331	360	7.0	6.7	50	47	8.3	13
V-17/VIII-13-75				7.2	3.5	8.3	7.5	338	365	5.6	5.8	46	47	13	17
Tobin and Youger, 1977															
VII-29-81	-	No	-	-	7.3	-	8.2	-	365	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	6.8	-	8.0	-	366	-	-	-	-	-	-

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
MADISON LAKE															
above dam	Slight	Slight	No	8.5	7.4	8.8	7.5	510	575	5.6	3.0	12	34	5.3	6.4
VI-5/VIII-7-79				0.9	0.7	7.8	6.7	520	570	2.0	2.9	10	37	13	5.6
OEPA/USGS, unpublished															
MEADOWBROOK LAKE	Partial	Partial	Yes	9.6	13.0	8.2	8.5	501	368	3.2	4.1	24	29	9.7	7.9
above dam				0.3	0.4	7.0	7.1	621	534	8.0	3.7	54	34	7.3	11
VI-2/VIII-29-80															
OEPA/USGS, unpublished															
MEANDER CREEK RESERVOIR															
above dam	Yes	Yes	Yes	6.6	7.4	8.9	8.8	410	400	1.1	0.8	36	11	6.4	8.3
VI-22/VIII-17-79				1.4	0.6	7.8	7.1	430	430	5.8	1.2	39	18	4.2	6.9
OEPA/USGS, unpublished															
MIAMI-WHITEWATER LAKE															
above dam	-	Yes	-	-	9.2	-	8.6	-	333	-	-	-	-	-	-
VII-7-81				-	0.5	-	7.3	-	302	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
MICHAEL J. KIRWAN RESERVOIR (West Branch Reservoir)															
above dam	Slight	Yes	Yes	11.9	8.6	7.9	7.9	358	380	1.0	0.3	15	15	3.8	4.9
IV-18/VIII-29-77				9.6	0.0	7.4	6.7	365	385	1.0	0.3	23	30	3.0	6.0
Tobin and Youger, 1979															
LAKE MILTON															
above dam	Yes	Yes	Yes	6.7	6.9	8.6	7.6	370	410	1.5	1.1	24	9	5.3	8.4
VI-21/VIII-16-79				2.4	0.6	7.7	6.9	380	430	3.3	1.7	41	28	7.5	8.8
OEPA/USGS, unpublished															
MOGADORE RESERVOIR															
above dam	No	Yes	Yes	8.8	12.4	7.8	9.0	318	265	0.8	2.0	12	23	3.8	7.3
V-4/VIII-23-76				8.6	0.0	7.8	7.1	318	320	0.6	0.8	7	16	4.1	8.1
Tobin and Youger, 1979															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION Sp	THERMAL STRATIFICATION Su	H_2S Su	DISSOLVED OXYGEN Sp	DISSOLVED OXYGEN Su	pH Sp	pH Su	SPECIFIC CONDUCTANCE Sp	SPECIFIC CONDUCTANCE Su	BOD Sp	BOD Su	COD Sp	COD Su	TOC Sp	TOC Su
MOUNT GILEAD LAKE #1 (the upper lake)															
above dam	-	No	-	-	4.0	-	7.4	-	250	-	-	-	-	-	-
VIII-4-80				-	2.6	-	7.4	-	280	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
MOUNT GILEAD LAKE #2 (the lower lake)															
above dam	-	No	-	-	6.1	-	7.4	-	305	-	-	-	-	-	-
VIII-4-80				-	6.9	-	7.6	-	270	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
NESMITH LAKE															
pt of max depth	No	Slight	Yes	12.6	12.0	8.6	9.1	900	700	-	9	26	17	-	-
IV-11/IX-26-79				12.6	0.1	8.6	7.4	900	900	7	-	22	21	12.1	-
OEPA special survey, unpublished															
NETTLE LAKE															
near midpoint	Yes	Yes	Yes	14.6	13.5	8.3	8.4	450	450	2.8	2.2	30	22	8.5	6.9
V-22/VIII-14-78				0.0	0.0	7.3	7.1	470	500	2.7	1.3	30	35	9.7	11
OEPA/USGS, unpublished															
NEW LEXINGTON RESERVOIR ('Old Reservoir')															
above dam	Yes	Yes	Yes	9.4	7.7	7.7	7.3	161	149	0.9	0.6	4	0	3.2	4.5
V-6/VIII-4-80				2.6	0.1	6.4	6.8	170	184	1.0	2.3	5	0	3.0	4.3
OEPA/USGS, unpublished															
NEWPORT LAKE															
above dam	Yes	Partial	No	9.4	18.6	8.8	8.0	450	344	7.9	7.6	32	35	4.6	15
V-22/VIII-28-80				0.4	0.4	8.3	6.9	675	329	8.0	4.1	31	34	6.0	10
OEPA/USGS, unpublished															
NIMISILA RESERVOIR															
above dam	Slight	Yes	Yes	10.8	8.7	8.3	8.5	390	355	3.9	3.4	18	25	5.9	6.9
V-2/VIII-8-77				0.0	0.0	7.1	6.7	420	480	5.0	17	9	35	9.1	7.4
Tobin and Youger, 1979															
NORTH BRANCH RESERVOIR															
above dam	Yes	Slight	Yes	7.5	6.7	8.9	8.6	380	395	3.0	3.0	26	10	3.1	5.5
VI-12/VIII-14-79				1.6	0.9	8.3	7.6	450	468	3.8	3.0	37	13	2.9	6.1
OEPA/USGS, unpublished															

OLD REID PARK PONDS

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
PAINT CREEK LAKE															
above dam	Partial	Partial	Yes	20.8	6.8	8.6	7.9	410	390	8.2	3.2	36	15	11	6.5
V-6/X-02-75				4.1	0.0	6.8	6.8	460	450	2.5	1.7	16	18	9.9	1.3
Tobin and Youger, 1977															
LAKE PARK															
above dam	-	No	-	-	3.8	-	7.6	-	328	-	-	-	-	-	-
VII-15-81				-	3.2	-	7.5	-	328	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
PIEDMONT LAKE															
above dam	Slight	Yes	Yes	12.4	10.2	8.5	8.6	990	1000	1.8	3.3	13	25	6.0	7.5
IV-12/VIII-11-77				9.8	0.0	8.1	7.1	1010	1055	1.7	4.9	12	20	4.9	6.2
Tobin and Youger, 1979															
PUNDERSON LAKE															
at midpoint	Yes	Yes	Yes	12.8	11.1	8.4	8.6	335	330	1.6	2.2	15	27	9.9	11
V-27/VIII-19-75				1.1	0.0	6.6	6.8	365	375	2.2	2.2	17	23	5.8	9.0
Tobin and Youger, 1977															
VII-7-80	-	Yes	-	-	9.2	-	8.8	-	330	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	0.0	-	9.0	-	255	-	-	-	-	-	-
RICHWOOD LAKE															
pt. of max. depth	-	No	-	-	8.0	-	8.4	-	450	-	-	-	-	-	-
VII-31-80				-	0.2	-	7.7	-	450	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
LAKE ROCKWELL															
above dam	Slight	Partial	Yes	10.4	12.3	8.1	8.7	300	288	2.0	3.0	18	22	7.4	7.2
V-11/VIII-20-76				7.2	0.0	7.4	6.9	295	345	1.6	2.2	18	20	7.9	7.6
Tobin and Youger, 1979															
ROCKY FORK LAKE															
above dam	Partial	Yes	Yes	12.9	6.2	8.5	7.7	335	305	4.2	3.3	20	15	12	12
V-7/IX-6-1975				0.8	0.0	7.5	6.6	360	407	1.5	2.7	8	17	7.9	21
Tobin and Youger, 1977															
VIII-12-81	-	Yes	-	-	10.6	-	8.9	-	293	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	0.4	-	7.2	-	351	-	-	-	-	-	-
ROSS LAKE															
above dam	Yes	Yes	Yes	8.1	6.1	9.3	9.1	300	265	1.1	1.1	170	12	9.4	5.5
VI-7/VIII-10-79				1.7	0.6	7.9	7.1	290	308	1.9	3.8	19	41	11.0	9.3
OEPA/USGS, unpublished															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
DATA SOURCE	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
LAKE RUPERT															
above dam	Yes	Yes	Yes	7.0	7.9	8.0	8.0	160	134	0.6	1.2	30	1	5.8	9.1
VI-15/IX-4-79				0.6	0.4	7.1	7.2	180	241	0.8	0.8	36	72	3.9	4.9
OEPA/USGS, unpublished															
SALT FORK LAKE															
above dam	Yes	Yes	Yes	10.6	9.6	7.8	8.4	235	250	1.3	2.6	12	21	8.1	4.8
V-20/VIII-15-75				1.3	0.0	6.2	6.5	255	287	1.2	2.4	12	21	4.9	4.4
Tobin and Youger, 1977															
SENECAVILLE LAKE															
above dam	Yes	Slight	Yes	14.6	10.2	8.7	8.4	325	340	2.2	2.7	10	13	4.6	4.7
IV-20/VIII-17-76				5.7	0.0	7.7	7.1	350	365	1.9	1.8	10	20	7.0	6.8
Tobin and Youger, 1979															
SHARON LAKE															
pt. of max. depth	-	Slight	-	-	13.6	-	8.8	-	510	-	-	-	-	-	-
VII-8-81				-	0.2	-	7.2	-	343	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
SIPPO LAKE															
pt. of max. depth	-	Slight	-	-	9.0	-	8.0	-	368	-	-	-	-	-	-
VII-15-81				-	0.2	-	7.1	-	389	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
LAKE SNOWDEN															
above dam	Yes	Yes	Yes	7.9	6.4	9.1	8.9	210	180	0.9	1.8	180	6	3.9	4.2
VI-8/IX-5-79				1.3	0.5	7.7	6.8	210	238	0.8	4.0	22	70	3.4	7.8
OEPA/USGS, unpublished															
SNYDER PARK LAGOONS															
pt. of max. depth															
in most western lagoon	-	No	-	-	7.1	-	8.0	-	750	-	-	-	-	-	-
VII-10-81				-	5.6	-	7.8	-	750	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
SPRINGFIELD LAKE															
pt. of max. depth	-	Yes	-	-	10.9	-	8.9	-	402	-	-	-	-	-	-
VIII-4-81				-	0.0	-	7.1	-	415	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
STONELICK LAKE															
above dam	Yes	Yes	Yes	11.5	13.2	8.1	9.0	290	265	4.7	3.6	36	35	7.3	7.3
IV-14/IX-1-77				2.0	0.0	6.9	6.6	275	488	2.4	4.0	34	45	6.4	6.2
Tobin and Youger, 1979															

APPENDIX D (continued)

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
SUMMIT LAKE															
near midpoint	Yes	Partial	Yes	10.5	17.8	8.4	8.8	915	850	3.8	6.2	22	26	6.8	6.3
V-3/VIII-19-76				0.0	0.0	7.3	7.1	1250	1150	4.2	8.1	20	-	6.0	-
Tobin and Youger, 1979															
at pt. of max. depth	-	Yes	-	-	10.9	-	8.4	-	910	-	-	-	-	-	-
VIII-5-81				-	0.6	-	7.2	-	700	-	-	-	-	-	-
OEPA Classification Survey, unpublished															
TAPPAN LAKE															
above dam	Slight	Partial	Yes	7.7	8.0	7.9	8.3	620	625	2.3	2.5	11	31	2.4	6.5
IV-26/IX-2-76				0.8	0.0	7.3	7.1	635	668	1.6	1.9	3	20	3.7	9.9
Tobin and Youger, 1979															
TURKEYFOOT LAKE															
at midpoint	Yes	Yes	Yes	18.4	8.5	8.9	8.2	410	420	7.5	2.8	30	20	7.1	7.6
IV-19/VIII-9-77				0.4	0.0	7.4	6.9	475	515	5.3	4.8	25	30	6.9	9.1
Tobin and Youger, 1979															
TYCOON LAKE															
near midpoint	No	Slight	No	10.6	8.0	7.1	7.5	103	103	1.4	1.2	15	9	6.4	3.4
V-2/VIII-24-78				10.1	1.0	6.9	6.7	105	105	1.4	1.1	15	13	8.7	0.7
OEPA/USGS, unpublished															
VAN BUREN LAKE															
above dam	Partial	No	Yes	12.8	8.8	8.5	7.8	548	415	4.3	2.7	36	38	7.9	9.8
IV-29/VIII-11-80				11.4	8.8	8.2	7.5	538	420	2.5	3.7	48	45	5.9	12
OEPA/USGS, unpublished															
LAKE VESUVIUS															
above dam	Yes	Yes	No	9.6	7.3	7.3	7.0	157	152	1.3	0.8	13	11	3.6	5.5
V-13/IX-2-75				3.6	0.0	5.9	6.0	132	185	0.5	1.0	15	22	5.7	8.1
Tobin and Youger, 1977															
VETO LAKE															
above dam	Slight	Yes	No	10.2	10.9	7.3	8.2	300	290	2.6	3.0	15	30	7.1	6.1
V-9/VIII-17-78				1.6	0.0	6.8	6.9	325	350	1.8	3.3	15	59	7.2	11
OEPA/USGS, unpublished															
WESTERVILLE RESERVOIR															
above dam	No	-	-	10.2	-	7.7	-	223	-	4	-	6	-	-	-
IV-1-80				8.2	-	8.1	-	228	-	4	-	10		-	-
OEPA special survey, unpublished															

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	THERMAL STRATIFICATION		H_2S	DISSOLVED OXYGEN		pH		SPECIFIC CONDUCTANCE		BOD		COD		TOC	
	Sp	Su	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su	Sp	Su
LAKE WHITE															
above dam	Yes	Yes	Yes	8.2	8.6	6.7	8.0	260	220	0.5	0.8	47	18	6.0	5.6
V-31/VIII-20-79				1.2	1.7	7.1	6.9	220	234	0.9	1.7	45	39	5.6	7.7
OEPA/USGS, unpublished															
WILLARD CITY RESERVOIR															
northeast quadrant	Yes	Yes	Yes	5.6	7.5	9.0	8.5	300	524	0.3	1.2	26	4	7.7	6.4
VI-22/VIII-30-79				1.8	0.5	8.1	7.3	310	564	0.2	2.9	51	5	6.7	6.3
OEPA/USGS, unpublished															
WILLS CREEK LAKE															
above dam	Partial	Yes	No	13.6	12.5	8.6	8.5	590	522	4.0	4.0	15	16	11	5.8
V-6/IX-7-76				11.0	2.4	7.9	7.1	620	557	4.6	2.2	16	17	11	7.1
Tobin and Youger, 1979															
WINTON LAKE															
(West Fork Mill Creek Lake)															
above dam	Yes	Yes	Yes	13.0	6.9	8.4	8.0	580	213	5.6	3.5	25	40	4.6	7.2
IV-24/VII-25-78				0.0	0.0	6.9	6.8	3150	2250	20.0	26.0	70	110	5.7	3.7
OEPA/USGS, unpublished															
WOLF RUN LAKE															
above dam	Partial	Yes	Yes	12.4	8.8	8.5	8.3	280	265	1.5	0.8	12	lt 10	3.9	3.5
IV-19/VIII-16-76				6.5	0.0	7.6	6.9	305	305	0.7	0.7	8	17	3.3	6.8
Tobin and Youger, 1979															
VIII-13-81	-	Yes	-	-	7.3	-	8.3	-	287	-	-	-	-	-	-
OEPA Classification Survey, unpublished				-	0.4	-	7.9	-	240	-	-	-	-	-	-

1. 2 ft. values listed above near bottom values; pH given in standard units, conductivity in u-MHO, all other parameters in mg/l. Dashes indicate information unavailable.

2. Sp - Spring values, Su - Summer values.

3. lt - less than, gt - greater than.

4. surface and bottom conductivity values determined in laboratory.

APPENDIX E

Selected Anions, Hardness, and Miscellaneous Parameters in Selected Ohio Lakes.[1]

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
ACTON LAKE																
above dam	157	150	0	0	3.1	3.0	7.2	0.4	20	4.1	1.9	140	$Ca/Mg/HCO_3$	160	342	0.1
IV-30/IX-9-75	84	311	0	0	2.7	156	-	-	-	3.2	7.2	-	-	-	-	-
Tobin and Youger, 1977																
VIII-10-81	-	-	-	-	-	-	26	0.21	37	-	-	-	-	253	13	lt[2].1
OEPA Classification Survey, unpublished							25	0.20	25							0.06
ADAMS LAKE																
above dam	136	152	0	0	1.8	1.5	5.6	0.1	25	3.6	4.1	80	Ca/HCO_3	193	43	lt .05
V-1/VIII-18-80	1	210	0	0	0.1	53	-	-	-	6.4	9.3	-	-	-	-	-
OEPA/USGS, unpublished																
LAKE ALMA																
South of island	194	34	0	0	15	8.6	3.8	0.1	62	0.7	2.0	73	Ca/HCO_3	128	47	lt .05
V-1/VIII-18-80	228	238	0	0	23	151	-	-	-	0.6	11	-	-	-	-	-
OEPA/USGS, unpublished																
ALUM CREEK LAKE																
above dam	113	132	0	0	0.9	2.6	33	0.2	70	0.4	0.8	170	$Ca/HCO3/SO_4$	275	25	0.06
IV-13/VIII-27-76	113	200	0	0	1.5	20	-	-	-	0.5	5.3	-	-	-	-	-
Tobin and Youger, 1979																
ATWOOD LAKE																
above dam	36	56	0	0	0.6	0.9	23	0.1	34	5.0	4.2	74	$Ca/Mg/SO_4/Cl$	139	22	0.08
V-17/VIII-30-76	37	88	0	0	15	18	-	-	-	6.1	8.2	-	-	-	-	-
Tobin and Youger, 1979																
BARNESVILLE RESERVOIR #3																
above dam	167	62	0	0	1.7	3.9	3.5	0.1	29	3.7	7.9	80	Ca/HCO_3	134	3	lt .05
V-15/VIII-21-80	128	128	0	0	20	32	-	-	-	8.1	-	-	-	-	-	-
OEPA/USGS, unpublished																
BELMONT LAKE																
above dam	85	60	15	6	2.0	0.2	25	0.2	51	0.0	4.1	140	$Ca/HCO_3/SO_4$	245	10	lt .05
V-8/VIII-7-80	228	158	0	0	23	6.3	-	-	-	5.4	7.6	-	-	-	-	-
OEPA/USGS, unpublished																
BERLIN LAKE																
above dam	64	90	0	0	0.5	4.5	25	0.2	92	1.0	0.1	150	Ca/SO_4	280	19	0.1
V-28/VIII-27-75	70	90	0	0	14	23	-	-	-	2.4	1.8	-	-	-	-	-
Tobin and Youger, 1977																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
BUCKEYE LAKE																
at midpoint	85	99	16	0	0.2	1.0	18	0.3	46	0.1	1.2	140	Ca/HCO3/SO_4	203	24	0.1
V-2/VIII-16-75	106	100	6	0	0.4	4.0	-	-	-	0.1	1.5	-	-	-	-	-
Tobin and Youger, 1977																
V-16/VIII-22-78	106	136	3	0	0.7	1.8	20	0.1	39	0.1	2.9	130	Ca/HCO_3	223	52	lt .05
OEPA/USGS	116	144	0	0	2.3	3.6	-	-	-	0.3	1.0	-	-	-	-	-
unpublished																
BURR OAK RESERVOIR																
above dam	46	60	2	1	0.2	0.3	5.6	0.1	42	4.6	4.4	79	Ca/SO_4/HC_O3	107	20	0.05
IV-22/IX-30-76	50	110	0	0	10	35	-	-	-	5.6	10		-	-	-	-
Tobin and Youger, 1979																
CAESAR CREEK LAKE																
above dam	138	208	0	0	3.5	5.2	18	0.2	27	4.1	2.4	160	Ca/HCO_3	199	36	0.12
IV-25/III-26-78	128	154	0	0	30	24	-	-	-	4.8	5.1	-	-	-	-	-
OEPA/USGS, unpublished																
CHARLES MILL RESERVOIR																
above dam	134	168	10	0	0.5	1.7	24	0.2	66	0.1	0.1	190	Ca/HCO_3	294	72	lt .05
V-12/VIII-8-78	156	170	2	0	1.0	6.8	-	-	-	0.1	0.8	-	-	-	-	-
OEPA/USGS, unpublished																
CLARK LAKE																
above dam	63	98	31	33	0.0	0.1	21	0.2	37	0.3	3.1	170	Mg/Ca/HCO_3	193	45	lt .05
V-29/VIII-13-79	204	524	0	0	6.5	166	-	-	-	2.4	12	-	-	-	-	-
OEPA/USGS, unpublished																
CLARENCE J. BROWN RESERVOIR (Buck Creek Lake)																
above dam	284	212	0	0	2.3	3.4	15	0.2	64	1.2	2.8	300	Ca/HCO_3	359	34	lt 0.07
IV-7/VIII-2-77	284	372	0	0	2.3	47	-	-	-	1.2	6.4	-	-	-	-	-
Tobin and Youger, 1979																
CLEAR FORK RESERVOIR																
above dam	58	111	13	0	0.1	1.1	20	0.1	37	0.1	2.3	100	Ca/HCO_3/SO_4	193	17	0.1
V-23/VIII-20-75	120	152	0	0	12	48	-	-	-	2.5	6.6	-	-	-	-	-
Tobin and Youger, 1977																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
CLENDENING LAKE																
above dam	69	81	6	2	0.3	0.4	4.6	0.1	240	4.4	5.0	310	Ca/SO_4	452	28	lt .05
IV-27/IX-3-76	100	220	0	0	10	28	-	-	-	5.8	9.1	-	-	-	-	-
Tobin and Youger, 1979																
CLOUSE LAKE																
above dam	134	76	0	0	0.5	2.4	120	0.2	75	6.9	9.4	210	Ca/Na/Cl	423	32	lt .05
V-29/VIII-5-80	154	124	0	0	24	49	-	-	-	5.0	12	-	-	-	-	-
OEPA/USGS, unpublished																
COWAN LAKE																
above dam	161	140	0	0	2.1	1.8	12	0.1	29	4.4	1.8	170	Ca/HCO_3	206	69	0.1
IV-29/IX-10-75	161	287	0	0	3.2	91	-	-	-	4.6	7.5	-	-	-	-	-
Tobin and Youger, 1977																
CUTLER LAKE																
above dam																
VII-22-81	-	-	-	-	-	-	25	0.19	62	-	-	-	-	272	11	lt .05
OEPA Classification Survey, unpublished							18	0.20	26							lt .05
DEER CREEK LAKE (Pickaway County)																
above dam	165	218	0	0	1.6	14.0	13	0.6	44	4.7	2.0	270	Ca/HCO_3	319	45	0.1
IV-25/IX-12-75	165	220	0	0	5.3	18	-	-	-	5.1	2.0	-	-	-	-	-
Tobin and Youger, 1977																
DEER CREEK RESERVOIR (Stark County)																
above dam	72	93	2	0	0.4	1.9	29	0.1	53	0.9	1.5	130	$Ca/HCO_3/SO_4$	225	35	0.1
IV-23/VIII-16-77	93	127	0	0	23	20	-	-	-	3.0	2.8	-	-	-	-	-
OEPA/USGS, unpublished																
DILLON LAKE																
above dam	105	150	0	0	5.2	1.5	16	0.1	33	5.9	4.4	130	Ca/HCO_3	199	61	0.07
IV-11/VIII-12-77	100	138	0	0	8.0	28	-	-	-	6.6	6.0	-	-	-	-	-
Tobin and Youger, 1979																
DOW LAKE																
above dam	80	88	0	0	2.5	1.4	6.5	0.1	54	4.0	7.5	110	Ca/HCO_3	163	52	lt .05
V-8/VIII-31-78	88	154	0	0	22	31	-	-	-	5.4	2.0	-	-	-	-	-
OEPA/USGS, unpublished																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
EAST BRANCH RESERVOIR																
above dam	52	76	0	1	6.6	0.5	14	0.1	24	3.0	2.8	78	$Ca/HCO_3/SO_4$	120	22	0.07
IV-26/VIII-15-77	52	54	0	0	6.6	27	-	-	-	3.0	5.8	-	-	-	-	-
Tobin and Youger, 1979																
EAST FORK LAKE																
above dam	196	60	7	2	1.0	0.4	12	0.1	30	2.5	2.8	110	$Ca/HCO_3/SO_4$	162	52	lt .05
VI-1/VIII-21-79	256	122	0	0	8.2	12	-	-	-	4.1	5.1		-	-	-	-
OEPA/USGS, unpublished																
EAST RESERVOIR																
near east shore	188	134	11	0	0.8	1.3	43	0.2	43	3.1	5.1	170	Ca/HCO_3	289	20	lt .05
V-23/IX-2-80	32	256	0	0	2.0	41	-	-	-	8.0	15	-	-	-	-	-
OEPA/USGS, unpublished																
ESSINGTON LAKE																
above dam																
VII-23-81	-	-	-	-	-	-	100	4.4	2230	-	-	-	-	3820	lt 10	lt .05
OEPA Classification Survey, unpublished							183	5.3	2900							0.06
FINDLAY CITY RESERVOIR																
near east shore	138	164	4	8	0.3	0.7	22	0.2	78	0.7	2.5	210	$Ca/HCO_3/SO_4$	310	31	lt .05
VI-27/VIII-31-79	178	144	0	0	1.8	5.8	-	-	-	3.4	4.1	-	-	-	-	-
OEPA/USGS, unpublished																
FINDLEY LAKE																
above dam	116	52	0	12	2.3	71	12	0.2	96	2.7	2.1	170	$Ca/Cl/SO_4$	254	267	lt .05
VI-3/VIII-12-80	26	260	0	0	5.2	164	-	-	-	6.4	12	-	-	-	-	-
OEPA/USGS, unpublished																
FIRESTONE RESERVOIR																
above dam																
VII-14-81	-	-	-	-	-	-	44	0.23	75	-	-	-	-	385	10	lt .05
OEPA Classification Survey, unpublished							44	0.17	75							0.05
FORKED RUN LAKE	32	52	0	0	2.0	2.0	4.8	0.1	26	4.0	4.0	46	Ca/HCO_3	84	34	lt .05
above dam	28	86	0	0	22	27	-	-	-	5.4	-	-	-	-	-	-

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
FOX LAKE																
above dam	144	73	0	0	3.6	4.6	2.6	0.1	37	6.2	6.8	75	Ca/HCO_3	126	26	lt .05
V-2/VIII-19-80	88	138	0	0	22	347	-	-	-	8.4	14	-	-	-	-	-
OEPA/USGS, unpublished																
GRAND LAKE SAINT MARYS																
near midpoint	42	64	16	8	0.0	0.2	19	0.3	63	0.1	0.4	120	$Mg/Ca/SO_4/HCO_3$	194	33	0.0
V-16/VIII-12-75	52	78	12	1	0.1	0.5	-	-	-	0.2	0.5	-	-	-	-	-
Tobin and Youger, 1977																
GRIGGS RESERVOIR																
above dam	45	168	0	8	5.4	0.7	34	0.3	130	-	3.8	310	$Ca/HCO_3/SO_4$	444	49	0.11
V-24/VIII-6-79	49	390	0	0	12	31	35	0.3	92	2.4	11	-	-	-	-	-
OEPA/USGS, unpublished																
GUILFORD LAKE																
above dam	18	64	14	3	0.0	0.0	17	0.1	44	2.1	1.7	100	$Ca/HCO_3/SO_4$	184	16	0.0
V-21/VIII-26-75	98	175	0	0	7.8	88	-	-	-	3.7	8.2	-	-	-	-	-
Tobin and Youger, 1977																
VIII-24-81	-	-	-	-	-	-	14	0.17	34	-	-	-	-	147	lt 10	lt .05
OEPA Classification Survey, unpublished							16	0.17	11							lt .08
HAMMERTOWN LAKE																
(Jackson City Reservoir)																
above dam	64	74	3	12	0.3	22	2.0	0.1	27	2.5	0.9	41	$Ca/Mg/HCO_3/SO_4$	84	15	lt .05
VI-14/VIII-6-79	88	62	0	0	7.0	25	-	-	-	3.4	8.2	-	-	-	-	-
OEPA/USGS, unpublished																
HARGUS LAKE																
above dam	164	162	0	0	2.1	1.6	14	0.2	48	4.0	2.8	190	Ca/HCO_3	214	68	0.05
IV-20/VIII-4-78	194	228	0	0	15	23	-	-	-	6.0	7.5	-	-	-	-	-
OEPA/USGS, unpublished																
HARRISON LAKE																
at East end	130	186	13	0	0.4	1.5	14	0.2	50	3.8	1.7	190	Ca/HCO_3	290	103	0.1
V-30/VIII-22-75	146	222	0	0	23	35	-	-	-	4.7	2.9	-	-	-	-	-
Tobin and Youger, 1977																
above dam																
VIII-24-81	-	-	-	-	-	-	18	0.28	36	-	-	-	-	248	11	0.11
OEPA Classification Survey, unpublished							19	0.28	23							0.1

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
HIGHLANDTOWN LAKE																
above dam	28	22	0	7	4.4	0.0	11	0.1	36	3.1	2.4	59	Ca/SO_4	126	39	lt .05
V-15/VIII-21-78	28	105	0	0	18	13	-	-	-	4.4	8.1	-	-	-	-	-
OEPA/USGS, unpublished																
HOOVER RESERVOIR																
at dam	98	121	0	0	1.0	4.8	14	0.2	42	3.1	0.9	110	Ca/HCO_3	171	38	0.1
V-09/VIII-29-75	90	124	0	0	7.2	49	-	-	-	4.6	7.5	-	-	-	-	-
Tobin and Youger, 1977																
LAKE HOPE																
above dam																
V-14/IX-3-75	lt 1	4	0	0	0.0	0.0	2.2	0.1	51	9.9	2.0	47	Ca/SO_4	81	21	0.0
Tobin and Youger 1977	0	95	0	0	0.2	0.2	-	-	-	9.4	9.6	-	-	-	-	-
IV-27/VIII-1-78	lt 1	3	0	0	-	0.2	7.5	0.1	54	8.8	7.3	51	SO^4/Ca	99	31	lt .05
OEPA/USGS	lt 1	52	0	0	-	41	-	-	-	9.1	10	-	-	-	-	-
unpublished																
HOSTERMAN LAKE																
above dam																
VII-17-81	-	-	-	-	-	-	25	0.21	26	-	-	-	-	310	10	0.05
OEPA Classification Survey, unpublished																
INDIAN LAKE																
near Shawnee Island	134	152	0	0	1.3	2.0	17	0.2	63	0.1	0.3	190	$Ca/Mg/HCO_3$	271	31	0.09
IV-21/VIII-18-77	136	150	0	0	1.4	4.8	-	-	-	0.1	0.3	-	-	-	-	-
Tobin and Youger, 1979																
LAKE ISABELLA																
at point of maximum depth																
VII-8-81	-	-	-	-	-	-	64	0.13	53	-	-	-	-	379	lt 10	lt.05
OEPA Classification Survey, unpublished																
JACKSON LAKE																
above dam	16	24	0	0	0.6	4.8	5.9	0.1	47	3.0	4.8	53	$Ca/Mg/SO_4$	110	18	0.05
V-1/VIII-18-78	22	42	0	0	22	6.7	-	-	-	4.5	12	-	-	-	-	-
OEPA/USGS, unpublished																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
JEFFERSON LAKE																
above dam	136	102	0	0	1.8	3.3	8.9	0.2	200	3.6	9.8	290	Ca/SO_4	430	33	lt .05
V-9/VIII-8-80	170	218	0	0	6.8	69	-	-	-	4.5	4.4	-	-	-	-	-
OEPA/USGS, unpublished																
LAKE KATHARINE																
pt of max depth	-	-	-	-	-	-	-	-	-	-	-	-	-	50	lt 10	-
III-22-79	-	-	-	-	-	-	-	-	-	-	-	-	-	48	lt 10	-
OEPA special survey, unpublished																
KILLDEER RESERVOIR																
at SW corner	134	132	0	0	2.1	1.3	21	0.2	96	0.3	0.9	230	$Ca/HCO_3/SO_4$	298	49	0.07
V-5/VIII-4-77	150	205	0	0	9.4	26	-	-	-	2.0	6.2	-	-	-	-	-
Tobin and Youger, 1979																
KISER LAKE																
above dam	185	202	6	0	0.9	1.6	8.1	0.3	29	0.1	7.0	200	$Mg/Ca/HCO_3$	244	39	0.06
IV-22/VIII-19-77	185	202	0	0	0.9	4.0	-	-	-	0.2	7.2	-	-	-	-	-
Tobin and Youger, 1979																
KNOX LAKE																
above dam	76	114	4	8	0.2	0.4	8.7	0.1	22	1.0	1.1	98	Ca/HCO_3	156	18	0.06
V-3/VIII-30-77	83	211	0	0	21	34	-	-	-	6.4	10	-	-	-	-	-
Tobin and Youger, 1979																
LADUE RESERVOIR																
above dam	62	80	0	0	1.6	0.8	26	0.1	32	0.1	1.2	90	$Ca/HCO_3/Cl$	183	8	0.09
V-11/VIII-7-78	62	86	0	0	2.0	14	-	-	-	0.1	1.3	-	-	-	-	-
OEPA/USGS, unpublished																
LEESVILLE LAKE																
above dam	38	50	0	0	1.0	0.6	6.3	0.1	29	4.7	3.3	63	$Ca/HCO_3/SO_4$	96	20	0.06
V-18/VIII-31-76	38	108	0	0	19	27	-	-	-	7.1	10	-	-	-	-	-
Tobin and Youger, 1979																
LAKE LOGAN																
above dam	36	64	0	0	0.6	1.0	6.7	0.1	27	6.4	7.0	61	$Ca/HCO_3/SO_4$	81	26	0.05
IV-15/IX-14-76	36	150	0	0	5.7	24	-	-	-	6.6	12	-	-	-	-	-
Tobin and Youger, 1979																
LONG LAKE																
at midpoint	116	146	12	1	0.3	0.9	44	0.1	58	1.5	5.9	190	$Ca/Mg/HCO_3/SO_4$	294	30	0.08
IV-19/VIII-9-77	153	252	0	0	12	63	-	-	-	5.6	9.5	-	-	-	-	-
Tobin and Youger, 1979																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
LAKE LORAMIE																
above dam	84	140	12	0	0.4	1.4	20	0.3	57	0.1	1.5	206	$Ca/Mg/SO_4/HCO_3$	206	80	0.1
V-17/VIII-13-75	108	142	0	0	0.9	7.1	-	-	-	0.2	1.0	-	-	-	-	-
Tobin and Youger, 1977																
VII-29-81	-	-	-	-	-	-	20	0.28	39	-	-	-	-	261	55	0.09
OEPA Classification Survey, unpublished							20	0.27	38							0.08
MADISON LAKE																
above dam	99	272	0	0	1.0	27	24	0.3	45	5.0	6.8	280	$Ca/Mg/HCO_3$	367	56	0.09
VI-5/VIII-7-79	51	276	0	0	1.3	87	-	-	-	6.2	11	-	-	-	-	-
OEPA/USGS, unpublished																
MEADOWBROOK LAKE																
above dam	100	132	0	2	1.0	1.1	45	0.2	58	6.0	5.7	210	$Ca/HCO_3/Cl$	361	1	0.06
VI-2/VIII-29-80	25	248	0	0	4.0	31	-	-	-	13	19	-	-	-	-	-
OEPA/USGS, unpublished																
MEANDER CREEK RESERVOIR																
above dam	64	62	8	11	0.1	0.2	41	0.2	76	0.1	1.4	140	$Ca/SO_4/HCO_3$	278	2	0.06
VI-22/VIII-17-79	156	118	0	0	3.9	14	-	-	-	5.8	8.0	-	-	-	-	-
OEPA/USGS, unpublished																
MIAMI-WHITEWATER LAKE																
above dam																
VII-7-81	-	-	-	-	-	-	15	0.25	47	-	-	-	-	227	10	0.05
OEPA Classification Survey, unpublished																
MICHAEL J. KIRWAN RESERVOIR (West Branch Reservoir)																
above dam	78	90	0	0	1.6	1.8	32	0.1	53	3.5	1.8	130	$Ca/Mg/HCO_3/SO_4$	232	6	0.07
IV-18/VIII-29-77	82	106	0	0	5.2	3.4	-	-	-	3.6	-	-	-	-	-	-
Tobin and Youger, 1979																
LAKE MILTON																
above dam	96	90	4	0	0.4	2.9	29	0.2	70	2.8	2.6	140	$Ca/HCO_3/SO_4$	263	8	0.06
VI-21/VIII-16-79	44	126	0	0	1.4	25	-	-	-	5.5	6.7	-	-	-	-	-
OEPA/USGS, unpublished																
MOGADORE RESERVOIR																
above dam	92	52	0	8	2.3	0.1	15	0.1	50	1.3	4.5	140	Ca/HCO_3	218	5	0.05
V-4/VIII-23-76	92	108	0	0	2.3	14	-	-	-	1.3	6.2	-	-	-	-	-
Tobin and Youger, 1979																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
MONROE LAKE																
above dam	170	60	0	0	6.8	4.8	11	0.1	28	3.2	6.1	90	Ca/HCO_3	154	14	lt .05
V-16/VIII-22-80	42	154	0	0	67	194	-	-	-	5.9	11	-	-	-	-	-
OEPA/USGS, unpublished																
MOSQUITO CREEK LAKE																
above dam	44	54	0	1	0.9	0.3	20	0.2	31	0.4	0.1	76	$Ca/Na/HCO_3/SO_4$	135	13	0.06
V-12/VIII-24-76	44	60	0	0	0.9	19	-	-	-	0.5	-	-	-	-	-	-
Tobin and Youger, 1979																
NESMITH LAKE																
pt of max depth	-	-	-	-	-	-	56	0.3	121	-	-	-	-	542	lt 10	0.1
IV-11-79	-	-	-	-	-	-	56	0.3	123	-	-	-	-	501	lt 10	0.1
OEPA special survey, unpublished																
NETTLE LAKE																
near midpoint	188	216	11	0	0.8	2.2	11	0.1	56	0.8	2.2	220	Ca/HCO_3	322	11	0.07
V-22/VIII-14-78	226	230	0	0	18	29	-	-	-	5.6	9.3	-	-	-	-	-
OEPA/USGS, unpublished																
NEW LEXINGTON RESERVOIR																
above dam	16	30	0	0	0.6	1.2	12	0.1	33	6.7	5.7	59	$Ca/Mg/SO_4$	128	137	lt .05
V-6/VIII-4-80	28	74	0	0	18	19	-	-	-	8.3	11	-	-	-	-	-
OEPA/USGS, unpublished																
NEWPORT LAKE																
above dam	22	118	7	0	0.0	3.8	41	-	-	6.7	7.7	-	-	350	13	0.07
V-22/VIII-28-80	80	124	0	0	0.8	25	-	-	-	8.5	12	-	-	-	-	-
OEPA/USGS, unpublished																
NIMISILA RESERVOIR																
above dam	154	68	0	0	1.2	0.3	27	0.1	41	3.7	4.7	180	Ca/HCO_3	262	33	0.06
V-2/VIII-8-77	135	240	0	0	17	76	-	-	-	5.0	6.9	-	-	-	-	-
Tobin and Youger, 1979																
NORTH BRANCH RESERVOIR																
above dam	42	130	16	12	0.1	0.5	17	0.1	38	3.6	3.8	220	$Ca/HCO_3/SO_4$	290	59	lt .05
VI-12/VIII-14-79	52	165	12	0	0.4	6.6	-	-	-	3.9	7.2	-	-	-	-	-
OEPA/USGS, unpublished																
PAINT CREEK LAKE																
above dam	196	186	7	0	1.0	3.7	17	0.3	40	2.2	1.8	260	Ca/HCO_3	291	58	0.1
V-6/X-02-75	256	262	0	0	65	66	-	-	-	6.5	6.6	-	-	-	-	-
Tobin and Youger, 1977																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3 Sp	HCO_3 Su	CO_3 Sp	CO_3 Su	CO_2 Sp	CO_2 Su	Cl Sp	Fl Sp	SO_4 Sp	SiO_2 Sp	SiO_2 Su	HARDNESS Sp	MAJOR IONS Sp	DISSOLVED SOLIDS Sp	SUSPENDED SOLIDS Sp	MBAS Sp
LAKE PARK																
at point of maximum depth, northeast corner																
VII-15-81	-	-	-	-	-	-	22	0.34	35	-	-	-	-	225	37	0.06
OEPA Classification Survey, unpublished																
PIEDMONT LAKE																
above dam	124	76	1	4	0.6	0.3	14	0.1	410	3.3	3.4	520	Ca/SO_4	777	34	lt .05
IV-12/VIII-11-77	128	196	0	0	1.7	25	-	-	-	3.6	7.1	-	-	-	-	-
Tobin and Youger, 1979																
PUNDERSON LAKE																
at midpoint	115	96	0	4	2.3	0.4	39	0.2	29	0.6	1.3	130	Ca/HCO_3	251	2	0.1
V-27/VIII-19-75	132	165	0	0	33	42	-	-	-	2.0	3.2	-	-	-	-	-
Tobin and Youger, 1977																
at point of maximum depth																
VII-7-80	-	-	-	-	-	-	35	-	-	-	-	-	-	-	-	-
OEPA Classification Survey, unpublished																
OLD REID PARK PONDS																
at outfall into Buck Creek																
VII-17-81	-	-	-	-	-	-	16	0.20	57	-	-	-	-	258	lt 10	lt .05
LAKE ROCKWELL																
above dam	83	92	0	6	1.1	0.3	28	0.1	29	0.6	1.1	110	$Ca/HCO_3/Cl$	177	25	0.05
V-11/VIII-20-76	83	123	0	0	5.2	20	-	-	-	1.2	6.8	-	-	-	-	-
Tobin and Youger, 1979																
ROCKY FORK LAKE																
above dam	168	164	8	0	0.8	6.6	9.1	0.3	23	0.2	2.2	200	Ca/HCO_3	201	48	0.1
V-7/IX-6-75	210	264	0	0	8.4	105	-	-	-	3.0	6.6	-	-	-	-	0.0
Tobin and Youger, 1977																
VIII-12-81	-	-	-	-	-	-	11	0.19	19	-	-	-	-	173	lt 10	lt .05
OEPA Classification Survey, unpublished							12	0.18	lt 10							0.05
ROSS LAKE																
above dam	64	67	11	15	0.0	0.1	6.4	0.1	38	0.7	1.6	83	$Ca/HCO_3/SO_4$	198	11	0.06
VI-7/VIII-10-79	157	160	0	0	3.1	20	-	-	-	7.5	9.7	-	-	-	-	-
OEPA/USGS, unpublished																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
LAKE RUPERT																
above dam	150	60	0	0	3.0	1.9	4.7	0.1	39	6.5	6.9	57	$Ca/HCO_3/SO_4$	115	9	lt .05
VI-15/IX-4-79	279	104	0	0	35	10	-	-	-	7.2	11	-	-	-	-	-
OEPA/USGS, unpublished																
SALT FORK LAKE																
above dam	44	60	0	2	1.1	0.4	8.9	0.1	66	5.3	4.2	95	$Ca/SO_4/HCO_3$	168	21	0.0
V-20/VIII-15-75	48	109	0	0	48	22	-	-	-	6.2	8.6	-	-	-	-	-
Tobin and Youger, 1977																
SENECAVILLE LAKE																
above dam	109	127	7	0	0.4	1.3	4.7	0.1	62	1.6	3.7	170	$Ca/HCO_3/SO_4$	181	53	lt .05
IV-20/VIII-17-76	133	150	0	0	4.3	19	-	-	-	2.9	5.3	-	-	-	-	-
Tobin and Youger, 1977																
SHARON LAKE																
at point of maximum depth																
VII-8-81	-	-	-	-	-	-	17	0.25	31	-	-	-	-	238	92	lt .05
OEPA Classification Survey, unpublished																
SIPPO LAKE																
at point of maximum depth																
VII-15-81	-	-	-	-	-	-	44	0.36	30	-	-	-	-	235	12	0.08
OEPA Classification Survey, unpublished							45	0.40	24							0.07
LAKE SNOWDEN																
above dam	58	96	13	4	0.0	0.3	5.4	0.1	54	1.0	3.1	130	$Ca/HCO_3/SO_4$	143	11	lt .05
VI-8/IX-5-79	120	114	0	0	3.8	29	-	-	-	3.9	7.6	-	-	-	-	-
OEPA/USGS, unpublished																
SNYDER PARK LAGOONS																
at point of maximum depth in most western lagoon																
VII-10-81	-	-	-	-	-	-	55	0.27	71	-	-	-	-	445	19	lt.05
OEPA Classification Survey, unpublished																
SPRINGFIELD LAKE																
at point of maximum depth																
VIII-4-81	-	-	-	-	-	-	57	0.23	35	-	-	-	-	261	9	0.10
OEPA Classification Survey, unpublished							59	0.22	28							0.12

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
STONELICK LAKE																
above dam	94	78	0	12	2.4	0.2	15	0.1	35	5.5	1.5	120	Ca/HCO_3	228	65	0.12
IV-14/IX-1-77	94	270	0	0	19	108	-	-	-	6.3	13	-	-	-	-	-
Tobin and Youger, 1979																
SUMMIT LAKE																
near midpoint	143	115	1	12	0.9	0.3	220	0.2	84	0.8	3.0	210	Na/Cl	670	18	-
V-3/VIII-19-76	158	310	0	0	13	31	-	-	-	3.1	14	-	-	-	-	-
Tobin and Youger, 1979																
at point of maximum depth																
VIII-5-81	-	-	-	-	-	-	171	0.20	94	-	-	-	-	560	6	0.09
OEPA Classification Survey, unpublished							165	0.19	49							0.13
TAPPAN LAKE																
above dam	81	84	0	0	2.0	0.7	6.5	0.1	230	4.9	4.7	310	Ca/SO_4	472	11	lt .05
IV-26/IX-2-76	90	132	0	0	7.2	13	-	-	-	5.4	7.1	-	-	-	-	-
Tobin and Youger, 1979																
TURKEYFOOT LAKE																
at midpoint	104	127	10	0	0.2	1.3	40	0.1	45	0.6	5.2	170	Ca/HCO_3	281	9	0.07
IV-19/VIII-9-77	168	204	0	0	11	41	-	-	-	3.4	5.7	-	-	-	-	-
Tobin and Youger, 1979																
TYCOON LAKE																
near midpoint	25	31	0	0	4.0	2.5	3.5	0.1	20	1.3	2.4	35	$Ca/SO_4/HCO_3$	79	23	0.06
V-2/VIII-24-78	26	32	0	0	5.2	10	-	-	-	1.3	2.8	-	-	-	-	-
OEPA/USGS, unpublished																
VAN BUREN LAKE																
above dam	127	162	5	0	0.9	6.5	25	0.3	110	3.8	3.0	290	$Ca/HCO_3/SO_4$	403	79	0.08
IV-29/VIII-11-80	156	174	0	0	2.0	8.7	-	-	-	4.1	3.2	-	-	-	-	-
OEPA/USGS, unpublished																
LAKE VESUVIUS																
above dam	34	51	0	0	3.4	10	1.2	0.2	37	6.7	3.8	55	Ca/SO_4	103	34	0.0
V-13/IX-2-75	33	74	0	0	52	93	-	-	-	6.1	7.6	-	-	-	-	-
Tobin and Youger, 1977																
VETO LAKE																
above dam	100	100	0	0	10	1.0	13	0.1	63	3.5	3.6	110	Ca/HCO_3	199	42	0.06
V-9/VIII-17-78	98	206	0	0	16	41	-	-	-	4.3	10	-	-	-	-	-
OEPA/USGS, unpublished																

NAME SAMPLING SITE SAMPLING DATES DATA SOURCE	HCO_3		CO_3		CO_2		Cl	Fl	SO_4	SiO_2		HARDNESS	MAJOR IONS	DISSOLVED SOLIDS	SUSPENDED SOLIDS	MBAS
	Sp	Su	Sp	Su	Sp	Su	Sp	Sp	Sp	Sp	Su	Sp	Sp	Sp	Sp	Sp
WESTERVILLE RESERVOIR																
pt of max depth	-	-	-	-	-	-	-	-	-	-	-	-	-	211	lt 10	-
IV-01-80	-	-	-	-	-	-	-	-	-	-	-	-	-	218	10	-
OEPA special survey, unpublished																
LAKE WHITE																
above dam	36	38	0	0	2.3	0.4	7.4	0.1	61	5.8	2.3	80	$Ca/Mg/SO_4/HCO_3$	159	23	lt .05
V-31/VIII-20-79	37	100	0	0	4.7	20	-	-	-	6.7	8.0	-	-	-	-	-
OEPA/USGS, unpublished																
WILLARD CITY RESERVOIR																
northeast quadrant	151	190	12	6	0.3	0.9	29	0.2	140	1.7	2.3	280	$Ca/HCO_3/SO_4$	429	22	lt .05
VI-22/VIII-30-79	161	200	0	0	2.1	16	-	-	-	6.0	7.6	-	-	-	-	-
OEPA/USGS, unpublished																
WILLS CREEK LAKE																
above dam	96	110	4	0	0.4	2.2	17	0.2	190	3.0	5.4	250	Ca/SO_4	392	57	0.05
V-6/IX-7-76	108	126	0	0	1.1	16	-	-	-	3.8	6.2	-	-	-	-	-
Tobin and Youger, 1979																
WINTON LAKE																
(West Fork Mill Creek Lake)																
above dam	164	118	2	0	1.1	3.8	68	0.2	54	2.4	4.4	190	Na/Cl	836	37	0.24
IV-24/VII-25-78	352	444	0	0	44	112	-	-	-	9.5	12	-	-	-	-	-
OEPA/USGS, unpublished																
WOLF RUN LAKE																
above dam	90	68	3	0	0.4	0.5	11	0.1	53	3.9	1.0	130	Ca/HCO_3	210	lt 1	lt .05
IV-19/VIII-16-76	98	130	0	0	3.9	16	-	-	-	4.6	6.2	-	-	-	-	-
Tobin and Youger, 1979																
above dam																
VIII-13-81	-	-	-	-	-	-	10	0.17	48	-	-	-	-	167	lt 10	lt .05
OEPA Classification Survey, unpublished							14	0.16	36							lt .05

1. Numerical values in mg/l. Dashes indicate information unavailable.

2. lt - less than gt - greater than

APPENDIX F

Concentrations of Metals, Transition Metals, and other Elements in Selected Ohio Lakes.[1]

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
ACTON LAKE																				
above dam	lt 10[3]	100	60	0	33	3	20	10	9000	9	13	240	lt .5	4	7	2.6	1	0	2.7	40
IV-30/IX-9-75							lt 10		2300	9		3200								10
Tobin and Younger, 1977																				
VIII-1-81	-	-	-	-	-	-	-	lt 30	170	lt 5	-	40	-	-	lt 100	-	-	-	-	lt 30
OEPA Classification Survey, unpublished[4]																				
ADAMS LAKE																				
above dam	lt 10	50	-	0	31	0	20	5	1100	3	-	440	lt .1	0	3	1.9	0	0	3.9	40
V-1/VIII-18-80																				
OEPA/USGS, unpublished																				
LAKE ALMA																				
South of island	lt 10	100	50	0	19	0	10	1	70	1	6.3	130	lt .1	0	4	1.8	0	0	3.7	260
V-1/VIII-18-80																				
OEPA/USGS, unpublished																				
ALUM CREEK LAKE																				
above dam	lt 10	100	40	0	50	1	10	10	140	4	12	50	lt .5	11	7	3.6	0	0	17	10
IV-13/VIII-27-76																				
Tobin and Younger, 1979																				
ATWOOD LAKE																				
above dam	lt 10	0	30	0	19	1	lt 10	0	270	5	6.5	200	lt .5	0	3	2.0	0	0	12	20
V-17/VIII-30-76																				
Tobin and Younger, 1979																				
BARNESVILLE RESERVOIR #3																				
above dam	lt 10	50	10	0	27	0	10	2	260	0	5.4	490	lt .1	2	0	1.4	0	0	3.5	30
V-15/VIII-21-80																				
OEPA/USGS, unpublished																				
BELMONT LAKE																				
above dam	lt 10	50	40	0	44	0	lt 10	1	110	0	8.5	290	lt .1	0	3	2.2	0	0	14	90
V-8/VIII-7-80																				
OEPA/USGS, unpublished																				
BERLIN LAKE																				
above dam	lt 10	0	50	0	40	0	lt 10	20	380	2	12	130	lt .5	0	11	3.3	0	0	15	10
V-28/VIII-27-75								10												
Tobin and Younger, 1977																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
BUCKEYE LAKE																				
at midpoint																				
V-2/VIII-16-75	lt 10	200	40	0	37	1	lt 10	10	410	3	12	150	lt .5	4	0	2.2	0	0	9.2	10
Tobin and Youger, 1977																				
V-16/VIII-22-78	lt 10	0	30	6	34	0	10	1	470	67	11	180	lt .5	4	6	2.2	0	0	9.1	20
OEPA/USGS, unpublished									250	3		80								
BURR OAK RESERVOIR																				
above dam	lt 10	0	20	0	22	0	10	0	180	2	5.8	150	lt .5	2	23	1.4	0	0	6.7	0
IV-22/IX-30-76																				
Tobin and Youger, 1977																				
CAESAR CREEK LAKE																				
above dam	lt 10	0	20	1	40	4	lt 10	1	520	8	14	10	lt .5	2	7	2.4	0	0	6.0	10
IV-25/III-26-78																				
OEPA/USGS, unpublished																				
CHARLES MILL RESERVOIR																				
above dam	lt 10	0	170	0	50	0	10	1	1200	23	16	150	lt .5	4	8	2.4	0	0	13	10
V-12/VIII-8-78		100		6			20			37							0	0		
OEPA/USGS, unpublished																				
CLARK LAKE																				
above dam	lt 10	0	10	0	24	2	20	3	270	4	26	60	lt .5	4	7	0.8	0	0	5.4	10
V-29/VIII-13-79																				
OEPA/USGS, unpublished																				
CLARENCE J. BROWN RESERVOIR																				
(Buck Creek Lake)																				
above dam	lt 10	200	10	0	69	0	10	3	170	6	32	160	0	2	2	2.5	0	0	5.5	0
IV-7/VIII-2-77																				
Tobin and Youger, 1979																				
CLEAR FORK RESERVOIR																				
above dam	lt 10	200	30	0	27	1	lt 10	20	290	1	8.2	490	lt .5	1	5	1.9	1	0	12	10
V-23/VIII-20-75																				
Tobin and Youger, 1977																				
CLENDENING LAKE																				
above dam	lt 10	100	30	0	76	1	10	0	110	1	28	670	lt .5	0	2	1.9	0	0	7.7	10
IV-27/IX-3-76																				
Tobin and Youger, 1979																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca^2	Co	Cr	Cu	Fe	Pb	Mg^2	Mn	Hg	Mo	Ni	K^2	Se	Ag	Na^2	Zn
CLOUSE LAKE above dam V-29/VIII-5-80 OEPA/USGS, unpublished	lt 10	100	70	0	56	3	lt 10	3	580	0	18	2100	lt .1	1	5	2.8	0	0	42	20
COWAN LAKE above dam IV-29/IX-10-75 Tobin and Youger, 1977	lt 10	100	60	0	42	1	0	10	1900 1100	1	15	90 2600	lt .5	4	0	2.2	1	0	4.8	20
CUTLER LAKE above dam VII-22-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	740	lt 5	-	420	-	-	lt 100	-	lt 5	-	-	lt 30
DEER CREEK LAKE (Pickaway County) above dam IV-25/IX-12-75 Tobin and Youger, 1977	lt 10	100	60	0	63	0	0	20 10	800	0	27	40	lt .5	5	0	1.5	1	lt 10	6.7	20 30
DEER CREEK RESERVOIR (Stark County) above dam IV-23/VIII-16-77 Tobin and Youger, 1979	lt 10	100	20	0	38	0	lt 10	2	1000	6	9.5	1300	0	3	5	3.4	0	0	15	10
DILLON LAKE above dam IV-11/VIII-12-77 Tobin and Youger, 1979	lt 10	100	90	0	34	0	10	4	1300	10	10	40	0	1	1	3.6	0	0	7.8	10
DOW LAKE above dam V-8/VIII-31-78 OEPA/USGS, unpublished	lt 10	100 0	70	4 2	33	0	10 lt 10	1	290	19	6.7	560	lt .5 lt .5	0	4	1.6	0 0	0 0	6.0	10
EAST BRANCH RESERVOIR above dam IV-26/VIII-15-77 Tobin and Youger, 1979	lt 10	0	10	0	22	0	lt 10	2	650	6	5.7	110	0	5	5	1.6	0	0	8.0	20
EAST FORK LAKE above dam VI-1/VIII-21-79 OEPA/USGS, unpublished	lt 10	0	20	2	31	2	30	5	550	0	8.7	50	lt .5	2	9	2.8	0	0	6.3	20
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
EAST RESERVOIR																				
near east shore	27	50	30	0	49	0	10	1	160	1	11	400	1t .1	0	0	2.1	0	0	25	20
V-23/IX-2-80	44																			
OEPA/USGS, unpublished																				
ESSINGTON LAKE																				
near center																				
VII-23-81	-	-	-	-	-	-	-	270	55[2]	7	-	70.5[2]	-	-	900	-	1t 100	-	-	-
OEPA Classification Survey, unpublished[4]																				
FINDLAY CITY RESERVOIR																				
near east shore	1t 10	0	50	0	54	0	10	6	50	1	18	40	1t .5	1	31	3.0	0	0	7.8	10
VI-27/VIII-31-79																				
OEPA/USGS, unpublished																				
FINDLEY LAKE																				
above dam	1t 10	50	60	0	42	0	20	2	120	0	15	180	1t .1	2	2	3.3	0	0	11	10
VI-3/VIII-12-80																				
OEPA/USGS, unpublished																				
FIRESTONE RESERVOIR																				
above dam																				
VII-14-81	-	-	-	-	-	-	-	1t 30	530	1t 5	-	110	-	-	1t 100	-	1t 5	-	-	-
OEPA Classification Survey, unpublished[4]																				
FORKED RUN LAKE																				
above dam	1t 10	100	40	2	12	0	1t 10	5	390	10	3.8	50	1t .5	0	60	1.5	0	0	5.9	20
V-4/VIII-25-78																				
OEPA/USGS, unpublished																				
FORTY ACRE POND																				
at outfall																				
VII-29-81	-	-	-	-	-	-	-	1t 30	3.1[2]	1t 5	-	170	-	-	1t 100	-	1t 10	-	-	-
OEPA Classification Survey, unpublished[4]																				
FOX LAKE																				
above dam	1t 10	50	30	0	21	0	10	0	310	0	5.5	580	1t .1	0	6	1.6	0	0	4.6	570
V-2/VIII-19-80																				
OEPA/USGS, unpublished																				
GRAND LAKE SAINT MARYS																				
near midpoint	1t 10	100	40	0	21	1	1t 10	0	1000	3	16	60	1t .5	9	1	3.3	1	0	10	10
V-16/VIII-12-75																				
Tobin and Yonger, 1977																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
GRIGGS RESERVOIR																				
above dam	1t 10	0	50	0	79	1	20	4	470	2	28	240	1t .5	11	13	2.9	1	0	18	30
V-24/VIII-6-79																				
OEPA/USGS, unpublished																				
GUILFORD LAKE																				
above dam	1t 10	400	20	1	28	0	10	10	110	1	7.2	710	1t .5	0	3	1.9	0	0	8.1	10
V-21/VIII-26-75		100						10	840			4800								
Tobin and Youger, 1977																				
VIII-24-81	-	-	-	-	-	-	-	1t 30	160	1t 5	-	80	-	-	100	-	1t 5	-	-	1t 30
OEPA Classification Survey, unpublished[4]																				
HAMMERTOWN LAKE																				
(Jackson City Reservoir)																				
above dam	1t 10	100	20	0	7.9	0	30	5	140	5	5.2	300	1t .5	2	16	1.6	0	0	2.2	20
VI-14/VIII-6-79																				
OEPA/USGS, unpublished																				
HARGUS LAKE																				
above dam	1t 10	100	40	4	47	0	1t 10	4	360	4	17	80	1t .5	8	9	3.2	0	0	6.3	10
IV-20/VIII-4-78																				
OEPA/USGS, unpublished																				
HARRISON LAKE																				
at East end	1t 10	0	40	0	55	1	10	20	3300	4	12	140	1.0	3	16	3.2	1	1	6.0	10
V-30/VIII-22-75								10	5500	30		970	1t .5		17					20
Tobin and Youger, 1977																				
VIII-19-81	-	-	-	-	-	-	-	1t 30	630	1t 5	-	90	-	-	100	-	1t 25	-	-	1t 30
OEPA Classification Survey, unpublished[4]																				
HIGHLANDTOWN LAKE																				
above dam	1t 10	0	9	1	15	0	1t 10	0	270	6	5.2	320	1t .5	0	9	1.5	0	0	6.1	10
V-15/VIII-21-78																				
OEPA/USGS, unpublished																				
HOOVER RESERVOIR																				
at dam	1t 10	100	30	0	31	1	1t 10	10	840	3	9.0	30	1t .5	3	3	2.3	1	0	7.7	20
V-09/VIII-29-75																				
Tobin and Youger, 1977																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
LAKE HOPE																				
above dam																				
V-14/IX-3-75	lt 10	100	20	0	11	5	lt 10	0	630	2	4.7	40	lt .5	1	6	1.4	0	0	3.0	30
Tobin and Youger, 1977						12		0	2300			2400								10
IV-27/VIII-1-78	lt 10	0	30	2	12	7	10	4	210	17	5.2	480	lt .5	1	13	1.6	0	0	4.8	30
OEPA/USGS, unpublished		0		2			10			39							0			
HOSTERMAN LAKE																				
near center																				
VII-17-81	-	-	-	-	-	-	-	lt 30	420	lt 10	lt 10	40	-	-	lt 100	-	lt 5	-	-	lt 30
OEPA Classification Survey, unpublished[4]																				
INDIAN LAKE																				
near Shawnee Island																				
IV-21/VIII-18-77	lt 10	100	80	1	42	0	lt 10	3	650	7	21	80	0	4	0	2.7	0	0	7.0	20
Tobin and Youger, 1979																				
JACKSON LAKE																				
above dam	lt 10	0	30	2	13	0	20	4	520	8	5.1	950	lt .5	0	5	2.2	0	1	4.1	10
V-1/VIII-18-78		200		0			lt 10			2							0	0		
OEPA/USGS, unpublished																				
JEFFERSON LAKE																				
above dam	lt 10	50	30	0	86	0	lt 10	3	110	0	18	220	lt .1	1	4	1.6	0	0	8.0	30
V-9/VIII-8-80																				
OEPA/USGS, unpublished																				
LAKE KATHARINE																				
pt of max depth	-	-	-	-	-	-	-	-	350	-	-	450	-	-	-	-	-	-	-	-
III-22-79	-	-	-	-	-	-	-	-	2250	-	-	470	-	-	-	-	-	-	-	-
OEPA special survey, unpublished[4]																				
KILLDEER RESERVOIR																				
at SW corner	lt 10	0	20	0	58	0	10	2	370	6	20	20	0	10	3	2.5	0	0	9.0	0
V-5/VIII-4-77																				
Tobin and Youger, 1979																				
KISER LAKE																				
above dam	lt 10	100	30	1	38	0	lt 10	3	310	8	25	60	0	9	0	1.9	0	0	5.3	20
IV-22/VIII-19-77																				
Tobin and Youger, 1979																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
KNOX LAKE above dam V-3/VIII-30-77 Tobin and Youger, 1979	lt 10	0	0	0	28	0	lt 10	2	750	4	6.9	520	0	0	3	3.3	0	0	4.2	10
LADUE RESERVOIR above dam V-11/VIII-7-78 OEPA/USGS, unpublished	lt 10	0	60	0	27	0	lt 10	0	310	9	5.5	100	lt .5	1	6	1.9	0	0	14	10
LEESVILLE LAKE above dam V-18/VIII-31-76 Tobin and Youger, 1979	lt 10	0	0	0	18	0	10	0	400	3	4.4	390	lt .5	0	2	1.6	0	0	3.8	20
LAKE LOGAN above dam IV-15/IX-14-76 Tobin and Youger, 1979	lt 10	0	20	0	15	0	10	0	290	2	5.8	140	lt .5	3	24	1.6	0	0	4.7	10
LONG LAKE at midpoint IV-19/VIII-9-77 Tobin and Youger, 1979	lt 10	100	40	0	54	0	lt 10	2	190 540	6	13	310 3300	0	2	2	2.7	0	0	24	20 0
LAKE LORAMIE above dam V-17/VIII-13-75 Tobin and Youger, 1977	lt 10	100	40	0	33	1	0	0	1600	3	18	140	lt .5	8	1	2.8	1	0	10	10
VII-7-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	2230	lt 5	-	120	-	-	lt 100	-	lt 5	-	-	lt 30
MADISON LAKE above dam VI-5/VIII-7-79 OEPA/USGS, unpublished	lt 10	0	-	1	65	0	20	6	890	4	29	180	lt .5	6	11	2.0	0	0	9.1	20
MEADOWBROOK LAKE above dam VI-2/VIII-29-80 OEPA/USGS, unpublished	lt 10	50	80	0	59	0	10	2	820	2	18	1500	lt .1	2	3	2.1	0	0	29	10
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
MEANDER CREEK RESERVOIR																				
above dam	lt 10	0	70	0	37	2	10	9	360	4	11	340	lt .5	0	160	3.1	0	0	2.5	20
VI-22/VIII-17-79																				
OEPA/USGS, unpublished																				
M.J. KIRWAN RESERVOIR																				
(West Branch Reservoir)																				
above dam	lt 10	0	50	0	34	0	lt 10	6	430	2	11	20	0	0	3	3.0	0	0	19	20
IV-18/VIII-29-77																				
Tobin and Youger, 1979																				
MIAMI-WHITEWATER LAKE																				
above dam																				
VII-7-81	-	-	-	-	-	-	-	lt 30	340	lt 5	-	130	-	-	-	-	-	-	-	30
OEPA Classification Survey, unpublished[4]																				
LAKE MILTON																				
above dam																				
VI-21/VIII-16-79	lt 10	0	70	20	39	2	10	7	340	3	11	390	lt .5	1	15	3.7	0	0	16	20
OEPA/USGS, unpublished																				
MOGADORE RESERVOIR																				
above dam	lt 10	0	40	0	42	0	10	0	70	1	8.9	70	lt .5	1	0	1.6	0	0	7.8	10
V-4/VIII-23-76																				
Tobin and Youger, 1979																				
MONROE LAKE																				
above dam	lt 10	100	10	0	27	0	10	3	200	0	5.5	300	lt .1	2	0	1.5	0	0	7.4	20
V-16/VIII-22-80																				
OEPA/USGS, unpublished																				
MOSQUITO CREEK LAKE																				
above dam	lt 10	0	30	0	21	0	lt 10	0	420	2	5.8	60	lt .5	0	4	2.8	0	0	12	10
V-12/VIII-24-76																				
Tobin and Youger, 1979																				
NESMITH LAKE																				
pt of max depth	-	-	-	-	-	-	lt 30	lt 30	140	6	-	-	lt .5	0	lt 100	-	-	-	-	lt 30
IV-11-79	-	-	-	-	-	-	-	-	130	lt 5	-	4280	-	-	-	-	-	-	-	-
OEPA special survey, unpublished[4]																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca[2]	Co	Cr	Cu	Fe	Pb	Mg[2]	Mn	Hg	Mo	Ni	K[2]	Se	Ag	Na[2]	Zn
NETTLE LAKE near midpoint V-22/VIII-14-78 OEPA/USGS, unpublished	lt 10	0	70	0	66	0	lt 10	4	310	6	14	170	lt .5	5	6	2.6	0	0	4.6	20
NEW LEXINGTON RESERVOIR ('Old Reservoir') above dam V-6/VIII-4-80 OEPA/USGS, unpublished	lt 10	50	40	0	14	0	lt 10	5	330	0	5.8	350	lt .1	2	4	1.8	0	0	6.5	120
NEWPORT LAKE above dam V-22/VIII-28-80 OEPA/USGS, unpublished	lt 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NIMISILA RESERVOIR above dam V-2/VIII-8-77 Tobin and Youger, 1979	lt 10	100	10	0	54	0	10	0	230	3	12	470	0	0	0	2.4	0	0	15	0
NORTH BRANCH RESERVOIR above dam VI-12/VIII-14-79 OEPA/USGS, unpublished	lt 10	0	20	0	58	0	40	3	920	7	19	1700	lt .5	5	10	2.2	0	0	7.6	20
PAINT CREEK LAKE above dam V-6/X-02-75 Tobin and Youger, 1977	lt 10	100	50	0	61	1	lt 10	0	270	2	25	60	lt .5	0	0	1.7	0	0	5.7	10
LAKE PARK Northeastern corner VIII-15-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	1980	lt 5	-	330	-	-	lt 100	-	lt 10	-	-	lt 30
PIEDMONT LAKE above dam IV-12/VIII-11-77 Tobin and Youger, 1979	lt 10	100	40	0	130	0	10	0	90	7	47	190	0	0	3	3.0	0	0	18	0
PUNDERSON LAKE at midpoint V-27/VIII-19-75 Tobin and Youger, 1977	lt 10	0	50	0	37	0	10	10	100	4	8.9	510	lt .5	1	2	2.0	0	0	24	10
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

APPENDIX F (continued)

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca^2	Co	Cr	Cu	Fe	Pb	Mg^2	Mn	Hg	Mo	Ni	K^2	Se	Ag	Na^2	Zn
OLD REID PARK PONDS at outfall to Buck Creek VII-17-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	70	lt 10	-	lt 30	-	-	lt 100	-	lt 5	-	-	lt 30
LAKE ROCKWELL	lt 10	100	40	0	32	1	lt 10	10	840	3	8.0	100	lt .5	0	5	2.0	0	0	13	40
above dam								10	590			2000								40
V-11/VIII-20-76 Tobin and Youger, 1979																				
ROCKY FORK LAKE																				
above dam	lt 10	100	30	0	43	1	0	10	250	7	22	210	lt .5	1	0	2.1	0	1	4.2	10
V-7/IX-6-75 Tobin and Youger, 1977																				
VIII-12-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	150	lt 5	-	lt 30	-	-	lt 100	-	lt 5	lt 30	-	lt 30
ROSS LAKE																				
above dam	lt 10	0	-	0	22	0	20	2	100	5	6.7	520	lt .5	0	8	2.2	0	0	5.9	20
VI-7/VIII-10-79 OEPA/USGS, unpublished																				
LAKE RUPERT																				
above dam	lt 10	0	20	0	14	0	10	4	170	6	5.4	2500	lt .5	2	10	1.5	0	0	4.1	20
VI-15/IX-4-79 OEPA/USGS, unpublished																				
SALT FORK LAKE																				
above dam	lt 10	200	10	1	25	0	20	10	150	1	7.9	480	lt .5	0	5	1.7	0	0	6.0	10
V-20/VIII-15-75 Tobin and Youger, 1977																				
SENECAVILLE LAKE																				
above dam	lt 10	100	20	0	49	2	lt 10	0	230	3	11	220	lt .5	3	23	1.7	0	0	4.9	0
IV-20/VIII-17-76 Tobin and Youger, 1979																				
SHARON LAKE at point of maximum depth VII-8-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	1060	lt 5	-	280	-	-	-	-	-	-	-	lt 30
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca^2	Co	Cr	Cu	Fe	Pb	Mg^2	Mn	Hg	Mo	Ni	K^2	Se	Ag	Na^2	Zn
SIPPO LAKE at point of maximum depth VII-15-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	750	lt 5	-	360	-	-	lt 100	-	lt 5	-	-	lt 30
LAKE SNOWDEN above dam VI-8/IX-5-79 OEPA/USGS, unpublished	lt 10	0	-	0	29	0	10	2	280	1	13	530	lt .5	2	9	2.2	0	0	8.2	20
SNYDER PARK LAGOONS at point of maximum depth in most western lagoon VII-10-81	-	-	-	-	-	-	-	lt 30	460	lt 5	-	80	-	-	-	-	-	-	-	lt 30
SPRINGFIELD LAKE at point of maximum depth VIII-4-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	140	lt 5	-	80	-	-	lt 100	-	lt 5	-	-	lt 30
STONELICK LAKE above dam IV-14/IX-1-77 Tobin and Youger, 1979	lt 10	0	60	0	32	0	10	4	2200	13	9.1	450	0	0	3	4.5	0	0	7.8	30
SUMMIT LAKE near midpoint V-3/VIII-19-76 Tobin and Youger, 1979	-	0	100	0	64	0	20 10	0	380 16000	5 23	13	310 3000	lt .5 lt .5	1	2	3.5	0	0	130	30
at point of maximum depth VIII-5-81 OEPA Classification Survey, unpublished[4]	-	-	-	-	-	-	-	lt 30	160	lt 5	-	60	-	-	lt 100	-	lt 5	-	-	lt 30
TAPPAN LAKE above dam IV-26/IX-2-76 Tobin and Youger, 1979	lt 10	100	40	1	76	1	10	0	740 1300	2	28	700 2000	lt .5	0	1	1.9	0	0	6.8	20
TURKEYFOOT LAKE at midpoint IV-19/VIII-9-77 Tobin and Youger, 1979	lt 10	0	40	0	50	0	lt 10	0	40	4	12	600	0	1	0	2.4	0	0	25	20
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca^2	Co	Cr	Cu	Fe	Pb	Mg^2	Mn	Hg	Mo	Ni	K^2	Se	Ag	Na^2	Zn
TYCOON LAKE near midpoint V-2/VIII-24-78 OEPA/USGS, unpublished	lt 10	0	30	2	9.4	0	20	8	200	11	2.9	50	lt .5	0	300	1.8	0	0	3.4	30
VAN BUREN LAKE above dam IV-29/VIII-11-80 OEPA/USGS, unpublished	lt 10	lt 50	60	0	78	0	20	7	1900	1	22	9	lt .1	2	5	13	0	0	13	20
LAKE VESUVIUS above dam V-13/IX-2-75 Tobin and Youger, 1977	lt 10	100	20	0	15	1	0	20	1200	3	4.3	740	lt .5	1	1	1.6	0	0	2.2	20
VETO LAKE above dam V-9/VIII-17-78 OEPA/USGS, unpublished	lt 10	100	20	2	30	0	10	3	920	18	9.3	570	lt .5	0	8	2.1	0	0	14	10
WESTERVILLE RESERVOIR above dam IV-11-79 OEPA special survey, unpublished[4]	-	-	-	-	-	-	-	-	810	-	-	140	-	-	-	-	-	-	-	-
LAKE WHITE above dam V-31/VIII-20-79 OEPA/USGS, unpublished	lt 10	0	20	1	14	1	30	4	330	8	11	390	lt .5	2	15	2.3	0	0	7.8	30
WILLARD CITY RESERVOIR northeast quadrant VI-22/VIII-30-79 OEPA/USGS, unpublished	lt 10	0	70	0	81	0	20	5	60	2	20	10	lt .5	1	13	4.0	0	0	17	10
WILLS CREEK LAKE above dam V-6/IX-7-76 Tobin and Youger, 1979	lt 10	0	60	0	60	2	10	0	1400	3	24	760	lt .5	0	5	2.1	1	0	18	10
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

NAME SAMPLING SITE SAMPLING DATE(S) DATA SOURCE	As	Ba	Bo	Cd	Ca^2	Co	Cr	Cu	Fe	Pb	Mg^2	Mn	Hg	Mo	Ni	K^2	Se	Ag	Na^2	Zn
WINTON LAKE																				
(West Fork Mill Creek Lake																				
above dam	lt 10	100	60	1	56	4	lt 10	4	890	26	13	3200	lt .5	3	4	2.4	0	0	40	20
IV-24/VII-25-78		200		1						260								0		
OEPA/USGS, unpublished																				
WOLF RUN LAKE																				
above dam	lt 10	100	20	0	36	3	10	0	110	3	9.1	150	lt .5	2	38	1.9	0	0	12	0
IV-19/VIII-16-76																				
Tobin and Yonger, 1979																				
VIII-4-81	-	-	-	-	-	-	-	lt 30	110	lt 5	-	50	-	-	lt 100	-	lt 5	-	-	lt 30
OEPA Classification Survey, unpublished[4]																				
Ohio Water Quality Standard	ns[5]	ns	ns	1.2	ns	ns	50	5	ns	30	ns	ns	0.2	ns	ns	ns	ns	ns	ns	30

As	Arsenic	Ba	Barium	Bo	Boron	Cd	Cadmium	Ca	Calcium	Co	Cobalt	Cr	Chromium
Cu	Copper	Fe	Iron	Pb	Lead	Mg	Magnesium	Mn	Manganese	Hg	Mercury	Mo	Molybdenum
Ni	Nickel	K	Potassium	Se	Selenium	Ag	Silver	Na	Sodium	Zn	Zinc		

1 Water samples were collected as vertical water column composites unless indicated otherwise. Values, except as noted represent total concentrations in micrograms per liter. Spring values on top - summer values on bottom. Single numbers represent spring values. Dashes indicate information unavailable.)

2 Concentration in mg/l

3 lt - less than

4 Water samples collected at two foot and from near bottom, two foot value on top, near bottom value below.

5 ns - No specific standard for this parameter. See Water Quality Standards, Ohio Environmental Protection Agency (1978) Chapter 3745.1 of the Administrative Code.

APPENDIX G

Phytoplankton Genera, Chlorophyll a, and Related Parameters from Specific Zones at the Primary Sampling Sites in Selected Ohio Lakes.[1]

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	%	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	%
	Spring						Summer					
ACTON LAKE												
above dam	1,600	Chrysophyta	95	-	-	-	-	-	-	660,000	Cyanophyta	99
IV-30/IX-9-75	-	Cyclotella	50	-	-	-	-	-	-	-	Raphidiopsis	61
ADAMS LAKE	580	Cyanophyta	56	640	Chlorophyta	48	53,000	Chlorophyta	59	100,000	Chlorophyta	56
above dam	6.6	Oscillatoria	53	8.2	Eudorina	32	14.5	Coelastrum	41	9.3	Coelastrum	37
V-1/VIII-18-80												
LAKE ALMA												
South of island	190	Chrysophyceae	40	2,700	Cyanophyta	71	1,600	Cyanophyta	96	290,000	Cyanophyta	100
V-1/VIII-18-80	1.7	Dinobryon	40	9.6	Anacystis	71	4.4	Anacystis	96	60.5	Oscillatoria	98
ALUM CREEK LAKE												
above dam	590	Chrysophyta	80	-	-	-	2,100	Chlorophyta	65	3,400	Cyanophyta	72
IV-13/VIII-27-76	-	Cyclotella	40	-	-	-	-	Sphaerocystis	42	-	Aphanizomenon	18
ATWOOD LAKE												
above dam	65,000	Cyanophyta	77	-	-	-	190,000	Cyanophyta	95	220,000	Cyanophyta	95
V-17/VIII-30-76	-	Oscillatoria	54	-	-	-	-	Oscillatoria	52	-	Cylindrospermum	40
BARNESVILLE RESERVOIR #3												
above dam	1,800	Chrysophyta	60	970	Chrysophyta	70	8,600	Cyanophyta	95	12,000	Cyanophyta	95
V-15/VIII-21-80	10.5	Cyclotella	59	9.9	Cyclotella	69	10.7	Anabaena	52	22.9	Anabaena	84
BELMONT LAKE												
above dam	3,700	Chrysophyta	85	2,400	Chrysophyta	100	130,000	Cyanophyta	92	120,000	Cyanophyta	93
V-8/VIII-7-80	17.4	Asterionella	80	14.8	Asterionella	84	42.8	Aphanizomenon	87	35.3	Aphanizomenon	57
BERLIN LAKE												
above dam	150	Chrysophyta	100	-	-	-	-	-	-	2,300	Cyanophyta	95
V-28/VIII-27-75	-	Cyclotella	89	-	-	-	-	-	-	-	Lyngbya	58
BUCKEYE LAKE												
at midpoint	190,000	Cyanophyta	79	-	-	-	-	-	-	1,200,000	Cyanophyta	94
V-2/VIII-16-75		Aphanizomenon	49	-	-	-	-	-	-	-	Anacystis	46
V-16/VIII-22-78	3,000,000	Cyanophyta	85	-	-	-	24,000	Chrysophyta	79	12,000	Chrysophyta	79
	87.7	Anacystis	67	-	-	-	52.9	Melosira	79	60.3	Melosira	67
BURR OAK RESERVOIR												
above dam	1,900	Cyanophyta	46	1,600	Chrysophyta	47	130,000	Cyanophyta	99	120,000	Cyanophyta	100
IV-22/IX-30-76	-	Oscillatoria	46	-	Melosira	34	-	Lyngbya	67	-	Aphanizomenon	75

APPENDIX G (continued)

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %
			Spring						Summer			
CAESAR CREEK LAKE												
above dam	680	Euglenophyta	59	-	-	-	70,000	Cyanophyta	81	11,000	Chlorophyta	100
IV-25/III-26-78	5.9	Cryptomonas	59	-	-	-	9.6	Gomphosphaeria	81	8.5	Sphaerocystis	100
CHARLES MILL RESERVOIR												
V-12/VIII-8-78	350,000	Chrysophyta	43	-	-	-	8,000	Chrysophyta	70	33,000	Cyanophyta	39
above dam	90.5	Cyclotella	40	-	-	-	57.5	Cyclotella	41	68.8	Agmenellum	39
CLARK LAKE												
above dam	13	Cryptophyta	100	240	Cryptophyta	89	2,600	Cyanophyta	87	26,000	Cyanophyta	94
V-29/VIII-13-79	2.4	Cryptomonas	100	14.2	Cryptomonas	89	11.2	Oscillatoria	87	34.3	Oscillatoria	54
CLARENCE J. BROWN RESERVOIR (Buck Creek Lake)												
above dam	9,600	Chrysophyta	55	5,100	Euglenophyta	55	130,000	Cyanophyta	100	290,000	Cyanophyta	100
IV-7/VIII-2-77	26	Fragilaria	35	26	Cryptomonas	30	-	Aphanizomenon	87	32	Aphanizomenon	97
CLEAR FORK RESERVOIR												
above dam	12,000	Cyanophyta	64	-	-	-	-	-	-	140,000	Cyanophyta	96
V-23/VIII-20-75	-	Anacystis	45	-	-	-	-	-	-	-	Agmenellum	57
CLENDENING LAKE												
above dam	210,000	Cyanophyta	95	-	-	-	1,100,000	Cyanophyta	99	340,000	Cyanophyta	98
IV-27/IX-3-76	-	Oscillatoria	95	-	-	-	-	Oscillatoria	55	-	Cylindrospermum	92
CLOUSE LAKE	3,300	Cryptophyta	38	3,800	Cyanophyta	26	2,100	Chlorophyta	50	2,000	Cyanophyta	66
above dam	23.6	Cryptomonas	20	20.3	Lyngbya	20	21.4	Pandorina	40	17.6	Oscillatoria	64
V-29/VIII-5-80												
COWAN LAKE												
above dam	2,700	Chrysophyta	100	-	-	-	-	-	-	360,000	Cyanophyta	97
IV-29/ IV-10-75	-	Cyclotella	47	-	-	-	-	-	-	-	Raphidiopsis	75
DEER CREEK LAKE												
above dam	13,000	Chrysophyta	77	-	-	-	-	-	-	48,000	Cyanophyta	78
IV-25/IX-12-75	-	Nitzschia	28	-	-	-	-	-	-		Agmenellum	76
		Melosira	28									
DEER CREEK RESERVOIR												
above dam	8,200	Chrysophyta	47	15,000	Chrysophyta	34	460,000	Cyanophyta	97	420,000	Cyanophyta	98
IV-23/VIII-16-77	28	Cyclotella	31	38	Cyclotella	22	22	Anacystis	43	25	Anacystis	50

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl *a* (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl *a* (ug/l)	Division Genus	%	PHOTIC ZONE COMPOSITES Cells/ml Chl *a* (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl *a* (ug/l)	Division Genus	%
	Spring						Summer					
DILLON LAKE												
above dam	1,900	Cyanophyta	54	4,100	Cyanophyta	50	160,000	Cyanophyta	94	860,000	Cyanophyta	99
IV-11/VIII-12-77	2.7	Oscillatoria	42	3.7	Oscillatoria	50	41	Oscillatoria	93	78	Oscillatoria	79
DOW LAKE												
above dam	23,000	Cyanophyta	96	-	-	-	32,000	Cyanophyta	99	30,000	Cyanophyta	99
V-8/VIII-31-78	10.2	Oscillatoria	69	-	-	-	8.3	Gomphosphaeria	50	6.2	Gomphosphaeria	44
EAST BRANCH RESERVOIR												
above dam	9,400	Chlorophyta	38	8,600	Chrysophyta	63	3,000,000	Cyanophyta	94	3,400,000	Cyanophyta	96
IV-26/VIII-15-77	13	Melosira (a Chrysophyte)	19	13	Melosira	27	23	Lyngbya	48	29	Lyngbya	70
EAST FORK LAKE												
above dam	1,400	Chlorophyta	98	2,500	Chlorophyta	100	9,900	Cyanophyta	100	26,600	Cyanophyta	90
VI-1/VIII-21-79	5.7	Coelastrum	37	8.5	Schroederia	51	21.1	Oscillatoria	51	38.1	Anabaena	57
EAST RESERVOIR												
near east shore	280,000	Cyanophyta	100	570,000	Cyanophyta	100	290,000	Cyanophyta	97	390,000	Cyanophyta	93
V-23/IX-2-80	18.8	Oscillatoria	88	11.7	Oscillatoria	95	81.2	Oscillatoria	59	30.5	Oscillatoria	56
FINDLAY CITY RESERVOIR												
near east shore	230,000	Cyanophyta	100	-	-	-	290,000	Cyanophyta	100	26,000	Cyanophyta	90
VI-27/VIII-31-79	5.4	Anacystis	100	6.1	-	-	25.2	Oscillatoria	51	38.1	Anabaena	57
FINDLEY LAKE	1,500	Cyanophyta	59	1,200	Chrysophyta	55	400,000	Cyanophyta	99	13,000	Cyanophyta	93
above dam	18.8	Oscillatoria	51	11.7	Synura	53	81.2	Oscillatoria	61	30.5	Anabaena	39
VI-3/VIII-12-80												
FORKED RUN LAKE												
above dam	560	Chloraphyta	57	-	-	-	6,900	Cyanophyta	90	910	Cyanophyta	84
V-4/VIII-25-78	-	Ankistrodesmus	54	-	-	-	24.4	Agmenellum	67	-	Oscillatoria	84
FOX LAKE	300	Chrysophyta	39	680	Chrysophyta	84	22,000	Cyanophyta	98	110,000	Cyanophyta	99
above dam	3.4	Mallomonas	22	3.3	Dinobryon	71	33.8	Aphanizomenon	94	17.5	Aphanizomenon	51
V-2/VIII-19-80												
GRAND LAKE SAINT MARYS												
near midpoint	2,830,000	Cyanophyta	99	-	-	-	-	-	-	2,400,000	Cyanophyta	99
V-16/VIII-12-75	-	Lyngbya	93	-	-	-	-	-	-	-	Gomphosphaeria	25

APPENDIX G (continued)

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	%	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	%	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	%
	Spring						Summer					
GRIGGS RESERVOIR												
above dam	200	Chlorophyta	80	180	Chlorophyta	64	53,000	Cyanophyta	100	510,000	Cyanophyta	100
V-24/VIII-6-79	6.3	Chlamydomonas	80	5.7	Chlamydomonas	36	29.2	Agmenellum	59	-	Gomphosphaeria	45
					Cryptomonas	36						
GUILFORD LAKE												
above dam	19,000	Cyanophyta	66	-	-	-	-	-	-	160,000	Cyanophyta	85
V-21/VIII-26-75	-	Anacystis	56	-	-	-	-	-	-	-	Lyngbya	53
HAMMERTOWN LAKE (Jackson City Reservoir)												
above dam	530	Chlorophyta	41	65	Euglenephyta	100	830	Chrysophyta	95	2,100	Chrysophyta	93
VI-14/VIII-6-79	3.1	Coelastrum	29	3.5	Trachelomonas	100	3.3	Fragilaria	88	12.4	Fragilaria	92
HARGUS LAKE												
above dam	8,400	Chrysophyta	56	-	-	-	3,300	Cyanophyta	71	510	Cyanophyta	78
IV-20/VIII-4-78	8.7	Ochromonas	37	-	-	-	4.6	Raphidiopsis	38	3.6	Raphidiopsis	78
HARRISON LAKE												
at East end	19,000	Chlorphyta	53	-	-	-	-	-	-	130,000	Cyanophyta	97
V-30/VIII-22-75	-	Micractinium	32	-	-	-	-	-	-	-	Agmenellum	96
HIGHLANDTOWN LAKE												
above dam	950	Chrysophyta	55	-	-	-	110,000	Cyanophyta	98	41,000	Cyanophyta	95
V-15/VIII-21-78	4.7	Cyclotella	27	-	-	-	-	Oscillatoria	64	-	Anabaena	76
HOOVER RESERVOIR												
at dam	10,000	Chrysophyta	100	-	-	-	-	-	-	3,500	Cyanophyta	92
V-09/VIII-29-75	-	Cyclotella	53	-	-	-	-	-	-	-	Lyngbya	82
LAKE HOPE												
above dam	2,200	Chlorophyta	90	-	-	-	-	-	-	4,200	Chlorophyta	95
V-14/IX-3-75	-	Quadrigula	87	-	-	-	-	-	-	-	Arthrodesmus	53
IV-27/VIII-1-78	660	Pyrrhophyta	67	-	-	-	32,000	Chlorophyta	100	140,000	Chlorophyta	100
	2.0	Dinoflagellates	64	-	-	-	27.9	Cosmarium	67	30.1	Cosmarium	75
INDIAN LAKE												
near Shawnee Island	610,000	Cyanophyta	92	730,000	Cyanophyta	91	2,500,000	Cyanophyta	97	1,500,000	Cyanophyta	98
IV-21/VIII-18-77	43	Oscillatoria	88	72	Oscillatoria	87	90	Oscillatoria	59	93	Oscillatoria	60

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl *a* (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl *a* (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl *a* (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl *a* (ug/l)	Division Genus	% %
	Spring						Summer					
JACKSON LAKE												
above dam	1,600	Cyanophyta	40	-	-	-	73,000	Cyanophyta	97	15,000	Cyanophyta	69
V-1/VIII-18-78	18.3	Anacystis	33	-	-	-	-	Oscillatoria	41	10.2	Anacystis	43
JEFFERSON LAKE	920	Chrysophyta	73	650	Chrysophyta	35	920	Chrysophyta	66	2,500	Chrysophyta	96
above dam V-9/VIII-8-80	3.7	Dinobryon	48	3.1	Dinobryon	24	4.6	Cyclotella	66	10.6	Cyclotella	96
KILLDEER RESERVOIR												
at SW corner	180	Englenophyta	58	910	Chrysophyta	66	13,000	Cyanophyta	78	12,000	Cyanophyta	58
V-5/VIII-4-77	3	Cryptomonas	48	3	Fragilaria	44	5.5	Anacystis	78	5.4	Anacystis	58
KISER LAKE												
above dam	660,000	Cyanophyta	90	560,000	Cyanophyta	87	3,400,000	Cyanophyta	97	4,200,000	Cyanophyta	98
IV-22/VIII-19-77	85	Oscillatoria	90	39	Oscillatoria	73	145	Oscillatoria	60	149	Oscillatoria	84
KNOX LAKE												
above dam	46,000	Chrysophyta	54	49,000	Cyanophyta	37	320,000	Cyanophyta	90	450,000	Cyanophyta	91
V-3/VIII-30-77	30	Melosira	44	23	Oscillatoria	31	46	Oscillatoria	31	35	Oscillatoria	45
LADUE RESERVOIR												
above dam	5,700	Chrysophyta	84	-	-	-	13,000	Cyanophyta	99	9,600	Cyanophyta	100
V-11/VIII-7-78	8.8	Asterionella	43	-	-	-	11.3	Anacystis	96	11.1	Anacystis	84
LEESVILLE LAKE												
above dam	42,000	Cyanophyta	94	-	-	-	73,000	Cyanophyta	98	49,000	Cyanophyta	96
V-18/VIII-31-76	-	Oscillatoria	94	-	-	-	-	Oscillatoria	96	-	Aphanizomenon	48
LAKE LOGAN												
above dam	11,000	Cyanophyta	60	-	-	-	270,000	Cyanophyta	99	64,000	Cyanophyta	98
IV-15/IX-14-76	-	Arthrospira	56	-	-	-	-	Agmenellum	71	-	Cylindrospermum	84
LONG LAKE												
at midpoint	270,000	Cyanophyta	85	280,000	Cyanophyta	83	860,000	Cyanophyta	98	470,000	Cyanophyta	98
IV-19/VIII-9-77	87	Oscillatoria	84	77	Oscillatoria	83	46	Cylindrospermum	55	35	Oscillatoria	64
LAKE LORAMIE												
above dam	46,000	Chrysophyta	49	-	-	-	-	-	-	450,000	Cyanophyta	91
V-17/VIII-13-75	-	Cyclotella	45	-	-	-	-	-	-	-	Lyngbya	79

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %
	Spring						Summer					
MADISON LAKE												
above dam	3,000	Chlorophyta	72	4,700	Chlorophyta	44	5,200	Cyanophyta	47	7,900	Cyanophyta	65
VI-5/VIII-7-79	32.9	Scenedesmus	60	47.3	Scenedesmus	33	20.7	Agmenellum	31	-	Agmenellum	55
MEADOWBROOK LAKE	11,000	Cryrtophyta	35	1,600	Cryptophyta	38	22,000	Chrysophyta	43	7,200	Chlorophyta	37
above dam	65.2	Cryptomonas	34	25.0	Cryptomonas	37	278.0	Mallomonas	37	22.3	Chlamydomonas	24
VI-2/VIII-29-80												
MEANDER CREEK RESERVOIR												
above dam	780	Chlorophyta	90	1,400	Chlorophyta	97	9,700	Chlorophyta	81	6,200	Chlorophyta	76
VI-22/VIII-17-79	4.7	Sphaerophyta	70	4.4	Coelastrum	76	7.4	Sphaerocystis	57	8.8	Sphaerocystis	72
MICHAEL J. KIRWAN RESERVOIR												
(West Branch Reservoir)												
above dam	3,200	Cyanophyta	56	4,600	Cyanophyta	93	1,800	Cyanophyta	46	1,600	Cyanophyta	58
IV-18/VIII-29-77	5.6	Oscillatoria	56	4.6	Oscillatoria	93	4.3	Anacystis	40	6.4	Oscillatoria	36
LAKE MILTON												
above dam	2,100	Cryptophyta	31	4,700	Cyanophyta	78	2,800	Cyanophyta	66	2,600	Cyanophyta	50
VI-21/VIII-16-79	8.2	Chroomonas	30	8.9	Oscillatoria	78	8.1	Oscillatoria	66	8.4	Oscillatoria	26
		Dinobryon	30									
MOGADORE RESERVOIR												
above dam	1,000	Chlorophyta	83	-	-	-	22,000	Cyanophyta	89	54,000	Cyanophyta	87
V-4/VIII-23-76	-	Schroederia	83	-	-	-	-	Aphanizomenon	33	-	Anabaena	29
MONROE LAKE	120	Chlorophyta	56	1,100	Chrysophyta	72	31,000	Cyanophyta	94	6,000	Cyanophyta	75
above dam	4.4	Chlamydomonas	56	4.9	Ochromonas	48	36.7	Oscillatoria	85	13.2	Oscillatoria	39
V-16/VIII-22-80												
MOSQUITO CREEK LAKE												
above dam	51,000	Cyanophyta	50	-	-	-	230,000	Cyanophyta	89	650,000	Cyanophyta	96
V-12/VIII-24-76	-	Anacystis	46	-	-	-	-	Oscillatoria	53	-	Oscillatoria	76
NETTLE LAKE												
near midpoint	8,100	Chrysophyta	35	-	-	-	88,000	Cyanophyta	54	8,600	Cyanophyta	47
V-22/VIII-14-78	21.9	Asterionella	15	-	-	-	11.9	Anacystis	35	19.5	Raphidiopsis	38
NEW LEXINGTON RESERVOIR												
('Old Reservoir')												
above dam	200	Chrysophyta	47	1,300	Chrysophyta	76	5,100	Cyanophyta	73	11,000	Cyanophyta	57
V-6/VIII-4-80	9.4	Cyclotella	27	5.5	Cyclotella	70	6.6	Oscillatoria	73	4.3	Oscillatoria	57

APPENDIX G (continued)

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %
	Spring						Summer					
NEWPORT LAKE	3,200	Chlorophyta	40	8,300	Chlorophyta	50	62,000	Chrysophyta	90	150,000	Chrysophyta	90
above dam	51.8	Chlamydomonas	29	73.2	Chlamydomonas	29	88.9	Cyclotella	62	155.2	Cyclotella	80
V-22/VIII-28-80												
NIMISILA RESERVOIR												
above dam	780,000	Cyanophyta	100	360,000	Cyanophyta	99	1,700,000	Cyanophyta	100	1,600,000	Cyanophyta	99
V-2/VIII-8-77	41	Oscillatoria	99	31	Oscillatoria	97	41	Aphanizomenon	69	44	Lyngbya	69
NORTH BRANCH RESERVOIR												
above dam	1700	Chlorophyta	51	340	Chrysophyta	100	15,000	Cyanophyta	65	22,000	Cyanophyta	74
VI-12/VIII-14-79	9.8	Coelastrum	30	-	Melosira	96	35.2	Agmenellum	38	46.1	Agmenellum	46
PAINT CREEK LAKE												
above dam	70,000	Chrysophyta	92	-	-	-	-	-	-	420,000	Cyanophyta	97
V-6/X-02-75	-	Chlorochromonas	88	-	-	-	-	-	-	-	Lyngbya	93
PIEDMONT LAKE												
above dam	180,000	Cyanophyta	90	210,000	Cyanophyta	92	480,000	Cyanophyta	100	710,000	Cyanophyta	100
IV-12/VIII-11-77	20	Oscillatoria	88	16	Oscillatoria	91	31	Cylindrospermum	82	33	Cylindrospermum	57
PUNDERSON LAKE												
at midpoint	52,000	Cyanophyta	99	-	-	-	78,000	Cyanophyta	88	300,000	Cyanophyta	100
V-27/VIII-19-75	-	Oscillatoria	96	-	-	-	-	Anacystis	38	-	Oscillatoria	86
LAKE ROCKWELL												
above dam	20,000	Chrysophyta	48	-	-	-	96,000	Cyanophyta	65	70,000	Cyanophyta	65
V-11/VIII-20-76	-	Cyclotella	18	-	-	-	-	Raphidiopsis	36	-	Oscillatoria	48
ROCKY FORK LAKE												
above dam	14,000	Chrysophyta	84	-	-	-	-	-	-	160,000	Cyanophyta	93
V-7/IX-6-1975	-	Melosira	30	-	-	-	-	-	-	-	Oscillatoria	34
		Cyclotella	30									
ROSS LAKE												
above dam	4,300	Cyanophyta	91	2,000	Chrysophyta	47	6,200	Cyanophyta	92	16,000	Cyanophyta	99
VI-7/VIII-10-79	12.5	Oscillatoria	91	-	Cyclotella	36	22.6	Oscillatoria	38	4.3	Aphanizomenon	86
LAKE RUPERT												
above dam	850	Cyanophyta	48	1,300	Chlorophyta	67	6,500	Cyanophyta	94	2,800	Chlorophyta	43
VI-15/IX-4-79	5.7	Anacystis	48	3.5	Crucigenia	32	14.3	Anacystis	37	7.8	Chlorella	39

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	%
	Spring						Summer					
SALT FORK LAKE												
above dam	21,000	Cyanophyta	81	-	-	-	-	-	-	410,000	Cyanophyta	100
V-20/VIII-15-75	-	Oscillatoria	81	-	-	-	-	-	-	-	Lyngbya	57
SENECAVILLE LAKE												
above dam	56,000	Cyanophyta	53	62,000	Cyanophyta	68	630,000	Cyanophyta	98	260,000	Cyanophyta	95
IV-20/VIII-17-76	-	Oscillatoria	31	-	Oscillatoria	68	-	Oscillatoria	71	-	Oscillatoria	64
LAKE SNOWDEN												
above dam	1,300	Chlorophyta	60	1,400	Chrysophyta	67	20,000	Chlorophyta	61	84,000	Chlorophyta	78
VI-8/IX-5-79	3.2	Sphaerocystis	55	4.0	Cyclotella	66	14.9	Volvox	60	17.4	Volvox	77
STONELICK LAKE												
above dam	6,000	Euglenophyta	81	11,000	Euglenophyta	77	59,000	Chlorophyta	93	91,000	Chlorophyta	83
IV-14/IX-1-77	38	Cryptomonas	52	54	Cryptomonas	55	24	Sphaerocystis	74	21	Sphaerocystis	58
SUMMIT LAKE												
near midpoint	440,000	Cyanophyta	95	-	-	-	300,000	Cyanophyta	94	550,000	Cyanophyta	94
V-3/VIII-19-76	-	Oscillatoria	94	-	-	-	-	Oscillatoria	75	-	Oscillatoria	65
TAPPAN LAKE												
above dam	110,000	Cyanophyta	82	-	-	-	650,000	Cyanophyta	99	490,000	Cyanophyta	94
IV-26/IX-2-76	-	Oscillatoria	81	-	-	-	-	Cylindrospermum	70	-	Cylindrospermum	66
TURKEYFOOT LAKE												
at midpoint	150,000	Cyanophyta	64	590,000	Cyanophyta	93	2,100,000	Cyanophyta	100	1,000,000	Cyanophyta	97
IV-19/VIII-9-77	59	Oscillatoria	64	62	Oscillatoria	93	29	Lyngbya	71	34	Lyngbya	55
TYCOON LAKE												
near midpoint	2,200	Chlorophyta	58	-	-	-	110,000	Cyanophyta	97	72,000	Cyanophyta	96
V-2/VIII-24-78	6.4	Cyclotella	17	-	-	-	12.1	Anacystis	65	10.1	Anacystis	69
VAN BUREN LAKE	2,600	Chrysophyta	77	16,000	Chrysophyta	78	2,200	Chlorophyta	83	3,500	Cyanophyta	81
above dam IV-29/VIII-11-80	64.7	Melosira	46	76.0	Cyclotella	44	6.0	Pediastrum	33	6.4	Oscillatoria	81
LAKE VESUVIUS												
above dam	420	Cyanophyta	73	-	-	-	-	-	-	13,000	Cyanophyta	80
V-13/IX-2-75	-	Anacystis	73	-	-	-	-	-	-	-	Agmenellum	41
VETO LAKE												
above dam	11,000	Cyanophyta	45	-	-	-	9,500	Cyanophyta	79	20,000	Cyanophyta	82
V-9/VIII-17-78	19.7	Anacystis	45	-	-	-	13.8	Anacystis	35	14.4	Anacystis	57

NAME SAMPLING SITE SAMPLING DATES	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %	PHOTIC ZONE COMPOSITES Cells/ml Chl a (ug/l)	Division Genus	% %	MAXIMUM DISSOLVED OXYGEN ZONE Cells/ml Chl a (ug/l)	Division Genus	% %
	Spring						Summer					
LAKE WHITE												
above dam	470	Chlorophyta	53	470	Chlorophyta	61	8400	Cyanophyta	66	13,000	Cyanophyta	86
V-31/VIII-20-79	3.9	Melosira	39	3.9	Oocystis	58	11.3	Anabaene	41	7.1	Aphanizomenon	47
WILLARD CITY RESERVOIR												
northeast quadrant	-	-	-	-	-	-	2,200	Cyanophyta	99	41	Chlorophyta	88
VI-22/VIII-30-79	2.1	-	-	1.4	-	-	2.2	Lyngbya	99	9.2	Sphaerocystis	50
WILLS CREEK LAKE												
above dam	72,000	Cyanophyta	54	-	-	-	8,700	Cyanophyta	83	4,100	Chrysophyta	59
V-6/IX-7-76	-	Oscillatoria	43	-	-	-	-	Aphanizomenon	46	-	Fragilaria	55
WINTON LAKE (West Fork Mill Creek Lake)												
above dam	16,000	Cyanophyta	83	-	-	-	160,000	Cyanophyta	96	180,000	Cyanophyta	99
IV-24/VII-25-78	45.4	Oscillatoria	71	-	-	-	18.8	Oscillatoria	93	35.7	Oscillatoria	94
WOLF RUN LAKE												
above dam	2,500	Crysophyta	100	-	-	-	8,700	Cyanophyta	83	4,100	Crysophyta	59
IV-19/VIII-16-76	-	Dinobryon	59	-	-	-	-	Aphanizomenon	46	-	Fragilaria	55

1. Parameters in the units indicated. Dashes indicate information unavailable.

APPENDIX H

Summary of Bacteriological Characteristics for the Primary Sites of Selected Ohio Lakes.[1]

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM		FECAL STREPTOCOCCI	
	Spring	Summer	Spring	Summer
ACTON LAKE above dam IV-30/IX-9-75	1,900-12,500	3-2	4,050-12,500	2-5
ADAMS LAKE above dam V-13/VIII-26-80	420-210	8-100	40-60	8-24
LAKE ALMA South of island V-1/VIII-18-80	4-24	2-4	4-45	4-36
ALUM CREEK LAKE above dam IV-13/VIII-27-76	2-2	2-2	2-2	54-2
ATWOOD LAKE above dam V-17/VIII-30-76	2-2	3-3	2-4	3-3
BARNESVILLE RESERVOIR #3 above dam V-15/VIII-21-80	228-48	20-230	52-60	40-120
BELMONT LAKE above dam V-8/VIII-7-80	4-4	70-8	4-12	20-8
BERLIN LAKE above dam V-28/VIII-27-75	3-3	2-6	3-3	2-3
BUCKEYE LAKE at midpoint V-2/VIII-16-75 V-16/VIII-22-78	4-6 lt 2-20[2]	29-48 30-28	2-3 34-428	3-6 12-16
BURR OAK RESERVOIR (Tom Jenkins Reservoir) above dam IV-22/IX-30-76	2-46	2-12	2-2	2-2
CAESAR CREEK LAKE above dam IV-25/VII-26-78	24-16	12-40	80-550	8-30

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM Spring	 Summer	FECAL STREPTOCOCCI Spring	 Summer
CHARLES MILL RESERVOIR above dam V-12/VIII-8-78	4-2	4-4	74-66	16-140
CLARK LAKE above dam V-29/VIII-13-79	2-2	2-6	10-16	6-6
CLARENCE J. BROWN RESERVOIR (Buck Creek Reservoir) above dam IV-7/VIII-2-77	64-52	2-2	20-20	2-2
CLEAR FORK RESERVOIR above dam V-23/VIII-20-75	3-3	2-3	3-3	2-2
CLENDENING LAKE above dam IV-27/IX-3-76	2-2	2-2	2-2	2-2
CLOUSE LAKE above dam V-29/VIII-5-80	34-911	460-240	20-42	1,360-1,640
COWAN LAKE above dam IV-29/ IV-10-75	500-600	2-8	170-300	2-2
DEER CREEK LAKE (Pickaway County) above dam IV-25/IX-12-75	18-8	26-9	28-84	56-100
DEER CREEK RESERVOIR (Stark County) above dam IV-23/VIII-16-77	2-2	2-2	2-2	2-2
DILLON LAKE above dam IV-11/VIII-12-77	10-54	4-16	10-136	4-120
DOW LAKE above dam V-8/VII-31-78	6-4	4-92	46-94	8-140

APPENDIX H (continued)

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM		FECAL STREPTOCOCCI	
	Spring	Summer	Spring	Summer
EAST BRANCH RESERVOIR above dam IV-26/VIII-15-77	80-90	24-200	60-44	10-430
EAST FORK LAKE above dam VI-1/VIII-21-79	4-4	lt 1-50	lt 1-50	lt 1-20
EAST RESERVOIR near east shore V-23/IX-2-80	16-24	6-8	16-16	18-18
FINDLAY CITY RESERVOIR near east shore VI-27/VIII-31-79	2-2	4-82	2-2	lt 2-30
FINDLEY LAKE above dam VI-3/VIII-12-80	12-8	10-30	8-4	70-60
FORKED RUN LAKE above dam V-4/VIII-25-78	lt 2-lt 2	30-26	40-lt 2	26-30
FOX LAKE above dam V-2/VIII-19-80	4-32	4-120	4-16	16-20
GRAND LAKE SAINT MARYS near midpoint V-16/VIII-12-75	3-3	3-3	3-3	3-3
GRIGGS RESERVOIR above dam V-24/VIII-6-79	10-14	8-152	28-54	54-38
GUILFORD LAKE above dam V-21/VIII-26-75	3-3	4-8	3-3	6-4
HAMMERTOWN LAKE (Jackson City Reservoir) above dam VI-14/VIII-6-79	2-2	2-4	4-6	4-6

APPENDIX H (continued)

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM		FECAL STREPTOCOCCI	
	Spring	Summer	Spring	Summer
HARGUS LAKE above dam IV-20/VIII-4-78	167-12	lt 4-12	330-24	lt 4-lt 4
HARRISON LAKE at East end V-30/VIII-22-75	16-400	100-152	20-1,100	100-160
HIGHLANDTOWN LAKE above dam V-15/VIII-21-78	24-18	2-2	42-48	2-4
HOOVER RESERVOIR at dam V-9/VIII-29-75	6-3	2-168	3-3	2-60
LAKE HOPE above dam V-14/IX-3-75 IV-27/VIII-1-78	3-12 lt 2-lt 2	2-3 12-76	3-30 lt 2-2	26-3 88-76
INDIAN LAKE near Shawnee Island IV-21/VIII-18-77	4-4	3-3	2-4	126-430
JACKSON LAKE above dam V-1/VIII-18-78	lt 2-lt 2	32-12	lt 2-10	104-54
JEFFERSON LAKE above dam V-9/VIII-8-80	4-12	240-640	2-20	144-120
KILLDEER RESERVOIR at SW corner V-5/VIII-4-77	2-2	2-4	2-2	2-6
KISER LAKE above dam IV-22/VIII-19-77	2-2	2-2	2-2	8-2
KNOX LAKE above dam V-3/VIII-30-77	3-9	3-56	3-3	2-8

APPENDIX H (continued)

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM		FECAL STREPTOCOCCI	
	Spring	Summer	Spring	Summer
LADUE RESERVOIR above dam V-11/VIII-7-78	lt 2-lt 2	2-lt 2	24-12	lt 2-lt 2
LEESVILLE LAKE above dam V-18/VIII-31-76	2-18	3-3	2-4	3-3
LAKE LOGAN above dam IV-15/IX-14-76	2-2	3-6	2-2	3-3
LONG LAKE at midpoint IV-19/VIII-9-77	2-2	36-12	2-2	26-12
LAKE LORAMIE above dam V-17/VIII-13-75	3-3	3-9	3-3	320-328
MADISON LAKE above dam VI-5/VIII-7-79	14-76	106-124	8-28	72-136
MEADOWBROOK LAKE above dam VI-2/VIII-29-80	320-120	40-300	64-48	40-140
MEANDER CREEK RESERVOIR above dam VI-22/VIII-17-79	2-6	2-10	8-170	10-30
MICHAEL J. KIRWAN RESERVOIR (West Branch Reservoir) above dam IV-18/VIII-29-77	2-2	2-2	2-4	2-2
LAKE MILTON above dam VI-21/VIII-16-79	6-2	4-8	6-10	80-8
MOGADORE RESERVOIR above dam V-4/VIII-23-76	2-2	2-12	2-2	2-50

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM Spring	 Summer	FECAL STREPTOCOCCI Spring	 Summer
MONROE LAKE above dam V-16/VIII-22-80	60-12	12-128	6-24	4-20
MOSQUITO CREEK LAKE above dam V-12/VIII-24-76	2-2	2-2	2-2	2-8
NESMITH LAKE[3] pt of max depth IV-11/IX-26-79	5-lt 5	lt 2-17	10-10	lt 2-23
NETTLE LAKE near midpoint V-22/VIII-14-78	2-2	6-4	10-58	18-120
NEW LEXINGTON RESERVOIR ('Old Reservoir') above dam V-6/VIII-4-80	2-4	4-16	4-12	12-18
NEWPORT LAKE above dam V-22/VIII-28-80	620-372	300-90	44-48	280-100
NIMISILA RESERVOIR above dam V-2/VIII-8-77	2-2	72-12	2-2	102-20
NORTH BRANCH RESERVOIR above dam VI-12/VIII-14-79	10-10	6-48	12-28	10-140
PAINT CREEK LAKE above dam V-6/IX-02-75	3-36	2-72	3-28	2-52
PIEDMONT LAKE above dam IV-12/VIII-11-77	2-2	2-2	2-2	2-6
PUNDERSON LAKE at midpoint V-27/VIII-19-75	24-2	2-2	8-3	2-2
LAKE ROCKWELL above dam V-11/VIII-20-76	2-2	2-2	2-2	2-2

APPENDIX H (continued)

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM Spring	 Summer	FECAL STREPTOCOCCI Spring	 Summer
ROCKY FORK LAKE above dam V-7/IX-6-75	3-3	90-70	3-3	40-24
ROSS LAKE above dam VI-7/VIII-10-79	4-6	4-10	26-30	40-70
LAKE RUPERT above dam VI-15/IX-4-79	4-10	8-258	6-12	6-20
SALT FORK LAKE above dam V-20/VIII-15-75	2-2	2-5	2-2	2-2
SENECAVILLE LAKE above dam IV-20/VIII-15-75	2-2	8-18	2-2	2-18
LAKE SNOWDEN above dam VI-8/IX-5-79	16-4	lt 1-12	20-8	8-50
STONELICK LAKE above dam IV-14/IX-1-77	3-24	4-8	6-9	12-14
SUMMIT LAKE near midpoint V-3/VIII-19-76	48-4	240-77	72-12	2-72
TAPPAN LAKE above dam IV-26/IX-2-76	2-2	2-2	2-2	2-2
TURKEYFOOT LAKE at midpoint IV-19/VIII-9-77	2-2	12-2	2-2	46-10
TYCOON LAKE near midpoint V-2/VIII-24-78	lt 2-4	2-4	lt 2-lt 2	32-32

LAKE NAME SAMPLING SITE SAMPLING DATES	FECAL COLIFORM Spring	 Summer	FECAL STREPTOCOCCI Spring	 Summer
VAN BUREN LAKE above dam IV-29/VIII-11-80	2-12	20-10	11-44	30-50
LAKE VESUVIUS above dam V-13/IX-2-75	3-36	2-5	3-32	2-14
VETO LAKE above dam V-9/VIII-17-78	58-26	22-30	200-80	20-52
LAKE WHITE above dam V-31/VIII-20-79	4-4	8-8	18-4	8-22
WILLARD CITY RESERVOIR northeast quadrant VI-22/VIII-30-79	2-2	14-12	2-22	2-4
WILLS CREEK LAKE above dam V-6/IX-7-76	8-2	2-6	2-2	2-12
WINTON LAKE (West Fork Mill Creek Lake) above dam IV-24/VII-25-78	15-290	900-1,600	24-200	240-680
WOLF RUN LAKE above dam IV-19/VIII-16-76	2-2	2-12	2-2	2-2

1 Data unless indicated otherwise is from the OEPA-USGS cooperative survey. Values represent number of colonies per 100 ml of lake water; 2 ft. values listed first near bottom values second.
2 lt - less than.
3 OEPA special survey, data unpublished.

DOCUMENT 1770W ARCHIVED ON 5109S

OHIO'S GROUND WATER

1982 305(b) REPORT

Ohio Environmental Protection Agency
Division of Public Water Supply
Ground Water Section
April 1982

Contents

		Page
I.	General	1
II.	Quantity of Ground Water	1
III.	Quality of Ground Water	2
IV.	Ohio EPA Ground Water Program	3
	a) Disposal Site Evaluations	4
	b) Technical Assistance Requests	4
	c) Ground Water Monitoring	5
	- Chemical Parameters	6
	- Summary of Results	7
	d) Ground Water Inventory and Assessment	7
V.	Summary of Ground Water Quality Problems	8
Figure I	- Major Aquifer Systems	10
Figure II	- Valley Aquifer Systems and Primary Monitor Wells	11
Figure III	- Bedrock Aquifer Systems and Primary Monitor Wells	12
Figure IV	- Pollution Source Monitoring Wells	13

305b
Ground Water Resources

I. General

The State of Ohio has abundant ground water resources due to a rather humid climate and favorable geologic conditions. The State is underlain by extensive glacial and bedrock aquifers which serve as sources of ground water supply in all geographic areas. Nearly 45% of Ohio's population utilizes ground water as a drinking water source through more than 550 municipal supplies and nearly one million individual wells. Ground water is also widely utilized for industrial, agricultural and various commercial uses.

Coupled with Ohio's favorable geographic location in relation to Lake Erie and the Ohio River, total available ground and surface water resources for the State far exceed current or projected future demands. There is no apparent water shortage problem for the State as a whole provided that water quality is maintained within the range of conventional and economic treatment to meet specific water use requirements.

II. Quantity of Ground Water

Ohio's ground water resources, while abundant, are unequally distributed. Problems associated with adequate quantity are generally local in nature and relate to available supply at certain points of use or to cyclic drought conditions which historically have been infrequent and of normally short duration. Water shortages due to drought or over-pumpage usually result from lack of planning or insufficient developed capacity of a water system to carry through periods of deficient precipitation and low ground water levels.

Conflicts between ground water users have been noted in some areas of the State and are usually the result of well interference between two or more large users or one large user effecting water levels in nearby shallow wells. For the most part, such problems are usually resolved voluntarily by adjusting pumping schedules or by developing new production wells beyond areas of interference. Over pumpage of an aquifer, where natural recharge is exceeded, rarely occurs in the State.

A total of 28 major aquifer systems have been identified in the State for possible future designation as underground sources of drinking water (Figure 1). The most productive aquifers are glacial outwash deposits of sand and gravel which lie beneath and adjacent to the Ohio River and the major tributary streams (Figure 2). Over 75% of Ohio's current ground water pumpage is from these valley aquifers where individual municipal and industrial wells may yield several hundred, or more, gallons per minute.

The most productive bedrock aquifers in the State are massive limestones, dolomites and sandstones which are generally confined to two large areas in the northern two-thirds of the State as shown in Figure 3. Bedrock wells within these areas commonly yield from 50 to several hundred gallons per minute.

In the remaining areas of Ohio, the bedrock consists of alternating beds of shale, limestone, sandstone, fireclay and coal, while the glacial overburden is largely clay-rich till interbedded with sand and gravel deposits. Although productive aquifers may occur in some isolated areas, these regions, overall, have a moderately low ground water development potential due to the predominance of relatively impervious shales and clays. On the average, well yields are commonly less than 25 gallons per minute and in some areas are barely adequate for domestic water supplies.

III. Quality of Ground Water

Ohio is a densely populated and highly industrialized state and generates large volumes of both solid and liquid wastes. Land disposal and storage facilities such as landfills, lagoons, sludge sites and spray irrigation are widely utilized and comprise potential sources of ground water contamination. Other land-use activities which may also impact water quality include product storage facilities for coal, salt, and petroleum, on-lot sewage disposal, animal wastes, agricultural chemicals, mining activity, oil and gas production, road salt, product spills, and pipe line or tank leaks.

Most of Ohio's ground water is well protected from the polluting effects of man's activities due to favorable geologic conditions. The northern and western two-thirds of the state is occupied by a layer of clay-rich glacial drift which provides an effective barrier against rapid infiltration of surface pollutants into shallow aquifers. In the unglaciated areas of southeastern Ohio, the subsurface migration of pollutants is generally restricted to relatively short distances and small areas due to both topographic and geologic controls.

Areas of Ohio most sensitive to ground water pollution are where permeable deposits of sand and gravel or fractured sandstone or limestone lie at or near the ground surface. Polluting substances above the ground may rapidly infiltrate downward to the zone of saturation and effect shallow aquifers. In many instances the upper limits of important fresh-water bearing zones are within 10 to 20 feet of the land surface and in direct hydraulic connection with surface pollutants. The valley outwash aquifers associated with the Ohio River and principal tributary streams are prime examples of sensitive aquifer areas. They are widely utilized as sources of municipal ground water supply and deserve the highest degree of protection from potential pollution sources within their recharge areas.

On a statewide basis, the most common ground water quality problems are attributed to naturally-occurring mineral substances derived from marine sedimentary rocks and glacial drift. Most of Ohio's ground waters may be classified as moderately to excessively hard due to dissolved calcium and

and magnesium salts and frequently contain objectionable levels of iron or manganese which cause tastes, odors and staining. Locally, ground waters may be charged with hydrogen sulfide gas which imparts an unpleasant "rotten egg" odor and is corrosive to metal plumbing and utensils. Water softening and other conventional water treatment are widely utilized for both municipal and private residential water supplies to correct these aesthetic problems.

Ground water contamination from land disposal activities has been noted in a number of isolated instances particularly around older disposal sites in sensitive aquifer areas. However, most of the land disposal facilities developed during the past 10 years have been more strictly regulated and are impacting ground water to a much lesser degree.

Other land-use activities in the state have had considerably more impact upon local ground water quality than waste disposal sites. The most prevelent contamination problems involve private residential wells effected by activities on-lot or on properties immediately adjacent to the effected wells. Based upon local inquiries and complaint investigations by the OEPA Ground Water Staff, the most common pollution sources effecting private wells include on-lot sewage disposal, hydrocarbon spills and tank leaks, pesticide application around the home and yard, and salt water contamination from nearby road salt or oil and gas drilling activity. Coal mining activities have likewise impacted ground water supplies in many areas of eastern Ohio but are largely the result of past mining activity rather than current operations. In the majority of cases, contamination of private individual wells from nearby pollution sources can be directly attributed to deficiencies in well siting, well construction and maintenance.

Overall, ground water quality in Ohio has not been contaminated to any significant degree and for the most part meets all primary drinking water standards without treatment. With few exceptions, contamination problems are of extremely limited areal extent and seldom involve more than one or two individual wells in close proximity to a pollution source. Collectively, however, several hundred individual well problems are investigated each year by Ohio EPA. Many additional problems no doubt occur and are not brought to the Agency's attention.

IV. Ohio EPA Ground Water Program

The Ground Water Section in the Division of Public Water Supply is responsible for the conduct of a statewide program for the protection and surveillance of Ohio's ground water resources under the authority of Chapters 6111 and 3745, Ohio Revised Code. Principal staff activities have been carried out since the creation of Ohio EPA in 1972 and include geologic evaluation and assessment of proposed land disposal facilities, response to all inquiries and complaints from well owners where contamination is observed or suspected, maintaining a comprehensive network for monitoring ground water quality, and the inventory and geologic assessment of existing land-use activities which comprise potential ground water pollution sources. Included below are summaries of program activities for the

period between July 1, 1979 and June 30, 1981.

a) Disposal Site Evaluations

Geologic evaluations of proposed land disposal sites are routinely conducted by the Ground Water Section as a technical assistance function for other program offices of Ohio EPA. At the request of district engineers charged with plan review and approval, preliminary field investigations are conducted for proposed landfills, lagoons, sludge disposal sites, spray irrigation facilities and ash ponds. Geologic reports are prepared for each site and include descriptive summaries of local topography and drainage, geology and ground water conditions. Comments on site suitability and recommendations for the protection and surveillance of local ground water resources are also provided.

For the two-year reporting period, a total of 258 proposed disposal sites were investigated and included 141 new landfills or landfill expansions, 56 industrial lagoons, and 61 sewage disposal facilities. Approximately one-half of the landfill sites were not recommended for approval due to unsuitable geologic conditions and a high potential for future ground water contamination. Many of the lagoon sites included recommendations for installation of artificial liners to prevent leakage into underlying aquifers. Nearly all new sites where plans were approved for construction contained requirements for on-site monitoring wells.

b) Technical Assistance Requests

For the two-year reporting period, the staff responded to a total of 802 separate requests for information and assistance. Around 340 of these inquiries involved individual wells where contamination of ground water was either observed or suspected. The remaining requests were for general information on ground water quality, well construction, and hydrogeologic conditions in specific areas.

Of the total number of reported contamination problems approximately 240 revealed some evidence of water quality degradation based upon both field observations and laboratory analyses. A categorical breakdown of contamination cases by source is included below:

Source/Contaminant	Number of Cases
1. Natural Conditions (Iron, Chloride, Hardness, Sulfate, H_2S)	56
2. Sewage/Animal Wastes (MBAS, Bacteria, Chloride, Nitrate, Ammonia, H_2S)	35
3. Oil and Gas Drilling (Sodium, Chloride, Barium, Crude Oil, Gas)	62

Contamination Cases Continued

Source/Contaminant	Number of Cases
4. Refined Hydrocarbons (Fuel Oil, Gasoline, Solvents)	32
5. Coal Mining Activity (Iron, Sulfate, Dissolved Solids, H_2S)	10
6. Pesticides/Fertilizer (Nitrate, Chlordane, Herbicides)	24
7. Road Salt (Sodium, Chloride)	14
8. Land Disposal Sites (Landfills, Lagoons)	9
Total Well Problems	242

Ground water problems related to natural conditions and to oil and gas drilling activity have been the most numerous sources of complaints. Many oil and gas-related problems are attributed to improper handling or disposal of oil field brines in producing fields. Many other problems relate to abandoned unplugged wells known to exist through large areas of eastern and northwestern Ohio.

Pollution effects from on-lot sewage disposal systems or from spills or leaks of refined hydrocarbons are other leading sources of private well contamination and are most frequently attributed to poor well siting, construction and maintenance. Problems relating to improper application or careless handling of pesticides for both agricultural and residential use have been increasing in recent years.

c) Ground Water Monitoring

The collection of ground-water quality data in Ohio has been conducted by the State for a number of years. A sampling and analyses program of all municipal ground water supplies was initiated by the Ohio Department of Health more than 40 years ago. Since mid-1972 this surveillance function has been under the direction of the Ohio EPA, Division of Public Water Supply. Between 500 and 600 municipal supplies are regularly sampled and more than 10,000 analyses are on file in the Agency. From 10 to 20 chemical parameters are recorded for each sample. The basis for the program has been to provide a continuing record on water quality so that any departures from the required standards for public water supplies can be immediately recognized and corrected.

The systematic collection of ambient ground water quality data was initiated by the Ohio Department of Natural Resources in the early 1960's and included the sampling and analyses of several hundred selected wells throughout the State. This program is now administered by the Ohio EPA, Ground Water Section to provide areal coverage for defining ambient water quality ranges for Ohio's major aquifer systems. At present, a total of approximately 2,000 detailed analyses from private wells are contained in Agency files.

An ambient monitoring program for recognizing seasonal and annual changes in ground water quality was initiated in 1967 and included semi-annual sampling and analyses of 12 producing wells on a continuing, long-term basis. Most of the sampling sites are high-capacity industrial or municipal wells developed in the State's principal valley aquifers and in the principal bedrock aquifers. The original monitoring network was expanded in 1974 and currently includes a total of 60 wells. The locations are shown in Figures 2 and 3.

The regular sampling of ground water quality in the vicinity of potential pollution sources was initiated in the early 1970's to provide early detection of ground water pollution problems. This monitoring activity consists of repeated sampling and analyses of cluster wells around selected landfills, waste lagoons, spray irrigation sites and other sources where ground water quality may be susceptible to pollution. The purpose is to provide information for measuring and evaluating the adequacy of waste disposal activities as they relate to local geologic conditions. Included in the current pollution source network are 24 landfill sites, 23 industrial lagoons, 2 coal stock piles, and 5 miscellaneous sites. The site locations and the number of monitor wells at each site are shown in Figure 4. An average of 300 water samples are collected annually as part of this program.

Chemical Parameters - The early surveillance program for municipal ground water supplies included routine determinations in the raw water quality for total dissolved solids, total alkalinity, hardness, pH, calcium, magnesium, sodium, iron, manganese, sulfate, chloride, fluoride and nitrate. Since the early 1970's, other determinations have been regularly conducted and include arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc, ammonia, phosphate and MBAS. Radiological analyses and pesticide scans are done on an occasional basis. The current program of municipal water analyses is directed largely toward analyses of finished water quality and primary drinking water parameters.

The ambient ground water monitoring for major aquifer systems includes regular determinations for dissolved solids, total alkalinity, sulfate, chloride, nitrate, ammonia, calcium, magnesium, sodium, iron, chromium, lead, chemical oxygen demand, total organic carbon, and MBAS. Occasional or periodic analyses are conducted for phenol, barium, cadmium, and phosphate.

The pollution source monitoring program includes varying chemical parameters selected on the basis of the type of land disposal facility and the character of the wastes. Conventional sanitary landfills may involve as many as 20 specific chemical parameters while the routine monitoring

of wells around coal piles generally include around six or eight parameters.

Summary of Results - A review of the analyses data for municipal ground water supplies reveals very few chemical violations of primary drinking water standards. In a few local areas of the State, barium and fluoride concentrations may be near or slightly above the drinking water standard and are generally attributed to natural-occurring mineral constituents in the aquifer. Periodically, relatively high levels of lead are reported but for the most part are believed to be effects from metallic pump parts or the distribution system. Locally, a few public supplies report abnormally high levels of chloride, the result of past oil and gas drilling practices or migration of deep natural brines into fresh-water bearing zones. For the most part, municipal wells throughout the State are well constructed, properly maintained, and isolated from potential sources of contamination.

Based upon analyses of 60 wells in the ambient monitoring network, ground water quality in the State's major aquifer systems has remained essentially unchanged over the past 5 to 10 years. Seasonal variations in water quality are relatively wide in comparison to annual changes suggesting that natural climatic conditions and changing recharge effects are the dominant factors which govern water quality. As in the case of municipal wells, the stations in this program are not generally subject to contamination and were selected for measuring long-term regional water quality trends.

Many of the individual wells in the pollution source monitoring program have shown varying degrees of contamination. Very slight to severe effects have been recorded in the immediate vicinity of 8 sanitary landfills and approximately 15 industrial lagoons. Most of the monitoring stations around coal storage facilities reveal levels of iron, sulfate, and dissolved solids which exceed ambient base line levels. Two monitoring sites in the northeastern area of the State are reporting high chloride and sodium levels resulting from road salt application.

d) Ground Water Inventory and Assessment

Staff effort over the past several years has been concentrated on the prevention of future ground water contamination by assuring that proposed land disposal sites are located in a geologic environment which provides a high degree of protection to local ground water resources. This program approach is based on the premise that most Ohio ground water is not contaminated and it is far more cost effective to prevent a future problem in comparison to the clean-up of an existing problem. In recent years, however, the hydrogeologic evaluation of existing and past land disposal practices has become an increasingly important function of the Ohio EPA due largely to increased public awareness and concerns over hazardous wastes and potential public health problems.

Initial inventory efforts of existing and old land disposal facilities were started in the mid-1970's and were directed toward sanitary landfills and abandoned dumps. A total of 750 of these solid waste disposal sites had

been identified by 1975 and local geologic conditions were described in a very generalized manner. Reasonably accurate appraisals of ground water pollution potential around old sites could not be made due to an almost complete lack on on-site test borings or monitor well data.

From 1978 through early 1980 an inventory and assessment of surface waste water impoundments were conducted and included over 16,000 individual ponds, pits and lagoons in the following categories: Agricultural - 180, Industrial - 1697, Municipal - 726, Oil and Gas related - 1344, and Mining - 12,258. Based upon a geologic assessment of over 80% of impoundment sites, the final SIA report concluded that surface waste water impoundments posed a significant threat to ground water and that industrial and oil and gas-related impoundments posed the greatest threat.

For the current reporting period, inventory and assessment efforts have been somewhat curtailed due to lower staffing levels and State budget cutbacks. In late 1980, an inventory of 16 Class I injection wells was completed and none are believed to have a potential effect upon ground water. Inventory programs for Class II and Class III injection wells (related to oil and gas production and solution mining of minerals, respectively) are being carried out by staff of the Ohio Department of Natural Resources, Division of Oil and Gas. A strategy to conduct an inventory of an estimated 5,000 Class IV and V injection wells was completed by the Ohio EPA staff in 1981 although the actual inventory and assessment of these facilities is not expected to begin until late 1982 or 1983.

Other inventory activities which relate to potential ground water contamination have been in progress during the 1980-81 period. The Ground Water staff has completed preliminary evaluations of around 25 surface impoundments at hazardous waste management facilities and has recommended that each site be further evaluated by conducting detailed on-site testing. A final inventory project is in progress under the Ohio EPA, Division of Land Pollution Control in which over 400 solid waste sites have been assessed using the standard rating system developed for the surface impoundment project. This project, known as the "open dump inventory" classifies solid waste sites according to Federal guidelines of the Resource Conservation and Recovery Act. Preliminary findings indicate that numerous abandoned landfills and dumps may have a substantial impact upon the quality of local ground water, particularly within the recharge areas of sensitive valley aquifers.

V. Summary of Ground Water Problems

As stated earlier in this report, ground water contamination problems are generally of limited areal extent and involve no more than one or two individual wells located in close proximity to a pollution source. The principal factors which govern the pollution of wells include the local hydrogeology, well construction and maintenance, and the character and volume of pollutants.

Based upon current monitoring data and field investigations of several hundred land disposal sites by the Ground Water Staff, the areas of Ohio most susceptable to pollution from land disposal are the valley outwash aquifers of sand and gravel

lying beneath and adjacent to Ohio's major streams and rivers. Valley aquifers associated with the Ohio River and the Great Miami River have the greatest number of known ground water contamination problems resulting from both current and past land disposal practices. The valley aquifers lying adjacent to the Scioto, Muskingum, and Tuscarawas Rivers and some valley segments in northeastern Ohio industrial areas have likewise shown pollution effects from land disposal sites. The principal sources of ground water contamination from land disposal are landfills and dumps situated in old sand and gravel pits, and industrial lagoons which lack natural or artificial barriers to prevent or restrict subsurface fluid migration.

Most of the known pollution problems from land disposal are attributed to sites which were developed prior to 1975. Since that time, solid waste disposal in quarries or gravel pits has been prohibited by state regulations and more stringent controls have been imposed upon industrial wastewater lagoons to minimize direct infiltration of pollutants.

Contamination of ground water from sources other than waste disposal has been noted in nearly all geographic areas of the state. The vast majority of contamination incidents involve individual residential wells effected by pollution sources on-site or on adjacent properties. Pollution effects from on-lot sewage disposal, leakage or spills of refined hydrocarbons and careless application of pesticides around the home have been the leading causes of contamination. Wells most susceptable to these surface-derived pollutants are shallow dug wells, shallow drilled wells containing less than 25 feet of well casing, and wells situated in frost-proof well pits. Since the adoption of a state well construction code in 1976, most new water wells are now constructed and maintained so as to prevent entrance of surface or near surface pollutants into the well bore.

Regional ground water quality problems in Ohio are primarily associated with oil and gas production, coal mining and, to a limited degree, road salt. Contamination from oil field brine has been most frequently reported in an 8 or 9-county area in the east-central part of Ohio and has been primarily attributed leakage from brine pits, faulty annular injection systems, and brine pit overflow. A relatively large number of individual brine contamination complaints have been reported in northeastern Ohio and have resulted from improper brine disposal in abandoned coal mines and gravel pit areas.

In some of the older oil and gas fields of the state, including some local areas in northwestern Ohio, ground water contamination from brine has been attributed to the migration of fluids upward through abandoned, unplugged oil wells.

Coal mining effects upon ground water are limited to a 20-county area of southeastern Ohio within the outcrop area of Pennsylvanian and Permian age rocks. Documented problems involving road salt have been most prevalent in the "snow belt" area of northeastern Ohio where the application of road salt is believed to far exceed the average for Ohio.

FIGURE 1

MAJOR AQUIFER SYSTEMS IN OHIO

I. Glacial Aquifers

a. Valley Outwash Deposits

1. Ohio (Upper Segment)
2. Ohio (Middle Segment)
3. Ohio (Lower Segment)
4. Muskingum
5. Tuscarawas - Sugar Creek
6. Walhounding - Killbuck
7. Licking - Little Walnut
8. Hocking
9. Scioto
10. Miami - Mad
11. L. Miami
12. Northeast Ohio
13. Buried Valleys (Limestone Areas)
14. Buried Valleys (Sandstone/Shale Areas)

b. Upland Drift

15. Limestone & Dolo. Areas
16. Sandstone & Shale Areas

II. Bedrock Aquifers

1. Ordovician Limestone & Shale
2. Lower Silurian Dolomite
3. Upper Silurian Limestone & Dolomite
4. Devonian Limestone
5. Devonian Ohio Shale
6. Mississippian - Berea Sandstone
7. Mississippian - Cuyahoga - Logan Formations
8. Mississippian - Black Hand Sandstone
9. Pennsylvanian - Sharon - Massillon Sandstone
10. Pennsylvanian - Upper Pottsville - Allegheny
11. Pennsylvanian - Conemaugh - Monogahela
12. Permian System

FIGURE 2

VALLEY AQUIFER SYSTEMS
AND
PRIMARY MONITORING WELLS

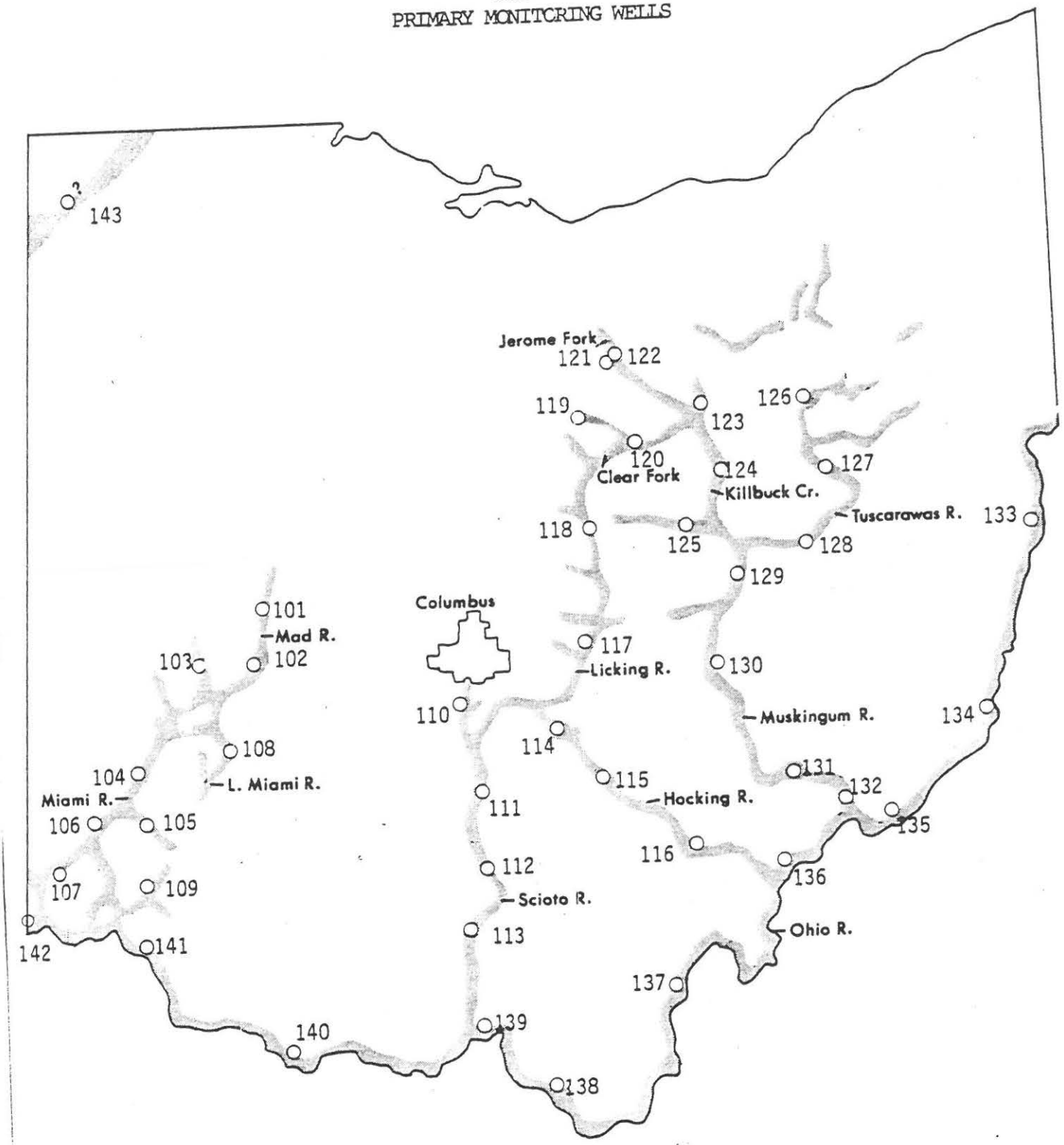
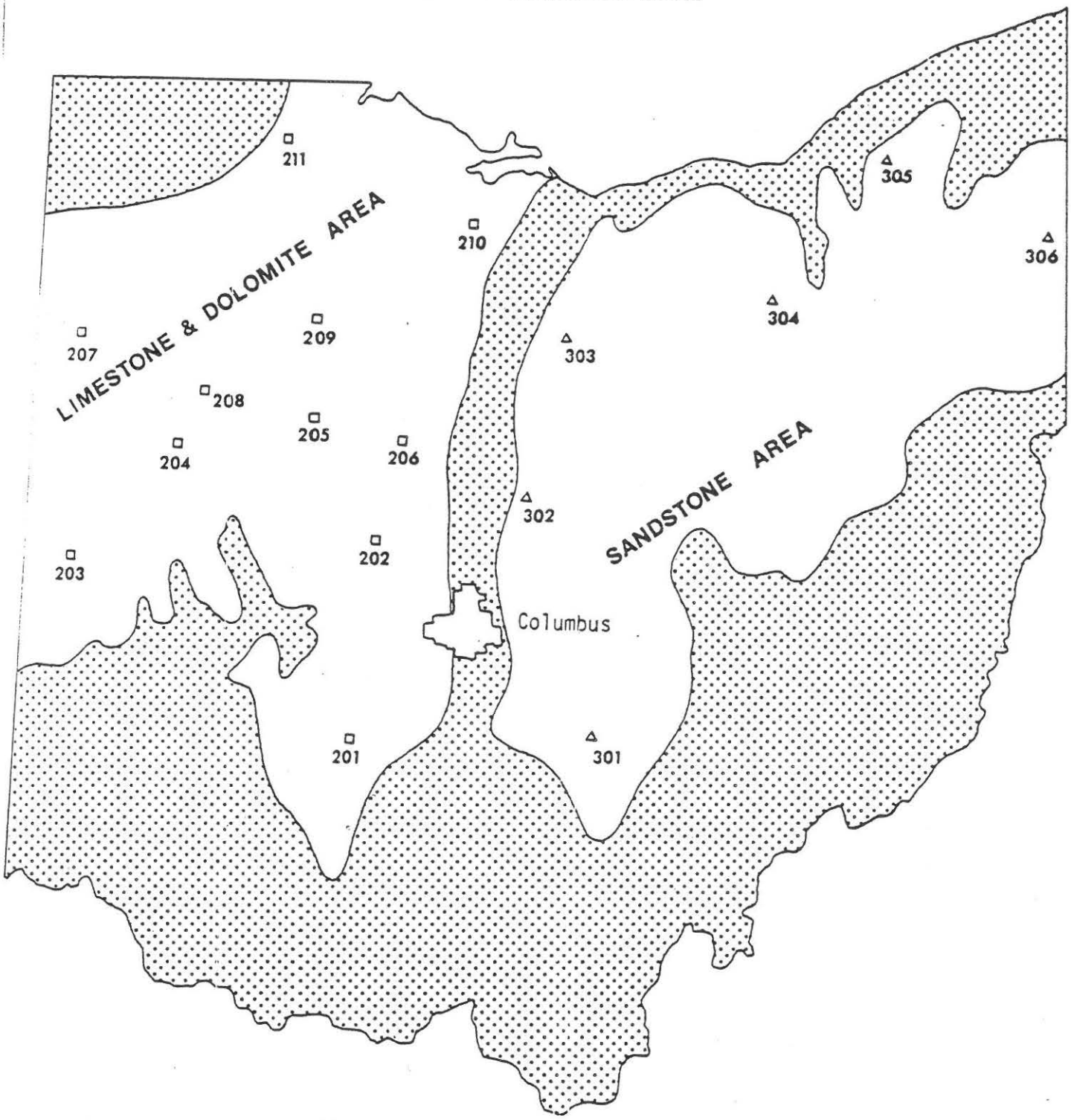


FIGURE 3

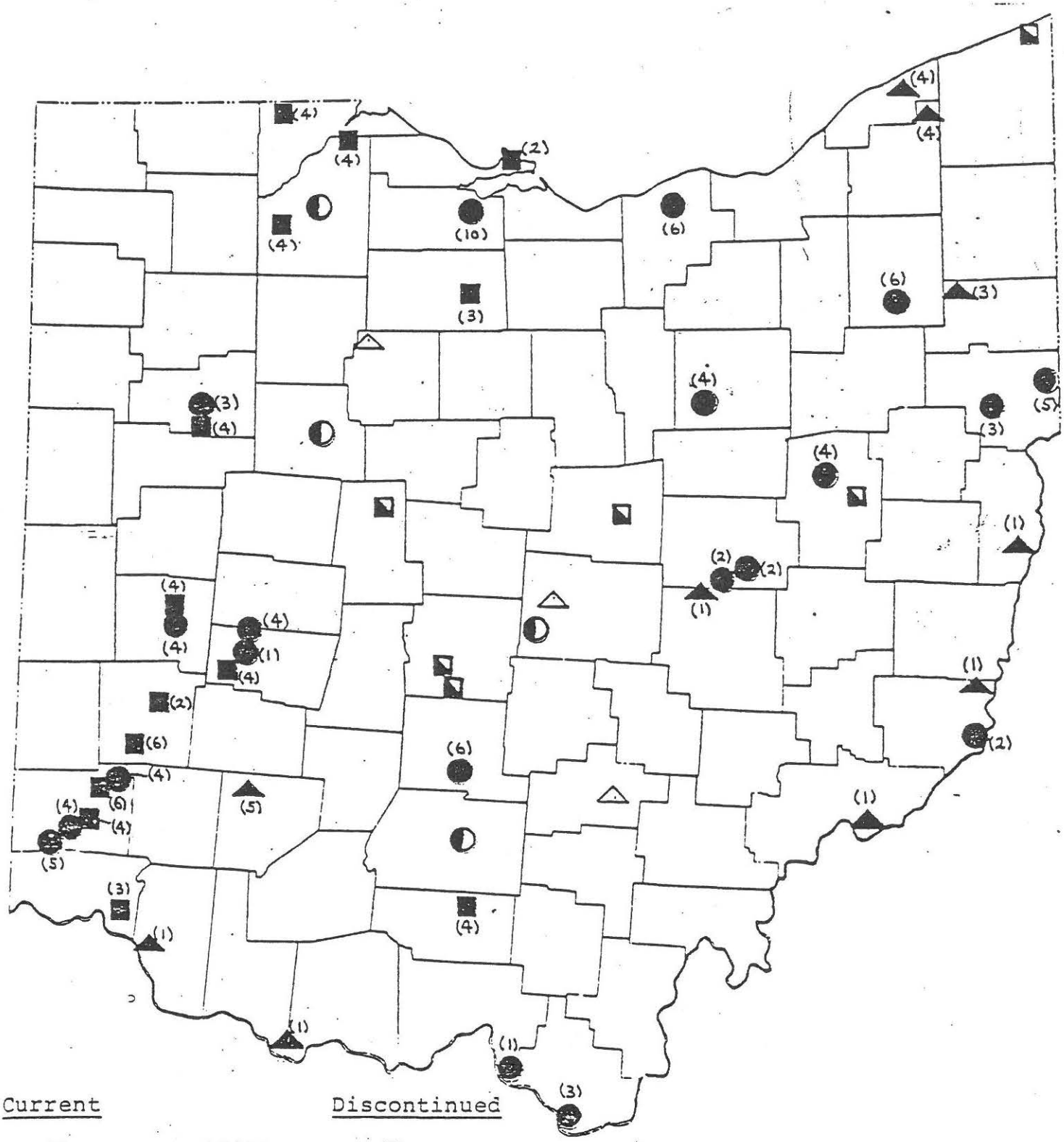
BEDROCK AQUIFER SYSTEMS
AND
PRIMARY MONITORING WELLS



Shaded areas underlain by shale and other rocks of low ground-water potential

FIGURE 4

OHIO GROUND WATER QUALITY
POLLUTION SOURCE MONITORING
(SEMI-ANNUAL SAMPLING)



GROUND WATER MONITORING

APPENDIX A

Prepared by

Russell B. Stein

Ohio Environmental Protection Agency
Division of Wastewater Pollution Control
Public Water Supply Section
Columbus, Ohio 43215

April, 1982

Ground Water Monitoring Programs

The collection of ground-water quality data in Ohio has been conducted by the State for a number of years. A sampling and analyses program of all municipal ground-water supplies was initiated by the Ohio Department of Health more than 40 years ago. Sampling continued on an annual or bi-annual schedule through the early 1970's with many of the originally sampled wells still in service. Since mid-1972, this surveillance function has been under the direction of the Ohio EPA, Office of Public Water Supply. Between 500 and 600 municipal ground water supplies are regularly sampled and more than 10,000 analyses are on file in the Agency. From 15 to 20 chemical parameters are recorded for each sample. The basis for the program has been to provide a continuing record of water quality so that any departures from the required standards for public water supplies can be immediately recognized and corrected.

A systematic data collection program on ground-water quality was initiated by the Ohio Department of Natural Resources in the early 1960's and included one-time sampling and analyses of several hundred selected wells throughout the State. This continuing program primarily emphasizes sampling private wells in areas of high development potential and is now administered by the Ohio EPA, Division of Ground Water. The purpose of the program is to provide broad areal coverage on ground-water quality for the purpose of adequately defining ambient water-quality ranges for each of Ohio's major aquifer systems. At present, a total of approximately 1500 detailed analyses from private sources are contained in the files of the Agency.

An ambient monitoring program for recognizing seasonal and annual changes in ground-water quality was initiated in 1967, and included semi-annual sampling and analyses of 12 producing wells on a continuing, long-term basis. Most of the sampling sites were high-capacity industrial or municipal wells developed in the principal valley aquifers along the Ohio River and the major tributaries and in the principal bedrock aquifers. One of the provisions of the Federal Water Pollution Control Act Amendments of 1972 called for the development of a statewide mopnitoring program in areas of high ground-water utilization. To conform with the recommendations of this Act and to provide a more comprehensive picture of water-quality changes, the original monitoring network was expanded in 1974 to include a total of 60 stations. Most of the stations in the current network are situated in urban or industrial areas where potential pollution sources are likely to be concentrated. The site locations (Figures 1 and 2) and descriptions of each well (Tables 1 and 2), are arranged according to major aquifer systems. The sampling schedule for the current program has continued on a semi-annual basis at times of the year which roughly coincide with seasonal extremes in ground-water levels.

Another monitoring program of the Division of Ground Water includes the regular sampling of ground-water quality in the vicinity of potential, pollution sources to provide early detection of ground-water pollution problems. This monitoring activity consists of semi-annual sampling and analyses of cluster wells around selected landfills, waste lagoons, spray irrigation sites and other sources where ground-water quality may be susceptible to pollution. The purpose is to provide information for measuring and evaluating the adequacy of waste disposal activities as they relate to local geologic conditions. Included in this pollution source network are 20 landfill sites, 24 industrial lagoons, 5 coal stock piles, and 7 miscellaneous sites. The site locations and the number of monitor wells at each site are shown in Figure 3. An average of 300 water samples are collected annually as part of this program.

Chemical Parameters

The early surveillance program for public ground water supplies included routine determinations in raw water for total dissolved solids, total alkalinity, hardness, pH, calcium, magnesium, sodium, iron, manganese, sulfate, chloride, fluoride and nitrate. Since the early 1970's, other heavy metal determinations are regularly conducted and include arsenic, barium, cadmium, chromium, copper, lead, mercury, silver and zinc. Analyses for ammonia, phosphate, selenium and MBAS are also conducted on a regular basis. Radiological analyses and pesticide scans are done on an occasional basis. With the enactment of the Federal Safe Drinking Water Act in 1975, the current sampling program is directed largely toward analyses of finished water quality and primary drinking water parameters.

The ambient ground-water monitoring for major aquifer systems includes regular determinations for dissolved solids, total alkalinity, sulfate, chloride, nitrate, ammonia, calcium, magnesium, sodium, iron, chromium, lead, chemical oxygen demand, total organic carbon and MBAS. Occasional or periodic analyses are conducted for phenol, barium, cadmium, and phosphate.

The pollution source monitoring program includes varying chemical parameters selected on the basis of the type of land disposal facility and the character of the wastes. Conventional sanitary landfills may involve as many as 20 specific chemical parameters, while the routine monitoring of wells around coal piles generally include around six or eight parameters.

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				MIAMI AND MAD RIVER AREA						
101	40°05'08"	83°48'01"	Champaign	Urbana	Southwest	1	63	1500	ODH	Jun.'73
102	39°58'35"	83°49'17"	Clark	Springfield	Southwest	1	80	2800	USGS	Jun.'67
103	40°02'58"	84°12'28"	Miami	Troy	Southwest	1	125	2100	USGS	Aug.'69
104	39°38'53"	84°17'07"	Montgomery	Miamisburg	Southwest	2	65	1600	USGS	Sep.'72
105	39°26'20"	84°19'07"	Warren	Lebanon	Southwest	5	129	750	ODH	Jan.'74
106	39°24'45"	84°33'30"	Butler	Hamilton	Southwest	2	181	1100	USGS	Dec.'65
107	39°17'48"	84°39'38"	Hamilton	Venice	Southwest	2	140	9000	USGS	Oct.'64
				LITTLE MIAMI RIVER AREA						
108	39°42'59"	83°58'04"	Greene	Xenia	Southwest	6	67	520	ODH	Dec.'73
109	39°16'34"	84°15'26"	Hamilton	Loveland	Southwest	1	70	1800	USGS	Jun.'67

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				SCIOTO RIVER AREA						
110	39°47'38"	83°00'33"	Pickaway	Shadeville	Central	3	100	600	ODH	Jun.'73
111	39°33'25"	82°57'11"	Pickaway	Circleville	Central	2	135	1500	USGS	Jun.'67
112	39°19'22"	82°57'44"	Ross	Chillicothe	Southeast	2	90	2800	ODH	Jan.'72
113	39°06'33"	82°58'45"	Pike	Waverly	Southeast	1	70	1000	ODH	Nov.'73
				HOCKING RIVER AREA						
114	39°42'00"	82°35'04"	Fairfield	Lancaster	Central	2	25	55	ODH	Jun.'73
115	39°31'10"	82°22'12"	Hocking	Logan	Southeast	2	25	-	ODH	Jun.'73
116	39°19'34"	82°06'50"	Athens	Athens	Southeast	1	52	800	USGS	Jun.'67

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				MUSKINGUM BASIN TRIBUTARIES AREA						
117	40°01'12"	82°26'23"	Licking	Heath	Central	1	200	500	ODH	Jun.'73
118	40°24'06"	82°29'45"	Knox	Mt. Vernon	Northwest	2	96	950	ODH	Jul.'73
119	40°44'46"	82°28'55"	Richland	Mansfield	Northwest	6	114	600	ODH	Jan.'74
120	40°39'26"	82°18'24"	Ashland	Perrysville	Northwest	2	84	300	ODH	Jan.'74
121	40°53'03"	82°17'08"	Ashland	Ashland	Northwest	1	91	800	ODH	Jun.'73
122	40°52'58"	82°17'01"	Ashland	Ashland	Northwest	1	326	750	ODH	Jun.'73
123	40°46'21"	81°56'44"	Wayne	Wooster	Northeast	2	101	100	ODH	Jan.'74
124	40°37'36"	81°55'10"	Holmes	Holmesville	Southeast	2	90	500	ODH	Nov.'73
125	40°19'57"	81°59'43"	Coshocton	Warsaw	Southeast	2	76	120	ODH	Nov.'73

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				TUSCARAWAS AND MUSKINGUM RIVER AREA						
126	40°46'49"	81°31'39"	Stark	Massillon	Northeast	2	137	500	ODH	Jun.'73
127	40°32'10"	81°29'31"	Tuscarawas	Dover	Southeast	1	103	2100	USGS	Jun.'67
128	40°15'53"	81°36'30"	Tuscarawas	Newcomerstown	Southeast	2	90	50	ODH	Jun.'73
129	40°11'02"	81°52'53"	Coshocton	Conesville	Southeast	3	92	2000	ODH	Jul.'73
130	39°57'53"	81°59'35"	Muskingum	Zanesville	Southeast	1	65	900	USGS	Jun.'67
131	39°35'23"	81°40'47"	Washington	Beverly	Southeast	3	63	180	ODH	Jun.'73
132	39°25'56"	81°28'15"	Washington	Marietta	Southeast	1	30	1027	USGS	Jun.'73

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				OHIO RIVER AREA						
133	40°18'53"	80°36'11"	Jefferson	Mingo Junction	Southeast	1	74	1000	USGS	Jun.'67
134	39°46'50"	80°51'32"	Monroe	Clarington	Southeast	1	70	165	ODH	Jun.'73
135	39°21'41"	81°19'18"	Washington	Marietta	Southeast	5	-	-	ODH	Jun.'73
136	39°16'39"	81°40'02"	Washington	Porterfield	Southeast	1	60	400	ODH	Jun.'73
137	38°50'00"	82°09'46"	Gallia	Gallipolis	Southeast	4	60	30	ODH	Dec.'73
138	38°30'36"	82°40'02"	Lawrence	Ironton	Southeast	2	84	400	ODH	Jun.'73
139	38°45'00"	82°56'02"	Scioto	New Boston	Southeast	2	81	-	ODH	Jun.'73
140	38°38'14"	83°41'18"	Adams	Aberdeen	Southeast	3	107	585	ODH	Apr.'73
141	38°59'33"	84°17'46"	Clermont	New Richmond	Southwest	3	113	620	ODH	May '73
142	39°06'45"	84°48'05"	Hamilton	North Bend	Southwest	2	133	650	USGS	Nov.'64

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 1: VALLEY AQUIFER MONITORS (Wells Developed in Sand and Gravel) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
				NORTHWEST OHIO OUTWASH AREA						
143	41°28'53"	84°32'20"	Williams	Bryan	Northeast	1	137	1800	USGS	Jun.'67

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 2: BEDROCK AQUIFER MONITORS (Wells Developed in Limestone and Dolomite)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
201	39°31'15"	82°25'27"	Fayette	Washington C.H.	Central	2	185	100	ODH	Jan.'74
202	40°14'16"	83°21'17"	Union	Marysville	Central	2	210	-	ODH	Mar.'73
204	40°34'03"	84°12'57"	Auglaize	Wapakoneta	Northwest	1	268	600	USGS	Jun.'67
205	40°37'38"	83°37'25"	Hardin	Kenton	Northwest	2	400	400	ODH	Jun.'73
206	40°34'23"	83°17'05"	Marion	New Bloomington	Northwest	5	290	500	ODH	Jun.'73
207	40°51'33"	84°35'22"	Van Wert	Van Wert	Northwest	2	400	130	ODH	Jan.'74
208	40°42'56"	84°08'00"	Allen	Lima	Northwest	2	415	700	ODH	May '74
209	41°01'46"	83°39'38"	Hancock	Findlay	Northwest	2	310	250	ODH	Jun.'73
210	41°15'30"	83°04'46"	Sandusky	Green Springs	Northwest	5	108	500	ODH	May '74
211	41°31'46"	83°51'15"	Lucas	Whitehouse	Northwest	5	250	500	ODH	May '74

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

TABLE 2: BEDROCK AQUIFER MONITORS (Wells Developed in Sandstone) (Continued)

Station Number	Latitude	Longitude	County	Nearest Town	Ohio EPA District	(a) Use Code	Well Depth (Feet)	(b) Well Yield	(c) Analysis by	Start of Record
301	39°39'33"	82°27'11"	Hocking	Rockbride	Southeast	4	215	12	ODH	Jan.'74
302	40°38'28"	82°50'00"	Morrow	Mt. Gilead	Northwest	2	75	80	ODH	Jan.'74
303	40°45'02"	82°29'10"	Richland	Mansfield	Northwest	2	200	500	ODH	Jan.'74
304	41°00'40"	81°42'49"	Medina	Wadsworth	Northeast	1	227	450	USGS	May '67
305	41°27'38"	81°17'57"	Geauga	South Russell	Northeast	4	136	40	ODH	Jan.'74

(a) Use Code:
1. Public Water Supply
2. Industrial Use
3. Electric Power Plant
4. Private or Commercial Supply
5. State Owned Facility
6. Municipal Sewage Treat. Plant

(b) Well Yield: As reported in Gallons/Minute

(c) Analyses by:
ODH - Ohio Department of Health
USGS - U.S. Geological Survey

REFERENCE DOCUMENT 1

ANNUAL SUMMARY STATISTICS

Prepared by

D. Mishne

Ohio Environmental Protection Agency
Office of Wastewater Pollution Control
Division of Surveillance and Water Quality Standards
Columbus, Ohio 43216
April 1982

Introduction for Annual Summary Statistics Tables

REFERENCE DOCUMENT 1 (RD1) - Yearly Summary Statistics

This document contains yearly summary statistics for chemical/physical parameters monitored in Ohio's ambient monitoring network, i.e., at monthly, quarterly and low-flow stations. Station information includes: STORET station number, latitude and longitude, a narrative description of the station's location, major drainage basin, State river basin and station river mile index (RMI) or river mile location.

STATION NUMBER 610000	STORET PRIMARY STATION CODE
40 33 50.0 084 48 10.0 2	LATITUDE LONGITUDE
WABASH R AT STATE LINE	STATION DESCRIPTION
OHIO RIVER (WABASH RIVER)	MAJOR DRAINAGE BASIN (STATE RIVER BASIN)
MILES 0953.80 0133.10 465.60	RIVER MILE INDEX (RMI) OR RIVER MILE

Statistical data for each parameter includes: parameter units; a remark column which may contain the remark codes K (less than), L (greater than), M (negative value) and T (all sample values including those designated K and L, values preceeded by remarks are considered actual values); number of samples for the reporting period; mean; standard deviation; minimum and maximum values; and the year and month for the beginning and end of the reporting period.

REFERENCE DOCUMENT 1 ORGANIZATION

Mainstem monitoring stations are arranged by State river basin/subbasin in alphabetical order , and within each river basin/subbasin by decreasing river mile. Mainstem stations are followed by stations located on tributaries, arranged in alphabetical order, and by decreasing river mile. (Table of Contents).

STATISTICAL REPORTING PROCEDURES

The lowest detectable concentrations routinely analyzed by the Ohio Department of Health Laboratories (ODHL) and the Ohio EPA Chemistry Laboratory are listed in Tables 1 and 2. Parameter concentrations reported by the laboratories that are below detectable limits are preceded by a less than notation, and those above reported limits by a greater than notation on the original data sheets. The data are entered into the STORET System by the Ohio EPA with the proper letter code in place of the notation.

Statistical summary data for each parameter may include data calculated three ways: 1. With remark code T - all values are treated as actual values; 2. With remark code K - all values are treated as actual values; and 3. With remark code L - all values are treated as actual values.

Table 1: Detectable limits for parameters routinely monitored by the Ohio Department of Health Laboratories

PHYSICAL/CHEMICAL PARAMETERS

Year (Month)	VALUE 1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Turbidity (J.U.)	1	1	1 (Feb)	1	0.5 (Jul)	0.5	0.5
Conductivity at 25°C(Micromhos)	1	1	1	1	1	2 (Mar)	0.4
pH (+ SU)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alkalinity Total, $CaCO_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Alkalinity Phth, $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Alkalinity, $CaCo_3$ Stabl(mg/l)	0	0	0	0	10	10 (Feb)	10
Acidity Total, $CaCo_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Acidity M.O., $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Hardness Total, $CaCo_3$(mg/l)	2	2	2	2	2	2	4
Residue, Total (mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Total Volatile (mg/l)	10	10	10	10	20	20	20
Residue, Total Nflt(Sus)(mg/l)	10	10	10	10	10	10	10
Residue, Vol Nflt (mg/l)	10	10	10	10	10	10	20
Residue, Total Flt(Diss)(mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Vol Flt (mg/l)	10	10	10	10	20	20	20
Residue, Settable (mg/l)	0.1	0.1	0.1	-	-	-	-
Nitrogen Ammonia, N (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Nitrite, N (mg/l)	0.05	0.05	0.05	0.05	0.01 (Feb)	0.01	0.01
Nitrate, N(mg/l)	0.1	0.05 (Jan)	0.05	0.05	0.05	0.05	0.05
TKN(mg/l)	0.3	0.05 (Sept)	0.05	0.05	0.05	0.05	0.05
Phosphorus, Total, P(mg/l)	0.1	0.05 (Sept)	0.05	0.05	0.05	0.05	0.02
Phorphorus, Soluble, P(mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.02
Phosphate Total, Low Level (mg/l)	-	-	-	-	0.010	0.010	0.002
Phosphate Ortho, Low Level (mg/l)	-	-	-	-	0.002	0.002	0.002
Sulfate, SO_4(mg/l)	10	10	10	10	10	10	10
Sulfide, S(mg/l)	-	-	-	-	1 (May)	1	1
Chloride, Cl(mg/l)	5	5	5	5	5	5	5
Fluoride Diss, F(mg/l)	0.02	0.02	0.02	0.05(Aug)	0.05	0.05	0.05
Calcium Total, Ca(mg/l) Flame AAS	2	2	2	2	2	2	2
Magnesium Total, Mg(mg/l) Flm AAS	2	2	2	2	2	2	2
Potassium Total, K(mg/l)	1	1	1	1	1	1	1
Sodium Total, Na(mg/l)	5	5	5	5	5	5	5

Table 1: continued

RADIOLOGICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Beta, Total (pc/l)**	1	1	1	1	3	3	4 Jun
Beta, Diss (pc/l)	1	1	1	1	3	3	4
Beta, Suspd (pc/l)	1	1	1	1	3	3	4
Alpha, Total (pc/l)	1	1	1	1	3	3	3
Alpha, Diss (pc/l)	1	1	1	1	3	3	3
Alpha, Suspd (pc/l)	1	1	1	1	3	3	3
Radium 226, Total (pc/l)	1	1	1	1	1	1	1
Strontium 89, Total (pc/l)	5	5	5	5	5	5	5
Strontium 90, Total (pc/l)	1	1	1	1	1	1	1

BIOLOGICAL PARAMETERS

Coliform Total, MF (#/100 ml)	1	1	1	1	1	1	1
Coliform Total, MPN (#/100 ml)	1	1	1	1	1	1	1
Fecal Coli Total, MF (#/100 ml)	1	1	1	1	1	1	1
Fecal Strep Total, MF (#/100 ml)	1	1	1	1	1	1	1
Plate Count, Total (#/ml)	1	1	1	1	1	1	1
Algae, Total (#/ml)	1	1	1	1	1	1	1

PESTICIDE, PCB AND PHTHALATE PARAMETERS 1979-1982***

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)
Aldrin, Whl Smpl	0.03	0.2
BHC, Whl Smpl	0.01	0.2
DDD, Whl Smpl	0.10	0.4
DDE, Whl Smpl	0.05	0.4
DDT, Whl Smpl	0.10	0.4
Diazinon, Whl Smpl	0.1	0.3
Dieldrin, Whl Smpl	0.05	0.4

Table continued

PHYSICAL/CHEMICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Aluminum Total, Al(ug/l)	200	200	200	200	200	200	200
Antimony Total, Sb (ug/l)	10	10	10	10	10	10	10
Arsenic Total, As (ug/l) HGA	10	10	10	10	10	10	10
Barium Total, Ba (ug/l)	200 (Mar)*	200	200	200	200	200	200
Berylium Total, Be (ug/l)	10	10	10	10	10	10	10
Cadmium Total, Cd (ug/l)	10	5 (Jul)	5	5	5	5	5
Chromium Total, Cr (ug/l)	30	30	30	30	30	30	30
Chromium Hex, Cr (ug/l)	30	30	30	30	30	30	30
Cobalt Total, Co (ug/l)	30	30	30	30	30	30	30
Copper Total, Cu (ug/l)	30	30	30	30	30	30	30
Iron Total, Fe (ug/l)	30	30	30	30	30	30	30
Iron Diss, Fe (ug/l)	30	30	30	30	30	30	30
Lead Total, Pb (ug/l)	10	10	5 (Feb)	5	5	5	5
Lithium Total, Li (ug/l)	100	100	100	100	100	100	100
Manganese Total, Mn (ug/l)	30	30	30	30	30	30	30
Manganese Diss, Mn (ug/l)		-	-	-	30	30	30
Mercury Total, Hg (ug/l)	1.0	0.5 (Jul)	0.5	0.5	0.5	0.5	0.5
Molybdenum Total, Mo (ug/l)	100	100	100	100	100	100	100
Nickel Total, Ni (ug/l)	100	100	100	100	100	100	100
Selenium Total, Se (ug/l)	10	5 (Jul)	5	5	5	5	5
Silica Diss, Si (mg/l)	-	-	-	-	0.05 (Jul)	0.05	0.05
Silver Total, Ag (ug/l)	30	30	30	30	30	30	30
Strontium Total, Sr (ug/l)	200	200	200	200	200	200	200
Thallium Total, Tl (ug/l)	10	-	-	-	-	-	-
Tin Total, Sm (ug/l)	10	10	10	10	10	10	10
Titanium Total, Ti (ug/l)	500	500	500	500	500	500	500
Vanadium total, V (ug/l)	10	10	10	10	10	10	10
Zinc Total, Zn (ug/l)	30	30	30	30	30	30	30
BOD, 5-Day (mg/l)	1	1	1	1	1	1	1
COD (mg/l)	4	4	4	4	4	4	4
Carbon Total Org, C (mg/l)	1	1	1	1	1	1	1
Cyanide, CN (mg/l)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MBAS (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Oil-Grease, Total (mg/l)	0.50	5 (Feb)	5	5	5	5	5
Phenolics (ug/l)	2	2	2	2	2	2	2

Introduction for Annual Summary Statistics Tables

REFERENCE DOCUMENT 1 (RD1) - Yearly Summary Statistics

This document contains yearly summary statistics for chemical/physical parameters monitored in Ohio's ambient monitoring network, i.e., at monthly, quarterly and low-flow stations. Station information includes: STORET station number, latitude and longitude, a narrative description of the station's location, major drainage basin, State river basin and station river mile index (RMI) or river mile location.

STATION NUMBER 610000	STORET PRIMARY STATION CODE
40 33 50.0 084 48 10.0 2	LATITUDE LONGITUDE
WABASH R AT STATE LINE	STATION DESCRIPTION
OHIO RIVER (WABASH RIVER)	MAJOR DRAINAGE BASIN (STATE RIVER BASIN)
MILES 0953.80 0133.10 465.60	RIVER MILE INDEX (RMI) OR RIVER MILE

Statistical data for each parameter includes: parameter units; a remark column which may contain the remark codes K (less than), L (greater than), M (negative value) and T (all sample values including those designated K and L, values preceeded by remarks are considered actual values); number of samples for the reporting period; mean; standard deviation; minimum and maximum values; and the year and month for the beginning and end of the reporting period.

REFERENCE DOCUMENT 1 ORGANIZATION

Mainstem monitoring stations are arranged by State river basin/subbasin in alphabetical order , and within each river basin/subbasin by decreasing river mile. Mainstem stations are followed by stations located on tributaries, arranged in alphabetical order, and by decreasing river mile. (Table of Contents).

STATISTICAL REPORTING PROCEDURES

The lowest detectable concentrations routinely analyzed by the Ohio Department of Health Laboratories (ODHL) and the Ohio EPA Chemistry Laboratory are listed in Tables 1 and 2. Parameter concentrations reported by the laboratories that are below detectable limits are preceded by a less than notation, and those above reported limits by a greater than notation on the original data sheets. The data are entered into the STORET System by the Ohio EPA with the proper letter code in place of the notation.

Statistical summary data for each parameter may include data calculated three ways: 1. With remark code T - all values are treated as actual values; 2. With remark code K - all values are treated as actual values; and 3. With remark code L - all values are treated as actual values.

Table 1: Detectable limits for parameters routinely monitored by the Ohio Department of Health Laboratories

PHYSICAL/CHEMICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Turbidity (J.U.)	1	1	1 (Feb)	1	0.5 (Jul)	0.5	0.5
Conductivity at 25°C(Micromhos)	1	1	1	1	1	2 (Mar)	0.4
pH (+ SU)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alkalinity Total, $CaCO_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Alkalinity Phth, $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Alkalinity, $CaCo_3$ Stabl(mg/l)	0	0	0	0	10	10 (Feb)	10
Acidity Total, $CaCo_3$(mg/l)	1	1	1	1	1	10 (Feb)	10
Acidity M.O., $CaCo_3$(mg/l)	0	0	0	0	0	10 (Feb)	-
Hardness Total, $CaCo_3$(mg/l)	2	2	2	2	2	2	4
Residue, Total (mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Total Volatile (mg/l)	10	10	10	10	20	20	20
Residue, Total Nflt(Sus)(mg/l)	10	10	10	10	10	10	10
Residue, Vol Nflt (mg/l)	10	10	10	10	10	10	20
Residue, Total Flt(Diss)(mg/l)	10	10	10	20 (Oct)	20	20	20
Residue, Vol Flt (mg/l)	10	10	10	10	20	20	20
Residue, Settable (mg/l)	0.1	0.1	0.1	-	-	-	-
Nitrogen Ammonia, N (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Nitrite, N (mg/l)	0.05	0.05	0.05	0.05	0.01 (Feb)	0.01	0.01
Nitrate, N(mg/l)	0.1	0.05 (Jan)	0.05	0.05	0.05	0.05	0.05
TKN(mg/l)	0.3	0.05 (Sept)	0.05	0.05	0.05	0.05	0.05
Phosphorus, Total, P(mg/l)	0.1	0.05 (Sept)	0.05	0.05	0.05	0.05	0.02
Phorphorus, Soluble, P(mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.02
Phosphate Total, Low Level (mg/l)	-	-	-	-	0.010	0.010	0.002
Phosphate Ortho, Low Level (mg/l)	-	-	-	-	0.002	0.002	0.002
Sulfate, SO_4(mg/l)	10	10	10	10	10	10	10
Sulfide, S(mg/l)	-	-	-	-	1 (May)	1	1
Chloride, Cl(mg/l)	5	5	5	5	5	5	5
Fluoride Diss, F(mg/l)	0.02	0.02	0.02	0.05(Aug)	0.05	0.05	0.05
Calcium Total, Ca(mg/l) Flame AAS	2	2	2	2	2	2	2
Magnesium Total, Mg(mg/l) Flm AAS	2	2	2	2	2	2	2
Potassium Total, K(mg/l)	1	1	1	1	1	1	1
Sodium Total, Na(mg/l)	5	5	5	5	5	5	5

Table continued

PHYSICAL/CHEMICAL PARAMETERS

VALUE

Year (Month)	1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Aluminum Total, Al(ug/l)	200	200	200	200	200	200	200
Antimony Total, Sb (ug/l)	10	10	10	10	10	10	10
Arsenic Total, As (ug/l) HGA	10	10	10	10	10	10	10
Barium Total, Ba (ug/l)	200 (Mar)*	200	200	200	200	200	200
Berylium Total, Be (ug/l)	10	10	10	10	10	10	10
Cadmium Total, Cd (ug/l)	10	5 (Jul)	5	5	5	5	5
Chromium Total, Cr (ug/l)	30	30	30	30	30	30	30
Chromium Hex, Cr (ug/l)	30	30	30	30	30	30	30
Cobalt Total, Co (ug/l)	30	30	30	30	30	30	30
Copper Total, Cu (ug/l)	30	30	30	30	30	30	30
Iron Total, Fe (ug/l)	30	30	30	30	30	30	30
Iron Diss, Fe (ug/l)	30	30	30	30	30	30	30
Lead Total, Pb (ug/l)	10	10	5 (Feb)	5	5	5	5
Lithium Total, Li (ug/l)	100	100	100	100	100	100	100
Manganese Total, Mn (ug/l)	30	30	30	30	30	30	30
Manganese Diss, Mn (ug/l)		-	-	-	30	30	30
Mercury Total, Hg (ug/l)	1.0	0.5 (Jul)	0.5	0.5	0.5	0.5	0.5
Molybdenum Total, Mo (ug/l)	100	100	100	100	100	100	100
Nickel Total, Ni (ug/l)	100	100	100	100	100	100	100
Selenium Total, Se (ug/l)	10	5 (Jul)	5	5	5	5	5
Silica Diss, Si (mg/l)	-	-	-	-	0.05 (Jul)	0.05	0.05
Silver Total, Ag (ug/l)	30	30	30	30	30	30	30
Strontium Total, Sr (ug/l)	200	200	200	200	200	200	200
Thallium Total, Tl (ug/l)	10	-	-	-	-	-	-
Tin Total, Sm (ug/l)	10	10	10	10	10	10	10
Titanium Total, Ti (ug/l)	500	500	500	500	500	500	500
Vanadium total, V (ug/l)	10	10	10	10	10	10	10
Zinc Total, Zn (ug/l)	30	30	30	30	30	30	30
BOD, 5-Day (mg/l)	1	1	1	1	1	1	1
COD (mg/l)	4	4	4	4	4	4	4
Carbon Total Org, C (mg/l)	1	1	1	1	1	1	1
Cyanide, CN (mg/l)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MBAS (mg/l)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Oil-Grease, Total (mg/l)	0.50	5 (Feb)	5	5	5	5	5
Phenolics (ug/l)	2	2	2	2	2	2	2

Table 1: continued

RADIOLOGICAL PARAMETERS

Year (Month)	VALUE 1975	1976	1977 (Feb)	1978	1979 (Jul)	1980	1981
Parameter (Units)							
Beta, Total (pc/l)**	1	1	1	1	3	3	4 Jun
Beta, Diss (pc/l)	1	1	1	1	3	3	4
Beta, Suspd (pc/l)	1	1	1	1	3	3	4
Alpha, Total (pc/l)	1	1	1	1	3	3	3
Alpha, Diss (pc/l)	1	1	1	1	3	3	3
Alpha, Suspd (pc/l)	1	1	1	1	3	3	3
Radium 226, Total (pc/l)	1	1	1	1	1	1	1
Strontium 89, Total (pc/l)	5	5	5	5	5	5	5
Strontium 90, Total (pc/l)	1	1	1	1	1	1	1

BIOLOGICAL PARAMETERS

Coliform Total, MF (#/100 ml)	1	1	1	1	1	1	1
Coliform Total, MPN (#/100 ml)	1	1	1	1	1	1	1
Fecal Coli Total, MF (#/100 ml)	1	1	1	1	1	1	1
Fecal Strep Total, MF (#/100 ml)	1	1	1	1	1	1	1
Plate Count, Total (#/ml)	1	1	1	1	1	1	1
Algae, Total (#/ml)	1	1	1	1	1	1	1

PESTICIDE, PCB AND PHTHALATE PARAMETERS 1979-1982***

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)
Aldrin, Whl Smpl	0.03	0.2
BHC, Whl Smpl	0.01	0.2
DDD, Whl Smpl	0.10	0.4
DDE, Whl Smpl	0.05	0.4
DDT, Whl Smpl	0.10	0.4
Diazinon, Whl Smpl	0.1	0.3
Dieldrin, Whl Smpl	0.05	0.4

Table .. continued

PESTICIDE, PCB AND PHTHALATE PARAMETERS 1979-1982***

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)
Chlordane, Whl Smpl	0.4	4.0
Endrin, Whl Smpl	0.03	0.4
Heptachlor, Whl Smpl	0.03	0.3
Heptachlor Epexide, Whl Smpl	0.03	0.3
Lindane, Whl Smpl	0.01	0.2
Malathion, Whl Smpl	0.1	-
Methoxychlor, Whl Smpl	0.15	2.4
Methyl Parathion, Whl Smpl	0.1	0.4
Mirex, Whl Smpl	0.25	0.5
Parathion, Whl Smpl	0.15	0.4
PCB, Whl Smpl	0.5	5.0
Phthalates, Whl Smpl	100	-
Silvex, Whl Smpl	1	-
Toxaphene, Whl Smpl	0.5	5.0
2,4-D, Whl Smpl	10	-

NONPESTICIDE ORGANICS (ug/l) (GC/MS; PURGE AND TRAP METHODOLOGY) 1979-1982****

Parameter		Parameter	
Benzene	0.5	1,2 dichloroethane	0.5
Bromodichloromethane	0.5	Ethylbenzene	0.5
Bromoform	1.5	Methylene chloride	1.5
Carbon tetrachloride	0.5	Tetrachloroethane	0.5
Chlorobenzene	0.5	Tetrachloroethylene	0.5
Chloroform	0.5	Trichloroethylene	0.5
Dibromochloromethane	0.5	Toluene	0.5
Dichlorobenzenes	0.5	Xylenes	0.5

Table 1: continued

NONPESTICIDE ORGANICS (mg/l) (FID - DETECTOR; SOLVENT/SOLVENT EXTRATION) 1979-1982*****

Parameter	WATER MATRIX (ug/l)	OIL MATRIX (mg/l)	
Benzene	0.1	Ethylbenzene	0.1
Bromoform	0.2	Methylene chloride	0.1
Carbon tetrachloride	0.2	Tetrachloroethane	0.1
Chlorobenzene	0.1	Tetrachloroethylene	0.1
Chlorodibromomethane	0.1	Trichloroethanes	0.1
Chloroform	0.1	Trichloroethylene	0.1
Cis 1,2-dichloroethylene	0.1	Toluene	0.1
Dichlorobromomethane	0.1	Vinyl chloride	0.1
1,2-Dichloroethane	0.1	Xylene	0.1

* The detectable limit before March 1975 was 100 ug/l.
** The detectable limit changed from 3 to 2 between 1980 and 1981, and than changed to 4 in June of 1981.
*** Water Matrix - 1 liter extracted and concentrated to 5 mls. Oil Matrix - 1 gm diluted to 100 mls with hexane (oil values are based on the response of standards).
**** 5 ml sample - normal operation.
***** 1 liter sample - concentration ratio 100 to 1.

Table 2: Ohio EPA Chemistry Laboratory Detection Limits 1981 -1982[a]

PARAMETER (Units)	1981	1982
Biochemical Oxygen Demand (mg/l) (BOD_5, BOD_{20}, $cBOD_5$, $cBOD_{20}$)	1	1
Chemical Oxygen Demand		
Automated (mg/l)	10	10
Manual (mg/l)	4	10
Total Residue (mg/l)	10	10
Total Filterable Residue (mg/l)	10	10
Total Nonfilterable Residue (mg/l)	5	5
Nitrate-Nitrite (mg/l)	0.05-0.09	0.05
Nitrite (mg/l)	0.02-0.03	0.02
Ammonia (mg/l)	0.05-0.09	0.05
Total Kjeldahl Nitrogen (mg/l)	0.1-0.3	0.1
Total Phosphorus		
High Level (mg/l)	0.05	0.05
Low Level (mg/l)	--	0.005
Dissolved Phosphorus		
High Level (mg/l)	0.05	0.05
Low Level (mg/l)	--	0.005
T. Cadmium (ug/l)	0.5-1.0	0.5
T. Calcium (mg/l)	1 - 2	1
T. Chromium (ug/l)	30-40	30
T. Copper (ug/l)	10-20	10
T. Iron (ug/l)	50-70	50
D. Iron (ug/l)	50-70	50
T. Lead (ug/l)	5-10	2
T. Magnesium (mg/l)	1-10	1
T. Manganese (ug/l)	--	100
T. Nickel (ug/l)	30-40	30
T. Zinc (ug/l)	10-15	10

a. Detection limit is statistically defined as twice the standard deviation of the concentration difference of a series of duplicate measurements of a solution near the blank absorbance measurement.

Key for Table of Contents

COLUMN CODES

RM - River mile, miles from mouth

(MAP) - Map codes refer to underground water maps of Ohio ("Publications, Division of Water", 1975. Ohio Department of Natural Resources, p. 6).

Station #

Top number - STORET (OEPA)
Lower number ( ) - USGS

District

CDO - Central District Office, Columbus
NEDO - Northeast District Office, Twinsburg
NWDO - Northwest District Office, Bowling Green
SEDO - Southeast District Office, Logan
SWDO - Southwest District Office, Dayton

Purpose

IJC - International Joint Commission
NASQAN - National Stream Quality Accounting Network (USGS)
NAWQMN - National Ambient Water Quality Monitoring Network. The number following NAWQMN refers to the location of the station shown on Figure 1.
OEPA - Ohio EPA

Sampling Frequency

(M) - Monthly sampling frequency
(Q) - Quarterly sampling frequency
(LF) - Sampled once per year during the low flow period
(A) - Annual

Use Designation

CRS - Cuyahoga River Standards
CWH - Coldwater Habitat
EWH - Exceptional Warmwater Habitat
LE - Lake Erie Standards
MRS - Mahoning River Standards
PWS - Public Drinking Water Source
WWH - Warmwater Habitat

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
ASHTABULA RIVER							
Ashtabula River near Ashtabula (State Rd)	5.5 (F-3)	502760 (04212500)	NEDO	NAWQMN, IJC (M)	WWH	1-2	1-4
Fields Brook near Ashtabula (15th St)	0.3 (F-3)	502780	NEDO	OEPA (M)	WWH	3-4	5-8
BLACK RIVER							
Black River at Elyria (Cascade Pk)	15.6 (D-4)	501520 (04200500)	NEDO	NAWQMN (M)	WWH	5-6	9-11
Black River below Elyria (Ford Rd)	10.4 (D-4)	501510 (04200550)	NEDO	IJC (M)	WWH	7-8	12-16
French Creek near Lorain (Rt 301)	0.7 (D-4)	501530	NEDO	OEPA (LF)	WWH	9	17
CHAGRIN RIVER							
Chagrin River at Willoughby (Rt 84)	5.0 (E-3)	502400 (04209000)	NEDO	NAWQMN, IJC (M)	EWH	10-11	18-21
CONNEAUT CREEK							
Conneaut Creek at Conneaut (Keefus Rd)	6.4 (F-3)	502870 (04213000)	NEDO	NAQMN, IJC (M)	CWH	12-13	22-26
CUYAHOGA RIVER							
Cuyahoga River at Independence (Old Rockside Rd.)	13.5 (E-2)	502020 (04208000)	NEDO	NAWQMN, NASQAN (M)	WWH	14-15	27-31

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
CUYAHOGA RIVER (CONTINUED)							
Cuyahoga River near Akron (USGS gage, Old Portage Trail)	40.3 (E-2)	502160 (04206000)	NEDO	OEPA (LF)	WWH	16	32
Cuyahoga River at Cleveland (Lower Harvard Ave.)	7.3 (E-2)	502130 (04208503)	NEDO	IJC (M)	WWH	17-18	33-36
Cuyahoga River at Cleveland (W. Third St)	3.0 (E-2)	502140 (04208506)	NEDO	OEPA (LF)	WWH	19-20	37-38
Big Creek at Cleveland (Jennings Ave)	0.3 (E-2)	502120	NEDO	OEPA (Q)	WWH	21-22	39-41
Little Cuyahoga River near Akron (Otto St. gage)	2.0 (E-1)	502080 (04205700)	NEDO	OEPA (Q)	WWH	23-24	42-44
Mill Creek at Garfield Heights (Canal Road)	0.1 (E-2)	502110	NEDO	OEPA (Q)	WWH	25-26	45-46
Tinkers Creek at Bedford (USGS gage at SR 14)	5.5 (E-2)	502220 (04207200)	NEDO	OEPA (LF)	WWH	27-28	47-49
EUCLID CREEK							
Euclid Creek at Euclid (St. Clair Ave.)	1.7 (E-2)	504250 (04208690)	NEDO	OEPA (M)	WWH	29-30	50-53

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
GRAND RIVER							
Grand River near Painesville (Rt 84)	8.7 (F-2)	502530 (04212100)	NEDO	NAWQMN, NASQAN (M)	WWH	31-32	54-57
Grand River at Painesville (Rt 535)	2.3 (F-2)	502520 (04212200)	NEDO	IJC (M)	WWH	33-34	58-61
GREAT MIAMI RIVER							
Great Miami River Below Lakeview (Rt 33)	156.2 (H-1)	600000	SWDO	OEPA (M)	WWH	35-36	62-63
Great Miami River below Piqua (Peterson Rd)	108.8 (H-2)	600090	SWDO	OEPA (LF)	WWH	37-38	64-65
Great Miami River near Taylorsville (SR 440)	90.7 (H-_)	610050 (03263000)	SWDO	OEPA (M)	WWH	39-40	66-68
Great Miami River at Dayton (Main St. Bridge)	80.0 (H-9)	610060 (03270500)	SWDO	NAWQMN (M)	WWH	41-42	69-71
Great Miami River at Miamisburg (SR 725)	66.4 (H-9)	600150 (03271500)	SWDO	OEPA (M)	WWH	43-44	72-74
Great Miami River at Hamilton (Columbia Bridge)	34.9 (H-11)	600270 (03274000)	SWDO	OEPA (M)	WWH	45-46	75-77
Great Miami River at New Baltimore (Blue Rock Road)	20.8 (H-11)	600030 (03274600)	SWDO	NAWQMN, NASQAN (M)	WWH	47-48	78-80
Great Miami River near Lawrenceburg (Lost Bridge)	5.2 (H-11)	600300	SWDO	OEPA (M)	WWH	49-50	81-83

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
GREAT MIAMI RIVER (CONTINUED)							
Buck Creek near Springfield (U.S. 40 and SR 4)	0.2 (H-3)	600350	SWDO	OEPA (Q)	WWH	51-52	84-85
Dicks Creek near Excello (Yankee Rd)	2.5 (H-9)	600250	SWDO	OEPA (M)	WWH	53-54	86-88
Four Mile Creek at New Miami (Jacksonburg Rd)	0.3 (H-10)	600260	SWDO	OEPA (Q)	WWH	55-56	89-91
Greenville Creek near Covington (Rangeline Rd)	3.4 (H-6,7$_2$	600060	SWDO	OEPA (Q)	WWH	57-58	92-93
Indian Creek near Ross (SR 128)	0.5 (H-1)	600280	SWDO	OEPA (Q)	EWH	59-60	94-96
Loramie Creek near Lockington (Harding-Wapak Rd)	0.4 (H-2)	600320	SWDO	OEPA (Q)	WWH	61-62	97-99
Mad River near Urbana (SR 36)	39.0 (H-3)	600130	SWDO	OEPA (LF)	CWH	63	100
Mad River at Eagle City (St. Paris Pike)	28.7 (H-3)	610040	SWDO	NAWQMN (M)	CWH	64-65	101-103
Mad River below Springfield (lower Valley Pike)	23.5 (H-4)	610010	SWDO	OEPA (LF)	WWH	66	104
Mad River above Dayton (Rt 444)	5.9 (H-4)	600190	SWDO	OEPA (M)	WWH	67-68	105-107

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
GREAT MIAMI RIVER (CONTINUED)							
Seven Mile Creek near Seven Mile (Taylor School Rd)	1.3 (H-10)	600340	SWDO	OEPA (Q)	WWH	69-70	108-110
Stillwater River near Englewood (U.S. 40)	8.9 (H-6,7_1)	600110 (03266000)	SWDO	OEPA (M)	WWH	71-72	111-112
Twin Creek near Franklin (Dayton-Oxford Rd)	0.6 (H-8,11a)	600180	SWDO	OEPA (Q)	EWH	73-74	113-114
Whitewater River near Hoover (Suspension Bridge Rd)	0.5 (H-11)	600290	SWDO	OEPA (Q)	WWH	75-76	115-117
HOCKING							
Hocking River below Lancaster (U.S. 33)	86.7 (O-1)	601550	CDO	OEPA (M)	WWH	77-78	118-119
Hocking River at Enterprise (CR 31 Bridge)	72.5 (O-1)	601530 (03157500)	SEDO	OEPA (M)	WWH	79-80	120-122
Hocking River at Athens (U.S. 33)	39.6 (O-2)	601650 (03159510)	SEDO	NAMWQN, NASQAN (M)	WWH	81	123
HURON RIVER							
Huron River below Milan (Mud Brook Rd)	1.6 (D-2)	501050	NWDO	NAWQMN, IJC (M)	EWH	82-83	124-128
East Branch Huron River below Norwalk (Schaeffer Rd)	2.0 (D-2)	501070	NWDO	OEPA (LF)	WWH	84	129
Rattlesnake Creek at Norwalk (Lais Rd)	1.7 (D-2)	501080	NWDO	OEPA (Q)	WWH	85-86	130-132

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
LAKE ERIE							
Turkey Creek near Conneaut (Lake Rd)	0.1 (F-3)	504260	NEDO	OEPA (Q)	CWH	87-88	133-135
LITTLE BEAVER CREEK							
Little Beaver Creek near East Liverpool (Grimms Bridge Road)	4.6 (S-1)	602000 (03109500)	NEDO	NAWQMN (M)	WWH	89-90	136-138
Middle Fork near Salem (Beachwood Rd)	52.8 (S-1)	602120	NEDO	OEPA (LF)	WWH	91-92	139-140
North Fork at Fredericktown (Fredericktown Rd)	0.2 (S-1)	612010	NEDO	OEPA (Q)	CWH	93-94	141-143
West Fork near Guilford (SR 30)	6.6 (S-1)	612000	NEDO	OEPA (Q)	WWH	95-96	144-146
Chemline Tributary near Lisbon (SR 518)	0.1 (S-1)	602090	NEDO	OEPA (M)	WWH	97-98	147-149
Stateline Creek East Branch near Negley (Twp. Rd 1024)	0.1 (S-1)	602060	NEDO	OEPA (M)	WWH	99-100	150-152
Stateline Creek West Branch near Negley (Twp. Rd 1024)	0.1 (S-1)	602050 (03109320)	NEDO	OEPA (M)	WWH	101-102	153-155

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
LITTLE MIAMI RIVER							
Little Miami River at Oldtown (U.S. 68)	79.5 (K-1)	600570	SWDO	NAWQMN (M)	EWH	103-104	156-158
Little Miami River near Xenia (Bellbrook Rd)	68.2 (K-1)	610550	SWDO	OEPA (Q)	WWH	105-106	159-161
Little Miami River at Spring Valley (Roxanna-New Burlington Rd)	59.3 (K-1)	600600	SWDO	OEPA (M)	WWH	107-108	162-164
Little Miami River near Morrow (Stubbs Mill Rd)	35.7 (K-5)	610520	SWDO	OEPA (M)	WWH	109-110	165-167
Little Miami River at Milford (U.S. 50)	12.7 (K-5)	600520 (03245500)	SWDO	NAWQMN, NASQAN (M)	WWH	111	168
East Fork Little Miami River at South Milford (near Terrace Park Country Club)	0.8 (K-5)	610530	SWDO	OEPA (M)	WWH	112-113	169-170
Beaver Creek near Xenia (Factory Rd)	0.1 (K-1)	600510	SWDO	OEPA (Q)	WWH	114-115	171-172
Caesar's Creek near Oregonia (Corwin Rd)	0.2 (K-2)	600550	SWDO	OEPA (M)	EWH	116-117	173-175

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
MAHONING RIVER							
Mahoning River at Leavittsburg (Leavitt Rd)	45.0 (T-2)	602280 (03094000)	NEDO	NAWQMN (M)	MRS	118-119	176-178
Mahoning River at Warren (South St. gage)	37.4 (T-2)	602400	NEDO	OEPA (Q)	MRS	120-121	179-181
Mahoning River at Niles (W. Park Ave)	33.1 (T-2)	602290	NEDO	OEPA (Q)	MRS	122-123	182-184
Mahoning River at Lowellville (First St)	11.6 ($T-3_1$)	602300 (03099500)	NEDO	NAWQMN (M)	MRS	124-125	185-187
MAUMEE RIVER							
Maumee River at Antwerp (SR 49)	100.3 (A-7)	500140 (04183500)	NWDO	NAWQMN (M)	WWH	126-127	188-191
Maumee River at Defiance (WTP)	65.6 (A-7)	500180 (04184100)	NWDO	OEPA (LF)	WWH	128	192
Maumee River near Florida (CR 18)	54.6 (A-10)	510210	NWDO	OEPA (LF)	WWH	129	193

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
MAUMEE RIVER (CONTINUED)							
Maumee River at Waterville (Rt 64)	20.8 (A-11)	500080 (04193500)	NWDO	NAWQMN, NASQAN IJC (M)	WWH	130	194
Auglaize River at Wapakoneta (Water St)	74.5 (A-3)	510240	NWDO	OEPA (Q)	WWH	131-132	195-196
Auglaize River at Wapakoneta (Fox Ranch Rd)	70.8 (A-3)	510250	NWDO	OEPA (Q)	WWH	133-134	197-198
Auglaize River near Fort Jennings (SR 224)	39.5 (A-3)	500070	NWDO	OEPA (LF)	WWH	135	199
Auglaize River near Cloverdale (SR 114)	28.5 (A-3)	500110	NWDO	OEPA (LF)	WWH	136	200
Auglaize River near Oakwood (SR 613)	19.3 (A-3)	500130	NWDO	OEPA (LF)	WWH	137	201
Auglaize River above Defiance (Power Dam, Harding Road)	4.1 (A-7)	500290 (04191500)	NWDO	NAWQMN (M)	WWH	138-139	202-205
Blanchard River below Findlay (County Rd)	53.0 (A-6)	500040 (04189000)	NWDO	OEPA (M)	WWH	140-141	206-210
Blanchard River near Dupont (CR 21)	2.5 (A-5)	500090	NWDO	OEPA (LF)	WWH	142	211
Little Auglaize River below Melrose (SR 613)	2.0 (A-2)	510200	NWDO	OEPA (LF)	WWH	143	212

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
MAUMEE RIVER (CONTINUED)							
Ottawa River above Lima (Thayer Rd)	45.4 (A-4)	500270	NWDO	OEPA (LF)	WWH	144	213
Ottawa River at Allentown (SR 81)	28.4 (A-4)	500050 (04187500)	NWDO	OEPA (M)	WWH	145-146	214-217
Ottawa River near Kalida (CR 19)	0.7 (A-4)	500150	NWDO	OEPA (LF)	WWH	147	218
St. Joseph River below Edgerton (SR 49)	8.9 (A-9)	510180	NWDO	OEPA (LF)	WWH	148	219
St. Marys River at St. Marys (Aqueduct Rd)	47.2 (A-1)	510010	NWDO	OEPA (Q)	WWH	149-150	220-222
St. Marys River at St. Marys (Glynwood Rd)	43.0 (A-1)	510020	NWDO	OEPA (Q)	WWH	151-152	223-225
St. Marys River near Willshire (SR 81)	1.3 (A-1)	510170	NWDO	OEPA (LF)	WWH	153	226
Tiffin River at Defiance (W. High St)	0.8 (A-8)	500160	NWDO	OEPA (LF)	WWH	154	227
MILL CREEK							
Mill Creek near Hamilton (Tylersville Rd)	24.5 (J)	600440	SWDO	OEPA (M)	WWH	155-156	228-229
Mill Creek at Carthage (Anthony Wayne Avenue)	11.0 (J)	600410 (03259000)	SWDO	OEPA (M)	WWH	157-158	230-232
Mill Creek at Cincinnati (Gest Rd)	0.5 (J)	600430	SWDO	OEPA (M)	WWH	159-160	233-234

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
MUSKINGUM RIVER							
Muskingum River below Coshocton (SR 83)	107.3 (P-11)	611740 (03140500)	SEDO	NAWQMN (M)	WWH	161-162	235-237
Muskingum River at Dresden (SR 208)	91.3 (P-11)	611750 (03144500)	SEDO	OEPA (M)	WWH	163-164	238-240
Muskingum River at McConnelsville (SR 37)	48.2 (P-16)	601860 (03150000)	SEDO	NAWQMN, NASQAN (M)	WWH	165	241
Chippewa Creek at Easton (USGS gage at SR 585)	6.8 (P-6)	611810 (03116200)	NEDO	OEPA (LF)	WWH	166-167	242-243
Hurford Run at Canton (Church St)	0.2 (P-7)	611850	NEDO	OEPA (Q)	WWH	168-169	244-246
Jerome Fork near Ashland (Rt 42)	13.0 (P-2)	611860	NWDO	OEPA (Q)	WWH	170-171	247-248
Jerome Fork near Ashland (CR 1032)	10.5 (P-2)	611870	NWDO	OEPA (Q)	WWH	172-173	249-250
Killbuck Creek near Wooster (Willow Rd)	44.8 (P-3)	601880	NEDO	OEPA (LF)	WWH	174-175	251-252
Kokosing River near Mt. Vernon (SR 661)	23.6 (P-12)	611880	NWDO	OEPA (Q)	WWH	176-177	253-254
Kokosing River near Mt. Vernon (Twp Rd 257)	21.6 (P-12)	611890	NWDO	OEPA (Q)	WWH	178-179	255-256
Licking River below Newark (Stadden Bridge)	25.6 (P-13)	601770 (031416500)	CDO	NAWQMN (M)	WWH	180-181	257-259
Mohican River at Greer (Rt 514)	16.6 (P-4)	601870 (03136000)	SEDO	NAWQMN (M)	WWH	182-183	260-262

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
MUSKINGUM RIVER (CONTINUED)							
Nimishillen Creek at North Industry (Cheyenne St)	8.2 (P-7)	601940 (03118500)	NEDO	NAWQMN (M)	WWH	184-185	263-265
Rocky Fork near Mansfield (SR 39)	12.5 (P-1)	611900	NWDO	OEPA (Q)	WWH	186-187	266-268
Rocky Fork near Mansfield (Illinois Ave)	10.1 (P-1)	611910	NWDO	OEPA (Q)	WWH	188-189	269-272
Sandy Creek at Waynesburg (USGS gage)	17.4 (P-7)	611800 (03117500)	NEDO	OEPA (LF)	WWH	190-191	273-274
Tuscarawas River at Canal Fulton (Market St)	95.9 (P-5)	611830	NEDO	OEPA (LF)	WWH	192-193	275-276
Tuscarawas River at Massillon (Walnut St)	88.4 (P-5)	611840	NEDO	OEPA (Q)	WWH	194-195	277-279
Tuscarawas River near Massillon (Warmington St.)	85.3 (P-5)	601930 (03117000)	NEDO	NAWQMN (M)	WWH	196-197	280-282
Tuscarawas River at Newcomerstown (SR 83)	21.3 (P-10)	611790 (031129000)	SEDO	NAWQMN (M)	WWH	198-199	283-286
Walhounding River at Nellie (U.S. 36)	14.7 (P-4)	601910 (03138500)	SEDO	NAWQMN (M)	WWH	200-201	287-289
Wills Creek at Cambridge (Twp Rd 452)	54.9 (P-17)	611760	SEDO	OEPA (LF)	WWH	202-203	290-291
Wills Creek below Dam (Twp Rd 274)	6.2 (P-17)	611770 (03143500)	SEDO	OEPA (LF)	WWH	204	292
Wolf Creek at Barberton (Snyder Ave)	0.2 (P-6)	611820	NEDO	OEPA (Q)	WWH	205-206	293-295

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
OHIO BRUSH CREEK							
Ohio Brush Creek near West Union (SR 348)	13.1 (L-2)	600660 (03237500)	SEDO	NAWQMN (M)	EWH	207-208	296-298
PORTAGE RIVER							
Portage River at Woodville (U.S. 20)	28.2 (B-2)	500510 (04195500)	NWDO	NAWQMN, IJC (M)	WWH	209-210	299-303
North Branch Portage River at Pemberville (N. River Rd)	0.1 (B-1)	500520	NWDO	OEPA (LF)	WWH	211-212	304-306
RACCOON CREEK							
Raccoon Creek at Adamsville (U.S. Rt 35)	29.6 (N-2)	601400 (03202000)	SEDO	NAWQMN (M)	WWH	213-214	307-309
ROCKY RIVER							
Rocky River near Berea (Cedar Pt Rd)	12.0 (D-5)	501800 (04201500)	NEDO	NAWQMN, IJC (M)	WWH	215-216	310-312
West Branch Rocky River near Medina (Fenn Rd)	28.0 (D-5)	501820	NEDO	OEPA (Q)	WWH	217-218	313-314
Abrams Creek near Berea (Cedar Point Rd)	0.9 (D-5)	501830	NEDO	OEPA (LF)	WWH	219-220	315-316
SANDUSKY RIVER							
Sandusky River below Upper Sandusky (CR 121)	78.7 (C-2)	500860	NWDO	OEPA (LF)	WWH	221-222	317-318
Sandusky River below Mexico (Scott Bridge Rd)	48.0 (C-2)	500830	NWDO	OEPA (LF)	WWH	223	319

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
SANDUSKY RIVER (CONTINUED)							
Sandusky River above Fremont (Rice Rd)	20.3 (C-4)	500820 (04198000)	NWDO	NAWQMN, NASQAN IJC (M)	WWH	224-225	320-321
Sandusky River at Fremont (Twp Rd 549)	13.0 (C-4)	500890	NWDO	OEPA (Q)	WWH	226-227	322-324
SCIOTO RIVER							
Scioto River near Kenton (CR 175)	206.8 (M-1)	610760	NWDO	OEPA (Q)	WWH	228-229	325-326
Scioto River near Kenton (CR 106)	201.0 (M-1)	610770	NWDO	OEPA (Q)	WWH	230-231	327-328
Scioto River near Circleville (Florence Chapel Rd)	101.8 (M-8)	601340	CDO	NAWQMN (M)	WWH	232-233	329-332
Scioto River near Richmondale (Higby Rd)	56.0 (M-11)	600770 (03234500)	SEDO	NAWQMN, NASQAN (M)	WWH	234-235	333-334
Big Darby Creek below Plain City (Cemetary Pike Rd)	50.3 (M-6)	600790	CDO	OEPA (LF)	EWH	236	335
Big Darby Creek at Darbyville (SR 316)	13.2 (M-8)	601300 (03230500)	CDO	NAWQMN (M)	EWH	237-238	336-338
Little Scioto River near Marion (SR 309)	8.9 (M-2)	610750	NWDO	OEPA (Q)	WWH	239-240	339-340
Little Scioto River near Marion (SR 739)	2.6 (M-5)	610740	NWDO	OEPA (Q)	WWH	241-242	341-342
Mill Creek below Marysville (Radnor Rd)	17.2 (M-5)	601350	CDO	OEPA (M)	WWH	243-244	343-344

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
SCIOTO RIVER (CONTINUED)							
Olentangy River near Worthington (I-270)	11.5 (M-3)	601290 (03226800)	CDO	NAWQMN (M)	WWH	245-246	345-348
Paint Creek below Washington C.H. (SR 35)	64.3 (M-13)	600740	CDO	OEPA (LF)	WWH	247	349
Paint Creek near Bournesville (Jones-Levee Rd)	22.1 (M-12,13)	601320 (03234000)	SEDO	OEPA (M)	EWH	248-249	350-352
Rocky Fork of Paint Creek near Barrett's Mills (Browning Rd)	2.8 (M-14)	610800 (03232500)	SEDO	OEPA (Q)	EWH	250-251	353-355
Walnut Creek below Baltimore (Leonard Rd)	36.6 (M-9)	600750	CDO	OEPA (LF)	WWH	252	356
Whetstone Creek near Mt. Gilead (SR 61)	21.5 (M-3)	610780	NWDO	OEPA (Q)	WWH	253-254	357-358
Whetstone Creek near Mt. Gilead (Cardington Rd)	19.9 (M-3)	610790	NWDO	OEPA (Q)	WWH	255-256	359-360
VERMILION RIVER							
Vermilion River at Vermilion (N. Ridge Rd)	4.5 (D-3)	501260 (04199500)	NWDO	NAWQMN, IJC (M)	EWH	257-258	361-364
WABASH RIVER							
Wabash River near New Corydon, Ind (State Line)	465.6 (G)	610000	NWDO	OEPA (LF)	WWH	259	365

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
WABASH RIVER (CONTINUED)							
Beaver Creek at Celina - (SR 703)	10.7 (G)	605010	NWDO	OEPA (Q)	WWH	260-261	366-367
Beaver Creek at Celina-Meyer Rd.	9.6 (G)	605020	NWDO	OEPQ (Q)	WWH	262-263	368-369
MINOR OHIO TRIBUTARIES							
Bullskin Creek near Cedron (Cedron Rd)	3.1 (K-6)	609100	SWDO	OEPA (LF)	WWH	276	391
Captina Creek near Powhatan Point (SR 148)	3.2 (S-4)	609210	SEDO	OEPA (LF)	WWH	276	391
Cross Creek near Mingo Junction (Twp Rd 167)	1.7 (S-2)	609250	SEDO	OEPA (LF)	WWH	276	391
Duck Creek near Marietta (SR 26)	1.8 (R-1,2)	609180	SEDO	OEPA (LF)	WWH	276	391
Eagle Creek near Ripley (CR 49)	3.7 (L-3)	609120	SEDO	OEPA (LF)	EWH	276	391
Indian Guyan Creek near Bradrick (SR 243)	2.5 (N-5)	609150	SEDO	OEPA (LF)	WWH	276	391
Leading Creek near Middleport (SR 7)	1.4 (O-4)	609160	SEDO	OEPA (LF)	WWH	276	391
Little Muskingum River near Reno (CR 9)	2.3 (R-2)	609190	SEDO	OEPA (LF)	WWH	276	391

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
Little Scioto River near Sciotoville (Twp Rd 248)	2.1 (N-4)	609130	SEDO	OEPA (LF)	EWH	276	391
McMahon Creek near Bellaire (SR 147)	1.3 (S-4)	609220	SEDO	OEPA (LF)	WWH	276	391
Pine Creek near Garden City (SR 52)	4.1 (N-4)	609140	SEDO	OEPA (LF)	WWH	276	391
Shade River near Keno (Twp Rd 114)	5.9 (O-4)	609170	SEDO	OEPA (LF)	EWH	276	391
Short Creek near Rayland (SR 150)	3.9 (S-3)	609240	SEDO	OEPA (LF)	WWH	276	391
Sunfish Creek near Cameron (SR 78)	6.8 (S-4)	609200	SEDO	OEPA (LF)	WWH	276	392
Symmes Creek near Chesapeake (SR 7)	0.4 (N-3)	609270	SEDO	OEPA (LF)		276	392
Ten Mile Creek near New Palestine (SR 749)	1.1 (K-6)	609050	SWDO	OEPA (LF)	WWH	276	392
Wheeling Creek near Bridgeport (CR 24)	1.5 (S-3)	609230	SEDO	OEPA (LF)	WWH	276	392
White Oak Creek below Georgetown (Rt. 221)	5.7 (L-1)	609110	SEDO	OEPA (LF)	WWH	276	392
Yellow Creek near Hammondsville (SR 213)	2.5 (S-2)	609260	SEDO	OEPA (LF)	WWH	276	392

TABLE OF CONTENTS

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION	TABLES RD 1-	PAGES RD 1-
LAKE ERIE							
Ashtabula Water Intake	- -	504160	NEDO	IJC (M)	EWH (LE), PWS	264-265	370-371
Conneaut Water Intake	- -	504170	NEDO	OEPA (M)	EWH (LE), PWS	266-267	372-374
Cleveland Crown Water Intake	- -	504090	NEDO	IJC (M)	EWH (LE), PWS	268-269	373-379
Mentor Water Intake	- -	504130	NEDO	NAWQMN, IJC (M)	EWH (LE), PWS	270-271	380-381
Oregon Water Intake	- -	504240	NWDO	NAWQMN, IJC (M)	EWH (LE), PWS	272-273	382-386
Sandusky Water Intake	- -	504030	NWDO	IJC (M)	EWH (LE), PWS	274-275	387-390

TABLE RD 1-1

STATION NUMBER 502760
41 51 20.0 080 45 44.0 2
ASHTABULA R AT ASHTABULA
LAKE ERIE 060691 (ASHTABULA RIVER)
MILES 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	9.40000	8.51427	23.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	115.609	147.403	378.000	.700000	78/10	79/09
TURB	JKSN	JTU		10	15.7500	28.3555	93.0000	.800000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		12	212.917	87.3982	340.000	110.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	200.000		200.000	200.000	79/03	79/03
DO		MG/L		12	10.8917	2.49014	14.2000	6.80000	78/10	79/09
BOD	5 DAY	MG/L		1	1.40000		1.40000	1.40000	78/10	78/10
COD	LOWLEVEL	MG/L		12	12.5750	6.97282	22.0000	4.00000	78/10	79/09
PH		SU		11	7.29999	.402537	8.10000	6.80000	78/10	79/09
T ALK	CACO3	MG/L		11	37.8182	11.3914	62.0000	24.0000	78/10	79/08
RESIDUE	DISS-105	C MG/L		11	225.273	74.7759	350.000	115.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	34.0833	53.7037	188.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.059167	.018809	.110000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.010000	.000008	.010000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.340833	.285544	.890000	.050000	78/10	79/09
TOT KJEL	N	MG/L		12	.613333	.529380	2.00000	.080000	78/10	79/09
PHOS-TOT		MG/L P		12	.061667	.026227	.120000	.020000	78/10	79/09
PHOS-DIS		MG/L P		9	.048889	.012693	.070000	.020000	78/10	79/09
T ORG C	C	MG/L		8	22.7125	28.0287	68.0000	5.00000	78/10	79/06
D ORG C	C	MG/L		6	11.4833	9.78804	30.0000	3.20000	78/11	79/06
TOT HARD	CACO3	MG/L		11	118.182	43.6437	212.000	59.0000	78/10	79/09
CHLORIDE	TOTAL	MG/L		12	31.4167	17.1648	56.0000	6.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		12	68.7500	28.8857	128.000	25.0000	78/10	79/09
FLUORIDE	F,DISS	MG/L		2	1.98000	2.63044	3.84000	.120000	79/05	79/07
SILICA	DISOLVED	MG/L		12	3.35499	2.34186	6.85000	.340000	78/10	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		11	30.0000	.000000	30.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		6	1821.67	2650.40	6900.00	270.000	78/10	79/09
LEAD	PB,TOT	UG/L		12	34.5000	46.4337	150.000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	80.0000	70.7107	130.000	30.0000	79/05	79/07
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/10	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		11	30.0000	.000000	30.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		1	900.000		900.000	900.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		10	421.100	511.557	1700.00	6.00000	78/10	79/09
			K	1	4.00000		4.00000	4.00000	79/02	79/02
			T	11	383.182	501.335	1700.00	4.00000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		10	729.100	1047.12	3400.00	29.0000	78/10	79/09

TABLE RD 1-1 (Continued)

STATION NUMBER 502760
41 51 20.0 080 45 44.0 2
ASHTABULA R AT ASHTABULA
LAKE ERIE 060691 (ASHTABULA RIVER)
MILES 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
FECSTREP	MF M-ENT	/100ML	K	1	4.00000		4.00000	4.00000	79/02	79/02
			T	11	663.182	1017.16	3400.00	4.00000	78/10	79/09
PHENOLS	TOTAL	UG/L		10	6.70000	9.85506	34.0000	2.00000	78/10	79/08
MBAS		MG/L		1	.060000		.060000	.060000	79/07	79/07
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/07	79/07
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MERCURY	HG,TOTAL	UG/L		6	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-2

STATION NUMBER 502760
41 51 20.0 080 45 44.0 2
ASHTABULA R AT ASHTABULA
LAKE ERIE 060691 (ASHTABULA RIVER)
MILES 0001.50 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	13.6667	9.24662	26.0000	2.00000	79/10	80/09
			M	1	-.100E+01		-.100E+01	-.100E+01	80/02	80/02
			T	10	12.2000	9.87477	26.0000	-.100E+01	79/10	80/09
STREAM	FLOW	CFS		4	147.505	142.037	324.000	.020000	79/10	80/02
STREAM	FLOW,	INST-CFS		2	19.9000	22.7689	36.0000	3.80000	80/05	80/06
STREAM	STAGE	FEET		4	.292500	.285351	.700000	.090000	80/04	80/07
TURB	JKSN	JTU		4	4.87500	6.18998	14.0000	.700000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		6	1.25833	.417634	1.70000	.600000	80/04	80/09
CNDUCTVY	FIELD	MICROMHO		9	180.726	81.0948	270.000	.530000	79/10	80/09
DO		MG/L		10	10.8500	2.39271	15.6000	8.00000	79/10	80/09
COD	LOWLEVEL	MG/L		11	16.4636	7.69850	38.0000	9.00000	79/10	80/09
PH		SU		7	7.55714	.759113	8.50000	6.50000	79/10	80/09
LAB	PH	SU		2	7.30000	.282873	7.50000	7.10000	80/04	80/05
T ALK	CACO3	MG/L		10	53.7000	20.2762	95.0000	22.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		4	145.500	48.3080	206.000	94.0000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		5	11.4000	2.19091	15.0000	10.0000	79/10	80/03
			K	6	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	11	10.6364	1.56671	15.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		8	.060000	.010691	.080000	.050000	79/10	80/08
			K	2	.050000	.000061	.050000	.050000	80/07	80/09
			T	10	.058000	.010328	.080000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		7	.010000	.000009	.010000	.010000	79/10	80/07
			K	3	.010000	.000000	.010000	.010000	80/06	80/09
			T	10	.010000	.000009	.010000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		6	.281666	.297282	.860000	.050000	79/10	80/07
			K	4	.050000	.000050	.050000	.050000	80/04	80/09
			T	10	.189000	.251814	.860000	.050000	79/10	80/09
TOT KJEL	N	MG/L		9	.388889	.088664	.550000	.300000	79/10	80/09
PHOS-TOT		MG/L P		6	.030833	.013228	.053000	.018000	79/12	80/09
			K	2	.020000	.000000	.020000	.020000	80/05	80/06
			T	8	.028125	.012253	.053000	.018000	79/12	80/09
PHOS-DIS		MG/L P		4	.020000	.009695	.031000	.010000	80/02	80/07
			K	3	.020000	.000000	.020000	.020000	80/05	80/09
			T	7	.020000	.006856	.031000	.010000	80/02	80/09
T ORG C	C	MG/L		6	10.0000	.894427	11.0000	9.00000	79/12	80/09
D ORG C	C	MG/L		3	10.6667	2.08170	13.0000	9.00000	80/07	80/09
TOT HARD	CACO3	MG/L		10	91.5000	20.7002	123.000	50.0000	79/10	80/09
CHLORIDE	TOTAL	MG/L		8	18.5000	6.27922	30.0000	12.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		9	48.5555	30.9924	128.000	22.0000	79/10	80/09
SILICA	DISOLVED	MG/L		9	2.31444	1.66947	4.62000	.810000	79/10	80/09
ARSENIC	AS,TOT	UG/L	K	3	10.0000	.000000	10.0000	10.0000	80/05	80/09

TABLE RD 1-2 (Continued)

STATION NUMBER 502760
41 51 20.0 080 45 44.0 2
ASHTABULA R AT ASHTABULA
LAKE ERIE 060691 (ASHTABULA RIVER)
MILES 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
			K	3	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		4	292.500	76.7572	350.000	180.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	79/10	80/04
			K	4	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	9	5.00000	.000000	5.00000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		1	30.0000		30.0000	30.0000	80/07	80/07
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/10	79/10
			K	3	100.000	.000000	100.000	100.000	80/05	80/09
			T	4	100.000	.000000	100.000	100.000	79/10	80/09
VANADIUM	V,TOT	UG/L	K	3	10.0000	.000000	10.0000	10.0000	80/05	80/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	80/09	80/09
			K	2	200.000	.000000	200.000	200.000	80/05	80/07
			T	3	200.000	.000000	200.000	200.000	80/05	80/09
SELENIUM	SE,TOT	UG/L	K	3	5.00000	.000000	5.00000	5.00000	80/05	80/09
FEC COLI	MFM-FCBR	/100ML		9	99.9667	119.598	370.000	6.70000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		9	354.967	574.559	1700.00	6.70000	79/10	80/08
PHENOLS	TOTAL	UG/L		8	2.87500	.991031	4.00000	2.00000	79/10	80/09
			K	2	2.00000	.000000	2.00000	2.00000	80/05	80/06
			T	10	2.70000	.948686	4.00000	2.00000	79/10	80/09
RESIDUE	DISS-180	C MG/L		7	166.571	27.2207	196.000	128.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10
			K	3	.500000	.000000	.500000	.500000	80/05	80/09
			T	4	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-3

STATION NUMBER 502780
41 53 36.0 080 47 34.0 2
FIELDS BROOK IN ASHTABULA
LAKE ERIE (ASHTABULA RIVER)
MILES 0001.50 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	17.4000	7.77748	28.5000	8.00000	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		10	2380.00	941.393	4150.00	1400.00	78/11	79/09
DO		MG/L		10	8.77999	1.90428	12.0000	5.80000	78/11	79/09
COD	LOWLEVEL	MG/L		10	17.2000	18.9872	69.1000	4.00000	78/11	79/09
PH		SU		10	7.28999	.611841	8.70000	6.60000	78/11	79/09
RESIDUE	DISS-105	C MG/L		5	2166.00	899.004	3500.00	1406.00	79/03	79/08
RESIDUE	TOT NFLT	MG/L		10	38.8000	20.9221	75.0000	11.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		10	.397000	.483874	1.73000	.060000	78/11	79/09
NO2-N	TOTAL	MG/L		9	.065555	.042753	.140000	.010000	78/12	79/09
NO3-N	TOTAL	MG/L		10	1.12000	.999445	3.26000	.400000	78/11	79/09
TOT KJEL	N	MG/L		10	1.35800	.831781	3.60000	.780000	78/11	79/09
PHOS-TOT		MG/L P		10	.152000	.100643	.400000	.060000	78/11	79/09
TOT HARD	CACO3	MG/L		8	678.875	241.478	1120.00	330.000	78/11	79/09
CHLORIDE	TOTAL	MG/L		1	511.000		511.000	511.000	79/09	79/09
CADMIUM	CD,TOT	UG/L		2	5.50000	.707107	6.00000	5.00000	79/04	79/07
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/04	79/07
COPPER	CU,TOT	UG/L		10	31.0000	3.16228	40.0000	30.0000	78/11	79/09
IRON	FE,TOT	UG/L		2	2365.00	1605.13	3500.00	1230.00	79/04	79/07
LEAD	PB,TOT	UG/L		2	54.5000	53.0330	92.0000	17.0000	79/04	79/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/04	79/07
ZINC	ZN,TOT	UG/L		2	40.0000	14.1421	50.0000	30.0000	79/04	79/07
FEC COLI	MFM-FCBR	/100ML		8	275.375	194.179	600.000	45.0000	78/11	79/09
			K	1	4.00000		4.00000	4.00000	79/02	79/02
			T	9	245.222	202.916	600.000	4.00000	78/11	79/09
FECSTREP	MF M-ENT	/100ML		8	312.750	280.455	830.000	30.0000	78/11	79/09
			K	1	5.00000		5.00000	5.00000	79/02	79/02
			T	9	278.555	281.685	830.000	5.00000	78/11	79/09
PHENOLS	TOTAL	UG/L		10	13.3000	25.8416	86.0000	2.00000	78/11	79/09
ALDRIN		TOT UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
GAMMABHC	LINDANE	TOT.UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08

TABLE RD 1-3 (Continued)

STATION NUMBER 502780
41 53 36.0 080 47 34.0 2
FIELDS BROOK IN ASHTABULA
LAKE ERIE (ASHTABULA RIVER)
MILES 0001.50 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHLRDANE	TECH&MET	TOT UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
DDD	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
DDE	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
DDT	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
DIELDRIN		TOTUG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
ENDRIN		TOT UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
HEPTCHLR		TOTUG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
HPCHLREP		TOTUG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
MTHXYCLR	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	78/11	78/11
MALATHN	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
PARATHN	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
MPARATHN	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
LINDANE	WHL SMPL	UG/L		8	.000000	.000000	.000000	.000000	78/11	79/08
CHLORINE	TOT RESD	MG/L		6	1.60167	2.75427	7.10000	.000000	78/11	79/08
CHLORINE	FREE AVL	MG/L		6	.211667	.356674	.900000	.000000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		10	5.20000	13.6624	44.0000	.500000	78/11	79/09

TABLE RD 1-4

STATION NUMBER 502780
41 53 36.0 080 47 34.0 2
FIELDS BROOK IN ASHTABULA
LAKE ERIE (ASHTABULA RIVER)
MILES 0001.50 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	21.5833	7.74553	32.0000	8.00000	79/10	80/08
TURB	TRBIDMTR	HACH FTU		1	5.45000		5.45000	5.45000	80/06	80/06
CNDUCTVY	FIELD	MICROMHO		12	5167.91	8512.48	32100.0	1070.00	79/10	80/08
DO		MG/L		12	8.14166	2.17902	13.6000	6.30000	79/10	80/08
COD	LOWLEVEL	MG/L		9	30.9777	18.3957	68.3000	8.20000	79/10	80/08
PH		SU		8	7.63749	.434058	8.10000	6.80000	79/10	80/08
LAB	PH	SU		2	7.10000	.141490	7.20000	7.00000	80/04	80/05
T ALK	CACO3	MG/L		1	71.0000		71.0000	71.0000	80/06	80/06
RESIDUE	DISS-105	C MG/L		2	1799.00	173.948	1922.00	1676.00	79/10	80/02
RESIDUE	TOT NFLT	MG/L		7	28.4286	20.5253	70.0000	11.0000	79/10	80/06
			K	2	10.0000	.000000	10.0000	10.0000	80/07	80/08
			T	9	24.3333	19.5448	70.0000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		8	.186250	.077816	.330000	.060000	79/10	80/08
NO2-N	TOTAL	MG/L		8	.062500	.084979	.270000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		8	.585000	.340042	1.12000	.030000	79/10	80/08
TOT KJEL	N	MG/L		8	.606250	.202480	.990000	.390000	79/10	80/08
PHOS-TOT		MG/L P		7	.091857	.050946	.160000	.029000	79/12	80/08
TOT HARD	CACO3	MG/L		9	961.778	314.229	1740.00	660.000	79/10	80/08
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/07
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/07
			K	4	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	7	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		6	45.0000	23.4521	80.0000	30.0000	79/10	80/06
			K	7	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	13	36.9231	17.0219	80.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		7	1551.43	1817.62	4310.00	300.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	18.0000	14.7309	34.0000	5.00000	79/10	80/06
			K	5	11.0000	8.21584	25.0000	5.00000	80/05	80/09
			T	8	13.6250	10.6629	34.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/05
			K	1	100.000		100.000	100.000	80/07	80/07
			T	4	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		5	56.0000	52.7257	150.000	30.0000	79/10	80/09
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/07
			T	8	46.2500	42.0671	150.000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		9	241.444	225.147	770.000	80.0000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		9	1154.11	2271.21	7100.00	10.0000	79/10	80/08
CARBNTET		TOTUG/L		1	.690000		.690000	.690000	80/08	80/08
			K	1	.500000		.500000	.500000	80/04	80/04

TABLE RD 4 (Continued)

STATION NUMBER 502780
41 53 36.0 080 47 34.0 2
FIELDS BROOK IN ASHTABULA
LAKE ERIE (ASHTABULA RIVER)
MILES 0001.50 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CARBNTET		TOTUG/L	T	2	.595000	.134352	.690000	.500000	80/04	80/08
12DICLET		TOTUG/L	K	4	.500000	.000000	.500000	.500000	80/04	80/09
CHLRFORM		TOTUG/L	K	1	.500000		.500000	.500000	80/04	80/04
PHENOLS	TOTAL	UG/L		12	10.0000	8.43154	35.0000	3.00000	79/10	80/09
TETRACHL	OROETHYL	TOTWUG/L		4	11.7525	5.64262	19.6400	6.80000	80/04	80/09
TRICHLOR	ETHYLENE	TOT UG/L		4	14.6775	5.45471	21.2300	8.81000	80/04	80/09
ALDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
GAMMABHC	LINDANE	TOT.UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
CHLRDANE	TECH&MET	TOT UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
DDD	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
DDE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
DDT	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
DIELDRIN		TOTUG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
ENDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
TOXAPHEN		TOTUG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
HEPTCHLR		TOTUG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
HPCHLREP		TOTUG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
MTHXYCLR	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
MALATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
PARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
DIAZINON	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
MPARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
MIREX	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
LINDANE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/04	80/06
CHLORINE	TOT RESD	MG/L		4	.010000	.020000	.040000	.000000	79/11	80/05
			K	5	.030000	.000043	.030000	.030000	80/06	80/09
			T	9	.021111	.016159	.040000	.000000	79/11	80/09
CHLORINE	FREE AVL	MG/L		3	.000000	.000000	.000000	.000000	79/11	80/05
RESIDUE	DISS-180	C MG/L		5	2034.20	226.380	2146.00	1630.00	80/03	80/08
MERCURY	HG,TOTAL	UG/L		5	.780000	.521536	1.70000	.500000	79/10	80/07
			K	6	.500000	.000000	.500000	.500000	80/04	80/09
			T	11	.627273	.360807	1.70000	.500000	79/10	80/09
TETRACL	ETHANE	TOT UG/L		4	23.9525	9.73520	35.5900	14.5900	80/04	80/09

TABLE RD 1-5

STATION NUMBER 501520
41 22 50.0 082 06 17.0 2
BLACK R AT ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
MILES 0015.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.1250	9.50867	24.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	140.858	191.626	689.000	25.0000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		12	503.750	164.581	750.000	250.000	78/10	79/09
DO		MG/L		12	9.86666	2.75693	14.6000	6.20000	78/10	79/09
BOD	5 DAY	MG/L		1	6.00000		6.00000	6.00000	78/10	78/10
COD	LOWLEVEL	MG/L		12	22.0916	8.01009	35.0000	6.00000	78/10	79/09
PH		SU		11	7.55454	.474110	8.30000	6.70000	78/10	79/09
RESIDUE	DISS-105	C MG/L		9	443.444	119.398	652.000	312.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	18.8333	9.92550	38.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.361666	.341090	1.02000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.083000	.057358	.200000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.96166	1.65177	5.95000	.100000	78/10	79/09
TOT KJEL	N	MG/L		11	1.94545	.916918	4.10000	.800000	78/10	79/08
PHOS-TOT		MG/L P		12	.407500	.357875	1.14000	.110000	78/10	79/09
PHOS-DIS		MG/L P		1	.400000		.400000	.400000	78/10	78/10
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	78/10	78/10
TOT HARD	CACO3	MG/L		6	308.000	141.657	550.000	158.000	78/10	79/07
CHLORIDE	TOTAL	MG/L		2	85.0000	11.3137	93.0000	77.0000	78/10	79/02
SILICA	DISOLVED	MG/L		1	5.03000		5.03000	5.03000	78/10	78/10
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	78/10	78/10
CADMIUM	CD,TOT	UG/L		5	5.40000	.894442	7.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		5	1062.00	623.434	1930.00	390.000	78/10	79/07
LEAD	PB,TOT	UG/L		5	30.0000	18.2893	56.0000	12.0000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/01	79/07
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/07
FEC COLI	MFM-FCBR	/100ML		11	6254.54	5899.55	22000.0	1300.00	78/10	79/09
FECSTREP	MF M-ENT	/100ML		11	6600.00	7651.07	22000.0	200.000	78/10	79/09
PHENOLS	TOTAL	UG/L		6	9.16667	3.60094	14.0000	6.00000	78/10	79/07
MBAS		MG/L		2	.190000	.000000	.190000	.190000	78/10	79/02
MERCURY	HG,TOTAL	UG/L		5	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-6

STATION NUMBER 501520
41 22 50.0 082 06 17.0 2
BLACK R AT ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
MILES 0015.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	11.6818	9.40551	24.5000	.000000	79/10	80/09
			M	1	-.100E+01		-.100E+01	-.100E+01	80/02	80/02
			T	12	10.6250	9.68627	24.5000	-.100E+01	79/10	80/09
STREAM	FLOW	CFS		5	82.0999	50.8319	141.700	38.9000	79/10	80/02
STREAM	FLOW,	INST-CFS		4	821.325	979.291	2221.00	119.900	80/03	80/06
STREAM	STAGE	FEET		4	3.53750	2.40064	6.79000	1.58000	80/03	80/06
CNDUCTVY	FIELD	MICROMHO		12	463.333	196.531	820.000	180.000	79/10	80/09
DO		MG/L		12	10.6917	3.95554	17.2000	5.00000	79/10	80/09
COD	LOWLEVEL	MG/L		12	24.0833	13.7805	46.0000	4.00000	79/10	80/09
PH		SU		11	7.86818	.268595	8.50000	7.50000	79/10	80/09
LAB	PH	SU		1	7.60000		7.60000	7.60000	80/08	80/08
RESIDUE	DISS-105	C MG/L		3	504.333	106.923	594.000	386.000	79/11	80/02
RESIDUE	TOT NFLT	MG/L		11	36.8182	33.8255	107.000	10.0000	79/11	80/09
			K	1	10.0000		10.0000	10.0000	79/10	79/10
			T	12	34.5833	33.1675	107.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	.222500	.159153	.560000	.080000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.072500	.045352	.140000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	2.07166	1.97464	7.89000	.110000	79/10	80/09
TOT KJEL	N	MG/L		12	.959999	.290799	1.65000	.570000	79/10	80/09
PHOS-TOT		MG/L P		10	.231600	.106827	.483000	.140000	79/12	80/09
TOT HARD	CACO3	MG/L		6	224.167	44.9287	292.000	159.000	79/10	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	4	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	6	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/07
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		6	1756.67	1768.18	5300.00	510.000	79/10	80/09

TABLE RD 1-6 (Continued)

STATION NUMBER 501520
41 22 50.0 082 06 17.0 2
BLACK R AT ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
MILES 0015.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		5	8.80000	5.54076	18.0000	5.00000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	6	8.16667	5.19295	18.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	4	100.000	.000000	100.000	100.000	80/03	80/09
			T	6	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/07
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		12	6691.66	7481.18	22000.0	1200.00	79/10	80/09
FECSTREP	MF M-ENT	/100ML		12	7063.33	10605.5	36000.0	330.000	79/10	80/09
PHENOLS	TOTAL	UG/L		6	5.16667	2.63945	9.00000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		6	326.166	53.9212	386.000	256.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.566667	.115471	.700000	.500000	79/10	80/03
			K	3	.500000	.000000	.500000	.500000	80/05	80/09
			T	6	.533333	.081650	.700000	.500000	79/10	80/09
PHTHALIC	TOTAL	UG/L	K	1	100.000		100.000	100.000	80/04	80/04

TABLE RD 1-7

STATION NUMBER 501510
41 24 42.0 082 05 45.0 2
BLACK R. BELOW ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
MILES 0010.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.4167	8.66244	24.0000	1.00000	78/10	79/09
STREAM	FLOW	CFS		1	88.7000		88.7000	88.7000	79/09	79/09
TURB	JKSN	JTU		11	12.4636	9.54016	28.0000	2.20000	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		11	683.636	213.976	1050.00	340.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	590.000		590.000	590.000	79/03	79/03
DO		MG/L		12	8.35833	3.54515	14.8000	4.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	39.0999	13.0690	62.1000	19.9000	78/10	79/09
PH		SU		12	7.45833	.339691	8.00000	7.00000	78/10	79/09
T ALK	CACO3	MG/L		10	143.800	41.9811	225.000	77.0000	78/11	79/08
RESIDUE	DISS-105	C MG/L		11	525.091	156.088	836.000	358.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	19.2500	10.3759	43.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	7.18416	5.04736	17.8000	.600000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.134167	.092585	.300000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.65333	1.52812	5.14000	.100000	78/10	79/09
TOT KJEL	N	MG/L		12	8.91833	6.06846	22.8000	2.22000	78/10	79/09
PHOS-TOT		MG/L P		12	1.18583	.676830	2.81000	.480000	78/10	79/09
PHOS-DIS		MG/L P		9	.714444	.472046	1.49000	.160000	78/11	79/07
T ORG C	C	MG/L		7	18.8143	8.93170	35.7000	10.3000	78/11	79/05
D ORG C	C	MG/L		2	14.3500	.777962	14.9000	13.8000	78/11	78/12
CYANIDE	CN-TOT	MG/L		8	.013750	.005175	.020000	.010000	79/01	79/08
TOT HARD	CACO3	MG/L		12	245.583	52.7972	322.000	165.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		11	77.0000	50.4004	173.000	13.0000	78/11	79/09
SULFATE	SO4-TOT	MG/L		11	153.636	52.1465	248.000	93.0000	78/11	79/09
FLUORIDE	F,DISS	MG/L		1	.550000		.550000	.550000	79/06	79/06
SILICA	DISOLVED	MG/L		10	11.4610	17.4306	60.6000	3.10000	78/11	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
CADMIUM	CD,TOT	UG/L		9	8.55556	6.26720	24.0000	5.00000	78/10	79/08
CHROMIUM	CR,TOT	UG/L		11	37.2727	21.0195	100.000	30.0000	78/10	79/08
COBALT	CO,TOTAL	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
COPPER	CU,TOT	UG/L		10	33.0000	9.48683	60.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		6	706.666	575.767	1880.00	410.000	78/10	79/07
LEAD	PB,TOT	UG/L		7	26.0000	8.54400	40.0000	16.0000	78/10	79/07
MANGNESE	MN	UG/L		1	90.0000		90.0000	90.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/10	79/07
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		10	66.0000	87.0759	310.000	30.0000	78/10	79/07

TABLE RD 1-7 (Continued)

STATION NUMBER 501510
41 24 42.0 082 05 45.0 2
BLACK R. BELOW ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
MILES 0010.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		8	18011.4	38207.5	110000	14.0000	78/10	79/09
			K	1	20000.0		20000.0	20000.0	79/01	79/01
			L	1	20000.0		20000.0	20000.0	78/12	78/12
			T	10	18409.1	33706.2	110000	14.0000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		8	21381.2	52245.5	150000	45.0000	78/10	79/09
			L	2	20000.0	.000000	20000.0	20000.0	78/11	78/12
			T	10	21105.0	46079.9	150000	45.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		11	10.5455	5.20315	19.0000	5.00000	78/10	79/08
DIETHYLP	HTHALATE	TOTWUG/L	K	8	100.000	.000000	100.000	100.000	78/11	79/08
DIMETHYL	PHTHALAT	TOTWUG/L	K	8	100.000	.000000	100.000	100.000	78/11	79/08
MBAS		MG/L		1	1.10000		1.10000	1.10000	79/02	79/02
PCBS	WHL SMPL	UG/L	K	7	.500000	.000000	.500000	.500000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		5	.500000	.000000	.500000	.500000	78/10	79/07
DEHP	ISOMER	TOT UG/L	K	8	100.000	.000000	100.000	100.000	78/11	79/08
DIBUTYL	NONANDOA	TOT UG/L	K	8	100.000	.000000	100.000	100.000	78/11	79/08

TABLE RD 1-8

STATION NUMBER 501510
41 24 42.0 082 05 45.0 2
BLACK R. BELOW ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
(RIVER MILE 10.4)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	9.50000	8.47349	23.0000	.000000	79/10	80/09
STREAM	STAGE	FEET		1	20.3000		20.3000	20.3000	80/09	80/09
TURB	JKSN	JTU		4	6.25000	2.53707	8.80000	3.00000	79/11	80/02
TURB	TRBIDMTR	HACH FTU		6	67.7666	94.3479	250.000	7.30000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		11	592.727	265.908	1050.00	270.000	79/10	80/09
CNDUCTVY	AT 25C	MICROMHO		1	419.000		419.000	419.000	80/03	80/03
DO		MG/L		11	9.89090	3.62643	14.2000	4.00000	79/10	80/09
COD	LOWLEVEL	MG/L		12	35.0000	23.4869	102.000	14.0000	79/10	80/09
PH		SU		11	7.68181	.345909	8.60000	7.30000	79/10	80/09
LAB	PH	SU		1	7.70000		7.70000	7.70000	80/08	80/08
T ALK	CACO3	MG/L		11	153.182	75.3019	338.000	72.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		5	424.000	247.584	636.000	10.0000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		12	55.2500	76.5341	250.000	10.0000	79/10	80/09
RESIDUE	VOL NFLT	MG/L		1	226.000		226.000	226.000	80/04	80/04
NH3+NH4-	N TOTAL	MG/L		11	3.21726	2.16456	6.05000	.210000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.126000	.111275	.360000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		11	2.02272	1.78669	7.01000	.160000	79/10	80/09
TOT KJEL	N	MG/L		11	4.48727	2.69729	7.90000	.760000	79/10	80/09
PHOS-TOT		MG/L P		9	.667333	.524584	1.97000	.260000	79/12	80/09
PHOS-DIS		MG/L P		8	.338749	.311562	.880000	.032000	79/12	80/09
T ORG C	C	MG/L		7	19.8571	6.76831	32.0000	12.0000	79/12	80/09
D ORG C	C	MG/L		2	13.0000	2.82843	15.0000	11.0000	80/03	80/07
CYANIDE	CN-TOT	MG/L		4	.022500	.025000	.060000	.010000	79/10	80/02
			K	3	.010000	.000000	.010000	.010000	80/03	80/05
			T	7	.017143	.018898	.060000	.010000	79/10	80/05
TOT HARD	CACO3	MG/L		11	234.091	69.1310	359.000	124.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		11	55.9091	27.6639	102.000	16.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		11	120.364	33.5181	177.000	62.0000	79/10	80/09
FLUORIDE	F,TOTAL	MG/L		1	.250000		.250000	.250000	80/03	80/03
SILICA	DISOLVED	MG/L		10	6.14299	1.58577	8.80000	3.87000	79/10	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/07	80/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	79/10	80/02
			K	5	24.0000	42.4853	100.000	5.00000	80/03	80/09
			T	9	15.5556	31.6667	100.000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		7	40.0000	17.3205	70.0000	30.0000	79/10	80/07
			K	3	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	10	37.0000	14.9443	70.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		7	51.4286	36.7100	110.000	30.0000	79/10	80/07
			K	4	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	11	43.6363	30.4213	110.000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		6	3973.33	5819.94	15200.0	490.000	79/10	80/09

TABLE RD 1-8 (Continued)

STATION NUMBER 501510
41 24 42.0 082 05 45.0 2
BLACK R. BELOW ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
(RIVER MILE 10.4)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		6	12.1667	11.6862	35.0000	5.00000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	7	11.1429	11.0065	35.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		3	106.667	72.3419	190.000	60.0000	80/01	80/09
NICKEL	NI,TOTAL	UG/L		5	120.000	44.7214	200.000	100.000	79/10	80/09
			K	1	100.000		100.000	100.000	80/03	80/03
			T	6	116.667	40.8249	200.000	100.000	79/10	80/09
VANADIUM	V,TOT	UG/L		2	38.5000	9.19239	45.0000	32.0000	80/07	80/09
ZINC	ZN,TOT	UG/L		9	58.8889	48.8479	170.000	30.0000	79/10	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/06
			T	11	53.6363	45.2267	170.000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		2	1350.00	1626.35	2500.00	200.000	80/07	80/09
SELENIUM	SE,TOT	UG/L		1	25.0000		25.0000	25.0000	80/01	80/01
			K	2	5.00000	.000000	5.00000	5.00000	80/07	80/09
			T	3	11.6667	11.5470	25.0000	5.00000	80/01	80/09
FEC COLI	MFM-FCBR	/100ML		12	9229.50	11386.6	34000.0	14.0000	79/10	80/09
FECSTREP	MF M-ENT	/100ML		12	11570.0	11795.1	39000.0	310.000	79/10	80/09
PHENOLS	TOTAL	UG/L		11	5.72727	2.90142	11.0000	2.00000	79/10	80/09
DIETHYLP	HTHALATE	TOTWUG/L	K	7	100.000	.000000	100.000	100.000	79/10	80/08
DIMETHYL	PHTHALAT	TOTWUG/L	K	7	100.000	.000000	100.000	100.000	79/10	80/08
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/11	79/11
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/11	79/11
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/11	79/11
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/11	79/11
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/11	79/11

TABLE RD 1-8 (Continued)

STATION NUMBER 501510
41 24 42.0 082 05 45.0 2
BLACK R. BELOW ELYRIA
LAKE ERIE 060591 (BLACK RIVER)
(RIVER MILE 10.4)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/11	79/11
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/11	79/11
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
PCB-1254		TOTUG/L		1	.270000		.270000	.270000	79/12	79/12
PCBS	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/07
			K	6	.500000	.000000	.500000	.500000	79/10	80/08
			T	8	.375000	.231455	.500000	.000000	79/10	80/08
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/11	79/11
RESIDUE	DISS-180	C MG/L		6	387.000	66.7862	472.000	272.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		4	1.20000	1.03923	2.70000	.500000	79/10	80/07
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/05	80/09
			T	6	.966666	.882421	2.70000	.500000	79/10	80/09
PHTHALIC	TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
DEHP	ISOMER	TOT UG/L	K	1	100.000		100.000	100.000	80/07	80/07
DIBUTYL	NONANDOA	TOT UG/L	K	7	100.000	.000000	100.000	100.000	79/10	80/08

TABLE RD 1-9

STATION NUMBER 501530
41 27 29.0 082 06 20.0 2
FRENCH CREEK NEAR LORAIN - SR 301
LAKE ERIE 060591 (BLACK RIVER)
MILES 0005.30 000.70

No data were collected from 10/78 - 9/80.

TABLE RD 1-10

STATION NUMBER 502400
41 37 51.0 081 24 13.0 2
CHAGRIN R AT WILLOUGHBY
LAKE ERIE 060691 (CHAGRIN RIVER)
MILES 0005.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	9.12500	7.54419	22.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	419.833	586.750	1694.00	67.0000	78/10	79/09
TURB	JKSN	JTU		10	7.91000	9.51321	34.0000	2.30000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		12	400.000	200.896	1000.00	220.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		2	1460.00	622.254	1900.00	1020.00	79/01	79/02
DO		MG/L		12	10.8583	2.83949	15.0000	7.00000	78/10	79/09
BOD	5 DAY	MG/L		1	1.00000		1.00000	1.00000	78/10	78/10
COD	LOWLEVEL	MG/L		12	10.1167	6.34563	27.1000	2.90000	78/10	79/09
PH		SU		12	7.66666	.257004	8.10000	7.20000	78/10	79/09
LAB	PH	SU		2	7.90000	.141436	8.00000	7.80000	79/01	79/02
T ALK	CACO3	MG/L		11	125.818	21.9310	162.000	83.0000	78/11	79/09
RESIDUE	DISS-105	C MG/L		10	423.500	262.697	1123.00	246.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	17.0833	13.3516	58.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.110833	.110409	.360000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.014167	.009962	.040000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.622500	.384522	1.58000	.280000	78/10	79/09
TOT KJEL	N	MG/L		12	.477500	.276443	.970000	.100000	78/10	79/09
PHOS-TOT		MG/L P		12	.085833	.032039	.160000	.050000	78/10	79/09
PHOS-DIS		MG/L P		9	.071111	.028038	.130000	.050000	78/10	79/07
T ORG C	C	MG/L		5	18.6800	21.1532	55.0000	5.00000	78/11	79/05
D ORG C	C	MG/L		3	4.46667	1.77857	6.40000	2.90000	78/11	79/01
TOT HARD	CACO3	MG/L		8	191.375	23.9340	231.000	156.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		11	98.8182	144.344	496.000	13.0000	78/10	79/09
SULFATE	SO4-TOT	MG/L		11	62.2727	18.7995	89.0000	36.0000	78/11	79/09
FLUORIDE	F,DISS	MG/L		2	.190000	.070711	.240000	.140000	78/11	79/09
SILICA	DISOLVED	MG/L		12	4.77833	2.24325	7.52000	.260000	78/10	79/09
ARSENIC	AS,TOT	UG/L		2	15.0000	7.07107	20.0000	10.0000	78/10	79/07
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		6	930.000	768.921	2410.00	350.000	78/10	79/09
LEAD	PB,TOT	UG/L		5	17.4000	13.4648	40.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		1	80.0000		80.0000	80.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	79/01	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		5	56.0000	43.3590	130.000	30.0000	79/01	79/09
ALUMINUM	AL,TOT	UG/L		1	850.000		850.000	850.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
BETA	TOTAL	PC/L		1	5.00000		5.00000	5.00000	78/10	78/10
FEC COLI	MFM-FCBR	/100ML		12	469.166	678.507	2600.00	130.000	78/10	79/09

TABLE RD 1-10 (Continued)

STATION NUMBER 502400
41 37 51.0 081 24 13.0 2
CHAGRIN R AT WILLOUGHBY
LAKE ERIE 060691 (CHAGRIN RIVER)
MILES 0005.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
FECSTREP	MF M-ENT	/100ML		12	650.000	987.743	3600.00	20.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		11	4.27273	4.40661	17.0000	2.00000	78/10	79/09
MBAS		MG/L		2	.095000	.063640	.140000	.050000	78/10	79/03
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	78/10	78/10
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MERCURY	HG,TOTAL	UG/L		6	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-11

STATION NUMBER 502400
41 37 51.0 081 24 13.0 2
CHAGRIN R AT WILLOUGHBY
LAKE ERIE 060691 (CHAGRIN RIVER)
MILES 0005.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	12.0500	7.86854	27.0000	1.00000	79/10	80/09
			M	2-	.100E+01	.000000-	.100E+01	-.100E+01	79/12	80/02
			T	12	9.87500	8.74415	27.0000-	.100E+01	79/10	80/09
STREAM	FLOW	CFS		4	256.250	75.8699	350.000	175.000	79/11	80/02
STREAM	FLOW,	INST-CFS		6	562.733	473.126	1221.00	113.500	80/03	80/09
STREAM	STAGE	FEET		7	2.59714	.573002	3.76000	2.14000	80/03	80/09
TURB	JKSN	JTU		4	4.62500	4.05000	10.0000	1.40000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		6	13.2467	10.3045	26.5000	1.60000	80/04	80/09
CNDUCTVY	FIELD	MICROMHO		12	377.416	162.957	830.000	210.000	79/10	80/09
DO		MG/L		11	11.2636	3.58978	18.2000	6.80000	79/11	80/09
COD	LOWLEVEL	MG/L		9	15.3889	9.94239	32.4000	4.00000	79/10	80/06
PH		SU		9	7.85555	.500336	8.40000	7.10000	79/10	80/09
LAB	PH	SU		3	7.73333	.152993	7.90000	7.60000	80/04	80/08
T ALK	CACO3	MG/L		12	129.167	37.3603	226.000	81.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		4	301.000	60.7179	378.000	230.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		10	34.8000	49.0664	168.000	10.0000	79/10	80/09
			K	2	10.0000	.000000	10.0000	10.0000	80/04	80/05
			T	12	30.6667	45.4199	168.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		8	.073750	.051530	.200000	.050000	79/10	80/07
			K	4	.050000	.000050	.050000	.050000	80/04	80/09
			T	12	.065833	.042738	.200000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.016667	.016583	.060000	.010000	79/10	80/09
			K	1	.010000		.010000	.010000	80/05	80/05
			T	10	.016000	.015776	.060000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		10	.583000	.356435	1.22000	.060000	79/10	80/09
			K	2	.050000	.000061	.050000	.050000	80/05	80/07
			T	12	.494166	.383393	1.22000	.050000	79/10	80/09
TOT KJEL	N	MG/L		10	.424000	.252288	.890000	.190000	79/10	80/09
			K	1	.050000		.050000	.050000	79/11	79/11
			T	11	.389999	.264576	.890000	.050000	79/10	80/09
PHOS-TOT		MG/L P		8	.178500	.112347	.400000	.060000	79/12	80/09
PHOS-DIS		MG/L P		8	.059250	.047210	.160000	.016000	80/02	80/09
T ORG C	C	MG/L		8	9.37500	3.20435	15.0000	6.00000	79/12	80/09
D ORG C	C	MG/L		4	8.25000	2.62996	11.0000	6.00000	80/03	80/09
TOT HARD	CACO3	MG/L		6	172.500	24.9138	198.000	134.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		12	43.3333	21.2746	93.0000	20.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		12	55.4167	11.5874	75.0000	34.0000	79/10	80/09
FLUORIDE	F,TOTAL	MG/L		1	.200000		.200000	.200000	80/03	80/03
SILICA	DISOLVED	MG/L		10	100.026	300.411	955.000	2.52000	79/10	80/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	80/01	80/01
			K	3	10.0000	.000000	10.0000	10.0000	80/05	80/09

TABLE RD 1-11 (Continued)

STATION NUMBER 502400
41 37 51.0 081 24 13.0 2
CHAGRIN R AT WILLOUGHBY
LAKE ERIE 060691 (CHAGRIN RIVER)
MILES 0005.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ARSENIC	AS,TOT	UG/L	T	4	10.0000	.000000	10.0000	10.0000	80/01	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	4	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	6	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		6	2231.67	2963.14	8200.00	310.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	6.33333	2.30941	9.00000	5.00000	79/10	80/03
			K	3	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	6	5.66667	1.63300	9.00000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		4	75.0000	45.0925	140.000	40.0000	80/01	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/09
			K	3	100.000	.000000	100.000	100.000	80/03	80/07
			T	6	100.000	.000000	100.000	100.000	79/10	80/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	80/01	80/01
			K	3	30.0000	17.3205	50.0000	20.0000	80/05	80/09
			T	4	25.0000	17.3205	50.0000	10.0000	80/01	80/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		2	600.000	.000000	600.000	600.000	80/07	80/09
			K	1	200.000		200.000	200.000	80/05	80/05
			T	3	466.666	230.941	600.000	200.000	80/05	80/09
SELENIUM	SE,TOT	UG/L		1	10.0000		10.0000	10.0000	80/01	80/01
			K	3	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	4	6.25000	2.50000	10.0000	5.00000	80/01	80/09
FEC COLI	MFM-FCBR	/100ML		9	260.555	192.816	700.000	45.0000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		9	468.889	503.002	1600.00	10.0000	79/10	80/08
PHENOLS	TOTAL	UG/L		11	2.81818	.750763	4.00000	2.00000	79/10	80/09
			K	1	2.00000		2.00000	2.00000	80/04	80/04
			T	12	2.75000	.753778	4.00000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		5	285.000	62.1932	364.000	208.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	2	.500000	.000000	.500000	.500000	80/03	80/05
			T	4	.500000	.000000	.500000	.500000	79/10	80/05

TABLE RD 1-12

STATION NUMBER 502870
41 55 37.0 080 36 15.0 2
CONNEAUT CRK. AT CONNEAUT
LAKE ERIE 060691 (CONNEAUT CREEK)
MILES 0006.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	9.41667	8.43918	23.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		8	104.500	119.026	297.000	8.00000	78/10	79/09
TURB	JKSN	JTU		10	12.4700	14.8646	48.0000	2.00000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		12	206.250	81.6067	330.000	105.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	200.000		200.000	200.000	79/03	79/03
DO		MG/L		12	11.1167	2.21559	14.0000	7.30000	78/10	79/09
BOD	5 DAY	MG/L		1	1.00000		1.00000	1.00000	78/10	78/10
COD	LOWLEVEL	MG/L		12	9.88333	4.86151	19.7000	4.00000	78/10	79/09
PH		SU		12	7.40833	.339691	7.90000	6.70000	78/10	79/09
T ALK	CACO3	MG/L		11	66.3636	26.8897	107.000	32.0000	78/10	79/08
RESIDUE	DISS-105	C MG/L		7	194.000	52.2047	254.000	124.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		9	28.5555	29.1081	88.0000	10.0000	78/11	79/08
			K	1	10.0000		10.0000	10.0000	78/10	78/10
			T	10	26.7000	28.0636	88.0000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		12	.065833	.031467	.160000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.010000	.000008	.010000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.315000	.285673	.830000	.050000	78/10	79/09
TOT KJEL	N	MG/L		11	.595454	.688409	2.60000	.100000	78/11	79/09
PHOS-TOT		MG/L P		12	.058333	.027248	.130000	.020000	78/10	79/09
PHOS-DIS		MG/L P		11	.050909	.013004	.070000	.020000	78/10	79/09
T ORG C	C	MG/L		5	5.91999	2.83145	9.50000	2.40000	78/11	79/04
D ORG C	C	MG/L		4	11.3500	13.7834	32.0000	3.80000	78/11	79/06
SULFITE	SO3	MG/L		1	64.0000		64.0000	64.0000	78/12	78/12
TOT HARD	CACO3	MG/L		7	108.143	36.0808	148.000	65.0000	78/10	79/09
CHLORIDE	TOTAL	MG/L		12	17.3333	7.65547	25.0000	5.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		9	49.2222	15.0066	69.0000	23.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		1	.100000		.100000	.100000	79/07	79/07
SILICA	DISOLVED	MG/L		12	3.24416	2.45469	7.40000	.350000	78/10	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
CADMIUM	CD,TOT	UG/L		6	5.83333	2.04125	10.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		6	1105.00	1537.28	4200.00	240.000	78/10	79/09
LEAD	PB,TOT	UG/L		6	19.3333	27.8974	76.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	30.0000	.000000	30.0000	30.0000	79/05	79/07
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/10	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		6	113.333	204.124	530.000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		11	207.545	184.738	580.000	10.0000	78/10	79/09

TABLE RD 1-12 (Continued)

STATION NUMBER 502870
41 55 37.0 080 36 15.0 2
CONNEAUT CRK. AT CONNEAUT
LAKE ERIE 060691 (CONNEAUT CREEK)
MILES 0006.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
FECSTREP	MF M-ENT	/100ML		11	679.909	1191.50	4000.00	20.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	6.08333	11.7044	43.0000	2.00000	78/10	79/09
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/07	79/07
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MERCURY	HG,TOTAL	UG/L		6	.716666	.530723	1.80000	.500000	78/10	79/09

TABLE RD 1-13

STATION NUMBER 502870
41 55 37.0 080 36 15.0 2
CONNEAUT CRK. AT CONNEAUT
LAKE ERIE 060691 (CONNEAUT CREEK)
MILES 0006.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	11.4000	9.30293	23.0000	.000000	79/10	80/08
			M	1	-.500E+00		-.500E+00	-.500E+00	80/02	80/02
			T	11	10.3182	9.52700	23.0000	-.500E+00	79/10	80/08
STREAM	FLOW	CFS		4	336.250	362.856	870.000	58.0000	79/10	80/02
STREAM	FLOW,	INST-CFS		3	340.467	519.242	940.000	35.0000	80/03	80/06
STREAM	STAGE	FEET		6	1.82167	1.08097	4.00000	1.15000	80/03	80/08
TURB	JKSN	JTU		5	6.90000	11.8093	28.0000	1.20000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		5	2.25600	1.23801	4.20000	1.10000	80/04	80/08
CNDUCTVY	FIELD	MICROMHO		11	198.364	68.4796	290.000	75.0000	79/10	80/08
DO		MG/L		11	11.4545	2.76817	16.4000	7.70000	79/10	80/08
COD	LOWLEVEL	MG/L		10	13.3300	8.70863	36.0000	4.00000	79/10	80/08
PH		SU		9	7.85555	.626755	8.60000	7.00000	79/10	80/08
LAB	PH	SU		2	7.80000	.282873	8.00000	7.60000	80/04	80/05
T ALK	CACO3	MG/L		11	66.6363	28.2251	120.000	25.0000	79/10	80/08
RESIDUE	DISS-105	C MG/L		4	164.750	30.0153	206.000	138.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		6	30.1667	38.1073	105.000	10.0000	79/10	80/03
			K	5	10.0000	.000000	10.0000	10.0000	80/04	80/08
			T	11	21.0000	28.9309	105.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		7	.165714	.279932	.800000	.050000	79/10	80/06
			K	4	.050000	.000050	.050000	.050000	80/04	80/08
			T	11	.123636	.224556	.800000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		9	.011111	.003333	.020000	.010000	79/10	80/07
			K	1	.010000		.010000	.010000	80/08	80/08
			T	10	.011000	.003162	.020000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		10	.310000	.274388	.810000	.050000	79/10	80/07
			K	1	.050000		.050000	.050000	80/08	80/08
			T	11	.286363	.271856	.810000	.050000	79/10	80/08
TOT KJEL	N	MG/L		10	.291000	.086340	.480000	.200000	79/10	80/08
			K	1	.050000		.050000	.050000	80/01	80/01
			T	11	.269091	.109496	.480000	.050000	79/10	80/08
PHOS-TOT		MG/L P		7	.056714	.048558	.150000	.020000	79/12	80/07
			K	2	.020000	.000000	.020000	.020000	80/05	80/08
			T	9	.048556	.045061	.150000	.020000	79/12	80/08
PHOS-DIS		MG/L P		5	.036800	.036458	.100000	.014000	80/01	80/06
			K	3	.020000	.000000	.020000	.020000	80/05	80/08
			T	8	.030500	.028899	.100000	.014000	80/01	80/08
T ORG C	C	MG/L		6	7.50000	2.16795	11.0000	5.00000	79/12	80/08
D ORG C	C	MG/L		4	7.50000	2.08167	10.0000	5.00000	80/03	80/08
TOT HARD	CACO3	MG/L		5	104.000	32.1947	125.000	47.0000	79/10	80/07
CHLORIDE	TOTAL	MG/L		9	17.1111	5.48740	27.0000	10.0000	79/10	80/07
SULFATE	SO4-TOT	MG/L		11	35.2727	8.77608	48.0000	19.0000	79/10	80/08

TABLE RD 1-13 (Continued)

STATION NUMBER 502870
41 55 37.0 080 36 15.0 2
CONNEAUT CRK. AT CONNEAUT
LAKE ERIE 060691 (CONNEAUT CREEK)
MILES 0006.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
SILICA	DISOLVED	MG/L		9	3.03444	1.85767	6.12000	.650000	79/12	80/08
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	80/01	80/01
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/07
			T	3	10.0000	.000000	10.0000	10.0000	80/01	80/07
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/07
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		5	1324.00	1692.43	4340.00	390.000	79/10	80/07
LEAD	PB,TOT	UG/L		3	6.66667	2.08168	9.00000	5.00000	79/10	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/07
			T	5	6.00000	1.73205	9.00000	5.00000	79/10	80/07
MANGNESE	MN	UG/L		2	40.0000	14.1421	50.0000	30.0000	80/01	80/07
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	36.6667	11.5471	50.0000	30.0000	80/01	80/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	3	100.000	.000000	100.000	100.000	80/03	80/07
			T	5	100.000	.000000	100.000	100.000	79/10	80/07
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	80/01	80/01
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/07
			T	3	10.0000	.000000	10.0000	10.0000	80/01	80/07

TABLE RD 1-13 (Continued)

STATION NUMBER 502870
41 55 37.0 080 36 15.0 2
CONNEAUT CRK. AT CONNEAUT
LAKE ERIE 060691 (CONNEAUT CREEK)
MILES 0006.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
ALUMINUM	AL,TOT	UG/L		2	200.000	.000000	200.000	200.000	80/01	80/07
			K	1	200.000		200.000	200.000	80/05	80/05
			T	3	200.000	.000000	200.000	200.000	80/01	80/07
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	80/01	80/01
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/07
			T	3	5.00000	.000000	5.00000	5.00000	80/01	80/07
FEC COLI	MFM-FCBR	/100ML		10	127.400	149.015	490.000	10.0000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		10	223.000	391.465	1300.00	10.0000	79/10	80/08
PHENOLS	TOTAL	UG/L		8	2.87500	1.45774	6.00000	2.00000	79/10	80/08
			K	3	2.00000	.000000	2.00000	2.00000	80/05	80/07
			T	11	2.63636	1.28629	6.00000	2.00000	79/10	80/08
RESIDUE	DISS-180 C	MG/L		5	169.600	40.4822	224.000	114.000	80/03	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	3	.500000	.000000	.500000	.500000	80/03	80/07
			T	5	.500000	.000000	.500000	.500000	79/10	80/07

TABLE RD 1-14

STATION NUMBER 502020
41 23 43.0 081 37 48.0 2
CUYAHOGA R AT INDEPENDENCE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0013.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	13.6700	8.84497	25.2000	.500000	78/10	79/09
STREAM	FLOW	CFS		9	764.333	609.044	2080.00	261.000	78/11	79/09
TURB	JKSN	JTU		5	57.6200	102.117	240.000	4.00000	79/04	79/09
CNDUCTVY	FIELD	MICROMHO		8	743.500	270.949	1164.00	290.000	78/10	79/09
DO		MG/L		8	8.66249	3.39914	13.0000	4.40000	78/10	79/08
BOD	5 DAY	MG/L		1	9.00000		9.00000	9.00000	79/03	79/03
COD	LOWLEVEL	MG/L		7	29.7143	25.0905	85.7000	14.0000	78/11	79/09
PH		SU		10	7.48000	.339222	7.90000	6.60000	78/10	79/09
T ALK	CACO3	MG/L		6	113.667	26.3415	154.000	80.0000	79/03	79/09
RESIDUE	DISS-105	C MG/L		7	495.428	99.1892	640.000	320.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		8	92.0000	167.956	505.000	10.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		9	1.02111	.357997	1.49000	.290000	78/10	79/09
NO2-N	TOTAL	MG/L		9	.254444	.200070	.590000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		9	1.71444	.857759	3.35000	.810000	78/10	79/09
TOT KJEL	N	MG/L		9	2.40222	1.14894	4.48000	.900000	78/10	79/09
PHOS-TOT		MG/L P		8	.393750	.153245	.600000	.180000	78/10	79/08
PHOS-DIS		MG/L P		5	.214000	.151096	.480000	.120000	78/11	79/08
T ORG C	C	MG/L		3	24.8666	14.1938	41.0000	14.3000	79/03	79/06
CYANIDE	CN-TOT	MG/L		10	.012000	.006325	.030000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		10	218.600	34.7603	265.000	152.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		8	103.000	60.8793	203.000	21.0000	79/01	79/09
SULFATE	SO4-TOT	MG/L		5	86.2000	13.9716	105.000	73.0000	79/03	79/08
FLUORIDE	F,DISS	MG/L		9	.357777	.077908	.510000	.250000	78/11	79/09
SILICA	DISOLVED	MG/L		6	5.27333	1.86758	8.53000	3.70000	79/03	79/09
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/03	79/07
CADMIUM	CD,TOT	UG/L		9	7.88889	5.41859	20.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		9	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		9	34.4444	13.3334	70.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		9	3921.11	7201.18	23000.0	260.000	78/10	79/09
LEAD	PB,TOT	UG/L		9	39.0000	47.0664	140.000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		6	230.000	161.617	550.000	120.000	79/03	79/09
NICKEL	NI,TOTAL	UG/L		7	100.000	.000000	100.000	100.000	78/11	79/09
VANADIUM	V,TOT	UG/L		5	10.0000	.000000	10.0000	10.0000	79/03	79/09
ZINC	ZN,TOT	UG/L		9	54.4444	58.7604	210.000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		2	400.000	282.843	600.000	200.000	79/03	79/07
SELENIUM	SE,TOT	UG/L		5	6.00000	2.23607	10.0000	5.00000	79/03	79/09
FEC COLI	MFM-FCBR	/100ML		4	28325.0	22326.8	59000.0	6300.00	79/03	79/09
FECSTREP	MF M-ENT	/100ML		4	5150.00	3398.53	9100.00	1000.00	79/03	79/09
PHENOLS	TOTAL	UG/L		10	11.3000	6.54981	22.0000	2.00000	78/10	79/09
DIETHYLP	HTHALATE	TOTWUG/L	K	7	100.000	.000000	100.000	100.000	78/11	79/09
DIMETHYL	PHTHALAT	TOTWUG/L	K	7	100.000	.000000	100.000	100.000	78/11	79/09

TABLE RD 1-14 (Continued)

STATION NUMBER 502020
41 23 43.0 081 37 48.0 2
CUYAHOGA R AT INDEPENDENCE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0013.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MBAS		MG/L		9	.152222	.046309	.230000	.070000	78/10	79/09
ALDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
GAMMABHC	LINDANE	TOT.UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
CHLRDANE	TECH&MET	TOT UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
DDD	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
DDE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
DDT	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
DIELDRIN		TOTUG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
ENDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
HEPTCHLR		TOTUG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
HPCHLREP		TOTUG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
MTHXYCLR	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
PCBS	WHL SMPL	UG/L	K	6	.500000	.000000	.500000	.500000	78/11	79/07
MALATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
PARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
MPARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
LINDANE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	78/11	79/05
MERCURY	HG,TOTAL	UG/L		9	.500000	.000000	.500000	.500000	78/10	79/09
TRICLORO	PENTENE	TOT UG/L	K	1	100.000		100.000	100.000	79/01	79/01
DEHP	ISOMER	TOT UG/L	K	5	100.000	.000000	100.000	100.000	78/11	79/07
DIBUTYL	NONANDOA	TOT UG/L	K	7	100.000	.000000	100.000	100.000	78/11	79/09

TABLE RD 1-15

STATION NUMBER 502020
41 23 43.0 081 37 48.0 2
CUYAHOGA R AT INDEPENDENCE
LAKE ERIE (CUYAHOGA RIVER)
MILES 0013.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.9000	8.02358	24.0000	1.00000	79/10	80/08
STREAM	FLOW	CFS		5	803.400	279.064	1155.00	479.000	79/10	80/02
STREAM	FLOW,	INST-CFS		3	1119.43	359.117	1395.00	713.300	80/03	80/06
STREAM	STAGE	FEET		5	3.93000	.855359	4.80000	2.87000	80/03	80/08
TURB	JKSN	JTU		3	19.0000	3.00000	22.0000	16.0000	79/12	80/02
TURB	TRBIDMTR	HACH FTU		4	9.64999	2.46241	13.0000	7.80000	80/03	80/08
CNDUCTVY	FIELD	MICROMHO		8	699.375	297.906	1276.00	360.000	79/11	80/08
DO		MG/L		10	8.67000	2.37068	12.0000	5.50000	79/10	80/08
BOD	5 DAY	MG/L		1	6.60000		6.60000	6.60000	80/02	80/02
COD	LOWLEVEL	MG/L		7	23.3286	3.37478	28.3000	18.0000	79/10	80/09
PH		SU		8	7.62499	.139004	7.80000	7.40000	79/10	80/08
LAB	PH	SU		2	7.25000	.070745	7.30000	7.20000	80/04	80/09
T ALK	CACO3	MG/L		9	130.667	41.2312	216.000	84.0000	79/11	80/08
RESIDUE	DISS-105	C MG/L		4	458.750	82.2734	552.000	380.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		7	32.7143	18.5716	60.0000	17.0000	79/10	80/08
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	8	29.8750	18.9770	60.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		10	1.15800	.655775	2.55000	.250000	79/10	80/08
NO2-N	TOTAL	MG/L		10	.209000	.251151	.850000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		10	1.36500	.358430	1.96000	.900000	79/10	80/08
TOT KJEL	N	MG/L		10	2.15200	.881818	3.66000	1.12000	79/10	80/08
PHOS-TOT		MG/L P		9	.493333	.286094	1.18000	.310000	79/11	80/08
PHOS-DIS		MG/L P		7	.162143	.078525	.262000	.057000	79/12	80/08
T ORG C	C	MG/L		5	16.0000	5.33854	22.0000	10.0000	79/12	80/08
D ORG C	C	MG/L		1	18.0000		18.0000	18.0000	80/03	80/03
CYANIDE	CN-TOT	MG/L		6	.666666	1.53619	3.80000	.010000	79/10	80/04
			K	2	.010000	.000000	.010000	.010000	80/03	80/06
			T	8	.502500	1.33342	3.80000	.010000	79/10	80/06
TOT HARD	CACO3	MG/L		10	211.000	39.1124	277.000	164.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		10	87.3250	46.3580	182.000	2.25000	79/10	80/08
SULFATE	SO4-TOT	MG/L		9	81.4444	10.9673	106.000	66.0000	79/10	80/08
FLUORIDE	F,DISS	MG/L		5	.316000	.047751	.390000	.270000	79/10	80/02
FLUORIDE	F,TOTAL	MG/L		4	.362500	.108744	.480000	.270000	80/03	80/08
			K	1	.010000		.010000	.010000	80/04	80/04
			T	5	.292000	.183631	.480000	.010000	80/03	80/08
SILICA	DISOLVED	MG/L		9	7.63444	1.95345	10.5000	3.80000	79/10	80/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/06
			T	6	5.00000	.000000	5.00000	5.00000	79/11	80/06
CHROMIUM	CR,TOT	UG/L		6	31.6667	4.08264	40.0000	30.0000	79/11	80/04
			K	1	30.0000		30.0000	30.0000	80/06	80/06

TABLE RD 1-15 (Continued)

STATION NUMBER 502020
41 23 43.0 081 37 48.0 2
CUYAHOGA R AT INDEPENDENCE
LAKE ERIE (CUYAHOGA RIVER)
MILES 0013.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L	T	7	31.4286	3.77983	40.0000	30.0000	79/11	80/06
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	5	30.0000	.000000	30.0000	30.0000	80/03	80/08
			T	10	30.0000	.000000	30.0000	30.0000	79/10	80/08
IRON	FE,TOT	UG/L		10	1743.00	775.400	2760.00	850.000	79/10	80/08
LEAD	PB,TOT	UG/L		10	7.80000	3.19027	16.0000	5.00000	79/10	80/08
MANGNESE	MN	UG/L		1	180.000		180.000	180.000	80/06	80/06
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/11	80/02
			K	3	100.000	.000000	100.000	100.000	80/03	80/06
			T	7	100.000	.000000	100.000	100.000	79/11	80/06
ZINC	ZN,TOT	UG/L		8	37.5000	8.86405	50.0000	30.0000	79/10	80/07
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/08
			T	10	36.0000	8.43274	50.0000	30.0000	79/10	80/08
FEC COLI	MFM-FCBR	/100ML		8	25512.5	17757.7	50000.0	3400.00	79/10	80/09
FECSTREP	MF M-ENT	/100ML		8	9037.50	10052.6	27000.0	1400.00	79/10	80/09
PHENOLS	TOTAL	UG/L		10	16.0000	23.0603	81.0000	5.00000	79/10	80/08
DIETHYLP	HTHALATE	TOTWUG/L	K	5	100.000	.000000	100.000	100.000	79/10	80/08
DIMETHYL	PHTHALAT	TOTWUG/L	K	5	100.000	.000000	100.000	100.000	79/10	80/08
MBAS		MG/L		10	.145000	.042753	.210000	.080000	79/10	80/08
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	80/06	80/06
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	80/06	80/06
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	80/06	80/06
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06

TABLE RD 1-15 (Continued)

STATION NUMBER 502020
41 23 43.0 081 37 48.0 2
CUYAHOGA R AT INDEPENDENCE
LAKE ERIE (CUYAHOGA RIVER)
MILES 0013.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	80/06	80/06
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	80/06	80/06
TOXAPHEN		TOTUG/L		1	.000000		.000000	.000000	80/06	80/06
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	80/06	80/06
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	80/06	80/06
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
			K	6	.515000	.036745	.590000	.500000	79/10	80/08
			T	7	.441428	.197521	.590000	.000000	79/10	80/08
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
DIAZINON	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
MIREX	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
RESIDUE	DISS-180	C MG/L		4	484.250	185.052	738.000	296.000	80/04	80/09
PH	CACO3	STABL		1	7.40000		7.40000	7.40000	80/06	80/06
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	79/11	80/02
			K	3	.500000	.000000	.500000	.500000	80/03	80/06
			T	7	.500000	.000000	.500000	.500000	79/11	80/06
DIBUTYL	NONANDOA	TOT UG/L	K	5	100.000	.000000	100.000	100.000	79/10	80/08

TABLE RD 1-16

STATION NUMBER 502160
41 08 07.0 081 32 51.0 2
CUYAHOGA R ABOVE AKRON STP - OLD PORTAGE TRAIL
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0040.30

No data were collected from 10/78 - 9/80.

TABLE RD 1-17

STATION NUMBER 502130
41 26 52.0 081 41 06.0 2
CUYAHOGA R CLEVELAND-HARVARD AVE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0007.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	13.9600	8.37088	25.0000	1.00000	78/10	79/09
TURB	JKSN	JTU		4	84.1999	147.932	306.000	5.30000	79/04	79/09
CNDUCTVY	FIELD	MICROMHO		6	720.833	232.002	1000.00	350.000	78/10	79/09
DO		MG/L		9	7.88889	3.20447	12.2000	4.00000	78/10	79/08
BOD	5 DAY	MG/L		1	10.0000		10.0000	10.0000	79/03	79/03
COD	LOWLEVEL	MG/L		8	26.9750	16.5263	63.7000	10.0000	78/11	79/09
PH		SU		10	7.31000	.344696	7.70000	6.60000	78/10	79/09
T ALK	CACO3	MG/L		7	126.000	26.6646	159.000	87.0000	78/11	79/09
RESIDUE	DISS-105	C MG/L		9	526.666	92.4723	675.000	362.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		9	89.0000	177.976	562.000	10.0000	78/11	79/09
OIL-GRSE	TOT-SXLT	MG/L		1	1340.00		1340.00	1340.00	78/11	78/11
NH3+NH4-	N TOTAL	MG/L		10	2.25400	1.01545	4.24000	.660000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.251000	.193991	.500000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		9	1.58889	.662333	2.53000	.900000	78/10	79/09
TOT KJEL	N	MG/L		10	3.98599	1.62933	6.70000	1.10000	78/10	79/09
PHOS-TOT		MG/L P		9	.469999	.265283	1.00000	.180000	78/10	79/08
PHOS-DIS		MG/L P		5	.170000	.065574	.260000	.100000	78/11	79/08
T ORG C	C	MG/L		4	15.2000	5.49606	19.1000	7.10000	78/11	79/05
CYANIDE	CN-TOT	MG/L		10	.018000	.025298	.090000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		10	221.700	30.7141	269.000	167.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		9	111.778	59.5395	202.000	25.0000	78/11	79/09
SULFATE	SO4-TOT	MG/L		5	101.200	20.4256	134.000	80.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		8	.541249	.200816	.940000	.300000	78/11	79/09
SILICA	DISOLVED	MG/L		4	4.86000	1.29294	6.74000	3.97000	79/03	79/08
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	78/11	79/07
CADMIUM	CD,TOT	UG/L		10	6.90000	3.21282	15.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		10	35.0000	10.8012	60.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		10	34.0000	9.66092	60.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		10	4508.00	7321.67	25000.0	910.000	78/10	79/09
LEAD	PB,TOT	UG/L		10	41.4000	40.3573	130.000	12.0000	78/10	79/09
MANGNESE	MN	UG/L		6	235.000	140.535	510.000	130.000	78/11	79/09
NICKEL	NI,TOTAL	UG/L		6	100.000	.000000	100.000	100.000	79/03	79/09
VANADIUM	V,TOT	UG/L		5	10.0000	.000000	10.0000	10.0000	78/11	79/09
ZINC	ZN,TOT	UG/L		10	156.000	181.488	600.000	40.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		3	466.666	115.471	600.000	400.000	78/11	79/07
SELENIUM	SE,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/11	79/09
FEC COLI	MFM-FCBR	/100ML		6	14383.3	8811.46	24000.0	6000.00	78/11	79/09
FECSTREP	MF M-ENT	/100ML		6	3796.67	2967.30	7800.00	680.000	78/11	79/09
PHENOLS	TOTAL	UG/L		10	15.5000	12.6864	50.0000	6.00000	78/10	79/09
DIETHYLP	HTHALATE	TOTWUG/L	K	4	100.000	.000000	100.000	100.000	78/11	79/08
DIMETHYL	PHTHALAT	TOTWUG/L	K	4	100.000	.000000	100.000	100.000	78/11	79/08

TABLE RD 1-17 (Continued)

STATION NUMBER 502130
41 26 52.0 081 41 06.0 2
CUYAHOGA R CLEVELAND-HARVARD AVE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0007.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MBAS		MG/L		10	.229000	.110901	.500000	.090000	78/10	79/09
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	78/11	78/11
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	78/11	78/11
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	78/11	78/11
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	78/11	78/11
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	78/11	78/11
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	78/11	78/11
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	78/11	78/11
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
PCBS	WHL SMPL	UG/L	K	4	.500000	.000000	.500000	.500000	78/11	79/08
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/11	78/11
MERCURY	HG,TOTAL	UG/L		9	.500000	.000000	.500000	.500000	78/10	79/09
TRICLORO	PENTENE	TOT UG/L	K	1	100.000		100.000	100.000	79/04	79/04
DEHP	ISOMER	TOT UG/L	K	3	100.000	.000000	100.000	100.000	78/11	79/08
DIBUTYL	NONANDOA	TOT UG/L	K	4	100.000	.000000	100.000	100.000	78/11	79/08

TABLE RD 1-18

STATION NUMBER 502130
41 26 52.0 081 41 06.0 2
CUYAHOGA R CLEVELAND-HARVARD AVE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0007.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	12.0909	7.56577	24.0000	1.50000	79/10	80/09
TURB	JKSN	JTU		2	16.0000	1.41421	17.0000	15.0000	79/12	80/01
TURB	TRBIDMTR	HACH FTU		1	17.0000		17.0000	17.0000	80/03	80/03
CNDUCTVY	FIELD	MICROMHO		7	795.571	325.454	1472.00	428.000	79/11	80/09
DO		MG/L		10	8.10999	2.36995	11.2000	4.60000	79/10	80/09
BOD	5 DAY	MG/L		1	8.60000		8.60000	8.60000	80/02	80/02
COD	LOWLEVEL	MG/L		8	34.3500	24.9105	94.4000	15.0000	79/10	80/09
PH		SU		9	7.62222	.156348	8.00000	7.50000	79/10	80/09
LAB	PH	SU		2	7.30000	.000000	7.30000	7.30000	80/04	80/06
T ALK	CACO3	MG/L		5	138.800	52.6281	228.000	102.000	79/11	80/04
RESIDUE	DISS-105	C MG/L		4	522.500	99.9550	620.000	397.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		9	31.5555	19.3269	78.0000	17.0000	79/10	80/09
OIL-GRSE	FREON-GR	MG/L	K	2	5.00000	.000000	5.00000	5.00000	80/08	80/09
NH3+NH4-	N TOTAL	MG/L		11	2.06272	.704053	3.34000	1.39000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.280000	.296817	.900000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		11	1.38909	.428051	2.27000	.910000	79/10	80/09
TOT KJEL	N	MG/L		11	3.06818	.841106	4.46000	2.19000	79/10	80/09
PHOS-TOT		MG/L P		10	.473300	.137686	.760000	.320000	79/11	80/09
PHOS-DIS		MG/L P		1	.120000		.120000	.120000	80/01	80/01
T ORG C	C	MG/L		4	19.5000	3.10913	22.0000	15.0000	79/12	80/03
CYANIDE	CN-TOT	MG/L		6	.039667	.056149	.150000	.010000	79/10	80/09
			K	5	.010000	.000000	.010000	.010000	80/03	80/08
			T	11	.026182	.042619	.150000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		8	203.250	20.6588	245.000	176.000	79/10	80/06
CHLORIDE	TOTAL	MG/L		8	109.375	52.3912	213.000	63.0000	79/10	80/06
SULFATE	SO4-TOT	MG/L		5	82.2000	4.76509	88.0000	75.0000	79/10	80/04
FLUORIDE	F,DISS	MG/L		5	.464000	.075035	.540000	.370000	79/10	80/02
FLUORIDE	F,TOTAL	MG/L		3	.403333	.032153	.440000	.380000	80/03	80/06
SILICA	DISOLVED	MG/L		3	7.99999	.946454	9.06000	7.24000	79/10	80/01
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/06
			T	6	5.00000	.000000	5.00000	5.00000	79/11	80/06
CHROMIUM	CR,TOT	UG/L		5	38.0000	13.0384	60.0000	30.0000	79/11	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/06
			T	7	35.7143	11.3390	60.0000	30.0000	79/11	80/06
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	8	30.0000	.000000	30.0000	30.0000	79/10	80/06
IRON	FE,TOT	UG/L		7	2011.43	800.175	3100.00	910.000	79/10	80/06
LEAD	PB,TOT	UG/L		8	11.5000	4.03555	19.0000	8.00000	79/10	80/06
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	79/11	80/04

TABLE RD 1-18 (Continued)

STATION NUMBER 502130
41 26 52.0 081 41 06.0 2
CUYAHOGA R CLEVELAND-HARVARD AVE
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0007.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
NICKEL	NI,TOTAL	UG/L	K	2	100.000	.000000	100.000	100.000	80/03	80/06
			T	7	100.000	.000000	100.000	100.000	79/11	80/06
ZINC	ZN,TOT	UG/L		8	56.2500	15.9799	90.0000	40.0000	79/10	80/06
FEC COLI	MFM-FCBR	/100ML		7	19185.7	14537.6	41000.0	1300.00	79/10	80/08
FECSTREP	MF M-ENT	/100ML		6	8543.33	12466.5	27000.0	100.000	79/10	80/08
PHENOLS	TOTAL	UG/L		11	11.7273	6.79840	30.0000	5.00000	79/10	80/09
DIETHYLP	HTHALATE	TOTWUG/L	K	1	100.000		100.000	100.000	79/11	79/11
DIMETHYL	PHTHALAT	TOTWUG/L	K	1	100.000		100.000	100.000	79/11	79/11
MBAS		MG/L		8	.180000	.069076	.280000	.090000	79/10	80/06
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	79/11	79/11
RESIDUE	DISS-180	C MG/L		4	412.500	61.5927	479.000	330.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	79/11	80/02
			K	3	.500000	.000000	.500000	.500000	80/03	80/06
			T	7	.500000	.000000	.500000	.500000	79/11	80/06
DIBUTYL	NONANDOA	TOT UG/L	K	1	100.000		100.000	100.000	79/11	79/11

TABLE RD 1-19

STATION NUMBER 502140
41 29 17.0 081 41 07.0 2
CUYAHOGA R AT CLEVELAND-W THIRD
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0003.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	18.1500	4.73765	21.5000	14.8000	78/10	79/09
TURB	JKSN	JTU		1	5.00000		5.00000	5.00000	79/09	79/09
CNDUCTVY	FIELD	MICROMHO		2	712.500	88.3883	775.000	650.000	78/10	79/09
DO		MG/L		1	5.50000		5.50000	5.50000	78/10	78/10
COD	LOWLEVEL	MG/L		1	8.00000		8.00000	8.00000	79/09	79/09
PH		SU		2	6.85000	.212164	7.00000	6.70000	78/10	79/09
T ALK	CACO3	MG/L		2	133.000	9.89949	140.000	126.000	78/10	79/09
RESIDUE	DISS-105	C MG/L		1	506.000		506.000	506.000	79/09	79/09
RESIDUE	TOT NFLT	MG/L		1	10.0000		10.0000	10.0000	79/09	79/09
NH3+NH4-	N TOTAL	MG/L		2	3.41500	.997020	4.12000	2.71000	78/10	79/09
NO2-N	TOTAL	MG/L		2	.150000	.183848	.280000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		2	1.58000	.537402	1.96000	1.20000	78/10	79/09
TOT KJEL	N	MG/L		2	4.01000	.579825	4.42000	3.60000	78/10	79/09
PHOS-TOT		MG/L P		1	.150000		.150000	.150000	78/10	78/10
CYANIDE	CN-TOT	MG/L		2	.090000	.070711	.140000	.040000	78/10	79/09
TOT HARD	CACO3	MG/L		2	229.000	5.65685	233.000	225.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		2	126.000	2.82843	128.000	124.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		2	1.27000	.494977	1.62000	.920000	78/10	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	78/10	78/10
CADMIUM	CD,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		2	860.000	212.132	1010.00	710.000	78/10	79/09
LEAD	PB,TOT	UG/L		2	39.5000	23.3345	56.0000	23.0000	78/10	79/09
MANGNESE	MN	UG/L		2	280.000	42.4264	310.000	250.000	78/10	79/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	78/10	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/09	79/09
ZINC	ZN,TOT	UG/L		2	85.0000	35.3553	110.000	60.0000	78/10	79/09
SELENIUM	SE,TOT	UG/L		2	27.5000	31.8198	50.0000	5.00000	78/10	79/09
FEC COLI	MFM-FCBR	/100ML		1	3900.00		3900.00	3900.00	79/09	79/09
FECSTREP	MF M-ENT	/100ML		1	100.000		100.000	100.000	79/09	79/09
PHENOLS	TOTAL	UG/L		2	12.0000	2.82843	14.0000	10.0000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-20

STATION NUMBER 502140
41 29 17.0 081 41 07.0 2
CUYAHOGA R AT CLEVELAND-W THIRD
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0003.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	18.1667	9.87846	27.0000	7.50000	79/12	80/09
STREAM	STAGE	FEET		3	10.3600	.450558	10.8800	10.1000	80/07	80/09
CNDUCTVY	FIELD	MICROMHO		3	889.333	165.970	1044.00	714.000	79/12	80/08
DO		MG/L		3	4.83333	1.75594	6.50000	3.00000	79/12	80/09
COD	LOWLEVEL	MG/L		2	25.0000	4.24264	28.0000	22.0000	80/08	80/09
PH		SU		4	7.45000	.264656	7.70000	7.10000	79/12	80/09
RESIDUE	DISS-105	C MG/L		1	593.000		593.000	593.000	79/12	79/12
RESIDUE	TOT NFLT	MG/L		3	14.6667	4.16335	18.0000	10.0000	79/12	80/09
OIL-GRSE	FREON-GR	MG/L	K	2	5.00000	.000000	5.00000	5.00000	80/08	80/09
NH3+NH4-	N TOTAL	MG/L		4	3.57250	1.57870	5.51000	2.26000	79/12	80/09
NO2-N	TOTAL	MG/L		3	.473333	.366652	.890000	.200000	79/12	80/09
NO3-N	TOTAL	MG/L		4	1.79750	.432698	2.42000	1.44000	79/12	80/09
TOT KJEL	N	MG/L		4	4.74000	1.73219	7.11000	3.31000	79/12	80/09
PHOS-TOT		MG/L P		4	.386500	.235217	.690000	.160000	79/12	80/09
CYANIDE	CN-TOT	MG/L		4	.082250	.012285	.100000	.072000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	1.80000		1.80000	1.80000	79/12	79/12
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
IRON	FE,TOT	UG/L		1	290.000		290.000	290.000	79/12	79/12
LEAD	PB,TOT	UG/L		1	6.00000		6.00000	6.00000	79/12	79/12
ZINC	ZN,TOT	UG/L		1	90.0000		90.0000	90.0000	79/12	79/12
FEC COLI	MFM-FCBR	/100ML		1	8000.00		8000.00	8000.00	80/08	80/08
FECSTREP	MF M-ENT	/100ML		1	2500.00		2500.00	2500.00	80/08	80/08
PHENOLS	TOTAL	UG/L		4	11.2500	6.55108	21.0000	7.00000	79/12	80/09
RESIDUE	DISS-180	C MG/L		1	518.000		518.000	518.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/12	79/12

TABLE RD 1-21

STATION NUMBER 502120
41 26 48.0 081 41 18.0 2
BIG CRK. AT CLEVELAND
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	8.33333	5.13161	14.0000	4.00000	78/11	79/06
CNDUCTVY	FIELD	MICROMHO		2	731.500	26.1725	750.000	713.000	78/11	79/06
DO		MG/L		3	10.5000	3.08062	13.8000	7.70000	78/11	79/06
BOD	5 DAY	MG/L		1	10.0000		10.0000	10.0000	79/03	79/03
COD	LOWLEVEL	MG/L		3	34.2000	15.5026	43.3000	16.3000	78/11	79/06
PH		SU		3	7.76666	.808344	8.50000	6.90000	78/11	79/06
LAB	PH	SU		1	8.50000		8.50000	8.50000	79/03	79/03
RESIDUE	DISS-105	C MG/L		2	875.000	380.423	1144.00	606.000	79/03	79/06
RESIDUE	TOT NFLT	MG/L		3	16.3333	5.68627	21.0000	10.0000	78/11	79/06
NH3+NH4-	N TOTAL	MG/L		3	2.27000	1.81083	4.36000	1.17000	78/11	79/06
NO2-N	TOTAL	MG/L		3	.176667	.057735	.210000	.110000	78/11	79/06
NO3-N	TOTAL	MG/L		3	.703333	.223683	.900000	.460000	78/11	79/06
TOT KJEL	N	MG/L		3	5.20000	1.44222	6.80000	4.00000	78/11	79/06
PHOS-TOT		MG/L P		3	.783333	.711501	1.52000	.100000	78/11	79/06
TOT HARD	CACO3	MG/L		3	253.667	47.5224	302.000	207.000	78/11	79/06
CHLORIDE	TOTAL	MG/L		3	188.667	194.500	411.000	50.0000	78/11	79/06
FLUORIDE	F,DISS	MG/L		3	1.37667	.393235	1.82000	1.07000	78/11	79/06
CADMIUM	CD,TOT	UG/L		3	13.3333	9.23761	24.0000	8.00000	78/11	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/06
IRON	FE,TOT	UG/L		3	2066.67	1941.58	4300.00	780.000	78/11	79/06
LEAD	PB,TOT	UG/L		3	39.6667	4.50954	44.0000	35.0000	78/11	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/11	79/06
ZINC	ZN,TOT	UG/L		3	350.000	420.000	830.000	50.0000	78/11	79/06
FEC COLI	MFM-FCBR	/100ML		3	57666.7	11676.3	68000.0	45000.0	78/11	79/06
FECSTREP	MF M-ENT	/100ML		3	19433.3	9862.22	29000.0	9300.00	78/11	79/06
PHENOLS	TOTAL	UG/L		3	72.6667	100.201	188.000	7.00000	78/11	79/06
MBAS		MG/L		2	.869999	.551543	1.26000	.480000	78/11	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/11	79/06

TABLE RD 1-22

STATION NUMBER 502120
41 26 48.0 081 41 18.0 2
BIG CRK. AT CLEVELAND
LAKE ERIE 060391 (CUYAHOGA RIVER)
(RIVER MILE 0.3)

PARAMETER			RMK	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	10.4000	6.45562	16.0000	2.00000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	1003.67	262.947	1275.00	750.000	79/12	80/09
DO		MG/L		5	9.21999	1.91628	11.2000	7.00000	79/10	80/09
COD	LOWLEVEL	MG/L		4	36.0750	20.5334	64.3000	16.0000	79/10	80/09
PH		SU		4	7.84999	.341709	8.20000	7.40000	79/10	80/09
LAB	PH	SU		1	7.90000		7.90000	7.90000	80/06	80/06
RESIDUE	DISS-105	C MG/L		2	914.000	432.749	1220.00	608.000	79/10	79/12
RESIDUE	TOT NFLT	MG/L		4	117.750	214.169	439.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/06	80/06
			T	5	96.2000	191.633	439.000	10.0000	79/10	80/09
OIL-GRSE	FREON-GR	MG/L		1	8.00000		8.00000	8.00000	80/03	80/03
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	2	6.50000	2.12132	8.00000	5.00000	80/03	80/09
NH3+NH4-	N TOTAL	MG/L		5	1.73000	1.03959	3.52000	1.00000	79/10	80/09
NO2-N	TOTAL	MG/L		5	.114000	.098133	.220000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		5	.680000	.203348	1.02000	.550000	79/10	80/09
TOT KJEL	N	MG/L		5	2.73800	.640134	3.53000	1.86000	79/10	80/09
PHOS-TOT		MG/L P		5	1.29740	1.72916	4.38000	.380000	79/10	80/09
T ORG C	C	MG/L		1	99.0000		99.0000	99.0000	79/12	79/12
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	80/06	80/06
TOT HARD	CACO3	MG/L		5	261.600	36.3167	306.000	220.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		4	160.750	65.8299	257.000	108.000	79/10	80/09
FLUORIDE	F,DISS	MG/L		2	1.27000	.523259	1.64000	.900000	79/10	80/09
FLUORIDE	F,TOTAL	MG/L		1	1.30000		1.30000	1.30000	80/06	80/06
CADMIUM	CD,TOT	UG/L		2	6.50000	2.12132	8.00000	5.00000	79/10	79/12
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	5	5.60000	1.34165	8.00000	5.00000	79/10	80/09

TABLE RD1-22 (Continued)

STATION NUMBER 502120
41 26 48.0 081 41 18.0 2
BIG CRK. AT CLEVELAND
LAKE ERIE 060391 (CUYAHOGA RIVER)
(RIVER MILE 0.3)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	63.3333	49.3289	120.000	30.0000	79/10	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	5	50.0000	39.3700	120.000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		2	250.000	311.127	470.000	30.0000	79/10	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	5	118.000	196.774	470.000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		5	6088.00	11412.6	26500.0	640.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	80.2000	93.9958	240.000	15.0000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	5	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		5	586.000	962.980	2300.00	70.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		3	46000.0	40951.2	93000.0	18000.0	79/10	80/06
FECSTREP	MF M-ENT	/100ML		3	20256.7	31840.2	57000.0	770.000	79/10	80/06
PHENOLS	TOTAL	UG/L		5	158.600	252.202	600.000	13.0000	79/10	80/09
MBAS		MG/L		5	.673999	.774487	2.05000	.230000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		3	557.000	48.7750	600.000	504.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	79/12
			K	3	.500000	.000000	.500000	.500000	80/03	80/09
			T	5	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-23

STATION NUMBER 502080
41 05 39.0 081 31 44.0 2
L CUYAHOGA BELOW CANAL (AKRON)
LAKE ERIE 050492 (CUYAHOGA RIVER)
MILES 0044.20 0002.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	14.0000	5.40833	20.0000	9.50000	78/11	79/06
STREAM	FLOW	CFS		2	33.5000	9.19239	40.0000	27.0000	79/03	79/06
CNDUCTVY	FIELD	MICROMHO		1	600.000		600.000	600.000	79/06	79/06
DO		MG/L		3	10.2000	1.53952	11.5000	8.50000	78/11	79/06
BOD	5 DAY	MG/L		1	6.00000		6.00000	6.00000	79/03	79/03
COD	LOWLEVEL	MG/L		3	42.7667	47.9244	98.0000	12.2000	78/11	79/06
PH		SU		3	8.10000	.173641	8.20000	7.90000	78/11	79/06
LAB	PH	SU		1	8.20000		8.20000	8.20000	79/03	79/03
RESIDUE	DISS-105	C MG/L		2	547.000	60.8112	590.000	504.000	79/03	79/06
RESIDUE	TOT NFLT	MG/L		3	10.0000	.000000	10.0000	10.0000	78/11	79/06
NH3+NH4-	N TOTAL	MG/L		3	.496667	.174739	.690000	.350000	78/11	79/06
NO2-N	TOTAL	MG/L		3	.146667	.055076	.200000	.090000	78/11	79/06
NO3-N	TOTAL	MG/L		3	.686666	.145030	.830000	.540000	78/11	79/06
TOT KJEL	N	MG/L		3	2.06667	.986578	3.20000	1.40000	78/11	79/06
PHOS-TOT		MG/L P		3	.143333	.063508	.180000	.070000	78/11	79/06
TOT HARD	CACO3	MG/L		3	250.000	33.8083	271.000	211.000	78/11	79/06
CHLORIDE	TOTAL	MG/L		3	99.6667	47.6901	142.000	48.0000	78/11	79/06
FLUORIDE	F,DISS	MG/L		2	.245000	.007076	.250000	.240000	79/03	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/11	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/06
IRON	FE,TOT	UG/L		3	480.000	112.694	550.000	350.000	78/11	79/06
LEAD	PB,TOT	UG/L		3	45.6667	39.8037	90.0000	13.0000	78/11	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/11	79/06
ZINC	ZN,TOT	UG/L		3	62.0000	27.0555	90.0000	36.0000	78/11	79/06
FEC COLI	MFM-FCBR	/100ML		3	51666.7	31564.8	76000.0	16000.0	78/11	79/06
FECSTREP	MF M-ENT	/100ML		3	40333.3	30615.9	75000.0	17000.0	78/11	79/06
PHENOLS	TOTAL	UG/L		3	6.33333	6.65833	14.0000	2.00000	78/11	79/06
MBAS		MG/L		2	.190000	.127279	.280000	.100000	78/11	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/11	79/06

TABLE RD 1-24

STATION NUMBER 502080
41 05 39.0 081 31 44.0 2
L CUYAHOGA BELOW CANAL (AKRON)
LAKE ERIE 050492 (CUYAHOGA RIVER)
MILES 0044.20 0002.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	13.9000	5.12836	20.0000	7.00000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	708.000	100.240	812.000	612.000	79/12	80/09
DO		MG/L		5	9.89999	2.11189	12.8000	7.80000	79/10	80/09
COD	LOWLEVEL	MG/L		4	39.5500	16.9237	60.2000	20.0000	79/10	80/09
PH		SU		3	8.10000	.173663	8.30000	8.00000	79/10	80/03
LAB	PH	SU		2	7.70000	.282846	7.90000	7.50000	80/06	80/09
RESIDUE	DISS-105	C MG/L		1	490.000		490.000	490.000	79/10	79/10
RESIDUE	TOT NFLT	MG/L		3	26.6667	24.6644	55.0000	10.0000	79/10	80/09
			K	2	10.0000	.000000	10.0000	10.0000	79/12	80/03
			T	5	20.0000	19.6850	55.0000	10.0000	79/10	80/09
OIL-GRSE	FREON-GR	MG/L	K	1	5.00000		5.00000	5.00000	80/09	80/09
NH3+NH4-	N TOTAL	MG/L		5	.476000	.271810	.810000	.190000	79/10	80/09
NO2-N	TOTAL	MG/L		5	.184000	.162880	.420000	.020000	79/10	80/09
NO3-N	TOTAL	MG/L		5	.656000	.276189	.980000	.240000	79/10	80/09
TOT KJEL	N	MG/L		5	1.48600	.573264	2.31000	.980000	79/10	80/09
PHOS-TOT		MG/L P		5	.200600	.072848	.273000	.100000	79/10	80/09
T ORG C	C	MG/L		1	16.0000		16.0000	16.0000	79/12	79/12
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	80/06	80/06
TOT HARD	CACO3	MG/L		5	237.000	20.2608	260.000	205.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		3	100.667	10.9703	113.000	92.0000	79/10	80/06
FLUORIDE	F,DISS	MG/L		1	.230000		.230000	.230000	79/10	79/10
FLUORIDE	F,TOTAL	MG/L		1	.240000		.240000	.240000	80/06	80/06
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
			K	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/09

TABLE RD 1-24 (Continued)

STATION NUMBER 502080
41 05 39.0 081 31 44.0 2
L CUYAHOGA BELOW CANAL (AKRON)
LAKE ERIE 050492 (CUYAHOGA RIVER)
MILES 0044.20 0002.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
			K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
			K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		5	780.000	574.804	1800.00	440.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	6.80000	2.94958	12.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/10	79/10
			K	4	100.000	.000000	100.000	100.000	79/12	80/09
			T	5	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		5	60.0000	24.4949	90.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		2	47000.0	26870.0	66000.0	28000.0	79/10	79/12
FECSTREP	MF M-ENT	/100ML		3	24000.0	6244.99	29000.0	17000.0	79/10	80/09
PHENOLS	TOTAL	UG/L		5	10.6000	4.39318	15.0000	5.00000	79/10	80/09
MBAS		MG/L		5	.140000	.059582	.220000	.080000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		4	481.000	61.7630	550.000	402.000	79/12	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10
			K	3	2.00000	2.59808	5.00000	.500000	80/03	80/09
			T	4	1.62500	2.25000	5.00000	.500000	79/10	80/09

TABLE RD 1-25

STATION NUMBER 502110
41 25 04.0 081 38 18.0 2
MILL CRK. AT CANAL
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	7.60000	5.28490	12.5000	2.00000	78/11	79/06
CNDUCTVY	FIELD	MICROMHO		2	1000.00	.000000	1000.00	1000.00	78/11	79/06
DO		MG/L		3	10.1333	3.30054	13.8000	7.40000	78/11	79/06
BOD	5 DAY	MG/L		1	9.00000		9.00000	9.00000	79/03	79/03
COD	LOWLEVEL	MG/L		3	30.1667	6.72635	34.1000	22.4000	78/11	79/06
PH		SU		3	7.46666	.305650	7.80000	7.20000	78/11	79/06
RESIDUE	DISS-105	C MG/L		3	970.333	195.466	1196.00	854.000	78/11	79/06
RESIDUE	TOT NFLT	MG/L		3	30.6667	13.4289	46.0000	21.0000	78/11	79/06
NH3+NH4-	N TOTAL	MG/L		3	6.19000	2.78557	8.62000	3.15000	78/11	79/06
NO2-N	TOTAL	MG/L		3	.196667	.219621	.450000	.060000	78/11	79/06
NO3-N	TOTAL	MG/L		3	.833333	.412352	1.16000	.370000	78/11	79/06
TOT KJEL	N	MG/L		3	9.53333	2.56973	11.9000	6.80000	78/11	79/06
PHOS-TOT		MG/L P		3	.260000	.190000	.470000	.100000	78/11	79/06
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	78/11	78/11
TOT HARD	CACO3	MG/L		3	362.666	20.6042	386.000	347.000	78/11	79/06
CHLORIDE	TOTAL	MG/L		2	256.000	258.801	439.000	73.0000	79/03	79/06
FLUORIDE	F,DISS	MG/L		2	.630000	.070717	.680000	.580000	79/03	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/11	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/06
COPPER	CU,TOT	UG/L		3	53.3333	32.1455	90.0000	30.0000	78/11	79/06
IRON	FE,TOT	UG/L		3	4400.00	608.276	5100.00	4000.00	78/11	79/06
LEAD	PB,TOT	UG/L		3	8.66667	4.61881	14.0000	6.00000	78/11	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/11	79/06
ZINC	ZN,TOT	UG/L		3	280.000	79.3725	340.000	190.000	78/11	79/06
FEC COLI	MFM-FCBR	/100ML		2	24950.0	22698.1	41000.0	8900.00	79/03	79/06
FECSTREP	MF M-ENT	/100ML		2	23000.0	22627.4	39000.0	7000.00	79/03	79/06
PHENOLS	TOTAL	UG/L		3	4.00000	2.00000	6.00000	2.00000	78/11	79/06
MBAS		MG/L		2	.430000	.240416	.600000	.260000	78/11	79/06
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/03	79/06

TABLE RD 1-26

STATION NUMBER 502110
41 25 04.0 081 38 18.0 2
MILL CRK. AT CANAL
LAKE ERIE 060391 (CUYAHOGA RIVER)
MILES 0000.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	9.20000	6.19072	15.0000	.500000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	1404.67	482.059	1938.00	1000.00	79/12	80/09
DO		MG/L		5	9.35999	2.94841	13.5000	6.60000	79/10	80/09
COD	LOWLEVEL	MG/L		5	55.1200	51.6505	144.600	20.0000	79/10	80/09
PH		SU		3	7.23333	.288785	7.40000	6.90000	79/10	80/03
LAB	PH	SU		2	6.90000	.282819	7.10000	6.70000	80/06	80/09
RESIDUE	DISS-105	C MG/L		2	1354.00	814.587	1930.00	778.000	79/10	79/12
RESIDUE	TOT NFLT	MG/L		5	30.2000	11.4979	46.0000	22.0000	79/10	80/09
OIL-GRSE	FREON-GR	MG/L	K	1	5.00000		5.00000	5.00000	80/09	80/09
NH3+NH4-	N TOTAL	MG/L		5	5.88000	1.76302	7.70000	3.32000	79/10	80/09
NO2-N	TOTAL	MG/L		5	.118000	.108259	.310000	.050000	79/10	80/09
NO3-N	TOTAL	MG/L		5	.713999	.298463	1.13000	.370000	79/10	80/09
TOT KJEL	N	MG/L		5	7.44799	1.83627	9.27000	4.70000	79/10	80/09
PHOS-TOT		MG/L P		5	.501400	.182141	.740000	.280000	79/10	80/09
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	80/06	80/06
TOT HARD	CACO3	MG/L		5	348.600	39.9930	417.000	316.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		4	237.250	90.6913	373.000	184.000	79/10	80/09
FLUORIDE	F,DISS	MG/L		1	.510000		.510000	.510000	79/10	79/10
FLUORIDE	F,TOTAL	MG/L		1	.790000		.790000	.790000	80/06	80/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	79/12
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		4	42.5000	12.5831	60.0000	30.0000	79/10	80/06
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	5	40.0000	12.2474	60.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		5	1458.00	3153.98	7100.00	40.0000	79/10	80/09
IRON	FE,TOT	UG/L		5	6030.00	3729.54	12600.0	3900.00	79/10	80/09
LEAD	PB,TOT	UG/L		5	12.0000	10.7238	31.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	79/12
			K	3	100.000	.000000	100.000	100.000	80/03	80/09
			T	5	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		5	214.000	35.0713	260.000	170.000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		4	29275.0	21018.3	52000.0	2100.00	79/10	80/09
FECSTREP	MF M-ENT	/100ML		4	18125.0	24585.5	55000.0	5600.00	79/10	80/09
PHENOLS	TOTAL	UG/L		5	10.4000	2.60769	12.0000	6.00000	79/10	80/09
MBAS		MG/L		5	.509999	.318826	1.05000	.260000	79/10	80/09
RESIDUE	DISS-180	C MG/L		3	876.666	144.575	1042.00	774.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10
			K	3	.500000	.000000	.500000	.500000	80/03	80/09
			T	4	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-27

STATION NUMBER 502220
41 23 04.0 081 31 39.0 2
TINKERS CRK AT BEDFORD
LAKE ERIE (CUYAHOGA RIVER)
MILES 0017.80 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	1.00000		1.00000	1.00000	78/12	78/12
STREAM	FLOW	CFS		1	83.0000		83.0000	83.0000	78/12	78/12
CNDUCTVY	FIELD	MICROMHO		1	400.000		400.000	400.000	78/12	78/12
DO		MG/L		1	12.7000		12.7000	12.7000	78/12	78/12
COD	LOWLEVEL	MG/L		1	31.0000		31.0000	31.0000	78/12	78/12
PH		SU		1	7.90000		7.90000	7.90000	78/12	78/12
RESIDUE	DISS-105	C MG/L		1	465.000		465.000	465.000	78/12	78/12
RESIDUE	TOT NFLT	MG/L		1	18.0000		18.0000	18.0000	78/12	78/12
NH3+NH4-	N TOTAL	MG/L		1	1.41000		1.41000	1.41000	78/12	78/12
TOT KJEL	N	MG/L		1	2.40000		2.40000	2.40000	78/12	78/12
PHOS-TOT		MG/L P		1	1.68000		1.68000	1.68000	78/12	78/12
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	78/12	78/12
TOT HARD	CACO3	MG/L		1	222.000		222.000	222.000	78/12	78/12
CHLORIDE	TOTAL	MG/L		1	116.000		116.000	116.000	78/12	78/12
FLUORIDE	F,DISS	MG/L		1	.460000		.460000	.460000	78/12	78/12
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	78/12	78/12
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
IRON	FE,TOT	UG/L		1	1180.00		1180.00	1180.00	78/12	78/12
LEAD	PB,TOT	UG/L		1	120.000		120.000	120.000	78/12	78/12
ZINC	ZN,TOT	UG/L		1	60.0000		60.0000	60.0000	78/12	78/12
FEC COLI	MFM-FCBR	/100ML		1	5000.00		5000.00	5000.00	78/12	78/12
FECSTREP	MF M-ENT	/100ML		1	32000.0		32000.0	32000.0	78/12	78/12
PHENOLS	TOTAL	UG/L		1	13.0000		13.0000	13.0000	78/12	78/12
MBAS		MG/L		1	.260000		.260000	.260000	78/12	78/12
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	78/12	78/12

TABLE RD 1-28

STATION NUMBER 502220
41 23 04.0 081 31 39.0 2
TINKERS CRK AT BEDFORD
LAKE ERIE (CUYAHOGA RIVER)
MILES 0017.80 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	9.10000	5.77062	14.5000	.000000	79/10	80/09
STREAM	FLOW	CFS		3	43.6667	12.2203	57.0000	33.0000	79/10	79/12
STREAM	FLOW,	INST-CFS		6	71.1833	53.5323	173.300	25.6000	79/10	80/09
STREAM	STAGE	FEET		2	2.94000	.098975	3.01000	2.87000	80/06	80/09
CNDUCTVY	FIELD	MICROMHO		4	651.750	64.6142	700.000	561.000	79/11	80/09
DO		MG/L		5	10.1600	1.98321	13.4000	8.60000	79/10	80/09
COD	LOWLEVEL	MG/L		6	36.2167	21.7532	78.3000	19.0000	79/10	80/09
PH		SU		3	7.63333	.115647	7.70000	7.50000	79/10	79/12
LAB	PH	SU		2	7.35000	.212164	7.50000	7.20000	80/06	80/09
RESIDUE	DISS-105	C MG/L		3	438.666	93.8326	547.000	383.000	79/10	79/12
RESIDUE	TOT NFLT	MG/L		6	16.0000	5.32916	23.0000	10.0000	79/10	80/09
OIL-GRSE	FREON-GR	MG/L	K	1	5.00000		5.00000	5.00000	80/09	80/09
NH3+NH4-	N TOTAL	MG/L		5	.940000	.531178	1.70000	.410000	79/10	80/09
NO2-N	TOTAL	MG/L		5	.148000	.171523	.340000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		5	1.97000	1.27675	4.02000	1.04000	79/10	80/09
TOT KJEL	N	MG/L		4	1.95250	.511816	2.70000	1.58000	79/10	80/09
PHOS-TOT		MG/L P		5	1.31800	.897425	2.87000	.640000	79/10	80/09
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	80/06	80/06
TOT HARD	CACO3	MG/L		5	244.600	49.9382	324.000	202.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		3	108.667	49.3594	165.000	73.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		1	.340000		.340000	.340000	79/10	79/10
FLUORIDE	F,TOTAL	MG/L		1	.430000		.430000	.430000	80/06	80/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	79/11
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/09

TABLE RD 1-28 (Continued)

STATION NUMBER 502220
41 23 04.0 081 31 39.0 2
TINKERS CRK AT BEDFORD
LAKE ERIE (CUYAHOGA RIVER)
MILES 0017.80 0005.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		4	1185.00	209.364	1420.00	980.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	206.667	340.643	600.000	8.00000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/06	80/06
			T	4	156.250	295.847	600.000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/11	79/11
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	3	100.000	.000000	100.000	100.000	79/11	80/09
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		4	2200.00	2278.87	5200.00	130.000	79/10	80/09
FECSTREP	MF M-ENT	/100ML		4	4455.00	8363.46	17000.0	230.000	79/10	80/09
PHENOLS	TOTAL	UG/L		5	8.20000	5.84808	18.0000	4.00000	79/10	80/09
MBAS		MG/L		4	.220000	.038297	.270000	.190000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		3	504.666	153.901	682.000	406.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	79/11
			K	2	.500000	.000000	.500000	.500000	80/06	80/09
			T	4	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-29

STATION NUMBER 504250
41 34 27.0 081 34 10.0 2
EUCLID CRK AT EUCLID
LAKE ERIE (EUCLID CREEK)
MILES 0001.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.0833	7.27647	22.0000	.500000	78/10	79/09
STREAM	FLOW	CFS		12	50.4083	70.9866	190.000	2.00000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		12	605.000	270.202	1300.00	370.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	2420.00		2420.00	2420.00	79/01	79/01
DO		MG/L		12	10.7833	2.05022	13.5000	7.30000	78/10	79/09
BOD	5 DAY	MG/L		1	1.70000		1.70000	1.70000	78/10	78/10
COD	LOWLEVEL	MG/L		11	12.4909	7.43081	26.0000	4.00000	78/10	79/09
PH		SU		11	7.32727	.241203	7.50000	6.70000	78/11	79/09
LAB	PH	SU		1	7.60000		7.60000	7.60000	79/01	79/01
RESIDUE	DISS-105	C MG/L		8	567.875	327.176	1356.00	373.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		11	15.4545	6.97659	30.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.755000	.616640	2.35000	.100000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.036667	.027743	.090000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.11917	.242246	1.45000	.750000	78/10	79/09
TOT KJEL	N	MG/L		12	1.28500	.813216	3.16000	.500000	78/10	79/09
PHOS-TOT		MG/L P		11	.174545	.132391	.520000	.050000	78/10	79/09
PHOS-DIS		MG/L P		2	.050000	.000061	.050000	.050000	78/10	78/10
TOT HARD	CACO3	MG/L		13	194.846	20.2316	242.000	167.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		11	178.545	199.170	655.000	35.0000	78/10	79/09
SILICA	DISOLVED	MG/L		1	5.54000		5.54000	5.54000	78/10	78/10
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	78/10	78/10
CADMIUM	CD,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		13	41.5384	41.6025	180.000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		12	4048.33	816.534	5000.00	2660.00	78/10	79/09
LEAD	PB,TOT	UG/L		12	30.6667	48.6459	160.000	5.00000	78/10	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/07
ZINC	ZN,TOT	UG/L		11	63.6363	95.7364	350.000	30.0000	78/11	79/09
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
BETA	TOTAL	PC/L		1	8.00000		8.00000	8.00000	78/10	78/10
FEC COLI	MFM-FCBR	/100ML		11	7125.45	8454.12	26000.0	230.000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		11	2478.18	2624.02	8100.00	130.000	78/10	79/09
PHENOLS	TOTAL	UG/L		13	5.00000	5.22813	16.0000	2.00000	78/10	79/09
MBAS		MG/L		2	.090000	.000000	.090000	.090000	78/10	78/10

TABLE RD 1-29 (Continued)

STATION NUMBER 504250
41 34 27.0 081 34 10.0 2
EUCLID CRK AT EUCLID
LAKE ERIE (EUCLID CREEK)
MILES 0001.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	78/10	78/10
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	78/10	78/10
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MERCURY	HG,TOTAL	UG/L		5	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-30

STATION NUMBER 504250
41 34 27.0 081 34 10.0 2
EUCLID CRK AT EUCLID
LAKE ERIE (EUCLID CREEK)
MILES 0001.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.5417	7.74438	22.0000	.500000	79/10	80/09
STREAM	FLOW	CFS		5	32.2200	39.1539	99.5000	3.90000	79/10	80/02
STREAM	FLOW,	INST-CFS		5	27.4860	22.9818	52.2000	3.98000	80/03	80/09
STREAM	STAGE	FEET		7	.908571	.362741	1.57000	.550000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		11	478.763	255.812	900.000	11.4000	79/10	80/09
DO		MG/L		11	11.4182	3.51761	18.4000	8.40000	79/11	80/09
COD	LOWLEVEL	MG/L		12	18.7000	12.2170	38.2000	4.00000	79/10	80/09
PH		SU		9	7.53333	.269276	7.80000	7.00000	79/10	80/09
LAB	PH	SU		3	7.33333	.208409	7.50000	7.10000	80/04	80/08
RESIDUE	DISS-105	C MG/L		4	423.000	119.794	578.000	294.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		7	16.1428	7.77665	29.0000	10.0000	79/10	80/07
			K	5	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	12	13.5833	6.55686	29.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	.420000	.191833	.820000	.220000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.024167	.025030	.100000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	.950833	.351295	1.46000	.370000	79/10	80/09
TOT KJEL	N	MG/L		11	.994545	.328431	1.60000	.510000	79/11	80/09
PHOS-TOT		MG/L P		10	.209700	.088507	.380000	.102000	79/12	80/09
TOT HARD	CACO3	MG/L		12	183.500	28.4653	232.000	146.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		11	126.545	82.8920	334.000	46.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	4	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	6	5.00000	.000000	5.00000	5.00000	79/10	80/09

TABLE RD 1-30 (Continued)

STATION NUMBER 504250
41 34 27.0 081 34 10.0 2
EUCLID CRK AT EUCLID
LAKE ERIE (EUCLID CREEK)
MILES 0001.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	7	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	12	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		12	1285.83	436.190	2030.00	640.000	79/10	80/09
LEAD	PB,TOT	UG/L		8	7.25000	3.95510	15.0000	5.00000	79/10	80/07
			K	4	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	12	6.50000	3.34392	15.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		1	100.000		100.000	100.000	80/09	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	4	100.000	.000000	100.000	100.000	80/03	80/09
			T	6	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	6	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	12	30.0000	.000000	30.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		9	15225.6	10755.6	35000.0	130.000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		9	11616.7	12481.5	38000.0	250.000	79/10	80/08
PHENOLS	TOTAL	UG/L		12	4.66667	4.55937	18.0000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		5	459.800	196.017	770.000	259.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.900000	.692820	1.70000	.500000	79/10	80/09
			K	3	.500000	.000000	.500000	.500000	80/03	80/07
			T	6	.700000	.489898	1.70000	.500000	79/10	80/09

TABLE RD 1-31

STATION NUMBER 502530
41 43 09.0 081 13 41.0 2
GRAND R NR PAINESVILLE - RT 84
LAKE ERIE (GRAND RIVER)
MILES 0008.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.2917	8.36241	24.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	813.636	923.087	2362.00	30.0000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		12	285.000	101.310	460.000	150.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	900.000		900.000	900.000	79/02	79/02
DO		MG/L		12	10.5000	2.50673	14.2000	6.90000	78/10	79/09
BOD	5 DAY	MG/L		1	1.10000		1.10000	1.10000	78/10	78/10
COD	LOWLEVEL	MG/L		12	14.4333	6.67647	24.0000	4.00000	78/10	79/09
PH		SU		12	7.43333	.374970	8.00000	6.50000	78/10	79/09
LAB	PH	SU		1	7.30000		7.30000	7.30000	79/02	79/02
RESIDUE	DISS-105	C MG/L		9	285.222	100.762	498.000	162.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	15.1667	9.25236	38.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.077500	.047887	.210000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		11	.010000	.000007	.010000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		11	.453636	.419220	1.39000	.050000	78/10	79/09
TOT KJEL	N	MG/L		11	.490909	.234327	.800000	.100000	78/10	79/09
PHOS-TOT		MG/L P		10	.087000	.075726	.290000	.050000	78/10	79/09
PHOS-DIS		MG/L P		1	.050000		.050000	.050000	78/10	78/10
TOT HARD	CACO3	MG/L		4	136.750	48.0928	181.000	80.0000	78/10	79/07
CHLORIDE	TOTAL	MG/L		2	50.0000	2.82843	52.0000	48.0000	78/10	79/08
SILICA	DISOLVED	MG/L		1	3.43000		3.43000	3.43000	78/10	78/10
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	78/10	78/10
CADMIUM	CD,TOT	UG/L		4	5.25000	.500000	6.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		4	745.000	502.958	1450.00	350.000	78/10	79/07
LEAD	PB,TOT	UG/L		4	42.0000	39.4715	80.0000	5.00000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/07
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/07
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
BETA	TOTAL	PC/L		1	6.00000		6.00000	6.00000	78/10	78/10
FEC COLI	MFM-FCBR	/100ML		11	144.364	126.162	440.000	7.00000	78/10	79/09
			K	1	4.00000		4.00000	4.00000	79/03	79/03
			T	12	132.667	126.932	440.000	4.00000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		12	427.333	466.864	1400.00	20.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	3.50000	3.00000	8.00000	2.00000	78/10	79/07
MBAS		MG/L		1	.060000		.060000	.060000	78/10	78/10
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	78/10	78/10
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10

TABLE RD 1-31 (Continued)

STATION NUMBER 502530
41 43 09.0 081 13 41.0 2
GRAND R NR PAINESVILLE - RT 84
LAKE ERIE (GRAND RIVER)
MILES 0008.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-32

STATION NUMBER 502530
41 43 09.0 081 13 41.0 2
GRAND R NR PAINESVILLE - RT 84
LAKE ERIE (GRAND RIVER)
MILES 0008.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	11.0500	9.32872	28.0000	.000000	79/10	80/08
			M	1	-.100E+01		-.100E+01	-.100E+01	80/02	80/02
			T	11	9.95454	9.56675	28.0000	-.100E+01	79/10	80/08
STREAM	FLOW	CFS		5	743.200	488.094	1410.00	232.000	79/10	80/02
STREAM	FLOW,	INST-CFS		5	1164.04	929.204	2610.00	196.000	80/03	80/07
STREAM	STAGE	FEET		6	3.19166	1.22996	5.25000	2.08000	80/03	80/08
CNDUCTVY	FIELD	MICROMHO		11	219.727	87.1024	332.000	80.0000	79/10	80/08
DO		MG/L		10	11.2200	3.63037	18.2000	6.60000	79/11	80/08
COD	LOWLEVEL	MG/L		10	14.1300	5.59842	20.0000	4.00000	79/10	80/08
PH		SU		8	7.47499	.620520	8.10000	6.10000	79/10	80/07
LAB	PH	SU		3	7.56667	.057807	7.60000	7.50000	80/04	80/08
RESIDUE	DISS-105	C MG/L		4	200.500	48.5627	248.000	138.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		9	27.1111	28.2553	97.0000	10.0000	79/10	80/07
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/08
			T	11	24.0000	26.2030	97.0000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		8	.085000	.027775	.130000	.050000	79/10	80/07
			K	3	.050000	.000075	.050000	.050000	80/04	80/08
			T	11	.075454	.028413	.130000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		11	.012727	.004671	.020000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		11	.381818	.221577	.660000	.050000	79/10	80/08
TOT KJEL	N	MG/L		9	3.00666	7.87505	24.0000	.050000	79/10	80/08
PHOS-TOT		MG/L P		9	1.15411	3.31727	10.0000	.020000	79/12	80/08
TOT HARD	CACO3	MG/L		6	104.000	29.9800	147.000	71.0000	80/01	80/07
ARSENIC	AS,TOT	UG/L		4	10.0000	.000000	10.0000	10.0000	79/11	80/02
			K	4	10.0000	.000000	10.0000	10.0000	80/03	80/08
			T	8	10.0000	.000000	10.0000	10.0000	79/11	80/08
CADMIUM	CD,TOT	UG/L		5	6.00000	2.23607	10.0000	5.00000	79/10	80/02
			K	5	5.00000	.000000	5.00000	5.00000	80/03	80/08
			T	10	5.50000	1.58114	10.0000	5.00000	79/10	80/08
CHROMIUM	HEX-VAL	UG/L		3	30.0000	.000000	30.0000	30.0000	79/12	80/02
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/04
CHROMIUM	CR,TOT	UG/L		6	38.3333	20.4124	80.0000	30.0000	79/10	80/03
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/08
			T	11	34.5454	15.0756	80.0000	30.0000	79/10	80/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		5	2192.00	2089.75	5600.00	400.000	79/10	80/07
LEAD	PB,TOT	UG/L		6	5.50000	1.22474	8.00000	5.00000	79/10	80/03
			K	4	5.00000	.000000	5.00000	5.00000	80/05	80/08

TABLE RD 1-32 (Continued)

STATION NUMBER 502530
41 43 09.0 081 13 41.0 2
GRAND R NR PAINESVILLE - RT 84
LAKE ERIE (GRAND RIVER)
MILES 0008.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L	T	10	5.30000	.948703	8.00000	5.00000	79/10	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	3	100.000	.000000	100.000	100.000	80/03	80/07
			T	5	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		10	323.600	419.761	1400.00	15.0000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		10	1565.86	2870.79	8400.00	2.60000	79/10	80/08
PHENOLS	TOTAL	UG/L		6	2.83333	1.32916	5.00000	2.00000	79/10	80/07
RESIDUE	DISS-180 C	MG/L		4	165.500	22.1133	194.000	148.000	80/03	80/06
MERCURY	HG,TOTAL	UG/L		5	.600000	.223607	1.00000	.500000	79/10	80/07
			K	4	.500000	.000000	.500000	.500000	80/03	80/08
			T	9	.555555	.166667	1.00000	.500000	79/10	80/08

TABLE RD 1-33

STATION NUMBER 502520
41 44 09.0 081 15 59.0 2
GRAND R AT PAINESVILLE
LAKE ERIE 060691 (GRAND RIVER)
MILES 0002.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	11.5000	9.04710	26.0000	.000000	78/11	79/09
STREAM	FLOW	CFS		1	2290.00		2290.00	2290.00	79/09	79/09
TURB	JKSN	JTU		10	11.0800	18.0953	62.0000	2.40000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		12	1412.92	1662.97	6400.00	250.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		2	1725.00	1237.44	2600.00	850.000	79/01	79/02
DO		MG/L		11	10.2182	2.61948	14.4000	5.40000	78/11	79/09
BOD	5 DAY	MG/L		1	1.10000		1.10000	1.10000	78/10	78/10
COD	LOWLEVEL	MG/L		12	15.9917	6.32505	28.1000	5.60000	78/10	79/09
PH		SU		12	7.29166	.355369	7.80000	6.50000	78/10	79/09
LAB	PH	SU		2	7.55000	.070745	7.60000	7.50000	79/01	79/02
T ALK	CACO3	MG/L		11	68.0909	24.9739	102.000	31.0000	78/11	79/09
RESIDUE	DISS-105	C MG/L		11	1099.00	604.725	2324.00	282.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	16.5833	9.60548	36.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.285000	.219896	.690000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.017500	.012881	.050000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.550000	.368214	1.28000	.090000	78/10	79/09
TOT KJEL	N	MG/L		11	.809090	.339779	1.37000	.100000	78/10	79/09
PHOS-TOT		MG/L P		12	.093333	.101205	.410000	.050000	78/10	79/09
PHOS-DIS		MG/L P		8	.051250	.003536	.060000	.050000	78/11	79/07
T ORG C	C	MG/L		6	19.4833	23.1617	66.0000	5.60000	78/11	79/05
D ORG C	C	MG/L		3	6.03333	1.87708	8.20000	4.90000	78/11	79/01
TOT HARD	CACO3	MG/L		12	419.083	245.877	938.000	86.0000	78/10	79/09
CHLORIDE	TOTAL	MG/L		10	344.000	346.970	1070.00	26.0000	78/12	79/09
SULFATE	SO4-TOT	MG/L		11	48.0909	20.0473	79.0000	13.0000	78/11	79/09
SILICA	DISOLVED	MG/L		11	3.85272	2.40282	7.03000	.430000	78/11	79/09
ARSENIC	AS,TOT	UG/L		1	20.0000		20.0000	20.0000	79/07	79/07
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/09

TABLE RD 1-33 (Continued)

STATION NUMBER 502520
41 44 09.0 081 15 59.0 2
GRAND R AT PAINESVILLE
LAKE ERIE 060691 (GRAND RIVER)
MILES 0002.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
CHROMIUM	CR,TOT	UG/L		5	40.0000	14.1421	60.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		12	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		5	1076.00	867.888	2580.00	380.000	79/01	79/09
LEAD	PB,TOT	UG/L		6	10.3333	9.04802	28.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		1	90.0000		90.0000	90.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		6	100.000	.000000	100.000	100.000	78/10	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		12	30.0000	.000000	30.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		12	1234.17	1830.47	6600.00	130.000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		12	621.166	832.491	2500.00	40.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	5.83333	5.14929	18.0000	2.00000	78/10	79/09
MBAS		MG/L		11	.160000	.073892	.280000	.070000	78/11	79/09
MERCURY	HG,TOTAL	UG/L		6	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-34

STATION NUMBER 502520
41 44 09.0 081 15 59.0 2
GRAND R AT PAINESVILLE
LAKE ERIE 060691 (GRAND RIVER)
MILES 0002.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	11.4500	9.37920	28.0000	.000000	79/10	80/08
			M	1	-.100E+01		-.100E+01	-.100E+01	80/02	80/02
			T	11	10.3182	9.65731	28.0000	-.100E+01	79/10	80/08
TURB	JKSN	JTU		3	9.56666	4.46583	14.5000	5.80000	79/10	79/12
TURB	TRBIDMTR	HACH FTU		7	16.8286	12.0260	35.0000	4.00000	80/01	80/08
CNDUCTVY	FIELD	MICROMHO		11	900.636	661.485	2000.00	230.000	79/10	80/08
DO		MG/L		11	10.7182	2.75894	15.7000	6.90000	79/10	80/08
COD	LOWLEVEL	MG/L		11	21.9909	11.7458	46.0000	4.00000	79/10	80/08
PH		SU		8	7.44999	.434259	8.00000	6.60000	79/10	80/07
LAB	PH	SU		3	7.23333	.208335	7.40000	7.00000	80/04	80/08
T ALK	CACO3	MG/L		9	71.0000	33.6489	143.000	37.0000	79/11	80/08
PHEN-PH-	LFIN ALK	MG/L		1	63.0000		63.0000	63.0000	80/07	80/07
RESIDUE	DISS-105	C MG/L		5	693.600	435.703	1286.00	278.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		11	30.6363	30.9977	115.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		11	.166363	.098618	.410000	.060000	79/10	80/08
NO2-N	TOTAL	MG/L		9	.017778	.009718	.030000	.010000	79/10	80/06
NO3-N	TOTAL	MG/L		11	.553636	.305950	1.05000	.050000	79/10	80/08
TOT KJEL	N	MG/L		11	1.10364	1.59384	5.85000	.270000	79/10	80/08
PHOS-TOT		MG/L P		9	.097333	.026491	.140000	.061000	79/12	80/08
PHOS-DIS		MG/L P		6	.031500	.009995	.050000	.020000	80/02	80/07
			K	1	.020000		.020000	.020000	80/08	80/08
			T	7	.029857	.010107	.050000	.020000	80/02	80/08
T ORG C	C	MG/L		7	11.2857	1.70436	14.0000	9.00000	79/12	80/08
D ORG C	C	MG/L		3	10.6667	1.15477	12.0000	10.0000	80/03	80/08
TOT HARD	CACO3	MG/L		11	300.364	178.479	576.000	95.0000	79/10	80/08
CHLORIDE	TOTAL	MG/L		10	232.700	175.728	500.000	48.0000	79/10	80/08
SULFATE	SO4-TOT	MG/L		10	42.4000	9.20395	62.0000	32.0000	79/10	80/08
SILICA	DISOLVED	MG/L		9	5.33444	1.02112	6.90000	3.95000	79/10	80/08
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/11	79/12
			K	6	8.50000	3.67423	10.0000	1.00000	80/01	80/08
			T	8	8.87500	3.18198	10.0000	1.00000	79/11	80/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	79/12
			K	7	5.71428	1.88983	10.0000	5.00000	80/01	80/08
			T	10	5.50000	1.58114	10.0000	5.00000	79/10	80/08
CHROMIUM	HEX-VAL	UG/L		2	42.0000	16.9706	54.0000	30.0000	79/12	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/01	80/04
			T	4	36.0000	12.0000	54.0000	30.0000	79/12	80/04
CHROMIUM	CR,TOT	UG/L		7	43.5714	12.4882	60.0000	30.0000	79/10	80/05
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/08
			T	11	38.6363	11.8514	60.0000	30.0000	79/10	80/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	79/12

TABLE RD 1-34 (Continued)

STATION NUMBER 502520
41 44 09.0 081 15 59.0 2
GRAND R AT PAINESVILLE
LAKE ERIE 060691 (GRAND RIVER)
MILES 0002.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	K	7	30.0000	.000000	30.0000	30.0000	80/01	80/08
			T	10	30.0000	.000000	30.0000	30.0000	79/10	80/08
IRON	FE,TOT	UG/L		5	2332.00	1487.45	4550.00	840.000	79/10	80/07
LEAD	PB,TOT	UG/L		4	5.75000	1.50000	8.00000	5.00000	79/10	80/03
			K	5	7.00000	2.73861	10.0000	5.00000	80/01	80/08
			T	9	6.44444	2.24228	10.0000	5.00000	79/10	80/08
MANGNESE	MN	UG/L		3	120.000	51.9615	180.000	90.0000	80/01	80/07
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/10	79/10
			K	4	100.000	.000000	100.000	100.000	80/01	80/07
			T	5	100.000	.000000	100.000	100.000	79/10	80/07
VANADIUM	V,TOT	UG/L		1	20.0000		20.0000	20.0000	79/10	79/10
			K	3	10.0000	.000000	10.0000	10.0000	80/01	80/07
			T	4	12.5000	5.00000	20.0000	10.0000	79/10	80/07
ZINC	ZN,TOT	UG/L		3	36.6667	11.5471	50.0000	30.0000	79/11	80/02
			K	7	30.0000	.000000	30.0000	30.0000	80/01	80/08
			T	10	32.0000	6.32456	50.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		3	816.666	682.520	1550.00	200.000	80/01	80/07
SELENIUM	SE,TOT	UG/L	K	3	8.33333	2.88676	10.0000	5.00000	80/01	80/07
FEC COLI	MFM-FCBR	/100ML		10	933.500	1275.33	3900.00	45.0000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		10	2080.00	3125.33	9200.00	20.0000	79/10	80/08
PHENOLS	TOTAL	UG/L		9	4.88889	1.26930	7.00000	3.00000	79/10	80/07
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	10	4.60000	1.50555	7.00000	2.00000	79/10	80/07
MBAS		MG/L		9	.117778	.042065	.190000	.070000	79/11	80/08
RESIDUE	DISS-180 C	MG/L		6	764.166	536.861	1410.00	208.000	80/03	80/08
MERCURY	HG,TOTAL	UG/L		2	.550000	.070715	.600000	.500000	79/10	79/11
			K	7	.500000	.000000	.500000	.500000	80/01	80/08
			T	9	.511111	.033336	.600000	.500000	79/10	80/08

TABLE RD 1-35

STATION NUMBER 600000
40 27 55.0 083 52 44.0 2
GREAT MIAMI RIVER AT LAKEVIEW - SR 33
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 156.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.0500	9.31153	24.5000	1.00000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		11	657.727	220.322	1030.00	422.000	78/10	79/09
DO		MG/L		12	9.63333	2.64208	14.0000	5.20000	78/10	79/09
COD	LOWLEVEL	MG/L		12	31.6667	50.0424	188.000	6.00000	78/10	79/09
PH		SU		8	7.96249	.495586	8.80000	7.40000	78/10	79/07
LAB	PH	SU		4	7.87500	.170970	8.10000	7.70000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	20.7500	10.7545	42.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.141666	.078374	.290000	.050000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.941666	.947356	2.95000	.050000	78/10	79/09
TOT KJEL	N	MG/L		11	1.02909	.653078	2.00000	.100000	78/10	79/09
			K	1	.050000		.050000	.050000	79/04	79/04
			T	12	.947500	.683828	2.00000	.050000	78/10	79/09
PHOS-TOT		MG/L P		12	.105000	.048524	.190000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		4	228.250	53.2001	303.000	183.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		4	.300000	.021601	.320000	.270000	79/01	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	79/01	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		2	1115.00	403.051	1400.00	830.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	12.5000	6.35085	22.0000	9.00000	79/01	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/01	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		12	2468.58	7420.15	26000.0	25.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	4.25000	.500000	5.00000	4.00000	79/01	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	79/01	79/09

TABLE RD 1-36

STATION NUMBER 600000
40 27 55.0 083 52 44.0 2
GT. MIAMI R. AT LAKEVIEW
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 156.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	8.16667	4.31085	12.0000	3.50000	79/10	79/12
CNDUCTVY	AT 25C	MICROMHO		4	655.750	80.6412	744.000	553.000	79/10	80/01
DO		MG/L		2	11.8000	.565746	12.2000	11.4000	79/10	79/11
COD	LOWLEVEL	MG/L		4	20.0000	12.5698	37.0000	10.0000	79/10	80/01
PH		SU		1	7.90000		7.90000	7.90000	79/11	79/11
LAB	PH	SU		3	7.76666	.305650	8.10000	7.50000	79/10	80/01
RESIDUE	DISS-105	C MG/L		1	387.000		387.000	387.000	79/12	79/12
RESIDUE	TOT NFLT	MG/L		2	21.0000	8.48528	27.0000	15.0000	79/10	80/01
			K	1	10.0000		10.0000	10.0000	79/11	79/11
			T	3	17.3333	8.73691	27.0000	10.0000	79/10	80/01
NH3+NH4-	N TOTAL	MG/L		3	.076667	.025166	.100000	.050000	79/11	80/01
			K	1	.050000		.050000	.050000	79/10	79/10
			T	4	.070000	.024495	.100000	.050000	79/10	80/01
NO3-N	TOTAL	MG/L		4	1.91000	.988872	2.77000	.510000	79/10	80/01
TOT KJEL	N	MG/L		4	.767500	.216853	1.09000	.640000	79/10	80/01
PHOS-TOT		MG/L P		4	.180000	.133666	.380000	.100000	79/10	80/01
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	79/12	79/12
TOT HARD	CACO3	MG/L		1	320.000		320.000	320.000	79/12	79/12
FLUORIDE	F,DISS	MG/L		1	.340000		.340000	.340000	79/12	79/12
CADMIUM	CD,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/12	79/12
CHROMIUM	CR,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/12	79/12
COPPER	CU,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/12	79/12
IRON	FE,TOT	UG/L		1	330.000		330.000	330.000	79/12	79/12
LEAD	PB,TOT	UG/L		1	8.00000		8.00000	8.00000	79/12	79/12
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	79/12	79/12
ZINC	ZN,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/12	79/12
FEC COLI	MFM-FCBR	/100ML		3	2410.00	3371.54	6300.00	330.000	79/10	80/01
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/12	79/12

TABLE RD 1-37

STATION NUMBER 600090
40 04 40.0 084 13 00.0 2
GREAT MIAMI R. BL PIQUA
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.43 110.07

No data were collected from 10/78 - 9/79.

TABLE RD 1-38

STATION NUMBER 600090
40 04 40.0 084 13 00.0 2
GREAT MIAMI R. BL PIQUA
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.43 110.07

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	25.8636	.674884	27.0000	25.0000	80/08	80/08
DO	PROBE	MG/L		11	6.02727	.306943	6.50000	5.50000	80/08	80/08

TABLE RD 1-39

STATION NUMBER 610050
39 52 20.5 084 09 48.0 2
GREAT MIAMI R NR VANDALIA - SR 440
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.43 092.46

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	12.3909	8.76190	22.8000	1.00000	78/11	79/09
STREAM	FLOW	CFS		12	2847.92	3603.76	11530.0	137.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	663.250	161.332	888.000	333.000	78/10	79/09
DO		MG/L		11	10.2000	2.42116	13.2000	6.70000	78/11	79/09
COD	LOWLEVEL	MG/L		12	17.6667	8.34850	37.0000	7.00000	78/10	79/09
PH		SU		6	8.03333	.467707	8.90000	7.60000	78/12	79/07
LAB	PH	SU		5	7.94000	.151892	8.10000	7.70000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		11	47.0909	44.7783	132.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.237500	.195593	.820000	.080000	78/10	79/09
NO3-N	TOTAL	MG/L		12	4.33500	2.39353	9.84000	1.73000	78/10	79/09
TOT KJEL	N	MG/L		12	1.19333	.482593	1.90000	.400000	78/10	79/09
PHOS-TOT		MG/L P		12	.384166	.304256	1.02000	.090000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/01	79/06
			K	1	.010000		.010000	.010000	79/09	79/09
			T	4	.010000	.000000	.010000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		4	239.250	84.4447	316.000	141.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		4	.305000	.070475	.400000	.230000	79/01	79/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/01	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	5.00000	.000000	5.00000	5.00000	79/01	79/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		2	1765.00	176.777	1890.00	1640.00	79/06	79/09
LEAD	PB,TOT	UG/L		4	11.7500	3.59398	17.0000	9.00000	79/01	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/06
			K	1	100.000		100.000	100.000	79/09	79/09
			T	4	100.000	.000000	100.000	100.000	79/01	79/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		10	7484.90	13546.2	33000.0	35.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		4	3.50000	.577350	4.00000	3.00000	79/01	79/09
MERCURY	HG,TOTAL	UG/L		4	.575000	.150001	.800000	.500000	79/01	79/09

TABLE RD 1-40

STATION NUMBER 610050
39 52 20.5 084 09 48.0 2
G MIAMI R AT USGS GAGE BELOW TAYLORSVILLE DAM
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.43 092.46

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		21	16.2857	7.83978	25.0000	3.80000	79/10	80/09
STREAM	FLOW	CFS		8	3793.67	4952.78	14550.0	429.000	79/11	80/06
STREAM	FLOW,	INST-CFS		1	6462.00		6462.00	6462.00	80/04	80/04
STREAM	STAGE	FEET		1	67.7800		67.7800	67.7800	80/04	80/04
CNDUCTVY	AT 25C	MICROMHO		22	614.773	123.707	767.000	368.000	79/10	80/09
SAMPLE	TREAT-	MENT		1	2552.00		2552.00	2552.00	80/07	80/07
DO	PROBE	MG/L		12	7.30000	1.21505	9.40000	4.90000	80/06	80/09
DO		MG/L		7	10.9571	1.67321	12.2000	8.30000	79/10	80/09
BOD	5 DAY	MG/L		13	3.16154	1.04765	5.70000	1.80000	80/06	80/09
COD	LOWLEVEL	MG/L		22	22.7636	11.6241	53.0000	10.0000	79/10	80/09
PH		SU		11	7.73636	.388023	8.30000	7.20000	79/11	80/08
LAB	PH	SU		19	7.81736	.323043	8.40000	7.20000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		21	80.8285	76.9505	238.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	79/11	79/11
			T	22	77.6090	76.5993	238.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		21	.214761	.228508	.840000	.020000	79/11	80/09
			K	1	.050000		.050000	.050000	79/10	79/10
			T	22	.207272	.225751	.840000	.020000	79/10	80/09
NO2-N	TOTAL	MG/L		13	.066923	.063296	.240000	.020000	80/06	80/09
NO3-N	TOTAL	MG/L		22	3.49908	1.73340	8.00000	.040000	79/10	80/09
TOT KJEL	N	MG/L		22	1.15909	.499296	2.30000	.280000	79/10	80/09
PHOS-TOT		MG/L P		22	.404045	.149080	.710000	.210000	79/10	80/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/12	79/12
			K	14	.009643	.001336	.010000	.005000	80/04	80/09
			T	15	.009667	.001291	.010000	.005000	79/12	80/09
TOT HARD	CACO3	MG/L		16	327.875	65.2615	430.000	201.000	79/12	80/09
MGNSIUM	MG,TOT	MG/L		13	33.6923	8.19950	45.0000	20.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		2	24.6000	2.26288	26.2000	23.0000	80/07	80/08
FLUORIDE	F,DISS	MG/L		1	.470000		.470000	.470000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	3.00000	2.82843	5.00000	1.00000	79/12	80/06
			K	14	1.57143	1.45255	5.00000	1.00000	80/04	80/09
			T	16	1.75000	1.61245	5.00000	1.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		8	63.7500	32.4862	120.000	30.0000	79/12	80/09
			K	8	37.5000	4.62910	40.0000	30.0000	80/04	80/09
			T	16	50.6250	26.1964	120.000	30.0000	79/12	80/09

TABLE RD 1-40 (Continued)

STATION NUMBER 610050
39 52 20.5 084 09 48.0 2
G MIAMI R AT USGS GAGE BELOW TAYLORSVILLE DAM
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.43 092.46

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		8	10.6250	8.63444	30.0000	5.00000	79/12	80/08
			K	8	13.1250	10.6695	30.0000	5.00000	80/04	80/09
			T	16	11.8750	9.46485	30.0000	5.00000	79/12	80/09
IRON	FE,TOT	UG/L		16	2958.75	3426.12	10400.0	310.000	79/12	80/09
LEAD	PB,TOT	UG/L		5	8.80000	2.58845	12.0000	5.00000	79/12	80/08
			K	11	5.00000	.000000	5.00000	5.00000	80/06	80/09
LEAD	PB,TOT	UG/L	T	16	6.18750	2.25739	12.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		6	65.0000	28.1069	100.000	40.0000	79/12	80/09
			K	10	46.0000	18.9737	100.000	40.0000	80/04	80/09
			T	16	53.1250	23.8659	100.000	40.0000	79/12	80/09
ZINC	ZN,TOT	UG/L		15	23.6667	16.5256	60.0000	10.0000	79/12	80/09
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	16	24.0625	16.0436	60.0000	10.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		18	2652.22	2991.03	11000.0	100.000	79/10	80/09
PHENOLS	TOTAL	UG/L		11	4.94727	1.91900	8.00000	2.00000	79/12	80/09
			K	4	2.00000	.000000	2.00000	2.00000	80/06	80/08
			T	15	4.16133	2.10960	8.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-41

STATION NUMBER 610060
39 45 55.0 084 11 51.0 2
G. MIAMI R AT DAYTON
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.5500	8.66094	24.0000	2.00000	78/10	79/09
STREAM	FLOW	CFS		9	3843.01	4262.60	12300.0	429.200	78/10	79/07
STREAM	STAGE	FEET		9	26.4078	1.59390	28.8900	23.5600	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		12	716.833	144.975	890.000	376.000	78/10	79/09
DO		MG/L		12	9.76666	2.32432	12.8000	5.80000	78/10	79/09
COD	LOWLEVEL	MG/L		12	19.2500	8.57189	32.0000	4.00000	78/10	79/09
PH		SU		8	7.88749	.203297	8.20000	7.70000	78/10	79/08
LAB	PH	SU		4	8.12499	.126617	8.30000	8.00000	78/12	79/09
RESIDUE	TOT NFLT	MG/L		11	49.8182	61.2206	221.000	10.0000	78/10	79/09
OIL-GRSE	TOT-SXLT	MG/L		1	5.00000		5.00000	5.00000	78/11	78/11
NH3+NH4-	N TOTAL	MG/L		12	.379166	.626062	2.31000	.050000	78/10	79/09
NO3-N	TOTAL	MG/L		12	4.00249	2.16991	8.85000	1.53000	78/10	79/09
TOT KJEL	N	MG/L		12	1.05167	.826403	3.50000	.500000	78/10	79/09
PHOS-TOT		MG/L P		12	.261666	.152127	.590000	.100000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/09
			K	1	.050000		.050000	.050000	79/06	79/06
			T	4	.020000	.020000	.050000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	306.500	98.8618	382.000	161.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.297500	.043494	.360000	.260000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		1	1010.00		1010.00	1010.00	79/09	79/09
LEAD	PB,TOT	UG/L		4	10.7500	.957427	12.0000	10.0000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		9	1856.22	3070.54	8700.00	15.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		4	6.25000	6.55108	16.0000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-42

STATION NUMBER 610060
39 45 55.0 084 11 51.0 2
G. MIAMI R AT DAYTON
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		21	17.6266	7.70505	25.1000	2.00000	79/10	80/09
CNDUCTVY	AT 25C	MICROMHO		20	590.250	156.498	790.000	228.000	79/10	80/09
SAMPLE	TREAT-	MENT		1	2553.00		2553.00	2553.00	80/07	80/07
DO	PROBE	MG/L		14	8.17142	.698691	10.0000	7.40000	80/06	80/09
DO		MG/L		5	11.5600	1.16754	12.8000	10.2000	79/10	80/04
BOD	5 DAY	MG/L		15	3.05999	1.01968	6.00000	1.60000	80/06	80/09
BOD	20 DAY	MG/L		3	7.66666	1.95026	9.60000	5.70000	80/09	80/09
COD	LOWLEVEL	MG/L		23	22.4043	13.6270	52.0000	2.10000	79/10	80/09
PH		SU		9	7.88888	.314156	8.20000	7.30000	79/11	80/08
LAB	PH	SU		21	7.94809	.269299	8.40000	7.30000	79/10	80/09
RESIDUE	TOTAL	MG/L		3	518.000	12.1655	532.000	510.000	80/09	80/09
RESIDUE	DISS-105	C MG/L		1	443.000		443.000	443.000	79/12	79/12
RESIDUE	TOT NFLT	MG/L		22	127.986	182.012	702.800	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		20	.167500	.267500	1.22000	.000000	79/10	80/09
			K	3	.023333	.023094	.050000	.010000	80/05	80/09
			T	23	.148695	.253597	1.22000	.000000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.076667	.040302	.190000	.040000	80/06	80/09
NO3-N	TOTAL	MG/L		20	3.13899	1.54107	5.44000	.030000	79/10	80/09
TOT KJEL	N	MG/L		23	1.37913	.873190	3.39000	.270000	79/10	80/09
NO2&NO3	N-TOTAL	MG/L		3	1.87333	.250066	2.16000	1.70000	80/09	80/09
PHOS-TOT		MG/L P		23	.369043	.223227	1.09000	.090000	79/10	80/09
PHOS-DIS	ORTHO	MG/L P		3	.193333	.011547	.200000	.180000	80/09	80/09
T ORG C	C	MG/L		3	4.66667	2.08167	7.00000	3.00000	80/09	80/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/12	79/12
			K	13	.009615	.001387	.010000	.005000	80/04	80/09
			T	14	.009643	.001336	.010000	.005000	79/12	80/09
TOT HARD	CACO3	MG/L		17	324.059	71.8166	412.000	137.000	79/12	80/09
CALCIUM	CA-TOT	MG/L		3	82.6667	3.51226	86.0000	79.0000	80/09	80/09
MGNSIUM	MG,TOT	MG/L		15	34.8000	7.72943	47.0000	17.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		4	28.0750	5.90671	32.0000	19.3000	80/08	80/09
FLUORIDE	F,DISS	MG/L		1	.260000		.260000	.260000	79/12	79/12
CADMIUM	CD,TOT	UG/L		3	2.33333	2.30940	5.00000	1.00000	79/12	80/06
			K	14	1.28571	1.06905	5.00000	1.00000	80/04	80/09
			T	17	1.47059	1.32842	5.00000	1.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		5	64.0000	27.0185	100.000	30.0000	79/12	80/09
			K	12	39.1667	2.88702	40.0000	30.0000	80/04	80/09
			T	17	46.4706	18.0074	100.000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		13	12.6923	8.80705	30.0000	5.00000	79/12	80/09
			K	4	8.75000	2.50000	10.0000	5.00000	80/06	80/08
			T	17	11.7647	7.89406	30.0000	5.00000	79/12	80/09
IRON	FE,TOT	UG/L		17	4785.29	6488.26	20980.0	300.000	79/12	80/09

TABLE RD 1-42 (Continued)

STATION NUMBER 610060
39 45 55.0 084 11 51.0 2
G. MIAMI R AT DAYTON
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		9	15.8889	10.5291	34.0000	5.00000	79/12	80/09
			K	8	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	17	10.7647	9.31752	34.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		5	60.0000	24.4949	100.000	40.0000	79/12	80/08
			K	12	45.0000	17.3205	100.000	40.0000	80/04	80/09
			T	17	49.4118	20.1465	100.000	40.0000	79/12	80/09
ZINC	ZN,TOT	UG/L		16	37.1875	30.0538	90.0000	5.00000	79/12	80/09
			K	1	5.00000		5.00000	5.00000	80/07	80/07
			T	17	35.2941	30.1284	90.0000	5.00000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		16	13742.5	21942.7	70000.0	330.000	79/10	80/09
PHENOLS	TOTAL	UG/L		10	5.10000	2.76687	11.0000	2.00000	79/12	80/09
			K	4	2.00000	.000000	2.00000	2.00000	80/06	80/08
			T	14	4.21428	2.72252	11.0000	2.00000	79/12	80/09
RESIDUE	DISS-180	C MG/L		3	468.000	8.00000	476.000	460.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/04	80/04
BOD 20C	5DAY CAR	MG/L		3	2.93333	.230932	3.20000	2.80000	80/09	80/09
BOD 20C	20DAYCAR	MG/L		3	6.66666	2.76830	9.60000	4.10000	80/09	80/09

TABLE RD 1-43

STATION NUMBER 600150
39 38 40.0 084 17 23.0 2
GREAT MIAMI R. AT MIAMISBURG
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 066.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.8083	8.06761	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	5121.00	6897.37	24880.0	671.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	759.333	198.834	1030.00	360.000	78/10	79/09
DO		MG/L		12	9.21666	2.89101	14.6000	6.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	26.8333	8.20020	44.0000	15.0000	78/10	79/09
PH		SU		8	7.82500	.212194	8.10000	7.50000	78/10	79/09
LAB	PH	SU		4	7.87500	.250122	8.20000	7.60000	78/12	79/07
RESIDUE	TOT NFLT	MG/L		12	58.1667	54.0300	172.000	13.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.856666	.721543	2.61000	.100000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.47166	1.43827	7.68000	2.58000	78/10	79/09
TOT KJEL	N	MG/L		12	1.97333	.813181	3.90000	1.00000	78/10	79/09
PHOS-TOT		MG/L P		12	.498333	.440306	1.63000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/06
TOT HARD	CACO3	MG/L		3	254.333	97.8283	344.000	150.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	.400000	.160001	.560000	.240000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	4500.00		4500.00	4500.00	79/03	79/03
LEAD	PB,TOT	UG/L		3	27.3333	15.0111	36.0000	10.0000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	50.0000	20.0000	70.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		8	23677.1	33551.2	98000.0	102.000	79/01	79/09
PHENOLS	TOTAL	UG/L		3	6.00000	4.00000	10.0000	2.00000	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-44

STATION NUMBER 600150
39 38 40.0 084 17 23.0 2
GREAT MIAMI R. AT MIAMISBURG
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 066.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		24	18.8916	7.69909	28.0000	3.00000	79/10	80/09
STREAM	FLOW	CFS		20	4455.75	6041.95	26490.0	1058.00	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		21	678.809	156.430	900.000	340.000	79/10	80/09
DO	PROBE	MG/L		15	7.18933	.983772	9.20000	6.00000	80/06	80/09
DO		MG/L		7	10.2429	1.96968	12.0000	6.50000	79/10	80/05
BOD	5 DAY	MG/L		16	5.39999	2.05621	10.8000	2.80000	80/06	80/09
BOD	20 DAY	MG/L		3	12.7000	1.64631	13.7000	10.8000	80/09	80/09
COD	LOWLEVEL	MG/L		24	27.0749	10.5819	47.0000	8.00000	79/10	80/09
PH		SU		11	7.88181	.194090	8.10000	7.60000	79/10	80/08
LAB	PH	SU		17	7.80940	.165544	8.10000	7.60000	80/01	80/09
RESIDUE	TOTAL	MG/L		3	570.666	8.34416	580.000	564.000	80/09	80/09
RESIDUE	TOT NFLT	MG/L		19	107.221	136.770	587.200	11.0000	80/03	80/09
			K	5	10.0000	.000000	10.0000	10.0000	79/10	80/02
			T	24	86.9666	127.539	587.200	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		27	.536888	.307353	1.30000	.080000	79/10	80/09
NO2-N	TOTAL	MG/L		16	.197500	.091616	.410000	.100000	80/06	80/09
NO3-N	TOTAL	MG/L		24	3.12833	1.44115	7.00000	.040000	79/10	80/09
TOT KJEL	N	MG/L		27	1.71444	.554741	2.70000	1.05000	79/10	80/09
NO2&NO3	N-TOTAL	MG/L		3	2.22000	.476342	2.50000	1.67000	80/09	80/09
PHOS-TOT		MG/L P		27	.579777	.158683	.910000	.320000	79/10	80/09
PHOS-DIS	ORTHO	MG/L P		6	.580000	.137404	.850000	.480000	80/09	80/09
T ORG C	C	MG/L		3	4.33333	1.15470	5.00000	3.00000	80/09	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	79/12
			K	14	.009643	.001336	.010000	.005000	79/10	80/09
			T	16	.009687	.001250	.010000	.005000	79/10	80/09
TOT HARD	CACO3	MG/L		20	322.300	62.6826	410.000	180.000	79/10	80/09
CALCIUM	CA-TOT	MG/L		2	60.5000	26.1629	79.0000	42.0000	80/09	80/09
			K	1	1.00000		1.00000	1.00000	80/09	80/09
			T	3	40.6667	39.0171	79.0000	1.00000	80/09	80/09
MGNSIUM	MG,TOT	MG/L		15	33.8666	8.42509	48.0000	19.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		5	45.2800	11.6958	57.0000	32.0000	80/07	80/09
FLUORIDE	F,DISS	MG/L		4	.512500	.250915	.870000	.290000	79/10	80/03
CADMIUM	CD,TOT	UG/L		2	1.00000	.000000	1.00000	1.00000	80/06	80/06
			K	17	1.94118	1.74895	5.00000	1.00000	79/10	80/09
			T	19	1.84210	1.67542	5.00000	1.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		1	74.0000		74.0000	74.0000	80/09	80/09
CHROMIUM	CR,TOT	UG/L		7	61.4286	27.3427	100.000	40.0000	80/06	80/08
			K	13	36.9231	4.80400	40.0000	30.0000	79/10	80/09
			T	20	45.5000	19.8614	100.000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		13	13.0769	4.34860	20.0000	5.00000	80/06	80/09
			K	7	21.4286	10.6905	30.0000	10.0000	79/10	80/06

TABLE RD 1-44 (Continued)

STATION NUMBER 600150
39 38 40.0 084 17 23.0 2
GREAT MIAMI R. AT MIAMISBURG
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 066.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	T	20	16.0000	8.04592	30.0000	5.00000	79/10	80/09
IRON	FE,TOT	UG/L		20	3020.00	4289.99	17530.0	210.000	79/10	80/09
LEAD	PB,TOT	UG/L		10	13.4000	8.97156	28.0000	5.00000	79/10	80/09
			K	10	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	20	9.20000	7.52959	28.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		5	50.0000	17.3205	80.0000	40.0000	80/06	80/08
			K	15	56.0000	27.4643	100.000	40.0000	79/10	80/09
			T	20	54.5000	25.0210	100.000	40.0000	79/10	80/09
ZINC	ZN,TOT	UG/L		16	36.8750	23.3006	85.0000	10.0000	80/06	80/09
			K	4	30.0000	.000000	30.0000	30.0000	79/10	80/03
			T	20	35.5000	20.8945	85.0000	10.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		17	73817.6	104718	450000	4700.00	79/10	80/09
CHLRPHYL	A	UG/L		2	37.3050	6.38516	41.8200	32.7900	80/09	80/09
PHENOLS	TOTAL	UG/L		15	3.66667	1.58865	7.00000	2.00000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/08	80/08
			T	16	3.75000	1.57056	7.00000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		3	520.000	20.0000	540.000	500.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10
			K	2	.500000	.000000	.500000	.500000	79/11	80/03
			T	3	.500000	.000000	.500000	.500000	79/10	80/03
BOD 20C	5DAY CAR	MG/L		3	4.70000	1.41775	5.80000	3.10000	80/09	80/09
BOD 20C	20DAYCAR	MG/L		3	7.99999	1.56211	9.80000	7.00000	80/09	80/09

TABLE RD 1-45

STATION NUMBER 600270
39 23 28.0 084 34 20.0 2
GREAT MIAMI R. AT HAMILTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 034.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	13.4083	8.58195	25.0000	1.00000	78/10	79/09
STREAM	FLOW	CFS		12	8824.50	9195.02	28260.0	795.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	741.750	193.510	1000.00	376.000	78/10	79/09
DO		MG/L		12	10.2000	2.28195	14.2000	7.80000	78/10	79/09
COD	LOWLEVEL	MG/L		12	23.8333	6.89977	32.0000	13.0000	78/10	79/09
PH		SU		8	7.92500	.260588	8.30000	7.50000	78/10	79/09
LAB	PH	SU		4	8.07500	.359375	8.60000	7.80000	78/12	79/07
RESIDUE	TOT NFLT	MG/L		11	119.364	120.584	357.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.581666	.576539	2.06000	.070000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.51666	1.16806	6.98000	2.28000	78/10	79/09
TOT KJEL	N	MG/L		12	1.72666	.594976	3.00000	.900000	78/10	79/09
PHOS-TOT		MG/L P		12	.429999	.263990	1.09000	.110000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.013333	.005773	.020000	.010000	78/12	79/06
TOT HARD	CACO3	MG/L		3	275.666	101.057	336.000	159.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	.410000	.127672	.520000	.270000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	5100.00		5100.00	5100.00	79/03	79/03
LEAD	PB,TOT	UG/L		3	22.3333	3.51194	26.0000	19.0000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	43.3333	15.2753	60.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		9	11042.9	27875.0	85000.0	73.0000	79/01	79/09
			L	1	100000		100000	100000	79/01	79/01
			T	10	19938.6	38497.0	100000	73.0000	79/01	79/09
PHENOLS	TOTAL	UG/L		3	10.3333	4.50927	15.0000	6.00000	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-46

STATION NUMBER 600270
39 23 28.0 084 34 20.0 2
GREAT MIAMI R. AT HAMILTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 034.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		23	18.7174	7.64695	29.5000	3.00000	79/10	80/09
STREAM	FLOW	CFS		18	5324.28	5707.88	23160.0	1708.00	79/10	80/08
STREAM	FLOW,	INST-CFS		1	2164.00		2164.00	2164.00	80/05	80/05
STREAM	STAGE	FEET		1	58.4000		58.4000	58.4000	80/05	80/05
CNDUCTVY	AT 25C	MICROMHO		20	663.250	169.230	870.000	315.000	79/10	80/09
DO	PROBE	MG/L		15	8.29333	1.06132	10.2000	6.80000	80/06	80/09
DO		MG/L		7	10.8571	1.25947	12.4000	9.40000	79/10	80/05
BOD	5 DAY	MG/L		15	4.35999	1.49944	7.30000	2.50000	80/06	80/09
COD	LOWLEVEL	MG/L		23	31.6652	27.0102	140.000	8.00000	79/10	80/09
PH		SU		5	8.03999	.152093	8.20000	7.80000	79/10	80/07
LAB	PH	SU		19	7.84999	.429158	8.51000	6.70000	80/01	80/09
RESIDUE	TOTAL	MG/L		1	904.000		904.000	904.000	80/08	80/08
RESIDUE	TOT NFLT	MG/L		23	245.543	636.589	3062.40	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		22	.281818	.287163	1.02000	.010000	79/10	80/09
			K	1	.050000		.050000	.050000	80/05	80/05
			T	23	.271739	.284695	1.02000	.010000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.125000	.056969	.240000	.050000	80/06	80/09
NO3-N	TOTAL	MG/L		23	3.25782	1.43350	7.20000	.070000	79/10	80/09
TOT KJEL	N	MG/L		23	1.72173	1.37800	7.35000	.660000	79/10	80/09
PHOS-TOT		MG/L P		23	.594608	.542141	2.92000	.262000	79/10	80/09
CYANIDE	CN-TOT	MG/L		1	.020000		.020000	.020000	79/11	79/11
			K	13	.009615	.001387	.010000	.005000	79/10	80/08
			T	14	.010357	.003079	.020000	.005000	79/10	80/08
TOT HARD	CACO3	MG/L		18	346.389	56.9515	456.000	243.000	79/10	80/09
CALCIUM	CA-TOT	MG/L		2	81.0000	33.9411	105.000	57.0000	80/07	80/08
MGNSIUM	MG,TOT	MG/L		9	35.0000	7.98436	47.0000	22.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		1	33.2000		33.2000	33.2000	80/08	80/08
FLUORIDE	F,DISS	MG/L		4	1.85500	2.97716	6.32000	.290000	79/10	80/03
CADMIUM	CD,TOT	UG/L		3	2.00000	1.73205	4.00000	1.00000	80/06	80/07
			K	15	2.06667	1.83095	5.00000	1.00000	79/10	80/09
			T	18	2.05556	1.76476	5.00000	1.00000	79/10	80/09

TABLE RD 1-46 (Continued)

STATION NUMBER 600270
39 23 28.0 084 34 20.0 2
GREAT MIAMI R. AT HAMILTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 034.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		4	65.0000	25.1661	100.000	40.0000	80/06	80/09
			K	14	37.1428	4.68817	40.0000	30.0000	79/10	80/09
			T	18	43.3333	16.4496	100.000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		11	15.4545	13.5008	55.0000	5.00000	80/06	80/09
			K	7	20.7143	11.7006	30.0000	5.00000	79/10	80/09
			T	18	17.5000	12.7475	55.0000	5.00000	79/10	80/09
IRON	FE,TOT	UG/L		18	4893.33	8876.98	38150.0	480.000	79/10	80/09
LEAD	PB,TOT	UG/L		13	16.0000	16.5126	63.0000	5.00000	79/10	80/09
			K	5	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	18	12.9444	14.7707	63.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		2	90.0000	14.1421	100.000	80.0000	80/08	80/08
			K	16	55.0000	26.8328	100.000	40.0000	79/10	80/09
			T	18	58.8889	27.8418	100.000	40.0000	79/10	80/09
ZINC	ZN,TOT	UG/L		15	53.6667	51.8400	230.000	25.0000	79/11	80/09
			K	3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			T	18	49.7222	47.9114	230.000	25.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		13	17471.5	23770.1	84000.0	200.000	79/12	80/09
			L	1	100000		100000	100000	80/06	80/06
			T	14	23366.4	31749.8	100000	200.000	79/12	80/09
PHENOLS	TOTAL	UG/L		11	4.81818	3.78994	15.0000	2.00000	79/10	80/08
			K	3	2.00000	.000000	2.00000	2.00000	80/06	80/08
			T	14	4.21428	3.53398	15.0000	2.00000	79/10	80/08
MERCURY	HG,TOTAL	UG/L	K	3	.500000	.000000	.500000	.500000	79/10	80/03

TABLE RD 1-47

STATION NUMBER 600030
39 15 47.0 084 40 04.0 2
GR. MIAMI AT NEW BALTIMORE
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 020.40

No data were collected from 10/78 - 9/79.

TABLE RD 1-48

STATION NUMBER 600030
39 15 47.0 084 40 04.0 2
GR. MIAMI AT NEW BALTIMORE
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 020.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		16	23.4187	2.70306	28.8000	19.0000	80/06	80/09
CNDUCTVY	AT 25C	MICROMHO		13	591.308	151.854	830.000	345.000	80/06	80/09
SAMPLE	TREAT-	MENT		1	2546.00		2546.00	2546.00	80/07	80/07
DO	PROBE	MG/L		16	7.91875	1.44739	11.6000	6.50000	80/06	80/09
BOD	5 DAY	MG/L		16	4.10000	1.45099	7.20000	2.20000	80/06	80/09
COD	LOWLEVEL	MG/L		16	34.4125	14.6082	53.0000	12.4000	80/06	80/09
PH		SU		1	8.00000		8.00000	8.00000	80/07	80/07
LAB	PH	SU		15	7.97266	.277756	8.40000	7.45000	80/06	80/09
RESIDUE	TOTAL	MG/L		1	880.000		880.000	880.000	80/08	80/08
RESIDUE	TOT NFLT	MG/L		16	218.944	211.166	739.600	47.8000	80/06	80/09
NH3+NH4-	N TOTAL	MG/L		15	.159333	.356660	1.43000	.000000	80/06	80/09
			K	1	.010000		.010000	.010000	80/09	80/09
			T	16	.150000	.346583	1.43000	.000000	80/06	80/09
NO2-N	TOTAL	MG/L		13	.087692	.069180	.230000	.020000	80/06	80/09
NO3-N	TOTAL	MG/L		16	3.36937	1.48505	7.40000	1.75000	80/06	80/09
TOT KJEL	N	MG/L		16	1.65562	.674284	2.80000	.800000	80/06	80/09
PHOS-TOT		MG/L P		16	.592375	.241302	1.20000	.340000	80/06	80/09
CYANIDE	CN-TOT	MG/L	K	13	.778076	2.77084	10.0000	.005000	80/06	80/09
TOT HARD	CACO3	MG/L		16	334.312	59.5595	414.000	202.000	80/06	80/09
CALCIUM	CA-TOT	MG/L		1	61.0000		61.0000	61.0000	80/08	80/08
MGNSIUM	MG,TOT	MG/L		12	34.0833	7.48896	46.0000	23.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		4	58.8750	13.6405	67.0000	38.5000	80/08	80/09
CADMIUM	CD,TOT	UG/L		1	1.00000		1.00000	1.00000	80/07	80/07
			K	15	1.00000	.000000	1.00000	1.00000	80/06	80/09
			T	16	1.00000	.000000	1.00000	1.00000	80/06	80/09

TABLE RD 1-48 (Continued)

STATION NUMBER 600030
39 15 47.0 084 40 04.0 2
GR. MIAMI AT NEW BALTIMORE
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 020.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		5	54.0000	11.4018	70.0000	40.0000	80/06	80/09
			K	11	40.0000	.000000	40.0000	40.0000	80/06	80/09
			T	16	44.3750	8.92095	70.0000	40.0000	80/06	80/09
COPPER	CU,TOT	UG/L		14	13.2143	4.64392	25.0000	10.0000	80/06	80/09
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	16	12.1875	5.15388	25.0000	5.00000	80/06	80/09
IRON	FE,TOT	UG/L		16	4783.12	5526.93	20240.0	600.000	80/06	80/09
LEAD	PB,TOT	UG/L		7	15.8571	7.17470	24.0000	7.00000	80/06	80/09
			K	8	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	15	10.0667	7.31404	24.0000	5.00000	80/06	80/09
MANGNESE	MN	UG/L		1	35.0000		35.0000	35.0000	80/07	80/07
NICKEL	NI,TOTAL	UG/L		4	55.0000	10.0000	70.0000	50.0000	80/07	80/09
			K	12	40.0000	.000000	40.0000	40.0000	80/06	80/09
			T	16	43.7500	8.06226	70.0000	40.0000	80/06	80/09
ZINC	ZN,TOT	UG/L		16	49.6875	23.9074	100.000	20.0000	80/06	80/09
FEC COLI	MFM-FCBR	/100ML		11	17454.5	13257.7	43000.0	1400.00	80/06	80/08
FEC COLI	MFM-FCBR	/100ML	K	1	110.000		110.000	110.000	80/09	80/09
			T	12	16009.2	13596.2	43000.0	110.000	80/06	80/09
PHENOLS	TOTAL	UG/L		10	7.50000	7.54615	25.0000	2.00000	80/06	80/09
			K	2	2.00000	.000000	2.00000	2.00000	80/07	80/08
			T	12	6.58333	7.15362	25.0000	2.00000	80/06	80/09

TABLE RD 1-49

STATION NUMBER 600300
39 09 10.0 084 47 44.0 2
GREAT MIAMI NR LAWRENCEBURG IND.
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.20

No data were collected from 10/78 - 9/79.

TABLE RD 1-50

STATION NUMBER 600300
39 09 10.0 084 47 44.0 2
GREAT MIAMI NR LAWRENCEBURG IND.
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	23.4583	3.04890	28.3000	19.0000	80/06	80/09
CNDUCTVY	AT 25C	MICROMHO		12	571.750	145.942	750.000	343.000	80/06	80/09
SAMPLE	TREAT-	MENT		1	2543.00		2543.00	2543.00	80/07	80/07
DO	PROBE	MG/L		12	7.82499	.954544	9.60000	6.30000	80/06	80/09
BOD	5 DAY	MG/L		12	3.89166	1.38988	6.70000	2.00000	80/06	80/09
COD	LOWLEVEL	MG/L		12	33.8500	15.7775	60.0000	16.3000	80/06	80/09
PH		SU		1	7.60000		7.60000	7.60000	80/07	80/07
LAB	PH	SU		12	7.67333	.386196	8.23000	6.80000	80/06	80/09
RESIDUE	TOTAL	MG/L		1	1020.00		1020.00	1020.00	80/08	80/08
RESIDUE	TOT NFLT	MG/L		12	266.691	312.829	988.000	57.7000	80/06	80/09
NH3+NH4-	N TOTAL	MG/L		12	.169166	.400419	1.43000	.000000	80/06	80/09
NO2-N	TOTAL	MG/L		12	.069167	.059154	.220000	.020000	80/06	80/09
NO3-N	TOTAL	MG/L		12	3.10583	1.90061	7.40000	.020000	80/06	80/09
TOT KJEL	N	MG/L		12	1.71333	.752424	3.10000	.800000	80/06	80/09
PHOS-TOT		MG/L P		12	.646333	.403793	1.50000	.310000	80/06	80/09
CYANIDE	CN-TOT	MG/L	K	12	.009583	.001443	.010000	.005000	80/06	80/09
TOT HARD	CACO3	MG/L		12	322.250	51.7134	398.000	204.000	80/06	80/09
MGNSIUM	MG,TOT	MG/L		12	34.0000	6.19384	44.0000	23.0000	80/06	80/09
CHLORIDE	TOTAL	MG/L		1	40.1000		40.1000	40.1000	80/08	80/08
CADMIUM	CD,TOT	UG/L		2	1.00000	.000000	1.00000	1.00000	80/06	80/06
			K	10	1.00000	.000000	1.00000	1.00000	80/06	80/09
			T	12	1.00000	.000000	1.00000	1.00000	80/06	80/09
CHROMIUM	CR,TOT	UG/L		3	73.3333	23.0941	100.000	60.0000	80/06	80/06
			K	9	40.0000	.000000	40.0000	40.0000	80/06	80/09
			T	12	48.3333	18.0068	100.000	40.0000	80/06	80/09

TABLE RD 1-50 (Continued)

STATION NUMBER 600300
39 09 10.0 084 47 44.0 2
GREAT MIAMI NR LAWRENCEBURG IND.
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		10	14.5000	8.64420	30.0000	5.00000	80/06	80/08
			K	2	7.50000	3.53553	10.0000	5.00000	80/06	80/09
			T	12	13.3333	8.34847	30.0000	5.00000	80/06	80/09
IRON	FE,TOT	UG/L		12	6539.16	7190.11	21380.0	960.000	80/06	80/09
LEAD	PB,TOT	UG/L		5	20.4000	9.34347	34.0000	9.00000	80/06	80/08
			K	7	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	12	11.4167	9.72773	34.0000	5.00000	80/06	80/09
NICKEL	NI,TOTAL	UG/L		2	50.0000	14.1421	60.0000	40.0000	80/07	80/08
			K	10	40.0000	.000000	40.0000	40.0000	80/06	80/09
			T	12	41.6667	5.77364	60.0000	40.0000	80/06	80/09
ZINC	ZN,TOT	UG/L		12	48.7500	32.7612	110.000	15.0000	80/06	80/09
FEC COLI	MFM-FCBR	/100ML		10	6405.00	8114.03	26000.0	270.000	80/06	80/08
			K	1	110.000		110.000	110.000	80/09	80/09
			L	1	100000		100000	100000	80/08	80/08
			T	12	13680.0	28215.2	100000	110.000	80/06	80/09
PHENOLS	TOTAL	UG/L		9	5.88889	4.01387	14.0000	2.00000	80/06	80/09
PHENOLS	TOTAL	UG/L	K	3	2.00000	.000000	2.00000	2.00000	80/06	80/08
			T	12	4.91667	3.84846	14.0000	2.00000	80/06	80/09

TABLE RD 1-51

STATION NUMBER 600350
39 55 32.0 083 50 53.0 2
BUCK CREEK AT SPRINGFIELD
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 026.50 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	10.8000	8.55142	22.5000	3.00000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	584.000	33.5956	629.000	550.000	78/10	79/07
DO		MG/L		4	11.0250	1.43849	12.4000	9.30000	78/10	79/07
COD	LOWLEVEL	MG/L		4	13.5250	5.26332	18.0000	6.00000	78/10	79/07
PH		SU		2	8.30000	.141867	8.40000	8.20000	79/04	79/07
LAB	PH	SU		2	8.05000	.071709	8.10000	8.00000	78/10	79/01
RESIDUE	TOT NFLT	MG/L		4	35.7500	36.5456	87.0000	9.00000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		3	.090000	.045826	.140000	.050000	79/01	79/07
NO3-N	TOTAL	MG/L		4	2.35250	1.38435	4.01000	.810000	78/10	79/07
TOT KJEL	N	MG/L		4	.675000	.359398	1.20000	.400000	78/10	79/07
PHOS-TOT		MG/L P		4	.107500	.085000	.230000	.050000	78/10	79/07
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/10	79/07
TOT HARD	CACO3	MG/L		4	285.000	28.3549	314.000	246.000	78/10	79/07
FLUORIDE	F,DISS	MG/L		4	.220000	.053541	.290000	.160000	78/10	79/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
LEAD	PB,TOT	UG/L		4	16.7500	9.63933	31.0000	10.0000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		4	45.0000	30.0000	90.0000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		3	1032.00	1531.26	2800.00	128.000	79/01	79/07
PHENOLS	TOTAL	UG/L		4	3.75000	2.21736	7.00000	2.00000	78/10	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-52

STATION NUMBER 600350
39 55 32.0 083 50 53.0 2
BUCK CREEK AT SPRINGFIELD
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 026.50 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.5000	8.65063	25.0000	6.00000	79/10	80/07
CNDUCTVY	AT 25C	MICROMHO		4	645.500	59.5119	697.000	584.000	79/10	80/07
DO		MG/L		4	10.0250	2.66382	12.0000	6.10000	79/10	80/07
COD	LOWLEVEL	MG/L		4	13.0000	8.08290	24.0000	6.00000	79/10	80/07
PH		SU		2	8.20000	.141706	8.30000	8.10000	79/10	80/07
LAB	PH	SU		2	7.95000	.070745	8.00000	7.90000	80/01	80/04
RESIDUE	TOT NFLT	MG/L		4	33.0000	41.4166	95.0000	10.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		4	.062500	.015000	.080000	.050000	79/10	80/07
NO3-N	TOTAL	MG/L		4	2.79500	.729221	3.49000	1.97000	79/10	80/07
TOT KJEL	N	MG/L		4	.377500	.179328	.480000	.110000	79/10	80/07
PHOS-TOT		MG/L P		4	.080000	.043205	.140000	.040000	79/10	80/07
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/10	80/01
			K	2	.010000	.000000	.010000	.010000	80/04	80/07
			T	4	.010000	.000000	.010000	.010000	79/10	80/07
TOT HARD	CACO3	MG/L		4	332.250	28.1469	360.000	308.000	79/10	80/07
FLUORIDE	F,DISS	MG/L		2	.230000	.000000	.230000	.230000	79/10	80/01
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	2	5.00000	.000000	5.00000	5.00000	80/04	80/07
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		4	1565.00	1775.43	4200.00	380.000	79/10	80/07
LEAD	PB,TOT	UG/L		4	7.00000	3.36650	12.0000	5.00000	79/10	80/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	2	100.000	.000000	100.000	100.000	80/04	80/07
			T	4	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/04
			K	1	30.0000		30.0000	30.0000	80/07	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		3	5076.66	6864.30	13000.0	930.000	79/10	80/04
PHENOLS	TOTAL	UG/L		2	2.00000	.000000	2.00000	2.00000	79/10	80/01
			K	2	2.00000	.000000	2.00000	2.00000	80/04	80/07
			T	4	2.00000	.000000	2.00000	2.00000	79/10	80/07
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	2	.500000	.000000	.500000	.500000	80/04	80/07
			T	4	.500000	.000000	.500000	.500000	79/10	80/07

TABLE RD 1-53

STATION NUMBER 600250
39 28 26.0 084 23 51.0 2
DICKS CREEK NEAR EXCELLO
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 046.80 002.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	13.9182	8.19314	25.5000	2.50000	78/10	79/08
CNDUCTVY	AT 25C	MICROMHO		12	1186.08	415.030	1840.00	460.000	78/10	79/09
DO		MG/L		11	9.26363	2.39929	14.0000	6.40000	78/10	79/08
COD	LOWLEVEL	MG/L		12	14.6667	5.38235	24.0000	6.00000	78/10	79/09
PH		SU		7	7.65714	.276066	8.00000	7.40000	78/10	79/08
LAB	PH	SU		4	7.97499	.221958	8.30000	7.80000	78/12	79/07
RESIDUE	TOT NFLT	MG/L		12	47.3333	70.9114	245.000	10.0000	78/10	79/09
OIL-GRSE	TOT-SXLT	MG/L		1	5.00000		5.00000	5.00000	78/11	78/11
NH3+NH4-	N TOTAL	MG/L		12	.865000	.464572	1.74000	.200000	78/10	79/09
NO3-N	TOTAL	MG/L		12	2.47166	.635120	3.75000	1.61000	78/10	79/09
TOT KJEL	N	MG/L		12	1.62250	.662562	3.00000	.800000	78/10	79/09
PHOS-TOT		MG/L P		12	.298333	.132448	.660000	.160000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.043333	.011547	.050000	.030000	78/12	79/06
TOT HARD	CACO3	MG/L		3	415.666	86.0265	515.000	366.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	1.82667	1.33133	3.30000	.710000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/06
LEAD	PB,TOT	UG/L		3	14.6667	8.02082	23.0000	7.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	326.666	176.163	530.000	220.000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		9	14383.8	30675.0	91000.0	25.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		2	15.5000	12.0208	24.0000	7.00000	78/12	79/03
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-54

STATION NUMBER 600250
39 28 26.0 084 23 51.0 2
DICKS CREEK NEAR EXCELLO
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 046.80 002.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	13.8222	6.82546	26.2000	5.00000	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		9	1155.67	161.322	1420.00	941.000	79/10	80/08
DO		MG/L		9	8.54444	2.09352	11.5000	5.80000	79/10	80/08
COD	LOWLEVEL	MG/L		9	18.3333	8.03120	35.0000	8.00000	79/10	80/08
PH		SU		6	8.04999	.609175	8.70000	7.30000	79/10	80/06
LAB	PH	SU		3	7.80000	.300172	8.10000	7.50000	80/01	80/08
RESIDUE	TOT NFLT	MG/L		7	19.1428	14.5994	50.0000	10.0000	79/10	80/05
			K	2	10.0000	.000000	10.0000	10.0000	80/06	80/08
			T	9	17.1111	13.2707	50.0000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		8	7.79499	9.96967	27.8000	.740000	79/10	80/08
NO3-N	TOTAL	MG/L		9	2.10778	.572647	2.90000	1.12000	79/10	80/08
TOT KJEL	N	MG/L		8	8.38374	10.2069	28.5000	1.29000	79/10	80/08
PHOS-TOT		MG/L P		8	.996125	1.58691	4.90000	.290000	79/10	80/08
CYANIDE	CN-TOT	MG/L		7	.054857	.031699	.090000	.010000	79/10	80/08
TOT HARD	CACO3	MG/L		7	420.857	42.7765	460.000	339.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		1	137.000		137.000	137.000	80/06	80/06
SULFATE	SO4-TOT	MG/L		1	164.000		164.000	164.000	80/06	80/06
FLUORIDE	F,DISS	MG/L		3	1.96667	1.67506	3.90000	.950000	79/10	80/02
FLUORIDE	F,TOTAL	MG/L		2	2.46000	1.32936	3.40000	1.52000	79/12	80/06
CADMIUM	CD,TOT	UG/L		4	7.25000	4.50000	14.0000	5.00000	79/10	80/04
			K	4	6.25000	2.50000	10.0000	5.00000	79/12	80/08
			T	8	6.75000	3.41216	14.0000	5.00000	79/10	80/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/04
			K	4	30.0000	.000000	30.0000	30.0000	79/12	80/08
			T	8	30.0000	.000000	30.0000	30.0000	79/10	80/08

TABLE RD 1-54 (Continued)

STATION NUMBER 600250
39 28 26.0 084 23 51.0 2
DICKS CREEK NEAR EXCELLO
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 046.80 002.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		5	32.0000	4.47214	40.0000	30.0000	79/10	80/06
			K	3	30.0000	.000000	30.0000	30.0000	79/12	80/08
			T	8	31.2500	3.53553	40.0000	30.0000	79/10	80/08
IRON	FE,TOT	UG/L		7	1335.71	1339.47	4340.00	530.000	79/10	80/08
IRON	FE,DISS	UG/L		1	1110.00		1110.00	1110.00	80/04	80/04
LEAD	PB,TOT	UG/L		7	9.71428	6.92133	25.0000	5.00000	79/10	80/06
			K	1	5.00000		5.00000	5.00000	80/08	80/08
			T	8	9.12500	6.62112	25.0000	5.00000	79/10	80/08
THALLIUM	TL,DISS	UG/L	K	1	100.000		100.000	100.000	80/06	80/06
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/10	80/04
			K	3	100.000	.000000	100.000	100.000	79/12	80/08
			T	7	100.000	.000000	100.000	100.000	79/10	80/08
ZINC	ZN,TOT	UG/L		8	1257.50	2522.57	7250.00	60.0000	79/10	80/08
FEC COLI	MFM-FCBR	/100ML		5	1992.80	1422.84	3700.00	64.0000	79/10	80/05
PHENOLS	TOTAL	UG/L		8	33.0000	37.7132	113.000	6.00000	79/10	80/08
MERCURY	HG,TOTAL	UG/L		4	1.10000	1.00333	2.60000	.500000	79/10	80/04
MERCURY	HG,TOTAL	UG/L	K	3	.500000	.000000	.500000	.500000	80/05	80/08
			T	7	.842857	.778582	2.60000	.500000	79/10	80/08

TABLE RD 1-55

STATION NUMBER 600260
39 26 36.0 084 32 50.0 2
FOUR MILE CRK. AT NEW MIAMI
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.2500	9.45604	21.5000	.000000	78/11	79/08
CNDUCTVY	AT 25C	MICROMHO		4	647.500	114.965	804.000	534.000	78/11	79/08
DO		MG/L		4	9.97499	1.96024	12.6000	7.90000	78/11	79/08
COD	LOWLEVEL	MG/L		4	11.5000	1.91485	14.0000	10.0000	78/11	79/08
PH		SU		3	7.83333	.321620	8.20000	7.60000	78/11	79/08
LAB	PH	SU		1	7.90000		7.90000	7.90000	79/02	79/02
RESIDUE	TOT NFLT	MG/L		4	24.5000	31.7228	72.0000	6.00000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.090000	.080000	.210000	.050000	78/11	79/08
NO3-N	TOTAL	MG/L		4	3.65250	1.10596	4.82000	2.56000	78/11	79/08
TOT KJEL	N	MG/L		4	.599999	.294393	.900000	.300000	78/11	79/08
PHOS-TOT		MG/L P		4	.137500	.017079	.160000	.120000	78/11	79/08
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		4	311.000	36.0648	350.000	266.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		4	.250000	.048304	.320000	.210000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
LEAD	PB,TOT	UG/L		4	22.5000	33.0303	72.0000	5.00000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		3	6996.66	11261.6	20000.0	400.000	79/02	79/08
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-56

STATION NUMBER 600260
39 26 36.0 084 32 50.0 2
FOUR MILE CRK. AT NEW MIAMI
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.3750	9.52519	23.5000	2.00000	79/11	80/08
CNDUCTVY	AT 25C	MICROMHO		4	651.500	56.0862	719.000	588.000	79/11	80/08
DO		MG/L		4	10.7750	1.99731	12.8000	8.10000	79/11	80/08
COD	LOWLEVEL	MG/L		4	18.2500	23.2433	53.0000	4.00000	79/11	80/08
PH		SU		2	8.20000	.009568	8.20000	8.20000	79/11	80/05
LAB	PH	SU		2	8.00000	.141436	8.10000	7.90000	80/02	80/08
RESIDUE	TOT NFLT	MG/L		3	15.3333	9.23761	26.0000	10.0000	79/11	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	4	14.0000	8.00000	26.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		3	.226667	.223010	.480000	.060000	79/11	80/08
			K	1	.050000		.050000	.050000	80/05	80/05
			T	4	.182500	.202382	.480000	.050000	79/11	80/08
NO3-N	TOTAL	MG/L		4	3.15250	.716070	4.08000	2.34000	79/11	80/08
TOT KJEL	N	MG/L		4	.427500	.131245	.590000	.290000	79/11	80/08
PHOS-TOT		MG/L P		4	.212000	.125443	.360000	.090000	79/11	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
			K	2	.010000	.000000	.010000	.010000	80/05	80/08
			T	4	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		4	320.750	22.3514	346.000	300.000	79/11	80/08
FLUORIDE	F,DISS	MG/L		2	.280000	.028283	.300000	.260000	79/11	80/02
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-56 (Continued)

STATION NUMBER 600260
39 26 36.0 084 32 50.0 2
FOUR MILE CRK. AT NEW MIAMI
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	390.000	580.172	1260.00	80.0000	79/11	80/08
LEAD	PB,TOT	UG/L		2	52.5000	67.1751	100.000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	28.7500	47.5000	100.000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		4	1815.00	1840.91	4200.00	130.000	79/11	80/08
PHENOLS	TOTAL	UG/L		3	3.00000	1.73205	5.00000	2.00000	79/11	80/08
PHENOLS	TOTAL	UG/L	K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	2.75000	1.50000	5.00000	2.00000	79/11	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-57

STATION NUMBER 600060
40 06 32.0 084 22 22.0 2
GREENVILLE CRK. NEAR COVINGTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.70 032.60 003.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.65000	7.34325	20.1000	3.00000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	615.500	117.162	718.000	467.000	78/10	79/07
DO		MG/L		4	11.1750	2.22468	13.0000	8.10000	78/10	79/07
COD	LOWLEVEL	MG/L		4	22.2750	13.4995	38.0000	10.0000	78/10	79/07
PH		SU		2	7.95000	.494985	8.30000	7.60000	79/04	79/07
LAB	PH	SU		2	8.00000	.282846	8.20000	7.80000	78/10	79/01
RESIDUE	TOT NFLT	MG/L		4	131.750	168.816	376.000	3.00000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		3	.106667	.032146	.130000	.070000	79/01	79/07
NO3-N	TOTAL	MG/L		4	3.73250	2.55420	6.58000	1.56000	78/10	79/07
TOT KJEL	N	MG/L		4	.900000	.559762	1.70000	.400000	78/10	79/07
PHOS-TOT		MG/L P		4	.267500	.104363	.380000	.160000	78/10	79/07
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/10	79/04
			K	1	.010000		.010000	.010000	79/07	79/07
			T	4	.010000	.000000	.010000	.010000	78/10	79/07
TOT HARD	CACO3	MG/L		4	305.500	85.8778	398.000	208.000	78/10	79/07
FLUORIDE	F,DISS	MG/L		4	.267500	.068496	.320000	.170000	78/10	79/07
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/10	79/04
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	4	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/10	79/04
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/10	79/04
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	4	30.0000	.000000	30.0000	30.0000	78/10	79/07
LEAD	PB,TOT	UG/L		4	16.5000	12.0416	32.0000	6.00000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/04
			K	1	100.000		100.000	100.000	79/07	79/07
			T	4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		3	40.0000	17.3205	60.0000	30.0000	78/10	79/04
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	4	37.5000	15.0000	60.0000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		4	451.250	700.259	1500.00	48.0000	78/10	79/07
PHENOLS	TOTAL	UG/L		3	6.33333	1.15472	7.00000	5.00000	78/10	79/04
			K	1	2.00000		2.00000	2.00000	79/07	79/07
			T	4	5.25000	2.36291	7.00000	2.00000	78/10	79/07
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/10	79/04
			K	1	.500000		.500000	.500000	79/07	79/07
			T	4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-58

STATION NUMBER 600060
40 06 32.0 084 22 22.0 2
GREENVILLE CRK. NEAR COVINGTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.70 032.60 003.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.7500	8.33167	22.5000	4.00000	79/10	80/07
CNDUCTVY	AT 25C	MICROMHO		4	623.000	136.599	771.000	466.000	79/10	80/07
DO		MG/L		4	10.3250	2.37680	12.5000	7.40000	79/10	80/07
COD	LOWLEVEL	MG/L		4	21.5000	14.5488	40.0000	8.00000	79/10	80/07
PH		SU		3	8.10000	.173663	8.30000	8.00000	79/10	80/07
LAB	PH	SU		1	7.90000		7.90000	7.90000	80/01	80/01
RESIDUE	TOT NFLT	MG/L		2	203.500	118.087	287.000	120.000	80/04	80/07
			K	2	10.0000	.000000	10.0000	10.0000	79/10	80/01
			T	4	106.750	130.877	287.000	10.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		2	.100000	.042427	.130000	.070000	80/01	80/04
			K	2	.050000	.000061	.050000	.050000	79/10	80/07
			T	4	.075000	.037859	.130000	.050000	79/10	80/07
NO3-N	TOTAL	MG/L		4	3.31250	1.66352	4.88000	.960000	79/10	80/07
TOT KJEL	N	MG/L		4	.492500	.278374	.800000	.150000	79/10	80/07
PHOS-TOT		MG/L P		4	.250000	.179072	.500000	.090000	79/10	80/07
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	80/07	80/07
			K	3	.010000	.000000	.010000	.010000	79/10	80/04
			T	4	.010000	.000000	.010000	.010000	79/10	80/07
TOT HARD	CACO3	MG/L		4	323.750	70.3201	395.000	236.000	79/10	80/07
FLUORIDE	F,DISS	MG/L		2	.275000	.007067	.280000	.270000	79/10	80/01
CADMIUM	CD,TOT	UG/L	K	4	5.00000	.000000	5.00000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/04	80/04
			K	3	30.0000	.000000	30.0000	30.0000	79/10	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		4	4970.00	5803.21	12100.0	140.000	79/10	80/07
LEAD	PB,TOT	UG/L		1	21.0000		21.0000	21.0000	80/04	80/04
			K	3	5.00000	.000000	5.00000	5.00000	79/10	80/07
			T	4	9.00000	8.00000	21.0000	5.00000	79/10	80/07
NICKEL	NI,TOTAL	UG/L	K	4	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		2	45.0000	21.2132	60.0000	30.0000	80/04	80/07
			K	2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			T	4	37.5000	15.0000	60.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		4	2327.50	3537.81	7600.00	130.000	79/10	80/07
PHENOLS	TOTAL	UG/L		2	4.00000	1.41421	5.00000	3.00000	79/10	80/04
			K	2	2.00000	.000000	2.00000	2.00000	80/01	80/07
			T	4	3.00000	1.41421	5.00000	2.00000	79/10	80/07
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/04	80/04
			K	3	.500000	.000000	.500000	.500000	79/10	80/07
			T	4	.500000	.000000	.500000	.500000	79/10	80/07

TABLE RD 1-59

STATION NUMBER 600280
39 20 28.0 084 37 46.0 2
INDIAN CREEK NEAR ROSS
OHIO RIVER 051391 (MIAMI RIVER)
MILES 0953.80 0490.10 027.70 001.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.1250	9.47676	20.8000	.000000	78/11	79/08
CNDUCTVY	AT 25C	MICROMHO		4	655.750	114.235	821.000	564.000	78/11	79/08
DO		MG/L		4	10.4500	2.27525	13.5000	8.00000	78/11	79/08
COD	LOWLEVEL	MG/L		4	13.5000	8.34666	24.0000	4.00000	78/11	79/08
PH		SU		3	7.90000	.264719	8.10000	7.60000	78/11	79/08
LAB	PH	SU		1	8.10000		8.10000	8.10000	79/02	79/02
RESIDUE	TOT NFLT	MG/L		4	37.2500	56.5177	122.000	7.00000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.085000	.070000	.190000	.050000	78/11	79/08
NO3-N	TOTAL	MG/L		4	3.99500	1.20290	5.06000	2.71000	78/11	79/08
TOT KJEL	N	MG/L		4	.600000	.408248	1.20000	.300000	78/11	79/08
PHOS-TOT		MG/L P		4	.090000	.056569	.170000	.050000	78/11	79/08
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		4	321.000	53.5226	375.000	255.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		4	.220000	.046904	.290000	.190000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
LEAD	PB,TOT	UG/L		4	38.0000	62.7110	132.000	5.00000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		2	256.000	104.652	330.000	182.000	79/02	79/05
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-60

STATION NUMBER 600280
39 20 28.0 084 37 46.0 2
INDIAN CREEK NEAR ROSS
OHIO RIVER 051391 (MIAMI RIVER)
MILES 0953.80 0490.10 027.70 001.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.8250	9.95066	24.2000	2.50000	79/11	80/08
CNDUCTVY	AT 25C	MICROMHO		4	647.500	57.9224	698.000	581.000	79/11	80/08
DO		MG/L		4	10.9750	2.27213	13.2000	7.90000	79/11	80/08
COD	LOWLEVEL	MG/L		3	7.33333	1.15473	8.00000	6.00000	79/11	80/05
			K	1	4.00000		4.00000	4.00000	80/08	80/08
			T	4	6.50000	1.91485	8.00000	4.00000	79/11	80/08
PH		SU		2	8.10000	.005524	8.10000	8.10000	79/11	80/05
LAB	PH	SU		2	8.05000	.212451	8.20000	7.90000	80/02	80/08
RESIDUE	TOT NFLT	MG/L		3	10.3333	.577491	11.0000	10.0000	79/11	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	4	10.2500	.500000	11.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		2	.050000	.000061	.050000	.050000	79/11	80/02
			K	2	.050000	.000061	.050000	.050000	80/05	80/08
			T	4	.050000	.000050	.050000	.050000	79/11	80/08
NO3-N	TOTAL	MG/L		4	3.37750	.949254	4.22000	2.28000	79/11	80/08
TOT KJEL	N	MG/L		3	.253333	.110151	.380000	.180000	80/02	80/08
			K	1	.050000		.050000	.050000	79/11	79/11
			T	4	.202500	.135739	.380000	.050000	79/11	80/08
PHOS-TOT		MG/L P		4	.045000	.034506	.096000	.020000	79/11	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
			K	2	.010000	.000000	.010000	.010000	80/05	80/08
			T	4	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		4	331.000	27.7489	360.000	303.000	79/11	80/08
FLUORIDE	F,DISS	MG/L		2	.235000	.063640	.280000	.190000	79/11	80/02
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08

TABLE RD 1-60 (Continued)

STATION NUMBER 600280
39 20 28.0 084 37 46.0 2
INDIAN CREEK NEAR ROSS
OHIO RIVER 051391 (MIAMI RIVER)
MILES 0953.80 0490.10 027.70 001.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	220.000	294.052	660.000	50.0000	79/11	80/08
LEAD	PB,TOT	UG/L		2	21.0000	5.65685	25.0000	17.0000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	13.0000	9.79796	25.0000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		2	565.000	120.208	650.000	480.000	79/11	80/05
PHENOLS	TOTAL	UG/L		3	2.66667	1.15470	4.00000	2.00000	79/11	80/08
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	2.50000	1.00000	4.00000	2.00000	79/11	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-61

STATION NUMBER 600320
40 11 39.0 084 14 29.0 2
LORAMIE CREEK NR. LOCKINGTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 118.80 000.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.25000	6.88598	19.0000	3.00000	78/10	79/07
STREAM	FLOW	CFS		4	851.900	1009.07	2040.00	9.60000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	584.750	158.294	740.000	425.000	78/10	79/07
DO		MG/L		4	9.84999	1.62790	12.0000	8.40000	78/10	79/07
COD	LOWLEVEL	MG/L		4	26.7750	13.0155	44.0000	14.1000	78/10	79/07
PH		SU		2	7.75000	.494970	8.10000	7.40000	79/04	79/07
LAB	PH	SU		2	7.75000	.353553	8.00000	7.50000	78/10	79/01
RESIDUE	TOT NFLT	MG/L		4	106.000	139.666	310.000	8.00000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		3	.140000	.078102	.190000	.050000	79/01	79/07
NO3-N	TOTAL	MG/L		4	3.93500	2.81098	6.55000	1.00000	78/10	79/07
TOT KJEL	N	MG/L		4	1.15000	.602772	2.00000	.600000	78/10	79/07
PHOS-TOT		MG/L P		4	.290000	.153840	.480000	.110000	78/10	79/07
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/10	79/07
TOT HARD	CACO3	MG/L		4	269.750	94.2492	358.000	170.000	78/10	79/07
FLUORIDE	F,DISS	MG/L		4	.375000	.234166	.710000	.170000	78/10	79/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
LEAD	PB,TOT	UG/L		4	8.25000	3.77492	12.0000	5.00000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		4	121.250	80.4917	220.000	23.0000	78/10	79/07
PHENOLS	TOTAL	UG/L		4	6.25000	1.25831	8.00000	5.00000	78/10	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-62

STATION NUMBER 600320
40 11 39.0 084 14 29.0 2
LORAMIE CREEK NR. LOCKINGTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 118.80 000.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.6250	8.71336	22.5000	4.00000	79/10	80/07
STREAM	FLOW	CFS		1	89.6000		89.6000	89.6000	79/10	79/10
STREAM	FLOW,	INST-CFS		2	554.100	689.995	1042.00	66.2000	80/04	80/07
STREAM	STAGE	FEET		2	78.8400	1.01743	79.5600	78.1200	80/04	80/07
CNDUCTVY	AT 25C	MICROMHO		4	599.000	133.509	707.000	404.000	79/10	80/07
DO		MG/L		4	9.20000	3.63961	13.0000	5.70000	79/10	80/07
COD	LOWLEVEL	MG/L		4	27.2500	14.5917	49.0000	18.0000	79/10	80/07
PH		SU		3	7.86666	.116010	8.00000	7.80000	79/10	80/07
LAB	PH	SU		1	7.80000		7.80000	7.80000	80/01	80/01
RESIDUE	TOT NFLT	MG/L		4	71.7500	103.616	227.000	14.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		3	.100000	.045826	.140000	.050000	79/10	80/04
			K	1	.050000		.050000	.050000	80/07	80/07
			T	4	.087500	.045000	.140000	.050000	79/10	80/07
NO3-N	TOTAL	MG/L		4	2.89500	1.34755	4.31000	1.10000	79/10	80/07
TOT KJEL	N	MG/L		4	.769999	.166335	.930000	.550000	79/10	80/07
PHOS-TOT		MG/L P		4	.267500	.189099	.550000	.150000	79/10	80/07
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/10	80/01
			K	2	.010000	.000000	.010000	.010000	80/04	80/07
			T	4	.010000	.000000	.010000	.010000	79/10	80/07
TOT HARD	CACO3	MG/L		4	300.250	72.0757	346.000	193.000	79/10	80/07
FLUORIDE	F,DISS	MG/L		2	.290000	.000000	.290000	.290000	79/10	80/01
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	2	5.00000	.000000	5.00000	5.00000	80/04	80/07
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/07

TABLE RD 1-62 (Continued)

STATION NUMBER 600320
40 11 39.0 084 14 29.0 2
LORAMIE CREEK NR. LOCKINGTON
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 118.80 000.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/04
			K	1	30.0000		30.0000	30.0000	80/07	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/07
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		4	4005.00	5240.67	11800.0	570.000	79/10	80/07
LEAD	PB,TOT	UG/L		3	6.00000	1.73205	8.00000	5.00000	79/10	80/04
			K	1	5.00000		5.00000	5.00000	80/07	80/07
			T	4	5.75000	1.50000	8.00000	5.00000	79/10	80/07
MANGNESE	MN	UG/L	K	1	.500000		.500000	.500000	80/07	80/07
MOLY	MO,TOT	UG/L	K	1	100.000		100.000	100.000	80/07	80/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	1	100.000		100.000	100.000	80/04	80/04
			T	3	100.000	.000000	100.000	100.000	79/10	80/04
ZINC	ZN,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/10	80/04
			K	1	30.0000		30.0000	30.0000	80/07	80/07
ZINC	ZN,TOT	UG/L	T	4	32.5000	5.00000	40.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		4	1043.00	1398.31	3100.00	82.0000	79/10	80/07
PHENOLS	TOTAL	UG/L		3	4.00000	1.73205	5.00000	2.00000	79/10	80/04
			K	1	2.00000		2.00000	2.00000	80/07	80/07
			T	4	3.50000	1.73205	5.00000	2.00000	79/10	80/07
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/10	80/04

TABLE RD 1-63

STATION NUMBER 600130
40 06 27.0 083 47 57.0 2
MAD R. NEAR URBANA
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.48 039.89

No data were collected from 10/78 - 9/80.

TABLE RD 1-64

STATION NUMBER 610040
39 57 51.0 083 49 54.0 2
MAD RIVER AT EAGLE CITY - ST PARIS PIKE
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 028.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.9167	6.32166	19.5000	2.00000	78/10	79/09
STREAM	FLOW	CFS		10	518.700	437.907	1457.00	120.000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		12	737.166	85.6324	844.000	593.000	78/10	79/09
DO		MG/L		12	10.9000	1.49119	12.6000	8.10000	78/10	79/09
COD	LOWLEVEL	MG/L		11	8.45454	4.86546	16.0000	3.00000	78/10	79/08
			K	1	4.00000		4.00000	4.00000	79/09	79/09
			T	12	8.08333	4.81397	16.0000	3.00000	78/10	79/09
PH		SU		7	7.94285	.230082	8.20000	7.50000	78/10	79/07
LAB	PH	SU		5	8.01999	.084143	8.10000	7.90000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	22.4167	14.7800	52.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.068000	.027406	.120000	.050000	78/10	79/07
			K	2	.050000	.000061	.050000	.050000	79/08	79/09
			T	12	.065000	.025761	.120000	.050000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.81499	.872232	5.23000	3.01000	78/10	79/09
TOT KJEL	N	MG/L		12	.462500	.263753	1.00000	.100000	78/10	79/09
PHOS-TOT		MG/L P		11	.080000	.046044	.200000	.050000	78/10	79/08
			K	1	.050000		.050000	.050000	79/09	79/09
			T	12	.077500	.044747	.200000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/01	79/06
			K	1	.010000		.010000	.010000	79/09	79/09
			T	4	.010000	.000000	.010000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		4	338.750	50.3281	394.000	278.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		4	.275000	.031092	.320000	.250000	79/01	79/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/01	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	5.00000	.000000	5.00000	5.00000	79/01	79/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09

TABLE RD 1-64 (Continued)

STATION NUMBER 610040
39 57 51.0 083 49 54.0 2
MAD RIVER AT EAGLE CITY - ST PARIS PIKE
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 028.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		2	505.000	487.904	850.000	160.000	79/06	79/09
LEAD	PB,TOT	UG/L		3	9.00000	3.60555	12.0000	5.00000	79/01	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	8.00000	3.55903	12.0000	5.00000	79/01	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/06
			K	1	100.000		100.000	100.000	79/09	79/09
			T	4	100.000	.000000	100.000	100.000	79/01	79/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
ZINC	ZN,TOT	UG/L	T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		10	3528.70	6850.66	17000.0	38.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		3	2.33333	.577352	3.00000	2.00000	79/01	79/06
			K	1	2.00000		2.00000	2.00000	79/09	79/09
			T	4	2.25000	.500000	3.00000	2.00000	79/01	79/09
MERCURY	HG,TOTAL	UG/L		3	2.00000	2.59808	5.00000	.500000	79/01	79/06
			K	1	.500000		.500000	.500000	79/09	79/09
			T	4	1.62500	2.25000	5.00000	.500000	79/01	79/09

TABLE RD 1-65

STATION NUMBER 610040
39 57 51.0 083 49 54.0 2
MAD RIVER AT EAGLE CITY
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 028.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	9.27000	5.26372	17.5000	4.00000	79/10	80/09
STREAM	FLOW	CFS		11	423.763	194.299	859.600	201.400	79/10	80/09
STREAM	FLOW,	INST-CFS		3	345.433	27.0769	373.600	319.600	80/05	80/07
STREAM	STAGE	FEET		3	5.23333	.344271	5.48000	4.84000	80/06	80/09
CNDUCTVY	AT 25C	MICROMHO		11	707.182	60.3755	830.000	606.000	79/10	80/09
DO		MG/L		9	10.7333	1.56924	12.7000	8.00000	79/10	80/09
COD	LOWLEVEL	MG/L		10	15.9000	7.78103	31.0000	4.00000	79/10	80/09
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	11	14.8182	8.20754	31.0000	4.00000	79/10	80/09
PH		SU		4	7.90000	.182677	8.10000	7.70000	79/11	80/07
LAB	PH	SU		7	7.95714	.181434	8.20000	7.60000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		5	28.2000	12.8141	50.0000	18.0000	80/02	80/07
			K	5	10.0000	.000000	10.0000	10.0000	79/10	80/09
			T	10	19.1000	12.8448	50.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		6	.141667	.131821	.390000	.050000	79/11	80/09
			K	5	.050000	.000061	.050000	.050000	79/10	80/06
			T	11	.100000	.104786	.390000	.050000	79/10	80/09
NO3-N	TOTAL	MG/L		11	3.48363	.318248	3.90000	2.96000	79/10	80/09
TOT KJEL	N	MG/L		9	.350000	.404475	1.41000	.100000	79/10	80/09
			K	2	.050000	.000061	.050000	.050000	79/11	80/01
			T	11	.295454	.381585	1.41000	.050000	79/10	80/09
PHOS-TOT		MG/L P		10	.067500	.056579	.210000	.020000	79/10	80/09
			K	1	.020000		.020000	.020000	79/11	79/11
			T	11	.063182	.055553	.210000	.020000	79/10	80/09
CYANIDE	CN-TOT	MG/L	K	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	372.000	35.4401	398.000	320.000	79/12	80/09
FLUORIDE	F,TOTAL	MG/L		1	.290000		.290000	.290000	79/12	79/12
CADMIUM	CD,TOT	UG/L	K	4	6.25000	2.50000	10.0000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	827.500	1020.31	2300.00	140.000	79/12	80/09
LEAD	PB,TOT	UG/L	K	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L	K	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		12	820.000	730.429	2300.00	120.000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	2.00000	.000000	2.00000	2.00000	80/04	80/09
			K	2	2.00000	.000000	2.00000	2.00000	79/12	80/06
			T	4	2.00000	.000000	2.00000	2.00000	79/12	80/09
RESIDUE	DISS-180	C MG/L		1	451.000		451.000	451.000	79/12	79/12
MERCURY	HG,TOTAL	UG/L	K	3	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-66

STATION NUMBER 610010
39 54 56.0 083 52 50.0 2
MAD RIVER BELOW SPRINGFIELD - LOWER VALLEY PIKE
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.48 023.34

No data were collected from 10/78 - 9/80.

TABLE RD 1-67

STATION NUMBER 600190
39 47 50.0 084 05 19.0 2
MAD RIVER NEAR DAYTON
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 005.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.9083	7.55951	23.4000	2.00000	78/10	79/09
STREAM	FLOW	CFS		10	1479.80	1343.94	4800.00	441.000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		12	699.666	123.160	830.000	462.000	78/10	79/09
DO		MG/L		12	9.94999	1.90862	13.6000	7.90000	78/10	79/09
COD	LOWLEVEL	MG/L		12	14.0000	10.9461	43.0000	4.00000	78/10	79/09
PH		SU		7	7.85714	.198874	8.10000	7.50000	78/10	79/07
LAB	PH	SU		5	7.94000	.114287	8.10000	7.80000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	57.0833	78.3506	253.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.221666	.127054	.560000	.100000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.17083	.956625	5.41000	2.00000	78/10	79/09
TOT KJEL	N	MG/L		12	.866666	.435542	1.90000	.400000	78/10	79/09
PHOS-TOT		MG/L P		12	.244166	.171064	.590000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		4	293.250	67.9479	353.000	198.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		4	.287500	.030957	.330000	.260000	79/01	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	79/01	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		2	1650.00	806.102	2220.00	1080.00	79/06	79/09
LEAD	PB,TOT	UG/L		4	17.0000	6.63325	26.0000	12.0000	79/01	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/01	79/09
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		9	6365.11	13082.9	40000.0	68.0000	79/01	79/09
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	79/01	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	79/01	79/09

TABLE RD 1-68

STATION NUMBER 600190
39 47 50.0 084 05 19.0 2
MAD RIVER NEAR DAYTON
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 005.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.8400	6.44484	22.2000	4.00000	79/10	80/09
STREAM	FLOW	CFS		1	4.00000		4.00000	4.00000	80/02	80/02
STREAM	FLOW,	INST-CFS		3	863.200	131.402	960.400	713.700	80/05	80/07
STREAM	STAGE	FEET		3	3.46000	.470310	3.78000	2.92000	80/06	80/09
CNDUCTVY	AT 25C	MICROMHO		11	685.182	71.0929	789.000	535.000	79/10	80/09
DO		MG/L		9	9.92222	1.94987	12.5000	7.00000	79/10	80/09
DEOXY K1	BASE E	PER DAY		1	.520000		.520000	.520000	79/12	79/12
COD	LOWLEVEL	MG/L		11	17.3636	8.64030	30.0000	4.00000	79/10	80/09
PH		SU		4	7.90000	.141580	8.00000	7.70000	79/11	80/07
LAB	PH	SU		7	8.01428	.090436	8.10000	7.90000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		10	52.4000	62.9660	189.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	11	48.5454	61.0874	189.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	.192727	.140719	.560000	.050000	79/10	80/09
NO3-N	TOTAL	MG/L		11	3.15090	.375839	3.86000	2.68000	79/10	80/09
TOT KJEL	N	MG/L		10	.534000	.346929	1.31000	.170000	79/10	80/09
PHOS-TOT		MG/L P		11	.228454	.054575	.320000	.150000	79/10	80/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/12	79/12
			K	3	.010000	.000000	.010000	.010000	80/04	80/09
			T	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	333.500	52.3609	393.000	269.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.290000		.290000	.290000	79/12	79/12
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	3	5.00000	.000000	5.00000	5.00000	80/04	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/04
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09

TABLE RD 1-68 (Continued)

STATION NUMBER 600190
39 47 50.0 084 05 19.0 2
MAD RIVER NEAR DAYTON
OHIO RIVER 051392 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 080.70 005.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	3655.00	3932.44	7900.00	220.000	79/12	80/09
LEAD	PB,TOT	UG/L		4	7.50000	2.38048	10.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	3	100.000	.000000	100.000	100.000	80/04	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/12	80/06
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	4	32.5000	5.00000	40.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		8	6301.25	4879.28	16000.0	910.000	79/10	80/06
PHENOLS	TOTAL	UG/L		3	2.33333	.577352	3.00000	2.00000	79/12	80/09
PHENOLS	TOTAL	UG/L	K	1	2.00000		2.00000	2.00000	80/06	80/06
			T	4	2.25000	.500000	3.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L	K	3	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-69

STATION NUMBER 600340
39 28 50.0 084 33 45.0 2
SEVEN MILE CREEK AT TAYLOR SCHOOL RD
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 003.60 001.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.4250	9.82798	22.0000	.000000	78/11	79/08
CNDUCTVY	AT 25C	MICROMHO		4	665.750	110.549	821.000	575.000	78/11	79/08
DO		MG/L		4	11.3000	2.87171	15.0000	8.30000	78/11	79/08
COD	LOWLEVEL	MG/L		4	10.0000	4.32049	14.0000	4.00000	78/11	79/08
PH		SU		3	7.93333	.404349	8.30000	7.50000	78/11	79/08
LAB	PH	SU		1	8.00000		8.00000	8.00000	79/02	79/02
RESIDUE	TOT NFLT	MG/L		4	17.5000	19.9416	47.0000	3.00000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.095000	.083467	.220000	.050000	78/11	79/08
NO3-N	TOTAL	MG/L		4	3.11750	1.13936	4.35000	2.08000	78/11	79/08
TOT KJEL	N	MG/L		4	.450000	.238048	.800000	.300000	78/11	79/08
PHOS-TOT		MG/L P		4	.077500	.029861	.120000	.050000	78/11	79/08
CYANIDE	CN-TOT	MG/L		4	.032500	.045000	.100000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		4	322.000	32.5372	358.000	288.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		4	.275000	.049329	.340000	.220000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.75000	1.50000	8.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
LEAD	PB,TOT	UG/L		4	18.2500	17.4045	44.0000	6.00000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		4	6060.50	11298.5	23000.0	70.0000	78/11	79/08
PHENOLS	TOTAL	UG/L		4	2.00000	.000000	2.00000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-70

STATION NUMBER 600340
39 28 50.0 084 33 45.0 2
SEVEN MILE CREEK AT TAYLOR SCHOOL RD
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 003.60 001.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.5750	10.0493	24.5000	2.00000	79/11	80/08
CNDUCTVY	AT 25C	MICROMHO		4	655.250	59.3717	708.000	593.000	79/11	80/08
SAMPLE	TREAT-	MENT	K	1	8.30000		8.30000	8.30000	80/05	80/05
DO		MG/L		4	12.0000	2.37769	14.8000	9.20000	79/11	80/08
COD	LOWLEVEL	MG/L		4	9.00000	4.76095	14.0000	4.00000	79/11	80/08
PH		SU		1	8.30000		8.30000	8.30000	79/11	79/11
LAB	PH	SU		2	8.05000	.212451	8.20000	7.90000	80/02	80/08
RESIDUE	TOT NFLT	MG/L		2	10.0000	.000000	10.0000	10.0000	79/11	80/02
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/08
			T	4	10.0000	.000000	10.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		3	.056667	.011547	.070000	.050000	79/11	80/05
			K	1	.050000		.050000	.050000	80/08	80/08
			T	4	.055000	.010000	.070000	.050000	79/11	80/08
NO3-N	TOTAL	MG/L		4	2.72500	.711735	3.55000	1.96000	79/11	80/08
TOT KJEL	N	MG/L		4	.317500	.076322	.410000	.250000	79/11	80/08
PHOS-TOT		MG/L P		4	.034000	.021848	.066000	.020000	79/11	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
			K	2	.010000	.000000	.010000	.010000	80/05	80/08
			T	4	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		4	324.000	25.0333	352.000	300.000	79/11	80/08
FLUORIDE	F,DISS	MG/L		2	.280000	.014141	.290000	.270000	79/11	80/02
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	7.50000	3.53553	10.0000	5.00000	80/05	80/08
			T	4	6.25000	2.50000	10.0000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-70 (Continued)

STATION NUMBER 600340
39 28 50.0 084 33 45.0 2
SEVEN MILE CREEK AT TAYLOR SCHOOL RD
OHIO RIVER (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 037.50 003.60 001.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	165.000	158.640	400.000	60.0000	79/11	80/08
LEAD	PB,TOT	UG/L		2	18.0000	9.89949	25.0000	11.0000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	11.5000	9.43398	25.0000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		3	129.667	182.352	340.000	16.0000	79/11	80/05
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	79/11	80/08
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	2.00000	.000000	2.00000	2.00000	79/11	80/08
MERCURY	HG,TOTAL	UG/L		2	.550000	.070715	.600000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.525000	.050002	.600000	.500000	79/11	80/08

TABLE RD 1-71

STATION NUMBER 600100
39 52 10.0 084 16 57.0 2
STILLWATER R AT ENGLEWOOD- US 40
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.70 008.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.3167	8.37277	23.0000	1.00000	78/10	79/09
STREAM	FLOW	CFS		11	1984.87	2681.14	8007.00	71.0000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	677.583	178.579	843.000	242.000	78/10	79/09
DO		MG/L		12	10.8250	2.46913	15.2000	7.50000	78/10	79/09
COD	LOWLEVEL	MG/L		12	17.1667	11.1423	44.0000	4.00000	78/10	79/09
PH		SU		7	8.09999	.321612	8.40000	7.70000	78/10	79/07
LAB	PH	SU		5	8.05999	.270407	8.30000	7.60000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	81.0833	117.290	416.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.159166	.082071	.300000	.060000	78/10	79/09
NO3-N	TOTAL	MG/L		12	4.64416	2.95021	9.90000	1.40000	78/10	79/09
TOT KJEL	N	MG/L		12	.968333	.583638	2.40000	.330000	78/10	79/09
PHOS-TOT		MG/L P		12	.250833	.164729	.510000	.060000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/01	79/06
			K	1	.010000		.010000	.010000	79/09	79/09
			T	4	.010000	.000000	.010000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		4	259.000	132.949	372.000	101.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		4	.270000	.042428	.310000	.220000	79/01	79/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/01	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	5.00000	.000000	5.00000	5.00000	79/01	79/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
COPPER	CU,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		2	895.000	332.340	1130.00	660.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	15.7500	7.13559	26.0000	10.0000	79/01	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/06
			K	1	100.000		100.000	100.000	79/09	79/09
			T	4	100.000	.000000	100.000	100.000	79/01	79/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		10	1826.60	2785.07	9000.00	37.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		3	2.66667	1.15470	4.00000	2.00000	79/01	79/06
			K	1	2.00000		2.00000	2.00000	79/09	79/09
			T	4	2.50000	1.00000	4.00000	2.00000	79/01	79/09
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/01	79/06
			K	1	.500000		.500000	.500000	79/09	79/09
			T	4	.500000	.000000	.500000	.500000	79/01	79/09

TABLE RD 1-72

STATION NUMBER 600110
39 52 10.0 084 16 57.0 2
STILLWATER R AT ENGLEWOOD- US 40
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 081.70 008.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	10.5273	7.84463	23.0000	.500000	79/10	80/09
STREAM	FLOW	CFS		8	1001.95	1060.09	3474.00	278.000	79/10	80/06
STREAM	FLOW,	INST-CFS		3	1504.00	1722.97	3474.00	278.300	80/04	80/06
STREAM	STAGE	FEET		2	74.7000	1.93750	76.0700	73.3300	80/04	80/06
CNDUCTVY	AT 25C	MICROMHO		12	643.500	108.452	762.000	437.000	79/10	80/09
DO		MG/L		10	10.5600	2.27606	13.8000	6.80000	79/10	80/09
COD	LOWLEVEL	MG/L		11	25.5454	14.3901	60.0000	4.00000	79/10	80/09
			K	1	4.00000		4.00000	4.00000	80/01	80/01
			T	12	23.7500	15.0643	60.0000	4.00000	79/10	80/09
PH		SU		5	8.09999	.187337	8.30000	7.80000	79/11	80/07
LAB	PH	SU		7	8.09999	.230965	8.40000	7.80000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		8	152.375	216.616	639.000	10.0000	79/10	80/09
			K	4	10.0000	.000000	10.0000	10.0000	79/10	80/01
			T	12	104.917	186.478	639.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	.091818	.068821	.210000	.010000	79/10	80/09
			K	1	.050000		.050000	.050000	80/06	80/06
			T	12	.088333	.066720	.210000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	3.48416	1.32441	5.59000	1.16000	79/10	80/09
TOT KJEL	N	MG/L		11	1.01909	1.16650	4.31000	.300000	79/10	80/09
PHOS-TOT		MG/L P		12	.273166	.271255	1.08400	.110000	79/10	80/09
CYANIDE	CN-TOT	MG/L	K	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	318.250	71.0979	389.000	220.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.250000		.250000	.250000	79/12	79/12
CADMIUM	CD,TOT	UG/L	K	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L	K	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	7900.00	11263.7	24500.0	190.000	79/12	80/09
LEAD	PB,TOT	UG/L		3	12.0000	6.55744	19.0000	6.00000	79/12	80/06
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	4	10.2500	6.39661	19.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	3	100.000	.000000	100.000	100.000	80/04	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		2	60.0000	42.4264	90.0000	30.0000	80/04	80/06
			K	2	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	4	45.0000	30.0000	90.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		11	1836.36	1857.74	5700.00	110.000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	6.00000	2.82843	8.00000	4.00000	80/04	80/09
			K	2	2.00000	.000000	2.00000	2.00000	79/12	80/06
			T	4	4.00000	2.82843	8.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/06

TABLE RD 1-73

STATION NUMBER 600180
39 33 22.0 084 21 00.0 2
TWIN CREEK NEAR FRANKLIN
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 056.60 000.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.92500	7.30907	20.2000	4.00000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	584.000	122.379	661.000	402.000	78/10	79/07
DO		MG/L		4	10.7500	2.36291	12.6000	7.40000	78/10	79/07
COD	LOWLEVEL	MG/L		4	12.0250	8.64114	24.0000	4.00000	78/10	79/07
PH		SU		1	8.00000		8.00000	8.00000	79/07	79/07
LAB	PH	SU		3	7.99999	.264906	8.20000	7.70000	78/10	79/04
RESIDUE	TOT NFLT	MG/L		4	52.5000	55.4647	133.000	10.0000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		3	.073333	.025166	.100000	.050000	79/01	79/07
NO3-N	TOTAL	MG/L		4	3.83750	2.22721	5.78000	1.81000	78/10	79/07
TOT KJEL	N	MG/L		4	.650000	.580230	1.50000	.200000	78/10	79/07
PHOS-TOT		MG/L P		4	.165000	.223383	.500000	.050000	78/10	79/07
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/10	79/07
TOT HARD	CACO3	MG/L		4	286.000	74.3729	339.000	176.000	78/10	79/07
FLUORIDE	F,DISS	MG/L		3	.323333	.023094	.350000	.310000	78/10	79/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		1	1920.00		1920.00	1920.00	79/04	79/04
LEAD	PB,TOT	UG/L		4	9.00000	3.74166	14.0000	5.00000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		4	174.500	136.222	360.000	37.0000	78/10	79/07
PHENOLS	TOTAL	UG/L		4	5.75000	4.34933	10.0000	2.00000	78/10	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-74

STATION NUMBER 600180
39 33 22.0 084 21 00.0 2
TWIN CREEK NEAR FRANKLIN
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 056.60 000.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	13.0250	7.38032	22.6000	6.50000	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		4	619.000	98.4039	689.000	474.000	79/10	80/08
DO		MG/L		4	10.1750	2.36838	12.5000	7.80000	79/10	80/08
COD	LOWLEVEL	MG/L		4	11.5000	9.00000	22.0000	4.00000	79/10	80/08
PH		SU		1	8.00000		8.00000	8.00000	79/10	79/10
LAB	PH	SU		3	8.03333	.153193	8.20000	7.90000	80/01	80/08
RESIDUE	TOT NFLT	MG/L		4	80.0000	97.4987	220.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		4	.087500	.068496	.190000	.050000	79/10	80/08
NO3-N	TOTAL	MG/L		4	2.98500	1.63174	4.52000	1.53000	79/10	80/08
TOT KJEL	N	MG/L		4	.407500	.135985	.600000	.280000	79/10	80/08
PHOS-TOT		MG/L P		4	.134000	.142380	.340000	.020000	79/10	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/10	80/01
			K	2	.010000	.000000	.010000	.010000	80/04	80/08
			T	4	.010000	.000000	.010000	.010000	79/10	80/08
TOT HARD	CACO3	MG/L		4	313.750	54.1749	355.000	236.000	79/10	80/08
FLUORIDE	F,DISS	MG/L		2	.270000	.000000	.270000	.270000	79/10	80/01
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	2	5.00000	.000000	5.00000	5.00000	80/04	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/08
IRON	FE,TOT	UG/L		4	3277.50	4299.10	9500.00	120.000	79/10	80/08
LEAD	PB,TOT	UG/L		3	6.33333	2.30941	9.00000	5.00000	79/10	80/04
			K	1	5.00000		5.00000	5.00000	80/08	80/08
			T	4	6.00000	2.00000	9.00000	5.00000	79/10	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	2	100.000	.000000	100.000	100.000	80/04	80/08
			T	4	100.000	.000000	100.000	100.000	79/10	80/08
ZINC	ZN,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/10	80/04
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	4	32.5000	5.00000	40.0000	30.0000	79/10	80/08
FEC COLI	MFM-FCBR	/100ML		3	790.000	1135.03	2100.00	100.000	79/10	80/04
PHENOLS	TOTAL	UG/L		4	2.75000	.957427	4.00000	2.00000	79/10	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	2	.500000	.000000	.500000	.500000	80/04	80/08
			T	4	.500000	.000000	.500000	.500000	79/10	80/08

TABLE RD 1-75

STATION NUMBER 600290
39 09 54.0 084 47 18.0 2
WHITEWATER R. NEAR HOOVEN
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.60 000.50

No data were collected from 10/78 - 9/80.

TABLE RD 1-76

STATION NUMBER 600290
39 09 54.0 084 47 18.0 2
WHITEWATER R. NEAR HOOVEN
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.60 000.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	13.0000	9.55685	24.0000	2.00000	79/11	80/08
CNDUCTVY	AT 25C	MICROMHO		4	570.500	44.8739	630.000	521.000	79/11	80/08
DO		MG/L		4	8.84999	3.85184	13.2000	4.20000	79/11	80/08
COD	LOWLEVEL	MG/L		3	8.00000	5.29150	14.0000	4.00000	79/11	80/08
			K	1	4.00000		4.00000	4.00000	80/05	80/05
			T	4	7.00000	4.76095	14.0000	4.00000	79/11	80/08
PH		SU		2	8.10000	.141598	8.20000	8.00000	79/11	80/05
LAB	PH	SU		2	8.00000	.141436	8.10000	7.90000	80/02	80/08
RESIDUE	TOT NFLT	MG/L		3	44.3333	47.8574	99.0000	10.0000	79/11	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	4	35.7500	42.6800	99.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		3	.063333	.023094	.090000	.050000	79/11	80/08
			K	1	.050000		.050000	.050000	80/05	80/05
			T	4	.060000	.020000	.090000	.050000	79/11	80/08
NO3-N	TOTAL	MG/L		4	2.12250	.387678	2.58000	1.74000	79/11	80/08
TOT KJEL	N	MG/L		4	.267500	.263233	.660000	.100000	79/11	80/08
PHOS-TOT		MG/L P		4	.065000	.056249	.146000	.024000	79/11	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
			K	2	.010000	.000000	.010000	.010000	80/05	80/08
			T	4	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		4	296.750	20.4185	318.000	272.000	79/11	80/08
FLUORIDE	F,DISS	MG/L		2	.240000	.014143	.250000	.230000	79/11	80/02
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-76 (Continued)

STATION NUMBER 600290
39 09 54.0 084 47 18.0 2
WHITEWATER R. NEAR HOOVEN
OHIO RIVER 051391 (GREAT MIAMI RIVER)
MILES 0953.80 0490.10 005.60 000.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	1140.00	1604.91	3500.00	100.000	79/11	80/08
LEAD	PB,TOT	UG/L		3	16.6667	10.4084	25.0000	5.00000	79/11	80/08
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	4	13.7500	10.3078	25.0000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		3	451.000	735.284	1300.00	20.0000	79/11	80/05
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	79/11	80/08
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	2.00000	.000000	2.00000	2.00000	79/11	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-77

STATION NUMBER 601550
39 40 00.0 082 33 04.0 2
HOCKING RIVER NR LANCASTER
OHIO RIVER 050691 (HOCKING RIVER)
MILES 0953.80 0781.80 086.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.5750	8.14059	22.3000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	58.5833	25.4468	108.000	32.0000	78/10	79/09
STREAM	FLOW,	INST-CFS		3	51.6667	20.4043	74.0000	34.0000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		12	648.750	255.059	1200.00	300.000	78/10	79/09
DO		MG/L		12	8.62499	3.24993	12.6000	2.10000	78/10	79/09
BOD	5 DAY	MG/L		8	5.17500	2.23335	8.00000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	12.4167	4.83281	22.0000	4.00000	78/10	79/09
CL2DMND	15 MIN	MG/L		1	10.0000		10.0000	10.0000	79/01	79/01
PH		SU		12	7.60833	.223468	7.90000	7.20000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	17.3333	10.3074	47.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.912500	.539261	2.00000	.240000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.176666	.139371	.460000	.030000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.96250	.868503	3.07000	.930000	78/10	79/09
TOT KJEL	N	MG/L		12	1.72916	.892512	4.00000	.900000	78/10	79/09
PHOS-TOT		MG/L P		12	.310000	.218757	.750000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		4	341.000	88.4345	471.000	281.000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	5.50000	1.00000	7.00000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		4	895.000	362.997	1270.00	550.000	78/12	79/09
LEAD	PB,TOT	UG/L		4	29.7500	33.5398	80.0000	11.0000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	60.0000	34.6410	90.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		12	20180.0	33590.6	120000	100.000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	4.50000	3.14787	12.0000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-78

STATION NUMBER 601550
39 40 00.0 082 33 04.0 2
HOCKING RIVER NR LANCASTER
OHIO RIVER 050691 (HOCKING RIVER)
MILES 0953.80 0781.80 086.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.2083	6.39822	23.5000	4.00000	79/11	80/09
STREAM	FLOW	CFS		2	65.9500	18.4555	79.0000	52.9000	79/10	79/11
STREAM	STAGE	FEET		6	3.07916	.450755	3.52000	2.49000	80/02	80/09
CNDUCTVY	FIELD	MICROMHO		12	654.416	348.922	1600.00	370.000	79/11	80/09
DO		MG/L		12	8.41249	2.73132	11.6000	4.15000	79/11	80/09
BOD	5 DAY	MG/L		9	10.2222	5.69601	21.0000	1.00000	79/12	80/09
COD	LOWLEVEL	MG/L		11	25.2727	10.5460	49.0000	10.0000	79/11	80/09
PH		SU		11	7.53181	.279596	7.90000	7.00000	79/11	80/09
LAB	PH	SU		1	7.90000		7.90000	7.90000	80/06	80/06
RESIDUE	TOT NFLT	MG/L		12	29.6667	15.9849	65.0000	10.0000	79/11	80/09
NH3+NH4-	N TOTAL	MG/L		12	1.24167	.831513	2.57000	.270000	79/11	80/09
NO2-N	TOTAL	MG/L		12	.221666	.167378	.580000	.060000	79/11	80/09
NO3-N	TOTAL	MG/L		12	1.88000	.659238	3.22000	.990000	79/11	80/09
TOT KJEL	N	MG/L		11	2.15909	1.02289	4.00000	.840000	79/11	80/09
PHOS-TOT		MG/L P		12	.541583	.208537	.860000	.244000	79/11	80/09
TOT HARD	CACO3	MG/L		4	321.500	46.0036	388.000	285.000	79/12	80/09
CHLORIDE	TOTAL	MG/L		2	37.5000	6.36396	42.0000	33.0000	80/02	80/09
SULFATE	SO4-TOT	MG/L		2	67.5000	12.0208	76.0000	59.0000	80/02	80/09
CADMIUM	CD,TOT	UG/L		3	6.33333	1.52754	8.00000	5.00000	79/12	80/09
			K	1	5.00000		5.00000	5.00000	80/06	80/06
			T	4	6.00000	1.41421	8.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		3	60.0000	51.9615	120.000	30.0000	79/12	80/09
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	4	52.5000	45.0000	120.000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	1270.00	671.764	2250.00	740.000	79/12	80/09
LEAD	PB,TOT	UG/L		4	22.0000	12.1929	40.0000	14.0000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		4	102.500	80.5709	220.000	50.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		1	45000.0		45000.0	45000.0	79/10	79/10
PHENOLS	TOTAL	UG/L		12	4.16667	2.97973	10.0000	2.00000	79/10	80/09
			K	1	2.00000		2.00000	2.00000	80/02	80/02
			T	13	4.00000	2.91548	10.0000	2.00000	79/10	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/12	79/12
			K	3	.500000	.000000	.500000	.500000	80/03	80/09
			T	4	.500000	.000000	.500000	.500000	79/12	80/09

TABLE RD 1-79

STATION NUMBER 601530
39 33 54.0 082 28 30.0 2
HOCKING RIVER NEAR ENTERPRISE
OHIO RIVER 050691 (HOCKING RIVER)
MILES 0953.80 0781.80 072.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.5833	6.52211	23.0000	2.50000	78/11	79/09
STREAM	FLOW	CFS		9	986.000	960.729	3189.00	190.000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		3	460.333	64.3931	530.000	403.000	78/11	79/03
CNDUCTVY	AT 25C	MICROMHO		8	541.375	189.721	873.000	256.000	78/11	79/09
DO		MG/L		12	9.40833	1.72230	12.9000	7.60000	78/11	79/09
BOD	5 DAY	MG/L		2	3.75000	3.18198	6.00000	1.50000	78/11	79/02
COD	LOWLEVEL	MG/L		13	11.0077	12.2741	49.0000	4.00000	78/11	79/09
PH		SU		11	7.58181	.231545	8.00000	7.30000	78/11	79/09
LAB	PH	SU		2	7.65000	.353532	7.90000	7.40000	78/12	79/05
T ALK	CACO3	MG/L		4	95.0000	31.2517	128.000	54.0000	79/02	79/09
RESIDUE	TOTAL	MG/L		3	349.000	156.464	485.000	178.000	78/11	79/07
RESIDUE	DISS-105	C MG/L		3	251.667	189.484	426.000	50.0000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		11	47.0909	37.1173	122.000	11.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		13	.311538	.269871	1.01000	.050000	78/11	79/09
NO2-N	TOTAL	MG/L		13	.041538	.031582	.100000	.010000	78/11	79/09
NO3-N	TOTAL	MG/L		13	1.56307	.584165	2.16000	.140000	78/11	79/09
TOT KJEL	N	MG/L		13	.796154	.586111	2.50000	.350000	78/11	79/09
PHOS-TOT		MG/L P		13	.154615	.177887	.700000	.050000	78/11	79/09
TOT HARD	CACO3	MG/L		7	229.571	89.4779	371.000	117.000	78/11	79/09
CHLORIDE	TOTAL	MG/L		1	25.0000		25.0000	25.0000	79/09	79/09
SULFATE	SO4-TOT	MG/L		1	67.0000		67.0000	67.0000	79/09	79/09
FLUORIDE	F,DISS	MG/L		1	.190000		.190000	.190000	79/02	79/02
CADMIUM	CD,TOT	UG/L		5	6.00000	2.23607	10.0000	5.00000	78/11	79/09
CHROMIUM	CR,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/11	79/09
COPPER	CU,TOT	UG/L		5	34.0000	8.94427	50.0000	30.0000	78/11	79/09
IRON	FE,TOT	UG/L		4	2300.00	2234.70	5600.00	820.000	78/11	79/09
LEAD	PB,TOT	UG/L		4	19.2500	17.1148	44.0000	5.00000	78/11	79/09
MANGNESE	MN	UG/L		4	905.000	404.681	1400.00	550.000	78/11	79/09
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/11	79/09
ZINC	ZN,TOT	UG/L		5	36.0000	8.94427	50.0000	30.0000	78/11	79/09
ALUMINUM	AL,TOT	UG/L		1	700.000		700.000	700.000	79/09	79/09
FEC COLI	MFM-FCBR	/100ML		12	6941.66	6728.16	20000.0	600.000	78/11	79/09
PHENOLS	TOTAL	UG/L		5	2.60000	1.34164	5.00000	2.00000	78/11	79/09
MERCURY	HG,TOTAL	UG/L		5	.720000	.491935	1.60000	.500000	78/11	79/09

TABLE RD 1-80

STATION NUMBER 601530
39 33 54.0 082 28 30.0 2
HOCKING RIVER NEAR ENTERPRISE
OHIO RIVER 050691 (HOCKING RIVER)
MILES 0953.80 0781.80 072.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	9.42857	7.96047	22.0000	.000000	79/10	80/08
STREAM	FLOW	CFS		2	922.500	854.892	1527.00	318.000	79/10	79/11
STREAM	FLOW,	INST-CFS		3	1898.33	553.019	2323.00	1273.00	80/04	80/08
STREAM	STAGE	FEET		5	5.00999	1.84205	6.80000	2.12000	79/10	80/08
CNDUCTVY	FIELD	MICROMHO		1	290.000		290.000	290.000	79/11	79/11
CNDUCTVY	AT 25C	MICROMHO		5	437.400	137.862	600.000	296.000	80/01	80/08
DO		MG/L		7	9.69999	2.36364	13.6000	6.40000	79/10	80/08
COD	LOWLEVEL	MG/L		7	15.0000	10.2794	34.0000	4.00000	79/10	80/08
PH		SU		6	7.38333	.292734	7.70000	6.90000	79/10	80/08
LAB	PH	SU		1	7.70000		7.70000	7.70000	80/02	80/02
T ALK	CACO3	MG/L		1	128.000		128.000	128.000	80/02	80/02
T ACDITY	CACO3	MG/L		1	10.0000		10.0000	10.0000	80/02	80/02
RESIDUE	DISS-105	C MG/L		3	284.333	54.3728	322.000	222.000	79/10	80/01
RESIDUE	TOT NFLT	MG/L		6	91.1667	72.5574	189.000	11.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		6	.198333	.130141	.350000	.060000	79/10	80/05
			K	1	.050000		.050000	.050000	80/08	80/08
			T	7	.177142	.131367	.350000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		6	.146667	.247278	.650000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		7	1.67000	.903770	3.66000	.950000	79/10	80/08
TOT KJEL	N	MG/L		8	.695000	.340336	1.41000	.270000	79/10	80/08
PHOS-TOT		MG/L P		7	.136714	.056753	.210000	.069000	79/10	80/08
TOT HARD	CACO3	MG/L		4	179.000	38.1838	234.000	146.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		1	55.0000		55.0000	55.0000	80/02	80/02
SULFATE	SO4-TOT	MG/L		2	65.0000	26.8701	84.0000	46.0000	80/02	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	4325.00	2670.05	7100.00	800.000	79/11	80/08

TABLE RD 1-80 (Continued)

STATION NUMBER 601530
39 33 54.0 082 28 30.0 2
HOCKING RIVER NEAR ENTERPRISE
OHIO RIVER 050691 (HOCKING RIVER)
MILES 0953.80 0781.80 072.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		3	39.0000	52.8299	100.000	8.00000	79/11	80/08
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	4	30.5000	46.3645	100.000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		4	710.000	183.485	980.000	590.000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
			K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	4	32.5000	5.00000	40.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		3	1366.67	850.492	2000.00	400.000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		5	5500.00	2589.40	9100.00	2600.00	79/10	80/08
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	79/11	80/08
RESIDUE	DISS-180 C	MG/L		2	226.000	22.6274	242.000	210.000	80/05	80/08
MERCURY	HG,TOTAL	UG/L		2	2.25000	2.47487	4.00000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	1.37500	1.75000	4.00000	.500000	79/11	80/08

TABLE RD 1-81

STATION NUMBER 601650
39 19 34.0 082 06 13.0 2
HOCKING RIVER AT ATHENS
OHIO RIVER 050692 (HOCKING RIVER)
MILES 0953.80 0781.80 039.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-82

STATION NUMBER 501050
41 18 24.0 082 36 21.0 2
HURON R BL MILAN-MUD BROOK RD
LAKE ERIE (HURON RIVER)
MILES 0011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	10.8889	8.13579	22.3000	.000000	78/10	79/07
TURB	JKSN	JTU		2	5.50000	4.10122	8.40000	2.60000	78/11	79/05
CNDUCTVY	AT 25C	MICROMHO		9	706.666	157.302	940.000	431.000	78/10	79/07
DO		MG/L		8	10.3250	2.01337	14.7000	8.20000	78/10	79/07
BOD	5 DAY	MG/L		7	2.24286	1.29596	4.20000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		8	18.2125	11.8644	43.0000	7.00000	78/10	79/09
LAB	PH	SU		10	8.00099	.186920	8.30000	7.71000	78/10	79/09
T ALK	CACO3	MG/L		1	218.000		218.000	218.000	78/11	78/11
RESIDUE	DISS-105	C MG/L		9	439.000	90.7497	608.000	292.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		10	81.0000	186.668	610.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		9	.494444	.608669	2.00000	.050000	78/10	79/09
			K	1	.050000		.050000	.050000	79/07	79/07
			T	10	.449999	.590819	2.00000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.184000	.244049	.840000	.030000	78/10	79/09
NO3-N	TOTAL	MG/L		10	4.10299	4.16778	12.8000	.080000	78/10	79/09
TOT KJEL	N	MG/L		10	1.66500	.707284	2.92000	.900000	78/10	79/09
T PO4	PO4	MG/L		1	.320000		.320000	.320000	78/11	78/11
PHOS-TOT		MG/L P		10	.433000	.323421	.960000	.120000	78/10	79/09
PHOS-DIS		MG/L P		4	.195000	.132288	.360000	.050000	78/11	79/05
T ORG C	C	MG/L		5	17.5400	17.1020	48.0000	7.30000	78/11	79/05
D ORG C	C	MG/L		1	6.90000		6.90000	6.90000	78/11	78/11
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/04	79/04
			K	1	.010000		.010000	.010000	79/07	79/07
			T	2	.010000	.000000	.010000	.010000	79/04	79/07
TOT HARD	CACO3	MG/L		9	292.111	56.5896	386.000	185.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		10	31.2000	24.1422	78.0000	7.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		10	129.200	46.9062	189.000	50.0000	78/10	79/09
FLUORIDE	F,DISS	MG/L		5	.377999	.145673	.580000	.220000	79/04	79/09
SILICA	DISOLVED	MG/L		5	6.21399	2.25828	8.07000	2.46000	78/11	79/07
ARSENIC	AS,TOT	UG/L		7	10.0000	.000000	10.0000	10.0000	78/10	79/09
			K	2	10.0000	.000000	10.0000	10.0000	79/07	79/07
			T	9	10.0000	.000000	10.0000	10.0000	78/10	79/09
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	79/03	79/03
CADMIUM	CD,TOT	UG/L		7	5.00000	.000000	5.00000	5.00000	78/10	79/09
			K	2	5.00000	.000000	5.00000	5.00000	79/07	79/07
			T	9	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	31.6667	4.08264	40.0000	30.0000	79/01	79/09
			K	1	30.0000		30.0000	30.0000	79/07	79/07

TABLE RD 1-82 (Continued)

STATION NUMBER 501050
41 18 24.0 082 36 21.0 2
HURON R BL MILAN-MUD BROOK RD
LAKE ERIE (HURON RIVER)
MILES 0011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	T	7	31.4286	3.77983	40.0000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		4	6852.50	10506.6	22500.0	610.000	79/06	79/09
IRON	FE,DISS	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
LEAD	PB,TOT	UG/L		9	14.0000	20.5852	68.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	50.0000	14.1421	60.0000	40.0000	79/07	79/09
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/05
ZINC	ZN,TOT	UG/L		8	33.7500	10.6066	60.0000	30.0000	78/10	79/09
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	33.3333	10.0001	60.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		4	2675.00	3931.39	8500.00	300.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/06	79/06
			K	2	7.50000	3.53553	10.0000	5.00000	79/07	79/07
			T	3	6.66667	2.88676	10.0000	5.00000	79/06	79/07
ALPHA	TOTAL	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
ALPHA	DISOLVED	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
ALPHA	SUSP	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
BETA	TOTAL	PC/L		1	8.00000		8.00000	8.00000	79/04	79/04
BETA	DISOLVED	PC/L		1	8.00000		8.00000	8.00000	79/04	79/04
BETA	SUSP	PC/L	K	1	2.00000		2.00000	2.00000	79/04	79/04
FEC COLI	MFM-FCBR	/100ML		9	996.666	2116.85	6600.00	20.0000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		2	385.000	318.198	610.000	160.000	79/05	79/06
PHENOLS	TOTAL	UG/L		4	3.75000	3.50000	9.00000	2.00000	79/03	79/09
			K	1	2.00000		2.00000	2.00000	79/07	79/07
			T	5	3.40000	3.13050	9.00000	2.00000	79/03	79/09
MBAS		MG/L		7	.150000	.053229	.220000	.090000	79/01	79/09
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/07	79/07

TABLE RD 1-82 (Continued)

STATION NUMBER 501050
41 18 24.0 082 36 21.0 2
HURON R BL MILAN-MUD BROOK RD
LAKE ERIE (HURON RIVER)
MILES 0011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/07	79/07
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/07	79/07
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/07	79/07
MERCURY	HG,TOTAL	UG/L		7	.514286	.037799	.600000	.500000	78/10	79/09
			K	2	.500000	.000000	.500000	.500000	79/07	79/07
			T	9	.511111	.033336	.600000	.500000	78/10	79/09

TABLE RD 1-83

STATION NUMBER 501050
41 18 24.0 082 36 21.0 2
HURON R BL MILAN-MUD BROOK RD
LAKE ERIE (HURON RIVER)
MILES 0011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	13.3400	9.66504	22.2000	.000000	80/03	80/09
TURB	JKSN	JTU		1	35.5000		35.5000	35.5000	80/04	80/04
TURB	TRBIDMTR	HACH FTU		1	35.5000		35.5000	35.5000	80/04	80/04
CNDUCTVY	AT 25C	MICROMHO		2	491.000	31.1127	513.000	469.000	80/03	80/04
DO		MG/L		5	9.59999	2.66554	13.9000	7.30000	80/03	80/09
BOD	5 DAY	MG/L		8	2.68750	1.52357	6.00000	1.00000	79/10	80/09
COD	LOWLEVEL	MG/L		8	35.2687	28.5082	78.0000	6.00000	79/10	80/09
LAB	PH	SU		9	7.64111	.406925	8.20000	7.00000	79/10	80/09
RESIDUE	TOTAL	MG/L		1	326.200		326.200	326.200	80/03	80/03
RESIDUE	DISS-105	C MG/L		8	424.750	93.7717	550.000	316.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		7	39.0000	28.8617	75.0000	10.0000	79/10	80/07
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
			T	9	32.5555	28.0763	75.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		8	.758875	1.71734	5.00000	.021000	79/10	80/09
			K	1	.050000		.050000	.050000	80/06	80/06
			T	9	.680111	1.62371	5.00000	.021000	79/10	80/09
NO2-N	TOTAL	MG/L		8	.090000	.114642	.360000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		9	4.23000	4.79741	15.9000	.310000	79/10	80/09
TOT KJEL	N	MG/L		9	.829999	.283550	1.30000	.550000	79/10	80/09
PHOS-TOT		MG/L P		8	.273500	.147221	.600000	.150000	79/10	80/09
T ORG C	C	MG/L		2	8.00000	1.41421	9.00000	7.00000	80/04	80/09
TOT HARD	CACO3	MG/L		8	296.750	64.2578	387.000	207.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		8	32.8750	8.57634	49.0000	24.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		8	125.875	33.0473	169.000	89.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		2	.240000	.000000	.240000	.240000	79/12	80/03
FLUORIDE	F,TOTAL	MG/L		3	.256667	.028867	.290000	.240000	80/03	80/05
SILICA	DISOLVED	MG/L		1	1.58000		1.58000	1.58000	79/10	79/10
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	80/03
			K	5	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	8	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	5	5.00000	.000000	5.00000	5.00000	80/04	80/09
			T	8	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L	K	1	30.0000		30.0000	30.0000	80/04	80/04
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/04
			K	4	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	8	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		9	1615.56	1623.11	4100.00	70.0000	79/10	80/09

TABLE RD 1-83 (Continued)

STATION NUMBER 501050
41 18 24.0 082 36 21.0 2
HURON R BL MILAN-MUD BROOK RD
LAKE ERIE (HURON RIVER)
MILES 0011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
IRON	FE,DISS	UG/L		1	50.0000		50.0000	50.0000	79/10	79/10
LEAD	PB,TOT	UG/L		6	6.00000	2.00000	10.0000	5.00000	79/10	80/05
			K	3	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	9	5.66667	1.65832	10.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		7	55.7143	22.2540	90.0000	30.0000	79/10	80/09
MANGNESE	MN,DISS	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/05	80/05
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		8	912.500	729.848	1900.00	200.000	79/10	80/09
ALPHA	TOTAL	PC/L	K	1	1.00000		1.00000	1.00000	80/04	80/04
BETA	TOTAL	PC/L		1	9.00000		9.00000	9.00000	80/04	80/04
FEC COLI	MFM-FCBR	/100ML		9	910.000	986.889	3000.00	10.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	5.00000	1.41421	6.00000	4.00000	79/10	80/06
			K	3	2.00000	.000000	2.00000	2.00000	80/04	80/07
			T	5	3.20000	1.78886	6.00000	2.00000	79/10	80/07
MBAS		MG/L		7	.105714	.052870	.200000	.050000	79/10	80/09
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	80/05	80/05
RESIDUE	DISS-180	C MG/L		2	330.900	176.919	456.000	205.800	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.533333	.057740	.600000	.500000	79/10	80/03
			K	5	.480000	.044725	.500000	.400000	80/04	80/09
			T	8	.500000	.053453	.600000	.400000	79/10	80/09

TABLE RD 1-84

STATION NUMBER 501070
41 16 32.0 082 38 13.0 2
E. BR. HURON RIVER BELOW NORWALK
LAKE ERIE (HURON RIVER)
(RIVER MILE 2.0)

No data were collected from 10/78 - 9/80.

TABLE RD 1-85

STATION NUMBER 501080
41 16 36.0 082 37 19.0 2
RATTLESNAKE CREEK AT LAIS ROAD
LAKE ERIE (HURON RIVER)
(RIVER MILE 1.7)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	11.8000	3.14329	15.2000	9.00000	78/11	79/06
CNDUCTVY	AT 25C	MICROMHO		4	1110.00	179.815	1300.00	880.000	78/11	79/06
DO		MG/L		3	6.36666	1.02637	7.50000	5.50000	78/11	79/06
BOD	5 DAY	MG/L		4	12.5500	7.95215	24.0000	5.80000	78/11	79/09
COD	LOWLEVEL	MG/L		2	72.0000	32.5269	95.0000	49.0000	79/06	79/09
LAB	PH	SU		5	7.70000	.158191	7.90000	7.50000	78/11	79/09
RESIDUE	DISS-105	C MG/L		2	714.500	86.9741	776.000	653.000	79/06	79/09
RESIDUE	TOT NFLT	MG/L		5	18.0000	9.56556	34.0000	10.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		5	6.60400	3.48316	9.89000	1.50000	78/11	79/09
NO2-N	TOTAL	MG/L		5	.584000	.300716	.940000	.210000	78/11	79/09
NO3-N	TOTAL	MG/L		5	7.69800	7.65539	21.2000	2.85000	78/11	79/09
TOT KJEL	N	MG/L		5	11.1600	5.68093	19.8000	4.70000	78/11	79/09
PHOS-TOT		MG/L P		4	7.30000	3.95285	13.0000	4.35000	78/11	79/06
T ORG C	C	MG/L		1	48.0000		48.0000	48.0000	78/11	78/11
CYANIDE	CN-TOT	MG/L		2	.040000	.042426	.070000	.010000	79/06	79/09
TOT HARD	CACO3	MG/L		5	264.200	32.1751	314.000	238.000	78/11	79/09
FLUORIDE	F,DISS	MG/L		2	1.19500	.714178	1.70000	.690000	79/06	79/09
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	78/11	79/09
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	79/06	79/06
CADMIUM	CD,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/11	79/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/06	79/06
CHROMIUM	CR,TOT	UG/L		5	48.0000	17.8885	70.0000	30.0000	78/11	79/09
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/11	79/09
IRON	FE,TOT	UG/L		2	405.000	21.2132	420.000	390.000	79/06	79/09
LEAD	PB,TOT	UG/L		5	17.0000	9.59166	31.0000	9.00000	78/11	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
STRONTUM	SR,TOT	UG/L		1	200.000		200.000	200.000	79/09	79/09
ZINC	ZN,TOT	UG/L		5	98.0000	17.8885	110.000	70.0000	78/11	79/09
ALUMINUM	AL,TOT	UG/L		2	200.000	.000000	200.000	200.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		1	25.0000		25.0000	25.0000	79/09	79/09
FEC COLI	MFM-FCBR	/100ML		4	1825.50	2245.01	4600.00	1.00000	78/11	79/09
PHENOLS	TOTAL	UG/L		1	15.0000		15.0000	15.0000	79/09	79/09
MBAS		MG/L		2	.765000	.190920	.900000	.630000	79/06	79/09
MERCURY	HG,TOTAL	UG/L		5	.540000	.089443	.700000	.500000	78/11	79/09

TABLE RD 1-86

STATION NUMBER 501080
41 16 36.0 082 37 19.0 2
RATTLESNAKE CREEK AT LAIS ROAD
LAKE ERIE (HURON RIVER)
(RIVER MILE 1.7)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	10.0333	9.93042	21.1000	1.90000	80/03	80/09
CNDUCTVY	AT 25C	MICROMHO		2	1035.50	265.166	1223.00	848.000	80/03	80/04
DO		MG/L		3	8.56666	3.82146	11.3000	4.20000	80/03	80/09
BOD	5 DAY	MG/L		7	14.5143	7.73314	26.0000	2.00000	79/10	80/09
COD	LOWLEVEL	MG/L		6	49.8666	49.0489	145.000	9.90000	79/10	80/09
LAB	PH	SU		7	7.70571	.202423	7.92000	7.46000	79/10	80/09
T ALK	CACO3	MG/L		1	184.000		184.000	184.000	79/12	79/12
T ACDITY	CACO3	MG/L		1	10.0000		10.0000	10.0000	79/12	79/12
RESIDUE	TOTAL	MG/L		1	624.600		624.600	624.600	80/03	80/03
RESIDUE	DISS-105	C MG/L		6	616.000	71.7551	714.000	500.000	79/10	80/05
RESIDUE	TOT NFLT	MG/L		6	24.5000	13.6784	46.0000	10.0000	79/10	80/05
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	7	22.4286	13.6365	46.0000	10.0000	79/10	80/09
OIL-GRSE	TOT-SXLT	MG/L		1	2.80000		2.80000	2.80000	79/11	79/11
NH3+NH4-	N TOTAL	MG/L		6	4.29500	3.14875	8.70000	.110000	79/10	80/09
NO2-N	TOTAL	MG/L		5	1.05400	1.03464	2.80000	.140000	79/10	80/09
NO3-N	TOTAL	MG/L		7	4.60000	3.19066	10.9000	1.61000	79/10	80/09
TOT KJEL	N	MG/L		7	8.52428	3.55272	14.5000	4.44000	79/10	80/09
PHOS-TOT		MG/L P		6	6.07833	2.75936	9.20000	2.12000	79/10	80/09
T ORG C	C	MG/L		2	23.5000	2.12132	25.0000	22.0000	80/04	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/10	79/12
			K	1	.010000		.010000	.010000	80/04	80/04
			T	3	.010000	.000000	.010000	.010000	79/10	80/04
TOT HARD	CACO3	MG/L		6	280.666	39.8295	320.000	222.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		4	122.500	38.1007	171.000	79.0000	79/12	80/05
SULFATE	SO4-TOT	MG/L		4	115.250	6.55108	125.000	111.000	79/12	80/05
FLUORIDE	F,DISS	MG/L		3	1.000000	.301166	1.33000	.740000	79/10	80/03
FLUORIDE	F,TOTAL	MG/L		2	.849999	.466690	1.18000	.520000	80/04	80/05
SILICA	DISOLVED	MG/L		1	11.8200		11.8200	11.8200	79/10	79/10
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	79/12
			K	3	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	6	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	3	5.00000	.000000	5.00000	5.00000	80/04	80/09
			T	7	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/12
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	3	30.0000	.000000	30.0000	30.0000	79/10	80/04
CHROMIUM	CR,TOT	UG/L		6	33.3333	8.16500	50.0000	30.0000	79/10	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	7	32.8571	7.55936	50.0000	30.0000	79/10	80/09

TABLE RD 1-86 (Continued)

STATION NUMBER 501080
41 16 36.0 082 37 19.0 2
RATTLESNAKE CREEK AT LAIS ROAD
LAKE ERIE (HURON RIVER)
(RIVER MILE 1.7)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	7	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		7	616.428	357.687	1050.00	245.000	79/10	80/09
IRON	FE,DISS	UG/L		1	140.000		140.000	140.000	79/10	79/10
LEAD	PB,TOT	UG/L		7	12.1429	7.69044	24.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		5	157.000	134.518	350.000	30.0000	79/10	80/09
MANGNESE	MN,DISS	UG/L		1	1015.00		1015.00	1015.00	79/10	79/10
NICKEL	NI,TOTAL	UG/L		6	133.333	51.6399	200.000	100.000	79/10	80/05
ZINC	ZN,TOT	UG/L		7	87.1428	37.2891	160.000	50.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		5	300.000	100.000	400.000	200.000	79/10	80/04
FEC COLI	MFM-FCBR	/100ML		7	9534.28	19832.4	54000.0	60.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	14.0000	.000000	14.0000	14.0000	80/04	80/05
MBAS		MG/L		6	.401666	.135709	.520000	.220000	79/10	80/09
RESIDUE	DISS-180	C MG/L		2	633.050	38.1174	660.000	606.100	80/03	80/09
MERCURY	HG,TOTAL	UG/L		4	2.20000	2.87750	6.50000	.500000	79/10	80/09
			K	2	.500000	.000000	.500000	.500000	80/04	80/05
			T	6	1.63333	2.39555	6.50000	.500000	79/10	80/09

TABLE RD 1-87

STATION NUMBER 504260
41 58 24.0 080 31 52.0 2
TURKEY CRK NR CONNEAUT - LAKE RD
LAKE ERIE (TURKEY CREEK)
(RIVER MILE 0.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	10.8750	9.25900	21.0000	.000000	78/10	79/07
CNDUCTVY	FIELD	MICROMHO		4	590.000	611.119	1500.00	200.000	78/10	79/07
DO		MG/L		4	10.4250	1.13253	12.0000	9.60000	78/10	79/07
COD	LOWLEVEL	MG/L		3	12.0333	1.10612	13.2000	11.0000	79/01	79/07
PH		SU		4	7.50000	.326704	7.90000	7.10000	78/10	79/07
RESIDUE	DISS-105	C MG/L		3	539.000	475.448	1088.00	264.000	79/01	79/07
RESIDUE	TOT NFLT	MG/L		3	21.0000	19.0526	43.0000	10.0000	79/01	79/07
NH3+NH4-	N TOTAL	MG/L		3	.050000	.000075	.050000	.050000	79/01	79/07
NO2-N	TOTAL	MG/L		3	.030000	.034641	.070000	.010000	79/01	79/07
NO3-N	TOTAL	MG/L		3	1.21667	1.17407	2.54000	.300000	79/01	79/07
TOT KJEL	N	MG/L		3	.363333	.158221	.500000	.190000	79/01	79/07
PHOS-TOT		MG/L P		3	.056667	.011547	.070000	.050000	79/01	79/07
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/10	79/07
TOT HARD	CACO3	MG/L		2	288.000	209.304	436.000	140.000	79/01	79/07
FLUORIDE	F,DISS	MG/L		3	.143333	.015275	.160000	.130000	79/01	79/07
CADMIUM	CD,TOT	UG/L		4	6.50000	2.38048	10.0000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		4	620.000	568.683	1460.00	270.000	78/10	79/07
LEAD	PB,TOT	UG/L		4	61.7500	92.2402	200.000	11.0000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		3	68.3333	63.5164	140.000	19.0000	78/10	79/07
			K	1	9.00000		9.00000	9.00000	79/04	79/04
			T	4	53.5000	59.7467	140.000	9.00000	78/10	79/07
FECSTREP	MF M-ENT	/100ML		3	349.666	442.697	860.000	69.0000	78/10	79/07
			K	1	9.00000		9.00000	9.00000	79/04	79/04
			T	4	264.500	399.583	860.000	9.00000	78/10	79/07
PHENOLS	TOTAL	UG/L		4	3.75000	1.25831	5.00000	2.00000	78/10	79/07
MBAS		MG/L		1	.160000		.160000	.160000	79/07	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-88

STATION NUMBER 504260
41 58 24.0 080 31 52.0 2
TURKEY CRK NR CONNEAUT - LAKE RD
LAKE ERIE (TURKEY CREEK)
(RIVER MILE 0.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	9.20000	8.83601	20.0000	.000000	79/10	80/07
CNDUCTVY	FIELD	MICROMHO		5	396.600	252.018	820.000	150.000	79/10	80/07
DO		MG/L		5	10.2800	3.28284	14.2000	6.90000	79/10	80/07
COD	LOWLEVEL	MG/L		4	18.1500	9.59636	28.6000	6.00000	79/10	80/07
			K	1	4.00000		4.00000	4.00000	80/03	80/03
			T	5	15.3200	10.4457	28.6000	4.00000	79/10	80/07
PH		SU		4	7.92500	.573802	8.60000	7.40000	79/10	80/07
RESIDUE	DISS-105	C MG/L		2	551.000	318.198	776.000	326.000	79/10	80/01
RESIDUE	TOT NFLT	MG/L		4	13.2500	4.71699	20.0000	10.0000	79/10	80/07
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	5	12.6000	4.33591	20.0000	10.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		4	.220000	.333367	.720000	.050000	79/10	80/07
			K	1	.050000		.050000	.050000	80/05	80/05
			T	5	.186000	.298546	.720000	.050000	79/10	80/07
NO2-N	TOTAL	MG/L		4	.010000	.000000	.010000	.010000	79/10	80/05
NO3-N	TOTAL	MG/L		5	.386000	.268663	.740000	.050000	79/10	80/07
TOT KJEL	N	MG/L		5	.534000	.168168	.760000	.340000	79/10	80/07
PHOS-TOT		MG/L P		3	.028000	.018000	.046000	.010000	80/01	80/07
			K	1	.020000		.020000	.020000	80/05	80/05
			T	4	.026000	.015232	.046000	.010000	80/01	80/07
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/10	80/01
			K	3	.010000	.000000	.010000	.010000	80/03	80/07
			T	5	.010000	.000000	.010000	.010000	79/10	80/07
TOT HARD	CACO3	MG/L		5	174.800	117.217	377.000	74.0000	79/10	80/07
FLUORIDE	F,DISS	MG/L		2	.130000	.000000	.130000	.130000	79/10	80/01
FLUORIDE	F,TOTAL	MG/L		3	.160000	.026457	.180000	.130000	80/03	80/07
CADMIUM	CD,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	79/10	80/01
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/07
			T	5	6.00000	2.23607	10.0000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		2	50.0000	28.2843	70.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	38.0000	17.8885	70.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		5	844.000	501.528	1390.00	380.000	79/10	80/07
LEAD	PB,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/07
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	3	100.000	.000000	100.000	100.000	80/03	80/07

TABLE RD 1-88 (Continued)

STATION NUMBER 504260
41 58 24.0 080 31 52.0 2
TURKEY CRK NR CONNEAUT - LAKE RD
LAKE ERIE (TURKEY CREEK)
(RIVER MILE 0.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
NICKEL	NI,TOTAL	UG/L	T	5	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		4	412.750	600.167	1300.00	33.0000	79/10	80/07
FECSTREP	MF M-ENT	/100ML		4	463.750	706.864	1500.00	10.0000	79/10	80/07
PHENOLS	TOTAL	UG/L		3	4.66667	3.05505	8.00000	2.00000	79/10	80/07
			K	2	2.00000	.000000	2.00000	2.00000	80/03	80/05
			T	5	3.60000	2.60768	8.00000	2.00000	79/10	80/07
MBAS		MG/L		4	.097500	.051881	.160000	.050000	79/10	80/07
RESIDUE	DISS-180	C MG/L		3	239.333	65.9195	298.000	168.000	80/03	80/07
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	3	.500000	.000000	.500000	.500000	80/03	80/07
			T	5	.500000	.000000	.500000	.500000	79/10	80/07

TABLE RD 1-89

STATION NUMBER 602000
40 40 33.0 080 32 27.0 2
L BEAVER CR NR E LIVERPOOL
OHIO RIVER (L BEAVER CREEK)
MILES 0953.80 0941.50 004.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	10.0455	8.76771	23.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	749.000	799.089	2680.00	117.000	78/10	79/08
STREAM	STAGE	FEET		5	4.83300	1.45197	6.88500	3.28000	78/11	79/04
CNDUCTVY	FIELD	MICROMHO		11	482.273	212.206	841.000	242.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	645.000		645.000	645.000	79/03	79/03
DO		MG/L		11	10.7454	2.98075	14.8000	6.70000	78/10	79/09
COD	LOWLEVEL	MG/L		12	6.93333	2.69624	11.0000	4.00000	78/10	79/09
PH		SU		9	8.04444	.357502	8.60000	7.60000	78/10	79/08
LAB	PH	SU		3	7.80000	.200250	8.00000	7.60000	79/01	79/04
RESIDUE	TOTAL	MG/L		2	412.000	96.1665	480.000	344.000	79/02	79/03
RESIDUE	DISS-105	C MG/L		7	450.286	126.404	594.000	254.000	79/02	79/08
RESIDUE	TOT NFLT	MG/L		10	15.1000	14.4564	56.0000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		12	.142500	.093432	.310000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.015000	.005270	.020000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		12	2.34333	2.42738	9.80000	.810000	78/10	79/09
TOT KJEL	N	MG/L		12	.662500	.847221	3.30000	.100000	78/10	79/09
PHOS-TOT		MG/L P		11	.062727	.021950	.120000	.050000	78/10	79/08
TOT HARD	CACO3	MG/L		2	214.000	48.0833	248.000	180.000	78/12	79/04
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		5	5.40000	.894442	7.00000	5.00000	78/12	79/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/02	79/02
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		4	935.000	1445.05	3100.00	120.000	78/12	79/08
LEAD	PB,TOT	UG/L		4	43.2500	30.3246	84.0000	16.0000	78/12	79/08
MANGNESE	MN	UG/L		3	183.333	205.508	420.000	50.0000	79/02	79/08
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/12	79/08
ZINC	ZN,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/12	79/08
FEC COLI	MFM-FCBR	/100ML		11	632.000	730.193	2500.00	24.0000	78/10	79/08
FECSTREP	MF M-ENT	/100ML		11	2009.55	3633.67	10000.0	5.00000	78/10	79/08
PHENOLS	TOTAL	UG/L		10	3.60000	2.22111	8.00000	2.00000	78/11	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/08

TABLE RD 1-90

STATION NUMBER 602000
40 40 33.0 080 32 27.0 2
L BEAVER CR NR E LIVERPOOL
OHIO RIVER (L BEAVER CREEK)
MILES 0953.80 0941.50 004.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.5700	6.60842	19.0000	.200000	79/10	80/09
			K	1	1.00000		1.00000	1.00000	80/03	80/03
			M	1	-.200E+01		-.200E+01	-.200E+01	79/12	79/12
			T	12	8.72500	7.39645	19.0000	-.200E+01	79/10	80/09
STREAM	FLOW	CFS		2	450.500	101.116	522.000	379.000	79/10	80/02
STREAM	FLOW,	INST-CFS		2	464.000	284.257	665.000	263.000	80/08	80/09
STREAM	STAGE	FEET		7	4.45000	.969201	5.86000	3.26000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		11	389.818	108.391	550.000	230.000	79/10	80/09
DO		MG/L		12	10.4750	1.80461	13.6000	8.20000	79/10	80/09
COD	LOWLEVEL	MG/L		12	16.1667	11.2155	40.0000	4.00000	79/10	80/09
PH		SU		11	8.20909	.415872	8.70000	7.50000	79/10	80/09
LAB	PH	SU		1	7.80000		7.80000	7.80000	80/08	80/08
RESIDUE	DISS-105	C MG/L		5	337.800	59.8738	400.000	241.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		9	54.0000	92.3120	295.000	10.0000	79/10	80/07
			K	3	10.0000	.000000	10.0000	10.0000	80/06	80/09
			T	12	43.0000	81.2001	295.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	.130000	.052536	.190000	.050000	79/10	80/09
			K	1	.050000		.050000	.050000	80/06	80/06
			T	12	.123333	.055159	.190000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		11	.022727	.013484	.050000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		12	2.02000	.574542	2.72000	.810000	79/10	80/09
TOT KJEL	N	MG/L		11	.506363	.386168	1.56000	.190000	79/10	80/09
PHOS-TOT		MG/L P		12	.083167	.098987	.370000	.020000	79/10	80/09
TOT HARD	CACO3	MG/L		1	261.000		261.000	261.000	79/11	79/11
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		3	710.000	411.461	1140.00	320.000	79/11	80/08
LEAD	PB,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	6.25000	2.50000	10.0000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		3	166.667	66.5836	240.000	110.000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/11	79/11
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	3	100.000	.000000	100.000	100.000	79/11	80/08

TABLE RD 1-90 (Continued)

STATION NUMBER 602000
40 40 33.0 080 32 27.0 2
L BEAVER CR NR E LIVERPOOL
OHIO RIVER (L BEAVER CREEK)
MILES 0953.80 0941.50 004.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		2	1750.00	2050.61	3200.00	300.000	79/10	80/02
FECSTREP	MF M-ENT	/100ML		2	4645.00	6300.32	9100.00	190.000	79/10	80/02
PHENOLS	TOTAL	UG/L		4	2.00000	.000000	2.00000	2.00000	79/10	80/02
			K	2	1.10000	1.27279	2.00000	.200000	80/05	80/08
			T	6	1.70000	.734849	2.00000	.200000	79/10	80/08
MBAS		MG/L		1	.100000		.100000	.100000	80/02	80/02
RESIDUE	DISS-180	C MG/L		7	331.714	58.0434	398.000	251.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	3.10000	4.15812	7.90000	.600000	79/11	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	2.45000	3.63547	7.90000	.500000	79/11	80/08

TABLE RD 1-91

STATION NUMBER 602120
40 55 45.0 080 52 08.0 2
MIDDLE FK NEAR SALEM
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 052.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	18.5000	3.53553	21.0000	16.0000	79/07	79/09
CNDUCTVY	FIELD	MICROMHO		2	807.000	120.208	892.000	722.000	79/07	79/09
DO		MG/L		2	5.15000	1.20208	6.00000	4.30000	79/07	79/09
COD	LOWLEVEL	MG/L		2	23.6000	10.6066	31.1000	16.1000	79/07	79/09
PH		SU		2	7.12500	.388902	7.40000	6.85000	79/07	79/09
RESIDUE	DISS-105	C MG/L		2	571.000	29.6985	592.000	550.000	79/07	79/09
RESIDUE	TOT NFLT	MG/L		2	10.0000	.000000	10.0000	10.0000	79/07	79/09
NH3+NH4-	N TOTAL	MG/L		2	5.61000	5.24673	9.32000	1.90000	79/07	79/09
NO2-N	TOTAL	MG/L		1	.820000		.820000	.820000	79/07	79/07
NO3-N	TOTAL	MG/L		2	3.98000	2.81428	5.97000	1.99000	79/07	79/09
TOT KJEL	N	MG/L		2	6.35000	5.30330	10.1000	2.60000	79/07	79/09
PHOS-TOT		MG/L P		2	.580000	.183848	.710000	.450000	79/07	79/09
TOT HARD	CACO3	MG/L		1	289.000		289.000	289.000	79/07	79/07
FLUORIDE	F,DISS	MG/L		2	.650000	.070717	.700000	.600000	79/07	79/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
IRON	FE,TOT	UG/L		1	550.000		550.000	550.000	79/07	79/07
LEAD	PB,TOT	UG/L		1	56.0000		56.0000	56.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/07	79/07
ZINC	ZN,TOT	UG/L		1	40.0000		40.0000	40.0000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		2	190.000	70.7107	240.000	140.000	79/07	79/09
FECSTREP	MF M-ENT	/100ML		2	165.000	35.3553	190.000	140.000	79/07	79/09
PHENOLS	TOTAL	UG/L		2	5.50000	4.94975	9.00000	2.00000	79/07	79/09
MBAS		MG/L		2	.325000	.120208	.410000	.240000	79/07	79/09

TABLE RD 1-92

STATION NUMBER 602120
40 55 45.0 080 52 08.0 2
MIDDLE FK NEAR SALEM
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 052.80

No data were collected from 10/79 - 9/80.

TABLE RD 1-93

STATION NUMBER 612010
40 42 53.0 080 32 41.0 2
N FK L BEAVER CR AT FREDERICTOWN
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 010.80 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.7500	9.02312	22.5000	.500000	78/10	79/08
CNDUCTVY	FIELD	MICROMHO		3	690.333	222.695	944.000	527.000	78/10	79/08
DO		MG/L		4	10.3750	2.10459	13.2000	8.30000	78/10	79/08
COD	LOWLEVEL	MG/L		4	19.8750	10.3844	34.0000	9.40000	78/10	79/08
PH		SU		4	7.90000	.374212	8.40000	7.50000	78/10	79/08
RESIDUE	DISS-105	C MG/L		2	644.000	173.948	767.000	521.000	79/05	79/08
RESIDUE	TOT NFLT	MG/L		4	10.0000	.000000	10.0000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		4	.062500	.015000	.080000	.050000	78/10	79/08
NO2-N	TOTAL	MG/L		4	.022500	.025000	.060000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		4	.425000	.366651	.930000	.100000	78/10	79/08
TOT KJEL	N	MG/L		4	.450000	.341565	.900000	.100000	78/10	79/08
PHOS-TOT		MG/L P		4	.072500	.017079	.090000	.050000	78/10	79/08
TOT HARD	CACO3	MG/L		4	354.250	71.6769	437.000	272.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		3	53.3333	35.6418	87.0000	16.0000	78/10	79/08
FLUORIDE	F,DISS	MG/L		2	.240000	.014143	.250000	.230000	78/10	79/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		4	372.500	123.390	530.000	260.000	78/10	79/08
LEAD	PB,TOT	UG/L		4	48.7500	39.5590	98.0000	6.00000	78/10	79/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		3	184.000	152.473	360.000	92.0000	78/10	79/08
FECSTREP	MF M-ENT	/100ML		3	98.6667	55.1847	140.000	36.0000	78/10	79/08
PHENOLS	TOTAL	UG/L		4	3.50000	1.29099	5.00000	2.00000	78/10	79/08
MBAS		MG/L		2	.050000	.000061	.050000	.050000	78/10	79/05
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	78/10	79/01

TABLE RD 1-94

STATION NUMBER 612010
40 42 53.0 080 32 41.0 2
N FK L BEAVER CR AT FREDERICKTOWN
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 010.80 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	13.6667	5.03324	19.0000	9.00000	79/11	80/08
			K	1	1.00000		1.00000	1.00000	80/03	80/03
			T	4	10.5000	7.54983	19.0000	1.00000	79/11	80/08
CNDUCTVY	FIELD	MICROMHO		4	465.000	140.772	600.000	285.000	79/11	80/08
DO		MG/L		4	11.0750	1.45464	13.2000	10.0000	79/11	80/08
COD	LOWLEVEL	MG/L		4	16.2500	9.94569	28.0000	5.00000	79/11	80/08
PH		SU		3	8.30000	.529257	8.70000	7.70000	79/11	80/05
LAB	PH	SU		1	8.10000		8.10000	8.10000	80/08	80/08
RESIDUE	DISS-105	C MG/L		1	395.000		395.000	395.000	79/11	79/11
RESIDUE	TOT NFLT	MG/L		2	25.5000	14.8492	36.0000	15.0000	79/11	80/03
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/08
			T	4	17.7500	12.3929	36.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		2	.085000	.035356	.110000	.060000	79/11	80/03
			K	2	.050000	.000061	.050000	.050000	80/05	80/08
			T	4	.067500	.028723	.110000	.050000	79/11	80/08
NO2-N	TOTAL	MG/L		4	.257499	.495000	1.00000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		4	1.08250	.629305	2.02000	.680000	79/11	80/08
TOT KJEL	N	MG/L		4	.367500	.317635	.840000	.160000	79/11	80/08
PHOS-TOT		MG/L P		4	.070500	.060119	.160000	.032000	79/11	80/08
TOT HARD	CACO3	MG/L		3	271.000	45.5302	312.000	222.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		2	35.0000	4.24264	38.0000	32.0000	80/03	80/05
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/11	79/11
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08

TABLE RD 1-94 (Continued)

STATION NUMBER 612010
40 42 53.0 080 32 41.0 2
N FK L BEAVER CR AT FREDERICKTOWN
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 010.80 000.20

PARAMETER				R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT		UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
				K	3	30.0000	.000000	30.0000	30.0000	80/03	80/08
				T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT		UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
				K	3	30.0000	.000000	30.0000	30.0000	80/03	80/08
				T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT		UG/L		4	817.500	658.603	1700.00	280.000	79/11	80/08
LEAD	PB,TOT		UG/L		2	12.5000	.707107	13.0000	12.0000	79/11	80/03
				K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
				T	4	8.75000	4.34933	13.0000	5.00000	79/11	80/08
MANGNESE	MN		UG/L		3	178.333	28.4319	210.000	155.000	80/03	80/08
NICKEL	NI,TOTAL		UG/L	K	3	100.000	.000000	100.000	100.000	80/03	80/08
ZINC	ZN,TOT		UG/L	K	3	30.0000	.000000	30.0000	30.0000	80/03	80/08
PHENOLS	TOTAL		UG/L		1	2.00000		2.00000	2.00000	79/11	79/11
				K	3	1.40000	1.03923	2.00000	.200000	80/03	80/08
				T	4	1.55000	.900002	2.00000	.200000	79/11	80/08
RESIDUE	DISS-180	C	MG/L		3	413.333	68.5743	480.000	343.000	80/03	80/08
MERCURY	HG,TOTAL		UG/L	K	3	.500000	.000000	.500000	.500000	80/03	80/08

TABLE RD 1-95

STATION NUMBER 612000
40 42 38.0 080 41 49.0 2
W FK L BEAVER CR NR GUILFORD
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 006.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	14.1667	9.00464	23.0000	5.00000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		3	569.000	321.874	935.000	330.000	78/11	79/08
DO		MG/L		3	8.60000	1.82487	9.80000	6.50000	78/11	79/08
COD	LOWLEVEL	MG/L		3	6.70000	3.10967	10.1000	4.00000	78/11	79/08
PH		SU		3	7.56667	.305525	7.90000	7.30000	78/11	79/08
RESIDUE	DISS-105	C MG/L		3	500.333	229.217	744.000	289.000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		3	10.0000	.000000	10.0000	10.0000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		3	.243333	.205264	.470000	.070000	78/11	79/08
NO2-N	TOTAL	MG/L		3	.126667	.125033	.270000	.040000	78/11	79/08
NO3-N	TOTAL	MG/L		3	5.67667	3.94556	10.1000	2.52000	78/11	79/08
TOT KJEL	N	MG/L		3	1.73333	1.79258	3.80000	.600000	78/11	79/08
PHOS-TOT		MG/L P		3	.050000	.000075	.050000	.050000	78/11	79/08
TOT HARD	CACO3	MG/L		3	285.000	110.286	411.000	206.000	78/11	79/08
CHLORIDE	TOTAL	MG/L		3	51.3333	55.6447	115.000	12.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		2	.250000	.056568	.290000	.210000	78/11	79/08
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/05	79/05
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	443.333	77.6754	530.000	380.000	78/11	79/08
LEAD	PB,TOT	UG/L		3	28.6667	14.9778	41.0000	12.0000	78/11	79/08
MANGNESE	MN	UG/L		1	200.000		200.000	200.000	79/05	79/05
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		3	316.666	193.477	540.000	200.000	78/11	79/08
FECSTREP	MF M-ENT	/100ML		3	470.000	547.449	1100.00	110.000	78/11	79/08
PHENOLS	TOTAL	UG/L		3	3.33333	1.52753	5.00000	2.00000	78/11	79/08
MBAS		MG/L		2	.085000	.049498	.120000	.050000	78/11	79/05

TABLE RD 1-96

STATION NUMBER 612000
40 42 38.0 080 41 49.0 2
W FK L BEAVER CR NR GUILFORD
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 006.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	6.00000	6.08276	13.0000	2.00000	79/11	80/05
CNDUCTVY	FIELD	MICROMHO		3	350.000	137.477	500.000	230.000	79/11	80/05
DO		MG/L		3	11.8667	1.79266	13.0000	9.80000	79/11	80/05
COD	LOWLEVEL	MG/L		3	6.33333	3.21456	10.0000	4.00000	79/11	80/05
PH		SU		3	8.40000	.556850	8.90000	7.80000	79/11	80/05
RESIDUE	DISS-105	C MG/L		2	345.000	55.1543	384.000	306.000	79/11	80/02
RESIDUE	TOT NFLT	MG/L		2	10.0000	.000000	10.0000	10.0000	79/11	80/02
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	3	10.0000	.000000	10.0000	10.0000	79/11	80/05
NH3+NH4-	N TOTAL	MG/L		3	.713333	.168623	.830000	.520000	79/11	80/05
NO2-N	TOTAL	MG/L		3	.043333	.049329	.100000	.010000	79/11	80/05
NO3-N	TOTAL	MG/L		3	4.75333	1.08487	5.72000	3.58000	79/11	80/05
TOT KJEL	N	MG/L		2	.835000	.289914	1.04000	.630000	80/02	80/05
PHOS-TOT		MG/L P		3	.022000	.007211	.030000	.016000	79/11	80/05
TOT HARD	CACO3	MG/L		2	242.000	14.1421	252.000	232.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		2	50.0000	2.82843	52.0000	48.0000	79/11	80/05
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/11	79/11
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/11	79/11
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	2	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05

TABLE RD 1-96 (Continued)

STATION NUMBER 612000
40 42 38.0 080 41 49.0 2
W FK L BEAVER CR NR GUILFORD
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 006.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		3	446.666	102.633	560.000	360.000	79/11	80/05
LEAD	PB,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	6.66667	2.88676	10.0000	5.00000	79/11	80/05
MANGNESE	MN	UG/L		1	260.000		260.000	260.000	80/05	80/05
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/11	79/11
			K	1	100.000		100.000	100.000	80/05	80/05
			T	2	100.000	.000000	100.000	100.000	79/11	80/05
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		2	105.000	7.07107	110.000	100.000	79/11	80/02
FECSTREP	MF M-ENT	/100ML		2	95.0000	21.2132	110.000	80.0000	79/11	80/02
PHENOLS	TOTAL	UG/L		2	2.00000	.000000	2.00000	2.00000	79/11	80/05
RESIDUE	DISS-180 C	MG/L		1	387.000		387.000	387.000	80/05	80/05
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	1	.500000		.500000	.500000	80/05	80/05
			T	2	.500000	.000000	.500000	.500000	80/02	80/05

TABLE RD 1-97

STATION NUMBER 602090
40 42 17.0 080 45 57.0 2
CHEMLINE TRIB. NR LISBON
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 013.50 000.03

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		16	8.29375	8.82689	23.0000	.000000	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		16	9394.87	5640.30	19975.0	2550.00	78/11	79/09
CNDUCTVY	AT 25C	MICROMHO		2	10300.0	3676.96	12900.0	7700.00	79/03	79/05
DO		MG/L		16	11.2250	2.37642	14.3000	7.60000	78/11	79/09
COD	LOWLEVEL	MG/L		9	25.5667	39.4196	123.500	3.00000	79/01	79/09
			K	1	4.00000		4.00000	4.00000	79/06	79/06
			T	10	23.4100	37.7857	123.500	3.00000	79/01	79/09
PH		SU		13	8.66153	1.03567	9.80000	6.00000	78/11	79/09
LAB	PH	SU		6	9.00000	.704304	10.0000	8.20000	79/01	79/09
RESIDUE	TOTAL	MG/L		2	8999.50	3587.15	11536.0	6463.00	79/02	79/03
RESIDUE	DISS-105	C MG/L		14	11037.6	5516.56	19328.0	3850.00	78/11	79/09
RESIDUE	TOT NFLT	MG/L		9	114.778	72.4048	216.000	25.0000	79/01	79/09
NH3+NH4-	N TOTAL	MG/L		16	116.286	65.4903	237.000	2.08000	78/11	79/09
NO2-N	TOTAL	MG/L		9	.350000	.269908	.800000	.060000	79/01	79/09
NO3-N	TOTAL	MG/L		9	436.555	286.472	995.000	133.000	79/01	79/09
TOT KJEL	N	MG/L		4	91.3750	36.9625	129.000	45.5000	79/01	79/05
NO2&NO3	N-TOTAL	MG/L		1	731.000		731.000	731.000	79/08	79/08
PHOS-TOT		MG/L P		14	.080000	.083574	.300000	.020000	78/11	79/09
CYANIDE	CN-TOT	MG/L		10	.033000	.020028	.070000	.010000	79/01	79/09
TOT HARD	CACO3	MG/L		9	9863.66	10069.6	26900.0	1100.00	79/01	79/09
CHLORIDE	TOTAL	MG/L		10	4039.80	3099.49	7800.00	308.000	79/01	79/09
FLUORIDE	F,DISS	MG/L		10	2.28800	1.61032	6.20000	.780000	79/01	79/09
ARSENIC	AS,TOT	UG/L		7	44.8571	17.6676	70.0000	24.0000	79/03	79/09
BARIUM	BA,TOT	UG/L		2	600.000	565.686	1000.00	200.000	79/03	79/06
CADMIUM	CD,TOT	UG/L		4	7.00000	2.44949	10.0000	5.00000	79/01	79/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/09	79/09
CHROMIUM	CR,TOT	UG/L		3	40.0000	17.3205	60.0000	30.0000	79/01	79/08
COPPER	CU,TOT	UG/L		9	64.4444	30.8671	100.000	30.0000	79/01	79/09
IRON	FE,TOT	UG/L		15	7277.33	8893.24	36000.0	950.000	78/11	79/09
LEAD	PB,TOT	UG/L		8	79.8750	141.547	417.000	5.00000	79/01	79/09
MANGNESE	MN	UG/L		10	13295.0	5947.38	23400.0	4000.00	79/01	79/09
NICKEL	NI,TOTAL	UG/L		9	744.444	335.825	1400.00	300.000	79/01	79/09
ZINC	ZN,TOT	UG/L		9	320.000	130.480	540.000	140.000	79/01	79/09
FEC COLI	MFM-FCBR	/100ML		2	43.5000	37.4766	70.0000	17.0000	79/02	79/09
FECSTREP	MF M-ENT	/100ML		2	610.000	551.543	1000.00	220.000	79/02	79/09
PHENOLS	TOTAL	UG/L		15	29.4667	99.2550	388.000	2.00000	78/11	79/09
MBAS		MG/L		12	6.11416	3.75059	12.2000	1.68000	78/11	79/08
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	78/12	78/12
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/01	79/04

TABLE RD 1-98

STATION NUMBER 602090
40 42 17.0 080 45 57.0 2
CHEMLINE TRIB. NR LISBON
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 013.50 000.03

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		15	8.01333	7.42745	22.0000	.000000	79/10	80/09
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			M	2	-.150E+01	.707107	-.100E+01	-.200E+01	79/12	79/12
			T	18	6.62222	7.49577	22.0000	-.200E+01	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		18	5988.33	3923.31	14000.0	390.000	79/10	80/09
DO		MG/L		18	11.3667	2.18554	14.0000	7.40000	79/10	80/09
COD	LOWLEVEL	MG/L		17	17.1176	17.4208	69.0000	4.00000	79/10	80/09
PH		SU		16	8.84374	1.35153	9.90000	5.40000	79/10	80/09
LAB	PH	SU		1	8.60000		8.60000	8.60000	80/08	80/08
RESIDUE	DISS-105	C MG/L		10	6161.30	4998.97	15532.0	270.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		17	35.2941	22.5188	87.0000	11.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		13	51.3538	35.1067	126.000	13.6000	79/10	80/08
NO2-N	TOTAL	MG/L		16	.089375	.067178	.230000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		15	276.800	149.301	643.000	106.000	79/10	80/08
TOT KJEL	N	MG/L		9	43.5444	14.7711	65.1000	18.7000	79/12	80/08
PHOS-TOT		MG/L P		12	.015750	.005362	.020000	.008000	79/10	80/09
			K	4	.020000	.000000	.020000	.020000	80/05	80/08
			T	16	.016812	.004970	.020000	.008000	79/10	80/09
CYANIDE	CN-TOT	MG/L		7	.018571	.010690	.040000	.010000	79/10	80/02
TOT HARD	CACO3	MG/L		5	4411.00	3811.72	11100.0	1905.00	79/10	80/03
CALCIUM	CA-TOT	MG/L		3	1738.33	435.789	2140.00	1275.00	80/04	80/07
MGNSIUM	MG,TOT	MG/L		1	29.0000		29.0000	29.0000	80/03	80/03
CHLORIDE	TOTAL	MG/L		16	2667.31	1756.53	6500.00	247.000	79/10	80/09
FLUORIDE	F,DISS	MG/L		7	1.81143	.966616	3.20000	.550000	79/10	80/01
FLUORIDE	F,TOTAL	MG/L		7	1.10143	.303009	1.42000	.670000	80/03	80/08
ARSENIC	AS,TOT	UG/L		4	25.5000	12.6886	40.0000	10.0000	79/10	80/02
BARIUM	BA,TOT	UG/L		3	433.333	230.940	700.000	300.000	80/04	80/07
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	80/02	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	3	5.00000	.000000	5.00000	5.00000	80/02	80/08
CHROMIUM	HEX-VAL	UG/L	K	1	30.0000		30.0000	30.0000	80/03	80/03
CHROMIUM	CR,TOT	UG/L		5	32.0000	4.47214	40.0000	30.0000	79/11	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	7	31.4286	3.77983	40.0000	30.0000	79/11	80/09

TABLE RD 1-98 (Continued)

STATION NUMBER 602090
40 42 17.0 080 45 57.0 2
CHEMLINE TRIB. NR LISBON
OHIO RIVER (LITTLE BEAVER CREEK)
MILES 0953.80 0941.50 018.80 013.50 000.03

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		7	47.1428	20.5867	80.0000	30.0000	79/10	80/03
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	8	45.0000	20.0000	80.0000	30.0000	79/10	80/03
IRON	FE,TOT	UG/L		17	1945.59	1194.72	4000.00	450.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	38.3333	53.4634	100.000	5.00000	79/11	80/02
MANGNESE	MN	UG/L		11	10211.8	6709.04	19600.0	2400.00	79/10	80/09
NICKEL	NI,TOTAL	UG/L		13	453.846	272.689	1000.00	200.000	79/10	80/09
ZINC	ZN,TOT	UG/L		7	270.000	148.997	460.000	80.0000	79/10	80/03
FEC COLI	MFM-FCBR	/100ML		1	10.0000		10.0000	10.0000	79/10	79/10
FECSTREP	MF M-ENT	/100ML		1	1200.00		1200.00	1200.00	79/10	79/10
PHENOLS	TOTAL	UG/L		10	4.50000	4.81317	17.0000	2.00000	79/10	80/09
			K	2	2.00000	.000000	2.00000	2.00000	80/05	80/06
			T	12	4.08333	4.46111	17.0000	2.00000	79/10	80/09
MBAS		MG/L		18	2.81555	1.72593	8.20000	1.23000	79/10	80/09
RESIDUE	DISS-180	C MG/L		7	4527.85	2256.29	6440.00	285.000	80/03	80/08
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	1	.500000		.500000	.500000	80/04	80/04
			T	2	.500000	.000000	.500000	.500000	80/02	80/04

TABLE RD 1-99

STATION NUMBER 602060
40 47 35.0 080 31 20.0 2
E BR STATELINE C NR NEGLEY
OHIO RIVER (L. BEAVER CREEK)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	9.89167	6.79605	20.0000	1.00000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		12	2071.75	746.585	2900.00	255.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	2900.00		2900.00	2900.00	79/03	79/03
DO		MG/L		12	10.8167	2.33349	14.6000	8.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	13.9583	13.1639	52.3000	4.00000	78/10	79/09
PH		SU		9	7.69999	.299994	8.40000	7.40000	78/10	79/08
LAB	PH	SU		6	7.81666	.183685	8.00000	7.50000	79/01	79/09
RESIDUE	TOTAL	MG/L		2	2581.00	343.654	2824.00	2338.00	79/02	79/03
RESIDUE	DISS-105	C MG/L		12	2456.83	430.222	3010.00	1804.00	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	12.4167	5.96137	29.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	6.66666	2.59258	9.67000	1.16000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.210000	.260279	.900000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	4.83833	2.10892	8.86000	.200000	78/10	79/09
TOT KJEL	N	MG/L		9	7.85555	3.49755	12.1000	1.20000	78/10	79/08
PHOS-TOT		MG/L P		12	.054167	.014434	.100000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		6	1362.83	305.826	1690.00	877.000	78/10	79/06
CHLORIDE	TOTAL	MG/L		11	656.000	343.262	1050.00	133.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		11	.373636	.045228	.480000	.320000	78/10	79/09
CADMIUM	CD,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	78/12	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/04
IRON	FE,TOT	UG/L		12	1308.33	925.811	3800.00	500.000	78/10	79/09
LEAD	PB,TOT	UG/L		4	11.7500	5.67891	20.0000	7.00000	78/12	79/09
MANGNESE	MN	UG/L		11	2553.64	985.579	3800.00	520.000	78/10	79/08
NICKEL	NI,TOTAL	UG/L		3	133.333	57.7352	200.000	100.000	78/12	79/08
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/08
FEC COLI	MFM-FCBR	/100ML		1	28.0000		28.0000	28.0000	78/11	78/11
FECSTREP	MF M-ENT	/100ML		1	36.0000		36.0000	36.0000	78/11	78/11
PHENOLS	TOTAL	UG/L		11	16.0909	17.1199	53.0000	2.00000	78/10	79/09
MBAS		MG/L		3	.393333	.150445	.490000	.220000	78/11	79/04
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/08

TABLE RD 1-100

STATION NUMBER 602060
40 47 35.0 080 31 20.0 2
E BR STATELINE C NR NEGLEY
OHIO RIVER (L. BEAVER CREEK)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.0700	5.67882	17.0000	.200000	79/10	80/09
			M	1	-.200E+01		-.200E+01	-.200E+01	79/12	79/12
			T	11	8.97273	6.50140	17.0000	-.200E+01	79/10	80/09
STREAM	STAGE	FEET		1	1.50000		1.50000	1.50000	80/06	80/06
CNDUCTVY	FIELD	MICROMHO		12	1875.83	292.184	2210.00	1300.00	79/10	80/09
DO		MG/L		12	10.3250	1.66904	13.4000	8.30000	79/10	80/09
COD	LOWLEVEL	MG/L		12	13.8333	9.35009	34.0000	4.00000	79/10	80/09
PH		SU		10	7.98999	.428067	8.50000	7.20000	79/10	80/09
LAB	PH	SU		2	7.50000	.141382	7.60000	7.40000	79/11	80/08
RESIDUE	DISS-105	C MG/L		5	2099.20	297.214	2590.00	1860.00	79/10	80/02
RESIDUE	TOT NFLT	MG/L		7	10.7143	1.88984	15.0000	10.0000	79/10	80/07
			K	5	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	12	10.4167	1.44339	15.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	4.75500	1.49825	7.37000	2.48000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.095833	.077631	.230000	.020000	79/10	80/09
NO3-N	TOTAL	MG/L		12	3.45166	.632610	4.44000	2.32000	79/10	80/09
TOT KJEL	N	MG/L		12	5.12749	1.50493	7.85000	2.62000	79/10	80/09
PHOS-TOT		MG/L P		7	.015286	.006211	.020000	.007000	79/10	80/04
			K	5	.020000	.000020	.020000	.020000	80/05	80/09
			T	12	.017250	.005190	.020000	.007000	79/10	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
TOT HARD	CACO3	MG/L		2	1340.00	127.279	1430.00	1250.00	79/11	80/02
CHLORIDE	TOTAL	MG/L		4	657.500	165.202	830.000	460.000	79/10	80/03
SULFATE	SO4-TOT	MG/L		1	330.000		330.000	330.000	80/03	80/03
FLUORIDE	F,DISS	MG/L		3	.350000	.026465	.370000	.320000	79/10	80/02
CADMIUM	CD,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	7.50000	2.88675	10.0000	5.00000	79/11	80/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		12	915.833	367.411	1620.00	520.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	5	6.00000	2.23607	10.0000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		5	1966.00	502.522	2840.00	1630.00	79/10	80/08
NICKEL	NI,TOTAL	UG/L		4	150.000	57.7350	200.000	100.000	79/11	80/08

TABLE RD 1-100 (Continued)

STATION NUMBER 602060
40 47 35.0 080 31 20.0 2
E BR STATELINE C NR NEGLEY
OHIO RIVER (L. BEAVER CREEK)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		1	210.000		210.000	210.000	79/10	79/10
FECSTREP	MF M-ENT	/100ML		1	670.000		670.000	670.000	79/10	79/10
PHENOLS	TOTAL	UG/L		12	5.25000	1.91287	8.00000	2.00000	79/10	80/09
MBAS		MG/L		3	.286667	.075055	.360000	.210000	79/11	80/02
RESIDUE	DISS-180	C MG/L		7	1724.29	228.829	2020.00	1440.00	80/03	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	3	.500000	.000000	.500000	.500000	80/02	80/08

TABLE RD 1-101

STATION NUMBER 602050
40 47 36.0 080 31 21.0 2
W BR STATELINE CR NR NEGLEY
OHIO RIVER (LITTLE BEAVER CRK.)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			RMK	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.2583	7.74297	22.0000	.200000	78/10	79/09
STREAM	STAGE	FEET		1	1.62000		1.62000	1.62000	79/01	79/01
CNDUCTVY	FIELD	MICROMHO		12	1996.00	987.012	3800.00	222.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	1380.00		1380.00	1380.00	79/03	79/03
DO		MG/L		12	10.2500	2.93893	14.4000	5.30000	78/10	79/09
COD	LOWLEVEL	MG/L		12	92.3166	79.4507	304.000	8.90000	78/10	79/09
PH		SU		9	7.69999	.409281	8.20000	6.70000	78/10	79/08
LAB	PH	SU		6	7.85000	.455007	8.20000	7.00000	79/01	79/09
RESIDUE	TOTAL	MG/L		2	1886.00	1006.92	2598.00	1174.00	79/02	79/03
RESIDUE	DISS-105	C MG/L		12	2415.67	844.087	4130.00	964.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	11.5833	5.03548	27.0000	8.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	1.87166	1.81218	7.27000	.210000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.029167	.030289	.120000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.648333	1.29801	4.74000	.050000	78/10	79/09
TOT KJEL	N	MG/L		12	2.57666	2.13235	8.50000	.400000	78/10	79/09
PHOS-TOT		MG/L P		12	.050000	.000055	.050000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		6	1445.50	802.093	2620.00	196.000	78/10	79/06
CHLORIDE	TOTAL	MG/L		11	600.636	452.429	1620.00	134.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		11	.319090	.056474	.440000	.260000	78/10	79/09
CADMIUM	CD,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	78/12	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/04
IRON	FE,TOT	UG/L		12	1379.58	1017.32	4400.00	710.000	78/10	79/09
LEAD	PB,TOT	UG/L		4	15.2500	13.7204	34.0000	5.00000	78/12	79/09
MANGNESE	MN	UG/L		11	1114.55	542.870	2180.00	310.000	78/10	79/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/08
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/08
FEC COLI	MFM-FCBR	/100ML		1	15.0000		15.0000	15.0000	78/11	78/11
FECSTREP	MF M-ENT	/100ML		1	4.00000		4.00000	4.00000	78/11	78/11
PHENOLS	TOTAL	UG/L		12	43.6667	38.6743	149.000	9.00000	78/10	79/09
MBAS		MG/L		3	.233333	.064291	.280000	.160000	78/11	79/04
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/08

TABLE RD 1-102

STATION NUMBER 602050
40 47 36.0 080 31 21.0 2
W BR STATELINE CR NR NEGLEY
OHIO RIVER (LITTLE BEAVER CRK.)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	10.6889	6.47851	18.0000	.000000	79/10	80/09
			M	1	-.200E+01		-.200E+01	-.200E+01	79/12	79/12
			T	10	9.42000	7.30811	18.0000	-.200E+01	79/10	80/09
STREAM	STAGE	FEET		3	1.51667	.095058	1.61000	1.42000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		11	1597.73	445.317	2300.00	900.000	79/10	80/09
DO		MG/L		11	9.81818	1.90780	13.7000	8.00000	79/10	80/09
COD	LOWLEVEL	MG/L		11	38.7273	22.6234	82.0000	10.0000	79/10	80/09
PH		SU		10	7.95000	.368947	8.50000	7.40000	79/10	80/09
LAB	PH	SU		1	7.40000		7.40000	7.40000	80/08	80/08
RESIDUE	DISS-105	C MG/L		5	1931.60	670.176	2710.00	1060.00	79/10	80/02
RESIDUE	TOT NFLT	MG/L		5	10.0000	.000000	10.0000	10.0000	79/10	80/02
			K	6	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	11	10.0000	.000000	10.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	1.04909	.684345	2.68000	.270000	79/10	80/09
NO2-N	TOTAL	MG/L		11	.013636	.006742	.030000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		11	.266363	.165123	.610000	.060000	79/10	80/09
TOT KJEL	N	MG/L		11	1.39091	.802724	3.27000	.390000	79/10	80/09
PHOS-TOT		MG/L P		7	.013857	.006492	.020000	.004000	79/10	80/04
			K	5	.020000	.000020	.020000	.020000	80/05	80/09
			T	12	.016417	.005744	.020000	.004000	79/10	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
TOT HARD	CACO3	MG/L		2	964.000	164.049	1080.00	848.000	79/11	80/02
CHLORIDE	TOTAL	MG/L		4	478.750	273.041	860.000	216.000	79/10	80/03
SULFATE	SO4-TOT	MG/L		1	270.000		270.000	270.000	80/03	80/03
FLUORIDE	F,DISS	MG/L		3	.266667	.094516	.340000	.160000	79/10	80/02
CADMIUM	CD,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	7.50000	2.88675	10.0000	5.00000	79/11	80/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		11	992.727	225.704	1350.00	660.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	5	5.00000	.000000	5.00000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		5	760.000	233.666	1130.00	500.000	79/10	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05

TABLE RD 1-102 (Continued)

STATION NUMBER 602050
40 47 36.0 080 31 21.0 2
W BR STATELINE CR NR NEGLEY
OHIO RIVER (LITTLE BEAVER CRK.)
MILES 0953.80 0941.50 010.80 007.70 000.30 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		1	500.000		500.000	500.000	79/10	79/10
FECSTREP	MF M-ENT	/100ML		1	150.000		150.000	150.000	79/10	79/10
PHENOLS	TOTAL	UG/L		11	21.3636	15.9266	54.0000	2.00000	79/10	80/09
MBAS		MG/L		3	.180000	.140000	.340000	.080000	79/11	80/02
RESIDUE	DISS-180	C MG/L		6	1408.00	352.556	1920.00	858.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	3	.500000	.000000	.500000	.500000	80/02	80/08

TABLE RD 1-103

STATION NUMBER 600570
39 44 54.0 083 55 53.0 2
LITTLE MIAMI R. NEAR OLDTOWN
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 079.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.4167	7.82477	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	405.200	328.188	1170.00	24.0000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	721.666	107.963	884.000	429.000	78/10	79/09
DO		MG/L		12	10.3500	2.18113	14.0000	7.80000	78/10	79/09
COD	LOWLEVEL	MG/L		12	10.2750	8.07320	33.0000	4.00000	78/10	79/09
PH		SU		7	7.95714	.190514	8.20000	7.60000	78/12	79/09
LAB	PH	SU		5	8.01999	.192638	8.30000	7.80000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	33.3333	48.0574	178.000	4.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.095000	.055227	.180000	.050000	78/12	79/09
NO3-N	TOTAL	MG/L		12	4.95499	2.23482	9.45000	2.20000	78/10	79/09
TOT KJEL	N	MG/L		12	.500833	.434646	1.80000	.200000	78/10	79/09
PHOS-TOT		MG/L P		12	.135833	.140354	.540000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	366.750	28.6284	392.000	326.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.322500	.025002	.360000	.310000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	10.0000	10.0000	25.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	1360.00	890.955	1990.00	730.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	18.7500	15.7771	42.0000	8.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		12	570.583	483.887	1400.00	13.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	2.00000	.000000	2.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-104

STATION NUMBER 600570
39 44 54.0 083 55 53.0 2
LITTLE MIAMI R. NEAR OLDTOWN
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 079.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.4833	7.80173	21.0000	.000000	79/10	80/09
STREAM	FLOW	CFS		6	324.150	194.610	683.400	154.100	79/10	80/03
STREAM	FLOW,	INST-CFS		5	279.020	151.351	443.500	85.0000	80/05	80/09
STREAM	STAGE	FEET		5	2.55600	.622921	3.20000	1.71000	80/05	80/09
CNDUCTVY	AT 25C	MICROMHO		12	670.500	88.0470	800.000	481.000	79/10	80/09
DO		MG/L		12	10.1333	2.37768	14.0000	7.20000	79/10	80/09
COD	LOWLEVEL	MG/L		11	12.3636	10.0824	34.0000	4.00000	79/10	80/09
			K	1	4.00000		4.00000	4.00000	80/05	80/05
			T	12	11.6667	9.91173	34.0000	4.00000	79/10	80/09
PH		SU		8	7.96249	.192275	8.30000	7.70000	79/11	80/07
LAB	PH	SU		4	8.05000	.059155	8.10000	8.00000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		11	41.0909	41.9248	139.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	12	38.5000	40.9689	139.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		10	.084000	.090210	.340000	.050000	79/10	80/07
			K	2	.050000	.000061	.050000	.050000	80/08	80/09
			T	12	.078333	.082664	.340000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		1	5.22000		5.22000	5.22000	80/07	80/07
NO3-N	TOTAL	MG/L		11	4.09908	.842412	5.72000	2.98000	79/10	80/09
TOT KJEL	N	MG/L		12	.376666	.293361	1.11000	.110000	79/10	80/09
PHOS-TOT		MG/L P		12	.161833	.165516	.620000	.040000	79/10	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	345.750	74.6832	403.000	236.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.270000		.270000	.270000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09

TABLE RD 1-104 (Continued)

STATION NUMBER 600570
39 44 54.0 083 55 53.0 2
LITTLE MIAMI R. NEAR OLDTOWN
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 079.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	1735.00	1567.43	3500.00	170.000	79/12	80/09
LEAD	PB,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	6.25000	2.50000	10.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
NICKEL	NI,TOTAL	UG/L	T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		3	36.6667	11.5471	50.0000	30.0000	79/12	80/06
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	4	35.0000	10.0000	50.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		9	516.555	511.883	1500.00	19.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	3.50000	2.12132	5.00000	2.00000	79/12	80/03
			K	2	2.00000	.000000	2.00000	2.00000	80/06	80/09
			T	4	2.75000	1.50000	5.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L		2	3.05000	3.60624	5.60000	.500000	79/12	80/03
			K	1	.500000		.500000	.500000	80/06	80/06
			T	3	2.20000	2.94448	5.60000	.500000	79/12	80/06

TABLE RD 1-105

STATION NUMBER 610550
39 39 30.0 084 02 30.0 2
L MIAMI R NR BELLBROOK - UPPER BELLBROOK RD
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 068.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.3250	7.55574	20.5000	5.80000	78/12	79/09
CNDUCTVY	AT 25C	MICROMHO		4	789.000	51.9294	861.000	750.000	78/12	79/09
DO		MG/L		4	9.82500	2.91705	13.0000	7.20000	78/12	79/09
BOD	5 DAY	MG/L		1	1.00000		1.00000	1.00000	78/11	78/11
COD	LOWLEVEL	MG/L		5	13.0400	11.4240	33.0000	4.00000	78/11	79/09
PH		SU		3	8.06667	.115581	8.20000	8.00000	78/12	79/09
LAB	PH	SU		1	8.00000		8.00000	8.00000	79/06	79/06
RESIDUE	TOTAL	MG/L		1	10.0000		10.0000	10.0000	78/11	78/11
RESIDUE	TOT NFLT	MG/L		5	37.6000	36.0042	100.000	10.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		5	.240000	.152316	.420000	.050000	78/11	79/09
NO2-N	TOTAL	MG/L		1	.010000		.010000	.010000	78/11	78/11
NO3-N	TOTAL	MG/L		5	4.76000	3.26100	8.35000	.050000	78/11	79/09
TOT KJEL	N	MG/L		4	.875000	.250001	1.20000	.600000	78/12	79/09
PHOS-TOT		MG/L P		5	.194000	.156621	.440000	.050000	78/11	79/09
T ORG C	C	MG/L		1	1.00000		1.00000	1.00000	78/11	78/11
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		5	292.800	164.473	383.000	1.00000	78/11	79/09
SULFATE	SO4-TOT	MG/L		1	10.0000		10.0000	10.0000	78/11	78/11
FLUORIDE	F,DISS	MG/L		4	.297500	.025000	.330000	.270000	78/12	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	78/11	78/11
CADMIUM	CD,TOT	UG/L		5	6.00000	2.23607	10.0000	5.00000	78/11	79/09
CHROMIUM	CR,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/11	79/09
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/11	79/09
IRON	FE,TOT	UG/L		2	1440.00	834.386	2030.00	850.000	79/06	79/09
LEAD	PB,TOT	UG/L		5	13.8000	12.0913	34.0000	5.00000	78/11	79/09
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/11	79/09
SILVER	AG,TOT	UG/L		1	30.0000		30.0000	30.0000	78/11	78/11
ZINC	ZN,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/11	79/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	78/11	78/11
FEC COLI	MFM-FCBR	/100ML		3	881.000	1076.08	2100.00	63.0000	78/12	79/06
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		5	.500000	.000000	.500000	.500000	78/11	79/09

TABLE RD 1-106

STATION NUMBER 610550
39 39 30.0 084 02 30.0 2
L MIAMI R NR BELLBROOK - UPPER BELLBROOK RD
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 068.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	6.10000	7.33008	14.5000	1.00000	79/12	80/06
CNDUCTVY	AT 25C	MICROMHO		3	706.000	108.862	796.000	585.000	79/12	80/06
DO		MG/L		3	11.4000	2.94621	14.0000	8.20000	79/12	80/06
COD	LOWLEVEL	MG/L		2	34.0000	5.65685	38.0000	30.0000	80/03	80/06
			K	1	4.00000		4.00000	4.00000	79/12	79/12
			T	3	24.0000	17.7764	38.0000	4.00000	79/12	80/06
PH		SU		3	7.99999	.100884	8.10000	7.90000	79/12	80/06
RESIDUE	TOT NFLT	MG/L		2	61.0000	7.07107	66.0000	56.0000	80/03	80/06
			K	1	10.0000		10.0000	10.0000	79/12	79/12
			T	3	44.0000	29.8664	66.0000	10.0000	79/12	80/06
NH3+NH4-	N TOTAL	MG/L		3	.476666	.077676	.540000	.390000	79/12	80/06
NO3-N	TOTAL	MG/L		3	4.07000	.783522	4.94000	3.42000	79/12	80/06
TOT KJEL	N	MG/L		3	.973333	.434321	1.45000	.600000	79/12	80/06
PHOS-TOT		MG/L P		3	.390000	.070003	.470000	.340000	79/12	80/06
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	80/03	80/03
			K	2	.010000	.000000	.010000	.010000	79/12	80/06
			T	3	.010000	.000000	.010000	.010000	79/12	80/06
TOT HARD	CACO3	MG/L		3	351.666	65.4258	403.000	278.000	79/12	80/06
FLUORIDE	F,TOTAL	MG/L		1	.280000		.280000	.280000	79/12	79/12
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	80/03	80/03
			K	2	5.00000	.000000	5.00000	5.00000	79/12	80/06
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/06
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	80/03	80/03
			K	2	30.0000	.000000	30.0000	30.0000	79/12	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/03	80/03
			K	2	30.0000	.000000	30.0000	30.0000	79/12	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
IRON	FE,TOT	UG/L		3	1723.33	1353.90	2510.00	160.000	79/12	80/06

TABLE RD 1-106 (Continued)

STATION NUMBER 610550
39 39 30.0 084 02 30.0 2
L MIAMI R NR BELLBROOK - UPPER BELLBROOK RD
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 068.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		3	7.00000	2.64575	10.0000	5.00000	79/12	80/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	80/03	80/03
			K	2	100.000	.000000	100.000	100.000	79/12	80/06
			T	3	100.000	.000000	100.000	100.000	79/12	80/06
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	80/03	80/03
			K	2	30.0000	.000000	30.0000	30.0000	79/12	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
FEC COLI	MFM-FCBR	/100ML		2	6750.00	7424.62	12000.0	1500.00	79/12	80/06
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	80/03	80/03
			K	2	2.00000	.000000	2.00000	2.00000	79/12	80/06
			T	3	2.00000	.000000	2.00000	2.00000	79/12	80/06
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/03	80/03
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/06	80/06
			T	2	.500000	.000000	.500000	.500000	80/03	80/06

TABLE RD 1-107

STATION NUMBER 600600
39 35 00.0 084 01 49.0 2
L MIAMI RIVER NR SPRING VALLEY
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 059.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.0833	8.00805	24.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	654.600	873.628	3003.00	109.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	833.333	148.992	1080.00	467.000	78/10	79/09
DO		MG/L		12	9.92500	2.20994	13.0000	7.50000	78/10	79/09
COD	LOWLEVEL	MG/L		12	14.9917	10.2564	40.0000	4.00000	78/10	79/09
PH		SU		7	7.91428	.134865	8.10000	7.70000	78/12	79/09
LAB	PH	SU		5	7.89999	.158576	8.10000	7.70000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	47.5833	55.7355	199.000	7.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.342000	.352256	1.32000	.090000	78/12	79/09
NO3-N	TOTAL	MG/L		12	4.50833	1.68561	8.34000	2.98000	78/10	79/09
TOT KJEL	N	MG/L		12	.989166	.463141	1.90000	.470000	78/10	79/09
PHOS-TOT		MG/L P		12	.450000	.490676	1.58000	.060000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	364.000	24.1799	384.000	331.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.285000	.028869	.320000	.250000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	6.25000	2.50000	10.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	2150.00	1767.77	3400.00	900.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	11.7500	5.85235	18.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		11	890.454	764.957	2500.00	203.000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-108

STATION NUMBER 600600
39 35 00.0 084 01 49.0 2
L MIAMI RIVER NR SPRING VALLEY
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 059.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	10.8636	7.89953	21.5000	1.00000	79/10	80/09
STREAM	FLOW	CFS		6	411.933	230.114	755.000	206.400	79/10	80/03
STREAM	FLOW,	INST-CFS		5	485.740	332.905	941.900	199.900	80/05	80/09
STREAM	STAGE	FEET		5	4.56600	1.08188	5.98000	3.53000	80/05	80/09
CNDUCTVY	AT 25C	MICROMHO		12	768.666	103.090	905.000	606.000	79/10	80/09
DO		MG/L		11	9.66363	2.48809	13.4000	6.60000	79/10	80/09
COD	LOWLEVEL	MG/L		12	17.8333	13.7961	40.0000	4.00000	79/10	80/09
PH		SU		7	7.91428	.186630	8.10000	7.60000	79/12	80/07
LAB	PH	SU		4	7.90000	.081876	8.00000	7.80000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		11	68.9091	77.4228	263.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	12	64.0000	75.7532	263.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	.378333	.184482	.690000	.200000	79/10	80/09
NO2-N	TOTAL	MG/L		1	4.92000		4.92000	4.92000	80/07	80/07
NO3-N	TOTAL	MG/L		11	3.59545	.714392	4.76000	2.45000	79/10	80/09
TOT KJEL	N	MG/L		12	.783333	.389833	1.80000	.310000	79/10	80/09
PHOS-TOT		MG/L P		12	.407250	.155665	.870000	.280000	79/10	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	361.500	52.3609	401.000	285.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.260000		.260000	.260000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	1310.00	1053.03	2250.00	250.000	79/12	80/09

TABLE RD 1-108 (Continued)

STATION NUMBER 600600
39 35 00.0 084 01 49.0 2
L MIAMI RIVER NR SPRING VALLEY
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 059.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		4	6.50000	2.38048	10.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/12	80/06
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	4	32.5000	5.00000	40.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		9	5082.89	4691.38	12000.0	86.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	2.00000	.000000	2.00000	2.00000	79/12	80/03
PHENOLS	TOTAL	UG/L	K	2	2.00000	.000000	2.00000	2.00000	80/06	80/09
			T	4	2.00000	.000000	2.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L		1	1.60000		1.60000	1.60000	80/03	80/03
			K	2	.500000	.000000	.500000	.500000	80/06	80/09
			T	3	.866666	.635085	1.60000	.500000	80/03	80/09

TABLE RD 1-109

STATION NUMBER 610520
39 20 48.0 084 10 26.0 2
L MIAMI R NR MORROW - STUBBS MILL RD
OHIO RIVER (L. MIAMI RIVER)
MILES 0953.80 0517.50 035.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	13.1250	8.96530	25.5000	.000000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	648.416	154.722	940.000	378.000	78/10	79/09
DO		MG/L		12	11.1500	2.61865	15.8000	7.80000	78/10	79/09
COD	LOWLEVEL	MG/L		12	15.5750	8.02588	32.0000	4.00000	78/10	79/09
PH		SU		7	8.09999	.200301	8.30000	7.80000	78/12	79/09
LAB	PH	SU		5	8.04000	.114287	8.20000	7.90000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	60.5000	69.1750	244.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.153000	.160697	.580000	.050000	78/12	79/09
NO3-N	TOTAL	MG/L		12	3.92249	1.77844	8.26000	2.26000	78/10	79/09
TOT KJEL	N	MG/L		12	.829166	.524169	2.10000	.300000	78/10	79/09
PHOS-TOT		MG/L P		12	.309166	.275729	.960000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	269.000	10.3602	283.000	258.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.247500	.035000	.290000	.210000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	6.25000	2.50000	10.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	2580.00	2008.18	4000.00	1160.00	79/06	79/09
LEAD	PB,TOT	UG/L		4	22.2500	26.6630	62.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN;TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		12	432.166	440.885	1300.00	58.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	2.00000	.000000	2.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-110

STATION NUMBER 610520
39 20 48.0 084 10 26.0 2
L MIAMI R NR MORROW - STUBBS MILL RD
OHIO RIVER (L. MIAMI RIVER)
MILES 0953.80 0517.50 035.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	34.6200	80.2545	262.000	.000000	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		11	606.909	104.424	812.000	510.000	79/10	80/08
DO		MG/L		10	10.7900	2.33546	14.0000	8.00000	79/10	80/08
COD	LOWLEVEL	MG/L		11	15.5455	11.7759	42.0000	4.00000	79/10	80/08
PH		SU		7	8.07142	.149870	8.20000	7.80000	79/11	80/07
LAB	PH	SU		3	7.90000	.173466	8.00000	7.70000	79/10	80/08
RESIDUE	TOT NFLT	MG/L		10	64.5000	48.6124	121.000	10.0000	79/10	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	11	59.5454	48.9579	121.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		9	.167778	.091485	.300000	.050000	79/10	80/08
			K	2	.050000	.000061	.050000	.050000	80/05	80/06
			T	11	.146363	.094686	.300000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		1	4.30000		4.30000	4.30000	80/07	80/07
NO3-N	TOTAL	MG/L		9	2.82222	.484540	3.38000	2.03000	79/10	80/08
			K	1	1.21000		1.21000	1.21000	80/06	80/06
			T	10	2.66099	.684560	3.38000	1.21000	79/10	80/08
TOT KJEL	N	MG/L		11	.558181	.330540	1.20000	.270000	79/10	80/08
PHOS-TOT		MG/L P		11	.225727	.066261	.335000	.130000	79/10	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	1	.010000		.010000	.010000	80/06	80/06
			T	3	.010000	.000000	.010000	.010000	79/12	80/06
TOT HARD	CACO3	MG/L		3	277.666	60.4359	316.000	208.000	79/12	80/06
FLUORIDE	F,DISS	MG/L		1	.250000		.250000	.250000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	1	5.00000		5.00000	5.00000	80/06	80/06
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06

TABLE RD 1-110 (Continued)

STATION NUMBER 610520
39 20 48.0 084 10 26.0 2
L MIAMI R NR MORROW - STUBBS MILL RD
OHIO RIVER (L. MIAMI RIVER)
MILES 0953.80 0517.50 035.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
IRON	FE,TOT	UG/L		3	2946.67	2207.38	4600.00	440.000	79/12	80/06
LEAD	PB,TOT	UG/L		3	8.66667	4.72582	14.0000	5.00000	79/12	80/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	1	100.000		100.000	100.000	80/06	80/06
			T	3	100.000	.000000	100.000	100.000	79/12	80/06
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
FEC COLI	MFM-FCBR	/100ML		9	2002.33	3043.39	9600.00	5.00000	79/10	80/07
PHENOLS	TOTAL	UG/L		2	3.00000	1.41421	4.00000	2.00000	79/12	80/03
			K	1	2.00000		2.00000	2.00000	80/06	80/06
			T	3	2.66667	1.15470	4.00000	2.00000	79/12	80/06
MERCURY	HG,TOTAL	UG/L		2	4.50000	5.65685	8.50000	.500000	79/12	80/03
			K	1	.500000		.500000	.500000	80/06	80/06
			T	3	3.16667	4.61880	8.50000	.500000	79/12	80/06

TABLE RD 1-111

STATION NUMBER 600520
39 10 17.0 084 17 53.0 2
LITTLE MIAMI RIVER AT MILFORD
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 012.70

No data were collected from 10/78 - 9/80.

TABLE RD 1-112

STATION NUMBER 610530
39 09 20.0 084 17 30.0 2
E FK L MIAMI R NR MILFORD - CLEVELAND AVE
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 011.10 000.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.7250	8.31243	24.5000	.000000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	427.250	177.132	849.000	252.000	78/10	79/09
DO		MG/L		12	10.7083	2.97367	16.0000	6.20000	78/10	79/09
COD	LOWLEVEL	MG/L		12	21.0917	19.1020	78.0000	8.00000	78/10	79/09
PH		SU		7	7.71428	.121701	7.90000	7.60000	78/12	79/09
LAB	PH	SU		5	7.68000	.110209	7.80000	7.50000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	49.9167	46.9322	151.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.153000	.129018	.500000	.050000	78/12	79/09
NO3-N	TOTAL	MG/L		12	1.65500	.656904	2.73000	.860000	78/10	79/09
TOT KJEL	N	MG/L		12	.915000	.242281	1.40000	.600000	78/10	79/09
PHOS-TOT		MG/L P		12	.363333	.299312	1.23000	.090000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	166.000	57.0321	221.000	106.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.207500	.034035	.240000	.160000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	6.25000	2.50000	10.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	1195.00	756.604	1730.00	660.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	17.5000	13.4288	36.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		12	1089.00	1495.81	4700.00	52.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	4.00000	2.82843	8.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-113

STATION NUMBER 610530
39 09 20.0 084 17 30.0 2
E FK L MIAMI R NR MILFORD - CLEVELAND AVE
OHIO RIVER (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 011.10 000.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	10.6909	6.91975	20.0000	1.00000	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		11	414.909	127.439	651.000	295.000	79/10	80/08
DO		MG/L		11	10.5364	1.89330	13.4000	7.80000	79/10	80/08
COD	LOWLEVEL	MG/L		11	18.4545	7.33981	30.0000	4.00000	79/10	80/08
PH		SU		8	7.68749	.223170	8.10000	7.30000	79/11	80/07
LAB	PH	SU		3	7.70000	.173334	7.90000	7.60000	79/10	80/08
RESIDUE	TOT NFLT	MG/L		10	39.2000	27.6478	89.0000	10.0000	79/10	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	11	36.5454	27.6672	89.0000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		11	.306363	.286156	.950000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		1	1.26000		1.26000	1.26000	80/07	80/07
NO3-N	TOTAL	MG/L		10	1.22700	.426876	2.16000	.650000	79/10	80/08
TOT KJEL	N	MG/L		11	.751818	.300760	1.38000	.360000	79/10	80/08
PHOS-TOT		MG/L P		11	.210000	.077222	.330000	.120000	79/10	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	1	.010000		.010000	.010000	80/06	80/06
			T	3	.010000	.000000	.010000	.010000	79/12	80/06
TOT HARD	CACO3	MG/L		3	177.000	57.6628	242.000	132.000	79/12	80/06
FLUORIDE	F,DISS	MG/L		1	.190000		.190000	.190000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	1	5.00000		5.00000	5.00000	80/06	80/06
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
IRON	FE,TOT	UG/L		3	2333.33	1126.47	3100.00	1040.00	79/12	80/06
LEAD	PB,TOT	UG/L		3	7.00000	2.64575	10.0000	5.00000	79/12	80/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	1	100.000		100.000	100.000	80/06	80/06
			T	3	100.000	.000000	100.000	100.000	79/12	80/06
ZINC	ZN,TOT	UG/L		3	36.6667	11.5471	50.0000	30.0000	79/12	80/06
FEC COLI	MFM-FCBR	/100ML		7	5644.28	4338.78	12000.0	310.000	79/10	80/06
PHENOLS	TOTAL	UG/L		2	2.00000	.000000	2.00000	2.00000	79/12	80/03
			K	1	2.00000		2.00000	2.00000	80/06	80/06
			T	3	2.00000	.000000	2.00000	2.00000	79/12	80/06
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/03	80/03
			K	1	.500000		.500000	.500000	80/06	80/06
			T	2	.500000	.000000	.500000	.500000	80/03	80/06

TABLE RD 1-114

STATION NUMBER 600510
39 41 54.0 084 01 10.0 2
BEAVER CREEK NEAR ALPHA
OHIO RIVER 051192 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 072.60 001.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	13.8750	6.58755	21.5000	7.00000	78/12	79/09
CNDUCTVY	AT 25C	MICROMHO		4	1117.50	90.3235	1210.00	1000.00	78/12	79/09
DO		MG/L		4	8.70000	1.62071	10.2000	7.20000	78/12	79/09
COD	LOWLEVEL	MG/L		4	14.6500	5.54587	22.6000	10.0000	78/12	79/09
PH		SU		3	7.86666	.058789	7.90000	7.80000	78/12	79/09
LAB	PH	SU		1	7.90000		7.90000	7.90000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		4	27.5000	21.2524	58.0000	12.0000	78/12	79/09
NH3+NH4-	N TOTAL	MG/L		4	2.76500	.704484	3.39000	1.88000	78/12	79/09
NO3-N	TOTAL	MG/L		4	1.71000	.185656	1.96000	1.53000	78/12	79/09
TOT KJEL	N	MG/L		4	3.56000	.636443	4.40000	3.00000	78/12	79/09
PHOS-TOT		MG/L P		4	1.01500	.649333	1.88000	.330000	78/12	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	389.000	4.96655	395.000	383.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.295000	.036969	.340000	.250000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	10.0000	10.0000	25.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	955.000	615.183	1390.00	520.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	21.2500	23.3862	55.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	37.5000	15.0000	60.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		1	4000.00		4000.00	4000.00	79/06	79/06
PHENOLS	TOTAL	UG/L		4	2.75000	1.50000	5.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-115

STATION NUMBER 600510
39 41 54.0 084 01 10.0 2
BEAVER CREEK NEAR ALPHA
OHIO RIVER 051192 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 072.60 001.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.77499	8.01930	18.8000	1.00000	79/12	80/09
CNDUCTVY	AT 25C	MICROMHO		4	937.500	138.580	1078.00	752.000	79/12	80/09
DO		MG/L		4	9.32500	3.07828	12.6000	5.70000	79/12	80/09
COD	LOWLEVEL	MG/L		4	21.0000	12.3828	38.0000	10.0000	79/12	80/09
PH		SU		3	7.80000	.100505	7.90000	7.70000	79/12	80/06
LAB	PH	SU		1	7.70000		7.70000	7.70000	80/09	80/09
RESIDUE	TOT NFLT	MG/L		4	22.2500	13.1751	36.0000	10.0000	79/12	80/09
NH3+NH4-	N TOTAL	MG/L		4	1.89250	.792271	2.83000	.920000	79/12	80/09
NO3-N	TOTAL	MG/L		4	2.41500	.201415	2.58000	2.14000	79/12	80/09
TOT KJEL	N	MG/L		4	2.42000	.883970	3.58000	1.43000	79/12	80/09
PHOS-TOT		MG/L P		4	1.21500	.525643	1.76000	.510000	79/12	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	371.500	48.9387	411.000	300.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.330000		.330000	.330000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	1032.50	693.896	1820.00	410.000	79/12	80/09
LEAD	PB,TOT	UG/L		3	14.3333	6.65834	22.0000	10.0000	79/12	80/06
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	4	13.2500	5.85235	22.0000	10.0000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		2	5500.00	5939.69	9700.00	1300.00	80/06	80/09
PHENOLS	TOTAL	UG/L		3	2.33333	.577352	3.00000	2.00000	79/12	80/09
			K	1	2.00000		2.00000	2.00000	80/06	80/06
			T	4	2.25000	.500000	3.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/03	80/03
			K	2	.500000	.000000	.500000	.500000	80/06	80/09
			T	3	.500000	.000000	.500000	.500000	80/03	80/09

TABLE RD 1-116

STATION NUMBER 600550
39 29 34.0 084 06 06.0 2
CAESAR CREEK NR OREGONIA
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 051.00 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.9083	8.87555	25.2000	.000000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	467.166	54.1454	581.000	411.000	78/10	79/09
DO		MG/L		12	11.1417	2.28611	14.2000	8.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	10.0667	4.99278	22.4000	4.00000	78/10	79/09
PH		SU		7	8.08571	.371676	8.50000	7.70000	78/12	79/09
LAB	PH	SU		5	7.96000	.114287	8.10000	7.80000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	15.9167	10.9914	43.0000	4.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.107000	.069770	.250000	.050000	78/12	79/09
NO3-N	TOTAL	MG/L		12	2.84249	.707780	3.82000	1.94000	78/10	79/09
TOT KJEL	N	MG/L		12	.607500	.360735	1.60000	.200000	78/10	79/09
PHOS-TOT		MG/L P		12	.081667	.046482	.170000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	209.750	29.5339	248.000	185.000	78/12	79/09
FLUORIDE	F,DISS	MG/L		4	.225000	.034156	.260000	.180000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	6.25000	2.50000	10.0000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	330.000	183.848	460.000	200.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	19.5000	21.9165	52.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		11	113.091	102.284	300.000	15.0000	78/10	79/09
			K	1	1.00000		1.00000	1.00000	79/02	79/02
			T	12	103.750	102.752	300.000	1.00000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.575000	.150001	.800000	.500000	78/12	79/09

TABLE RD 1-117

STATION NUMBER 600550
39 29 34.0 084 06 06.0 2
CAESAR CREEK NR OREGONIA
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 051.00 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.3750	7.33945	23.0000	1.50000	79/10	80/09
CNDUCTVY	AT 25C	MICROMHO		12	466.250	26.6134	507.000	426.000	79/10	80/09
DO		MG/L		12	11.2250	2.20090	15.0000	8.40000	79/10	80/09
COD	LOWLEVEL	MG/L		12	12.8333	5.02419	20.0000	6.00000	79/10	80/09
PH		SU		8	8.12499	.191002	8.40000	7.80000	79/11	80/07
LAB	PH	SU		4	7.92500	.050881	8.00000	7.90000	79/10	80/09
RESIDUE	TOT NFLT	MG/L		8	12.0000	4.86973	24.0000	10.0000	79/10	80/07
			K	4	10.0000	.000000	10.0000	10.0000	80/05	80/09
			T	12	11.3333	4.00757	24.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		9	.126667	.137386	.460000	.050000	79/10	80/08
			K	3	.050000	.000075	.050000	.050000	80/05	80/09
			T	12	.107500	.122187	.460000	.050000	79/10	80/09
NO3-N	TOTAL	MG/L		12	2.52833	.519013	3.64000	1.99000	79/10	80/09
TOT KJEL	N	MG/L		12	.709166	1.04066	4.00000	.250000	79/10	80/09
PHOS-TOT		MG/L P		12	.104250	.135213	.390000	.021000	79/10	80/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/12	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	4	.010000	.000000	.010000	.010000	79/12	80/09
TOT HARD	CACO3	MG/L		4	228.250	11.6154	244.000	219.000	79/12	80/09
FLUORIDE	F,DISS	MG/L		1	.210000		.210000	.210000	79/12	79/12
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	442.500	120.104	570.000	280.000	79/12	80/09

TABLE RD 1-117 (Continued)

STATION NUMBER 600550
39 29 34.0 084 06 06.0 2
CAESAR CREEK NR OREGONIA
OHIO RIVER 051191 (LITTLE MIAMI RIVER)
MILES 0953.80 0517.50 051.00 000.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		2	7.50000	3.53553	10.0000	5.00000	79/12	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	4	6.25000	2.50000	10.0000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/12	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		8	80.2500	122.740	360.000	2.00000	79/10	80/07
			K	1	29.0000		29.0000	29.0000	80/09	80/09
FEC COLI	MFM-FCBR	/100ML	T	9	74.5555	116.077	360.000	2.00000	79/10	80/09
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	79/12	80/09
			K	1	2.00000		2.00000	2.00000	80/06	80/06
			T	4	2.00000	.000000	2.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L		2	.800000	.424263	1.10000	.500000	80/03	80/09
			K	1	.500000		.500000	.500000	80/06	80/06
			T	3	.700000	.346410	1.10000	.500000	80/03	80/09

TABLE RD 1-118

STATION NUMBER 602280
41 14 22.0 080 52 52.0 2
MAHONING R. AT LEAVITTSBURG
OHIO RIVER 052191 (MAHONING RIVER BASIN)
MILES 0953.80 0955.50 021.80 043.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	9.77500	7.17979	18.0000	.500000	78/10	79/09
STREAM	FLOW	CFS		11	1099.45	942.453	3333.00	286.000	78/10	79/09
STREAM	STAGE	FEET		3	6.32166	2.47135	8.95000	4.04500	78/11	79/01
CNDUCTVY	FIELD	MICROMHO		11	288.091	84.6567	425.000	144.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	235.000		235.000	235.000	79/04	79/04
DO		MG/L		12	10.6500	1.99842	13.5000	8.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	16.4667	8.15257	34.0000	1.10000	78/10	79/09
PH		SU		12	7.77083	.396882	8.50000	7.20000	78/10	79/09
LAB	PH	SU		2	7.25000	.070745	7.30000	7.20000	79/03	79/04
RESIDUE	TOTAL	MG/L		1	250.000		250.000	250.000	79/03	79/03
RESIDUE	DISS-105	C MG/L		7	247.429	44.0867	296.000	158.000	78/12	79/09
RESIDUE	TOT NFLT	MG/L		11	17.7273	14.1992	58.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.167500	.137651	.430000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.019167	.015643	.060000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.656666	.320549	1.05000	.210000	78/10	79/09
TOT KJEL	N	MG/L		10	.650000	.190030	.900000	.300000	78/10	79/09
PHOS-TOT		MG/L P		12	.089166	.042310	.170000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		6	.010000	.000000	.010000	.010000	78/11	79/09
TOT HARD	CACO3	MG/L		4	122.250	48.3899	172.000	71.0000	78/12	79/08
CHLORIDE	TOTAL	MG/L		1	36.0000		36.0000	36.0000	78/12	78/12
FLUORIDE	F,DISS	MG/L		5	.214000	.032095	.260000	.170000	78/12	79/08
CADMIUM	CD,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		8	1493.75	1075.08	3200.00	460.000	78/11	79/09
LEAD	PB,TOT	UG/L		8	26.3750	28.8243	84.0000	6.00000	78/10	79/09
MANGNESE	MN	UG/L		1	130.000		130.000	130.000	78/12	78/12
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		10	1248.00	865.766	3200.00	360.000	78/11	79/09
			K	1	910.000		910.000	910.000	79/01	79/01
			T	11	1217.27	827.636	3200.00	360.000	78/11	79/09
FECSTREP	MF M-ENT	/100ML		11	6071.91	16360.7	55000.0	71.0000	78/11	79/09
PHENOLS	TOTAL	UG/L		11	6.18182	4.62208	18.0000	2.00000	78/11	79/09
MBAS		MG/L		2	.050000	.000061	.050000	.050000	79/03	79/05
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-119

STATION NUMBER 602280
41 14 22.0 080 52 52.0 2
MAHONING R. AT LEAVITTSBURG
OHIO RIVER 052191 (MAHONING RIVER BASIN)
MILES 0953.80 0955.50 021.80 043.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	4.28571	5.28250	15.0000	.000000	79/11	80/05
STREAM	FLOW	CFS		4	450.500	366.728	980.000	193.000	79/10	80/03
STREAM	FLOW,	INST-CFS		2	1587.00	971.565	2274.00	900.000	80/04	80/05
STREAM	STAGE	FEET		2	6.11000	1.73948	7.34000	4.88000	80/04	80/05
CNDUCTVY	FIELD	MICROMHO		6	205.000	64.4981	290.000	120.000	79/11	80/05
DO		MG/L		7	12.6286	2.20132	15.0000	8.50000	79/11	80/05
BOD	5 DAY	MG/L		2	1.70000	.565688	2.10000	1.30000	80/03	80/04
COD	LOWLEVEL	MG/L		7	17.1428	3.43653	20.0000	10.0000	79/10	80/04
PH		SU		6	7.73333	.895954	8.50000	6.20000	79/11	80/05
RESIDUE	DISS-105	C MG/L		6	245.667	62.9467	306.000	140.000	79/10	80/03
RESIDUE	TOT NFLT	MG/L		7	17.4286	13.1385	46.0000	10.0000	79/10	80/04
NH3+NH4-	N TOTAL	MG/L		7	.145714	.091626	.280000	.050000	79/11	80/05
NO2-N	TOTAL	MG/L		6	.013333	.005164	.020000	.010000	79/11	80/05
NO3-N	TOTAL	MG/L		7	.841428	.217212	1.17000	.590000	79/11	80/05
TOT KJEL	N	MG/L		8	.563750	.137211	.780000	.450000	79/10	80/05
PHOS-TOT		MG/L P		6	.090167	.015237	.110000	.070000	79/11	80/05
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	79/11	80/09
			K	6	.016667	.016330	.050000	.010000	80/05	80/09
			T	10	.014000	.012649	.050000	.010000	79/11	80/09
TOT HARD	CACO3	MG/L		2	139.500	7.77817	145.000	134.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		1	32.0000		32.0000	32.0000	79/11	79/11
FLUORIDE	F,DISS	MG/L		2	.200000	.056568	.240000	.160000	79/11	80/03
FLUORIDE	F,TOTAL	MG/L		1	.210000		.210000	.210000	80/05	80/05
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/04	80/04
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		7	1415.71	816.269	2520.00	630.000	79/11	80/05

TABLE RD 1-119 (Continued)

STATION NUMBER 602280
41 14 22.0 080 52 52.0 2
MAHONING R. AT LEAVITTSBURG
OHIO RIVER 052191 (MAHONING RIVER BASIN)
MILES 0953.80 0955.50 021.80 043.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		6	5.83333	2.04125	10.0000	5.00000	79/11	80/05
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	1	100.000		100.000	100.000	80/05	80/05
			T	3	100.000	.000000	100.000	100.000	79/11	80/05
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		6	1941.67	1428.35	4400.00	800.000	79/10	80/04
FECSTREP	MF M-ENT	/100ML		6	982.833	912.187	2500.00	67.0000	79/10	80/04
PHENOLS	TOTAL	UG/L		13	4.15385	1.34451	6.00000	2.00000	79/11	80/09
MBAS		MG/L		2	.060000	.014142	.070000	.050000	79/11	80/05
RESIDUE	DISS-180	C MG/L		1	248.000		248.000	248.000	80/04	80/04
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	1	.500000		.500000	.500000	80/05	80/05
			T	3	.500000	.000000	.500000	.500000	79/11	80/05

TABLE RD 1-120

STATION NUMBER 602400
41 14 02.0 080 49 23.0 2
MAHONING R AT WARREN
OHIO RIVER (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 038.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		6	12.1667	8.38849	18.5000	.500000	78/12	79/09
STREAM	STAGE	FEET		3	2.92333	.707414	3.74000	2.50000	78/12	79/06
CNDUCTVY	FIELD	MICROMHO		5	340.000	54.2125	425.000	289.000	78/12	79/09
DO		MG/L		6	10.4333	2.93031	14.8000	8.00000	78/12	79/09
COD	LOWLEVEL	MG/L		6	12.9000	2.95773	17.0000	10.0000	78/12	79/09
PH		SU		6	7.53333	.320522	7.90000	7.10000	78/12	79/09
RESIDUE	DISS-105	C MG/L		5	286.600	59.9825	384.000	222.000	78/12	79/09
RESIDUE	TOT NFLT	MG/L		6	15.1667	7.41396	27.0000	10.0000	78/12	79/09
NH3+NH4-	N TOTAL	MG/L		5	.154000	.158209	.420000	.050000	78/12	79/09
NO2-N	TOTAL	MG/L		5	.024000	.015166	.050000	.010000	78/12	79/09
NO3-N	TOTAL	MG/L		5	.692000	.317994	1.02000	.280000	78/12	79/09
TOT KJEL	N	MG/L		5	.646000	.301795	1.00000	.200000	78/12	79/09
PHOS-TOT		MG/L P		5	.074000	.023022	.110000	.050000	78/12	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/09
TOT HARD	CACO3	MG/L		4	162.000	10.0333	171.000	151.000	78/12	79/08
CHLORIDE	TOTAL	MG/L		1	36.0000		36.0000	36.0000	78/12	78/12
FLUORIDE	F,DISS	MG/L		2	.225000	.035356	.250000	.200000	78/12	79/08
CADMIUM	CD,TOT	UG/L		4	5.75000	.957427	7.00000	5.00000	78/12	79/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/02	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/08
IRON	FE,TOT	UG/L		5	1442.00	886.690	2940.00	770.000	78/12	79/09
LEAD	PB,TOT	UG/L		5	66.6000	52.4577	120.000	9.00000	78/12	79/09
MANGNESE	MN	UG/L		1	130.000		130.000	130.000	78/12	78/12
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/08
ZINC	ZN,TOT	UG/L		4	137.500	169.189	390.000	30.0000	78/12	79/08
FEC COLI	MFM-FCBR	/100ML		6	715.000	166.943	1000.00	530.000	78/12	79/09
FECSTREP	MF M-ENT	/100ML		6	401.666	414.411	1200.00	100.000	78/12	79/09
PHENOLS	TOTAL	UG/L		4	7.00000	5.35412	13.0000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		3	.566667	.115471	.700000	.500000	79/02	79/09

TABLE RD 1-121

STATION NUMBER 602400
41 14 02.0 080 49 23.0 2
MAHONING R AT WARREN
OHIO RIVER (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 038.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	7.60000	5.54978	16.0000	1.00000	79/10	80/05
STREAM	STAGE	FEET		1	5.36000		5.36000	5.36000	80/04	80/04
CNDUCTVY	FIELD	MICROMHO		5	273.600	43.9876	320.000	220.000	79/10	80/05
DO		MG/L		5	11.0400	1.72718	13.0000	8.30000	79/10	80/05
BOD	5 DAY	MG/L		1	2.50000		2.50000	2.50000	80/04	80/04
COD	LOWLEVEL	MG/L		4	12.3500	9.37852	22.0000	1.40000	79/10	80/04
PH		SU		5	7.71999	.668642	8.40000	6.90000	79/10	80/05
RESIDUE	DISS-105	C MG/L		3	293.333	34.0207	332.000	268.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		4	14.7500	9.50000	29.0000	10.0000	79/10	80/04
NH3+NH4-	N TOTAL	MG/L		4	.170000	.100000	.300000	.060000	79/10	80/05
			K	1	.100000		.100000	.100000	80/04	80/04
			T	5	.156000	.092087	.300000	.060000	79/10	80/05
NO2-N	TOTAL	MG/L		4	.015000	.005774	.020000	.010000	79/10	80/05
NO3-N	TOTAL	MG/L		4	.685000	.296479	1.11000	.420000	79/10	80/05
TOT KJEL	N	MG/L		4	.562500	.115002	.670000	.400000	79/10	80/05
PHOS-TOT		MG/L P		4	.089500	.024515	.120000	.060000	79/10	80/05
CYANIDE	CN-TOT	MG/L		3	.076667	.115470	.210000	.010000	79/11	80/09
			K	6	.010000	.000000	.010000	.010000	80/05	80/09
			T	9	.032222	.066667	.210000	.010000	79/11	80/09
TOT HARD	CACO3	MG/L		3	159.667	28.6771	190.000	133.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		1	34.0000		34.0000	34.0000	79/11	79/11
FLUORIDE	F,DISS	MG/L		2	.230000	.014143	.240000	.220000	79/11	80/02
FLUORIDE	F,TOTAL	MG/L		1	.220000		.220000	.220000	80/05	80/05
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05

TABLE RD 1-121 (Continued)

STATION NUMBER 602400
41 14 02.0 080 49 23.0 2
MAHONING R AT WARREN
OHIO RIVER (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 038.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	100.000	98.9949	170.000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	76.6667	80.8291	170.000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		3	1240.00	211.660	1480.00	1080.00	79/11	80/05
LEAD	PB,TOT	UG/L		4	13.5000	8.18535	21.0000	5.00000	79/10	80/05
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
ZINC	ZN,TOT	UG/L		3	143.333	196.299	370.000	30.0000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		4	1900.00	752.773	2600.00	1200.00	79/10	80/04
FECSTREP	MF M-ENT	/100ML		4	907.500	619.859	1500.00	130.000	79/10	80/04
PHENOLS	TOTAL	UG/L		10	4.40000	1.77639	7.00000	2.00000	79/10	80/09
MBAS		MG/L		3	.060000	.000086	.060000	.060000	79/11	80/05
RESIDUE	DISS-180	C MG/L		1	222.000		222.000	222.000	80/04	80/04
MERCURY	HG,TOTAL	UG/L		2	1.50000	1.41421	2.50000	.500000	79/11	80/02
			K	1	.500000		.500000	.500000	80/05	80/05
			T	3	1.16667	1.15470	2.50000	.500000	79/11	80/05

TABLE RD 1-122

STATION NUMBER 602290
41 10 52.0 080 47 21.0 2
MAHONING R. AT NILES S
OHIO RIVER 052191 (MAHONING RIVER)
(RIVER MILE 33.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		6	15.0833	7.67735	21.0000	1.00000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		6	373.666	123.243	529.000	171.000	78/10	79/09
DO		MG/L		6	7.48333	2.82518	12.4000	4.90000	78/10	79/09
COD	LOWLEVEL	MG/L		6	20.7667	7.21739	32.0000	12.1000	78/10	79/09
PH		SU		6	7.26666	.307777	7.60000	6.70000	78/10	79/09
RESIDUE	DISS-105	C MG/L		5	292.600	50.6845	336.000	205.000	79/01	79/09
RESIDUE	TOT NFLT	MG/L		5	17.4000	4.15936	23.0000	13.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		6	.841666	.536150	1.87000	.280000	78/10	79/09
NO2-N	TOTAL	MG/L		6	.033333	.015056	.050000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		6	.573333	.303360	.930000	.230000	78/10	79/09
TOT KJEL	N	MG/L		5	1.61400	.844678	3.10000	1.10000	78/10	79/09
PHOS-TOT		MG/L P		6	.193333	.071741	.270000	.110000	78/10	79/09
CYANIDE	CN-TOT	MG/L		6	.116667	.103279	.310000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		3	628.666	850.462	1610.00	106.000	79/01	79/08
FLUORIDE	F,DISS	MG/L		5	.424000	.148762	.640000	.230000	78/10	79/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/08
IRON	FE,TOT	UG/L		6	3890.00	1306.22	6300.00	2700.00	78/10	79/09
LEAD	PB,TOT	UG/L		6	47.5000	18.8653	64.0000	14.0000	78/10	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		4	197.500	103.400	350.000	120.000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		4	13670.0	24255.0	50000.0	570.000	79/05	79/09
FECSTREP	MF M-ENT	/100ML		4	3400.00	5740.23	12000.0	310.000	79/05	79/09
PHENOLS	TOTAL	UG/L		6	20.3333	18.6619	53.0000	4.00000	78/10	79/09
MBAS		MG/L		3	.136667	.061101	.190000	.070000	79/01	79/07
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-123

STATION NUMBER 602290
41 10 52.0 080 47 21.0 2
MAHONING R. AT NILES
OHIO RIVER 052191 (MAHONING RIVER)
(RIVER MILE 33.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	8.90000	4.47773	16.0000	5.00000	79/10	80/05
CNDUCTVY	FIELD	MICROMHO		5	340.000	49.4975	390.000	260.000	79/10	80/05
DO		MG/L		5	10.6200	2.05235	13.4000	7.80000	79/10	80/05
BOD	5 DAY	MG/L		1	3.30000		3.30000	3.30000	80/04	80/04
COD	LOWLEVEL	MG/L		4	23.0000	11.0151	34.0000	10.0000	79/10	80/04
PH		SU		5	7.75999	.577174	8.60000	7.20000	79/10	80/05
RESIDUE	DISS-105	C MG/L		3	307.666	19.8620	330.000	292.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		4	21.5000	5.74456	30.0000	18.0000	79/10	80/04
NH3+NH4-	N TOTAL	MG/L		5	1.47600	1.62317	4.26000	.300000	79/10	80/05
NO2-N	TOTAL	MG/L		4	.035000	.017321	.050000	.010000	79/10	80/05
NO3-N	TOTAL	MG/L		4	.770000	.242899	1.11000	.590000	79/10	80/05
TOT KJEL	N	MG/L		4	2.54500	1.84757	5.25000	1.11000	79/10	80/05
PHOS-TOT		MG/L P		4	.275000	.107238	.360000	.120000	79/10	80/05
CYANIDE	CN-TOT	MG/L		5	.114400	.163177	.400000	.010000	79/10	80/09
			K	5	.010000	.000000	.010000	.010000	80/07	80/09
			T	10	.062200	.121909	.400000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		3	166.667	22.0539	191.000	148.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		1	43.0000		43.0000	43.0000	79/11	79/11
FLUORIDE	F,DISS	MG/L		2	.510000	.197991	.650000	.370000	79/11	80/02
FLUORIDE	F,TOTAL	MG/L		1	.610000		.610000	.610000	80/05	80/05
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/11	80/05
COPPER	CU,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	33.3333	5.77355	40.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		3	2806.67	819.415	3700.00	2090.00	79/11	80/05

TABLE RD 1-123 (Continued)

STATION NUMBER 602290
41 10 52.0 080 47 21.0 2
MAHONING R. AT NILES S
OHIO RIVER 052191 (MAHONING RIVER)
(RIVER MILE 33.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		4	47.7500	36.9628	100.000	13.0000	79/10	80/05
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	1	100.000		100.000	100.000	80/05	80/05
			T	3	100.000	.000000	100.000	100.000	79/11	80/05
ZINC	ZN,TOT	UG/L		3	180.000	26.4575	210.000	160.000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		4	3392.50	3621.63	8700.00	570.000	79/10	80/04
FECSTREP	MF M-ENT	/100ML		4	1667.50	1183.31	3200.00	700.000	79/10	80/04
PHENOLS	TOTAL	UG/L		10	30.7000	47.6306	148.000	6.00000	79/10	80/09
MBAS		MG/L		4	.097500	.029861	.130000	.060000	79/10	80/05
RESIDUE	DISS-180	C MG/L		1	234.000		234.000	234.000	80/04	80/04
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	1	.500000		.500000	.500000	80/05	80/05
MERCURY	HG,TOTAL	UG/L	T	3	.500000	.000000	.500000	.500000	79/11	80/05

TABLE RD 1-124

STATION NUMBER 602300
41 02 10.0 080 32 10.0 2
MAHONING R. AT LOWELLVILLE
OHIO RIVER 050392 (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	15.0583	8.63107	25.5000	3.00000	78/10	79/09
STREAM	FLOW	CFS		12	2089.75	2041.72	6932.00	493.000	78/10	79/09
STREAM	STAGE	FEET		4	4.55750	2.15859	7.74000	3.10000	78/11	79/02
CNDUCTVY	FIELD	MICROMHO		12	463.000	188.080	748.000	230.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	350.000		350.000	350.000	79/04	79/04
DO		MG/L		12	8.44999	3.74178	14.3000	4.60000	78/10	79/09
COD	LOWLEVEL	MG/L		11	22.9273	13.9300	56.0000	3.00000	78/10	79/09
PH		SU		12	7.56666	.471629	8.50000	6.90000	78/10	79/09
LAB	PH	SU		1	7.40000		7.40000	7.40000	79/03	79/03
RESIDUE	TOTAL	MG/L		1	290.000		290.000	290.000	79/03	79/03
RESIDUE	DISS-105	C MG/L		8	323.125	60.6193	386.000	226.000	78/12	79/09
RESIDUE	TOT NFLT	MG/L		12	32.5833	39.5761	140.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	2.10500	1.08094	3.62000	.560000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.156666	.198097	.730000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.844166	.243701	1.13000	.320000	78/10	79/09
TOT KJEL	N	MG/L		12	2.93083	1.14287	4.70000	1.57000	78/10	79/09
PHOS-TOT		MG/L P		11	.474545	.206658	.790000	.250000	78/10	79/09
CYANIDE	CN-TOT	MG/L		12	.056667	.034728	.130000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		4	222.500	172.191	478.000	104.000	78/12	79/08
CHLORIDE	TOTAL	MG/L		1	43.0000		43.0000	43.0000	78/12	78/12
FLUORIDE	F,DISS	MG/L		12	.522500	.194101	.930000	.260000	78/10	79/09
CADMIUM	CD,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	78/12	78/12
CHROMIUM	CR,TOT	UG/L		4	42.5000	18.9297	70.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/12	79/08
IRON	FE,TOT	UG/L		12	4429.16	5176.51	20000.0	1300.00	78/10	79/09
LEAD	PB,TOT	UG/L		8	109.625	156.185	480.000	17.0000	78/10	79/09
MANGNESE	MN	UG/L		1	330.000		330.000	330.000	78/12	78/12
NICKEL	NI,TOTAL	UG/L		5	100.000	.000000	100.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		5	174.000	173.580	470.000	30.0000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		10	13510.0	5651.04	21000.0	5000.00	78/11	79/09
FECSTREP	MF M-ENT	/100ML		10	13340.0	16518.6	54000.0	1800.00	78/11	79/09
PHENOLS	TOTAL	UG/L		12	30.8333	33.2206	110.000	8.00000	78/10	79/09
MBAS		MG/L		4	.232500	.117863	.360000	.090000	79/01	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-125

STATION NUMBER 602300
41 02 10.0 080 32 10.0 2
MAHONING R. AT LOWELLVILLE
OHIO RIVER 050392 (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	9.18750	4.94207	18.0000	3.00000	79/10	80/05
STREAM	FLOW	CFS		5	1144.60	595.466	1904.00	352.000	79/10	80/03
STREAM	FLOW,	INST-CFS		2	2837.50	642.760	3292.00	2383.00	80/04	80/05
STREAM	STAGE	FEET		2	5.02500	.431318	5.33000	4.72000	80/04	80/05
CNDUCTVY	FIELD	MICROMHO		7	383.571	215.923	800.000	130.000	79/10	80/05
DO		MG/L		8	9.57499	2.54265	15.2000	7.00000	79/10	80/05
BOD	5 DAY	MG/L		2	9.95000	6.85894	14.8000	5.10000	80/03	80/04
COD	LOWLEVEL	MG/L		8	42.0250	23.2405	94.2000	22.0000	79/10	80/05
PH		SU		8	7.05000	.669769	8.10000	6.10000	79/10	80/05
RESIDUE	DISS-105	C MG/L		6	323.833	107.448	436.000	165.000	79/10	80/03
RESIDUE	TOT NFLT	MG/L		8	25.2500	13.5831	54.0000	12.0000	79/10	80/05
NH3+NH4-	N TOTAL	MG/L		8	2.53875	2.67148	6.77000	.310000	79/10	80/05
NO2-N	TOTAL	MG/L		8	.100000	.096806	.300000	.010000	79/10	80/05
NO3-N	TOTAL	MG/L		8	.895000	.153530	1.10000	.610000	79/10	80/05
TOT KJEL	N	MG/L		8	3.64499	3.16365	8.78000	1.13000	79/10	80/05
PHOS-TOT		MG/L P		8	1.57125	2.66692	8.10000	.270000	79/10	80/05
CYANIDE	CN-TOT	MG/L		13	.067308	.087147	.310000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		3	191.667	26.2750	222.000	176.000	79/11	80/05
CHLORIDE	TOTAL	MG/L		1	56.0000		56.0000	56.0000	79/11	79/11
FLUORIDE	F,DISS	MG/L		5	.577999	.243969	.880000	.340000	79/10	80/03
FLUORIDE	F,TOTAL	MG/L		1	.440000		.440000	.440000	80/05	80/05
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/04	80/04
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/05
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		8	3015.00	1392.56	5900.00	1350.00	79/10	80/05

TABLE RD 1-125 (Continued)

STATION NUMBER 602300
41 02 10.0 080 32 10.0 2
MAHONING R. AT LOWELLVILLE
OHIO RIVER 050392 (MAHONING RIVER)
MILES 0953.80 0955.50 021.80 011.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		6	26.0000	7.94984	37.0000	14.0000	79/11	80/05
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	1	100.000		100.000	100.000	80/05	80/05
			T	3	100.000	.000000	100.000	100.000	79/11	80/05
ZINC	ZN,TOT	UG/L		3	93.3333	35.1190	130.000	60.0000	79/11	80/05
FEC COLI	MFM-FCBR	/100ML		6	73166.6	47696.7	150000	33000.0	79/10	80/04
FECSTREP	MF M-ENT	/100ML		6	16216.7	8376.27	30000.0	8800.00	79/10	80/04
PHENOLS	TOTAL	UG/L		13	53.0769	67.2501	228.000	7.00000	79/10	80/09
MBAS		MG/L		4	.130000	.038297	.160000	.080000	79/11	80/05
RESIDUE	DISS-180	C MG/L		2	1284.00	1465.13	2320.00	248.000	80/04	80/05
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	1	.500000		.500000	.500000	80/05	80/05
			T	3	.500000	.000000	.500000	.500000	79/11	80/05

TABLE RD 1-126

STATION NUMBER 500140
41 11 56.0 084 44 40.0 2
MAUMEE R. AT ANTWERP
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0100.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	13.7500	8.47989	23.8000	2.00000	78/10	79/08
TURB	JKSN	JTU		2	77.5000	30.4056	99.0000	56.0000	79/07	79/08
CNDUCTVY	AT 25C	MICROMHO		11	761.091	166.543	1030.00	557.000	78/10	79/08
DO		MG/L		8	9.06250	1.87993	12.0000	6.50000	78/10	79/08
BOD	5 DAY	MG/L		8	3.06250	1.39892	5.00000	1.20000	78/12	79/07
			L	1	7.50000		7.50000	7.50000	78/11	78/11
			T	9	3.55555	1.97492	7.50000	1.20000	78/11	79/07
COD	LOWLEVEL	MG/L		11	23.7909	6.73781	33.5000	11.8000	78/10	79/08
LAB	PH	SU		11	7.95454	.284272	8.50000	7.60000	78/10	79/08
RESIDUE	DISS-105	C MG/L		11	457.454	110.112	620.000	313.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		11	65.0000	59.6674	198.000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		11	.386363	.578831	1.90000	.050000	78/10	79/08
NO2-N	TOTAL	MG/L		11	.055455	.029787	.110000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		11	4.68636	2.30080	8.24000	2.35000	78/10	79/08
TOT KJEL	N	MG/L		11	1.79909	.791034	3.10000	.500000	78/10	79/08
PHOS-TOT		MG/L P		10	.248000	.183957	.570000	.050000	78/10	79/08
PHOS-DIS		MG/L P		7	.174285	.114143	.340000	.050000	78/10	79/06
T ORG C	C	MG/L		7	19.4428	7.38512	32.0000	10.3000	78/10	79/06
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/03	79/05
TOT HARD	CACO3	MG/L		11	292.273	53.6399	372.000	215.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		11	48.0909	30.6120	102.000	9.00000	78/10	79/08
SULFATE	SO4-TOT	MG/L		10	103.700	30.5581	145.000	62.0000	78/10	79/08
FLUORIDE	F,DISS	MG/L		2	.450000	.183848	.580000	.320000	79/07	79/08
ARSENIC	AS,TOT	UG/L		9	10.0000	.000000	10.0000	10.0000	78/10	79/06
			K	2	105.000	134.350	200.000	10.0000	79/07	79/08
			T	11	27.2727	57.2872	200.000	10.0000	78/10	79/08
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	79/08	79/08
CADMIUM	CD,TOT	UG/L		10	5.00000	.000000	5.00000	5.00000	78/10	79/08
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	11	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	HEX-VAL	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/03
CHROMIUM	CR,TOT	UG/L		10	30.5000	1.58114	35.0000	30.0000	78/10	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	11	30.4545	1.50792	35.0000	30.0000	78/10	79/08

TABLE RD 1-126 (Continued)

STATION NUMBER 500140
41 11 56.0 084 44 40.0 2
MAUMEE R. AT ANTWERP
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0100.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		10	37.0000	10.5935	60.0000	30.0000	78/10	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	11	36.3636	10.2692	60.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		2	6300.00	3394.11	8700.00	3900.00	79/07	79/08
LEAD	PB,TOT	UG/L		11	12.7273	12.0838	48.0000	5.00000	78/10	79/08
ZINC	ZN,TOT	UG/L		11	35.4545	8.20206	50.0000	30.0000	78/10	79/08
ALUMINUM	AL,TOT	UG/L		2	2825.00	2015.25	4250.00	1400.00	79/07	79/08
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
ZIRCONUM	ZR-TOT	UG/L		1	40.0000		40.0000	40.0000	78/11	78/11
FEC COLI	MFM-FCBR	/100ML		9	5616.66	14112.9	43000.0	60.0000	78/11	79/08
FECSTREP	MF M-ENT	/100ML		7	11617.1	25908.4	70000.0	20.0000	78/11	79/06
PHENOLS	TOTAL	UG/L		7	6.42857	3.64496	10.0000	2.00000	78/10	79/06
MBAS		MG/L		6	.135000	.052440	.200000	.060000	79/03	79/08
PCBS	WHL SMPL	UG/L	K	3	.500000	.000000	.500000	.500000	78/10	79/02
MERCURY	HG,TOTAL	UG/L		10	.500000	.000000	.500000	.500000	78/10	79/08
			K	1	.500000		.500000	.500000	79/07	79/07
			T	11	.500000	.000000	.500000	.500000	78/10	79/08

TABLE RD 1-127

STATION NUMBER 500140
41 11 56.0 084 44 40.0 2
MAUMEE R. AT ANTWERP
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0100.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		6	18.3500	7.95583	25.0000	3.40000	80/03	80/09
TURB	JKSN	JTU		3	277.500	102.865	375.000	170.000	79/11	80/04
TURB	TRBIDMTR	HACH FTU		2	331.250	61.8718	375.000	287.500	80/03	80/04
CNDUCTVY	AT 25C	MICROMHO		4	640.250	375.171	1193.00	397.000	79/12	80/08
DO		MG/L		6	8.13333	2.33125	12.6000	6.00000	80/03	80/09
BOD	5 DAY	MG/L		9	4.19999	1.99688	8.00000	1.10000	79/10	80/09
COD	LOWLEVEL	MG/L		9	26.7555	10.0483	41.0000	13.2000	79/10	80/09
LAB	PH	SU		10	7.75599	.359790	8.40000	7.00000	79/10	80/09
T ALK	CACO3	MG/L		5	141.200	43.8032	214.000	97.0000	79/11	80/09
RESIDUE	DISS-105	C MG/L		6	427.333	83.4721	560.000	344.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		10	131.160	110.870	363.000	12.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		10	.404000	.520170	1.77000	.050000	79/10	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	11	.371818	.504887	1.77000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.105000	.087464	.220000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		10	4.35099	2.10404	8.22000	1.33000	79/10	80/09
TOT KJEL	N	MG/L		10	1.53100	.833125	3.50000	.780000	79/10	80/09
PHOS-TOT		MG/L P		10	.417800	.196771	.800000	.210000	79/10	80/09
T ORG C	C	MG/L		5	18.8000	9.44461	31.0000	11.0000	80/03	80/09
TOT HARD	CACO3	MG/L		10	271.400	63.1743	377.000	176.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		10	36.3000	14.2288	70.0000	23.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		10	75.8000	21.3948	119.000	52.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		3	.503333	.205508	.740000	.370000	79/10	79/12
FLUORIDE	F,TOTAL	MG/L		3	.306667	.005767	.310000	.300000	80/03	80/05
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	79/12
			K	7	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	10	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	79/12
			K	6	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	9	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/06
CHROMIUM	CR,TOT	UG/L		6	31.6667	4.08264	40.0000	30.0000	79/10	80/08
			K	4	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	10	31.0000	3.16228	40.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	79/10	80/04
			K	6	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	10	31.0000	3.16228	40.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		10	6492.00	5636.44	17500.0	590.000	79/10	80/09
LEAD	PB,TOT	UG/L		10	13.7000	18.3185	65.0000	5.00000	79/10	80/09

TABLE RD 1-127 (Continued)

STATION NUMBER 500140
41 11 56.0 084 44 40.0 2
MAUMEE R. AT ANTWERP
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0100.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MANGNESE	MN	UG/L		10	123.000	49.8999	220.000	40.0000	79/10	80/09
ZINC	ZN,TOT	UG/L		8	48.7500	30.4432	120.000	30.0000	79/10	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/07
			T	10	45.0000	27.9881	120.000	30.0000	79/10	80/09
ANTIMONY	SB,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/04	80/04
ALUMINUM	AL,TOT	UG/L		10	3920.00	4733.98	16000.0	300.000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		8	2525.00	5060.12	15000.0	40.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	2.50000	.707107	3.00000	2.00000	79/12	80/03
MBAS		MG/L		10	.103000	.020576	.140000	.070000	79/10	80/09
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/05	80/05
RESIDUE	DISS-180	C MG/L		3	373.333	40.2174	418.000	340.000	80/06	80/09
MERCURY	HG,TOTAL	UG/L		3	2.40000	3.11929	6.00000	.500000	79/10	79/12
			K	7	.500000	.000000	.500000	.500000	80/03	80/09
			T	10	1.07000	1.73336	6.00000	.500000	79/10	80/09

TABLE RD 1-128

STATION NUMBER 500180
41 16 43.0 084 23 07.0 2
MAUMEE RIVER AT DEFIANCE - WTP INTAKE
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 065.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-129

STATION NUMBER 510210
41 19 14.0 084 12 00.0 2
MAUMEE R AT FLORIDA-CO. RD. 18
LAKE ERIE 060190(MAUMEE RIVER BASIN)
MILES 054.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-130

STATION NUMBER 500080
41 30 00.0 083 42 46.0 2
MAUMEE RIVER AT WATERVILLE - SR 64
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0020.40

No data were collected from 10/78 - 9/80.

TABLE RD 1-131

STATION NUMBER 510240
40 34 15.0 084 12 15.0 2
AUGLAIZE R. AT WAPAKONETA
LAKE ERIE (MAUMEE RIVER)
MILES 0063.80 0074.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	7.43333	9.54690	18.2000	.000000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	823.666	57.4717	890.000	789.000	78/12	79/06
DO		MG/L		2	8.30000	1.13143	9.10000	7.50000	78/12	79/06
BOD	5 DAY	MG/L		3	2.30000	.700001	3.00000	1.60000	78/12	79/06
COD	LOWLEVEL	MG/L		1	11.9000		11.9000	11.9000	79/06	79/06
LAB	PH	SU		3	8.10000	.200364	8.30000	7.90000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	488.000		488.000	488.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	10.6667	1.15477	12.0000	10.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	.133333	.047258	.170000	.080000	78/12	79/06
NO2-N	TOTAL	MG/L		3	.046667	.035119	.080000	.010000	78/12	79/06
NO3-N	TOTAL	MG/L		3	3.71667	1.03582	4.91000	3.05000	78/12	79/06
TOT KJEL	N	MG/L		3	.900000	.360555	1.20000	.500000	78/12	79/06
PHOS-TOT		MG/L P		3	.106667	.072342	.190000	.060000	78/12	79/06
TOT HARD	CACO3	MG/L		3	374.666	20.5312	392.000	352.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	530.000		530.000	530.000	79/06	79/06
LEAD	PB,TOT	UG/L		3	9.00000	2.64575	11.0000	6.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		2	5700.00	2687.01	7600.00	3800.00	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-132

STATION NUMBER 510240
40 34 15.0 084 12 15.0 2
AUGLAIZE R. AT WAPAKONETA
LAKE ERIE (MAUMEE RIVER)
MILES 0063.80 0074.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.3000		19.3000	19.3000	80/09	80/09
DO		MG/L		1	5.40000		5.40000	5.40000	80/09	80/09
BOD	5 DAY	MG/L		1	3.90000		3.90000	3.90000	80/09	80/09
COD	LOWLEVEL	MG/L		1	54.2000		54.2000	54.2000	80/04	80/04
LAB	PH	SU		2	8.13000	.016106	8.14000	8.12000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	462.000		462.000	462.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	38.0000		38.0000	38.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	24.0000	19.7990	38.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.016000		.016000	.016000	80/09	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	2	.033000	.024042	.050000	.016000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.015000	.007071	.020000	.010000	80/04	80/09
NO3-N	TOTAL	MG/L		2	1.55500	1.42128	2.56000	.550000	80/04	80/09
TOT KJEL	N	MG/L		2	.470000	.296985	.680000	.260000	80/04	80/09
PHOS-TOT		MG/L P		2	.102000	.080610	.159000	.045000	80/04	80/09
TOT HARD	CACO3	MG/L		2	374.500	31.8198	397.000	352.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		1	50.0000		50.0000	50.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	40.0000	14.1421	50.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1405.00	1378.86	2380.00	430.000	80/04	80/09
LEAD	PB,TOT	UG/L		1	7.00000		7.00000	7.00000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	8.50000	2.12132	10.0000	7.00000	80/04	80/09
MANGNESE	MN	UG/L		1	120.000		120.000	120.000	80/09	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/04	80/04
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		1	1200.00		1200.00	1200.00	80/09	80/09
FEC COLI	MFM-FCBR	/100ML		1	900.000		900.000	900.000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	464.000		464.000	464.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-133

STATION NUMBER 510250
40 34 15.0 084 14 25.0 2
AUGLAIZE R AT WAPAKONETA
LAKE ERIE (MAUMEE RIVER)
MILES 0063.80 0070.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	8.93333	9.33614	19.5000	1.80000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	934.333	67.6831	999.000	864.000	78/12	79/06
DO		MG/L		2	9.35000	3.04057	11.5000	7.20000	78/12	79/06
BOD	5 DAY	MG/L		3	4.23333	.208171	4.40000	4.00000	78/12	79/06
COD	LOWLEVEL	MG/L		1	15.9000		15.9000	15.9000	79/06	79/06
LAB	PH	SU		3	8.06666	.153417	8.20000	7.90000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	582.000		582.000	582.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	13.6667	4.04147	18.0000	10.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	.483333	.087371	.580000	.410000	78/12	79/06
NO2-N	TOTAL	MG/L		3	.096667	.061101	.150000	.030000	78/12	79/06
NO3-N	TOTAL	MG/L		3	3.21333	.997514	4.31000	2.36000	78/12	79/06
TOT KJEL	N	MG/L		3	1.16667	.850491	1.80000	.200000	78/12	79/06
PHOS-TOT		MG/L P		3	1.06000	.150997	1.22000	.920000	78/12	79/06
TOT HARD	CACO3	MG/L		3	372.333	21.9645	386.000	347.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	550.000		550.000	550.000	79/06	79/06
LEAD	PB,TOT	UG/L		3	5.66667	1.15472	7.00000	5.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	266.666	208.167	500.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		1	4300.00		4300.00	4300.00	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-134

STATION NUMBER 510250
40 34 15.0 084 14 25.0 2
AUGLAIZE R AT WAPAKONETA
LAKE ERIE (MAUMEE RIVER)
MILES 0063.80 0070.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	20.5000		20.5000	20.5000	80/09	80/09
DO		MG/L		1	4.00000		4.00000	4.00000	80/09	80/09
BOD	5 DAY	MG/L		1	6.80000		6.80000	6.80000	80/09	80/09
COD	LOWLEVEL	MG/L		2	40.9500	10.2530	48.2000	33.7000	80/04	80/09
LAB	PH	SU		2	8.12499	.079288	8.18000	8.07000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	468.000		468.000	468.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	39.0000		39.0000	39.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	24.5000	20.5061	39.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		2	.395000	.431335	.700000	.090000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.155000	.091924	.220000	.090000	80/04	80/09
NO3-N	TOTAL	MG/L		2	1.55500	1.35057	2.51000	.600000	80/04	80/09
TOT KJEL	N	MG/L		2	1.03500	.982880	1.73000	.340000	80/04	80/09
PHOS-TOT		MG/L P		2	.892499	.717714	1.40000	.385000	80/04	80/09
TOT HARD	CACO3	MG/L		2	350.000	8.48528	356.000	344.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		1	60.0000		60.0000	60.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	45.0000	21.2132	60.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1160.00	1032.38	1890.00	430.000	80/04	80/09
LEAD	PB,TOT	UG/L		1	7.00000		7.00000	7.00000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	8.50000	2.12132	10.0000	7.00000	80/04	80/09
MANGNESE	MN	UG/L		1	190.000		190.000	190.000	80/09	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	80/04	80/04
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		1	1200.00		1200.00	1200.00	80/09	80/09
FEC COLI	MFM-FCBR	/100ML		1	530.000		530.000	530.000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	612.000		612.000	612.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-135

STATION NUMBER 500070
40 56 55.0 084 15 58.0 2
AUGLAIZE R BELOW FT. JENNINGS - SR 224
LAKE ERIE 060190 (MAUMEE RIVER BASIN)
MILES 0063.80 0039.50

No data were collected from 10/78 - 9/80.

TABLE RD 1-136

STATION NUMBER 500110
41 01 15.0 084 17 20.0 2
AUGLAIZE RIVER AT CLOVERDALE - SR 114
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0028510

No data were collected from 10/78 - 9/80.

TABLE RD 1-137

STATION NUMBER 500130
41 05 32.0 084 22 55.0 2
AUGLAIZE RIVER AT OAKWOOD - SR 66
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0016.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-138

STATION NUMBER 500290
41 15 13.0 084 23 33.0 2
AUGLAIZE R. AB DEFIANCE
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0004.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	13.6625	7.84728	23.2000	2.80000	78/10	79/08
TURB	JKSN	JTU		2	66.5000	23.3345	83.0000	50.0000	79/07	79/08
CNDUCTVY	AT 25C	MICROMHO		9	831.666	219.373	1120.00	520.000	78/10	79/08
DO		MG/L		8	9.94999	1.82367	12.3000	8.10000	78/10	79/08
BOD	5 DAY	MG/L		8	4.43749	3.18746	11.1000	1.50000	78/10	79/07
COD	LOWLEVEL	MG/L		9	21.3444	9.61292	35.0000	9.80000	78/10	79/08
LAB	PH	SU		9	8.28888	.404632	9.00000	7.80000	78/10	79/08
RESIDUE	DISS-105	C MG/L		9	509.333	150.145	718.000	337.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		9	43.2222	25.7866	100.000	21.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		9	.167778	.098333	.320000	.050000	78/10	79/08
NO2-N	TOTAL	MG/L		9	.081111	.050607	.140000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		9	6.17555	5.77049	15.1000	.210000	78/10	79/08
TOT KJEL	N	MG/L		8	1.57625	.995101	3.20000	.600000	78/10	79/07
PHOS-TOT		MG/L P		9	.247777	.197090	.650000	.080000	78/10	79/08
PHOS-DIS		MG/L P		5	.228000	.200300	.520000	.050000	78/10	79/06
T ORG C	C	MG/L		6	21.1500	11.2018	41.0000	8.70000	78/10	79/06
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/03	79/04
TOT HARD	CACO3	MG/L		9	310.444	51.2919	362.000	211.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		9	57.8889	42.7740	117.000	11.0000	78/10	79/08
SULFATE	SO4-TOT	MG/L		8	152.125	75.2907	251.000	81.0000	78/10	79/08
FLUORIDE	F,DISS	MG/L		2	.390000	.212132	.540000	.240000	79/07	79/08
ARSENIC	AS,TOT	UG/L		8	10.6250	4.17261	20.0000	5.00000	78/10	79/08
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	9	10.5556	3.90868	20.0000	5.00000	78/10	79/08
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	79/08	79/08
CADMIUM	CD,TOT	UG/L		8	5.00000	.000000	5.00000	5.00000	78/10	79/08
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	9	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/03	79/03
CHROMIUM	CR,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/10	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/10	79/06
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	8	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		2	3410.00	1400.07	4400.00	2420.00	79/07	79/08
LEAD	PB,TOT	UG/L		8	22.1250	29.0243	91.0000	5.00000	78/10	79/07
MANGNESE	MN	UG/L		1	60.0000		60.0000	60.0000	79/08	79/08
ZINC	ZN,TOT	UG/L		8	31.2500	3.53553	40.0000	30.0000	78/10	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	31.1111	3.33359	40.0000	30.0000	78/10	79/08

TABLE RD 1-138 (Continued)

STATION NUMBER 500290
41 15 13.0 084 23 33.0 2
AUGLAIZE R. AB DEFIANCE
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0004.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ALUMINUM	AL,TOT	UG/L		2	1800.00	989.949	2500.00	1100.00	79/07	79/08
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/08	79/08
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	2	5.00000	.000000	5.00000	5.00000	79/07	79/08
FEC COLI	MFM-FCBR	/100ML		8	337.625	500.810	1200.00	1.00000	78/10	79/08
FECSTREP	MF M-ENT	/100ML		5	386.000	423.356	970.000	10.0000	78/11	79/06
PHENOLS	TOTAL	UG/L		4	5.00000	2.16025	7.00000	2.00000	79/03	79/08
MBAS		MG/L		7	.154286	.061606	.250000	.070000	78/10	79/08
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/04	79/04
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
PCBS	WHL SMPL	UG/L	K	3	.500000	.000000	.500000	.500000	78/10	79/04
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
MERCURY	HG,TOTAL	UG/L		8	.500000	.000000	.500000	.500000	78/10	79/08
			K	1	.500000		.500000	.500000	79/07	79/07
			T	9	.500000	.000000	.500000	.500000	78/10	79/08

TABLE RD 1-139

STATION NUMBER 500290
41 15 13.0 084 23 33.0 2
AUGLAIZE R. AB DEFIANCE
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0004.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		6	18.2667	7.68288	24.0000	3.50000	80/03	80/09
TURB	JKSN	JTU		3	222.500	112.444	350.000	137.500	79/11	80/04
TURB	TRBIDMTR	HACH FTU		2	243.750	150.260	350.000	137.500	80/03	80/04
CNDUCTVY	AT 25C	MICROMHO		4	597.250	186.559	869.000	451.000	79/12	80/08
DO		MG/L		6	8.48333	2.60801	13.6000	6.60000	80/03	80/09
BOD	5 DAY	MG/L		9	3.43333	1.59766	6.00000	1.50000	79/10	80/09
COD	LOWLEVEL	MG/L		9	22.1111	24.9592	86.0000	5.20000	79/10	80/09
LAB	PH	SU		10	7.78099	.425046	8.70000	7.00000	79/10	80/09
T ALK	CACO3	MG/L		5	123.400	19.3601	139.000	96.0000	79/11	80/09
RESIDUE	DISS-105	C MG/L		7	456.428	77.9882	584.000	360.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		10	97.7400	110.593	400.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		9	.294444	.168458	.510000	.050000	79/10	80/09
			K	1	.050000		.050000	.050000	80/06	80/06
			T	10	.270000	.176636	.510000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.116000	.074715	.260000	.030000	79/10	80/09
NO3-N	TOTAL	MG/L		10	5.75599	3.80834	12.9000	1.42000	79/10	80/09
TOT KJEL	N	MG/L		10	1.18900	.328346	1.82000	.820000	79/10	80/09
PHOS-TOT		MG/L P		10	.389999	.268494	1.09000	.210000	79/10	80/09
T ORG C	C	MG/L		5	16.0000	8.42615	29.0000	9.00000	80/03	80/09
CYANIDE	CN-TOT	MG/L		2	.180000	.240416	.350000	.010000	79/11	80/05
TOT HARD	CACO3	MG/L		10	272.000	64.9324	378.000	200.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		9	38.4444	18.0701	78.0000	24.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		10	95.5000	37.7749	185.000	63.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		3	.490000	.251595	.780000	.330000	79/10	79/12
FLUORIDE	F,TOTAL	MG/L		3	13.2067	22.3377	39.0000	.310000	80/03	80/05
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	79/12
			K	7	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	10	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	79/12
			K	7	5.71428	1.88983	10.0000	5.00000	80/03	80/09
			T	10	5.50000	1.58114	10.0000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	30.0000	.000000	30.0000	30.0000	79/12	80/04
CHROMIUM	CR,TOT	UG/L		6	31.6667	4.08264	40.0000	30.0000	79/10	80/08
			K	4	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	10	31.0000	3.16228	40.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/10	80/05
			K	6	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	10	32.0000	6.32456	50.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		10	5740.00	5284.30	18000.0	540.000	79/10	80/09

TABLE RD 1-139 (Continued)

STATION NUMBER 500290
41 15 13.0 084 23 33.0 2
AUGLAIZE R. AB DEFIANCE
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0004.10

PARAMETER			RMK	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		7	10.0000	5.00000	17.0000	5.00000	79/10	80/09
			K	3	5.00000	.000000	5.00000	5.00000	80/06	80/08
			T	10	8.50000	4.74342	17.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		10	81.0000	44.0832	170.000	30.0000	79/10	80/09
ZINC	ZN,TOT	UG/L		7	37.1428	11.1271	60.0000	30.0000	79/10	80/09
			K	3	30.0000	.000000	30.0000	30.0000	80/06	80/08
			T	10	35.0000	9.71825	60.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		10	3420.00	3110.48	9700.00	300.000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		9	592.333	860.957	2800.00	1.00000	79/10	80/09
PHENOLS	TOTAL	UG/L		2	4.00000	2.82843	6.00000	2.00000	79/11	79/12
MBAS		MG/L		10	.131000	.042805	.210000	.080000	79/10	80/09
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/05	80/05
			K	1	.500000		.500000	.500000	80/04	80/04
			T	2	.250000	.353553	.500000	.000000	80/04	80/05
RESIDUE	DISS-180	C MG/L		2	307.000	21.2132	322.000	292.000	80/08	80/09
MERCURY	HG,TOTAL	UG/L		2	3.75000	4.59619	7.00000	.500000	79/10	79/11
			K	7	.500000	.000000	.500000	.500000	80/03	80/09
			T	9	1.22222	2.16667	7.00000	.500000	79/10	80/09

TABLE RD 1-140

STATION NUMBER 500040
41 03 21.0 083 41 17.0 2
BLANCHARD R. BL FINDLAY
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 053.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	15.4667	8.11157	26.0000	4.90000	78/10	79/09
TURB	JKSN	JTU		2	55.5000	2.12132	57.0000	54.0000	79/07	79/09
CNDUCTVY	AT 25C	MICROMHO		12	860.083	228.736	1350.00	581.000	78/10	79/09
DO		MG/L		9	7.82222	2.94354	12.4000	4.80000	78/10	79/09
BOD	5 DAY	MG/L		9	5.02222	2.07894	8.00000	2.00000	78/11	79/09
			L	1	5.70000		5.70000	5.70000	78/10	78/10
			T	10	5.09000	1.97172	8.00000	2.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	25.6916	8.40841	42.0000	12.0000	78/10	79/09
LAB	PH	SU		12	7.71666	.220870	8.30000	7.40000	78/10	79/09
T ALK	CACO3	MG/L		2	160.000	7.07107	165.000	155.000	79/05	79/09
RESIDUE	DISS-105	C MG/L		12	489.583	130.370	802.000	322.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	37.2500	35.4173	111.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	3.41499	4.00165	9.90000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		13	.313846	.559278	2.13000	.040000	78/10	79/09
NO3-N	TOTAL	MG/L		13	3.99923	2.93713	8.93000	.150000	78/10	79/09
TOT KJEL	N	MG/L		13	4.83153	3.83023	10.8000	.470000	78/10	79/09
T PO4	PO4	MG/L		1	.580000		.580000	.580000	78/12	78/12
PHOS-TOT		MG/L P		12	1.62582	2.48544	7.91000	.050000	78/10	79/09
PHOS-DIS		MG/L P		6	1.13667	1.67563	4.37000	.050000	78/10	79/06
T ORG C	C	MG/L		8	17.9250	8.37170	35.0000	9.80000	78/10	79/06
INVALID	PAR	NUMBER	K	1	.500000		.500000	.500000	79/07	79/07
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	79/03	79/09
			K	1	.010000		.010000	.010000	79/07	79/07
			T	5	.010000	.000000	.010000	.010000	79/03	79/09
TOT HARD	CACO3	MG/L		13	301.846	57.3062	396.000	228.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		13	48.7692	42.6012	155.000	11.0000	78/10	79/09
SULFATE	SO4-TOT	MG/L		7	110.286	25.3558	142.000	67.0000	79/04	79/09
FLUORIDE	F,DISS	MG/L		3	.486666	.109699	.550000	.360000	79/07	79/09
SILICA	DISOLVED	MG/L		4	3.33750	1.73179	4.98000	.900000	79/05	79/09
ARSENIC	AS,TOT	UG/L		11	10.9091	3.01512	20.0000	10.0000	78/10	79/09
			K	2	10.0000	.000000	10.0000	10.0000	79/07	79/07
			T	13	10.7692	2.77351	20.0000	10.0000	78/10	79/09
CADMIUM	CD,TOT	UG/L		11	5.00000	.000000	5.00000	5.00000	78/10	79/09
			K	2	5.00000	.000000	5.00000	5.00000	79/07	79/07
			T	13	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/03	79/03
CHROMIUM	CR,TOT	UG/L		11	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07
			T	13	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		10	30.0000	.000000	30.0000	30.0000	78/10	79/07
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07

TABLE RD 1-140 (Continued)

STATION NUMBER 500040
41 03 21.0 083 41 17.0 2
BLANCHARD R. BL FINDLAY
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 053.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	T	12	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		3	3666.67	461.892	4200.00	3400.00	79/07	79/07
IRON	FE,DISS	UG/L		2	130.000	.000000	130.000	130.000	79/07	79/07
LEAD	PB,TOT	UG/L		11	10.3636	6.34465	24.0000	5.00000	78/10	79/07
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	12	9.91667	6.24439	24.0000	5.00000	78/10	79/07
MANGNESE	MN	UG/L		2	80.0000	.000000	80.0000	80.0000	79/07	79/07
MANGNESE	MN,DISS	UG/L		1	50.0000		50.0000	50.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		7	100.000	.000000	100.000	100.000	78/10	79/06
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/05	79/05
ZINC	ZN,TOT	UG/L		12	33.3333	6.51348	50.0000	30.0000	78/10	79/09
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	13	33.0769	6.30432	50.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		5	1360.00	669.328	1900.00	200.000	79/05	79/09
SELENIUM	SE,TOT	UG/L		3	37.0000	54.5619	100.000	5.00000	79/05	79/09
			K	2	7.50000	3.53553	10.0000	5.00000	79/07	79/07
			T	5	25.2000	41.8653	100.000	5.00000	79/05	79/09
FEC COLI	MFM-FCBR	/100ML		8	1428.75	1953.15	5700.00	30.0000	78/10	79/09
			L	1	20000.0		20000.0	20000.0	79/07	79/07
			T	9	3492.22	6454.39	20000.0	30.0000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		5	17028.0	33664.0	77000.0	20.0000	78/12	79/06
PHENOLS	TOTAL	UG/L		6	6.16667	1.94080	10.0000	5.00000	79/03	79/07
MBAS		MG/L		13	.256153	.086270	.430000	.140000	78/10	79/09
ALDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
GAMMABHC	LINDANE	TOT.UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06

TABLE RD 1-140 (Continued)

STATION NUMBER 500040
41 03 21.0 083 41 17.0 2
BLANCHARD R. BL FINDLAY
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 053.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHLRDANE	TECH&MET	TOT UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
DDD	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
DDE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
DDT	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
DIELDRIN		TOTUG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
ENDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
HEPTCHLR		TOTUG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
HPCHLREP		TOTUG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
MTHXYCLR	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
PCBS	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
			K	2	.500000	.000000	.500000	.500000	78/10	78/12
			T	5	.200000	.273861	.500000	.000000	78/10	79/06
MALATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
PARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
MPARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
LINDANE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	79/04	79/06
MERCURY	HG,TOTAL	UG/L		12	.500000	.000000	.500000	.500000	78/10	79/09
			K	1	.500000		.500000	.500000	79/07	79/07
			T	13	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-141

STATION NUMBER 500040
41 03 21.0 083 41 17.0 2
BLANCHARD R. BL FINDLAY
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 053.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		6	16.8500	9.44326	24.0000	3.30000	80/03	80/09
TURB	JKSN	JTU		2	172.750	196.929	312.000	33.5000	80/03	80/04
TURB	TRBIDMTR	HACH FTU		2	172.750	196.929	312.000	33.5000	80/03	80/04
CNDUCTVY	AT 25C	MICROMHO		3	526.333	86.5590	611.000	438.000	80/03	80/08
DO	PROBE	MG/L		1	7.00000		7.00000	7.00000	80/08	80/08
DO		MG/L		5	8.77999	3.00533	12.2000	4.40000	80/03	80/09
BOD	5 DAY	MG/L		7	4.78571	3.10293	11.2000	2.60000	80/03	80/09
COD	LOWLEVEL	MG/L		6	24.3166	5.91389	32.9000	17.2000	80/03	80/09
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	7	21.4143	9.38677	32.9000	4.00000	80/03	80/09
LAB	PH	SU		7	7.62857	.326882	8.08000	7.20000	80/03	80/09
T ALK	CACO3	MG/L		2	117.000	32.5269	140.000	94.0000	80/03	80/08
RESIDUE	DISS-105	C MG/L		5	406.600	81.6881	504.000	298.000	80/03	80/07
RESIDUE	TOT NFLT	MG/L		6	97.0500	116.324	323.000	10.0000	80/03	80/09
NH3+NH4-	N TOTAL	MG/L		7	1.36143	1.54358	3.50000	.060000	79/10	80/09
NO2-N	TOTAL	MG/L		8	.091250	.072789	.220000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		8	3.75125	2.62663	7.29000	.730000	79/10	80/09
TOT KJEL	N	MG/L		8	2.07000	1.66875	5.29000	.570000	79/10	80/09
PHOS-TOT		MG/L P		8	.399500	.177830	.650000	.160000	79/10	80/09
T ORG C	C	MG/L		4	14.2500	11.5866	30.0000	3.00000	80/03	80/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/10	79/10
TOT HARD	CACO3	MG/L		8	296.875	60.2790	375.000	198.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		8	33.5000	7.57816	42.0000	24.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		8	118.125	35.4902	165.000	65.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		1	.760000		.760000	.760000	79/10	79/10
FLUORIDE	F,TOTAL	MG/L		3	.520000	.236433	.790000	.350000	80/03	80/05
SILICA	DISOLVED	MG/L		1	3.27000		3.27000	3.27000	79/10	79/10
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/10	79/10
			K	7	11.4286	3.77965	20.0000	10.0000	80/03	80/09
			T	8	11.2500	3.53553	20.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
			K	7	5.71428	1.88983	10.0000	5.00000	80/03	80/09
			T	8	5.62500	1.76777	10.0000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/09
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	8	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
			K	7	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	8	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		8	3707.50	4641.30	14500.0	730.000	79/10	80/09
LEAD	PB,TOT	UG/L		7	7.00000	3.41565	12.0000	5.00000	79/10	80/09

TABLE RD 1-141 (Continued)

STATION NUMBER 500040
41 03 21.0 083 41 17.0 2
BLANCHARD R. BL FINDLAY
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 053.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L	K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	8	6.75000	3.24037	12.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		8	110.000	38.5450	160.000	50.0000	79/10	80/09
MANGNESE	MN,DISS	UG/L		1	70.0000		70.0000	70.0000	79/10	79/10
ZINC	ZN,TOT	UG/L		4	37.5000	9.57427	50.0000	30.0000	79/10	80/08
			K	4	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	8	33.7500	7.44024	50.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		8	2037.50	2550.60	8100.00	400.000	79/10	80/09
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
			K	1	5.00000		5.00000	5.00000	80/03	80/03
			T	2	5.00000	.000000	5.00000	5.00000	79/10	80/03
FEC COLI	MFM-FCBR	/100ML		7	2258.57	2062.25	5600.00	140.000	79/10	80/09
PHENOLS	TOTAL	UG/L		4	9.00000	7.61577	20.0000	3.00000	79/10	80/07
			K	1	2.00000		2.00000	2.00000	80/04	80/04
			T	5	7.60000	7.30069	20.0000	2.00000	79/10	80/07
MBAS		MG/L		7	.128571	.031847	.180000	.080000	79/10	80/09
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/07	80/07
			K	1	.500000		.500000	.500000	80/05	80/05
			T	2	.250000	.353553	.500000	.000000	80/05	80/07
RESIDUE	DISS-180 C	MG/L		2	445.500	88.3883	508.000	383.000	80/08	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10
			K	7	.500000	.000000	.500000	.500000	80/03	80/09
			T	8	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-142

STATION NUMBER 500090
41 05 14.0 084 16 12.0 2
BLANCHARD RIVER ABOVE DUPONT - CO RD 21-14
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0026.20 002.50

No data were collected from 10/78 - 9/80.

TABLE RD 1-143

STATION NUMBER 510200
41 05 32.0 084 24 28.0 2
L AUGLAIZE R BL MELROSE
LAKE ERIE (MAUMEE RIVER)
(RIVER MILE 2.0)

No data were collected from 10/78 - 9/80.

TABLE RD 1-144

STATION NUMBER 500270
40 45 56.0 084 00 47.0 2
OTTAWA RIVER ABOVE LIMA - THAYER RD
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0033.20 043.90

No data were collected from 10/78 - 9/80.

TABLE RD 1-145

STATION NUMBER 500050
40 45 18.0 084 11 41.0 2
OTTAWA R. AT ALLENTOWN
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0033.20 028.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	14.9286	7.28005	24.6000	4.10000	78/10	79/07
TURB	JKSN	JTU		1	4.00000		4.00000	4.00000	79/07	79/07
CNDUCTVY	AT 25C	MICROMHO		10	1323.60	379.920	1830.00	646.000	78/10	79/07
DO		MG/L		7	8.02857	2.97418	12.0000	3.80000	78/10	79/07
BOD	5 DAY	MG/L		10	8.01000	5.26486	18.8000	2.70000	78/10	79/07
COD	LOWLEVEL	MG/L		10	30.7499	11.9206	51.0000	11.8000	78/10	79/07
LAB	PH	SU		10	7.73999	.320471	8.10000	7.20000	78/10	79/07
RESIDUE	DISS-105	C MG/L		10	819.800	258.230	1140.00	363.000	78/10	79/07
RESIDUE	TOT NFLT	MG/L		9	30.0000	58.5064	186.000	10.0000	78/10	79/06
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	10	28.0000	55.5218	186.000	10.0000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		10	3.37299	4.12187	13.4000	.060000	78/10	79/07
NO2-N	TOTAL	MG/L		10	.362000	.293212	1.09000	.050000	78/10	79/07
NO3-N	TOTAL	MG/L		10	5.99599	2.16647	9.60000	3.09000	78/10	79/07
TOT KJEL	N	MG/L		10	6.40399	5.68930	19.6000	1.34000	78/10	79/07
PHOS-TOT		MG/L P		10	.564000	.464332	1.59000	.110000	78/10	79/07
PHOS-DIS		MG/L P		6	.368333	.337011	1.00000	.100000	78/10	79/06
T ORG C	C	MG/L		7	24.4714	18.1185	65.0000	12.5000	78/10	79/06
CYANIDE	CN-TOT	MG/L		7	.035714	.026992	.090000	.010000	78/10	79/06
TOT HARD	CACO3	MG/L		10	392.500	72.7744	466.000	234.000	78/10	79/07
CHLORIDE	TOTAL	MG/L		10	123.100	78.8296	238.000	13.0000	78/10	79/07
SULFATE	SO4-TOT	MG/L		5	253.200	139.860	470.000	100.000	78/11	79/07
FLUORIDE	F,DISS	MG/L		1	.800000		.800000	.800000	79/07	79/07
SILICA	DISOLVED	MG/L		1	5.14000		5.14000	5.14000	79/05	79/05
ARSENIC	AS,TOT	UG/L		9	11.1111	3.33334	20.0000	10.0000	78/10	79/06
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	10	11.0000	3.16228	20.0000	10.0000	78/10	79/07
CADMIUM	CD,TOT	UG/L		9	5.00000	.000000	5.00000	5.00000	78/10	79/06
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	10	5.00000	.000000	5.00000	5.00000	78/10	79/07
CHROMIUM	HEX-VAL	UG/L		9	34.7778	14.3334	73.0000	30.0000	78/10	79/06
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	10	34.3000	13.5978	73.0000	30.0000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		9	38.8889	16.9149	80.0000	30.0000	78/10	79/06
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	10	38.0000	16.1933	80.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/11	79/06
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/11	79/07
IRON	FE,TOT	UG/L		1	140.000		140.000	140.000	79/07	79/07
LEAD	PB,TOT	UG/L		10	10.0000	4.85340	19.0000	5.00000	78/10	79/07

TABLE RD 1-145 (Continued)

STATION NUMBER 500050
40 45 18.0 084 11 41.0 2
OTTAWA R. AT ALLENTOWN
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0033.20 028.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ZINC	ZN,TOT	UG/L		9	66.6667	41.8330	170.000	30.0000	78/10	79/06
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	10	63.0000	41.1096	170.000	30.0000	78/10	79/07
ALUMINUM	AL,TOT	UG/L	K	1	200.000		200.000	200.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		8	2837.50	4428.71	13000.0	60.0000	78/10	79/06
FECSTREP	MF M-ENT	/100ML		5	420.000	362.215	880.000	80.0000	78/11	79/06
PHENOLS	TOTAL	UG/L		6	8.33333	3.82971	14.0000	2.00000	78/10	79/06
MBAS		MG/L		9	.349999	.152235	.560000	.170000	78/10	79/07
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/04	79/04
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/04	79/04
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/04	79/04
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
			K	2	.500000	.000000	.500000	.500000	78/10	78/12
			T	3	.333333	.288675	.500000	.000000	78/10	79/04
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/04	79/04
MERCURY	HG,TOTAL	UG/L		9	.500000	.000000	.500000	.500000	78/10	79/06
			K	1	.500000		.500000	.500000	79/07	79/07
			T	10	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-146

STATION NUMBER 500050
40 45 18.0 084 11 41.0 2
OTTAWA R. AT ALLENTOWN
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0033.20 028.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	17.2857	8.77733	25.8000	3.40000	79/12	80/09
TURB	JKSN	JTU		3	98.0000	52.5738	158.000	60.0000	79/11	80/04
TURB	TRBIDMTR	HACH FTU		2	109.000	69.2965	158.000	60.0000	80/03	80/04
CNDUCTVY	AT 25C	MICROMHO		3	856.000	363.340	1260.00	556.000	80/03	80/08
DO		MG/L		7	7.21428	2.67795	12.0000	4.20000	79/12	80/09
BOD	5 DAY	MG/L		8	5.05000	1.55840	6.80000	2.80000	79/10	80/09
COD	LOWLEVEL	MG/L		7	34.9928	38.7939	118.000	2.00000	79/10	80/08
LAB	PH	SU		8	7.61500	.337814	8.04000	6.96000	79/11	80/09
T ALK	CACO3	MG/L		5	135.400	28.1924	174.000	104.000	79/11	80/09
RESIDUE	DISS-105	C MG/L		6	614.833	266.351	962.000	246.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		8	55.7375	86.3865	259.000	3.40000	79/10	80/08
			K	2	10.0000	.000000	10.0000	10.0000	80/06	80/09
			T	10	46.5900	78.5886	259.000	3.40000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		9	1.42111	2.06012	6.74000	.100000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.474444	.393894	1.07000	.040000	79/10	80/09
NO3-N	TOTAL	MG/L		9	6.52777	2.63270	12.8000	3.66000	79/10	80/09
TOT KJEL	N	MG/L		9	2.81444	1.78128	7.10000	1.10000	79/10	80/09
PHOS-TOT		MG/L P		9	.535666	.181782	.759000	.270000	79/10	80/09
T ORG C	C	MG/L		6	14.6667	5.46505	23.0000	8.00000	79/11	80/09
CYANIDE	CN-TOT	MG/L		4	.033750	.030923	.080000	.015000	79/10	80/05
			K	1	.010000		.010000	.010000	80/03	80/03
			T	5	.029000	.028810	.080000	.010000	79/10	80/05
TOT HARD	CACO3	MG/L		10	359.200	72.6452	432.000	228.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		9	111.000	52.8204	208.000	34.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		10	222.900	102.706	400.000	82.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		3	.753333	.448368	1.23000	.340000	79/10	79/12
FLUORIDE	F,TOTAL	MG/L		2	.395000	.063639	.440000	.350000	80/03	80/04
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	79/12
			K	7	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	10	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	79/10	79/12
			K	7	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	10	5.50000	1.58114	10.0000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/12
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/06
CHROMIUM	CR,TOT	UG/L		7	41.4286	14.6386	60.0000	30.0000	79/10	80/09
			K	3	30.0000	.000000	30.0000	30.0000	80/04	80/06
			T	10	38.0000	13.1656	60.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		5	30.0000	.000000	30.0000	30.0000	79/10	80/05
			K	5	30.0000	.000000	30.0000	30.0000	80/03	80/09

TABLE RD 1-146 (Continued)

STATION NUMBER 500050
40 45 18.0 084 11 41.0 2
OTTAWA R. AT ALLENTOWN
LAKE ERIE 060191 (MAUMEE RIVER BASIN)
MILES 0063.80 0033.20 028.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	T	10	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		10	1772.00	2672.88	8200.00	130.000	79/10	80/09
LEAD	PB,TOT	UG/L		7	9.57143	4.03556	16.0000	5.00000	79/10	80/09
			K	3	6.66667	2.88676	10.0000	5.00000	80/06	80/08
			T	10	8.70000	3.83116	16.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		8	86.2500	35.4310	160.000	40.0000	79/10	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
ZINC	ZN,TOT	UG/L		7	34.2857	7.86801	50.0000	30.0000	79/10	80/08
			K	3	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	10	33.0000	6.74948	50.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		7	1328.57	1661.04	4700.00	200.000	79/10	80/07
			K	2	200.000	.000000	200.000	200.000	80/08	80/09
			T	9	1077.78	1522.15	4700.00	200.000	79/10	80/09
SELENIUM	SE,TOT	UG/L		1	10.0000		10.0000	10.0000	79/12	79/12
			K	1	5.00000		5.00000	5.00000	80/03	80/03
			T	2	7.50000	3.53553	10.0000	5.00000	79/12	80/03
FEC COLI	MFM-FCBR	/100ML		8	2585.00	4277.57	13000.0	80.0000	79/10	80/09
			L	1	10000.0		10000.0	10000.0	79/11	79/11
			T	9	3408.89	4703.14	13000.0	80.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		7	6.71428	2.62770	10.0000	3.00000	79/10	80/07
MBAS		MG/L		10	.234000	.066867	.310000	.150000	79/10	80/09
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/12	79/12
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/12	79/12
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/12	79/12
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/12	79/12
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/12	79/12
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/12	79/12
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/12	79/12
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
PCBS	WHL SMPL	UG/L	K	2	.500000	.000000	.500000	.500000	79/12	80/04
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/12	79/12
RESIDUE	DISS-180	C MG/L		3	762.333	143.544	928.000	675.000	80/06	80/09
MERCURY	HG,TOTAL	UG/L		1	8.00000		8.00000	8.00000	79/10	79/10
			K	7	.500000	.000000	.500000	.500000	80/03	80/09
			T	8	1.43750	2.65165	8.00000	.500000	79/10	80/09

TABLE RD 1-147

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE RIVER AT WOODVILLE - U.S. 20
LAKE ERIE 060492 (MAUMEE RIVER BASIN)
MILES 28.20

No data were collected from 10/78 - 9/80.

TABLE RD 1-148

STATION NUMBER 510180
41 26 17.0 084 44 57.0 2
ST JOSEPH RIVER BELOW EDGERTON - SR 49
LAKE ERIE (MAUMEE RIVER)
(RIVER MILE 8.9)

No data were collected from 10/78 - 9/80.

TABLE RD 1-149

STATION NUMBER 510010
40 32 07.0 084 22 38.0 2
ST. MARY'S R. AT ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 47.2)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	11.4500	10.0035	23.1000	2.10000	78/12	79/08
CNDUCTVY	AT 25C	MICROMHO		4	902.250	68.6561	944.000	800.000	78/12	79/08
DO		MG/L		3	7.90000	2.86881	11.2000	6.00000	78/12	79/08
BOD	5 DAY	MG/L		4	1.82500	.713559	2.70000	1.00000	78/12	79/08
COD	LOWLEVEL	MG/L		2	20.8500	9.97022	27.9000	13.8000	79/06	79/08
LAB	PH	SU		4	7.95000	.191619	8.10000	7.70000	78/12	79/08
RESIDUE	DISS-105	C MG/L		2	543.000	80.6102	600.000	486.000	79/06	79/08
RESIDUE	TOT NFLT	MG/L		4	29.5000	30.8167	75.0000	10.0000	78/12	79/08
NH3+NH4-	N TOTAL	MG/L		3	.230000	.251197	.520000	.080000	78/12	79/06
			K	1	.050000		.050000	.050000	79/08	79/08
			T	4	.185000	.223979	.520000	.050000	78/12	79/08
NO2-N	TOTAL	MG/L		4	.085000	.064550	.150000	.020000	78/12	79/08
NO3-N	TOTAL	MG/L		4	4.54750	3.38253	9.07000	1.07000	78/12	79/08
TOT KJEL	N	MG/L		4	1.29250	.839977	2.30000	.600000	78/12	79/08
PHOS-TOT		MG/L P		4	.215000	.174069	.470000	.090000	78/12	79/08
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	79/08	79/08
TOT HARD	CACO3	MG/L		4	398.750	46.7217	453.000	347.000	78/12	79/08
FLUORIDE	F,DISS	MG/L		1	.320000		.320000	.320000	79/08	79/08
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/06	79/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
			K	1	5.00000		5.00000	5.00000	79/08	79/08
			T	4	5.00000	.000000	5.00000	5.00000	78/12	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/08	79/08
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/08

TABLE RD 1-149 (Continued)

STATION NUMBER 510010
40 32 07.0 084 22 38.0 2
ST. MARY'S R. AT ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 47.2)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/08	79/08
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/08
IRON	FE,TOT	UG/L		2	1865.00	1322.29	2800.00	930.000	79/06	79/08
IRON	FE,DISS	UG/L		1	110.000		110.000	110.000	79/08	79/08
LEAD	PB,TOT	UG/L		3	8.00000	2.64575	10.0000	5.00000	78/12	79/06
			K	1	5.00000		5.00000	5.00000	79/08	79/08
			T	4	7.25000	2.62996	10.0000	5.00000	78/12	79/08
MANGNESE	MN	UG/L		1	90.0000		90.0000	90.0000	79/08	79/08
MANGNESE	MN,DISS	UG/L		1	40.0000		40.0000	40.0000	79/08	79/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/08	79/08
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/08
ALUMINUM	AL,TOT	UG/L		1	1100.00		1100.00	1100.00	79/08	79/08
SELENIUM	SE,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/08	79/08
FEC COLI	MFM-FCBR	/100ML		3	2796.67	2132.85	5100.00	890.000	78/12	79/08
FECSTREP	MF M-ENT	/100ML		1	1970.00		1970.00	1970.00	79/06	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06
			K	1	.500000		.500000	.500000	79/08	79/08
			T	4	.500000	.000000	.500000	.500000	78/12	79/08

TABLE RD 1-150

STATION NUMBER 510010
40 32 07.0 084 22 38.0 2
ST. MARY'S R. AT ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 47.2)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	18.8000		18.8000	18.8000	80/09	80/09
DO		MG/L		1	5.80000		5.80000	5.80000	80/09	80/09
BOD	5 DAY	MG/L		1	3.10000		3.10000	3.10000	80/09	80/09
COD	LOWLEVEL	MG/L		2	52.4000	10.7480	60.0000	44.8000	80/04	80/09
LAB	PH	SU		2	8.12499	.107120	8.20000	8.05000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	508.000		508.000	508.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	14.0000		14.0000	14.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	12.0000	2.82843	14.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.012000		.012000	.012000	80/09	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	2	.031000	.026870	.050000	.012000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.025000	.007071	.030000	.020000	80/04	80/09
NO3-N	TOTAL	MG/L		2	1.09000	1.15966	1.91000	.270000	80/04	80/09
TOT KJEL	N	MG/L		2	.789999	.692965	1.28000	.300000	80/04	80/09
PHOS-TOT		MG/L P		2	.149500	.126572	.239000	.060000	80/04	80/09
TOT HARD	CACO3	MG/L		2	337.000	69.2965	386.000	288.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		1	40.0000		40.0000	40.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	35.0000	7.07107	40.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1015.00	714.178	1520.00	510.000	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	170.000	155.563	280.000	60.0000	80/04	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/04	80/04
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	500.000	424.264	800.000	200.000	80/04	80/09
RESIDUE	DISS-180	C MG/L		1	440.000		440.000	440.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-151

STATION NUMBER 510020
40 34 56.0 084 23 32.0 2
ST. MARY'S BELOW ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 43.0)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.2000	11.0227	24.0000	.800000	78/12	79/08
CNDUCTVY	AT 25C	MICROMHO		4	843.000	67.4734	935.000	790.000	78/12	79/08
DO		MG/L		3	6.70000	2.85833	10.0000	5.00000	78/12	79/08
BOD	5 DAY	MG/L		4	3.82500	.895824	4.60000	3.00000	78/12	79/08
COD	LOWLEVEL	MG/L		2	26.8000	7.21252	31.9000	21.7000	79/06	79/08
LAB	PH	SU		4	7.84999	.129497	8.00000	7.70000	78/12	79/08
RESIDUE	DISS-105	C MG/L		2	530.000	62.2254	574.000	486.000	79/06	79/08
RESIDUE	TOT NFLT	MG/L		4	41.0000	39.6737	97.0000	10.0000	78/12	79/08
NH3+NH4-	N TOTAL	MG/L		3	.563333	.326242	.940000	.370000	78/12	79/06
			K	1	.050000		.050000	.050000	79/08	79/08
			T	4	.434999	.369910	.940000	.050000	78/12	79/08
NO2-N	TOTAL	MG/L		4	.127500	.075000	.210000	.050000	78/12	79/08
NO3-N	TOTAL	MG/L		4	4.33500	2.17829	7.17000	2.03000	78/12	79/08
TOT KJEL	N	MG/L		4	1.64250	.462487	2.10000	1.00000	78/12	79/08
PHOS-TOT		MG/L P		4	1.62250	1.80184	4.20000	.370000	78/12	79/08
INVALID	PAR	NUMBER	K	1	.500000		.500000	.500000	79/08	79/08
CYANIDE	CN-TOT	MG/L	K	1	.010000		.010000	.010000	79/08	79/08
TOT HARD	CACO3	MG/L		4	345.000	35.1093	390.000	312.000	78/12	79/08
FLUORIDE	F,DISS	MG/L		1	.350000		.350000	.350000	79/08	79/08
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
			K	1	10.0000		10.0000	10.0000	79/08	79/08
			T	2	10.0000	.000000	10.0000	10.0000	79/06	79/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
			K	1	5.00000		5.00000	5.00000	79/08	79/08
			T	4	5.00000	.000000	5.00000	5.00000	78/12	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/08	79/08
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/08

TABLE RD 1-151 (Continued)

STATION NUMBER 510020
40 34 56.0 084 23 32.0 2
ST. MARY'S BELOW ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 43.0)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/08	79/08
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/08
IRON	FE,TOT	UG/L		2	2540.00	1357.64	3500.00	1580.00	79/06	79/08
IRON	FE,DISS	UG/L		1	80.0000		80.0000	80.0000	79/08	79/08
LEAD	PB,TOT	UG/L		4	7.75000	2.50000	11.0000	5.00000	78/12	79/08
MANGNESE	MN	UG/L		1	110.000		110.000	110.000	79/08	79/08
MANGNESE	MN,DISS	UG/L		1	50.0000		50.0000	50.0000	79/08	79/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/08
ALUMINUM	AL,TOT	UG/L		1	1400.00		1400.00	1400.00	79/08	79/08
SELENIUM	SE,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/08	79/08
FEC COLI	MFM-FCBR	/100ML		3	1693.33	1319.14	2600.00	180.000	78/12	79/08
FECSTREP	MF M-ENT	/100ML		1	440.000		440.000	440.000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/08

TABLE RD 1-152

STATION NUMBER 510020
40 34 56.0 084 23 32.0 2
ST. MARY'S BELOW ST. MARY'S
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 43.0)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.8000		19.8000	19.8000	80/09	80/09
DO		MG/L		1	4.10000		4.10000	4.10000	80/09	80/09
BOD	5 DAY	MG/L		1	5.80000		5.80000	5.80000	80/09	80/09
COD	LOWLEVEL	MG/L		2	44.5500	10.1117	51.7000	37.4000	80/04	80/09
LAB	PH	SU		2	8.02000	.085314	8.08000	7.96000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	538.000		538.000	538.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	14.5000	.707107	15.0000	14.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		2	2.12500	2.08597	3.60000	.650000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.220000	.169705	.340000	.100000	80/04	80/09
NO3-N	TOTAL	MG/L		2	2.49000	.579827	2.90000	2.08000	80/04	80/09
TOT KJEL	N	MG/L		2	2.99000	2.81428	4.98000	1.00000	80/04	80/09
PHOS-TOT		MG/L P		2	1.37500	1.02531	2.10000	.650000	80/04	80/09
TOT HARD	CACO3	MG/L		2	334.500	58.6899	376.000	293.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		1	50.0000		50.0000	50.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	40.0000	14.1421	50.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1330.00	735.391	1850.00	810.000	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	7.50000	3.53553	10.0000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	185.000	134.350	280.000	90.0000	80/04	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/04	80/04
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	650.000	494.975	1000.00	300.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		1	100.000		100.000	100.000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	564.000		564.000	564.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-153

STATION NUMBER 510170
40 44 58.0 084 47 25.0 2
ST. MARY'S R. AT WILLSHIRE - SR 81
LAKE ERIE 060191 (MAUMEE RIVER)
(RIVER MILE 1.3)

No data were collected from 10/78 - 9/80.

TABLE RD 1-154

STATION NUMBER 500160
41 17 25.0 084 23 08.0 2
TIFFIN RIVER ABOVE DEFIANCE - WEST HIGH ST
LAKE ERIE (MAUMEE RIVER)
MILES 0065.50 0000.80

No data were collected from 10/78 - 9/80.

TABLE RD 1-155

STATION NUMBER 600440
39 21 43.0 084 29 47.0 2
MILL CREEK NEAR HAMILTON
OHIO RIVER (210HIO 760506 05090203000 IRM)
MILES 0953.80 0508.50 024.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.2250	9.09886	25.0000	.000000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	737.416	112.719	850.000	441.000	78/10	79/09
DO		MG/L		12	9.70833	2.33296	12.8000	6.20000	78/10	79/09
COD	LOWLEVEL	MG/L		12	11.3333	7.66733	28.0000	4.00000	78/10	79/09
PH		SU		5	7.74000	.241051	8.00000	7.50000	78/11	79/09
LAB	PH	SU		7	7.99999	.216224	8.40000	7.80000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		11	53.1818	78.3579	251.000	10.0000	78/11	79/09
NH3+NH4-	N TOTAL	MG/L		12	.191666	.196646	.770000	.050000	78/10	79/09
NO3-N	TOTAL	MG/L		12	2.13000	1.09028	4.90000	.710000	78/10	79/09
TOT KJEL	N	MG/L		12	.788333	.577846	2.05000	.400000	78/10	79/09
PHOS-TOT		MG/L P		12	.632499	.520439	1.94000	.190000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/06
TOT HARD	CACO3	MG/L		3	338.666	16.2635	357.000	326.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	.303333	.075055	.390000	.260000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		2	555.000	63.6396	600.000	510.000	78/12	79/03
LEAD	PB,TOT	UG/L		3	9.66667	6.35087	17.0000	6.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		12	1379.33	3374.66	12000.0	20.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		3	3.66667	2.08167	6.00000	2.00000	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-156

STATION NUMBER 600440
39 21 43.0 084 29 47.0 2
MILL CREEK NEAR HAMILTON
OHIO RIVER (MILL CREEK)
MILES 0953.80 0508.50 024.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	11.4000	4.80834	14.8000	8.00000	79/10	79/11
CNDUCTVY	AT 25C	MICROMHO		2	776.000	4.24264	779.000	773.000	79/10	79/11
DO		MG/L		2	11.8000	.282981	12.0000	11.6000	79/10	79/11
COD	LOWLEVEL	MG/L		2	28.5000	23.3345	45.0000	12.0000	79/10	79/11
PH		SU		1	7.90000		7.90000	7.90000	79/10	79/10
LAB	PH	SU		1	7.90000		7.90000	7.90000	79/11	79/11
RESIDUE	TOT NFLT	MG/L		2	17.5000	10.6066	25.0000	10.0000	79/10	79/11
NH3+NH4-	N TOTAL	MG/L		2	.050000	.000061	.050000	.050000	79/10	79/11
NO3-N	TOTAL	MG/L		2	1.76500	.162632	1.88000	1.65000	79/10	79/11
TOT KJEL	N	MG/L		2	.345000	.106066	.420000	.270000	79/10	79/11
PHOS-TOT		MG/L P		2	.555000	.063642	.600000	.510000	79/10	79/11
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/10	79/10
TOT HARD	CACO3	MG/L		1	383.000		383.000	383.000	79/10	79/10
FLUORIDE	F,DISS	MG/L		1	.250000		.250000	.250000	79/10	79/10
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
IRON	FE,TOT	UG/L		1	1030.00		1030.00	1030.00	79/10	79/10
LEAD	PB,TOT	UG/L		1	5.00000		5.00000	5.00000	79/10	79/10
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/10	79/10
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
FEC COLI	MFM-FCBR	/100ML		1	640.000		640.000	640.000	79/10	79/10
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/10	79/10
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/10	79/10

TABLE RD 1-157

STATION NUMBER 600410
39 12 07.0 084 26 16.0 2
MILL CREEK AT CARTHAGE
OHIO RIVER 051191 (MILL CREEK)
MILES 0953.80 0508.50 011.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.5000	9.06040	25.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	793.250	777.517	1871.00	24.0000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	740.416	335.681	1650.00	411.000	78/10	79/09
DO		MG/L		12	9.84999	2.52678	13.3000	6.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	21.2500	16.8368	60.0000	4.00000	78/10	79/09
PH		SU		5	7.92000	.216788	8.20000	7.70000	78/11	79/09
LAB	PH	SU		7	7.90000	.182552	8.20000	7.70000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	70.4167	109.348	386.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.980833	1.97185	7.12000	.140000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.30500	.405359	2.15000	.750000	78/10	79/09
TOT KJEL	N	MG/L		12	1.86917	1.87601	7.58000	.500000	78/10	79/09
PHOS-TOT		MG/L P		12	.378333	.149474	.630000	.110000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/12	79/06
TOT HARD	CACO3	MG/L		3	253.000	90.3161	326.000	152.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	.286667	.070238	.360000	.220000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		2	3960.00	3167.84	6200.00	1720.00	78/12	79/03
LEAD	PB,TOT	UG/L		3	15.0000	9.16515	23.0000	5.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		10	21170.9	59434.3	190000	28.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		3	14.3333	2.30944	17.0000	13.0000	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-158

STATION NUMBER 600410
39 12 07.0 084 26 16.0 2
MILL CREEK AT CARTHAGE
OHIO RIVER 051191 (MILL CREEK)
MILES 0953.80 0508.50 011.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	13.3636	7.03240	23.0000	2.00000	79/10	80/09
STREAM	FLOW	CFS		4	101.575	83.6316	226.000	47.1000	79/10	80/01
STREAM	FLOW,	INST-CFS		5	347.340	586.889	1393.00	35.9000	80/05	80/09
CNDUCTVY	AT 25C	MICROMHO		12	695.666	295.663	1330.00	253.000	79/10	80/09
DO		MG/L		10	9.43000	2.30124	12.0000	5.40000	79/10	80/09
COD	LOWLEVEL	MG/L		12	27.0833	18.0124	75.0000	8.00000	79/10	80/09
PH		SU		4	7.80000	.294518	8.10000	7.40000	79/10	80/07
LAB	PH	SU		8	7.83749	.226505	8.30000	7.50000	79/11	80/09
RESIDUE	TOT NFLT	MG/L		10	191.500	441.063	1425.00	10.0000	79/10	80/09
			K	2	10.0000	.000000	10.0000	10.0000	80/04	80/05
			T	12	161.250	405.164	1425.00	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	1.05500	2.28633	8.13000	.070000	79/10	80/09
NO2-N	TOTAL	MG/L		1	1.03000		1.03000	1.03000	80/06	80/06
NO3-N	TOTAL	MG/L		11	.932727	.371270	1.60000	.520000	79/10	80/09
TOT KJEL	N	MG/L		12	1.82666	2.26558	8.57000	.500000	79/10	80/09
PHOS-TOT		MG/L P		12	.511500	.632227	2.51000	.240000	79/10	80/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/10	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	5	.010000	.000000	.010000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		5	256.600	76.2260	351.000	177.000	79/10	80/09
FLUORIDE	F,DISS	MG/L		3	.326667	.085049	.410000	.240000	79/10	80/03
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	2	7.50000	3.53553	10.0000	5.00000	80/06	80/09
			T	5	6.00000	2.23607	10.0000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09

TABLE RD 1-158 (Continued)

STATION NUMBER 600410
39 12 07.0 084 26 16.0 2
MILL CREEK AT CARTHAGE
OHIO RIVER 051191 (MILL CREEK)
MILES 0953.80 0508.50 011.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		5	1350.00	1101.14	2910.00	320.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	8.20000	3.83407	14.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	5	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	79/10	80/09
			K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	5	32.0000	4.47214	40.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		11	20809.1	21565.8	63000.0	1300.00	79/10	80/09
PHENOLS	TOTAL	UG/L		5	16.0000	26.4291	63.0000	2.00000	79/10	80/09
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/10	80/03
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/06	80/09
			T	5	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-159

STATION NUMBER 600430
39 06 10.0 084 32 00.0 2
MILL CREEK AT CINCINNATI
OHIO RIVER 051191 (MILL CREEK)
MILES 0953.80 0508.50 000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	14.8333	7.35568	25.0000	4.00000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		12	885.333	365.344	1760.00	514.000	78/10	79/09
DO		MG/L		12	3.07500	2.90709	9.20000	.000000	78/10	79/09
COD	LOWLEVEL	MG/L		12	95.5000	89.5154	349.000	25.0000	78/10	79/09
PH		SU		5	7.48000	.342148	7.90000	7.20000	78/11	79/09
LAB	PH	SU		7	7.25714	.299264	7.70000	6.90000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		11	74.0909	52.8573	168.000	12.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	4.50083	2.56058	9.06000	1.00000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.955833	.599825	2.10000	.050000	78/10	79/09
TOT KJEL	N	MG/L		12	10.0542	7.28851	28.3000	2.80000	78/10	79/09
PHOS-TOT		MG/L P		12	1.98166	2.09852	7.15000	.360000	78/10	79/09
CYANIDE	CN-TOT	MG/L		3	.040000	.043589	.090000	.010000	78/12	79/06
TOT HARD	CACO3	MG/L		3	268.666	83.5013	352.000	185.000	78/12	79/06
FLUORIDE	F,DISS	MG/L		3	.430000	.117901	.530000	.300000	78/12	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	96.6667	28.8678	130.000	80.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	60.0000	10.0000	70.0000	50.0000	78/12	79/06
IRON	FE,TOT	UG/L		2	3060.00	3026.42	5200.00	920.000	78/12	79/03
LEAD	PB,TOT	UG/L		2	94.0000	25.4558	112.000	76.0000	78/12	79/03
NICKEL	NI,TOTAL	UG/L		3	133.333	57.7352	200.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	106.667	30.5508	140.000	80.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		9	414003	740121	1900000	30.0000	78/12	79/09
PHENOLS	TOTAL	UG/L		3	129.000	102.103	209.000	14.0000	78/12	79/06
MBAS		MG/L		1	1.38000		1.38000	1.38000	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-160

STATION NUMBER 600430
39 06 10.0 084 32 00.0 2
MILL CREEK AT CINCINNATI
OHIO RIVER 051191 (MILL CREEK)
MILES 0953.80 0508.50 000.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	14.4167	7.12101	23.0000	2.00000	79/10	80/09
CNDUCTVY	AT 25C	MICROMHO		12	759.250	287.859	1180.00	273.000	79/10	80/09
DO		MG/L		11	5.00000	4.42561	11.2000	.000000	79/10	80/09
COD	LOWLEVEL	MG/L		12	35.8333	17.7756	68.0000	15.0000	79/10	80/09
PH		SU		4	7.40000	.316278	7.70000	7.00000	79/10	80/07
LAB	PH	SU		8	7.57500	.183267	7.80000	7.20000	79/11	80/09
RESIDUE	TOT NFLT	MG/L		10	206.200	595.226	1900.00	10.0000	79/10	80/08
			K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	12	173.500	543.791	1900.00	10.0000	79/10	80/09
OIL-GRSE	TOT-SXLT	MG/L		1	37.0000		37.0000	37.0000	79/11	79/11
NH3+NH4-	N TOTAL	MG/L		12	3.28416	2.56786	7.79000	.190000	79/10	80/09
NO3-N	TOTAL	MG/L		12	.832500	.322211	1.46000	.280000	79/10	80/09
TOT KJEL	N	MG/L		12	4.75082	2.85177	9.86000	.720000	79/10	80/09
PHOS-TOT		MG/L P		12	.854083	.935627	3.72000	.140000	79/10	80/09
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/10	80/03
			K	2	.010000	.000000	.010000	.010000	80/06	80/09
			T	5	.010000	.000000	.010000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		5	248.400	88.5372	367.000	125.000	79/10	80/09
FLUORIDE	F,DISS	MG/L		3	.300000	.124900	.440000	.200000	79/10	80/03
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	2	30.0000	.000000	30.0000	30.0000	80/06	80/09
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		5	1202.00	557.064	2140.00	710.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	15.2000	7.59606	28.0000	9.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/03
			K	2	100.000	.000000	100.000	100.000	80/06	80/09
			T	5	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		5	36.0000	8.94427	50.0000	30.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		5	131600	105690	310000	45000.0	79/10	80/07
PHENOLS	TOTAL	UG/L		5	15.4000	5.77062	21.0000	7.00000	79/10	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/03
			K	2	.500000	.000000	.500000	.500000	80/06	80/09
			T	4	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-161

STATION NUMBER 611740
40 14 02.0 081 52 16.0 2
MUSKINGUM R BL COSHOCTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 107.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	11.0455	8.17452	20.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		8	10558.7	6480.60	19300.0	1907.00	78/11	79/06
CNDUCTVY	FIELD	MICROMHO		3	591.666	203.369	820.000	430.000	78/10	79/05
CNDUCTVY	AT 25C	MICROMHO		9	663.889	238.873	933.000	298.000	78/11	79/09
DO		MG/L		10	9.00000	1.83547	11.8000	6.20000	78/10	79/09
BOD	5 DAY	MG/L		2	4.25000	3.88909	7.00000	1.50000	78/11	79/02
COD	LOWLEVEL	MG/L		12	12.7500	7.03401	29.0000	4.00000	78/10	79/09
PH		SU		9	7.45555	.390898	8.00000	6.80000	78/10	79/09
LAB	PH	SU		3	7.76000	.504837	8.10000	7.18000	78/11	79/08
T ALK	CACO3	MG/L		5	111.000	34.9500	137.000	51.0000	78/11	79/08
RESIDUE	TOTAL	MG/L		3	520.000	63.0238	582.000	456.000	78/11	79/05
RESIDUE	DISS-105	C MG/L		4	452.000	47.6305	503.000	408.000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		12	55.2500	58.0566	216.000	4.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.162500	.193397	.710000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		11	.020000	.008944	.030000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.67250	.417615	2.56000	1.21000	78/10	79/09
TOT KJEL	N	MG/L		11	.754545	.136849	.900000	.500000	78/10	79/09
			K	1	.050000		.050000	.050000	79/05	79/05
			T	12	.695833	.241641	.900000	.050000	78/10	79/09
PHOS-TOT		MG/L P		12	.138333	.097219	.370000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		4	282.500	38.9059	326.000	241.000	78/11	79/08
CHLORIDE	TOTAL	MG/L		11	55.0909	44.0329	153.000	9.00000	78/10	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		4	1645.00	1139.28	3300.00	700.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	10.5000	6.85565	20.0000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		4	420.000	148.549	630.000	280.000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	50.0000	40.0000	110.000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		6	3616.67	2164.64	7600.00	1800.00	78/11	79/09
			L	6	2013.33	1201.11	3300.00	800.000	78/10	79/08
			T	12	2815.00	1867.27	7600.00	800.000	78/10	79/09
PHENOLS	TOTAL	UG/L		11	6.72727	4.45176	17.0000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-162

STATION NUMBER 611740
40 14 02.0 081 52 16.0 2
MUSKINGUM R BL COSHOCTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 107.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	11.2273	8.01675	21.5000	.000000	79/10	80/09
STREAM	FLOW	CFS		2	5115.50	2420.43	6827.00	3404.00	79/11	80/02
STREAM	FLOW,	INST-CFS		3	13582.3	4406.29	16430.0	8507.00	80/04	80/06
STREAM	STAGE	FEET		6	9.88833	2.40118	13.4500	7.46000	79/12	80/09
CNDUCTVY	FIELD	MICROMHO		1	380.000		380.000	380.000	79/12	79/12
CNDUCTVY	AT 25C	MICROMHO		11	564.091	150.749	712.000	333.000	79/10	80/09
SAMPLE	TREAT-	MENT		1	.000000		.000000	.000000	80/09	80/09
DO		MG/L		11	9.53181	2.11311	13.1000	7.05000	79/10	80/09
COD	LOWLEVEL	MG/L		12	20.8333	12.7553	43.0000	4.00000	79/10	80/09
PH		SU		6	7.92499	.553045	8.95000	7.30000	79/10	80/08
LAB	PH	SU		7	7.68571	.107120	7.90000	7.60000	79/12	80/09
T ALK	CACO3	MG/L		7	101.357	66.0712	224.000	6.50000	79/10	80/08
RESIDUE	DISS-105	C MG/L		1	307.000		307.000	307.000	80/02	80/02
RESIDUE	TOT NFLT	MG/L		12	86.3333	73.7136	226.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		9	.262222	.398333	1.29000	.050000	79/10	80/09
			K	3	.050000	.000075	.050000	.050000	80/06	80/08
			T	12	.209166	.352999	1.29000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		11	.035455	.020181	.070000	.010000	79/10	80/08
			K	1	.010000		.010000	.010000	80/09	80/09
			T	12	.033333	.020597	.070000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	1.60333	.416253	2.12000	.890000	79/10	80/09
TOT KJEL	N	MG/L		12	.995833	1.18777	4.43000	.130000	79/10	80/09
PHOS-TOT		MG/L P		11	.194000	.088082	.306000	.080000	79/10	80/09
TOT HARD	CACO3	MG/L		7	204.000	58.3352	274.000	130.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		10	43.9000	18.7821	75.0000	23.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	4875.00	3655.48	8800.00	700.000	79/11	80/08

TABLE RD 1-162 (Continued)

STATION NUMBER 611740
40 14 02.0 081 52 16.0 2
MUSKINGUM R BL COSHOCTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 107.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		3	9.00000	1.00000	10.0000	8.00000	79/11	80/05
			K	1	25.0000		25.0000	25.0000	80/08	80/08
			T	4	13.0000	8.04156	25.0000	8.00000	79/11	80/08
MANGNESE	MN	UG/L		3	433.333	193.993	560.000	210.000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
			K	1	100.000		100.000	100.000	80/08	80/08
NICKEL	NI,TOTAL	UG/L	T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	37.5000	9.57427	50.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		3	1766.67	1379.61	2800.00	200.000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		10	3240.00	2638.27	8400.00	1100.00	79/10	80/09
			L	2	1115.00	544.472	1500.00	730.000	79/11	80/03
			T	12	2885.83	2531.02	8400.00	730.000	79/10	80/09
PHENOLS	TOTAL	UG/L		12	5.00000	2.55841	10.0000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		1	257.000		257.000	257.000	80/06	80/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/11	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-163

STATION NUMBER 611750
40 07 14.0 082 00 00.0 2
MUSKINGUM R IN DRESDEN - SR 208
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 091.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.2083	8.15882	21.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		9	10742.9	9431.44	25630.0	2252.00	78/10	79/06
CNDUCTVY	FIELD	MICROMHO		5	575.600	238.416	913.000	310.000	78/10	79/05
CNDUCTVY	AT 25C	MICROMHO		9	687.444	221.510	1020.00	308.000	78/11	79/09
DO		MG/L		10	9.13999	1.66815	11.8000	6.70000	78/10	79/09
BOD	5 DAY	MG/L		2	4.25000	3.88909	7.00000	1.50000	78/11	79/02
COD	LOWLEVEL	MG/L		12	16.9167	11.9123	44.0000	4.00000	78/10	79/09
PH		SU		11	7.55454	.297860	8.10000	7.20000	78/10	79/09
LAB	PH	SU		1	8.00000		8.00000	8.00000	78/11	78/11
T ALK	CACO3	MG/L		4	120.000	16.7531	132.000	96.0000	78/11	79/08
RESIDUE	TOTAL	MG/L		3	626.333	177.501	804.000	449.000	78/11	79/05
RESIDUE	DISS-105	C MG/L		4	534.000	191.786	800.000	372.000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		12	77.0000	87.7341	317.000	4.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.150833	.147861	.500000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.018333	.009374	.030000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.50750	.389369	2.30000	.930000	78/10	79/09
TOT KJEL	N	MG/L		11	.818181	.466516	2.00000	.100000	78/11	79/09
PHOS-TOT		MG/L P		11	.204545	.186407	.640000	.050000	78/10	79/09
PHOS-DIS		MG/L P		1	.050000		.050000	.050000	79/05	79/05
TOT HARD	CACO3	MG/L		4	271.750	42.2719	312.000	218.000	78/11	79/08
CHLORIDE	TOTAL	MG/L		12	52.5000	45.1271	158.000	5.00000	78/10	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		4	1717.50	1028.99	3200.00	860.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	9.25000	2.62996	12.0000	7.00000	78/11	79/08
MANGNESE	MN	UG/L		4	397.500	175.570	660.000	290.000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		7	4431.42	5378.87	16000.0	920.000	78/10	79/09
			L	5	1118.00	1049.63	2500.00	280.000	79/03	79/08
			T	12	3050.83	4369.53	16000.0	280.000	78/10	79/09
PHENOLS	TOTAL	UG/L		11	4.27273	2.68667	11.0000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-164

STATION NUMBER 611750
40 07 14.0 082 00 00.0 2
MUSKINGUM R IN DRESDEN - SR 208
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 091.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.0417	8.84837	23.0000	.000000	79/10	80/09
STREAM	FLOW	CFS		1	11250.0		11250.0	11250.0	80/02	80/02
STREAM	FLOW,	INST-CFS		3	19046.7	4776.80	22280.0	13560.0	80/04	80/06
STREAM	STAGE	FEET		5	11.8700	2.78112	15.1000	7.59000	80/05	80/09
CNDUCTVY	FIELD	MICROMHO		1	394.000		394.000	394.000	79/12	79/12
CNDUCTVY	AT 25C	MICROMHO		10	562.700	127.619	732.000	373.000	79/10	80/09
SAMPLE	TREAT-	MENT		1	.000000		.000000	.000000	80/09	80/09
DO		MG/L		11	9.83636	2.10489	13.0000	6.90000	79/10	80/09
COD	LOWLEVEL	MG/L		12	19.2500	10.4631	40.0000	4.00000	79/10	80/09
PH		SU		7	7.86428	.536016	8.95000	7.40000	79/10	80/08
LAB	PH	SU		7	7.59999	.141490	7.70000	7.40000	79/12	80/09
T ALK	CACO3	MG/L		6	114.833	56.4745	218.000	72.0000	79/10	80/08
RESIDUE	DISS-105	C MG/L		1	307.000		307.000	307.000	80/02	80/02
RESIDUE	TOT NFLT	MG/L		12	72.5833	62.0959	199.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		8	.172500	.084811	.330000	.090000	79/10	80/09
			K	4	.050000	.000050	.050000	.050000	80/05	80/08
			T	12	.131666	.090638	.330000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		12	.027500	.019129	.060000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	1.39667	.417622	1.99000	.560000	79/10	80/09
TOT KJEL	N	MG/L		12	.479166	.259000	1.06000	.130000	79/10	80/09
PHOS-TOT		MG/L P		12	21.1415	72.7016	252.000	.020000	79/10	80/09
TOT HARD	CACO3	MG/L		7	216.571	59.0618	280.000	134.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		10	39.8000	18.7071	72.0000	20.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		2	6.00000	1.41421	7.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.50000	1.00000	7.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	4457.50	3155.51	7700.00	830.000	79/11	80/08

TABLE RD 1-164 (Continued)

STATION NUMBER 611750
40 07 14.0 082 00 00.0 2
MUSKINGUM R IN DRESDEN - SR 208
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 091.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		4	48.7500	80.8429	170.000	7.00000	79/11	80/08
MANGNESE	MN	UG/L		3	396.666	166.534	530.000	210.000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
			K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	37.5000	15.0000	60.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		3	1633.33	1250.33	2500.00	200.000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		7	2231.43	1695.36	5700.00	520.000	79/10	80/09
			L	4	827.500	501.024	1500.00	360.000	79/11	80/02
			T	11	1720.91	1517.09	5700.00	360.000	79/10	80/09
PHENOLS	TOTAL	UG/L		11	3.63636	2.06266	9.00000	2.00000	79/10	80/09
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	12	3.50000	2.02260	9.00000	2.00000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		1	267.000		267.000	267.000	80/06	80/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/11	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-165

STATION NUMBER 601860
39 38 42.0 081 51 00.0 2
MUSKINGUM R. AT MCCONNELSVILLE
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 048.20

No data were collected from 10/78 - 9/80.

TABLE RD 1-166

STATION NUMBER 611810
40 56 47.0 081 44 35.0 2
CHIPPEWA CRK AT EASTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 098.90 006.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	22.0000	8.48528	28.0000	16.0000	79/06	79/08
STREAM	FLOW	CFS		2	27.0000	9.89949	34.0000	20.0000	79/06	79/08
STREAM	STAGE	FEET		1	1.91000		1.91000	1.91000	79/06	79/06
CNDUCTVY	FIELD	MICROMHO		2	1570.50	778.525	2121.00	1020.00	79/06	79/08
DO		MG/L		2	8.49999	2.54563	10.3000	6.70000	79/06	79/08
COD	LOWLEVEL	MG/L		2	29.0000	7.07107	34.0000	24.0000	79/06	79/08
PH		SU		2	7.95000	.353553	8.20000	7.70000	79/06	79/08
RESIDUE	DISS-105	C MG/L		2	1118.00	743.876	1644.00	592.000	79/06	79/08
RESIDUE	TOT NFLT	MG/L		2	30.5000	.707107	31.0000	30.0000	79/06	79/08
NH3+NH4-	N TOTAL	MG/L		2	1.24500	.346482	1.49000	1.00000	79/06	79/08
NO2-N	TOTAL	MG/L		2	.545000	.431336	.850000	.240000	79/06	79/08
NO3-N	TOTAL	MG/L		2	2.28500	.855601	2.89000	1.68000	79/06	79/08
TOT KJEL	N	MG/L		2	3.07000	.325276	3.30000	2.84000	79/06	79/08
PHOS-TOT		MG/L P		1	.340000		.340000	.340000	79/06	79/06
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/08	79/08
CHROMIUM	CR,TOT	UG/L		1	40.0000		40.0000	40.0000	79/08	79/08
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/08	79/08
IRON	FE,TOT	UG/L		1	2010.00		2010.00	2010.00	79/08	79/08
LEAD	PB,TOT	UG/L		1	26.0000		26.0000	26.0000	79/08	79/08
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/08	79/08
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/08	79/08
FEC COLI	MFM-FCBR	/100ML		2	41000.0	38183.7	68000.0	14000.0	79/06	79/08
FECSTREP	MF M-ENT	/100ML		2	15725.0	21602.1	31000.0	450.000	79/06	79/08
PHENOLS	TOTAL	UG/L		2	8.50000	.707107	9.00000	8.00000	79/06	79/08

TABLE RD 1-167

STATION NUMBER 611810
40 56 47.0 081 44 35.0 2
CHIPPEWA CRK AT EASTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 098.90 006.80

No data were collected from 10/79 - 9/80.

TABLE RD 1-168

STATION NUMBER 611850
40 46 27.0 081 23 26.0 2
HURFORD RUN AT CANTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 012.00 00.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	14.1750	6.09282	22.5000	8.00000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		4	1192.50	308.282	1530.00	927.000	78/11	79/08
DO		MG/L		4	7.20000	2.04777	9.70000	5.20000	78/11	79/08
COD	LOWLEVEL	MG/L		4	26.6750	22.3716	58.7000	7.00000	78/11	79/08
PH		SU		4	7.87500	.287342	8.30000	7.70000	78/11	79/08
RESIDUE	DISS-105	C MG/L		3	991.666	116.606	1124.00	904.000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		3	11.6667	2.88678	15.0000	10.0000	79/01	79/08
NH3+NH4-	N TOTAL	MG/L		4	3.15250	2.97404	7.52000	.840000	78/11	79/08
NO2-N	TOTAL	MG/L		4	.560000	.535101	1.32000	.130000	78/11	79/08
NO3-N	TOTAL	MG/L		4	1.84750	.856560	2.61000	1.00000	78/11	79/08
TOT KJEL	N	MG/L		4	4.07500	3.60682	9.40000	1.40000	78/11	79/08
PHOS-TOT		MG/L P		4	.067500	.035000	.120000	.050000	78/11	79/08
CYANIDE	CN-TOT	MG/L		4	.015000	.005773	.020000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		3	419.666	35.5326	456.000	385.000	78/11	79/05
CHLORIDE	TOTAL	MG/L		3	227.000	53.1131	268.000	167.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		3	1.22000	.400375	1.63000	.830000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	102.500	17.0782	120.000	80.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		2	1785.00	516.188	2150.00	1420.00	78/11	79/01
IRON	FE,DISS	UG/L		1	1320.00		1320.00	1320.00	79/05	79/05
LEAD	PB,TOT	UG/L		4	63.7500	48.9379	124.000	12.0000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	157.500	117.863	300.000	30.0000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	57.5000	17.0782	80.0000	40.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		3	327.333	409.440	800.000	82.0000	78/11	79/05
FECSTREP	MF M-ENT	/100ML		3	1207.67	1985.25	3500.00	50.0000	78/11	79/05
PHENOLS	TOTAL	UG/L		4	8.25000	4.50000	12.0000	2.00000	78/11	79/08
MBAS		MG/L		2	.430000	.042427	.460000	.400000	78/11	79/05
MERCURY	HG,TOTAL	UG/L		3	.866666	.635085	1.60000	.500000	79/01	79/08

TABLE RD 1-169

STATION NUMBER 611850
40 46 27.0 081 23 26.0 2
HURFORD RUN AT CANTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 012.00 00.20

PARAMETER			RMK	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.0000	5.47723	20.0000	8.00000	79/11	80/08
CNDUCTVY	FIELD	MICROMHO		3	930.000	157.162	1100.00	790.000	80/02	80/08
DO		MG/L		4	8.40000	1.12843	9.50000	7.00000	79/11	80/08
BOD	5 DAY	MG/L		1	9.70000		9.70000	9.70000	80/08	80/08
COD	LOWLEVEL	MG/L		4	57.5000	84.3702	184.000	12.0000	79/11	80/08
PH		SU		3	7.99999	.529308	8.40000	7.40000	79/11	80/05
LAB	PH	SU		1	7.00000		7.00000	7.00000	80/08	80/08
RESIDUE	DISS-105	C MG/L		1	976.000		976.000	976.000	80/02	80/02
RESIDUE	TOT NFLT	MG/L		3	11.3333	1.15477	12.0000	10.0000	79/11	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	4	11.0000	1.15470	12.0000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		4	1.65250	1.08368	2.54000	.180000	79/11	80/08
NO2-N	TOTAL	MG/L		4	.187500	.176706	.430000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		4	1.23250	.488153	1.95000	.860000	79/11	80/08
TOT KJEL	N	MG/L		4	2.02750	1.15225	3.05000	.480000	79/11	80/08
PHOS-TOT		MG/L P		4	.108000	.047638	.160000	.050000	79/11	80/08
CYANIDE	CN-TOT	MG/L	K	4	.007750	.004500	.010000	.001000	79/11	80/08
TOT HARD	CACO3	MG/L		4	370.500	38.2666	413.000	325.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		2	142.500	14.8492	153.000	132.000	79/11	80/05
SULFATE	SO4-TOT	MG/L		1	173.000		173.000	173.000	80/08	80/08
FLUORIDE	F,DISS	MG/L		1	1.24000		1.24000	1.24000	80/02	80/02
FLUORIDE	F,TOTAL	MG/L		3	2.42667	2.40710	5.20000	.880000	79/11	80/08
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/08	80/08
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	80/08	80/08
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	80/02	80/02
			K	2	5.00000	.000000	5.00000	5.00000	79/11	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05
CHROMIUM	CR,TOT	UG/L		4	45.0000	17.3205	60.0000	30.0000	79/11	80/08

TABLE RD 1-169 (Continued)

STATION NUMBER 611850
40 46 27.0 081 23 26.0 2
HURFORD RUN AT CANTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 012.00 00.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
			K	2	30.0000	.000000	30.0000	30.0000	79/11	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		4	1237.50	366.367	1570.00	850.000	79/11	80/08
LEAD	PB,TOT	UG/L		4	10.0000	5.09902	17.0000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		4	150.000	57.7350	200.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	60.0000	18.2574	80.0000	40.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		2	320.000	424.264	620.000	20.0000	80/02	80/08
FECSTREP	MF M-ENT	/100ML		1	20.0000		20.0000	20.0000	80/02	80/02
PHENOLS	TOTAL	UG/L		4	6.75000	4.27200	12.0000	2.00000	79/11	80/08
MBAS		MG/L		1	.250000		.250000	.250000	80/05	80/05
			K	1	.050000		.050000	.050000	79/11	79/11
			T	2	.150000	.141421	.250000	.050000	79/11	80/05
RESIDUE	DISS-180 C	MG/L		3	788.333	149.181	950.000	656.000	79/11	80/08
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	3	.500000	.000000	.500000	.500000	80/02	80/08

TABLE RD 1-170

STATION NUMBER 611860
40 53 03.0 082 17 02.0 2
JEROME FK AT ASHLAND - RT. 42
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.30 013.90 13.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	14.2750	10.0527	22.7000	.500000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		4	1025.50	542.936	1830.00	638.000	78/10	79/06
DO		MG/L		4	8.62500	1.51962	10.2000	7.00000	78/10	79/09
BOD	5 DAY	MG/L		5	2.50000	1.10454	4.00000	1.00000	78/12	79/09
COD	LOWLEVEL	MG/L		4	18.4500	9.60608	32.0000	10.0000	78/10	79/09
LAB	PH	SU		5	7.94000	.151691	8.10000	7.70000	78/10	79/09
RESIDUE	DISS-105	C MG/L		3	462.666	21.0134	484.000	442.000	79/06	79/09
RESIDUE	TOT NFLT	MG/L		6	26.0000	22.2980	65.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		6	.131667	.076790	.230000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		5	.012000	.004472	.020000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		6	.848333	.876662	2.01000	.050000	78/10	79/09
TOT KJEL	N	MG/L		6	.671666	.440655	1.40000	.300000	78/10	79/09
PHOS-TOT		MG/L P		6	.056667	.026583	.100000	.020000	78/10	79/09
TOT HARD	CACO3	MG/L		6	451.333	272.982	997.000	243.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		1	.150000		.150000	.150000	79/09	79/09
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/09	79/09
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		4	1180.00	881.816	2500.00	660.000	78/10	79/09
LEAD	PB,TOT	UG/L		6	5.50000	.836660	7.00000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	60.0000	.000000	60.0000	60.0000	79/09	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/03
ZINC	ZN,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
ANTIMONY	SB,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
ALUMINUM	AL,TOT	UG/L		3	500.000	346.410	900.000	300.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		2	52.5000	67.1751	100.000	5.00000	79/06	79/09
FEC COLI	MFM-FCBR	/100ML		6	2001.83	2965.69	7900.00	1.00000	78/10	79/09
PHENOLS	TOTAL	UG/L		2	4.00000	2.82843	6.00000	2.00000	78/10	79/06
MBAS		MG/L		3	.110000	.050000	.160000	.060000	79/06	79/09
MERCURY	HG,TOTAL	UG/L		6	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-171

STATION NUMBER 611860
40 53 03.0 082 17 02.0 2
JEROME FK AT ASHLAND - RT. 42
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.30 013.90 13.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	18.4000		18.4000	18.4000	80/09	80/09
CNDUCTVY	AT 25C	MICROMHO		1	611.000		611.000	611.000	80/04	80/04
DO		MG/L		1	10.0000		10.0000	10.0000	80/09	80/09
BOD	5 DAY	MG/L		1	1.00000		1.00000	1.00000	80/09	80/09
COD	LOWLEVEL	MG/L		2	24.1000	4.94975	27.6000	20.6000	80/04	80/09
LAB	PH	SU		2	7.97000	.099053	8.04000	7.90000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	412.000		412.000	412.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	33.0000		33.0000	33.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	21.5000	16.2635	33.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L	K	2	.050000	.000061	.050000	.050000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.010000	.000000	.010000	.010000	80/04	80/09
NO3-N	TOTAL	MG/L		2	.645000	.502046	1.00000	.290000	80/04	80/09
TOT KJEL	N	MG/L		2	.715000	.360625	.970000	.460000	80/04	80/09
PHOS-TOT		MG/L P		2	.048000	.042426	.078000	.018000	80/04	80/09
T ORG C	C	MG/L		1	12.0000		12.0000	12.0000	80/09	80/09
TOT HARD	CACO3	MG/L		2	336.000	56.5685	376.000	296.000	80/04	80/09
CHLORIDE	TOTAL	MG/L		1	23.0000		23.0000	23.0000	80/04	80/04
SULFATE	SO4-TOT	MG/L		1	118.000		118.000	118.000	80/04	80/04
FLUORIDE	F,TOTAL	MG/L		1	.250000		.250000	.250000	80/04	80/04
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L		1	80.0000		80.0000	80.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	55.0000	35.3553	80.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1240.00	919.239	1890.00	590.000	80/04	80/09
LEAD	PB,TOT	UG/L		1	16.0000		16.0000	16.0000	80/09	80/09
			K	1	5.00000		5.00000	5.00000	80/04	80/04
			T	2	10.5000	7.77817	16.0000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	480.000	622.254	920.000	40.0000	80/04	80/09
ZINC	ZN,TOT	UG/L		1	900.000		900.000	900.000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	465.000	615.183	900.000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	200.000	.000000	200.000	200.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		1	160.000		160.000	160.000	80/04	80/04
			L	1	100000		100000	100000	80/09	80/09
			T	2	50080.0	70597.5	100000	160.000	80/04	80/09
MBAS		MG/L		1	.050000		.050000	.050000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	525.000		525.000	525.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/04	80/04

TABLE RD 1-172

STATION NUMBER 611870
40 51 27.0 082 15 12.0 2
JEROME FK AT ASHLAND - C.R. 1320
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.30 013.90 10.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	15.0500	9.54864	22.3000	1.10000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		4	994.000	562.084	1810.00	554.000	78/10	79/06
DO		MG/L		4	5.97500	2.25148	8.60000	4.00000	78/10	79/09
BOD	5 DAY	MG/L		5	9.64000	3.34187	14.0000	5.60000	78/12	79/09
COD	LOWLEVEL	MG/L		4	28.6000	16.6525	40.0000	4.00000	78/10	79/09
LAB	PH	SU		5	7.65999	.260989	7.80000	7.20000	78/10	79/09
RESIDUE	DISS-105	C MG/L		3	412.666	90.6508	466.000	308.000	79/06	79/09
RESIDUE	TOT NFLT	MG/L		6	80.1667	159.855	406.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		7	2.35143	2.11955	6.60000	.350000	78/10	79/09
NO2-N	TOTAL	MG/L		6	.125000	.111310	.300000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		6	2.92000	1.48966	5.74000	1.83000	78/10	79/09
TOT KJEL	N	MG/L		6	4.28500	2.77104	9.80000	2.10000	78/10	79/09
PHOS-TOT		MG/L P		6	1.48333	1.41555	3.97000	.260000	78/10	79/09
TOT HARD	CACO3	MG/L		6	306.500	139.294	577.000	183.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		1	.500000		.500000	.500000	79/09	79/09
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/09	79/09
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	45.0000	12.2474	60.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		4	4612.50	8259.01	17000.0	360.000	78/10	79/09
LEAD	PB,TOT	UG/L		6	11.0000	8.57904	28.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	375.000	21.2132	390.000	360.000	79/09	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/03
ZINC	ZN,TOT	UG/L		6	630.833	724.268	2050.00	30.0000	78/10	79/09
ANTIMONY	SB,TOT	UG/L		1	20.0000		20.0000	20.0000	79/06	79/06
ALUMINUM	AL,TOT	UG/L		3	2633.33	4214.66	7500.00	200.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		2	52.5000	67.1751	100.000	5.00000	79/06	79/09
FEC COLI	MFM-FCBR	/100ML		1	1.00000		1.00000	1.00000	78/12	78/12
			L	2	15000.0	7071.08	20000.0	10000.0	79/09	79/09
			T	3	10000.3	9999.51	20000.0	1.00000	78/12	79/09
PHENOLS	TOTAL	UG/L		2	8.50000	2.12132	10.0000	7.00000	78/10	79/06
MBAS		MG/L		3	.226667	.058595	.270000	.160000	79/06	79/09
MERCURY	HG,TOTAL	UG/L		6	.516667	.040829	.600000	.500000	78/10	79/09

TABLE RD 1-173

STATION NUMBER 611870
40 51 27.0 082 15 12.0 2
JEROME FK AT ASHLAND - C.R. 1320
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.30 013.90 10.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	18.1000		18.1000	18.1000	80/09	80/09
CNDUCTVY	AT 25C	MICROMHO		1	667.000		667.000	667.000	80/04	80/04
DO		MG/L		1	5.10000		5.10000	5.10000	80/09	80/09
BOD	5 DAY	MG/L		2	14.0000	2.26282	15.6000	12.4000	80/04	80/09
COD	LOWLEVEL	MG/L		2	49.3000	.990186	50.0000	48.6000	80/04	80/09
LAB	PH	SU		2	7.82500	.106046	7.90000	7.75000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	440.000		440.000	440.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	32.5000	24.7487	50.0000	15.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.480000		.480000	.480000	80/04	80/04
NO2-N	TOTAL	MG/L		2	.170000	.084853	.230000	.110000	80/04	80/09
NO3-N	TOTAL	MG/L		2	2.22500	.728320	2.74000	1.71000	80/04	80/09
TOT KJEL	N	MG/L		2	5.09000	3.21026	7.36000	2.82000	80/04	80/09
PHOS-TOT		MG/L P		2	1.30500	.841458	1.90000	.710000	80/04	80/09
T ORG C	C	MG/L		1	18.0000		18.0000	18.0000	80/09	80/09
TOT HARD	CACO3	MG/L		2	273.000	7.07107	278.000	268.000	80/04	80/09
CHLORIDE	TOTAL	MG/L		1	43.0000		43.0000	43.0000	80/04	80/04
SULFATE	SO4-TOT	MG/L		1	103.000		103.000	103.000	80/04	80/04
FLUORIDE	F,TOTAL	MG/L		1	.570000		.570000	.570000	80/04	80/04
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	810.000	84.8528	870.000	750.000	80/04	80/09
LEAD	PB,TOT	UG/L		1	21.0000		21.0000	21.0000	80/04	80/04
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	2	13.0000	11.3137	21.0000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	450.000	494.975	800.000	100.000	80/04	80/09
ZINC	ZN,TOT	UG/L		1	1500.00		1500.00	1500.00	80/04	80/04
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	2	765.000	1039.45	1500.00	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	450.000	353.553	700.000	200.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML	L	1	100000		100000	100000	80/09	80/09
PHENOLS	TOTAL	UG/L		1	6.00000		6.00000	6.00000	80/04	80/04
MBAS		MG/L		1	.180000		.180000	.180000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	532.000		532.000	532.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/04	80/04

TABLE RD 1-174

STATION NUMBER 601880
40 45 19.0 081 57 26.0 2
KILLBUCK CRK BELOW WOOSTER
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 007.30 045.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	8.23333	8.92544	18.0000	.500000	79/02	79/09
CNDUCTVY	FIELD	MICROMHO		2	256.000	35.3553	281.000	231.000	79/02	79/04
CNDUCTVY	AT 25C	MICROMHO		1	420.000		420.000	420.000	79/04	79/04
DO		MG/L		3	8.73333	3.36505	11.2000	4.90000	79/02	79/09
COD	LOWLEVEL	MG/L		3	12.3333	2.30944	15.0000	11.0000	79/02	79/09
PH		SU		2	7.10000	.565692	7.50000	6.70000	79/02	79/04
LAB	PH	SU		3	7.66666	.305775	8.00000	7.40000	79/02	79/09
RESIDUE	TOTAL	MG/L		1	388.000		388.000	388.000	79/02	79/02
RESIDUE	DISS-105	C MG/L		3	326.000	56.0000	366.000	262.000	79/02	79/09
RESIDUE	TOT NFLT	MG/L		3	23.6667	21.1266	48.0000	10.0000	79/02	79/09
NH3+NH4-	N TOTAL	MG/L		3	.976666	.702163	1.54000	.190000	79/02	79/09
NO2-N	TOTAL	MG/L		2	.040000	.042426	.070000	.010000	79/04	79/09
NO3-N	TOTAL	MG/L		2	2.53500	1.26572	3.43000	1.64000	79/04	79/09
TOT KJEL	N	MG/L		2	1.30000	.565688	1.70000	.900000	79/04	79/09
PHOS-TOT		MG/L P		1	.550000		.550000	.550000	79/09	79/09
TOT HARD	CACO3	MG/L		1	169.000		169.000	169.000	79/04	79/04
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/04	79/04
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/04	79/04
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/04	79/04
IRON	FE,TOT	UG/L		3	1570.00	874.700	2580.00	1060.00	79/02	79/09
LEAD	PB,TOT	UG/L		1	18.0000		18.0000	18.0000	79/04	79/04
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/04	79/04
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/04	79/04
FEC COLI	MFM-FCBR	/100ML		2	299.500	396.687	580.000	19.0000	79/02	79/04
FECSTREP	MF M-ENT	/100ML		1	2900.00		2900.00	2900.00	79/04	79/04
PHENOLS	TOTAL	UG/L		2	4.00000	2.82843	6.00000	2.00000	79/04	79/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/04	79/04

TABLE RD 1-175

STATION NUMBER 601880
40 45 19.0 081 57 26.0 2
KILLBUCK CRK BELOW WOOSTER
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 007.30 045.60

No data were collected from 10/79 - 9/80.

TABLE RD 1-176

STATION NUMBER 611880
40 23 20.0 082 27 45.0 2
KOKOSING R AT MT. VERNON-S.R.661
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.55000	8.10534	20.4000	2.20000	78/10	79/06
CNDUCTVY	AT 25C	MICROMHO		4	557.500	69.1929	640.000	490.000	78/10	79/06
DO		MG/L		4	10.9500	1.33042	12.6000	9.40000	78/10	79/06
BOD	5 DAY	MG/L		2	1.60000	.848529	2.20000	1.00000	78/12	79/03
COD	LOWLEVEL	MG/L		2	7.00000	1.41421	8.00000	6.00000	78/10	79/06
LAB	PH	SU		4	8.05000	.238335	8.30000	7.80000	78/10	79/06
RESIDUE	DISS-105	C MG/L		1	318.000		318.000	318.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		4	15.0000	6.00000	22.0000	10.0000	78/10	79/06
NH3+NH4-	N TOTAL	MG/L		4	.062500	.025000	.100000	.050000	78/10	79/06
NO2-N	TOTAL	MG/L		4	.010000	.000000	.010000	.010000	78/10	79/06
NO3-N	TOTAL	MG/L		4	1.49250	.767523	2.38000	.510000	78/10	79/06
TOT KJEL	N	MG/L		4	.300000	.216025	.600000	.100000	78/10	79/06
PHOS-TOT		MG/L P		4	.062500	.015000	.080000	.050000	78/10	79/06
T ORG C	C	MG/L		1	12.0000		12.0000	12.0000	78/10	78/10
TOT HARD	CACO3	MG/L		4	247.000	22.7889	270.000	225.000	78/10	79/06
ARSENIC	AS,TOT	UG/L		3	20.0000	17.3205	40.0000	10.0000	78/10	79/06
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/06
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/06
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/06
IRON	FE,TOT	UG/L		2	1120.00	989.949	1820.00	420.000	78/10	79/06
LEAD	PB,TOT	UG/L		4	11.7500	8.42120	24.0000	5.00000	78/10	79/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/03	79/03
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/10	79/06
ALUMINUM	AL,TOT	UG/L		1	300.000		300.000	300.000	79/06	79/06
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/06	79/06
FEC COLI	MFM-FCBR	/100ML		2	2150.00	2192.03	3700.00	600.000	78/12	79/03
FECSTREP	MF M-ENT	/100ML		1	260.000		260.000	260.000	79/03	79/03
MBAS		MG/L		1	.050000		.050000	.050000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		4	.675000	.350000	1.20000	.500000	78/10	79/06

TABLE RD 1-177

STATION NUMBER 611880
40 23 20.0 082 27 45.0 2
KOKOSING R AT MT. VERNON-S.R.661
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 023.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	16.2000		16.2000	16.2000	80/09	80/09
DO		MG/L		1	11.0000		11.0000	11.0000	80/09	80/09
BOD	5 DAY	MG/L		2	3.40000	2.68701	5.30000	1.50000	80/05	80/09
COD	LOWLEVEL	MG/L		2	21.9500	15.2028	32.7000	11.2000	80/05	80/09
LAB	PH	SU		2	8.24999	.072345	8.30000	8.20000	80/05	80/09
RESIDUE	DISS-105	C MG/L		1	296.000		296.000	296.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		1	.060000		.060000	.060000	80/09	80/09
			K	1	.050000		.050000	.050000	80/05	80/05
			T	2	.055000	.007071	.060000	.050000	80/05	80/09
NO2-N	TOTAL	MG/L		2	.030000	.028284	.050000	.010000	80/05	80/09
NO3-N	TOTAL	MG/L		2	1.21500	.247489	1.39000	1.04000	80/05	80/09
TOT KJEL	N	MG/L		2	.255000	.162635	.370000	.140000	80/05	80/09
PHOS-TOT		MG/L P		2	.026000	.005657	.030000	.022000	80/05	80/09
T ORG C	C	MG/L		1	8.00000		8.00000	8.00000	80/09	80/09
TOT HARD	CACO3	MG/L		2	278.000	53.7401	316.000	240.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	310.000	14.1421	320.000	300.000	80/05	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	40.0000	14.1421	50.0000	30.0000	80/05	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L	K	2	200.000	.000000	200.000	200.000	80/05	80/09
FEC COLI	MFM-FCBR	/100ML		2	480.000	84.8528	540.000	420.000	80/05	80/09
RESIDUE	DISS-180	C MG/L		1	318.000		318.000	318.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/05	80/05

TABLE RD 1-178

STATION NUMBER 611890
40 22 18.0 082 27 45.0 2
KOKOSING R AT MT. VERNON-TWP 257
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 021.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	9.12500	8.00307	20.4000	2.20000	78/10	79/06
CNDUCTVY	AT 25C	MICROMHO		4	575.750	95.1367	680.000	480.000	78/10	79/06
DO		MG/L		4	11.0250	.579601	11.8000	10.4000	78/10	79/06
BOD	5 DAY	MG/L		2	2.70000	.989949	3.40000	2.00000	78/12	79/03
COD	LOWLEVEL	MG/L		2	4.50000	.707107	5.00000	4.00000	78/10	79/06
LAB	PH	SU		4	8.00000	.316253	8.30000	7.60000	78/10	79/06
RESIDUE	DISS-105	C MG/L		1	332.000		332.000	332.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		4	17.2500	8.61684	27.0000	10.0000	78/10	79/06
NH3+NH4-	N TOTAL	MG/L		4	.105000	.040415	.140000	.050000	78/10	79/06
NO2-N	TOTAL	MG/L		4	.022500	.018930	.050000	.010000	78/10	79/06
NO3-N	TOTAL	MG/L		4	1.96000	.548512	2.65000	1.38000	78/10	79/06
TOT KJEL	N	MG/L		4	.550000	.173206	.700000	.400000	78/10	79/06
PHOS-TOT		MG/L P		4	.142500	.121758	.320000	.050000	78/10	79/06
T ORG C	C	MG/L		1	13.0000		13.0000	13.0000	78/10	78/10
TOT HARD	CACO3	MG/L		4	244.500	28.5949	270.000	212.000	78/10	79/06
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	78/10	79/06
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/06
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/03	79/03
CHROMIUM	CR,TOT	UG/L		4	127.500	195.000	420.000	30.0000	78/10	79/06
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/06
IRON	FE,TOT	UG/L		2	435.000	247.487	610.000	260.000	78/10	79/06
LEAD	PB,TOT	UG/L		4	18.0000	17.4547	44.0000	7.00000	78/10	79/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/03	79/03
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/06
ALUMINUM	AL,TOT	UG/L		1	300.000		300.000	300.000	79/06	79/06
SELENIUM	SE,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
FEC COLI	MFM-FCBR	/100ML		2	2000.00	2404.16	3700.00	300.000	78/12	79/03
FECSTREP	MF M-ENT	/100ML		1	100.000		100.000	100.000	79/03	79/03
MBAS		MG/L		1	.080000		.080000	.080000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		4	.525000	.050002	.600000	.500000	78/10	79/06

TABLE RD 1-179

STATION NUMBER 611890
40 22 18.0 082 27 45.0 2
KOKOSING R AT MT. VERNON-TWP 257
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 021.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	16.4000		16.4000	16.4000	80/09	80/09
DO		MG/L		1	10.0000		10.0000	10.0000	80/09	80/09
BOD	5 DAY	MG/L		2	3.85000	4.03051	6.70000	1.00000	80/05	80/09
COD	LOWLEVEL	MG/L		1	39.6000		39.6000	39.6000	80/09	80/09
			K	1	4.00000		4.00000	4.00000	80/05	80/05
			T	2	21.8000	25.1730	39.6000	4.00000	80/05	80/09
LAB	PH	SU		1	8.40000		8.40000	8.40000	80/05	80/05
RESIDUE	DISS-105	C MG/L		1	304.000		304.000	304.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L		1	30.0000		30.0000	30.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	2	20.0000	14.1421	30.0000	10.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		1	.060000		.060000	.060000	80/05	80/05
			K	1	.050000		.050000	.050000	80/09	80/09
			T	2	.055000	.007071	.060000	.050000	80/05	80/09
NO2-N	TOTAL	MG/L		2	.020000	.014142	.030000	.010000	80/05	80/09
NO3-N	TOTAL	MG/L		2	1.59000	.070725	1.64000	1.54000	80/05	80/09
TOT KJEL	N	MG/L		2	.230000	.042426	.260000	.200000	80/05	80/09
PHOS-TOT		MG/L P		2	.048500	.010607	.056000	.041000	80/05	80/09
T ORG C	C	MG/L		1	8.00000		8.00000	8.00000	80/09	80/09
TOT HARD	CACO3	MG/L		2	258.000	25.4558	276.000	240.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	235.000	21.2132	250.000	220.000	80/05	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	35.0000	7.07107	40.0000	30.0000	80/05	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L	K	2	200.000	.000000	200.000	200.000	80/05	80/09
FEC COLI	MFM-FCBR	/100ML		2	405.000	91.9239	470.000	340.000	80/05	80/09
RESIDUE	DISS-180	C MG/L		1	324.000		324.000	324.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/05	80/05

TABLE RD 1-180

STATION NUMBER 601770
40 03 33.0 082 20 23.0 2
LICKING RIVER NEAR NEWARK
OHIO RIVER 050491 (MUSKINGUM RIVER)
MILES 0953.80 0808.80 078.30 025.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.5500	8.63476	22.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	679.364	434.079	1439.00	205.000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		12	457.916	164.835	700.000	210.000	78/10	79/09
DO		MG/L		12	10.1417	2.45078	13.6000	6.80000	78/10	79/09
BOD	5 DAY	MG/L		9	3.83333	1.45431	7.10000	2.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	14.8333	5.58949	24.0000	6.00000	78/10	79/09
PH		SU		12	7.69999	.279667	8.30000	7.30000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		12	20.4167	21.1250	82.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.652500	.329687	1.41000	.120000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.060833	.045419	.160000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.61666	.622027	3.15000	.900000	78/10	79/09
TOT KJEL	N	MG/L		11	1.86182	1.90610	7.40000	.500000	78/10	79/09
PHOS-TOT		MG/L P		12	.131666	.086952	.380000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		3	269.333	53.7253	320.000	213.000	78/12	79/06
CHLORIDE	TOTAL	MG/L		10	32.3000	22.0406	84.0000	7.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		10	69.3000	15.6281	97.0000	51.0000	78/10	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/12	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		4	687.500	556.020	1500.00	240.000	78/12	79/09
LEAD	PB,TOT	UG/L		4	7.00000	2.30940	9.00000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		10	4259.00	9441.47	30000.0	160.000	78/11	79/09
			L	2	26000.0	9899.49	33000.0	19000.0	78/10	79/02
			T	12	7882.50	12387.9	33000.0	160.000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	3.91667	3.20393	13.0000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	.525000	.050002	.600000	.500000	78/12	79/09

TABLE RD 1-181

STATION NUMBER 601770
40 03 33.0 082 20 23.0 2
LICKING RIVER NEAR NEWARK
OHIO RIVER 050491 (MUSKINGUM RIVER)
MILES 0953.80 0808.80 078.30 025.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	11.3400	7.37310	23.7000	2.00000	79/11	80/08
STREAM	FLOW	CFS		2	952.500	85.5628	1013.00	892.000	79/10	79/11
STREAM	FLOW,	INST-CFS		1	1304.00		1304.00	1304.00	80/03	80/03
STREAM	STAGE	FEET		6	4.33166	.825314	5.37000	3.35000	80/03	80/08
CNDUCTVY	FIELD	MICROMHO		10	392.800	128.195	650.000	270.000	79/11	80/08
DO		MG/L		10	10.7300	2.29979	13.5000	7.20000	79/11	80/08
BOD	5 DAY	MG/L		9	5.00000	2.73861	10.0000	1.00000	79/11	80/08
COD	LOWLEVEL	MG/L		10	58.5000	132.338	435.000	10.0000	79/11	80/08
PH		SU		10	7.55400	.306673	8.00000	7.00000	79/11	80/08
RESIDUE	TOT NFLT	MG/L		9	40.7778	36.6189	102.000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		10	3.58800	9.28530	30.0000	.250000	79/11	80/08
NO2-N	TOTAL	MG/L		10	.059000	.067404	.220000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		10	1.67400	.583598	2.78000	.790000	79/11	80/08
TOT KJEL	N	MG/L		10	1.24000	.428071	1.94000	.580000	79/11	80/08
PHOS-TOT		MG/L P		10	.133800	.044510	.200000	.080000	79/11	80/08
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	80/02	80/02
TOT HARD	CACO3	MG/L		3	263.000	40.0375	304.000	224.000	79/12	80/06
CHLORIDE	TOTAL	MG/L		11	28.6363	7.99099	41.0000	19.0000	79/10	80/08
SULFATE	SO4-TOT	MG/L		11	62.1818	13.3928	79.0000	36.0000	79/10	80/08
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	2	5.00000	.000000	5.00000	5.00000	80/03	80/06
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/06
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
IRON	FE,TOT	UG/L		3	670.000	407.799	1140.00	410.000	79/12	80/06

TABLE RD 1-181 (Continued)

STATION NUMBER 601770
40 03 33.0 082 20 23.0 2
LICKING RIVER NEAR NEWARK
OHIO RIVER 050491 (MUSKINGUM RIVER)
MILES 0953.80 0808.80 078.30 025.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		2	17.0000	16.9706	29.0000	5.00000	79/12	80/06
			K	1	5.00000		5.00000	5.00000	80/03	80/03
			T	3	13.0000	13.8564	29.0000	5.00000	79/12	80/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	2	100.000	.000000	100.000	100.000	80/03	80/06
			T	3	100.000	.000000	100.000	100.000	79/12	80/06
ZINC	ZN,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/12	80/06
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	3	33.3333	5.77355	40.0000	30.0000	79/12	80/06
FEC COLI	MFM-FCBR	/100ML		1	48.0000		48.0000	48.0000	79/10	79/10
PHENOLS	TOTAL	UG/L		6	2.33333	.816498	4.00000	2.00000	79/10	80/08
			K	5	2.00000	.000000	2.00000	2.00000	80/03	80/07
PHENOLS	TOTAL	UG/L	T	11	2.18182	.603027	4.00000	2.00000	79/10	80/08
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/12	79/12
			K	2	.500000	.000000	.500000	.500000	80/03	80/06
			T	3	.500000	.000000	.500000	.500000	79/12	80/06

TABLE RD 1-182

STATION NUMBER 601870
40 31 20.0 082 11 45.0 2
MOHICAN R AT GREER
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 016.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.0417	8.87913	21.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	1264.40	1293.57	3668.00	168.000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		7	367.143	47.1576	425.000	275.000	78/10	79/08
CNDUCTVY	AT 25C	MICROMHO		7	453.857	90.5566	556.000	308.000	79/01	79/09
DO		MG/L		10	9.86999	2.01830	12.5000	7.80000	78/10	79/09
BOD	5 DAY	MG/L		1	3.10000		3.10000	3.10000	78/11	78/11
COD	LOWLEVEL	MG/L		12	16.2500	4.95663	24.0000	10.0000	78/10	79/09
PH		SU		10	7.81999	.230053	8.30000	7.60000	78/10	79/09
LAB	PH	SU		1	7.80000		7.80000	7.80000	79/01	79/01
T ALK	CACO3	MG/L		2	160.000	16.9706	172.000	148.000	78/11	79/01
RESIDUE	TOTAL	MG/L		1	345.000		345.000	345.000	78/11	78/11
RESIDUE	DISS-105	C MG/L		6	250.333	54.8114	306.000	169.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		13	32.4615	25.2442	85.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		13	.207692	.176973	.610000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		13	.043077	.049394	.190000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		13	2.16461	.864871	3.41000	.830000	78/10	79/09
TOT KJEL	N	MG/L		12	.825000	.333371	1.40000	.400000	78/10	79/09
PHOS-TOT		MG/L P		13	.177692	.092930	.420000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		5	198.400	39.7785	234.000	131.000	78/11	79/08
CHLORIDE	TOTAL	MG/L		2	27.0000	2.82843	29.0000	25.0000	79/01	79/08
SULFATE	SO4-TOT	MG/L		1	65.0000		65.0000	65.0000	79/08	79/08
CADMIUM	CD,TOT	UG/L		4	8.75000	7.50000	20.0000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	47.5000	28.7228	90.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	1823.33	1179.59	2840.00	530.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	216.750	422.168	850.000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		3	123.333	58.5948	190.000	80.0000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		10	2745.00	6780.41	22000.0	100.000	78/10	79/08
PHENOLS	TOTAL	UG/L		4	2.00000	.000000	2.00000	2.00000	79/02	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-183

STATION NUMBER 601870
40 31 20.0 082 11 45.0 2
MOHICAN R AT GREER
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 016.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	10.7500	7.68115	20.0000	2.00000	79/10	80/09
STREAM	FLOW	CFS		3	1082.33	973.990	2207.00	520.000	79/10	80/02
STREAM	FLOW,	INST-CFS		2	1343.50	1498.36	2403.00	284.000	80/06	80/09
STREAM	STAGE	FEET		5	2.82200	1.03909	4.16000	1.66000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	355.000	18.0278	375.000	340.000	79/10	79/12
CNDUCTVY	AT 25C	MICROMHO		7	440.286	84.0536	562.000	344.000	79/11	80/09
SAMPLE	TREAT-	MENT		2	.940000	1.32936	1.88000	.000000	80/03	80/07
DO		MG/L		8	10.1500	1.60805	12.4000	8.10000	79/10	80/09
COD	LOWLEVEL	MG/L		8	15.2500	5.14781	23.0000	10.0000	79/10	80/09
PH		SU		6	7.86666	.225239	8.10000	7.60000	79/10	80/09
LAB	PH	SU		2	7.85000	.070637	7.90000	7.80000	79/12	80/03
T ALK	CACO3	MG/L		2	214.500	89.8026	278.000	151.000	79/11	80/07
RESIDUE	DISS-105	C MG/L		2	261.500	48.7904	296.000	227.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		7	40.4286	38.8796	100.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		5	.238000	.166343	.420000	.050000	79/10	80/03
			K	3	.050000	.000075	.050000	.050000	80/06	80/09
			T	8	.167500	.158992	.420000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		8	.040000	.035456	.090000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		8	1.84625	1.06863	3.83000	.160000	79/10	80/09
TOT KJEL	N	MG/L		8	.606250	.377811	1.36000	.160000	79/10	80/09
PHOS-TOT		MG/L P		8	.166500	.046556	.230000	.090000	79/10	80/09
TOT HARD	CACO3	MG/L		4	209.000	43.6119	237.000	144.000	79/10	80/02
CHLORIDE	TOTAL	MG/L		3	25.0000	2.00000	27.0000	23.0000	79/10	79/12
FLUORIDE	F,DISS	MG/L		1	.190000		.190000	.190000	79/10	79/10
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/02
CHROMIUM	CR,TOT	UG/L		4	47.5000	28.7228	90.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		4	40.0000	20.0000	70.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		4	1377.50	1755.42	4000.00	350.000	79/10	80/09
LEAD	PB,TOT	UG/L		4	7.00000	2.44949	10.0000	5.00000	79/10	80/09

TABLE RD 1-183 (Continued)

STATION NUMBER 601870
40 31 20.0 082 11 45.0 2
MOHICAN R AT GREER
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 016.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MANGNESE	MN	UG/L		3	80.0000	17.3205	100.000	70.0000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/02
			K	1	100.000		100.000	100.000	80/09	80/09
			T	4	100.000	.000000	100.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		4	37.5000	15.0000	60.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/11	79/11
FEC COLI	MFM-FCBR	/100ML		11	1210.91	1836.72	6000.00	100.000	79/10	80/09
PHENOLS	TOTAL	UG/L		4	2.50000	.577350	3.00000	2.00000	79/10	80/02
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	5	2.40000	.547725	3.00000	2.00000	79/10	80/03
RESIDUE	DISS-180	C MG/L		2	254.000	43.8406	285.000	223.000	80/06	80/09
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/10	80/02
MERCURY	HG,TOTAL	UG/L	K	1	.590000		.590000	.590000	80/09	80/09
			T	4	.522500	.045003	.590000	.500000	79/10	80/09

TABLE RD 1-184

STATION NUMBER 601940
40 44 03.0 081 21 08.0 2
NIMISHILLEN CRK AT N INDUSTRY
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 008.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.1083	7.41258	21.0000	.500000	78/10	79/09
STREAM	FLOW	CFS		9	323.000	331.292	1040.00	119.000	78/10	79/09
STREAM	STAGE	FEET		2	1.47500	.035400	1.50000	1.45000	78/11	79/02
CNDUCTVY	FIELD	MICROMHO		12	729.250	273.003	1114.00	336.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	575.000		575.000	575.000	79/04	79/04
DO		MG/L		12	8.17500	2.91520	11.8000	3.90000	78/10	79/09
COD	LOWLEVEL	MG/L		13	30.4461	24.9433	100.000	7.00000	78/10	79/09
PH		SU		12	7.63749	.262050	8.20000	7.30000	78/10	79/09
LAB	PH	SU		3	7.83333	.153118	8.00000	7.70000	79/02	79/04
RESIDUE	TOTAL	MG/L		3	543.333	183.536	754.000	418.000	79/02	79/04
RESIDUE	DISS-105	C MG/L		8	666.875	205.203	928.000	342.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		10	33.0000	47.7912	159.000	10.0000	78/10	79/08
			K	1	10.0000		10.0000	10.0000	79/09	79/09
			T	11	30.9091	45.8660	159.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	2.87416	1.56280	5.08000	.620000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.168333	.193946	.630000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.63499	1.88841	9.15000	2.10000	78/10	79/09
TOT KJEL	N	MG/L		12	4.69999	2.50672	9.50000	1.20000	78/10	79/09
PHOS-TOT		MG/L P		12	1.09750	1.14914	4.50000	.280000	78/10	79/09
CYANIDE	CN-TOT	MG/L		12	.010833	.002887	.020000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		2	306.000	151.321	413.000	199.000	78/11	79/04
CHLORIDE	TOTAL	MG/L		7	98.7143	45.9882	160.000	39.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		12	.970000	.402672	1.53000	.390000	78/10	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		9	1762.22	1432.95	4100.00	510.000	78/10	79/09
LEAD	PB,TOT	UG/L		4	72.0000	80.5812	188.000	10.0000	78/10	79/08
NICKEL	NI,TOTAL	UG/L		4	175.000	50.0000	200.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		4	120.000	49.6655	180.000	60.0000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		9	58233.3	85243.7	210000	2300.00	78/11	79/09
FECSTREP	MF M-ENT	/100ML		7	49328.6	56264.5	140000	4000.00	78/11	79/09
PHENOLS	TOTAL	UG/L		12	37.9167	112.803	396.000	2.00000	78/10	79/09
MBAS		MG/L		2	.180000	.127279	.270000	.090000	78/11	79/04
MERCURY	HG,TOTAL	UG/L		2	.700000	.282843	.900000	.500000	78/10	79/08

TABLE RD 1-185

STATION NUMBER 601940
40 44 03.0 081 21 08.0 2
NIMISHILLEN CRK AT N INDUSTRY
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 008.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.1667	7.15838	22.0000	2.00000	79/10	80/09
STREAM	FLOW	CFS		1	205.000		205.000	205.000	79/10	79/10
STREAM	FLOW,	INST-CFS		3	449.000	207.029	658.000	244.000	80/03	80/05
STREAM	STAGE	FEET		4	2.03750	.724954	2.85000	1.17000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		12	738.500	277.771	1490.00	400.000	79/10	80/09
DO		MG/L		12	9.49166	2.08567	12.8000	6.10000	79/10	80/09
BOD	5 DAY	MG/L		1	8.10000		8.10000	8.10000	80/08	80/08
COD	LOWLEVEL	MG/L		11	24.1727	11.3987	51.0000	10.0000	79/10	80/09
PH		SU		10	7.86000	.474244	8.50000	7.30000	79/10	80/07
LAB	PH	SU		2	38.9000	43.9821	70.0000	7.80000	80/08	80/09
RESIDUE	DISS-105	C MG/L		5	661.200	98.7193	786.000	536.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		9	24.5555	24.4444	79.0000	10.0000	79/10	80/09
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/07
			T	11	21.9091	22.6427	79.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		12	1.65666	.908911	3.15000	.510000	79/10	80/09
NO2-N	TOTAL	MG/L		11	.111818	.087615	.330000	.010000	79/10	80/09
			K	1	.010000		.010000	.010000	80/08	80/08
			T	12	.103333	.088558	.330000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	3.34333	1.99144	7.78000	1.61000	79/10	80/09
TOT KJEL	N	MG/L		12	2.34166	.976150	4.34000	1.05000	79/10	80/09
PHOS-TOT		MG/L P		12	.571250	.201913	.940000	.270000	79/10	80/09
CYANIDE	CN-TOT	MG/L		6	.014000	.008000	.030000	.010000	79/10	80/08
			K	5	.010000	.000000	.010000	.010000	80/03	80/09
			T	11	.012182	.006030	.030000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		4	341.250	61.5704	421.000	272.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		5	153.200	96.6629	324.000	98.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		2	110.000	2.82843	112.000	108.000	80/04	80/08
FLUORIDE	F,DISS	MG/L		5	1.01000	.099500	1.10000	.860000	79/10	80/02
FLUORIDE	F,TOTAL	MG/L		6	.561666	.180380	.870000	.380000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/08	80/08
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	80/08	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05

TABLE RD 1-185 (Continued)

STATION NUMBER 601940
40 44 03.0 081 21 08.0 2
NIMISHILLEN CRK AT N INDUSTRY
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 007.90 008.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		12	1543.33	1216.44	4400.00	640.000	79/10	80/09
LEAD	PB,TOT	UG/L		6	11.1667	4.79236	18.0000	7.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	115.000	71.4143	220.000	60.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		6	5683.33	3548.19	12000.0	1700.00	79/10	80/09
FECSTREP	MF M-ENT	/100ML		6	41366.7	62223.2	140000	500.000	79/10	80/09
PHENOLS	TOTAL	UG/L		12	4.16667	3.01008	12.0000	2.00000	79/10	80/09
MBAS		MG/L		3	.106667	.025166	.130000	.080000	80/05	80/09
RESIDUE	DISS-180	C MG/L		6	457.733	249.785	743.000	9.40000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	3	.500000	.000000	.500000	.500000	80/02	80/08

TABLE RD 1-186

STATION NUMBER 611900
40 45 28.0 082 29 53.0 2
ROCKY FK AT MANSFIELD - S.R. 39
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 10.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	19.5000	3.24509	22.2000	15.9000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	903.000	38.5660	934.000	850.000	78/10	79/07
DO		MG/L		3	7.60000	1.37482	9.10000	6.40000	78/10	79/07
BOD	5 DAY	MG/L		2	8.30000	2.12135	9.80000	6.80000	79/03	79/07
COD	LOWLEVEL	MG/L		4	23.3750	7.76074	30.0000	14.0000	78/10	79/09
LAB	PH	SU		5	7.77999	.205366	8.10000	7.60000	78/10	79/09
RESIDUE	DISS-105	C MG/L		4	483.250	49.6076	517.000	410.000	79/03	79/09
RESIDUE	TOT NFLT	MG/L		5	13.0000	3.74166	18.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		5	4.79600	2.61090	7.60000	.700000	78/10	79/09
NO2-N	TOTAL	MG/L		4	.190000	.157692	.370000	.010000	78/10	79/07
NO3-N	TOTAL	MG/L		5	.635999	.200451	.970000	.460000	78/10	79/09
TOT KJEL	N	MG/L		5	7.62600	2.21538	10.4000	5.00000	78/10	79/09
PHOS-TOT		MG/L P		5	1.29600	.656529	2.25000	.440000	78/10	79/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/06	79/06
			K	1	.010000		.010000	.010000	79/07	79/07
			T	2	.010000	.000000	.010000	.010000	79/06	79/07
TOT HARD	CACO3	MG/L		5	270.000	23.6960	298.000	243.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		3	.396667	.095044	.490000	.300000	79/06	79/09
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/06	79/09
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	3	10.0000	.000000	10.0000	10.0000	79/06	79/09
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	79/07	79/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/10	79/09
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	5	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	HEX-VAL	UG/L		2	1242.00	1524.52	2320.00	164.000	79/03	79/07
CHROMIUM	CR,TOT	UG/L		5	1096.00	951.331	2600.00	370.000	78/10	79/09
COBALT	CO,TOTAL	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
COPPER	CU,TOT	UG/L		5	198.000	110.318	380.000	110.000	78/10	79/09
IRON	FE,TOT	UG/L		4	677.500	105.317	820.000	570.000	78/10	79/09
IRON	FE,DISS	UG/L		1	90.0000		90.0000	90.0000	79/07	79/07
LEAD	PB,TOT	UG/L		5	16.0000	13.6565	35.0000	5.00000	78/10	79/09

TABLE RD 1-186 (Continued)

STATION NUMBER 611900
40 45 28.0 082 29 53.0 2
ROCKY FK AT MANSFIELD - S.R. 39
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 10.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MANGNESE	MN	UG/L		3	150.000	17.3205	160.000	130.000	79/06	79/09
MANGNESE	MN,DISS	UG/L		1	110.000		110.000	110.000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		5	1100.00	400.000	1600.00	600.000	78/10	79/09
STRONTUM	SR,TOT	UG/L		2	650.000	70.7107	700.000	600.000	79/07	79/09
ZINC	ZN,TOT	UG/L		5	68.0000	24.8998	110.000	50.0000	78/10	79/09
ANTIMONY	SB,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
TIN	SN,TOT	UG/L		2	30.0000	14.1421	40.0000	20.0000	79/06	79/07
ALUMINUM	AL,TOT	UG/L		3	200.000	.000000	200.000	200.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/06	79/09
SELENIUM	SE,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	3	5.00000	.000000	5.00000	5.00000	79/06	79/09
FEC COLI	MFM-FCBR	/100ML		2	1800.00	2262.74	3400.00	200.000	78/10	79/03
			L	1	6200.00		6200.00	6200.00	79/07	79/07
			T	3	3266.67	3002.22	6200.00	200.000	78/10	79/07
PHENOLS	TOTAL	UG/L		2	10.5000	2.12132	12.0000	9.00000	78/10	79/06
MBAS		MG/L		2	.325000	.077781	.380000	.270000	79/06	79/07
MERCURY	HG,TOTAL	UG/L		5	.560000	.134165	.800000	.500000	78/10	79/09

TABLE RD 1-187

STATION NUMBER 611900
40 45 28.0 082 29 53.0 2
ROCKY FK AT MANSFIELD - S.R. 39
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 10.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.6000		19.6000	19.6000	80/09	80/09
CNDUCTVY	AT 25C	MICROMHO		1	739.000		739.000	739.000	80/04	80/04
DO		MG/L		1	6.30000		6.30000	6.30000	80/09	80/09
BOD	5 DAY	MG/L		2	15.1000	4.66691	18.4000	11.8000	80/04	80/09
COD	LOWLEVEL	MG/L		2	48.4000	.279508	48.6000	48.2000	80/04	80/09
LAB	PH	SU		2	7.96500	.190927	8.10000	7.83000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	432.000		432.000	432.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	51.5000	48.7904	86.0000	17.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		2	2.78000	.042421	2.81000	2.75000	80/04	80/09
NO2-N	TOTAL	MG/L		2	1.01500	.671752	1.49000	.540000	80/04	80/09
NO3-N	TOTAL	MG/L		2	1.42500	.954595	2.10000	.750000	80/04	80/09
TOT KJEL	N	MG/L		2	3.67500	.233331	3.84000	3.51000	80/04	80/09
PHOS-TOT		MG/L P		2	.871500	.139307	.970000	.773000	80/04	80/09
TOT HARD	CACO3	MG/L		2	236.000	56.5685	276.000	196.000	80/04	80/09
CHLORIDE	TOTAL	MG/L		1	71.0000		71.0000	71.0000	80/04	80/04
SULFATE	SO4-TOT	MG/L		1	84.0000		84.0000	84.0000	80/04	80/04
FLUORIDE	F,TOTAL	MG/L		1	.400000		.400000	.400000	80/04	80/04
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	HEX-VAL	UG/L		1	1160.00		1160.00	1160.00	80/04	80/04
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	2	595.000	799.031	1160.00	30.0000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		2	725.000	883.884	1350.00	100.000	80/04	80/09
COPPER	CU,TOT	UG/L		2	65.0000	35.3553	90.0000	40.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	2375.00	2580.94	4200.00	550.000	80/04	80/09
LEAD	PB,TOT	UG/L		1	7.00000		7.00000	7.00000	80/09	80/09
			K	1	5.00000		5.00000	5.00000	80/04	80/04
			T	2	6.00000	1.41421	7.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	135.000	7.07107	140.000	130.000	80/04	80/09
NICKEL	NI,TOTAL	UG/L		2	350.000	212.132	500.000	200.000	80/04	80/09
ZINC	ZN,TOT	UG/L		2	85.0000	7.07107	90.0000	80.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		1	1100.00		1100.00	1100.00	80/09	80/09
FEC COLI	MFM-FCBR	/100ML		1	1100.00		1100.00	1100.00	80/04	80/04
			L	1	100000		100000	100000	80/09	80/09
			T	2	50550.0	69932.8	100000	1100.00	80/04	80/09
PHENOLS	TOTAL	UG/L		2	7.00000	4.24264	10.0000	4.00000	80/04	80/09
MBAS		MG/L		1	.020000		.020000	.020000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	368.000		368.000	368.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-188

STATION NUMBER 611910
40 45 04.0 082 29 04.0 2
ROCKY FK AT MANSFIELD-ILL. AVE.
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 11.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	21.4667	4.84182	24.7000	15.9000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		4	792.000	49.1596	843.000	741.000	78/10	79/07
DO		MG/L		3	10.7667	2.96875	13.3000	7.50000	78/10	79/07
BOD	5 DAY	MG/L		2	2.40000	1.69706	3.60000	1.20000	79/03	79/07
COD	LOWLEVEL	MG/L		4	15.6750	3.23870	19.0000	12.0000	78/10	79/09
LAB	PH	SU		5	8.10000	.245069	8.40000	7.80000	78/10	79/09
RESIDUE	DISS-105	C MG/L		4	450.500	53.2259	520.000	394.000	79/03	79/09
RESIDUE	TOT NFLT	MG/L		5	10.0000	.000000	10.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		5	.112000	.058052	.180000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		4	.032500	.017078	.050000	.010000	78/10	79/07
NO3-N	TOTAL	MG/L		5	.552000	.208015	.860000	.290000	78/10	79/09
TOT KJEL	N	MG/L		5	.853999	.443599	1.60000	.510000	78/10	79/09
PHOS-TOT		MG/L P		5	.110000	.060415	.210000	.050000	78/10	79/09
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/06	79/07
TOT HARD	CACO3	MG/L		5	279.600	21.1756	316.000	264.000	78/10	79/09
FLUORIDE	F,DISS	MG/L		3	.390000	.036062	.430000	.360000	79/06	79/09
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/06	79/09
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	79/07	79/07
CADMIUM	CD,TOT	UG/L		5	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	HEX-VAL	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/07
CHROMIUM	CR,TOT	UG/L		5	114.000	124.619	330.000	30.0000	78/10	79/09
COBALT	CO,TOTAL	UG/L		1	30.0000		30.0000	30.0000	79/07	79/07
COPPER	CU,TOT	UG/L		5	32.0000	4.47214	40.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		4	882.500	276.692	1120.00	600.000	78/10	79/09
IRON	FE,DISS	UG/L		1	60.0000		60.0000	60.0000	79/07	79/07
LEAD	PB,TOT	UG/L		5	5.80000	.836679	7.00000	5.00000	78/10	79/09

TABLE RD 1-188 (Continued)

STATION NUMBER 611910
40 45 04.0 082 29 04.0 2
ROCKY FK AT MANSFIELD-ILL. AVE.
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 11.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MANGNESE	MN	UG/L		3	126.667	35.1191	160.000	90.0000	79/06	79/09
MANGNESE	MN,DISS	UG/L		1	80.0000		80.0000	80.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		5	120.000	44.7214	200.000	100.000	78/10	79/09
STRONTUM	SR,TOT	UG/L		2	750.000	70.7107	800.000	700.000	79/07	79/09
ZINC	ZN,TOT	UG/L		5	36.0000	5.47723	40.0000	30.0000	78/10	79/09
ANTIMONY	SB,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
TIN	SN,TOT	UG/L		1	40.0000		40.0000	40.0000	79/06	79/06
ALUMINUM	AL,TOT	UG/L		3	200.000	.000000	200.000	200.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/06	79/09
FEC COLI	MFM-FCBR	/100ML		3	1276.67	990.774	2200.00	230.000	78/10	79/09
			L	1	6700.00		6700.00	6700.00	79/07	79/07
			T	4	2632.50	2829.76	6700.00	230.000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		1	10.0000		10.0000	10.0000	79/03	79/03
PHENOLS	TOTAL	UG/L		2	3.00000	1.41421	4.00000	2.00000	78/10	79/06
MBAS		MG/L		2	.125000	.049498	.160000	.090000	79/06	79/07
MERCURY	HG,TOTAL	UG/L		5	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-189

STATION NUMBER 611910
40 45 04.0 082 29 04.0 2
ROCKY FK AT MANSFIELD-ILL. AVE.
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 11.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	20.5000		20.5000	20.5000	80/09	80/09
CNDUCTVY	AT 25C	MICROMHO		1	617.000		617.000	617.000	80/04	80/04
DO	PROBE	MG/L		2	8.95000	1.48496	10.0000	7.90000	79/10	79/10
DO		MG/L		1	6.80000		6.80000	6.80000	80/09	80/09
BOD	5 DAY	MG/L		1	6.00000		6.00000	6.00000	80/09	80/09
COD	LOWLEVEL	MG/L		2	42.4000	8.76812	48.6000	36.2000	80/04	80/09
LAB	PH	SU		2	8.24999	.072345	8.30000	8.20000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	434.000		434.000	434.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	96.0000	118.794	180.000	12.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.330000		.330000	.330000	80/09	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	2	.190000	.197990	.330000	.050000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.035000	.021213	.050000	.020000	80/04	80/09
NO3-N	TOTAL	MG/L		2	.605000	.162638	.720000	.490000	80/04	80/09
TOT KJEL	N	MG/L		2	.724999	.487904	1.07000	.380000	80/04	80/09
PHOS-TOT		MG/L P		2	.154500	.118087	.238000	.071000	80/04	80/09
TOT HARD	CACO3	MG/L		2	222.000	48.0833	256.000	188.000	80/04	80/09
CHLORIDE	TOTAL	MG/L		1	44.0000		44.0000	44.0000	80/04	80/04
SULFATE	SO4-TOT	MG/L		1	88.0000		88.0000	88.0000	80/04	80/04
FLUORIDE	F,TOTAL	MG/L		1	.370000		.370000	.370000	80/04	80/04
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	HEX-VAL	UG/L		1	34.0000		34.0000	34.0000	80/04	80/04
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	2	32.0000	2.82843	34.0000	30.0000	80/04	80/09
CHROMIUM	CR,TOT	UG/L		4	665.000	741.283	1520.00	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		2	100.000	.000000	100.000	100.000	79/10	79/10
			K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	4	65.0000	40.4145	100.000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		2	4485.00	5112.38	8100.00	870.000	80/04	80/09

TABLE RD 1-189 (Continued)

STATION NUMBER 611910
40 45 04.0 082 29 04.0 2
ROCKY FK AT MANSFIELD-ILL. AVE.
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 023.30 027.20 014.00 11.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		2	13.0000	4.24264	16.0000	10.0000	79/10	80/09
			K	2	5.00000	.000000	5.00000	5.00000	79/10	80/04
			T	4	9.00000	5.22813	16.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		2	135.000	21.2132	150.000	120.000	80/04	80/09
NICKEL	NI,TOTAL	UG/L		3	366.666	230.941	500.000	100.000	79/10	80/04
			K	1	100.000		100.000	100.000	80/09	80/09
			T	4	300.000	230.940	500.000	100.000	79/10	80/09
ZINC	ZN,TOT	UG/L		4	45.0000	17.3205	60.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		1	2500.00		2500.00	2500.00	80/09	80/09
FEC COLI	MFM-FCBR	/100ML		1	220.000		220.000	220.000	80/04	80/04
			L	1	100000		100000	100000	80/09	80/09
FEC COLI	MFM-FCBR	/100ML	T	2	50110.0	70555.0	100000	220.000	80/04	80/09
PHENOLS	TOTAL	UG/L		1	8.00000		8.00000	8.00000	80/09	80/09
MBAS		MG/L		1	.070000		.070000	.070000	80/04	80/04
RESIDUE	DISS-180	C MG/L		1	306.000		306.000	306.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	3	.500000	.000000	.500000	.500000	79/10	80/09

TABLE RD 1-190

STATION NUMBER 611800
40 40 21.0 081 15 36.0 2
SANDY CRK AT WAYNESBURG
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 017.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	14.7500	1.06066	15.5000	14.0000	79/06	79/09
STREAM	FLOW	CFS		2	81.0000	5.65685	85.0000	77.0000	79/06	79/09
CNDUCTVY	FIELD	MICROMHO		2	455.000	42.4264	485.000	425.000	79/06	79/09
DO		MG/L		2	7.85000	.212164	8.00000	7.70000	79/06	79/09
COD	LOWLEVEL	MG/L		2	4.00000	.000000	4.00000	4.00000	79/06	79/09
PH		SU		2	7.45000	.070637	7.50000	7.40000	79/06	79/09
RESIDUE	DISS-105	C MG/L		2	388.500	.707107	389.000	388.000	79/06	79/09
RESIDUE	TOT NFLT	MG/L		2	10.0000	.000000	10.0000	10.0000	79/06	79/09
NH3+NH4-	N TOTAL	MG/L		2	.090000	.056569	.130000	.050000	79/06	79/09
NO2-N	TOTAL	MG/L		2	.010000	.000000	.010000	.010000	79/06	79/09
NO3-N	TOTAL	MG/L		2	.305000	.049497	.340000	.270000	79/06	79/09
TOT KJEL	N	MG/L		2	.250000	.070710	.300000	.200000	79/06	79/09
PHOS-TOT		MG/L P		2	.045000	.007071	.050000	.040000	79/06	79/09
IRON	FE,TOT	UG/L		1	1240.00		1240.00	1240.00	79/09	79/09
FEC COLI	MFM-FCBR	/100ML		1	8300.00		8300.00	8300.00	79/06	79/06
FECSTREP	MF M-ENT	/100ML		1	1400.00		1400.00	1400.00	79/06	79/06
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/06	79/06

TABLE RD 1-191

STATION NUMBER 611800
40 40 21.0 081 15 36.0 2
SANDY CRK AT WAYNESBURG
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 070.50 017.40

No data were collected from 10/79 - 9/80.

TABLE RD 1-192

STATION NUMBER 611830
40 53 22.0 081 36 00.0 2
TUSCARAWAS R AT CANAL FULTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 095.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	21.0000	1.41421	22.0000	20.0000	79/06	79/09
CNDUCTVY	FIELD	MICROMHO		1	2550.00		2550.00	2550.00	79/06	79/06
DO		MG/L		2	3.60000	.000000	3.60000	3.60000	79/06	79/09
COD	LOWLEVEL	MG/L		2	22.5500	5.02054	26.1000	19.0000	79/06	79/09
PH		SU		2	7.70000	.141436	7.80000	7.60000	79/06	79/09
RESIDUE	DISS-105	C MG/L		2	2268.00	197.990	2408.00	2128.00	79/06	79/09
RESIDUE	TOT NFLT	MG/L		2	45.5000	7.77817	51.0000	40.0000	79/06	79/09
NH3+NH4-	N TOTAL	MG/L		2	1.72000	.127276	1.81000	1.63000	79/06	79/09
NO2-N	TOTAL	MG/L		2	.125000	.162635	.240000	.010000	79/06	79/09
NO3-N	TOTAL	MG/L		2	.660000	.070713	.710000	.610000	79/06	79/09
TOT KJEL	N	MG/L		1	3.00000		3.00000	3.00000	79/06	79/06
PHOS-TOT		MG/L P		2	.220000	.169705	.340000	.100000	79/06	79/09
IRON	FE,TOT	UG/L		1	2270.00		2270.00	2270.00	79/09	79/09
FEC COLI	MFM-FCBR	/100ML		2	216000	302642	430000	2000.00	79/06	79/09
FECSTREP	MF M-ENT	/100ML		1	300.000		300.000	300.000	79/09	79/09
			K	1	88.0000		88.0000	88.0000	79/06	79/06
			T	2	194.000	149.907	300.000	88.0000	79/06	79/09
PHENOLS	TOTAL	UG/L		2	15.5000	.707107	16.0000	15.0000	79/06	79/09
MBAS		MG/L		1	.250000		.250000	.250000	79/06	79/06

TABLE RD 1-193

STATION NUMBER 611830
40 53 22.0 081 36 00.0 2
TUSCARAWAS R AT CANAL FULTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 095.90

No data were collected from 10/79 - 9/80.

TABLE RD 1-194

STATION NUMBER 611840
40 47 16.0 081 31 23.0 2
TUSCARAWAS R. AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 088.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	10.8500	11.5454	25.5000	.200000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		3	2084.33	81.1850	2178.00	2035.00	78/11	79/08
DO		MG/L		4	7.37500	1.52836	9.50000	6.00000	78/11	79/08
COD	LOWLEVEL	MG/L		4	19.3750	6.17007	28.6000	15.9000	78/11	79/08
PH		SU		4	8.12500	.263163	8.50000	7.90000	78/11	79/08
RESIDUE	DISS-105	C MG/L		3	1721.33	16.4012	1740.00	1710.00	78/11	79/08
RESIDUE	TOT NFLT	MG/L		4	19.5000	13.8203	40.0000	10.0000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.815000	.579281	1.49000	.230000	78/11	79/08
NO2-N	TOTAL	MG/L		4	.122500	.120104	.300000	.040000	78/11	79/08
NO3-N	TOTAL	MG/L		4	1.07250	.618299	1.99000	.650000	78/11	79/08
TOT KJEL	N	MG/L		4	1.70000	.454608	2.30000	1.20000	78/11	79/08
PHOS-TOT		MG/L P		4	.215000	.071414	.320000	.170000	78/11	79/08
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		3	548.666	148.669	719.000	445.000	78/11	79/05
CHLORIDE	TOTAL	MG/L		3	600.666	149.940	740.000	442.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		3	.230000	.020000	.250000	.210000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	780.000	167.033	930.000	600.000	78/11	79/05
LEAD	PB,TOT	UG/L		4	56.5000	66.0177	150.000	8.00000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		4	5725.00	1826.43	7500.00	4100.00	78/11	79/08
FECSTREP	MF M-ENT	/100ML		3	5566.66	4670.48	9700.00	500.000	78/11	79/05
PHENOLS	TOTAL	UG/L		4	5.75000	3.09570	10.0000	3.00000	78/11	79/08
MBAS		MG/L		1	.300000		.300000	.300000	78/11	78/11
MERCURY	HG,TOTAL	UG/L		3	.800000	.519615	1.40000	.500000	79/01	79/08

TABLE RD 1-195

STATION NUMBER 611840
40 47 16.0 081 31 23.0 2
TUSCARAWAS R. AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 088.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	10.7500	9.97914	23.0000	.000000	79/11	80/08
CNDUCTVY	FIELD	MICROMHO		4	1462.50	306.526	1850.00	1100.00	79/11	80/08
DO		MG/L		4	7.25000	2.58909	9.40000	4.20000	79/11	80/08
BOD	5 DAY	MG/L		1	4.80000		4.80000	4.80000	80/08	80/08
COD	LOWLEVEL	MG/L		4	35.0000	30.4740	80.0000	13.0000	79/11	80/08
PH		SU		3	8.39999	.200326	8.60000	8.20000	79/11	80/05
LAB	PH	SU		1	7.20000		7.20000	7.20000	80/08	80/08
RESIDUE	DISS-105	C MG/L		2	1361.00	241.831	1532.00	1190.00	79/11	80/02
RESIDUE	TOT NFLT	MG/L		4	55.5000	45.8003	117.000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		4	.710000	.440984	1.33000	.380000	79/11	80/08
NO2-N	TOTAL	MG/L		2	.075000	.035355	.100000	.050000	79/11	80/05
			K	1	.010000		.010000	.010000	80/08	80/08
			T	3	.053333	.045093	.100000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		4	1.06500	.425244	1.39000	.440000	79/11	80/08
TOT KJEL	N	MG/L		4	1.56500	.465367	2.19000	1.15000	79/11	80/08
PHOS-TOT		MG/L P		4	.416250	.125392	.570000	.270000	79/11	80/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/11	80/02
			K	2	.010000	.000000	.010000	.010000	80/05	80/08
			T	4	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		3	286.666	17.0147	306.000	274.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		2	491.500	12.0208	500.000	483.000	79/11	80/05
SULFATE	SO4-TOT	MG/L		1	50.0000		50.0000	50.0000	80/08	80/08
FLUORIDE	F,DISS	MG/L		1	.230000		.230000	.230000	79/11	79/11
FLUORIDE	F,TOTAL	MG/L		2	.255000	.007072	.260000	.250000	80/05	80/08
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/08	80/08
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	80/08	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05

TABLE RD 1-195 (Continued)

STATION NUMBER 611840
40 47 16.0 081 31 23.0 2
TUSCARAWAS R. AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 088.40

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	33.3333	5.77355	40.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	4	32.5000	5.00000	40.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		4	2740.00	2124.88	5700.00	680.000	79/11	80/08
LEAD	PB,TOT	UG/L		4	13.0000	3.82971	18.0000	10.0000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/08
			K	1	100.000		100.000	100.000	80/05	80/05
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		2	8350.00	5161.88	12000.0	4700.00	80/02	80/08
FECSTREP	MF M-ENT	/100ML		2	14550.0	13364.3	24000.0	5100.00	80/02	80/08
PHENOLS	TOTAL	UG/L		4	5.75000	2.75378	9.00000	3.00000	79/11	80/08
MBAS		MG/L		1	.100000		.100000	.100000	80/05	80/05
RESIDUE	DISS-180	C MG/L		2	1033.00	377.595	1300.00	766.000	80/05	80/08
MERCURY	HG,TOTAL	UG/L		2	2.50000	2.82843	4.50000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	1.50000	2.00000	4.50000	.500000	79/11	80/08

TABLE RD 1-196

STATION NUMBER 601930
40 45 08.0 081 31 45.0 2
TUSCARAWAS R AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 085.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.0000	9.03780	23.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	753.333	1035.93	3615.00	206.000	78/10	79/08
STREAM	STAGE	FEET		4	1.56500	.709060	2.61000	1.07000	78/11	79/02
CNDUCTVY	FIELD	MICROMHO		12	1305.67	796.676	2340.00	230.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	650.000		650.000	650.000	79/04	79/04
DO		MG/L		12	8.22500	2.13844	11.5000	4.90000	78/10	79/09
COD	LOWLEVEL	MG/L		13	25.8846	13.1406	62.1000	6.00000	78/10	79/09
PH		SU		12	7.70416	.319454	8.40000	7.30000	78/10	79/09
LAB	PH	SU		3	7.86666	.208463	8.10000	7.70000	79/02	79/04
RESIDUE	TOTAL	MG/L		3	708.000	410.015	1176.00	412.000	79/02	79/04
RESIDUE	DISS-105	C MG/L		9	1269.56	560.530	1858.00	320.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	33.4167	34.6028	125.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	1.52666	1.02091	3.63000	.230000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.150000	.112896	.320000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	2.60416	.625632	3.77000	1.52000	78/10	79/09
TOT KJEL	N	MG/L		12	2.62333	1.28261	4.50000	1.00000	78/10	79/09
PHOS-TOT		MG/L P		12	.479166	.374832	1.49000	.130000	78/10	79/09
CYANIDE	CN-TOT	MG/L		12	.010000	.000008	.010000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		3	430.666	239.745	652.000	176.000	78/11	79/05
CHLORIDE	TOTAL	MG/L		7	427.143	236.771	640.000	92.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		11	.771818	.361962	1.36000	.240000	78/10	79/09
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/03	79/03
CADMIUM	CD,TOT	UG/L		6	5.00000	.000000	5.00000	5.00000	78/10	79/08
CHROMIUM	CR,TOT	UG/L		6	76.6667	38.8159	130.000	30.0000	78/10	79/08
COPPER	CU,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/08
IRON	FE,TOT	UG/L		9	2458.89	1981.90	6950.00	940.000	78/10	79/09
LEAD	PB,TOT	UG/L		6	30.8333	28.6176	88.0000	13.0000	78/10	79/08
NICKEL	NI,TOTAL	UG/L		6	116.667	40.8249	200.000	100.000	78/10	79/08
ZINC	ZN,TOT	UG/L		6	36.6667	12.1107	60.0000	30.0000	78/10	79/08
FEC COLI	MFM-FCBR	/100ML		10	2674.00	1730.41	6500.00	540.000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		8	72262.5	185542	530000	170.000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	9.66667	9.28668	29.0000	2.00000	78/10	79/09
MBAS		MG/L		2	.215000	.162634	.330000	.100000	78/11	79/04
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	79/01	79/01
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/08

TABLE RD 1-197

STATION NUMBER 601930
40 45 08.0 081 31 45.0 2
TUSCARAWAS R AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 085.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	8.20000	6.84430	18.0000	1.00000	79/10	80/09
STREAM	FLOW	CFS		2	281.500	103.945	355.000	208.000	79/10	80/02
STREAM	FLOW,	INST-CFS		3	1016.67	1120.71	2303.00	251.000	80/04	80/09
STREAM	STAGE	FEET		4	4.81000	3.06793	7.81000	2.15000	80/03	80/06
CNDUCTVY	FIELD	MICROMHO		9	963.889	463.626	1800.00	260.000	79/11	80/09
DO		MG/L		10	8.94999	2.46768	12.2000	5.90000	79/10	80/09
COD	LOWLEVEL	MG/L		9	45.3222	66.5142	220.000	8.00000	79/10	80/09
PH		SU		9	8.07777	.393078	8.50000	7.30000	79/10	80/06
LAB	PH	SU		1	7.50000		7.50000	7.50000	80/09	80/09
RESIDUE	DISS-105	C MG/L		5	1688.60	1751.29	4814.00	752.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		8	39.6250	29.2767	94.0000	10.0000	79/10	80/05
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	9	36.3333	29.1119	94.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	.899090	.582794	2.28000	.280000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.046000	.031693	.110000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		11	1.79909	.255649	2.16000	1.36000	79/10	80/09
TOT KJEL	N	MG/L		11	1.69272	.626199	3.04000	.770000	79/10	80/09
PHOS-TOT		MG/L P		11	.583272	.478980	1.99000	.270000	79/10	80/09
CYANIDE	CN-TOT	MG/L		4	.010000	.000000	.010000	.010000	79/10	80/02
			K	6	.010000	.000000	.010000	.010000	80/03	80/09
			T	10	.010000	.000007	.010000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		4	336.500	108.507	497.000	262.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		8	266.250	137.424	470.000	57.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		1	74.0000		74.0000	74.0000	80/04	80/04
			K	1	10.0000		10.0000	10.0000	80/08	80/08
			T	2	42.0000	45.2548	74.0000	10.0000	80/04	80/08
FLUORIDE	F,DISS	MG/L		5	.611999	.321978	1.06000	.370000	79/10	80/02
FLUORIDE	F,TOTAL	MG/L		5	.464000	.218472	.730000	.220000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	1	10.0000		10.0000	10.0000	80/08	80/08
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	80/08	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	3	5.00000	.000000	5.00000	5.00000	79/11	80/05

TABLE RD 1-197 (Continued)

STATION NUMBER 601930
40 45 08.0 081 31 45.0 2
TUSCARAWAS R AT MASSILLON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 085.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		4	62.5000	12.5831	80.0000	50.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/05
IRON	FE,TOT	UG/L		11	2707.27	1853.96	6000.00	570.000	79/10	80/09
LEAD	PB,TOT	UG/L		4	12.0000	9.20145	25.0000	5.00000	79/11	80/05
			K	1	25.0000		25.0000	25.0000	80/08	80/08
			T	5	14.6000	9.86408	25.0000	5.00000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	37.5000	15.0000	60.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		6	4733.33	3842.22	12000.0	1400.00	79/10	80/09
FECSTREP	MF M-ENT	/100ML		6	5788.33	6445.90	15000.0	130.000	79/10	80/09
PHENOLS	TOTAL	UG/L		11	5.90909	1.92118	9.00000	3.00000	79/10	80/09
MBAS		MG/L		3	.210000	.164621	.400000	.110000	80/05	80/09
RESIDUE	DISS-180 C	MG/L		4	666.750	408.031	1220.00	283.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.550000	.070715	.600000	.500000	80/02	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	3	.533333	.057740	.600000	.500000	80/02	80/08

TABLE RD 1-198

STATION NUMBER 611790
40 15 41.0 081 36 33.0 2
TUSCARAWAS R AT NEWCOMERSTOWN
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 021.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.5833	8.15708	20.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		6	4031.67	4073.01	9372.00	1028.00	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		4	2275.00	2828.27	6500.00	520.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		9	789.000	342.741	1320.00	357.000	78/11	79/09
DO		MG/L		10	9.19999	1.44376	12.4000	7.40000	78/10	79/09
BOD	5 DAY	MG/L		3	6.33333	2.88676	8.00000	3.00000	78/11	79/09
COD	LOWLEVEL	MG/L		13	10.1538	4.82781	22.0000	4.00000	78/10	79/09
PH		SU		10	7.52999	.319878	8.10000	7.00000	78/10	79/09
LAB	PH	SU		3	7.77666	.835330	8.60000	6.93000	78/11	79/08
T ALK	CACO3	MG/L		6	86.8333	39.2705	127.000	37.0000	78/11	79/09
RESIDUE	TOTAL	MG/L		3	568.000	130.985	692.000	431.000	78/11	79/05
RESIDUE	DISS-105	C MG/L		5	523.000	140.768	622.000	277.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		12	55.5000	44.2626	137.000	13.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.152500	.106526	.400000	.050000	78/10	79/09
			K	1	.050000		.050000	.050000	79/09	79/09
			T	13	.144615	.105879	.400000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.080833	.186131	.670000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		13	1.62384	.461657	2.68000	1.17000	78/10	79/09
TOT KJEL	N	MG/L		13	.707692	.266025	1.20000	.400000	78/10	79/09
PHOS-TOT		MG/L P		13	.149230	.129516	.460000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		5	287.600	96.1816	356.000	121.000	78/11	79/09
CHLORIDE	TOTAL	MG/L		12	84.1667	67.4117	237.000	16.0000	78/10	79/09
SULFATE	SO4-TOT	MG/L		1	212.000		212.000	212.000	79/09	79/09
FLUORIDE	F,DISS	MG/L		1	.300000		.300000	.300000	79/09	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	5	5.00000	.000000	5.00000	5.00000	78/11	79/09
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	5	30.0000	.000000	30.0000	30.0000	78/11	79/09
COPPER	CU,TOT	UG/L		4	177.500	295.000	620.000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	5	148.000	263.856	620.000	30.0000	78/11	79/09
IRON	FE,TOT	UG/L		5	3166.00	2508.24	7100.00	1100.00	78/11	79/09

TABLE RD 1-198 (Continued)

STATION NUMBER 611790
40 15 41.0 081 36 33.0 2
TUSCARAWAS R AT NEWCOMERSTOWN
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 021.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		4	24.5000	26.6646	64.0000	7.00000	78/11	79/08
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	5	20.6000	24.6840	64.0000	5.00000	78/11	79/09
MANGNESE	MN	UG/L		5	606.000	187.029	840.000	340.000	78/11	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
			K	1	100.000		100.000	100.000	79/09	79/09
			T	5	100.000	.000000	100.000	100.000	78/11	79/09
ZINC	ZN,TOT	UG/L		4	32.5000	5.00000	40.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	5	32.0000	4.47214	40.0000	30.0000	78/11	79/09
ALUMINUM	AL,TOT	UG/L		1	300.000		300.000	300.000	79/09	79/09
FEC COLI	MFM-FCBR	/100ML		12	2528.58	1943.44	7000.00	83.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	3.58333	1.50504	7.00000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08
			K	1	.500000		.500000	.500000	79/09	79/09
			T	5	.500000	.000000	.500000	.500000	78/11	79/09

TABLE RD 1-199

STATION NUMBER 611790
40 15 41.0 081 36 33.0 2
TUSCARAWAS R AT NEWCOMERSTOWN
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 021.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	10.8375	8.86146	22.0000	.000000	79/11	80/08
STREAM	FLOW	CFS		1	3319.00		3319.00	3319.00	80/02	80/02
STREAM	FLOW,	INST-CFS		3	7939.33	1274.01	8764.00	6472.00	80/04	80/06
STREAM	STAGE	FEET		4	5.46750	2.10403	7.21000	2.42000	80/05	80/08
CNDUCTVY	FIELD	MICROMHO		1	495.000		495.000	495.000	79/12	79/12
CNDUCTVY	AT 25C	MICROMHO		10	710.500	203.710	921.000	429.000	79/10	80/08
DO		MG/L		10	10.1400	2.14539	13.4000	7.20000	79/10	80/08
COD	LOWLEVEL	MG/L		11	19.8182	9.89768	35.0000	4.00000	79/10	80/08
PH		SU		7	6.66428	2.50214	7.80000	1.00000	79/10	80/08
LAB	PH	SU		6	7.58333	.147406	7.80000	7.40000	79/12	80/08
T ALK	CACO3	MG/L		5	96.8000	55.2920	194.000	63.0000	79/10	80/08
PHEN-PH-	LFIN ALK	MG/L		1	106.000		106.000	106.000	80/07	80/07
RESIDUE	DISS-105	C MG/L		1	479.000		479.000	479.000	80/02	80/02
RESIDUE	TOT NFLT	MG/L		11	70.8182	63.3243	207.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		10	.215000	.161676	.540000	.060000	79/10	80/08
			K	1	.050000		.050000	.050000	80/06	80/06
			T	11	.200000	.161245	.540000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		11	.037273	.021019	.070000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		11	1.55727	.372159	2.23000	1.03000	79/10	80/08
TOT KJEL	N	MG/L		11	.596363	.222229	1.04000	.170000	79/10	80/08
PHOS-TOT		MG/L P		11	.214818	.058919	.300000	.140000	79/10	80/08
TOT HARD	CACO3	MG/L		8	248.875	79.2400	335.000	148.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		10	73.0000	33.5460	119.000	33.0000	79/10	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-199 Continued)

STATION NUMBER 611790
40 15 41.0 081 36 33.0 2
TUSCARAWAS R AT NEWCOMERSTOWN
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 021.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	3902.50	2590.65	6400.00	1140.00	79/11	80/08
LEAD	PB,TOT	UG/L		4	27.7500	37.5267	84.0000	7.00000	79/11	80/08
MANGNESE	MN	UG/L		3	546.666	66.5855	620.000	490.000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
			K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		4	37.5000	5.00000	40.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		3	1383.33	1032.39	2100.00	200.000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		12	2476.67	1140.97	5500.00	920.000	79/10	80/09
PHENOLS	TOTAL	UG/L		10	2.50000	.971825	5.00000	2.00000	79/10	80/08
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	11	2.45454	.934202	5.00000	2.00000	79/10	80/08
RESIDUE	DISS-180	C MG/L		1	330.000		330.000	330.000	80/06	80/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/11	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-200

STATION NUMBER 601910
40 20 29.0 082 03 56.0 2
WALHONDING R AT NELLIE BL DAM
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 014.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.4583	8.83551	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	2399.20	2811.64	8497.00	257.000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		7	325.428	91.7499	450.000	200.000	78/10	79/08
CNDUCTVY	AT 25C	MICROMHO		7	413.428	86.5515	514.000	302.000	79/01	79/09
DO		MG/L		10	9.95999	2.02772	13.0000	7.60000	78/10	79/09
BOD	5 DAY	MG/L		1	4.00000		4.00000	4.00000	78/11	78/11
COD	LOWLEVEL	MG/L		11	14.2727	5.21711	26.0000	8.00000	78/10	79/09
PH		SU		11	7.81818	.331088	8.40000	7.30000	78/10	79/09
LAB	PH	SU		1	7.70000		7.70000	7.70000	79/01	79/01
T ALK	CACO3	MG/L		2	151.500	13.4350	161.000	142.000	78/11	79/01
RESIDUE	TOTAL	MG/L		1	351.000		351.000	351.000	78/11	78/11
RESIDUE	DISS-105	C MG/L		6	234.500	63.8365	308.000	160.000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		13	34.6923	36.3694	139.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		13	.120000	.081956	.270000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		13	.020000	.010801	.040000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		13	2.11538	.715058	3.19000	1.17000	78/10	79/09
TOT KJEL	N	MG/L		12	.730833	.315579	1.30000	.400000	78/10	79/09
PHOS-TOT		MG/L P		13	.128769	.070874	.260000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		5	188.200	54.1500	238.000	96.0000	78/11	79/08
CHLORIDE	TOTAL	MG/L		2	26.5000	.707107	27.0000	26.0000	79/01	79/08
SULFATE	SO4-TOT	MG/L		1	60.0000		60.0000	60.0000	79/08	79/08
CADMIUM	CD,TOT	UG/L		4	6.75000	3.50000	12.0000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/02	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	2063.33	1763.53	4000.00	550.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	18.5000	22.5758	52.0000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		3	83.3333	30.5505	110.000	50.0000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		11	1648.73	3476.42	12000.0	10.0000	78/10	79/08
PHENOLS	TOTAL	UG/L		4	4.00000	2.44949	7.00000	2.00000	79/02	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-201

STATION NUMBER 601910
40 20 29.0 082 03 56.0 2
WALHONDING R AT NELLIE BL DAM
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 014.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.8500	7.64871	21.0000	2.00000	79/10	80/09
STREAM	FLOW	CFS		3	1675.67	1252.09	3118.00	868.000	79/10	80/02
STREAM	FLOW,	INST-CFS		4	3829.50	2584.03	6340.00	636.000	80/04	80/09
STREAM	STAGE	FEET		8	134.376	358.255	1021.00	5.47000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	326.666	40.4166	350.000	280.000	79/10	79/12
CNDUCTVY	AT 25C	MICROMHO		9	388.778	91.3845	508.000	269.000	79/11	80/09
SAMPLE	TREAT-	MENT		1	.000000		.000000	.000000	80/03	80/03
DO		MG/L		9	10.6555	2.22719	13.4000	7.60000	79/10	80/09
COD	LOWLEVEL	MG/L		10	16.0000	9.10433	29.0000	4.00000	79/10	80/09
PH		SU		8	7.92500	.191002	8.20000	7.70000	79/10	80/09
LAB	PH	SU		2	7.85000	.070637	7.90000	7.80000	79/12	80/03
T ALK	CACO3	MG/L		2	191.500	115.258	273.000	110.000	79/11	80/08
PHEN-PH-	LFIN ALK	MG/L		1	136.000		136.000	136.000	80/07	80/07
RESIDUE	DISS-105	C MG/L		2	269.000	59.3970	311.000	227.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		10	57.2000	47.2507	123.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		7	.117143	.095518	.310000	.050000	79/10	80/08
			K	3	.050000	.000075	.050000	.050000	80/06	80/09
			T	10	.097000	.084465	.310000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.032222	.023333	.080000	.010000	79/10	80/08
			K	1	.010000		.010000	.010000	80/09	80/09
			T	10	.030000	.023094	.080000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		10	1.84700	.627538	3.15000	1.18000	79/10	80/09
TOT KJEL	N	MG/L		9	.556666	.273816	1.05000	.290000	79/10	80/09
			K	1	.050000		.050000	.050000	79/11	79/11
			T	10	.506000	.303835	1.05000	.050000	79/10	80/09
PHOS-TOT		MG/L P		10	.146400	.068395	.236000	.040000	79/10	80/09
TOT HARD	CACO3	MG/L		5	192.600	42.1702	227.000	145.000	79/10	80/08
CHLORIDE	TOTAL	MG/L		4	21.7500	4.34933	26.0000	16.0000	79/10	80/08
FLUORIDE	F,DISS	MG/L		1	.160000		.160000	.160000	79/10	79/10
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/02
			K	1	5.00000		5.00000	5.00000	80/08	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/10	80/08

TABLE RD 1-201 (Continued)

STATION NUMBER 601910
40 20 29.0 082 03 56.0 2
WALHONDING R AT NELLIE BL DAM
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 014.70

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/02
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/10	80/08
IRON	FE,TOT	UG/L		4	2587.50	2563.53	5800.00	360.000	79/10	80/08
LEAD	PB,TOT	UG/L		4	7.25000	2.62996	10.0000	5.00000	79/10	80/08
MANGNESE	MN	UG/L		3	96.6667	73.7112	180.000	40.0000	79/10	80/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/10	80/02
			K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/10	80/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	79/10	80/08
ALUMINUM	AL,TOT	UG/L		2	1150.00	1343.50	2100.00	200.000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		11	921.545	1251.88	3900.00	25.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		6	2.33333	.516400	3.00000	2.00000	79/10	80/08
MBAS		MG/L		1	.050000		.050000	.050000	79/10	79/10
RESIDUE	DISS-180 C	MG/L		4	203.000	47.1664	272.000	169.000	80/04	80/09
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/10	80/02
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	.500000	.000000	.500000	.500000	79/10	80/08

TABLE RD 1-202

STATION NUMBER 611760
40 02 43.0 081 34 33.0 2
WILLS CRK BL CAMBRIDGE
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 099.40 054.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COD	LOWLEVEL	MG/L		1	15.0000		15.0000	15.0000	78/10	78/10
RESIDUE	DISS-105	C MG/L		1	980.000		980.000	980.000	78/10	78/10
RESIDUE	TOT NFLT	MG/L		1	18.0000		18.0000	18.0000	78/10	78/10
NH3+NH4-	N TOTAL	MG/L		1	.210000		.210000	.210000	78/10	78/10
TOT HARD	CACO3	MG/L		1	519.000		519.000	519.000	78/10	78/10
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	78/10	78/10
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	78/10	78/10
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	78/10	78/10
IRON	FE,TOT	UG/L		1	620.000		620.000	620.000	78/10	78/10
LEAD	PB,TOT	UG/L		1	5.00000		5.00000	5.00000	78/10	78/10
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	78/10	78/10
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	78/10	78/10
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	78/10	78/10
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	78/10	78/10

TABLE RD 1-203

STATION NUMBER 611760
40 02 43.0 081 34 33.0 2
WILLS CRK BL CAMBRIDGE
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 099.40 054.90

No data were collected from 10/79 - 9/80.

TABLE RD 1-204

STATION NUMBER 611770
40 09 34.0 081 50 51.0 2
WILLS CRK BL WILLS CRK DAM
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 099.40 006.20

No data were collected from 10/78 - 9/80.

TABLE RD 1-205

STATION NUMBER 611820
41 00 11.0 081 36 33.0 2
WOLF CRK AT BARBERTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 111.10 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	20.0000	14.3469	39.0000	4.50000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		4	838.250	323.226	1114.00	459.000	78/11	79/08
DO		MG/L		4	6.25000	1.62995	8.60000	4.90000	78/11	79/08
COD	LOWLEVEL	MG/L		4	18.8750	4.58939	23.5000	14.0000	78/11	79/08
PH		SU		4	7.47499	.435034	8.10000	7.10000	78/11	79/08
RESIDUE	DISS-105	C MG/L		3	618.000	87.1091	712.000	540.000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		4	16.0000	5.59762	23.0000	11.0000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.382500	.221717	.620000	.110000	78/11	79/08
NO2-N	TOTAL	MG/L		4	.015000	.005773	.020000	.010000	78/11	79/08
NO3-N	TOTAL	MG/L		4	.569999	.578331	1.42000	.200000	78/11	79/08
TOT KJEL	N	MG/L		4	1.000000	.424264	1.50000	.600000	78/11	79/08
PHOS-TOT		MG/L P		4	.107500	.040311	.140000	.050000	78/11	79/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		3	265.333	22.1902	290.000	247.000	78/11	79/05
CHLORIDE	TOTAL	MG/L		3	156.000	19.5192	176.000	137.000	78/11	79/08
FLUORIDE	F,DISS	MG/L		3	.263333	.040414	.300000	.220000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	37.5000	9.57427	50.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	1380.00	453.982	1890.00	1020.00	78/11	79/05
LEAD	PB,TOT	UG/L		4	62.7500	52.0344	136.000	16.0000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	62.5000	47.1699	130.000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		3	1013.00	1313.86	2500.00	9.00000	78/11	79/05
FECSTREP	MF M-ENT	/100ML		3	1256.33	2031.08	3600.00	9.00000	78/11	79/05
PHENOLS	TOTAL	UG/L		4	4.75000	3.59398	10.0000	2.00000	78/11	79/08
MBAS		MG/L		1	.120000		.120000	.120000	78/11	78/11
MERCURY	HG,TOTAL	UG/L		3	.800000	.519615	1.40000	.500000	79/01	79/08

TABLE RD 1-206

STATION NUMBER 611820
41 00 11.0 081 36 33.0 2
WOLF CRK AT BARBERTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 111.10 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	17.3333	10.9697	30.0000	11.0000	79/11	80/08
CNDUCTVY	FIELD	MICROMHO		3	1433.33	1187.79	2800.00	650.000	79/11	80/08
DO		MG/L		3	8.06667	1.61659	9.00000	6.20000	79/11	80/08
BOD	5 DAY	MG/L		2	1.90000	.424263	2.20000	1.60000	80/02	80/08
COD	LOWLEVEL	MG/L		3	24.3333	30.9893	60.0000	4.00000	79/11	80/08
PH		SU		2	6.85000	.495001	7.20000	6.50000	79/11	80/02
LAB	PH	SU		1	7.20000		7.20000	7.20000	80/08	80/08
RESIDUE	DISS-105	C MG/L		2	1288.00	1154.00	2104.00	472.000	79/11	80/02
RESIDUE	TOT NFLT	MG/L		3	17.3333	6.65835	25.0000	13.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		3	.370000	.065575	.440000	.310000	79/11	80/08
NO2-N	TOTAL	MG/L		3	.013333	.005773	.020000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		3	.616666	.267272	.800000	.310000	79/11	80/08
TOT KJEL	N	MG/L		3	.963333	.149779	1.13000	.840000	79/11	80/08
PHOS-TOT		MG/L P		3	.121667	.036856	.150000	.080000	79/11	80/08
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/11	79/11
			K	1	.010000		.010000	.010000	80/08	80/08
			T	2	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		3	240.000	32.0780	277.000	220.000	79/11	80/08
CALCIUM	CA-TOT	MG/L		1	60.0000		60.0000	60.0000	80/08	80/08
CHLORIDE	TOTAL	MG/L		1	1110.00		1110.00	1110.00	80/02	80/02
SULFATE	SO4-TOT	MG/L		1	84.0000		84.0000	84.0000	80/08	80/08
FLUORIDE	F,DISS	MG/L		1	.250000		.250000	.250000	80/02	80/02
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	80/02	80/02
BARIUM	BA,TOT	UG/L		1	200.000		200.000	200.000	80/02	80/02
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/11	79/11
			K	1	5.00000		5.00000	5.00000	80/08	80/08
			T	2	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	80/02	80/02
CHROMIUM	CR,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/11	80/08

TABLE RD 1-206 (Continued)

STATION NUMBER 611820
41 00 11.0 081 36 33.0 2
WOLF CRK AT BARBERTON
OHIO RIVER (MUSKINGUM RIVER)
MILES 0953.80 0808.80 110.20 111.10 000.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	2	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		3	1386.67	65.0884	1450.00	1320.00	79/11	80/08
LEAD	PB,TOT	UG/L		3	16.3333	7.76747	25.0000	10.0000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	1	100.000		100.000	100.000	80/08	80/08
			T	3	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	3	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		2	90.0000	113.137	170.000	10.0000	80/02	80/08
FECSTREP	MF M-ENT	/100ML		2	335.000	289.914	540.000	130.000	80/02	80/08
PHENOLS	TOTAL	UG/L		3	8.66667	5.68625	15.0000	4.00000	79/11	80/08
MBAS		MG/L		1	.290000		.290000	.290000	80/02	80/02
RESIDUE	DISS-180 C	MG/L		1	492.000		492.000	492.000	80/08	80/08
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/02	80/02
			K	1	.500000		.500000	.500000	80/08	80/08
			T	2	.500000	.000000	.500000	.500000	80/02	80/08

TABLE RD 1-207

STATION NUMBER 600660
38 48 13.0 083 25 16.0 2
OHIO BRUSH CRK NR WEST UNION
OHIO RIVER (OHIO BRUSH CREEK)
MILES 0953.80 0592.80 013.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	15.3750	9.80984	30.0000	2.50000	78/10	79/09
STREAM	FLOW	CFS		10	760.000	1244.58	4167.00	17.0000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		5	287.800	101.071	460.000	200.000	78/12	79/09
CNDUCTVY	AT 25C	MICROMHO		7	436.857	122.922	588.000	206.000	78/10	79/08
DO		MG/L		11	9.78181	2.67949	13.9000	6.40000	78/10	79/09
COD	LOWLEVEL	MG/L		12	11.4167	4.10008	19.0000	4.00000	78/10	79/09
PH		SU		12	7.69999	.422112	8.30000	6.90000	78/10	79/09
T ALK	CACO3	MG/L		2	110.500	142.128	211.000	10.0000	79/06	79/09
RESIDUE	DISS-105	C MG/L		1	279.000		279.000	279.000	79/09	79/09
RESIDUE	TOT NFLT	MG/L		12	38.9167	54.1118	206.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.085833	.055834	.200000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.014167	.007930	.030000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.05583	.576106	1.94000	.080000	78/10	79/09
TOT KJEL	N	MG/L		12	.545000	.342624	1.30000	.200000	78/10	79/09
PHOS-TOT		MG/L P		12	.071667	.052886	.230000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		4	181.500	80.6577	270.000	81.0000	78/11	79/08
SULFATE	SO4-TOT	MG/L		1	43.0000		43.0000	43.0000	78/11	78/11
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		4	2795.00	3093.45	7200.00	580.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	12.0000	6.21825	19.0000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		2	58.0000	25.4558	76.0000	40.0000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		9	975.555	1274.10	4000.00	100.000	78/10	79/09
			K	1	3.30000		3.30000	3.30000	79/03	79/03
			L	1	400.000		400.000	400.000	78/11	78/11
			T	11	834.845	1185.13	4000.00	3.30000	78/10	79/09
PHENOLS	TOTAL	UG/L		3	4.33333	1.52753	6.00000	3.00000	79/02	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-208

STATION NUMBER 600660
38 48 13.0 083 25 16.0 2
OHIO BRUSH CRK NR WEST UNION
OHIO RIVER (OHIO BRUSH CREEK)
MILES 0953.80 0592.80 013.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	10.8889	8.34707	25.0000	1.00000	79/10	80/07
STREAM	FLOW	CFS		4	219.000	65.9394	284.000	128.000	79/10	80/02
STREAM	FLOW,	INST-CFS		5	2464.60	3795.28	9152.00	71.0000	80/03	80/08
STREAM	STAGE	FEET		9	4.76888	3.03490	12.5000	2.72000	79/10	80/08
CNDUCTVY	FIELD	MICROMHO		3	311.666	45.3707	360.000	270.000	79/10	79/12
CNDUCTVY	AT 25C	MICROMHO		7	374.571	101.948	497.000	217.000	79/11	80/08
DO		MG/L		10	9.80999	2.50887	13.6000	6.30000	79/10	80/08
BOD	5 DAY	MG/L		1	34.0000		34.0000	34.0000	79/10	79/10
COD	LOWLEVEL	MG/L		9	31.0000	24.2487	70.0000	6.00000	79/11	80/08
PH		SU		8	7.91250	.551511	8.50000	7.00000	79/11	80/08
LAB	PH	SU		2	8.00000	.141436	8.10000	7.90000	79/10	80/02
RESIDUE	DISS-105	C MG/L		2	292.500	2.12132	294.000	291.000	79/10	79/11
RESIDUE	TOT NFLT	MG/L		9	219.111	362.321	1140.00	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		8	.070000	.039641	.150000	.030000	79/10	80/07
			K	2	.050000	.000061	.050000	.050000	80/03	80/08
			T	10	.066000	.035963	.150000	.030000	79/10	80/08
NO2-N	TOTAL	MG/L		9	.042222	.037006	.110000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		10	1.22100	.656225	2.47000	.280000	79/10	80/08
TOT KJEL	N	MG/L		10	.598000	.831154	2.92000	.160000	79/10	80/08
PHOS-TOT		MG/L P		10	.163800	.224831	.741000	.014000	79/10	80/08
TOT HARD	CACO3	MG/L		4	203.250	69.0380	263.000	116.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		2	9.00000	.000000	9.00000	9.00000	79/11	80/02
SULFATE	SO4-TOT	MG/L		2	23.0000	14.1421	33.0000	13.0000	79/11	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-208 (Continued)

STATION NUMBER 600660
38 48 13.0 083 25 16.0 2
OHIO BRUSH CRK NR WEST UNION
OHIO RIVER (OHIO BRUSH CREEK)
MILES 0953.80 0592.80 013.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	11047.5	16987.7	36000.0	240.000	79/11	80/08
LEAD	PB,TOT	UG/L		4	14.0000	9.89949	28.0000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		2	495.000	657.609	960.000	30.0000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		3	50.0000	34.6410	90.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	4	45.0000	30.0000	90.0000	30.0000	79/11	80/08
ALUMINUM	AL,TOT	UG/L		1	2900.00		2900.00	2900.00	80/05	80/05
FEC COLI	MFM-FCBR	/100ML		9	2380.22	3850.82	12000.0	72.0000	79/10	80/09
PHENOLS	TOTAL	UG/L		4	5.25000	3.59398	10.0000	2.00000	79/11	80/08
RESIDUE	DISS-180 C	MG/L		5	223.400	30.6485	252.000	171.000	80/03	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-209

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE R. AT WOODVILLE
LAKE ERIE 060492 (PORTAGE RIVER BASIN)
MILES 0028.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	13.0500	9.22548	24.4000	.000000	78/10	79/09
TURB	JKSN	JTU		4	33.2500	34.8522	70.0000	1.80000	78/11	79/09
CNDUCTVY	AT 25C	MICROMHO		10	872.700	268.560	1430.00	553.000	78/10	79/09
DO		MG/L		8	9.31250	2.69627	14.2000	6.00000	78/10	79/09
BOD	5 DAY	MG/L		6	3.03333	1.00731	4.20000	1.60000	78/10	79/09
COD	LOWLEVEL	MG/L		9	19.1555	5.97896	26.0000	6.80000	78/10	79/09
LAB	PH	SU		10	7.96999	.383158	8.70000	7.40000	78/10	79/09
T ALK	CACO3	MG/L		3	173.000	16.6433	185.000	154.000	78/11	79/09
RESIDUE	DISS-105	C MG/L		9	492.555	174.423	882.000	330.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		10	34.5000	26.3069	85.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		10	.697000	1.18779	2.98000	.050000	78/10	79/09
			K	1	.050000		.050000	.050000	79/07	79/07
			T	11	.638181	1.14359	2.98000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.076000	.055217	.200000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		10	5.56000	3.71544	11.4000	1.33000	78/10	79/09
TOT KJEL	N	MG/L		10	2.02600	1.30823	4.40000	.700000	78/10	79/09
PHOS-TOT		MG/L P		10	.244000	.181855	.650000	.050000	78/10	79/09
PHOS-DIS		MG/L P		5	.138000	.128724	.360000	.050000	79/01	79/07
T ORG C	C	MG/L		6	14.0833	10.9136	35.0000	5.20000	78/11	79/06
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/09	79/09
			K	1	.010000		.010000	.010000	79/07	79/07
			T	2	.010000	.000000	.010000	.010000	79/07	79/09
TOT HARD	CACO3	MG/L		9	313.111	63.9170	440.000	236.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		10	67.9000	61.9954	195.000	15.0000	78/10	79/09
SULFATE	SO4-TOT	MG/L		9	122.889	63.1357	256.000	59.0000	78/10	79/09
FLUORIDE	F,DISS	MG/L		3	.263333	.049329	.320000	.230000	79/04	79/09
SILICA	DISOLVED	MG/L		7	4.89142	2.61291	8.80000	1.80000	79/01	79/09
ARSENIC	AS,TOT	UG/L		9	11.1111	3.33334	20.0000	10.0000	78/10	79/09
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	10	11.0000	3.16228	20.0000	10.0000	78/10	79/09
CADMIUM	CD,TOT	UG/L		8	5.00000	.000000	5.00000	5.00000	78/10	79/09
			K	2	5.00000	.000000	5.00000	5.00000	79/07	79/07
			T	10	5.00000	.000000	5.00000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		9	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	10	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07
			T	10	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		5	2122.00	1504.33	4000.00	800.000	79/04	79/09
IRON	FE,DISS	UG/L		3	43.3333	23.0941	70.0000	30.0000	79/07	79/09

TABLE RD 1-209 (Continued)

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE R. AT WOODVILLE
LAKE ERIE 060492 (PORTAGE RIVER BASIN)
MILES 0028.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L		9	14.2222	14.7714	52.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		3	46.6667	15.2753	60.0000	30.0000	79/04	79/09
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/06
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/05	79/05
ZINC	ZN,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07
			T	10	30.0000	.000000	30.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		4	1075.00	670.199	1700.00	400.000	79/05	79/09
SELENIUM	SE,TOT	UG/L		3	38.3333	53.4634	100.000	5.00000	79/05	79/09
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	4	30.0000	46.7261	100.000	5.00000	79/05	79/09
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
			K	1	1.00000		1.00000	1.00000	79/04	79/04
			T	2	1.00000	.000000	1.00000	1.00000	78/10	79/04
ALPHA	DISOLVED	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
ALPHA	SUSP	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
BETA	TOTAL	PC/L		1	13.0000		13.0000	13.0000	78/10	78/10
			K	1	2.00000		2.00000	2.00000	79/04	79/04
			T	2	7.50000	7.77817	13.0000	2.00000	78/10	79/04
BETA	DISOLVED	PC/L	K	1	2.00000		2.00000	2.00000	79/04	79/04
BETA	SUSP	PC/L	K	1	2.00000		2.00000	2.00000	79/04	79/04
FEC COLI	MFM-FCBR	/100ML		7	1280.14	1251.92	3600.00	1.00000	79/01	79/09
FECSTREP	MF M-ENT	/100ML		3	290.000	247.588	570.000	100.000	79/04	79/06
PHENOLS	TOTAL	UG/L		2	6.00000	1.41421	7.00000	5.00000	79/05	79/07
MBAS		MG/L		9	.216666	.084854	.380000	.090000	78/10	79/09
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/06	79/06
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/06	79/06

TABLE RD 1-209 (Continued)

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE R. AT WOODVILLE
LAKE ERIE 060492 (PORTAGE RIVER BASIN)
MILES 0028.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/06	79/06
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/06	79/06
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/06	79/06
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/06	79/06
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/06	79/06
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		9	.500000	.000000	.500000	.500000	78/10	79/09
			K	1	.500000		.500000	.500000	79/07	79/07
			T	10	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-210

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE R. AT WOODVILLE
LAKE ERIE 060492 (PORTAGE RIVER BASIN)
MILES 0028.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	12.8000	8.55647	23.1000	3.00000	79/12	80/09
TURB	JKSN	JTU		2	52.5000	2.12132	54.0000	51.0000	80/03	80/04
TURB	TRBIDMTR	HACH FTU		2	52.5000	2.12132	54.0000	51.0000	80/03	80/04
CNDUCTVY	AT 25C	MICROMHO		2	824.500	248.195	1000.00	649.000	79/12	80/04
DO		MG/L		7	9.00000	2.14633	12.6000	6.50000	79/12	80/09
BOD	5 DAY	MG/L		6	3.23333	1.43202	5.30000	1.00000	79/12	80/09
COD	LOWLEVEL	MG/L		7	37.8714	35.5577	102.000	3.00000	79/10	80/09
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	8	33.6375	35.0305	102.000	3.00000	79/10	80/09
LAB	PH	SU		8	7.44999	.454815	8.08000	6.80000	79/10	80/09
T ALK	CACO3	MG/L		2	182.000	49.4975	217.000	147.000	79/12	80/03
RESIDUE	DISS-105	C MG/L		6	435.000	125.070	537.000	201.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		7	54.7857	33.3640	86.5000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/07	80/07
			T	8	49.1875	34.7110	86.5000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		7	.497142	.889002	2.50000	.050000	79/10	80/09
			K	2	.050000	.000061	.050000	.050000	80/04	80/06
			T	9	.397777	.794745	2.50000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.082222	.093110	.260000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		9	7.48888	8.42511	22.8000	1.17000	79/10	80/09
TOT KJEL	N	MG/L		9	1.06889	.349088	1.77000	.600000	79/10	80/09
PHOS-TOT		MG/L P		8	.195000	.051824	.260000	.120000	79/10	80/07
T ORG C	C	MG/L		3	18.0000	4.58258	23.0000	14.0000	80/03	80/09
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/10	79/10
			K	1	.010000		.010000	.010000	79/10	79/10
			T	2	.010000	.000000	.010000	.010000	79/10	79/10
TOT HARD	CACO3	MG/L		9	312.111	52.2507	401.000	220.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		9	58.5555	38.4224	119.000	18.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		9	109.111	40.8946	160.000	42.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		2	.435000	.176777	.560000	.310000	79/10	79/12
FLUORIDE	F,TOTAL	MG/L		4	.250000	.024494	.280000	.230000	80/03	80/06
SILICA	DISOLVED	MG/L		1	.430000		.430000	.430000	79/10	79/10
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	79/10	79/12
			K	6	10.0000	.000000	10.0000	10.0000	79/10	80/09
			T	8	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	79/12
			K	7	5.00000	.000000	5.00000	5.00000	79/10	80/09
			T	9	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
CHROMIUM	CR,TOT	UG/L		5	32.0000	4.47214	40.0000	30.0000	79/10	80/09
			K	4	30.0000	.000000	30.0000	30.0000	79/10	80/07

TABLE RD 1-210 (Continued)

STATION NUMBER 500510
41 26 58.0 083 21 29.0 2
PORTAGE R. AT WOODVILLE
LAKE ERIE 060492 (PORTAGE RIVER BASIN)
MILES 0028.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L	T	9	31.1111	3.33359	40.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		9	2220.00	1891.64	5300.00	380.000	79/10	80/09
IRON	FE,DISS	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/10
LEAD	PB,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/04
			K	6	8.33333	8.16497	25.0000	5.00000	79/10	80/09
			T	9	7.22222	6.66667	25.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		8	55.0000	19.2725	80.0000	30.0000	79/10	80/09
MANGNESE	MN,DISS	UG/L		1	30.0000		30.0000	30.0000	79/10	79/10
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	79/12
			K	7	30.0000	.000000	30.0000	30.0000	79/10	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		9	1077.78	913.480	2600.00	200.000	79/10	80/09
ALPHA	TOTAL	PC/L	K	2	1.00000	.000000	1.00000	1.00000	80/03	80/04
BETA	TOTAL	PC/L		2	10.0000	1.41421	11.0000	9.00000	80/03	80/04
FEC COLI	MFM-FCBR	/100ML		6	996.666	747.361	2100.00	130.000	79/10	80/09
PHENOLS	TOTAL	UG/L		3	6.00000	3.46410	8.00000	2.00000	79/10	79/12
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	4	5.00000	3.46410	8.00000	2.00000	79/10	80/03
MBAS		MG/L		8	.158750	.073181	.270000	.060000	79/10	80/09
RESIDUE	DISS-180	C MG/L		2	362.000	82.0244	420.000	304.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.633333	.230941	.900000	.500000	79/10	80/06
			K	6	.500000	.000000	.500000	.500000	79/10	80/09
			T	9	.544444	.133334	.900000	.500000	79/10	80/09

TABLE RD 1-211

STATION NUMBER 500520
41 24 37.0 083 27 31.0 2
N BR PORTAGE R AT PEMBERVILLE
LAKE ERIE (PORTAGE RIVER)
(RIVER MILE 0.1)

No data were collected from 10/78 - 9/79.

TABLE RD 1-212

STATION NUMBER 500520
41 24 37.0 083 27 31.0 2
N BR PORTAGE R AT PEMBERVILLE
LAKE ERIE (PORTAGE RIVER)
MILES

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	4.20000	1.55563	5.30000	3.10000	79/12	80/04
TURB	JKSN	JTU		1	22.5000		22.5000	22.5000	80/04	80/04
TURB	TRBIDMTR	HACH FTU		1	22.5000		22.5000	22.5000	80/04	80/04
CNDUCTVY	AT 25C	MICROMHO		2	907.000	202.233	1050.00	764.000	79/12	80/04
DO		MG/L		1	11.2000		11.2000	11.2000	79/12	79/12
			L	1	15.0000		15.0000	15.0000	80/04	80/04
			T	2	13.1000	2.68705	15.0000	11.2000	79/12	80/04
BOD	5 DAY	MG/L		2	3.95000	2.89914	6.00000	1.90000	79/12	80/04
COD	LOWLEVEL	MG/L		1	22.0000		22.0000	22.0000	79/12	79/12
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	2	13.0000	12.7279	22.0000	4.00000	79/12	80/04
LAB	PH	SU		2	7.62000	.296978	7.83000	7.41000	79/12	80/04
RESIDUE	DISS-105	C MG/L		2	481.500	168.999	601.000	362.000	79/12	80/04
RESIDUE	TOT NFLT	MG/L		2	29.0000	26.8701	48.0000	10.0000	79/12	80/04
NH3+NH4-	N TOTAL	MG/L		1	1.13000		1.13000	1.13000	79/12	79/12
			K	1	.050000		.050000	.050000	80/04	80/04
			T	2	.589999	.763675	1.13000	.050000	79/12	80/04
NO2-N	TOTAL	MG/L		2	.165000	.035356	.190000	.140000	79/12	80/04
NO3-N	TOTAL	MG/L		2	8.75500	1.42132	9.76000	7.75000	79/12	80/04
TOT KJEL	N	MG/L		2	1.35500	.629325	1.80000	.910000	79/12	80/04
PHOS-TOT		MG/L P		2	.625000	.601040	1.05000	.200000	79/12	80/04
T ORG C	C	MG/L		1	17.0000		17.0000	17.0000	80/04	80/04
TOT HARD	CACO3	MG/L		2	381.500	36.0624	407.000	356.000	79/12	80/04
CHLORIDE	TOTAL	MG/L		2	64.0000	28.2843	84.0000	44.0000	79/12	80/04
SULFATE	SO4-TOT	MG/L		2	134.500	31.8198	157.000	112.000	79/12	80/04
FLUORIDE	F,DISS	MG/L		1	.460000		.460000	.460000	79/12	79/12
FLUORIDE	F,TOTAL	MG/L		1	.330000		.330000	.330000	80/04	80/04
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/12	79/12
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	2	10.0000	.000000	10.0000	10.0000	79/12	80/04
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	1	5.00000		5.00000	5.00000	80/04	80/04
			T	2	5.00000	.000000	5.00000	5.00000	79/12	80/04

TABLE RD 1-212 (Continued)

STATION NUMBER 500520
41 24 37.0 083 27 31.0 2
N BR PORTAGE R AT PEMBERVILLE
LAKE ERIE (PORTAGE RIVER)
(RIVER MILE 0.1)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	30.0000	.000000	30.0000	30.0000	79/12	80/04
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	30.0000	.000000	30.0000	30.0000	79/12	80/04
IRON	FE,TOT	UG/L		2	1285.00	1025.30	2010.00	560.000	79/12	80/04
LEAD	PB,TOT	UG/L		2	9.00000	5.65685	13.0000	5.00000	79/12	80/04
MANGNESE	MN	UG/L		2	80.0000	42.4264	110.000	50.0000	79/12	80/04
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	30.0000	.000000	30.0000	30.0000	79/12	80/04
ALUMINUM	AL,TOT	UG/L		2	600.000	565.686	1000.00	200.000	79/12	80/04
FEC COLI	MFM-FCBR	/100ML		1	3500.00		3500.00	3500.00	80/04	80/04
MBAS		MG/L		2	.225000	.007072	.230000	.220000	79/12	80/04
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/12	79/12
			K	1	.500000		.500000	.500000	80/04	80/04
			T	2	.500000	.000000	.500000	.500000	79/12	80/04

TABLE RD 1-213

STATION NUMBER 601400
38 52 25.0 082 21 22.0 2
RACCOON CRK AT ADAMSVILLE
OHIO RIVER (RACCOON CREEK)
MILES 0953.80 0704.90 029.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.0417	8.88937	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		12	1429.08	2070.41	7442.00	70.0000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		5	296.000	129.393	490.000	155.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		7	370.143	155.549	582.000	147.000	78/11	79/08
DO		MG/L		11	10.4818	2.38237	13.8000	7.40000	78/10	79/09
COD	LOWLEVEL	MG/L		11	5.36364	1.62928	8.00000	4.00000	78/10	79/09
PH		SU		12	5.67499	.570726	7.10000	4.90000	78/10	79/09
LAB	PH	SU		1	6.70000		6.70000	6.70000	79/06	79/06
T ACDITY	CACO3	MG/L		10	23.8000	13.0197	52.0000	11.0000	78/10	79/09
RESIDUE	DISS-105	C MG/L		1	222.000		222.000	222.000	79/09	79/09
RESIDUE	TOT NFLT	MG/L		12	19.9167	12.7597	42.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.146666	.084567	.290000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.010000	.000008	.010000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	.433333	.130198	.730000	.260000	78/10	79/09
TOT KJEL	N	MG/L		12	.290833	.132491	.600000	.090000	78/10	79/09
PHOS-TOT		MG/L P		12	.085000	.075498	.260000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		5	131.600	43.2760	191.000	92.0000	78/10	79/08
CHLORIDE	TOTAL	MG/L		2	40.0000	8.48528	46.0000	34.0000	78/11	79/07
SULFATE	SO4-TOT	MG/L		2	144.000	35.3553	169.000	119.000	79/06	79/07
CADMIUM	CD,TOT	UG/L		4	5.75000	1.50000	8.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		10	1525.00	919.351	2740.00	400.000	78/10	79/08
FERROUS	IRON	UG/L		1	790.000		790.000	790.000	79/09	79/09
LEAD	PB,TOT	UG/L		4	30.2500	36.6276	84.0000	6.00000	78/11	79/08
MANGNESE	MN	UG/L		11	1690.91	826.541	3100.00	450.000	78/10	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	45.0000	19.1485	70.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		9	72.4444	78.9843	190.000	1.00000	78/10	79/09
			K	2	4.30000	3.25269	6.60000	2.00000	79/03	79/05
			T	11	60.0545	75.8403	190.000	1.00000	78/10	79/09
PHENOLS	TOTAL	UG/L		3	4.66667	2.51661	7.00000	2.00000	79/02	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-214

STATION NUMBER 601400
38 52 25.0 082 21 22.0 2
RACCOON CRK AT ADAMSVILLE
OHIO RIVER (RACCOON CREEK)
MILES 0953.80 0704.90 029.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	10.0909	7.60532	21.5000	1.00000	79/10	80/09
STREAM	FLOW	CFS		5	679.000	208.388	1012.00	483.000	79/10	80/02
STREAM	FLOW,	INST-CFS		6	932.333	601.742	1826.00	239.000	80/03	80/09
STREAM	STAGE	FEET		8	6.76624	2.44187	11.2700	3.86000	79/11	80/09
CNDUCTVY	FIELD	MICROMHO		3	186.000	53.9259	248.000	150.000	79/11	80/01
CNDUCTVY	AT 25C	MICROMHO		7	318.000	61.1365	408.000	238.000	79/11	80/09
DO		MG/L		10	9.93000	1.85177	13.8000	7.50000	79/10	80/09
COD	LOWLEVEL	MG/L		10	29.4000	50.0227	168.000	4.00000	79/10	80/08
			K	1	4.00000		4.00000	4.00000	80/09	80/09
			T	11	27.0909	48.0697	168.000	4.00000	79/10	80/09
PH		SU		9	6.14444	.604422	6.80000	5.20000	79/11	80/09
LAB	PH	SU		2	6.65000	.353553	6.90000	6.40000	79/10	80/02
T ACDITY	CACO3	MG/L		3	10.0000	.000000	10.0000	10.0000	79/10	79/12
RESIDUE	DISS-105	C MG/L		5	201.200	30.6548	240.000	158.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		9	20.6667	20.6821	74.0000	10.0000	79/10	80/08
			K	2	10.0000	.000000	10.0000	10.0000	80/06	80/09
			T	11	18.7273	18.9952	74.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	.111818	.046221	.170000	.060000	79/10	80/09
NO2-N	TOTAL	MG/L		7	.010000	.000009	.010000	.010000	79/10	80/06
			K	4	.010000	.000000	.010000	.010000	80/03	80/09
			T	11	.010000	.000008	.010000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		11	.388181	.119652	.660000	.280000	79/10	80/09
TOT KJEL	N	MG/L		11	.232727	.071568	.350000	.130000	79/10	80/09
PHOS-TOT		MG/L P		9	.024556	.021090	.074000	.008000	79/10	80/08
			K	2	.020000	.000000	.020000	.020000	80/06	80/09
			T	11	.023727	.018953	.074000	.008000	79/10	80/09
TOT HARD	CACO3	MG/L		8	125.000	20.3891	154.000	96.0000	79/11	80/09
CHLORIDE	TOTAL	MG/L		2	15.5000	2.12132	17.0000	14.0000	79/11	80/01
SULFATE	SO4-TOT	MG/L		7	108.143	12.9289	128.000	93.0000	79/11	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/11	80/05
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	5	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	7	30.0000	.000000	30.0000	30.0000	79/11	80/09
IRON	FE,TOT	UG/L		11	1593.64	1234.76	4700.00	440.000	79/10	80/09
LEAD	PB,TOT	UG/L		3	353.333	603.331	1050.00	5.00000	79/11	80/03
			K	2	7.50000	3.53553	10.0000	5.00000	80/05	80/08

TABLE RD 1-214 (Continued)

STATION NUMBER 601400
38 52 25.0 082 21 22.0 2
RACCOON CRK AT ADAMSVILLE
OHIO RIVER (RACCOON CREEK)
MILES 0953.80 0704.90 029.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
LEAD	PB,TOT	UG/L	T	5	215.000	466.784	1050.00	5.00000	79/11	80/08
MANGNESE	MN	UG/L		10	1678.00	451.362	2520.00	1050.00	79/10	80/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/11	80/05
			K	1	100.000		100.000	100.000	80/08	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		9	50.0000	23.4521	100.000	30.0000	79/11	80/09
ALUMINUM	AL,TOT	UG/L		6	500.000	244.949	900.000	200.000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		7	112.000	84.5281	230.000	2.00000	79/10	80/06
			L	1	200.000		200.000	200.000	80/04	80/04
			T	8	123.000	84.2157	230.000	2.00000	79/10	80/06
PHENOLS	TOTAL	UG/L		3	2.33333	.577352	3.00000	2.00000	79/11	80/05
			K	1	2.00000		2.00000	2.00000	80/08	80/08
			T	4	2.25000	.500000	3.00000	2.00000	79/11	80/08
RESIDUE	DISS-180	C MG/L		4	248.500	42.8680	293.000	193.000	80/05	80/09
T ACDITY	HOT-MG/L	CACO3	K	4	10.0000	.000000	10.0000	10.0000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-215

STATION NUMBER 501800
41 24 24.0 081 53 14.0 2
ROCKY R NEAR BEREA
LAKE ERIE 060591 (ROCKY RIVER)
MILES 0012.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	10.3333	9.40342	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	146.000	139.680	416.000	33.0000	78/10	79/08
TURB	JKSN	JTU		11	12.7364	17.7020	61.0000	1.40000	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		12	585.833	128.963	750.000	360.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	1010.00		1010.00	1010.00	79/03	79/03
DO		MG/L		12	10.1667	2.66129	15.0000	6.60000	78/10	79/09
BOD	5 DAY	MG/L		1	3.60000		3.60000	3.60000	78/10	78/10
COD	LOWLEVEL	MG/L		12	20.6667	9.33257	40.0000	10.0000	78/10	79/09
PH		SU		12	7.58333	.279032	8.00000	6.90000	78/10	79/09
T ALK	CACO3	MG/L		11	128.818	26.1069	174.000	81.0000	78/11	79/09
RESIDUE	DISS-105	C MG/L		9	529.333	110.818	724.000	389.000	78/10	79/08
RESIDUE	TOT NFLT	MG/L		12	20.5833	21.7359	80.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		11	1.28363	.906478	2.82000	.100000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.209166	.174901	.590000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	1.98333	.910510	3.10000	.300000	78/10	79/09
TOT KJEL	N	MG/L		12	2.23416	.981019	4.07000	1.10000	78/10	79/09
PHOS-TOT		MG/L P		12	.934166	.711828	2.31000	.180000	78/10	79/09
PHOS-DIS		MG/L P		8	.779999	.695475	2.14000	.240000	78/10	79/06
T ORG C	C	MG/L		7	11.5857	4.05810	19.4000	7.10000	78/11	79/05
D ORG C	C	MG/L		1	8.70000		8.70000	8.70000	78/12	78/12
TOT HARD	CACO3	MG/L		8	239.125	41.9675	317.000	187.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		12	110.083	64.0149	208.000	24.0000	78/10	79/09
SULFATE	SO4-TOT	MG/L		11	110.091	25.2725	158.000	79.0000	78/11	79/09
SILICA	DISOLVED	MG/L		10	5.14799	2.71258	8.32000	1.24000	78/10	79/08
ARSENIC	AS,TOT	UG/L		2	10.0000	.000000	10.0000	10.0000	78/10	79/07
CADMIUM	CD,TOT	UG/L		7	5.71428	1.88983	10.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/10	79/09
IRON	FE,TOT	UG/L		8	800.000	618.939	2290.00	380.000	78/10	79/09
LEAD	PB,TOT	UG/L		8	17.7500	22.4992	72.0000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		1	120.000		120.000	120.000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		6	100.000	.000000	100.000	100.000	79/01	79/09
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
ZINC	ZN,TOT	UG/L		6	35.0000	12.2474	60.0000	30.0000	79/01	79/09
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/07	79/07
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		10	2612.00	2736.87	8100.00	430.000	78/10	79/08
FECSTREP	MF M-ENT	/100ML		10	1715.00	1063.37	3800.00	530.000	78/10	79/08
PHENOLS	TOTAL	UG/L		11	6.00000	3.40588	12.0000	2.00000	78/10	79/09
MBAS		MG/L		2	.290000	.084853	.350000	.230000	78/10	79/02
MERCURY	HG,TOTAL	UG/L		7	.542857	.113391	.800000	.500000	78/10	79/09

TABLE RD 1-216

STATION NUMBER 501800
41 24 24.0 081 53 14.0 2
ROCKY R NEAR BEREA
LAKE ERIE 060591 (ROCKY RIVER)
MILES 0012.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	10.1000	8.16088	23.5000	.000000	79/10	80/09
			M	1	-.500E+00		-.500E+00	-.500E+00	80/02	80/02
			T	11	9.13636	8.37583	23.5000	-.500E+00	79/10	80/09
STREAM	FLOW	CFS		4	122.875	56.3148	190.800	59.0000	79/11	80/02
STREAM	FLOW,	INST-CFS		4	137.750	105.037	289.000	49.4000	80/03	80/07
STREAM	STAGE	FEET		6	1.58500	.739750	2.99000	.950000	80/03	80/09
TURB	JKSN	JTU		4	8.34999	4.23519	11.5000	2.10000	79/11	80/02
TURB	TRBIDMTR	HACH FTU		4	30.7000	27.2169	65.0000	6.80000	80/03	80/07
CNDUCTVY	FIELD	MICROMHO		10	528.000	150.835	720.000	300.000	79/11	80/09
CNDUCTVY	AT 25C	MICROMHO		1	588.000		588.000	588.000	80/03	80/03
DO		MG/L		11	11.4909	3.69309	18.6000	5.60000	79/10	80/09
COD	LOWLEVEL	MG/L		10	23.1000	17.2977	53.0000	4.00000	79/10	80/08
PH		SU		10	7.86999	.343434	8.40000	7.40000	79/11	80/09
LAB	PH	SU		1	7.70000		7.70000	7.70000	80/08	80/08
T ALK	CACO3	MG/L		11	132.545	36.1287	224.000	84.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		4	489.000	70.2472	576.000	420.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		11	42.4545	55.1514	179.000	10.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/08	80/08
			T	12	39.7500	53.4128	179.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		11	1.16454	1.00767	3.27000	.170000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.071000	.055867	.180000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		11	1.57545	.562003	2.38000	.730000	79/10	80/09
TOT KJEL	N	MG/L		11	1.84909	1.30299	4.90000	.520000	79/10	80/09
PHOS-TOT		MG/L P		9	.707444	.531007	1.89000	.220000	79/12	80/09
PHOS-DIS		MG/L P		8	.436249	.449046	1.39000	.031000	79/12	80/09
T ORG C	C	MG/L		7	13.4286	3.59895	18.0000	8.00000	79/12	80/09
D ORG C	C	MG/L		3	10.6667	2.51664	13.0000	8.00000	80/03	80/09
SULFITE	SO3	MG/L		1	108.000		108.000	108.000	79/10	79/10
TOT HARD	CACO3	MG/L		6	212.333	19.1804	239.000	187.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		10	87.2000	27.8121	149.000	51.0000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/04	80/04
			T	11	79.7273	36.1998	149.000	5.00000	79/10	80/09
SULFATE	SO4-TOT	MG/L		9	98.8889	11.9318	121.000	83.0000	79/11	80/09
			K	1	10.0000		10.0000	10.0000	80/04	80/04
			T	10	90.0000	30.2765	121.000	10.0000	79/11	80/09
FLUORIDE	F,TOTAL	MG/L		1	.240000		.240000	.240000	80/03	80/03
SILICA	DISOLVED	MG/L		9	6.45999	1.18221	7.97000	5.23000	79/11	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/07	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	4	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	6	5.00000	.000000	5.00000	5.00000	79/10	80/09

TABLE RD 1-216 (Continued)

STATION NUMBER 501800
41 24 24.0 081 53 14.0 2
ROCKY R NEAR BEREA
LAKE ERIE 060591 (ROCKY RIVER)
MILES 0012.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	6	30.0000	.000000	30.0000	30.0000	79/10	80/09
IRON	FE,TOT	UG/L		6	2141.67	1487.26	4400.00	540.000	79/10	80/09
LEAD	PB,TOT	UG/L		5	12.2000	13.4052	36.0000	5.00000	79/10	80/09
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	6	11.0000	12.3450	36.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		2	340.000	311.127	560.000	120.000	80/07	80/09
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	4	100.000	.000000	100.000	100.000	80/03	80/09
			T	6	100.000	.000000	100.000	100.000	79/10	80/09
VANADIUM	V,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/07	80/09
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/10	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/05
			T	6	33.3333	8.16500	50.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		2	1300.00	424.264	1600.00	1000.00	80/07	80/09
SELENIUM	SE,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/07	80/09
FEC COLI	MFM-FCBR	/100ML		12	4525.83	8076.76	29000.0	140.000	79/10	80/09
FECSTREP	MF M-ENT	/100ML		12	10085.0	21043.3	69000.0	100.000	79/10	80/09
PHENOLS	TOTAL	UG/L		9	4.22222	2.27914	8.00000	2.00000	79/11	80/09
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	10	4.00000	2.26078	8.00000	2.00000	79/11	80/09
DIETHYLP	HTHALATE	TOTWUG/L	K	1	100.000		100.000	100.000	80/09	80/09
DIMETHYL	PHTHALAT	TOTWUG/L	K	1	100.000		100.000	100.000	80/09	80/09
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	80/09	80/09
RESIDUE	DISS-180	C MG/L		6	378.666	67.5368	436.000	254.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	4	.500000	.000000	.500000	.500000	80/03	80/09
			T	6	.500000	.000000	.500000	.500000	79/10	80/09
DIBUTYL	NONANDOA	TOT UG/L	K	1	100.000		100.000	100.000	80/09	80/09

TABLE RD 1-217

STATION NUMBER 501820
41 10 15.0 081 51 08.0 2
WEST BR ROCKY RIVER BELOW MEDINA - FENN RD
LAKE ERIE (ROCKY RIVER)
MILES 0012.30 0026.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	10.6250	9.44612	23.0000	.000000	78/10	79/07
CNDUCTVY	FIELD	MICROMHO		4	757.500	237.820	1000.00	430.000	78/10	79/07
CNDUCTVY	AT 25C	MICROMHO		1	1880.00		1880.00	1880.00	79/01	79/01
DO		MG/L		4	7.07500	4.92975	13.1000	1.60000	78/10	79/07
COD	LOWLEVEL	MG/L		5	51.7800	44.3898	125.000	21.9000	78/10	79/07
PH		SU		4	7.34999	.288825	7.60000	7.10000	78/10	79/07
LAB	PH	SU		1	7.87000		7.87000	7.87000	79/01	79/01
RESIDUE	DISS-105	C MG/L		4	577.000	285.174	1000.00	406.000	79/01	79/07
RESIDUE	TOT NFLT	MG/L		5	20.8000	16.7093	48.0000	10.0000	78/10	79/07
NH3+NH4-	N TOTAL	MG/L		5	2.19200	2.61101	6.49000	.100000	78/10	79/07
NO2-N	TOTAL	MG/L		4	.057500	.045735	.110000	.010000	78/10	79/07
NO3-N	TOTAL	MG/L		4	.222500	.318891	.700000	.050000	78/10	79/07
TOT KJEL	N	MG/L		4	4.97499	3.90503	10.4000	1.30000	78/10	79/07
PHOS-TOT		MG/L P		4	1.39500	1.09388	3.02000	.660000	78/10	79/07
CYANIDE	CN-TOT	MG/L		3	.083333	.056862	.130000	.020000	79/01	79/07
TOT HARD	CACO3	MG/L		4	264.750	51.4093	333.000	219.000	78/10	79/07
CHLORIDE	TOTAL	MG/L		3	148.667	168.986	341.000	24.0000	79/01	79/07
CADMIUM	CD,TOT	UG/L		4	13.5000	9.81495	22.0000	5.00000	78/10	79/07
CHROMIUM	CR,TOT	UG/L		4	42.5000	25.0000	80.0000	30.0000	78/10	79/07
COPPER	CU,TOT	UG/L		4	37.5000	15.0000	60.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		4	992.500	453.900	1620.00	630.000	78/10	79/07
LEAD	PB,TOT	UG/L		4	38.5000	53.7308	119.000	8.00000	78/10	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/10	79/07
ZINC	ZN,TOT	UG/L		4	125.000	111.505	280.000	30.0000	78/10	79/07
FEC COLI	MFM-FCBR	/100ML		3	41600.0	31007.7	60000.0	5800.00	78/10	79/07
			K	1	890.000		890.000	890.000	79/04	79/04
			T	4	31422.5	32485.5	60000.0	890.000	78/10	79/07
FECSTREP	MF M-ENT	/100ML		3	620133	1022146	1800000	3400.00	78/10	79/07
			K	1	890.000		890.000	890.000	79/04	79/04
			T	4	465323	890161	1800000	890.000	78/10	79/07
PHENOLS	TOTAL	UG/L		3	9.33333	4.50927	14.0000	5.00000	78/10	79/07
MBAS		MG/L		2	.705000	.134349	.800000	.610000	79/01	79/07
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/10	79/07

TABLE RD 1-218

STATION NUMBER 501820
41 10 15.0 081 51 08.0 2
WEST BR ROCKY RIVER BELOW MEDINA - FENN RD
LAKE ERIE (ROCKY RIVER)
MILES 0012.30 0026.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	11.5000	10.7703	23.0000	.000000	79/10	80/07
CNDUCTVY	FIELD	MICROMHO		5	609.000	224.009	900.000	280.000	79/10	80/07
DO		MG/L		5	8.57999	4.54776	13.4000	4.10000	79/10	80/07
COD	LOWLEVEL	MG/L		5	32.0200	20.1296	62.0000	12.0000	79/10	80/07
PH		SU		5	7.69000	.309162	8.10000	7.30000	79/10	80/07
RESIDUE	DISS-105	C MG/L		1	576.000		576.000	576.000	80/01	80/01
RESIDUE	TOT NFLT	MG/L		5	80.6000	98.6550	226.000	10.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		5	1.34200	1.42559	3.85000	.480000	79/10	80/07
NO2-N	TOTAL	MG/L		5	.052000	.052631	.140000	.010000	79/10	80/07
NO3-N	TOTAL	MG/L		5	.572000	.419309	1.09000	.100000	79/10	80/07
TOT KJEL	N	MG/L		4	2.16500	1.94954	5.02000	.910000	79/10	80/07
PHOS-TOT		MG/L P		4	.420000	.172241	.640000	.230000	80/01	80/07
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	80/01	80/01
TOT HARD	CACO3	MG/L		5	252.800	49.5856	313.000	200.000	79/10	80/07
CHLORIDE	TOTAL	MG/L		2	87.0000	59.3970	129.000	45.0000	80/01	80/05
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/07
			T	5	5.00000	.000000	5.00000	5.00000	79/10	80/07
CHROMIUM	CR,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	32.0000	4.47214	40.0000	30.0000	79/10	80/07
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/10	80/01
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	5	30.0000	.000000	30.0000	30.0000	79/10	80/07
IRON	FE,TOT	UG/L		4	4702.50	4960.44	11400.0	610.000	80/01	80/07
LEAD	PB,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	79/10	80/07
			K	2	5.00000	.000000	5.00000	5.00000	80/03	80/05
			T	5	6.00000	2.23607	10.0000	5.00000	79/10	80/07
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/10	80/01
			K	3	100.000	.000000	100.000	100.000	80/03	80/07
			T	5	100.000	.000000	100.000	100.000	79/10	80/07
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	79/10	80/07
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	5	34.0000	8.94427	50.0000	30.0000	79/10	80/07
FEC COLI	MFM-FCBR	/100ML		5	1504.00	2056.34	4900.00	20.0000	79/10	80/07
FECSTREP	MF M-ENT	/100ML		5	7863.80	16848.5	38000.0	9.00000	79/10	80/07
PHENOLS	TOTAL	UG/L		5	5.20000	3.34664	11.0000	3.00000	79/10	80/07
MBAS		MG/L		1	.100000		.100000	.100000	80/01	80/01
RESIDUE	DISS-180	C MG/L		2	357.500	17.6777	370.000	345.000	80/03	80/05
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/10	80/01
			K	3	.500000	.000000	.500000	.500000	80/03	80/07
			T	5	.500000	.000000	.500000	.500000	79/10	80/07

TABLE RD 1-219

STATION NUMBER 501830
41 24 28.0 081 52 10.0 2
ABRAMS CREEK NR BEREA - CEDAR POINT RD
LAKE ERIE (ROCKY RIVER)
MILES 0010.40 0000.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	14.5000		14.5000	14.5000	78/10	78/10
CNDUCTVY	FIELD	MICROMHO		1	750.000		750.000	750.000	78/10	78/10
DO		MG/L		1	11.2000		11.2000	11.2000	78/10	78/10
PH		SU		1	7.25000		7.25000	7.25000	78/10	78/10
RESIDUE	DISS-105	C MG/L		1	534.000		534.000	534.000	78/10	78/10
RESIDUE	TOT NFLT	MG/L		1	198.000		198.000	198.000	78/10	78/10
CHROMIUM	CR,TOT	UG/L	K	1	30.0000		30.0000	30.0000	78/10	78/10
IRON	FE,TOT	UG/L		1	8700.00		8700.00	8700.00	78/10	78/10
LEAD	PB,TOT	UG/L		1	46.0000		46.0000	46.0000	78/10	78/10
PHENOLS	TOTAL	UG/L		1	61.0000		61.0000	61.0000	78/10	78/10

TABLE RD 1-220

STATION NUMBER 501830
41 24 28.0 081 52 10.0 2
ABRAMS CREEK NR BEREA - CEDAR POINT RD
LAKE ERIE (ROCKY RIVER)
MILES 0010.40 0000.80

No data were collected from 10/79 - 9/80.

TABLE RD 1-221

STATION NUMBER 500860
40 51 02.0 083 15 23.0 2
SANDUSKY R BL UPPER SANDUSKY
LAKE ERIE (SANDUSKY RIVER)
MILES

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CADMIUM	CD,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/08	79/08
CHROMIUM	CR,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
COPPER	CU,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
IRON	FE,TOT	UG/L		1	2590.00		2590.00	2590.00	79/08	79/08
LEAD	PB,TOT	UG/L		1	5.00000		5.00000	5.00000	79/08	79/08
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	79/08	79/08
ZINC	ZN,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	79/08	79/08

TABLE RD 1-222

STATION NUMBER 500860
40 51 02.0 083 15 23.0 2
SANDUSKY R BL UPPER SANDUSKY
LAKE ERIE (SANDUSKY RIVER)
MILES 0078.7

No data were collected from 10/79 - 9/80.

TABLE RD 1-223

STATION NUMBER 500830
41 02 39.0 083 11 42.0 2
SANDUSKY RIVER BELOW MEXICO - SCOTT BRIDGE RD
LAKE ERIE 060191 (SANDUSKY RIVER BASIN)
MILES 0048.00

No data were collected from 10/78 - 9/80.

TABLE RD 1-224

STATION NUMBER 500820
41 18 28.0 083 09 32.0 2
SANDUSKY R. AB FREMONT
LAKE ERIE 060191 (SANDUSKY RIVER BASIN)
MILES 0020.30

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	5.00000	3.11127	7.20000	2.80000	78/11	78/12
CNDUCTVY	AT 25C	MICROMHO		2	850.000	254.558	1030.00	670.000	78/11	78/12
DO		MG/L		2	11.1000	.282900	11.3000	10.9000	78/11	78/12
BOD	5 DAY	MG/L		2	6.55000	.777824	7.10000	6.00000	78/11	78/12
LAB	PH	SU		2	7.95000	.212164	8.10000	7.80000	78/11	78/12
RESIDUE	TOT NFLT	MG/L		2	24.5000	14.8492	35.0000	14.0000	78/11	78/12
NH3+NH4-	N TOTAL	MG/L		2	.080000	.028285	.100000	.060000	78/11	78/12
NO2-N	TOTAL	MG/L		2	.045000	.049497	.080000	.010000	78/11	78/12
NO3-N	TOTAL	MG/L		2	3.99500	4.90025	7.46000	.530000	78/11	78/12
TOT KJEL	N	MG/L		2	1.80000	.424268	2.10000	1.50000	78/11	78/12
PHOS-TOT		MG/L P		2	.255000	.035356	.280000	.230000	78/11	78/12
T ORG C	C	MG/L		1	20.0000		20.0000	20.0000	78/11	78/11
TOT HARD	CACO3	MG/L		2	369.500	123.744	457.000	282.000	78/11	78/12
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	78/11	78/11
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	78/11	78/12
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/11	78/12
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/11	78/12
LEAD	PB,TOT	UG/L		2	8.50000	4.94975	12.0000	5.00000	78/11	78/12
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	78/12	78/12
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/11	78/12
FEC COLI	MFM-FCBR	/100ML		2	2350.50	3322.69	4700.00	1.00000	78/11	78/12
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	78/11	78/12

TABLE RD 1-225

STATION NUMBER 500820
41 18 28.0 083 09 32.0 2
SANDUSKY R. AB FREMONT
LAKE ERIE 060191 (SANDUSKY RIVER BASIN)
MILES 0020.30

No data were collected from 10/79 - 9/80.

TABLE RD 1-226

STATION NUMBER 500890
41 22 01.0 083 06 29.0 2
SANDUSKY R. AT FREMONT - TWP 549
LAKE ERIE (SANDUSKY RIVER)
MILES 0013.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	12.5800	10.1596	25.8000	.000000	78/11	79/07
TURB	JKSN	JTU		1	7.00000		7.00000	7.00000	79/05	79/05
CNDUCTVY	AT 25C	MICROMHO		5	756.600	152.994	1010.00	637.000	78/11	79/07
DO		MG/L		4	9.57499	2.17468	11.3000	6.50000	78/11	79/05
BOD	5 DAY	MG/L		3	4.40000	2.50599	7.00000	2.00000	78/11	79/05
COD	LOWLEVEL	MG/L		4	25.8500	12.7032	38.0000	14.0000	78/12	79/07
PH		SU		1	8.55000		8.55000	8.55000	79/07	79/07
LAB	PH	SU		5	8.11999	.396364	8.60000	7.80000	78/11	79/07
T ALK	CACO3	MG/L		2	72.0000	80.6102	129.000	15.0000	79/05	79/07
RESIDUE	DISS-105	C MG/L		3	438.000	50.2693	491.000	391.000	79/04	79/07
RESIDUE	TOT NFLT	MG/L		5	42.2000	33.2596	100.000	18.0000	78/11	79/07
NH3+NH4-	N TOTAL	MG/L		4	.205000	.212994	.520000	.050000	78/11	79/05
			K	1	.050000		.050000	.050000	79/07	79/07
			T	5	.174000	.197053	.520000	.050000	78/11	79/07
NO2-N	TOTAL	MG/L		5	.042000	.034928	.100000	.010000	78/11	79/07
NO3-N	TOTAL	MG/L		5	4.32999	3.43263	8.65000	.380000	78/11	79/07
TOT KJEL	N	MG/L		5	1.47600	.757550	2.60000	.780000	78/11	79/07
PHOS-TOT		MG/L P		5	.212000	.182126	.440000	.070000	78/11	79/07
PHOS-DIS		MG/L P		2	.050000	.000061	.050000	.050000	79/04	79/05
			K	1	.050000		.050000	.050000	79/07	79/07
			T	3	.050000	.000075	.050000	.050000	79/04	79/07
T ORG C	C	MG/L		2	12.1500	13.9300	22.0000	2.30000	78/11	79/05
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	79/05	79/05
TOT HARD	CACO3	MG/L		5	319.400	61.6878	423.000	262.000	78/11	79/07
CHLORIDE	TOTAL	MG/L		3	29.0000	23.5159	52.0000	5.00000	79/04	79/07
SULFATE	SO4-TOT	MG/L		3	118.667	19.5026	141.000	105.000	79/04	79/07
FLUORIDE	F,DISS	MG/L		3	.363333	.086219	.440000	.270000	79/04	79/07
SILICA	DISOLVED	MG/L		3	3.53667	2.95943	5.30000	.120000	79/04	79/07
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	78/11	79/05
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	4	10.0000	.000000	10.0000	10.0000	78/11	79/07
BARIUM	BA,TOT	UG/L	K	1	200.000		200.000	200.000	79/07	79/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/11	79/05
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	5	5.00000	.000000	5.00000	5.00000	78/11	79/07
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/05
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	5	30.0000	.000000	30.0000	30.0000	78/11	79/07
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/05
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	5	30.0000	.000000	30.0000	30.0000	78/11	79/07

TABLE RD 1-226 (Continued)

STATION NUMBER 500890
41 22 01.0 083 06 29.0 2
SANDUSKY R. AT FREMONT - TWP 549
LAKE ERIE (SANDUSKY RIVER)
MILES 0013.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
IRON	FE,TOT	UG/L		3	1166.67	549.030	1750.00	660.000	79/04	79/07
IRON	FE,DISS	UG/L		1	50.0000		50.0000	50.0000	79/07	79/07
LEAD	PB,TOT	UG/L		5	11.8000	9.85901	29.0000	5.00000	78/11	79/07
MANGNESE	MN	UG/L		1	50.0000		50.0000	50.0000	79/07	79/07
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/05
			K	1	100.000		100.000	100.000	79/07	79/07
			T	4	100.000	.000000	100.000	100.000	78/12	79/07
STRONTUM	SR,TOT	UG/L		1	2200.00		2200.00	2200.00	79/07	79/07
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/05
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	5	30.0000	.000000	30.0000	30.0000	78/11	79/07
ANTIMONY	SB,TOT	UG/L		1	10.0000		10.0000	10.0000	79/07	79/07
TIN	SN,TOT	UG/L		1	1000.00		1000.00	1000.00	79/07	79/07
ALUMINUM	AL,TOT	UG/L		2	400.000	141.421	500.000	300.000	79/05	79/07
SELENIUM	SE,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/07	79/07
FEC COLI	MFM-FCBR	/100ML		4	3975.00	4008.64	8600.00	100.000	78/11	79/05
FECSTREP	MF M-ENT	/100ML		2	860.000	14.1421	870.000	850.000	79/04	79/05
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/05	79/05
MBAS		MG/L		2	.100000	.056569	.140000	.060000	79/05	79/07
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	79/05	79/05
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	79/05	79/05
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	79/05	79/05
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	79/05	79/05
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	79/05	79/05
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	79/05	79/05
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	79/05	79/05
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/05	79/05
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/05
			K	1	.500000		.500000	.500000	79/07	79/07
			T	5	.500000	.000000	.500000	.500000	78/11	79/07

TABLE RD 1-227

STATION NUMBER 500890
41 22 01.0 083 06 29.0 2
SANDUSKY R. AT FREMONT - TWP 549
LAKE ERIE (SANDUSKY RIVER)
MILES 0013.10

No data were collected from 10/79 - 9/80.

TABLE RD 1-228

STATION NUMBER 610760
40 38 14.0 083 34 24.0 2
SCIOTO R. AT KENTON - C.R. 179
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 206.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	16.4500	9.12168	22.9000	10.0000	79/03	79/06
CNDUCTVY	AT 25C	MICROMHO		2	1035.50	91.2195	1100.00	971.000	79/03	79/06
DO		MG/L		2	9.74999	.919389	10.4000	9.10000	79/03	79/06
BOD	5 DAY	MG/L		1	4.00000		4.00000	4.00000	79/03	79/03
COD	LOWLEVEL	MG/L		1	12.2000		12.2000	12.2000	79/06	79/06
LAB	PH	SU		2	8.10000	.141598	8.20000	8.00000	79/03	79/06
RESIDUE	DISS-105	C MG/L		2	332.500	449.013	650.000	15.0000	79/03	79/06
RESIDUE	TOT NFLT	MG/L		1	31.0000		31.0000	31.0000	79/06	79/06
NH3+NH4-	N TOTAL	MG/L		2	.165000	.162634	.280000	.050000	79/03	79/06
NO2-N	TOTAL	MG/L		2	.060000	.000086	.060000	.060000	79/03	79/06
NO3-N	TOTAL	MG/L		2	4.92000	2.48902	6.68000	3.16000	79/03	79/06
TOT KJEL	N	MG/L		2	.750000	.777817	1.30000	.200000	79/03	79/06
PHOS-TOT		MG/L P		2	.170000	.070710	.220000	.120000	79/03	79/06
TOT HARD	CACO3	MG/L		2	502.000	86.2670	563.000	441.000	79/03	79/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/03	79/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
IRON	FE,TOT	UG/L		1	960.000		960.000	960.000	79/06	79/06
LEAD	PB,TOT	UG/L		2	12.0000	2.82843	14.0000	10.0000	79/03	79/06
MANGNESE	MN	UG/L		1	90.0000		90.0000	90.0000	79/06	79/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/03	79/06
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
ALUMINUM	AL,TOT	UG/L		1	500.000		500.000	500.000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/03	79/06

TABLE RD 1-229

STATION NUMBER 610760
40 38 14.0 083 34 24.0 2
SCIOTO R. AT KENTON - C.R. 179
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 206.80

PARAMETER			RMK	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	17.4000		17.4000	17.4000	80/09	80/09
DO		MG/L		1	7.40000		7.40000	7.40000	80/09	80/09
BOD	5 DAY	MG/L		1	7.30000		7.30000	7.30000	80/09	80/09
COD	LOWLEVEL	MG/L		2	32.7000	27.8600	52.4000	13.0000	80/04	80/09
LAB	PH	SU		2	8.10000	.005524	8.10000	8.10000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	566.000		566.000	566.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	25.0000		25.0000	25.0000	80/04	80/04
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	2	17.5000	10.6066	25.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		2	.200000	.183848	.330000	.070000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.060000	.014142	.070000	.050000	80/04	80/09
NO3-N	TOTAL	MG/L		2	3.24500	1.74655	4.48000	2.01000	80/04	80/09
TOT KJEL	N	MG/L		2	.905000	.360625	1.16000	.650000	80/04	80/09
PHOS-TOT		MG/L P		2	.497500	.335876	.735000	.260000	80/04	80/09
TOT HARD	CACO3	MG/L		2	433.000	24.0416	450.000	416.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1185.00	219.203	1340.00	1030.00	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	80.0000	56.5685	120.000	40.0000	80/04	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	650.000	212.132	800.000	500.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		2	1140.00	1216.22	2000.00	280.000	80/04	80/09
RESIDUE	DISS-180	C MG/L		1	671.000		671.000	671.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-230

STATION NUMBER 610770
40 40 00.0 083 40 45.0 2
SCIOTO R. AT KENTON - C.R. 106
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 201.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	16.0000	7.77817	21.5000	10.5000	79/03	79/06
CNDUCTVY	AT 25C	MICROMHO		2	1049.50	156.272	1160.00	939.000	79/03	79/06
DO		MG/L		2	9.35000	2.61630	11.2000	7.50000	79/03	79/06
BOD	5 DAY	MG/L		1	5.00000		5.00000	5.00000	79/03	79/03
COD	LOWLEVEL	MG/L		1	16.3000		16.3000	16.3000	79/06	79/06
LAB	PH	SU		2	8.14999	.072028	8.20000	8.10000	79/03	79/06
RESIDUE	DISS-105	C MG/L		2	732.000	124.451	820.000	644.000	79/03	79/06
RESIDUE	TOT NFLT	MG/L		1	52.0000		52.0000	52.0000	79/06	79/06
NH3+NH4-	N TOTAL	MG/L		2	.100000	.070711	.150000	.050000	79/03	79/06
NO2-N	TOTAL	MG/L		2	.035000	.007071	.040000	.030000	79/03	79/06
NO3-N	TOTAL	MG/L		2	4.32500	4.49013	7.50000	1.15000	79/03	79/06
TOT KJEL	N	MG/L		2	1.55000	.636399	2.00000	1.10000	79/03	79/06
PHOS-TOT		MG/L P		2	.050000	.000061	.050000	.050000	79/03	79/06
TOT HARD	CACO3	MG/L		2	544.500	94.0452	611.000	478.000	79/03	79/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/03	79/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
IRON	FE,TOT	UG/L		1	1280.00		1280.00	1280.00	79/06	79/06
LEAD	PB,TOT	UG/L		2	11.0000	1.41421	12.0000	10.0000	79/03	79/06
MANGNESE	MN	UG/L		1	80.0000		80.0000	80.0000	79/06	79/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/03	79/06
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
ALUMINUM	AL,TOT	UG/L		1	700.000		700.000	700.000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/03	79/06

TABLE RD 1-231

STATION NUMBER 610770
40 40 00.0 083 40 45.0 2
SCIOTO R. AT KENTON - C.R. 106
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 201.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	15.7000		15.7000	15.7000	80/09	80/09
DO		MG/L		1	5.90000		5.90000	5.90000	80/09	80/09
BOD	5 DAY	MG/L		1	8.25000		8.25000	8.25000	80/09	80/09
COD	LOWLEVEL	MG/L		2	32.9000	22.2031	48.6000	17.2000	80/04	80/09
LAB	PH	SU		2	8.05000	.071709	8.10000	8.00000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	600.000		600.000	600.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	32.5000	3.53553	35.0000	30.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.070000		.070000	.070000	80/04	80/04
			K	1	.050000		.050000	.050000	80/09	80/09
			T	2	.060000	.014142	.070000	.050000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.045000	.021213	.060000	.030000	80/04	80/09
NO3-N	TOTAL	MG/L		2	2.94000	2.98399	5.05000	.830000	80/04	80/09
TOT KJEL	N	MG/L		2	.805000	.190920	.940000	.670000	80/04	80/09
PHOS-TOT		MG/L P		2	.113500	.040305	.142000	.085000	80/04	80/09
TOT HARD	CACO3	MG/L		2	495.000	1.41421	496.000	494.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1525.00	190.919	1660.00	1390.00	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	85.0000	49.4975	120.000	50.0000	80/04	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	700.000	141.421	800.000	600.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		2	2585.00	2708.22	4500.00	670.000	80/04	80/09
RESIDUE	DISS-180	C MG/L		1	704.000		704.000	704.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/04	80/04

TABLE RD 1-232

STATION NUMBER 601340
39 37 58.0 082 57 45.0 2
SCIOTO R NR CIRCLEVILLE - FLORENCE CHAPEL RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 102.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		18	10.4278	7.75149	24.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		10	2796.30	3709.06	12133.0	393.000	78/10	79/09
STREAM	FLOW,	INST-CFS		3	1007.67	981.828	2140.00	393.000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		11	515.818	145.372	700.000	187.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		7	533.714	101.769	736.000	440.000	78/11	78/12
DO		MG/L		18	8.17777	3.08251	12.8000	3.70000	78/10	79/09
BOD	5 DAY	MG/L		16	6.81250	4.72185	21.0000	3.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	19.9167	6.74821	33.0000	8.00000	78/10	79/09
PH		SU		11	7.55454	.262202	7.90000	7.10000	78/10	79/09
LAB	PH	SU		7	7.67142	.221614	7.80000	7.20000	78/11	78/12
T ALK	CACO3	MG/L		6	186.667	26.5836	220.000	140.000	78/11	78/12
RESIDUE	TOT NFLT	MG/L		13	43.7692	45.7696	155.000	7.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		18	.811666	.783394	2.59000	.120000	78/10	79/09
NO2-N	TOTAL	MG/L		18	.185555	.125428	.550000	.050000	78/10	79/09
NO3-N	TOTAL	MG/L		18	3.50444	1.26873	6.22000	.920000	78/10	79/09
TOT KJEL	N	MG/L		12	1.69833	1.00401	4.20000	.100000	78/10	79/09
PHOS-TOT		MG/L P		18	1.18222	1.12443	5.05000	.180000	78/10	79/09
TOT HARD	CACO3	MG/L		4	262.000	87.0708	324.000	134.000	78/12	79/09
CHLORIDE	TOTAL	MG/L		6	49.1667	6.11312	55.0000	38.0000	78/11	78/12
CADMIUM	CD,TOT	UG/L		3	5.33333	.577359	6.00000	5.00000	78/12	79/06
			K	3	5.00000	.000000	5.00000	5.00000	79/08	79/09
			T	6	5.16667	.408273	6.00000	5.00000	78/12	79/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/06	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	3	30.0000	.000000	30.0000	30.0000	79/08	79/09
			T	6	30.0000	.000000	30.0000	30.0000	78/12	79/09

TABLE RD 1-232 (Continued)

STATION NUMBER 601340
39 37 58.0 082 57 45.0 2
SCIOTO R NR CIRCLEVILLE - FLORENCE CHAPEL RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 102.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	3	30.0000	.000000	30.0000	30.0000	79/08	79/09
			T	6	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		4	1435.00	295.916	1820.00	1120.00	79/06	79/09
LEAD	PB,TOT	UG/L		6	13.1667	6.49359	25.0000	7.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
			K	3	100.000	.000000	100.000	100.000	79/08	79/09
			T	6	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	35.0000	10.0000	50.0000	30.0000	78/12	79/08
			K	2	30.0000	.000000	30.0000	30.0000	79/09	79/09
			T	6	33.3333	8.16500	50.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		18	6723.33	10391.5	40000.0	100.000	78/10	79/09
PHENOLS	TOTAL	UG/L		11	5.54545	4.34428	14.0000	2.00000	78/10	79/08
			K	1	2.00000		2.00000	2.00000	79/09	79/09
			T	12	5.25000	4.26668	14.0000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06
			K	2	.500000	.000000	.500000	.500000	79/08	79/09
			T	5	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-233

STATION NUMBER 601340
39 37 58.0 082 57 45.0 2
SCIOTO R NR CIRCLEVILLE - FLORENCE CHAPEL RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 102.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		15	26.6899	48.1165	198.000	4.20000	79/10	80/09
STREAM	FLOW	CFS		3	3287.67	614.875	3992.00	2858.00	79/10	79/12
STREAM	FLOW,	INST-CFS		1	6695.80		6695.80	6695.80	80/04	80/04
STREAM	STAGE	FEET		4	6.96749	2.64728	9.67000	4.27000	80/03	80/06
CNDUCTVY	FIELD	MICROMHO		7	441.000	57.1431	540.000	365.000	79/10	80/06
CNDUCTVY	AT 25C	MICROMHO		7	563.143	148.803	793.000	321.000	80/01	80/09
INTNSVE	SURVEY	IDENT		6	803902	.000000	803902	803902	80/06	80/09
DO	PROBE	MG/L		9	7.64444	4.88137	19.5000	4.00000	79/10	80/09
DO		MG/L		6	8.53333	2.95884	11.3000	4.70000	80/01	80/06
BOD	5 DAY	MG/L		14	3.88571	1.85301	8.00000	.900000	79/10	80/09
			L	1	35.0000		35.0000	35.0000	80/07	80/07
			T	15	5.96000	8.22972	35.0000	.900000	79/10	80/09
COD	LOWLEVEL	MG/L		15	22.7133	12.7755	53.0000	6.00000	79/10	80/09
PH		SU		9	7.59444	.437744	8.40000	6.90000	79/10	80/06
LAB	PH	SU		7	7.42856	.240205	7.68000	6.99000	80/01	80/09
RESIDUE	TOT NFLT	MG/L		14	64.4928	44.9370	148.000	5.00000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		15	.446000	.479937	1.97000	.020000	79/10	80/09
NO2-N	TOTAL	MG/L		15	.122000	.064498	.240000	.040000	79/10	80/09
NO3-N	TOTAL	MG/L		15	3.30666	1.14723	5.02000	1.83000	79/10	80/09
TOT KJEL	N	MG/L		15	1.33200	.619509	3.25000	.800000	79/10	80/09
PHOS-TOT		MG/L P		15	.519333	.242766	1.20000	.240000	79/10	80/09
TOT HARD	CACO3	MG/L		3	259.000	57.2975	321.000	208.000	79/12	80/06
CALCIUM	CA-TOT	MG/L		7	63.2143	11.9857	77.0000	40.0000	79/10	80/09
MGNSIUM	MG,TOT	MG/L		7	21.7857	2.99809	26.0000	18.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	9	2.33333	2.00000	5.00000	1.00000	79/10	80/09
			T	10	2.60000	2.06559	5.00000	1.00000	79/10	80/09
CHROMIUM	CR,TOT	UG/L		4	37.5000	17.0782	60.0000	20.0000	79/12	80/09
			K	6	35.0000	5.47723	40.0000	30.0000	79/10	80/08
			T	10	36.0000	10.7497	60.0000	20.0000	79/10	80/09

TABLE RD 1-233 (Continued)

STATION NUMBER 601340
39 37 58.0 082 57 45.0 2
SCIOTO R NR CIRCLEVILLE - FLORENCE CHAPEL RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 102.10

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		4	18.7500	8.53913	30.0000	10.0000	79/12	80/09
			K	6	18.3333	12.9100	30.0000	5.00000	79/10	80/08
			T	10	18.5000	10.8141	30.0000	5.00000	79/10	80/09
IRON	FE,TOT	UG/L		10	2815.00	1964.10	7200.00	700.000	79/10	80/09
IRON	FE,DISS	UG/L		3	310.000	260.000	610.000	150.000	80/07	80/08
LEAD	PB,TOT	UG/L		8	19.0000	14.8228	45.0000	5.00000	79/10	80/08
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/09
			T	10	16.2000	14.3434	45.0000	5.00000	79/10	80/09
NICKEL	NI,TOTAL	UG/L		2	70.0000	42.4264	100.000	40.0000	79/12	80/06
			K	8	62.5000	31.0529	100.000	40.0000	79/10	80/09
			T	10	64.0000	30.9839	100.000	40.0000	79/10	80/09
ZINC	ZN,TOT	UG/L		10	41.5000	22.3669	80.0000	20.0000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		3	4911.33	8343.05	14545.0	67.0000	79/10	79/12
PHENOLS	TOTAL	UG/L		10	5.10000	4.81779	18.0000	2.00000	79/11	80/08
			K	2	2.00000	.000000	2.00000	2.00000	80/04	80/06
			T	12	4.58333	4.52183	18.0000	2.00000	79/11	80/08
RESIDUE	DISS-180	C MG/L		5	325.560	75.4176	384.000	193.400	80/06	80/09
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	79/12	79/12
			K	3	.500000	.000000	.500000	.500000	79/10	80/06
			T	4	.500000	.000000	.500000	.500000	79/10	80/06

TABLE RD 1-234

STATION NUMBER 600770
39 12 44.0 082 51 35.0 2
SCIOTO R. BL CHILLICOTHE-HIGBY
OHIO RIVER 051091 (SCIOTO RIVER)
MILES 0953.80 0624.60 056.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		50	13.0000	8.46722	26.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		50	6481.24	7168.52	33740.0	700.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		50	612.400	131.037	890.000	315.000	78/10	79/09
DO		MG/L		50	8.95194	2.31028	13.4000	5.70000	78/10	79/09
BOD	5 DAY	MG/L		47	3.94467	1.29309	7.80000	1.80000	78/10	79/09
LAB	PH	SU		49	7.85118	.184946	8.50000	7.50000	78/10	79/09
PHOS-TOT		MG/L P		13	.450769	.178907	.780000	.250000	78/10	79/06
CADMIUM	CD,TOT	UG/L	K	1	5.00000		5.00000	5.00000	79/08	79/08
CHROMIUM	CR,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
COPPER	CU,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
IRON	FE,TOT	UG/L		1	1040.00		1040.00	1040.00	79/08	79/08
LEAD	PB,TOT	UG/L		1	31.0000		31.0000	31.0000	79/08	79/08
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	79/08	79/08
ZINC	ZN,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/08	79/08
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	79/08	79/08

TABLE RD 1-235

STATION NUMBER 600770
39 12 44.0 082 51 35.0 2
SCIOTO R. BL CHILLICOTHE-HIGBY
OHIO RIVER 051091 (SCIOTO RIVER)
MILES 0953.80 0624.60 056.00

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		46	13.8370	8.73757	26.0000	1.00000	79/10	80/09
STREAM	FLOW	CFS		39	7374.87	5789.75	29000.0	1500.00	79/10	80/08
STREAM	FLOW,	INST-CFS		5	5200.00	6111.05	16100.0	1800.00	80/07	80/09
CNDUCTVY	AT 25C	MICROMHO		46	581.848	93.3902	780.000	355.000	79/10	80/09
DO		MG/L		46	8.76733	2.19465	12.1000	5.30000	79/10	80/09
BOD	5 DAY	MG/L		45	3.02666	1.21119	6.00000	1.20000	79/10	80/09
LAB	PH	SU		46	7.96106	.258157	8.70000	7.40000	79/10	80/09
PHOS-TOT		MG/L P		2	.285000	.007067	.290000	.280000	80/09	80/09
CALCIUM	CA-TOT	MG/L		1	89.0000		89.0000	89.0000	79/10	79/10
MGNSIUM	MG,TOT	MG/L		1	31.0000		31.0000	31.0000	79/10	79/10
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	79/10	79/10
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	79/10	79/10
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	79/10	79/10
IRON	FE,TOT	UG/L		2	1085.00	431.335	1390.00	780.000	79/10	79/10
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	79/10	79/10
NICKEL	NI,TOTAL	UG/L	K	2	100.000	.000000	100.000	100.000	79/10	79/10
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	79/10	79/10
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	79/10	79/10

TABLE RD 1-236

STATION NUMBER 600790
40 05 50.0 083 15 41.0 2
BIG DARBY CREEK BELOW PLAIN CITY STP
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 101.00 050.30

No data were collected from 10/78 - 9/80.

TABLE RD 1-237

STATION NUMBER 601300
39 42 03.0 083 06 35.0 2
BIG DARBY CREEK AT DARBYVILLE - SR 316
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 101.00 013.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.5417	8.79612	24.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		9	543.177	767.295	2349.00	67.6000	78/10	79/09
STREAM	FLOW,	INST-CFS		3	236.867	291.967	574.000	67.6000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		11	550.091	153.525	740.000	284.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	679.000		679.000	679.000	78/12	78/12
DO		MG/L		12	10.6583	2.69898	17.5000	7.50000	78/10	79/09
BOD	5 DAY	MG/L		8	2.97500	1.43602	5.00000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	11.8333	5.52405	20.0000	4.00000	78/10	79/09
PH		SU		11	7.99090	.202403	8.30000	7.70000	78/10	79/09
LAB	PH	SU		1	7.60000		7.60000	7.60000	78/12	78/12
RESIDUE	TOT NFLT	MG/L		12	24.2500	12.5707	45.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.091666	.065897	.230000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.020000	.014142	.050000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.54250	2.34026	6.59000	.660000	78/10	79/09
TOT KJEL	N	MG/L		12	.555833	.199885	.900000	.300000	78/10	79/09
PHOS-TOT		MG/L P		11	.150909	.077001	.330000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		4	319.750	76.7783	392.000	226.000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/12	79/09
CHROMIUM	HEX-VAL	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		3	1203.33	621.477	1870.00	640.000	79/03	79/09
LEAD	PB,TOT	UG/L		4	14.7500	8.61684	22.0000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		11	1082.64	1361.78	4400.00	60.0000	78/11	79/09
			L	1	100000		100000	100000	78/10	78/10
			T	12	9325.75	28584.5	100000	60.0000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	3.50000	2.38048	7.00000	2.00000	78/12	79/09
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-238

STATION NUMBER 601300
39 42 03.0 083 06 35.0 2
BIG DARBY CREEK AT DARBYVILLE - SR 316
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 101.00 013.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	11.9429	7.95400	19.5000	2.00000	80/01	80/09
STREAM	FLOW	CFS		2	586.000	325.269	816.000	356.000	79/10	79/11
STREAM	STAGE	FEET		5	3.80000	2.23782	6.97000	1.13000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		4	388.125	306.889	790.000	42.5000	80/02	80/09
CNDUCTVY	AT 25C	MICROMHO		2	727.500	64.3506	773.000	682.000	80/01	80/06
DO		MG/L		7	10.2143	2.33413	13.1000	8.10000	80/01	80/09
BOD	5 DAY	MG/L		7	3.42857	1.98806	6.00000	1.00000	80/01	80/09
COD	LOWLEVEL	MG/L		7	19.8571	9.51192	31.0000	4.00000	80/01	80/09
PH		SU		7	7.72142	.416243	8.10000	7.10000	80/01	80/09
LAB	PH	SU		1	7.90000		7.90000	7.90000	80/01	80/01
RESIDUE	TOT NFLT	MG/L		7	77.7143	77.4870	185.000	10.0000	80/01	80/09
NH3+NH4-	N TOTAL	MG/L		5	.134000	.155177	.410000	.050000	80/01	80/08
			K	2	.050000	.000061	.050000	.050000	80/06	80/09
			T	7	.110000	.133167	.410000	.050000	80/01	80/09
NO2-N	TOTAL	MG/L		6	.055000	.058224	.160000	.010000	80/01	80/08
			K	1	.010000		.010000	.010000	80/09	80/09
			T	7	.048571	.055806	.160000	.010000	80/01	80/09
NO3-N	TOTAL	MG/L		7	3.76857	2.07033	6.77000	.400000	80/01	80/09
TOT KJEL	N	MG/L		7	.680000	.455851	1.25000	.060000	80/01	80/09
PHOS-TOT		MG/L P		7	.182571	.088397	.302000	.075000	80/01	80/09
TOT HARD	CACO3	MG/L		4	345.250	58.1342	405.000	266.000	79/12	80/09
CADMIUM	CD,TOT	UG/L		1	10.0000		10.0000	10.0000	79/12	79/12
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	4	6.25000	2.50000	10.0000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09

TABLE RD 1-238 (Continued)

STATION NUMBER 601300
39 42 03.0 083 06 35.0 2
BIG DARBY CREEK AT DARBYVILLE - SR 316
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 101.00 013.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	3	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	4	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		4	1917.50	2202.97	5000.00	190.000	79/12	80/09
LEAD	PB,TOT	UG/L		1	6.00000		6.00000	6.00000	79/12	79/12
			K	3	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	4	5.25000	.500000	6.00000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	3	100.000	.000000	100.000	100.000	80/03	80/09
			T	4	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/12	80/06
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	4	32.5000	5.00000	40.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		2	338.500	408.001	627.000	50.0000	79/10	79/11
PHENOLS	TOTAL	UG/L		2	2.50000	.707107	3.00000	2.00000	79/12	80/09
			K	2	2.00000	.000000	2.00000	2.00000	80/03	80/06
			T	4	2.25000	.500000	3.00000	2.00000	79/12	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/03	80/06

TABLE RD 1-239

STATION NUMBER 610750
40 36 40.0 083 11 01.0 2
L. SCIOTO R. AT MARION - RT. 309
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 179.30 008.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	14.3000	5.93970	18.5000	10.1000	79/03	79/06
CNDUCTVY	AT 25C	MICROMHO		2	731.000	4.24264	734.000	728.000	79/03	79/06
DO		MG/L		2	8.70000	2.96986	10.8000	6.60000	79/03	79/06
BOD	5 DAY	MG/L		2	2.65000	1.90919	4.00000	1.30000	79/03	79/06
COD	LOWLEVEL	MG/L		1	24.0000		24.0000	24.0000	79/06	79/06
LAB	PH	SU		2	8.05000	.071709	8.10000	8.00000	79/03	79/06
RESIDUE	DISS-105	C MG/L		1	434.000		434.000	434.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		2	36.0000	31.1127	58.0000	14.0000	79/03	79/06
NH3+NH4-	N TOTAL	MG/L		2	.060000	.014142	.070000	.050000	79/03	79/06
NO2-N	TOTAL	MG/L		2	.030000	.028284	.050000	.010000	79/03	79/06
NO3-N	TOTAL	MG/L		2	5.76000	2.17788	7.30000	4.22000	79/03	79/06
TOT KJEL	N	MG/L		2	.850000	.212134	1.00000	.700000	79/03	79/06
PHOS-TOT		MG/L P		2	.060000	.014142	.070000	.050000	79/03	79/06
TOT HARD	CACO3	MG/L		2	328.000	9.89949	335.000	321.000	79/03	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/03	79/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
IRON	FE,TOT	UG/L		1	2990.00		2990.00	2990.00	79/06	79/06
FERROUS	IRON	UG/L		1	9.00000		9.00000	9.00000	79/06	79/06
LEAD	PB,TOT	UG/L		1	7.00000		7.00000	7.00000	79/03	79/03
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/03	79/03
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
ALUMINUM	AL,TOT	UG/L		1	1400.00		1400.00	1400.00	79/06	79/06
MBAS		MG/L		1	.080000		.080000	.080000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/03	79/06

TABLE RD 1-240

STATION NUMBER 610750
40 36 40.0 083 11 01.0 2
L. SCIOTO R. AT MARION - RT. 309
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 179.30 008.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	16.4000		16.4000	16.4000	80/09	80/09
DO		MG/L		1	6.00000		6.00000	6.00000	80/09	80/09
BOD	5 DAY	MG/L		1	3.10000		3.10000	3.10000	80/09	80/09
COD	LOWLEVEL	MG/L		2	31.7000	40.0222	60.0000	3.40000	80/04	80/09
LAB	PH	SU		2	7.95000	.212164	8.10000	7.80000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	366.000		366.000	366.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		2	29.0000	16.9706	41.0000	17.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		1	.050000		.050000	.050000	80/09	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	2	.050000	.000061	.050000	.050000	80/04	80/09
NO2-N	TOTAL	MG/L		1	.020000		.020000	.020000	80/04	80/04
			K	1	.010000		.010000	.010000	80/09	80/09
			T	2	.015000	.007071	.020000	.010000	80/04	80/09
NO3-N	TOTAL	MG/L		2	1.75500	2.21324	3.32000	.190000	80/04	80/09
TOT KJEL	N	MG/L		2	.420000	.197990	.560000	.280000	80/04	80/09
PHOS-TOT		MG/L P		2	.088000	.021213	.103000	.073000	80/04	80/09
TOT HARD	CACO3	MG/L		2	352.000	21.2132	367.000	337.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	1205.00	586.899	1620.00	790.000	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	70.0000	28.2843	90.0000	50.0000	80/04	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	600.000	282.843	800.000	400.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		2	190.000	113.137	270.000	110.000	80/04	80/09
RESIDUE	DISS-180	C MG/L		1	494.000		494.000	494.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/04	80/04

TABLE RD 1-241

STATION NUMBER 610740
40 33 14.0 083 11 07.0 2
L. SCIOTO AT MARION - S.R. 739
OHIO RIVER (SCIOTO BASIN)
MILES 0953.80 0624.60 179.30 002.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	14.5500	5.72756	18.6000	10.5000	79/03	79/06
CNDUCTVY	AT 25C	MICROMHO		2	999.000	114.551	1080.00	918.000	79/03	79/06
DO		MG/L		2	7.55000	3.60624	10.1000	5.00000	79/03	79/06
BOD	5 DAY	MG/L		2	2.80000	1.69706	4.00000	1.60000	79/03	79/06
COD	LOWLEVEL	MG/L		1	12.0000		12.0000	12.0000	79/06	79/06
LAB	PH	SU		2	7.60000	.282819	7.80000	7.40000	79/03	79/06
RESIDUE	DISS-105	C MG/L		2	315.000	431.335	620.000	10.0000	79/03	79/06
RESIDUE	TOT NFLT	MG/L		1	10.0000		10.0000	10.0000	79/06	79/06
NH3+NH4-	N TOTAL	MG/L		2	.425000	.091924	.490000	.360000	79/03	79/06
NO2-N	TOTAL	MG/L		2	.195000	.021214	.210000	.180000	79/03	79/06
NO3-N	TOTAL	MG/L		2	9.20499	4.23559	12.2000	6.21000	79/03	79/06
TOT KJEL	N	MG/L		2	1.50000	.141426	1.60000	1.40000	79/03	79/06
PHOS-TOT		MG/L P		2	.130000	.014143	.140000	.120000	79/03	79/06
TOT HARD	CACO3	MG/L		2	333.500	4.94975	337.000	330.000	79/03	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/03	79/06
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/03	79/06
IRON	FE,TOT	UG/L		1	560.000		560.000	560.000	79/06	79/06
LEAD	PB,TOT	UG/L		2	10.5000	4.94975	14.0000	7.00000	79/03	79/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/03	79/03
ZINC	ZN,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/03	79/06
ALUMINUM	AL,TOT	UG/L		1	200.000		200.000	200.000	79/06	79/06
MBAS		MG/L		1	.240000		.240000	.240000	79/06	79/06
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/03	79/06

TABLE RD 1-242

STATION NUMBER 610740
40 33 14.0 083 11 07.0 2
L. SCIOTO AT MARION - S.R. 739
OHIO RIVER (SCIOTO BASIN)
MILES 0953.80 0624.60 179.30 002.60

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	17.5000		17.5000	17.5000	80/09	80/09
DO		MG/L		1	4.20000		4.20000	4.20000	80/09	80/09
BOD	5 DAY	MG/L		1	7.00000		7.00000	7.00000	80/09	80/09
COD	LOWLEVEL	MG/L		2	34.3500	9.54594	41.1000	27.6000	80/04	80/09
LAB	PH	SU		2	7.50000	.424273	7.80000	7.20000	80/04	80/09
RESIDUE	DISS-105	C MG/L		1	522.000		522.000	522.000	80/04	80/04
RESIDUE	TOT NFLT	MG/L		1	14.0000		14.0000	14.0000	80/04	80/04
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	2	12.0000	2.82843	14.0000	10.0000	80/04	80/09
NH3+NH4-	N TOTAL	MG/L		2	.240000	.000000	.240000	.240000	80/04	80/09
NO2-N	TOTAL	MG/L		2	.145000	.120208	.230000	.060000	80/04	80/09
NO3-N	TOTAL	MG/L		2	5.00500	.883883	5.63000	4.38000	80/04	80/09
TOT KJEL	N	MG/L		2	1.10000	.197992	1.24000	.960000	80/04	80/09
PHOS-TOT		MG/L P		2	.527000	.226274	.687000	.367000	80/04	80/09
TOT HARD	CACO3	MG/L		2	332.000	33.9411	356.000	308.000	80/04	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/04	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/04	80/09
IRON	FE,TOT	UG/L		2	655.000	374.767	920.000	390.000	80/04	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/04	80/09
MANGNESE	MN	UG/L		2	125.000	49.4975	160.000	90.0000	80/04	80/09
ZINC	ZN,TOT	UG/L		1	60.0000		60.0000	60.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/04	80/04
			T	2	45.0000	21.2132	60.0000	30.0000	80/04	80/09
ALUMINUM	AL,TOT	UG/L		2	350.000	212.132	500.000	200.000	80/04	80/09
FEC COLI	MFM-FCBR	/100ML		2	945.000	219.203	1100.00	790.000	80/04	80/09
RESIDUE	DISS-180	C MG/L		1	634.000		634.000	634.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/04	80/09

TABLE RD 1-243

STATION NUMBER 601350
40 15 21.0 083 20 43.0 2
MILL CREEK BELOW MARYSVILLE - NR CR 114
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 157.20 017.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.3750	9.56282	23.5000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	237.993	427.693	1461.00	7.00000	78/10	79/09
STREAM	FLOW,	INST-CFS		3	39.1333	47.7478	94.0000	7.00000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		11	622.727	304.544	1300.00	182.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	1230.00		1230.00	1230.00	78/11	78/11
DO		MG/L		12	8.54999	3.20213	12.4000	4.90000	78/10	79/09
BOD	5 DAY	MG/L		11	4.95454	3.05332	11.0000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	23.9167	6.05224	36.0000	11.0000	78/10	79/09
PH		SU		11	7.66363	.420164	8.50000	6.80000	78/11	79/09
LAB	PH	SU		2	7.80000	.141490	7.90000	7.70000	78/10	78/11
RESIDUE	TOT NFLT	MG/L		12	27.9167	21.5342	83.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	1.65833	1.75723	6.75000	.070000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.223333	.294690	1.02000	.020000	78/10	79/09
NO3-N	TOTAL	MG/L		12	4.04416	5.04405	18.8000	.280000	78/10	79/09
TOT KJEL	N	MG/L		12	3.13333	1.81576	7.70000	1.20000	78/10	79/09
PHOS-TOT		MG/L P		12	.922500	1.26114	3.98000	.120000	78/10	79/09
CYANIDE	CN-TOT	MG/L		11	.014545	.012136	.050000	.010000	78/10	79/09
TOT HARD	CACO3	MG/L		4	265.750	82.8427	340.000	148.000	78/12	79/09
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	78/12	79/09
CHROMIUM	HEX-VAL	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/03
CHROMIUM	CR,TOT	UG/L		4	37.5000	9.57427	50.0000	30.0000	78/12	79/09
COPPER	CU,TOT	UG/L		4	50.0000	40.0000	110.000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	1275.00	657.609	1740.00	810.000	79/06	79/09
LEAD	PB,TOT	UG/L		4	48.2500	45.1544	100.000	7.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		4	125.000	50.0000	200.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		4	40.0000	20.0000	70.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		11	944.091	1307.20	4300.00	25.0000	78/11	79/09
			K	3	6.70000	.006176	6.70000	6.70000	78/10	79/06
			T	14	743.221	1213.99	4300.00	6.70000	78/10	79/09
PHENOLS	TOTAL	UG/L		12	4.00000	2.08893	8.00000	2.00000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		4	1.62500	2.25000	5.00000	.500000	78/12	79/09

TABLE RD 1-244

STATION NUMBER 601350
40 15 21.0 083 20 43.0 2
MILL CREEK BELOW MARYSVILLE - NR CR 114
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 157.20 017.20

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		10	12.3000	8.33173	25.5000	1.50000	79/10	80/09
STREAM	FLOW	CFS		2	74.0000	29.6985	95.0000	53.0000	79/10	79/11
STREAM	FLOW,	INST-CFS		3	307.233	282.659	591.200	25.9000	80/03	80/05
STREAM	STAGE	FEET		6	2.28167	1.06698	3.80000	1.10000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		9	564.222	242.146	1000.00	260.000	79/10	80/09
CNDUCTVY	AT 25C	MICROMHO		1	915.000		915.000	915.000	80/01	80/01
DO		MG/L		10	8.76999	3.02106	13.5000	4.40000	79/10	80/09
BOD	5 DAY	MG/L		9	5.77778	2.43813	11.0000	3.00000	79/10	80/09
COD	LOWLEVEL	MG/L		10	34.2000	24.7333	92.0000	10.0000	79/10	80/09
PH		SU		10	7.65999	.353400	8.20000	7.20000	79/10	80/09
T ALK	CACO3	MG/L		1	206.000		206.000	206.000	80/07	80/07
RESIDUE	TOTAL	MG/L		1	546.000		546.000	546.000	80/07	80/07
RESIDUE	TOT NFLT	MG/L		10	105.000	167.899	542.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		10	1.38600	1.31179	4.50000	.210000	79/10	80/09
NO2-N	TOTAL	MG/L		10	.131000	.178851	.580000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		10	1.62800	1.11620	3.58000	.300000	79/10	80/09
TOT KJEL	N	MG/L		10	2.25400	1.57694	6.26000	.750000	79/10	80/09
PHOS-TOT		MG/L P		10	.735399	.584529	2.28000	.330000	79/10	80/09
CYANIDE	CN-TOT	MG/L		5	.013200	.004604	.020000	.010000	79/10	80/09
			K	5	.010000	.000000	.010000	.010000	80/03	80/08
			T	10	.011600	.003502	.020000	.010000	79/10	80/09
TOT HARD	CACO3	MG/L		3	360.000	129.800	468.000	216.000	79/12	80/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	2	5.00000	.000000	5.00000	5.00000	80/03	80/09
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/09
CHROMIUM	CR,TOT	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/12	80/09
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	3	33.3333	5.77355	40.0000	30.0000	79/12	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/09
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/09
IRON	FE,TOT	UG/L		3	2603.33	3130.69	6200.00	490.000	79/12	80/09
LEAD	PB,TOT	UG/L		2	6.00000	1.41421	7.00000	5.00000	79/12	80/03
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	3	5.66667	1.15472	7.00000	5.00000	79/12	80/09
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	2	100.000	.000000	100.000	100.000	80/03	80/09
			T	3	100.000	.000000	100.000	100.000	79/12	80/09
ZINC	ZN,TOT	UG/L		3	36.6667	11.5471	50.0000	30.0000	79/12	80/09
FEC COLI	MFM-FCBR	/100ML		2	3700.00	4666.91	7000.00	400.000	79/10	79/11
PHENOLS	TOTAL	UG/L		9	5.88889	3.58624	12.0000	2.00000	79/10	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/03	80/03

TABLE RD 1-245

STATION NUMBER 601290
40 06 37.0 083 01 55.0 2
OLENTANGY RIVER NR WORTHINGTON - I 270 N.
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 011.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	11.6500	9.14137	23.0000	.000000	78/10	79/09
STREAM	FLOW	CFS		11	380.000	507.464	1598.00	14.0000	78/10	79/09
STREAM	FLOW,	INST-CFS		3	76.0000	56.0268	123.000	14.0000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		11	514.091	134.701	690.000	250.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		1	814.000		814.000	814.000	78/11	78/11
DO		MG/L		11	10.1909	2.65838	16.0000	7.10000	78/10	79/09
BOD	5 DAY	MG/L		9	3.94444	3.39526	11.0000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		12	16.2500	3.59608	23.0000	12.0000	78/10	79/09
PH		SU		10	7.81000	.328166	8.20000	7.20000	78/12	79/09
LAB	PH	SU		2	7.70000	.141436	7.80000	7.60000	78/10	78/11
RESIDUE	TOT NFLT	MG/L		12	23.3333	16.3670	66.0000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		11	.196363	.158763	.490000	.050000	78/10	79/08
			K	1	.050000		.050000	.050000	79/09	79/09
			T	12	.184166	.157160	.490000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.040833	.025746	.110000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.55499	2.57026	9.69000	.640000	78/10	79/09
TOT KJEL	N	MG/L		12	.982500	.372757	1.50000	.390000	78/10	79/09
PHOS-TOT		MG/L P		12	.187500	.135454	.580000	.080000	78/10	79/09
TOT HARD	CACO3	MG/L		4	249.000	54.9242	297.000	173.000	78/12	79/09
CADMIUM	CD,TOT	UG/L		3	7.00000	3.46410	11.0000	5.00000	78/12	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	6.50000	3.00000	11.0000	5.00000	78/12	79/09
CHROMIUM	HEX-VAL	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/03
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/09

TABLE RD 1-245 (Continued)

STATION NUMBER 601290
40 06 37.0 083 01 55.0 2
OLENTANGY RIVER NR WORTHINGTON - I 270 N.
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 011.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/09
IRON	FE,TOT	UG/L		2	1790.00	226.274	1950.00	1630.00	79/06	79/09
LEAD	PB,TOT	UG/L		3	57.3333	85.4537	156.000	7.00000	78/12	79/06
			K	1	5.00000		5.00000	5.00000	79/09	79/09
			T	4	44.2500	74.5179	156.000	5.00000	78/12	79/09
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
			K	1	100.000		100.000	100.000	79/09	79/09
			T	4	100.000	.000000	100.000	100.000	78/12	79/09
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
			K	1	30.0000		30.0000	30.0000	79/09	79/09
			T	4	30.0000	.000000	30.0000	30.0000	78/12	79/09
FEC COLI	MFM-FCBR	/100ML		14	2406.43	4346.24	17000.0	150.000	78/10	79/09
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	78/12	79/06
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06
			K	1	.500000		.500000	.500000	79/09	79/09
			T	4	.500000	.000000	.500000	.500000	78/12	79/09

TABLE RD 1-246

STATION NUMBER 601290
40 06 37.0 083 01 55.0 2
OLENTANGY RIVER NR WORTHINGTON - I 270 N.
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 011.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		9	10.3000	7.73821	22.0000	2.20000	79/10	80/08
STREAM	FLOW	CFS		2	1648.50	1813.73	2931.00	366.000	79/10	79/11
STREAM	FLOW,	INST-CFS		2	528.500	612.213	961.400	95.6000	80/03	80/05
STREAM	STAGE	FEET		2	2.70500	1.02531	3.43000	1.98000	80/03	80/05
CNDUCTVY	FIELD	MICROMHO		8	420.625	127.895	590.000	245.000	79/10	80/08
CNDUCTVY	AT 25C	MICROMHO		1	643.000		643.000	643.000	80/01	80/01
DO		MG/L		9	9.96111	2.34839	13.2000	7.20000	79/10	80/08
BOD	5 DAY	MG/L		7	4.14286	1.95180	8.00000	2.00000	79/11	80/08
			K	1	1.00000		1.00000	1.00000	79/10	79/10
			T	8	3.75000	2.12132	8.00000	1.00000	79/10	80/08
COD	LOWLEVEL	MG/L		9	18.6667	8.73215	31.0000	4.00000	79/10	80/08
PH		SU		9	7.81666	.350084	8.30000	7.30000	79/10	80/08
RESIDUE	TOT NFLT	MG/L		8	41.5000	41.1790	111.000	10.0000	79/10	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	9	38.0000	39.9249	111.000	10.0000	79/10	80/08
NH3+NH4-	N TOTAL	MG/L		6	.216666	.148818	.410000	.060000	79/11	80/08
			K	3	.050000	.000075	.050000	.050000	79/10	80/06
			T	9	.161111	.144174	.410000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		8	.045000	.037033	.100000	.010000	79/11	80/08
			K	1	.010000		.010000	.010000	79/10	79/10
			T	9	.041111	.036553	.100000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		9	3.03111	1.15943	4.55000	1.86000	79/10	80/08
TOT KJEL	N	MG/L		9	.776666	.304795	1.37000	.410000	79/10	80/08
PHOS-TOT		MG/L P		9	.180444	.158751	.580000	.060000	79/10	80/08
TOT HARD	CACO3	MG/L		3	259.333	65.2871	318.000	189.000	79/12	80/06
SODIUM	NA,TOT	MG/L		1	580.000		580.000	580.000	79/10	79/10
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/12	79/12
			K	2	5.00000	.000000	5.00000	5.00000	80/03	80/06
			T	3	5.00000	.000000	5.00000	5.00000	79/12	80/06

TABLE RD 1-246 (Continued)

STATION NUMBER 601290
40 06 37.0 083 01 55.0 2
OLENTANGY RIVER NR WORTHINGTON - I 270 N.
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 011.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
IRON	FE,TOT	UG/L		3	2566.67	3234.71	6300.00	600.000	79/12	80/06
LEAD	PB,TOT	UG/L		3	12.0000	10.4403	24.0000	5.00000	79/12	80/06
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/12	79/12
			K	2	100.000	.000000	100.000	100.000	80/03	80/06
			T	3	100.000	.000000	100.000	100.000	79/12	80/06
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/12	80/03
ZINC	ZN,TOT	UG/L	K	1	30.0000		30.0000	30.0000	80/06	80/06
			T	3	30.0000	.000000	30.0000	30.0000	79/12	80/06
FEC COLI	MFM-FCBR	/100ML		2	1055.00	1053.59	1800.00	310.000	79/10	79/11
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/12	79/12
			K	2	2.00000	.000000	2.00000	2.00000	80/03	80/06
			T	3	2.00000	.000000	2.00000	2.00000	79/12	80/06
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/03	80/06

TABLE RD 1-247

STATION NUMBER 600740
39 31 03.0 083 25 02.0 2
PAINT CREEK BELOW WASHINGTON C.H. - U.S. RT. 35
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 064.30

No data were collected from 10/78 - 9/80.

TABLE RD 1-248

STATION NUMBER 601320
39 15 49.0 083 10 01.0 2
PAINT CREEK NEAR BOURNEVILLE
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 021.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	13.7083	8.94290	25.0000	1.00000	78/10	79/09
STREAM	FLOW	CFS		11	1574.18	2175.58	7737.00	63.0000	78/10	79/09
CNDUCTVY	FIELD	MICROMHO		5	343.000	86.0755	470.000	264.000	78/10	79/09
CNDUCTVY	AT 25C	MICROMHO		6	531.666	84.4523	599.000	367.000	78/11	79/08
DO		MG/L		11	10.2909	2.10498	14.7000	8.10000	78/10	79/09
COD	LOWLEVEL	MG/L		12	12.0833	5.03548	19.0000	4.00000	78/10	79/09
PH		SU		12	7.81666	.301032	8.30000	7.20000	78/10	79/09
T ALK	CACO3	MG/L		2	107.000	137.179	204.000	10.0000	79/06	79/09
RESIDUE	DISS-105	C MG/L		1	286.000		286.000	286.000	79/09	79/09
RESIDUE	TOT NFLT	MG/L		12	31.8333	26.0239	105.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		12	.097500	.061663	.240000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		12	.033333	.020597	.070000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		12	3.30833	1.90802	7.93000	1.09000	78/10	79/09
TOT KJEL	N	MG/L		12	1.02250	1.46420	5.60000	.300000	78/10	79/09
PHOS-TOT		MG/L P		12	.083333	.050871	.190000	.050000	78/10	79/09
TOT HARD	CACO3	MG/L		4	228.250	51.8483	266.000	152.000	79/01	79/08
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/02	79/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/02	79/08
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/02	79/08
IRON	FE,TOT	UG/L		3	1740.00	1555.41	3500.00	550.000	79/02	79/08
LEAD	PB,TOT	UG/L		3	6.66667	.577405	7.00000	6.00000	79/02	79/08
MANGNESE	MN	UG/L		1	100.000		100.000	100.000	79/08	79/08
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/02	79/08
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/02	79/08
FEC COLI	MFM-FCBR	/100ML		12	373.333	224.837	800.000	150.000	78/10	79/09
PHENOLS	TOTAL	UG/L		4	3.00000	2.00000	6.00000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/02	79/08

TABLE RD 1-249

STATION NUMBER 601320
39 15 49.0 083 10 01.0 2
PAINT CREEK NEAR BOURNEVILLE
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 021.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		12	12.1250	8.81405	26.0000	1.00000	79/10	80/09
STREAM	FLOW	CFS		4	661.750	221.670	894.000	423.000	79/10	80/02
STREAM	FLOW,	INST-CFS		7	1772.29	1435.72	4132.00	331.000	80/03	80/09
STREAM	STAGE	FEET		8	4.21125	1.57547	6.83000	2.31000	79/10	80/09
CNDUCTVY	FIELD	MICROMHO		3	368.333	80.3644	460.000	310.000	79/10	80/01
CNDUCTVY	AT 25C	MICROMHO		8	496.500	89.9492	605.000	305.000	79/11	80/09
DO		MG/L		12	10.0250	1.82465	13.9000	7.70000	79/10	80/09
COD	LOWLEVEL	MG/L		12	17.0000	14.8752	50.0000	4.00000	79/10	80/09
PH		SU		11	7.99999	.379530	8.70000	7.40000	79/11	80/09
LAB	PH	SU		2	8.00000	.000000	8.00000	8.00000	79/10	80/02
RESIDUE	DISS-105	C MG/L		4	334.000	7.87401	345.000	327.000	79/10	80/01
RESIDUE	TOT NFLT	MG/L		12	55.4167	103.273	376.000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		9	.065555	.017401	.100000	.050000	79/10	80/08
			K	3	.050000	.000075	.050000	.050000	80/06	80/09
			T	12	.061667	.016423	.100000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		11	.038182	.021363	.070000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		12	2.95416	1.27613	5.20000	.610000	79/10	80/09
TOT KJEL	N	MG/L		10	.568000	.490279	1.94000	.330000	79/10	80/08
PHOS-TOT		MG/L P		11	.116000	.105153	.417000	.030000	79/10	80/09
			K	1	.020000		.020000	.020000	80/05	80/05
			T	12	.108000	.104019	.417000	.020000	79/10	80/09
TOT HARD	CACO3	MG/L		4	256.000	69.4550	316.000	156.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		2	18.0000	1.41421	19.0000	17.0000	79/11	80/02
SULFATE	SO4-TOT	MG/L		3	35.6667	14.7423	47.0000	19.0000	79/11	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-249 (Continued)

STATION NUMBER 601320
39 15 49.0 083 10 01.0 2
PAINT CREEK NEAR BOURNEVILLE
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 021.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/11	80/05
			K	1	30.0000		30.0000	30.0000	80/08	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	3587.50	6276.68	13000.0	310.000	79/11	80/08
LEAD	PB,TOT	UG/L		4	9.00000	2.70801	11.0000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		3	163.333	213.854	410.000	30.0000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		3	36.6667	11.5471	50.0000	30.0000	79/11	80/08
			K	1	30.0000		30.0000	30.0000	80/05	80/05
ZINC	ZN,TOT	UG/L	T	4	35.0000	10.0000	50.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		9	481.666	781.914	2500.00	36.0000	79/10	80/07
PHENOLS	TOTAL	UG/L		3	4.00000	3.46410	8.00000	2.00000	79/11	80/08
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	3.50000	3.00000	8.00000	2.00000	79/11	80/08
RESIDUE	DISS-180	C MG/L		6	278.833	46.0024	323.000	195.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.566667	.115471	.700000	.500000	79/11	80/05
			K	1	.500000		.500000	.500000	80/08	80/08
			T	4	.550000	.100001	.700000	.500000	79/11	80/08

TABLE RD 1-250

STATION NUMBER 610800
39 13 06.0 083 23 08.0 2
ROCKY FK NR BARRETTS MILLS
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 037.70 002.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	13.7500	7.80491	21.0000	4.00000	78/11	79/08
STREAM	FLOW	CFS		4	328.500	476.145	1038.00	15.0000	78/11	79/08
CNDUCTVY	AT 25C	MICROMHO		3	412.666	40.6763	445.000	367.000	78/11	79/05
DO		MG/L		4	9.52500	2.18385	12.8000	8.40000	78/11	79/08
COD	LOWLEVEL	MG/L		4	9.00000	2.16025	12.0000	7.00000	78/11	79/08
PH		SU		3	7.60000	.500137	8.10000	7.10000	78/11	79/08
RESIDUE	TOT NFLT	MG/L		4	32.0000	32.0832	78.0000	10.0000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		4	.105000	.091104	.240000	.050000	78/11	79/08
NO2-N	TOTAL	MG/L		4	.010000	.000000	.010000	.010000	78/11	79/08
NO3-N	TOTAL	MG/L		4	.789999	.581779	1.56000	.190000	78/11	79/08
TOT KJEL	N	MG/L		4	.650000	.191486	.800000	.400000	78/11	79/08
PHOS-TOT		MG/L P		4	.087500	.037749	.140000	.050000	78/11	79/08
TOT HARD	CACO3	MG/L		4	176.750	22.0359	195.000	148.000	78/11	79/08
CADMIUM	CD,TOT	UG/L		4	8.00000	6.00000	17.0000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		4	890.000	999.900	2350.00	160.000	78/11	79/08
LEAD	PB,TOT	UG/L		4	63.2500	104.790	220.000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		2	105.000	7.07107	110.000	100.000	78/11	79/08
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/08
ZINC	ZN,TOT	UG/L		4	30.0000	.000000	30.0000	30.0000	78/11	79/08
FEC COLI	MFM-FCBR	/100ML		4	207.500	170.953	450.000	50.0000	78/11	79/08
PHENOLS	TOTAL	UG/L		4	2.25000	.500000	3.00000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		4	.500000	.000000	.500000	.500000	78/11	79/08

TABLE RD 1-251

STATION NUMBER 610800
39 13 06.0 083 23 08.0 2
ROCKY FK NR BARRETTS MILLS
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 037.70 002.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		4	12.8750	9.11386	23.0000	2.00000	79/11	80/08
STREAM	FLOW	CFS		2	130.500	58.6899	172.000	89.0000	79/11	80/02
STREAM	FLOW,	INST-CFS		2	791.500	279.308	989.000	594.000	80/05	80/08
STREAM	STAGE	FEET		3	3.45333	1.37961	5.02000	2.42000	79/11	80/08
CNDUCTVY	FIELD	MICROMHO		1	285.000		285.000	285.000	79/11	79/11
CNDUCTVY	AT 25C	MICROMHO		4	372.250	76.5435	448.000	266.000	79/11	80/08
DO		MG/L		4	10.7500	2.30146	13.9000	8.40000	79/11	80/08
COD	LOWLEVEL	MG/L		4	18.2500	4.34933	24.0000	14.0000	79/11	80/08
PH		SU		4	7.75000	.311007	8.10000	7.40000	79/11	80/08
LAB	PH	SU		1	8.00000		8.00000	8.00000	80/02	80/02
RESIDUE	DISS-105	C MG/L		1	218.000		218.000	218.000	79/11	79/11
RESIDUE	TOT NFLT	MG/L		3	52.6667	73.9008	138.000	10.0000	79/11	80/08
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	4	42.0000	64.0000	138.000	10.0000	79/11	80/08
NH3+NH4-	N TOTAL	MG/L		3	.090000	.034641	.110000	.050000	79/11	80/08
			K	1	.050000		.050000	.050000	80/05	80/05
			T	4	.080000	.034641	.110000	.050000	79/11	80/08
NO2-N	TOTAL	MG/L		4	.017500	.009574	.030000	.010000	79/11	80/08
NO3-N	TOTAL	MG/L		4	.647500	.259407	.970000	.340000	79/11	80/08
TOT KJEL	N	MG/L		4	.542500	.331198	.990000	.230000	79/11	80/08
PHOS-TOT		MG/L P		4	.062500	.067988	.164000	.020000	79/11	80/08
TOT HARD	CACO3	MG/L		4	191.500	43.0542	235.000	132.000	79/11	80/08
CHLORIDE	TOTAL	MG/L		2	10.0000	1.41421	11.0000	9.00000	79/11	80/02
SULFATE	SO4-TOT	MG/L		3	18.6667	5.03329	24.0000	14.0000	79/11	80/08
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	80/02
			K	2	5.00000	.000000	5.00000	5.00000	80/05	80/08
			T	4	5.00000	.000000	5.00000	5.00000	79/11	80/08
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08

TABLE RD 1-251 (Continued)

STATION NUMBER 610800
39 13 06.0 083 23 08.0 2
ROCKY FK NR BARRETTS MILLS
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 063.80 037.70 002.80

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
			T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
IRON	FE,TOT	UG/L		4	1282.50	2080.87	4400.00	110.000	79/11	80/08
LEAD	PB,TOT	UG/L		4	13.2500	12.6853	32.0000	5.00000	79/11	80/08
MANGNESE	MN	UG/L		3	120.000	113.578	250.000	40.0000	79/11	80/08
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	79/11	80/02
			K	2	100.000	.000000	100.000	100.000	80/05	80/08
			T	4	100.000	.000000	100.000	100.000	79/11	80/08
ZINC	ZN,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/02
			K	2	30.0000	.000000	30.0000	30.0000	80/05	80/08
ZINC	ZN,TOT	UG/L	T	4	30.0000	.000000	30.0000	30.0000	79/11	80/08
FEC COLI	MFM-FCBR	/100ML		3	3016.67	4336.57	8000.00	100.000	79/11	80/08
PHENOLS	TOTAL	UG/L		3	3.00000	1.73205	5.00000	2.00000	79/11	80/08
			K	1	2.00000		2.00000	2.00000	80/05	80/05
			T	4	2.75000	1.50000	5.00000	2.00000	79/11	80/08
RESIDUE	DISS-180 C	MG/L		2	188.000	35.3553	213.000	163.000	80/05	80/08
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	80/02
			K	2	.500000	.000000	.500000	.500000	80/05	80/08
			T	4	.500000	.000000	.500000	.500000	79/11	80/08

TABLE RD 1-252

STATION NUMBER 600750
39 49 53.0 082 38 25.0 2
L. WALNUT CREEK BELOW BALTIMORE - LEONARD RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 106.50 036.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-253

STATION NUMBER 610780
40 32 40.0 082 49 46.0 2
WHETSTONE CRK AT MT. GILEAD-SR61
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 037.60 021.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	11.1667	10.7561	22.5000	1.10000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	664.000	169.726	790.000	471.000	78/12	79/06
DO		MG/L		3	11.9000	1.55247	13.4000	10.3000	78/12	79/06
BOD	5 DAY	MG/L		3	2.73333	2.05264	5.00000	1.00000	78/12	79/06
COD	LOWLEVEL	MG/L		1	8.00000		8.00000	8.00000	79/06	79/06
LAB	PH	SU		3	8.10000	.200364	8.30000	7.90000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	455.000		455.000	455.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	10.0000	.000000	10.0000	10.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	.066667	.028868	.100000	.050000	78/12	79/06
NO2-N	TOTAL	MG/L		3	.020000	.010000	.030000	.010000	78/12	79/06
NO3-N	TOTAL	MG/L		3	2.40000	.754453	3.02000	1.56000	78/12	79/06
TOT KJEL	N	MG/L		3	.699999	.360556	1.10000	.400000	78/12	79/06
PHOS-TOT		MG/L P		3	.053333	.005774	.060000	.050000	78/12	79/06
TOT HARD	CACO3	MG/L		3	246.667	50.3426	289.000	191.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	520.000		520.000	520.000	79/06	79/06
LEAD	PB,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	78/12	79/06
MANGNESE	MN	UG/L		1	30.0000		30.0000	30.0000	79/06	79/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	78/12	79/03
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
ALUMINUM	AL,TOT	UG/L		1	600.000		600.000	600.000	79/06	79/06
FEC COLI	MFM-FCBR	/100ML		1	450.000		450.000	450.000	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-254

STATION NUMBER 610780
40 32 40.0 082 49 46.0 2
WHETSTONE CRK AT MT. GILEAD-SR61
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 037.60 021.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	17.0000		17.0000	17.0000	80/09	80/09
DO		MG/L		1	9.50000		9.50000	9.50000	80/09	80/09
BOD	5 DAY	MG/L		2	3.80000	2.26274	5.40000	2.20000	80/05	80/09
COD	LOWLEVEL	MG/L		2	25.7000	21.7789	41.1000	10.3000	80/05	80/09
LAB	PH	SU		2	8.35000	.353575	8.60000	8.10000	80/05	80/09
RESIDUE	DISS-105	C MG/L		1	396.000		396.000	396.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L		1	60.0000		60.0000	60.0000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	2	35.0000	35.3553	60.0000	10.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		1	.060000		.060000	.060000	80/09	80/09
			K	1	.050000		.050000	.050000	80/05	80/05
			T	2	.055000	.007071	.060000	.050000	80/05	80/09
NO2-N	TOTAL	MG/L		2	.010000	.000000	.010000	.010000	80/05	80/09
NO3-N	TOTAL	MG/L		2	.320000	.212132	.470000	.170000	80/05	80/09
TOT KJEL	N	MG/L		2	.365000	.176777	.490000	.240000	80/05	80/09
PHOS-TOT		MG/L P		2	.029000	.014142	.039000	.019000	80/05	80/09
TOT HARD	CACO3	MG/L		2	319.000	60.8112	362.000	276.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	265.000	7.07107	270.000	260.000	80/05	80/09
LEAD	PB,TOT	UG/L		1	16.0000		16.0000	16.0000	80/05	80/05
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	2	10.5000	7.77817	16.0000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	45.0000	21.2132	60.0000	30.0000	80/05	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L	K	2	200.000	.000000	200.000	200.000	80/05	80/09
FEC COLI	MFM-FCBR	/100ML	L	1	100000		100000	100000	80/09	80/09
RESIDUE	DISS-180	C MG/L		1	594.000		594.000	594.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/05	80/09

TABLE RD 1-255

STATION NUMBER 610790
40 32 43.0 082 51 16.0 2
WHETSTONE C AT MT GILEAD-CAR. RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 037.60 019.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	10.6333	9.11171	20.0000	1.80000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	702.666	214.443	944.000	534.000	78/12	79/06
DO		MG/L		3	10.3333	2.88678	12.0000	7.00000	78/12	79/06
BOD	5 DAY	MG/L		3	3.63333	2.05508	6.00000	2.30000	78/12	79/06
COD	LOWLEVEL	MG/L		1	4.00000		4.00000	4.00000	79/06	79/06
LAB	PH	SU		3	7.90000	.008735	7.90000	7.90000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	506.000		506.000	506.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	15.3333	3.21458	19.0000	13.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	.160000	.103923	.280000	.100000	78/12	79/06
NO2-N	TOTAL	MG/L		2	.090000	.113137	.170000	.010000	79/03	79/06
NO3-N	TOTAL	MG/L		3	2.69333	1.24500	3.94000	1.45000	78/12	79/06
TOT KJEL	N	MG/L		3	1.03333	.305504	1.30000	.700000	78/12	79/06
PHOS-TOT		MG/L P		3	.120000	.040000	.160000	.080000	78/12	79/06
TOT HARD	CACO3	MG/L		3	299.333	97.5112	396.000	201.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	780.000		780.000	780.000	79/06	79/06
LEAD	PB,TOT	UG/L		3	11.3333	2.08170	13.0000	9.00000	78/12	79/06
MANGNESE	MN	UG/L		1	50.0000		50.0000	50.0000	79/06	79/06
NICKEL	NI,TOTAL	UG/L		2	100.000	.000000	100.000	100.000	78/12	79/03
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
ALUMINUM	AL,TOT	UG/L		1	400.000		400.000	400.000	79/06	79/06
FEC COLI	MFM-FCBR	/100ML		1	530.000		530.000	530.000	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-256

STATION NUMBER 610790
40 32 43.0 082 51 16.0 2
WHETSTONE C AT MT GILEAD-CAR. RD
OHIO RIVER (SCIOTO RIVER)
MILES 0953.80 0624.60 133.30 037.60 019.90

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	16.8000		16.8000	16.8000	80/09	80/09
DO		MG/L		1	6.40000		6.40000	6.40000	80/09	80/09
BOD	5 DAY	MG/L		2	3.55000	2.75772	5.50000	1.60000	80/05	80/09
COD	LOWLEVEL	MG/L		2	19.8000	3.67702	22.4000	17.2000	80/05	80/09
LAB	PH	SU		2	8.30000	.283089	8.50000	8.10000	80/05	80/09
RESIDUE	DISS-105	C MG/L		1	430.000		430.000	430.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L		1	100.000		100.000	100.000	80/09	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	2	55.0000	63.6396	100.000	10.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		2	.385000	.035356	.410000	.360000	80/05	80/09
NO2-N	TOTAL	MG/L		2	.095000	.077782	.150000	.040000	80/05	80/09
NO3-N	TOTAL	MG/L		2	.600000	.098996	.670000	.530000	80/05	80/09
TOT KJEL	N	MG/L		2	.830000	.296984	1.04000	.620000	80/05	80/09
PHOS-TOT		MG/L P		2	.268000	.152735	.376000	.160000	80/05	80/09
TOT HARD	CACO3	MG/L		2	313.000	43.8406	344.000	282.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	7.50000	3.53553	10.0000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	345.000	77.7817	400.000	290.000	80/05	80/09
LEAD	PB,TOT	UG/L		1	12.0000		12.0000	12.0000	80/05	80/05
			K	1	5.00000		5.00000	5.00000	80/09	80/09
			T	2	8.50000	4.94975	12.0000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	85.0000	49.4975	120.000	50.0000	80/05	80/09
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L	K	2	200.000	.000000	200.000	200.000	80/05	80/09
FEC COLI	MFM-FCBR	/100ML		1	130.000		130.000	130.000	80/05	80/05
			L	1	100000		100000	100000	80/09	80/09
			T	2	50065.0	70618.7	100000	130.000	80/05	80/09
RESIDUE	DISS-180	C MG/L		1	594.000		594.000	594.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	2	.500000	.000000	.500000	.500000	80/05	80/09

TABLE RD 1-257

STATION NUMBER 501260
41 22 55.0 082 19 01.0 2
VERMILION R. NEAR VERMILION
LAKE ERIE 060591 (VERMILION RIVER)
MILES 0004.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	13.1125	8.53437	24.3000	.000000	78/10	79/07
TURB	JKSN	JTU		2	5.80000	5.51543	9.70000	1.90000	78/11	79/05
CNDUCTVY	AT 25C	MICROMHO		9	632.555	140.089	850.000	471.000	78/10	79/07
DO		MG/L		8	10.7500	1.37115	12.4000	8.80000	78/10	79/07
BOD	5 DAY	MG/L		7	1.68571	1.11867	4.00000	1.00000	78/10	79/09
COD	LOWLEVEL	MG/L		9	13.9556	4.51279	19.8000	4.00000	78/10	79/09
LAB	PH	SU		10	8.11199	.390694	8.80000	7.70000	78/10	79/09
T ALK	CACO3	MG/L		1	230.000		230.000	230.000	78/11	78/11
RESIDUE	DISS-105	C MG/L		9	370.444	78.1737	547.000	301.000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		10	46.7000	108.027	354.000	10.0000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		9	.082222	.053333	.190000	.050000	78/10	79/09
			K	1	.050000		.050000	.050000	79/07	79/07
			T	10	.079000	.051305	.190000	.050000	78/10	79/09
NO2-N	TOTAL	MG/L		10	.057000	.067831	.180000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		10	3.15100	4.32408	11.3000	.010000	78/10	79/09
TOT KJEL	N	MG/L		9	1.06444	.772401	2.40000	.370000	78/10	79/09
			K	1	.730000		.730000	.730000	79/07	79/07
			T	10	1.03100	.735867	2.40000	.370000	78/10	79/09
T PO4	PO4	MG/L		1	.050000		.050000	.050000	78/11	78/11
PHOS-TOT		MG/L P		10	.167000	.196641	.550000	.020000	78/10	79/09
PHOS-DIS		MG/L P		4	.057500	.015000	.080000	.050000	78/11	79/05
T ORG C	C	MG/L		5	17.2200	18.4902	50.0000	7.10000	78/11	79/05
D ORG C	C	MG/L		1	6.50000		6.50000	6.50000	78/11	78/11
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/04	79/09
			K	1	.010000		.010000	.010000	79/07	79/07
			T	3	.010000	.000000	.010000	.010000	79/04	79/09
TOT HARD	CACO3	MG/L		9	247.000	48.4149	355.000	194.000	78/10	79/09
CHLORIDE	TOTAL	MG/L		10	25.2000	19.6740	62.0000	7.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		10	101.800	35.9686	175.000	57.0000	78/10	79/09
FLUORIDE	F,DISS	MG/L		5	.304000	.144673	.560000	.210000	79/04	79/09
SILICA	DISOLVED	MG/L		5	4.11200	3.30130	7.56000	.680000	78/11	79/07
ARSENIC	AS,TOT	UG/L		7	10.0000	.000000	10.0000	10.0000	78/10	79/09
			K	2	10.0000	.000000	10.0000	10.0000	79/07	79/07
			T	9	10.0000	.000000	10.0000	10.0000	78/10	79/09
CADMIUM	CD,TOT	UG/L		8	6.25000	3.53553	15.0000	5.00000	78/10	79/09
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	9	6.11111	3.33334	15.0000	5.00000	78/10	79/09
CHROMIUM	CR,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/10	79/09
			K	2	30.0000	.000000	30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/10	79/09
COPPER	CU,TOT	UG/L		6	30.0000	.000000	30.0000	30.0000	78/10	79/07

TABLE RD 1-257 (Continued)

STATION NUMBER 501260
41 22 55.0 082 19 01.0 2
VERMILION R. NEAR VERMILION
LAKE ERIE 060591 (VERMILION RIVER)
MILES 0004.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	7	30.0000	.000000	30.0000	30.0000	78/10	79/07
IRON	FE,TOT	UG/L		4	3527.50	6515.40	13300.0	170.000	79/06	79/09
IRON	FE,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
LEAD	PB,TOT	UG/L		8	28.0000	56.7047	168.000	5.00000	78/10	79/09
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	9	25.4444	53.5936	168.000	5.00000	78/10	79/09
MANGNESE	MN	UG/L		2	35.0000	7.07107	40.0000	30.0000	79/07	79/09
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/10	79/05
ZINC	ZN,TOT	UG/L		8	32.5000	4.62910	40.0000	30.0000	78/10	79/09
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	32.2222	4.40974	40.0000	30.0000	78/10	79/09
ALUMINUM	AL,TOT	UG/L		4	1375.00	2350.00	4900.00	200.000	79/06	79/09
SELENIUM	SE,TOT	UG/L		1	5.00000		5.00000	5.00000	79/06	79/06
			K	2	7.50000	3.53553	10.0000	5.00000	79/07	79/07
			T	3	6.66667	2.88676	10.0000	5.00000	79/06	79/07
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
			K	1	1.00000		1.00000	1.00000	79/04	79/04
			T	2	1.00000	.000000	1.00000	1.00000	78/10	79/04
ALPHA	DISOLVED	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
ALPHA	SUSP	PC/L	K	1	1.00000		1.00000	1.00000	79/04	79/04
BETA	TOTAL	PC/L		2	7.00000	.000000	7.00000	7.00000	78/10	79/04
BETA	DISOLVED	PC/L		1	7.00000		7.00000	7.00000	79/04	79/04
BETA	SUSP	PC/L	K	1	2.00000		2.00000	2.00000	79/04	79/04
FEC COLI	MFM-FCBR	/100ML		9	483.333	754.719	2400.00	20.0000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		2	605.000	289.914	810.000	400.000	79/05	79/06
PHENOLS	TOTAL	UG/L		5	3.20000	2.16795	7.00000	2.00000	79/03	79/09
MBAS		MG/L		8	.105000	.048697	.200000	.060000	78/10	79/09
MERCURY	HG,TOTAL	UG/L		7	.500000	.000000	.500000	.500000	78/10	79/09
			K	2	.500000	.000000	.500000	.500000	79/07	79/07
			T	9	.500000	.000000	.500000	.500000	78/10	79/09

TABLE RD 1-258

STATION NUMBER 501260
41 22 55.0 082 19 01.0 2
VERMILION R. NEAR VERMILION
LAKE ERIE 060591 (VERMILION RIVER)
MILES 0004.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		5	15.5800	10.6879	24.1000	.600000	80/03	80/09
TURB	JKSN	JTU		1	58.5000		58.5000	58.5000	80/04	80/04
TURB	TRBIDMTR	HACH FTU		1	58.5000		58.5000	58.5000	80/04	80/04
CNDUCTVY	AT 25C	MICROMHO		2	388.500	.707107	389.000	388.000	80/03	80/04
DO		MG/L		5	10.2600	1.98066	13.6000	8.40000	80/03	80/09
BOD	5 DAY	MG/L		8	1.83750	1.01691	4.00000	1.00000	79/10	80/09
COD	LOWLEVEL	MG/L		7	33.6286	27.7940	78.0000	8.30000	79/10	80/09
LAB	PH	SU		9	7.75777	.442976	8.30000	6.90000	79/10	80/09
RESIDUE	TOTAL	MG/L		1	228.400		228.400	228.400	80/03	80/03
RESIDUE	DISS-105	C MG/L		7	339.000	84.7447	433.000	252.000	79/10	80/07
RESIDUE	TOT NFLT	MG/L		7	38.5714	32.9386	86.0000	10.0000	79/10	80/07
			K	1	10.0000		10.0000	10.0000	80/09	80/09
			T	8	35.0000	32.1248	86.0000	10.0000	79/10	80/09
NH3+NH4-	N TOTAL	MG/L		6	.126667	.168839	.460000	.010000	79/10	80/09
			K	3	.050000	.000075	.050000	.050000	80/04	80/06
			T	9	.101111	.138874	.460000	.010000	79/10	80/09
NO2-N	TOTAL	MG/L		6	.038333	.030605	.080000	.010000	79/10	80/07
			K	2	.010000	.000000	.010000	.010000	80/05	80/09
			T	8	.031250	.029001	.080000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		7	2.99143	1.71004	5.80000	.050000	79/10	80/07
			K	2	.050000	.000061	.050000	.050000	80/05	80/09
			T	9	2.33777	1.96863	5.80000	.050000	79/10	80/09
TOT KJEL	N	MG/L		9	.607777	.236050	1.10000	.400000	79/10	80/09
PHOS-TOT		MG/L P		8	.060125	.040954	.120000	.020000	79/10	80/09
T ORG C	C	MG/L		2	13.5000	.707107	14.0000	13.0000	80/04	80/09
TOT HARD	CACO3	MG/L		8	233.750	57.5717	306.000	152.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		8	24.7500	7.45941	40.0000	16.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		8	89.5000	19.8134	113.000	61.0000	79/10	80/09
FLUORIDE	F,DISS	MG/L		2	.215000	.007072	.220000	.210000	79/10	80/03
FLUORIDE	F,TOTAL	MG/L		3	.226667	.028867	.260000	.210000	79/12	80/05
SILICA	DISOLVED	MG/L		1	.860000		.860000	.860000	79/10	79/10
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/10	80/03
			K	5	10.0000	.000000	10.0000	10.0000	80/04	80/09
			T	8	10.0000	.000000	10.0000	10.0000	79/10	80/09
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/10	80/03
			K	6	5.00000	.000000	5.00000	5.00000	79/12	80/09
			T	9	5.00000	.000000	5.00000	5.00000	79/10	80/09
CHROMIUM	HEX-VAL	UG/L	K	1	30.0000		30.0000	30.0000	80/04	80/04
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	6	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09

TABLE RD 1-258 (Continued)

STATION NUMBER 501260
41 22 55.0 082 19 01.0 2
VERMILION R. NEAR VERMILION
LAKE ERIE 060591 (VERMILION RIVER)
MILES 0004.50

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/03
			K	6	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	8	30.0000	.000000	30.0000	30.0000	79/11	80/09
IRON	FE,TOT	UG/L		9	1987.78	2297.61	6300.00	100.000	79/10	80/09
IRON	FE,DISS	UG/L		1	50.0000		50.0000	50.0000	79/10	79/10
LEAD	PB,TOT	UG/L		5	6.00000	2.23607	10.0000	5.00000	79/10	80/04
			K	4	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	9	5.55556	1.66667	10.0000	5.00000	79/10	80/09
MANGNESE	MN	UG/L		7	52.8571	24.9762	90.0000	30.0000	79/10	80/07
			K	1	30.0000		30.0000	30.0000	80/09	80/09
			T	8	50.0000	24.4949	90.0000	30.0000	79/10	80/09
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/10	79/10
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/10	80/03
			K	6	30.0000	.000000	30.0000	30.0000	79/12	80/09
			T	9	30.0000	.000000	30.0000	30.0000	79/10	80/09
ALUMINUM	AL,TOT	UG/L		6	1116.67	951.666	2300.00	200.000	79/10	80/09
			K	2	200.000	.000000	200.000	200.000	79/12	80/05
			T	8	887.500	909.376	2300.00	200.000	79/10	80/09
ALPHA	TOTAL	PC/L	K	1	1.00000		1.00000	1.00000	80/04	80/04
BETA	TOTAL	PC/L		1	13.0000		13.0000	13.0000	80/04	80/04
FEC COLI	MFM-FCBR	/100ML		8	376.250	301.517	980.000	50.0000	79/10	80/09
			K	1	10.0000		10.0000	10.0000	80/05	80/05
			T	9	335.555	307.332	980.000	10.0000	79/10	80/09
PHENOLS	TOTAL	UG/L	K	1	2.00000		2.00000	2.00000	80/04	80/04
MBAS		MG/L		6	.078333	.021370	.100000	.050000	79/10	80/06
			K	1	.050000		.050000	.050000	80/09	80/09
			T	7	.074286	.022254	.100000	.050000	79/10	80/09
RESIDUE	DISS-180 C	MG/L		2	234.500	118.087	318.000	151.000	80/03	80/09
MERCURY	HG,TOTAL	UG/L		3	.766666	.461880	1.30000	.500000	79/10	80/03
			K	5	.500000	.000000	.500000	.500000	80/04	80/09
			T	8	.600000	.282843	1.30000	.500000	79/10	80/09

TABLE RD 1-259

STATION NUMBER 610000
40 33 50.0 084 48 10.0 2
WABASH R AT STATE LINE
OHIO RIVER (WABASH RIVER)
MILES 953.80 133.10 465.60

No data were collected from 10/78 - 9/80.

TABLE RD 1-260

STATION NUMBER 605010
40 32 04.0 084 34 27.0 2
BEAVER CRK AT CELINA - S.R. 703
OHIO RIVER (WABASH RIVER)
RIVER MILE 10.7

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	9.10000	9.80765	20.4000	2.80000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	772.666	457.080	1300.00	490.000	78/12	79/06
DO		MG/L		2	7.65000	1.76777	8.90000	6.40000	78/12	79/06
BOD	5 DAY	MG/L		3	8.63333	2.21891	11.1000	6.80000	78/12	79/06
COD	LOWLEVEL	MG/L		1	31.8000		31.8000	31.8000	79/06	79/06
LAB	PH	SU		3	7.93333	.602905	8.50000	7.30000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	296.000		296.000	296.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	64.0000	26.2869	94.0000	45.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	.340000	.442380	.850000	.060000	78/12	79/06
NO2-N	TOTAL	MG/L		3	.030000	.026457	.060000	.010000	78/12	79/06
NO3-N	TOTAL	MG/L		3	.546666	.435010	.860000	.050000	78/12	79/06
TOT KJEL	N	MG/L		3	2.16667	1.12398	3.40000	1.20000	78/12	79/06
PHOS-TOT		MG/L P		3	.180000	.112694	.310000	.110000	78/12	79/06
TOT HARD	CACO3	MG/L		3	322.000	193.124	545.000	210.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	1450.00		1450.00	1450.00	79/06	79/06
LEAD	PB,TOT	UG/L		3	27.0000	32.0780	64.0000	7.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	40.0000	17.3205	60.0000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		1	5800.00		5800.00	5800.00	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-261

STATION NUMBER 605010
40 32 04.0 084 34 27.0 2
BEAVER CRK AT CELINA - S.R. 703
OHIO RIVER (WABASH RIVER)
RIVER MILE 10.7

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.3000		19.3000	19.3000	80/09	80/09
DO		MG/L		1	8.40000		8.40000	8.40000	80/09	80/09
BOD	5 DAY	MG/L		2	8.45000	.919281	9.10000	7.80000	80/05	80/09
COD	LOWLEVEL	MG/L		2	51.0000	35.0725	75.8000	26.2000	80/05	80/09
LAB	PH	SU		2	7.92500	.459628	8.25000	7.60000	80/05	80/09
RESIDUE	DISS-105	C MG/L		1	254.000		254.000	254.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L		2	32.0000	21.2132	47.0000	17.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		1	.060000		.060000	.060000	80/09	80/09
			K	1	.050000		.050000	.050000	80/05	80/05
			T	2	.055000	.007071	.060000	.050000	80/05	80/09
NO2-N	TOTAL	MG/L		1	.010000		.010000	.010000	80/05	80/05
			K	1	.010000		.010000	.010000	80/09	80/09
			T	2	.010000	.000000	.010000	.010000	80/05	80/09
NO3-N	TOTAL	MG/L	K	2	.050000	.000061	.050000	.050000	80/05	80/09
TOT KJEL	N	MG/L		2	1.40500	1.11016	2.19000	.620000	80/05	80/09
PHOS-TOT		MG/L P		2	.162500	.003535	.165000	.160000	80/05	80/09
T ORG C	C	MG/L		1	21.0000		21.0000	21.0000	80/09	80/09
TOT HARD	CACO3	MG/L		2	160.000	22.6274	176.000	144.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	1000.00	466.690	1330.00	670.000	80/05	80/09
LEAD	PB,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	140.000	70.7107	190.000	90.0000	80/05	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/05	80/05
ZINC	ZN,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L		1	500.000		500.000	500.000	80/09	80/09
FEC COLI	MFM-FCBR	/100ML	K	2	5.50000	6.36396	10.0000	1.00000	80/05	80/09
RESIDUE	DISS-180	C MG/L		1	212.000		212.000	212.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/05	80/05

TABLE RD 1-262

STATION NUMBER 605020
40 32 12.0 084 35 26.0 2
BEAVER CRK. AT CELINA-MEYER RD.
OHIO RIVER (WABASH RIVER)
RIVER MILE 9.6

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	9.73333	10.7431	22.0000	2.00000	78/12	79/06
CNDUCTVY	AT 25C	MICROMHO		3	776.666	358.008	1190.00	564.000	78/12	79/06
DO		MG/L		2	8.35000	.636407	8.80000	7.90000	78/12	79/06
BOD	5 DAY	MG/L		3	8.29999	1.70007	10.0000	6.60000	78/12	79/06
COD	LOWLEVEL	MG/L		1	35.7000		35.7000	35.7000	79/06	79/06
LAB	PH	SU		3	7.90000	.500069	8.40000	7.40000	78/12	79/06
RESIDUE	DISS-105	C MG/L		1	350.000		350.000	350.000	79/06	79/06
RESIDUE	TOT NFLT	MG/L		3	37.6667	25.7747	61.0000	10.0000	78/12	79/06
NH3+NH4-	N TOTAL	MG/L		3	3.63667	4.99125	9.40000	.730000	78/12	79/06
NO2-N	TOTAL	MG/L		3	.223333	.318172	.590000	.020000	78/12	79/06
NO3-N	TOTAL	MG/L		3	2.13333	2.39529	4.89000	.560000	78/12	79/06
TOT KJEL	N	MG/L		3	5.80000	6.11474	12.8000	1.50000	78/12	79/06
PHOS-TOT		MG/L P		3	1.60000	2.25169	4.20000	.290000	78/12	79/06
TOT HARD	CACO3	MG/L		3	278.666	88.7947	381.000	222.000	78/12	79/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/06	79/06
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	78/12	79/06
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
COPPER	CU,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	78/12	79/06
IRON	FE,TOT	UG/L		1	1530.00		1530.00	1530.00	79/06	79/06
LEAD	PB,TOT	UG/L		3	9.33333	3.78596	12.0000	5.00000	78/12	79/06
NICKEL	NI,TOTAL	UG/L		3	166.667	115.470	300.000	100.000	78/12	79/06
ZINC	ZN,TOT	UG/L		3	110.000	138.564	270.000	30.0000	78/12	79/06
FEC COLI	MFM-FCBR	/100ML		1	4700.00		4700.00	4700.00	78/12	78/12
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	78/12	79/06

TABLE RD 1-263

STATION NUMBER 605020
40 32 12.0 084 35 26.0 2
BEAVER CRK. AT CELINA-MEYER RD.
OHIO RIVER (WABASH RIVER)
RIVER MILE 9.5

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.4000		19.4000	19.4000	80/09	80/09
DO		MG/L		1	4.00000		4.00000	4.00000	80/09	80/09
BOD	5 DAY	MG/L		2	9.39999	3.11131	11.6000	7.20000	80/05	80/09
COD	LOWLEVEL	MG/L		2	59.9000	5.37391	63.7000	56.1000	80/05	80/09
LAB	PH	SU		2	7.78000	.254566	7.96000	7.60000	80/05	80/09
RESIDUE	DISS-105	C MG/L		1	258.000		258.000	258.000	80/05	80/05
RESIDUE	TOT NFLT	MG/L		2	24.5000	2.12132	26.0000	23.0000	80/05	80/09
NH3+NH4-	N TOTAL	MG/L		2	2.14500	2.05768	3.60000	.690000	80/05	80/09
NO2-N	TOTAL	MG/L		2	.175000	.233345	.340000	.010000	80/05	80/09
NO3-N	TOTAL	MG/L		2	1.98500	2.72236	3.91000	.060000	80/05	80/09
TOT KJEL	N	MG/L		2	3.70500	3.25976	6.01000	1.40000	80/05	80/09
PHOS-TOT		MG/L P		2	1.59000	1.69706	2.79000	.390000	80/05	80/09
T ORG C	C	MG/L		1	19.0000		19.0000	19.0000	80/09	80/09
TOT HARD	CACO3	MG/L		2	210.000	19.7990	224.000	196.000	80/05	80/09
ARSENIC	AS,TOT	UG/L	K	2	10.0000	.000000	10.0000	10.0000	80/05	80/09
CADMIUM	CD,TOT	UG/L	K	2	5.00000	.000000	5.00000	5.00000	80/05	80/09
CHROMIUM	CR,TOT	UG/L		1	50.0000		50.0000	50.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	40.0000	14.1421	50.0000	30.0000	80/05	80/09
COPPER	CU,TOT	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/05	80/09
IRON	FE,TOT	UG/L		2	2880.00	3139.55	5100.00	660.000	80/05	80/09
LEAD	PB,TOT	UG/L		1	31.0000		31.0000	31.0000	80/09	80/09
			K	1	5.00000		5.00000	5.00000	80/05	80/05
			T	2	18.0000	18.3848	31.0000	5.00000	80/05	80/09
MANGNESE	MN	UG/L		2	135.000	63.6396	180.000	90.0000	80/05	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/05	80/05
ZINC	ZN,TOT	UG/L		1	60.0000		60.0000	60.0000	80/09	80/09
			K	1	30.0000		30.0000	30.0000	80/05	80/05
			T	2	45.0000	21.2132	60.0000	30.0000	80/05	80/09
ALUMINUM	AL,TOT	UG/L		1	1600.00		1600.00	1600.00	80/09	80/09
FEC COLI	MFM-FCBR	/100ML		1	140.000		140.000	140.000	80/05	80/05
			L	1	200.000		200.000	200.000	80/09	80/09
			T	2	170.000	42.4264	200.000	140.000	80/05	80/09
RESIDUE	DISS-180	C MG/L		1	452.000		452.000	452.000	80/09	80/09
MERCURY	HG,TOTAL	UG/L	K	1	.500000		.500000	.500000	80/05	80/05

TABLE RD 1-264

STATION NUMBER 504160
41 54 30.0 080 48 38.0 2
ASHTABULA WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN ASHTABULA ARE

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		11	9.73636	9.42574	23.0000	.500000	78/12	79/09
TURB	JKSN	JTU		12	7.74833	13.0813	47.0000	.180000	78/11	79/09
CNDUCTVY	FIELD	MICROMHO		9	192.222	37.7585	260.000	150.000	79/01	79/09
DO		MG/L		4	9.77499	3.04454	12.4000	6.80000	79/03	79/09
COD	LOWLEVEL	MG/L		1	9.00000		9.00000	9.00000	79/09	79/09
PH		SU		11	7.59090	.266405	7.80000	7.00000	78/12	79/09
T ALK	CACO3	MG/L		12	96.9167	13.2699	137.000	84.0000	78/11	79/09
RESIDUE	TOT NFLT	MG/L		1	10.0000		10.0000	10.0000	79/09	79/09
NH3+NH4-	N TOTAL	MG/L		12	.089166	.043789	.150000	.050000	78/11	79/09
NO2-N	TOTAL	MG/L		11	.016364	.010269	.040000	.010000	78/11	79/09
			K	1	.010000		.010000	.010000	79/03	79/03
			T	12	.015833	.009962	.040000	.010000	78/11	79/09
NO3-N	TOTAL	MG/L		12	.307500	.189647	.720000	.090000	78/11	79/09
TOT KJEL	N	MG/L		10	.621999	.809908	2.90000	.200000	78/12	79/09
PHOS-TOT		MG/L P		11	.066364	.036952	.160000	.020000	78/11	79/09
			K	1	.050000		.050000	.050000	79/03	79/03
			T	12	.065000	.035548	.160000	.020000	78/11	79/09
PHOS-DIS		MG/L P		1	.050000		.050000	.050000	79/02	79/02
CHLORIDE	TOTAL	MG/L		12	19.0833	9.01978	30.0000	3.00000	78/11	79/09
SULFATE	SO4-TOT	MG/L		12	26.4167	12.3984	62.0000	12.0000	78/11	79/09
SILICA	DISOLVED	MG/L		9	.234444	.138935	.420000	.050000	78/11	79/09
			K	1	.050000		.050000	.050000	79/08	79/08
			T	10	.216000	.143388	.420000	.050000	78/11	79/09
FEC COLI	MFM-FCBR	/100ML		4	10.7500	11.5289	28.0000	4.00000	79/05	79/09
			K	3	2.33333	.288680	2.50000	2.00000	79/03	79/08
			T	7	7.14286	9.31269	28.0000	2.00000	79/03	79/09
FECSTREP	MF M-ENT	/100ML		4	14.2500	15.7560	35.0000	2.00000	79/03	79/09
			K	3	2.16667	.288683	2.50000	2.00000	79/04	79/08
			T	7	9.07143	12.8790	35.0000	2.00000	79/03	79/09

TABLE RD 1-265

STATION NUMBER 504160
41 54 30.0 080 48 38.0 2
ASHTABULA WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN ASHTABULA AR

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	12.0625	7.48540	21.0000	2.00000	79/10	80/09
TURB	JKSN	JTU		5	42.7200	54.2010	135.000	2.30000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		7	9.90714	14.5553	42.5000	1.90000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		10	203.500	69.8431	280.000	60.0000	79/10	80/09
COD	LOWLEVEL	MG/L		5	13.0200	11.1334	32.0000	4.00000	79/10	80/02
PH		SU		10	8.14499	.236392	8.50000	7.80000	79/10	80/09
T ALK	CACO3	MG/L		11	86.2363	25.9117	97.0000	8.60000	79/11	80/09
RESIDUE	DISS-105	C MG/L		3	165.333	11.3743	178.000	156.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		4	46.7500	56.7883	130.000	10.0000	79/10	80/02
NH3+NH4-	N TOTAL	MG/L		8	.077500	.042678	.170000	.040000	79/10	80/06
			K	4	.050000	.000050	.050000	.050000	80/05	80/09
			T	12	.068333	.036639	.170000	.040000	79/10	80/09
NO2-N	TOTAL	MG/L		9	.011111	.003333	.020000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		11	.360909	.217415	.840000	.120000	79/10	80/08
			K	1	.050000		.050000	.050000	80/09	80/09
			T	12	.335000	.225892	.840000	.050000	79/10	80/09
TOT KJEL	N	MG/L		10	.359000	.177480	.690000	.160000	79/10	80/09
PHOS-TOT		MG/L P		8	.060375	.038116	.107000	.019000	79/11	80/09
			K	3	.020000	.000000	.020000	.020000	80/05	80/08
			T	11	.049364	.037049	.107000	.019000	79/11	80/09
CHLORIDE	TOTAL	MG/L		12	19.3333	2.46193	23.0000	16.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		12	21.1250	6.86270	28.0000	2.50000	79/10	80/09
SILICA	DISOLVED	MG/L		10	.545000	.475587	1.83000	.200000	79/10	80/09
			K	1	.050000		.050000	.050000	80/04	80/04
			T	11	.500000	.475226	1.83000	.050000	79/10	80/09
FEC COLI	MFM-FCBR	/100ML		5	46.2000	33.9882	100.000	10.0000	79/10	80/02
			K	1	2.00000		2.00000	2.00000	80/08	80/08
			T	6	38.8333	35.3520	100.000	2.00000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		6	31.8333	35.5889	93.0000	2.00000	79/10	80/08

TABLE RD 1-266

STATION NUMBER 504170
41 42 00.0 083 15 32.0 2
CONNEAUT WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN CONNEAUT AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	5.00000		5.00000	5.00000	79/02	79/02
COD	LOWLEVEL	MG/L		9	9.78889	5.61704	19.0000	4.00000	78/11	79/09
PH		SU		1	7.50000		7.50000	7.50000	79/02	79/02
RESIDUE	DISS-105	C MG/L		1	194.000		194.000	194.000	79/08	79/08
RESIDUE	TOT NFLT	MG/L		3	12.6667	4.61882	18.0000	10.0000	79/03	79/09
NH3+NH4-	N TOTAL	MG/L		10	.076000	.028752	.120000	.050000	78/11	79/09
NO2-N	TOTAL	MG/L		6	.018333	.009832	.030000	.010000	79/02	79/08
NO3-N	TOTAL	MG/L		10	.328000	.278600	.840000	.080000	78/11	79/09
TOT KJEL	N	MG/L		9	.337777	.105569	.500000	.200000	78/11	79/09
PHOS-TOT		MG/L P		10	.098000	.136528	.480000	.020000	78/11	79/09
PHOS-DIS		MG/L P		8	.050000	.000052	.050000	.050000	78/11	79/08
T ORG C	C	MG/L		5	5.82000	1.86870	8.40000	3.40000	78/11	79/04
CYANIDE	CN-TOT	MG/L		9	.010000	.000008	.010000	.010000	78/11	79/08
TOT HARD	CACO3	MG/L		1	123.000		123.000	123.000	79/04	79/04
SILICA	DISOLVED	MG/L		9	.381111	.283789	.890000	.050000	78/11	79/09
			K	1	.050000		.050000	.050000	79/03	79/03
			T	10	.348000	.287317	.890000	.050000	78/11	79/09
CADMIUM	CD,TOT	UG/L		8	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/01	79/01
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/01	79/01
IRON	FE,TOT	UG/L		9	731.111	1006.47	3300.00	30.0000	78/11	79/09
LEAD	PB,TOT	UG/L		1	7.00000		7.00000	7.00000	79/01	79/01
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/01	79/01
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/01	79/01
FEC COLI	MFM-FCBR	/100ML		1	6.00000		6.00000	6.00000	79/09	79/09
FECSTREP	MF M-ENT	/100ML	K	1	2.00000		2.00000	2.00000	79/09	79/09
PHENOLS	TOTAL	UG/L		8	3.87500	3.35676	11.0000	2.00000	78/11	79/08
MERCURY	HG,TOTAL	UG/L		1	.800000		.800000	.800000	79/01	79/01

TABLE RD 1-267

STATION NUMBER 504170
41 42 00.0 083 15 32.0 2
CONNEAUT WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN CONNEAUT ARE

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COD	LOWLEVEL	MG/L		8	6.75000	4.74342	18.0000	4.00000	79/10	80/06
			K	1	4.00000		4.00000	4.00000	80/07	80/07
			T	9	6.44444	4.53076	18.0000	4.00000	79/10	80/07
RESIDUE	DISS-105	C MG/L		3	166.000	10.3923	172.000	154.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		5	41.6000	37.4473	102.000	10.0000	79/10	80/02
			K	3	10.0000	.000000	10.0000	10.0000	80/05	80/07
			T	8	29.7500	32.6923	102.000	10.0000	79/10	80/07
NH3+NH4-	N TOTAL	MG/L		5	.066000	.026077	.110000	.050000	79/10	80/04
			K	4	.050000	.000050	.050000	.050000	80/03	80/08
			T	9	.058889	.020276	.110000	.050000	79/10	80/08
NO2-N	TOTAL	MG/L		6	.010000	.000000	.010000	.010000	79/10	80/06
			K	3	.010000	.000000	.010000	.010000	80/03	80/08
			T	9	.010000	.000008	.010000	.010000	79/10	80/08
NO3-N	TOTAL	MG/L		9	.324444	.249003	.830000	.110000	79/10	80/08
TOT KJEL	N	MG/L		8	.267500	.114363	.500000	.160000	79/11	80/08
PHOS-TOT		MG/L P		7	.127000	.197205	.560000	.016000	79/11	80/06
			K	1	.020000		.020000	.020000	80/08	80/08
			T	8	.113625	.186454	.560000	.016000	79/11	80/08
PHOS-DIS		MG/L P		3	.015667	.012897	.030000	.005000	80/01	80/06
			K	2	.020000	.000000	.020000	.020000	80/05	80/08
			T	5	.017400	.009423	.030000	.005000	80/01	80/08
T ORG C	C	MG/L		5	7.40000	2.70186	10.0000	4.00000	80/01	80/08
CYANIDE	CN-TOT	MG/L		3	.010000	.000000	.010000	.010000	79/11	80/01
			K	5	.010000	.000000	.010000	.010000	80/03	80/08
			T	8	.010000	.000000	.010000	.010000	79/11	80/08
TOT HARD	CACO3	MG/L		2	117.500	2.12132	119.000	116.000	80/01	80/03
SILICA	DISOLVED	MG/L		7	.297142	.140324	.550000	.150000	79/10	80/07
			K	1	.050000		.050000	.050000	80/04	80/04
			T	8	.266250	.156565	.550000	.050000	79/10	80/07
CADMIUM	CD,TOT	UG/L		4	5.00000	.000000	5.00000	5.00000	79/10	80/01
			K	6	5.83333	2.04125	10.0000	5.00000	80/03	80/08
			T	10	5.50000	1.58114	10.0000	5.00000	79/10	80/08

TABLE RD 1-267 (Continued)

STATION NUMBER 504170
41 42 00.0 083 15 32.0 2
CONNEAUT WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN CONNEAUT AREA

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	2	30.0000	.000000	30.0000	30.0000	80/01	80/03
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	2	30.0000	.000000	30.0000	30.0000	80/01	80/03
IRON	FE,TOT	UG/L		10	1147.00	1458.12	4500.00	60.0000	79/10	80/08
LEAD	PB,TOT	UG/L		1	5.00000		5.00000	5.00000	80/01	80/01
			K	1	10.0000		10.0000	10.0000	80/03	80/03
LEAD	PB,TOT	UG/L	T	2	7.50000	3.53553	10.0000	5.00000	80/01	80/03
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	80/01	80/01
			K	1	100.000		100.000	100.000	80/03	80/03
			T	2	100.000	.000000	100.000	100.000	80/01	80/03
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	2	30.0000	.000000	30.0000	30.0000	80/01	80/03
FEC COLI	MFM-FCBR	/100ML		5	17.6000	12.9731	35.0000	2.00000	79/10	80/02
FECSTREP	MF M-ENT	/100ML		5	10.6000	7.02140	17.0000	2.00000	79/10	80/02
PHENOLS	TOTAL	UG/L		5	3.20000	2.68328	8.00000	2.00000	79/10	80/03
			K	5	2.00000	.000000	2.00000	2.00000	80/04	80/08
			T	10	2.60000	1.89737	8.00000	2.00000	79/10	80/08
RESIDUE	DISS-180 C	MG/L		3	174.333	15.8863	184.000	156.000	80/03	80/07
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/01	80/01
			K	1	.500000		.500000	.500000	80/03	80/03
			T	2	.500000	.000000	.500000	.500000	80/01	80/03

TABLE RD 1-268

STATION NUMBER 504090
41 31 08.0 081 52 46.0 2
CROWN WATER SUPPLY INTAKE
LAKE ERIE (CENTRAL BASIN CLEVELAND AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		8	12.5375	9.62911	25.0000	1.10000	78/11	79/08
TURB	JKSN	JTU		10	7.33999	8.36915	28.0000	1.40000	78/11	79/08
CNDUCTVY	FIELD	MICROMHO		6	247.000	11.7983	260.000	230.000	78/12	79/08
CNDUCTVY	AT 25C	MICROMHO		3	239.000	15.5242	254.000	223.000	78/11	79/08
DO		MG/L		9	9.94444	3.19732	13.0000	3.60000	78/11	79/08
PH		SU		10	7.71999	.436662	8.30000	6.70000	78/11	79/08
T ALK	CACO3	MG/L		10	93.0000	4.24264	100.000	84.0000	78/11	79/08
NH3+NH4-	N TOTAL	MG/L		10	.067000	.030203	.140000	.050000	78/11	79/08
NO2-N	TOTAL	MG/L		10	.013000	.009487	.040000	.010000	78/11	79/08
NO3-N	TOTAL	MG/L		10	.374000	.305185	1.11000	.150000	78/11	79/08
TOT KJEL	N	MG/L		10	.556000	.752938	2.60000	.060000	78/11	79/08
PHOS-TOT		MG/L P		10	.056000	.013499	.090000	.050000	78/11	79/08
PHOS-DIS		MG/L P		6	.066667	.028752	.120000	.050000	79/01	79/08
CYANIDE	CN-TOT	MG/L		2	.010000	.000000	.010000	.010000	79/03	79/04
TOT HARD	CACO3	MG/L		5	127.400	7.05780	134.000	116.000	79/01	79/08
CHLORIDE	TOTAL	MG/L		10	16.2000	7.45059	24.0000	6.00000	78/11	79/08
SULFATE	SO4-TOT	MG/L		9	25.3333	14.8493	62.0000	10.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		6	.178333	.065853	.270000	.110000	79/01	79/08
SILICA	DISOLVED	MG/L		9	.457777	.493274	1.71000	.100000	78/11	79/08
			K	1	.050000		.050000	.050000	78/12	78/12
			T	10	.417000	.482610	1.71000	.050000	78/11	79/08
ARSENIC	AS,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/01	79/04
CADMIUM	CD,TOT	UG/L		3	5.00000	.000000	5.00000	5.00000	79/01	79/04
CHROMIUM	CR,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/04
COPPER	CU,TOT	UG/L		3	46.6667	20.8167	70.0000	30.0000	79/01	79/04
IRON	FE,TOT	UG/L		3	276.666	155.671	440.000	130.000	79/01	79/04
LEAD	PB,TOT	UG/L		3	16.3333	14.7422	33.0000	5.00000	79/01	79/04
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	79/01	79/04
VANADIUM	V,TOT	UG/L		3	10.0000	.000000	10.0000	10.0000	79/01	79/04
ZINC	ZN,TOT	UG/L		3	30.0000	.000000	30.0000	30.0000	79/01	79/04
ALUMINUM	AL,TOT	UG/L		3	200.000	.000000	200.000	200.000	79/01	79/04
SELENIUM	SE,TOT	UG/L		3	6.66667	2.88676	10.0000	5.00000	79/01	79/04
FEC COLI	MFM-FCBR	/100ML		4	7.62500	8.28025	20.0000	2.50000	79/05	79/08
			K	2	2.50000	.000000	2.50000	2.50000	79/03	79/04
			T	6	5.91667	6.93842	20.0000	2.50000	79/03	79/08
FECSTREP	MF M-ENT	/100ML		2	14.0000	5.65685	18.0000	10.0000	79/03	79/05
			K	4	2.25000	.288675	2.50000	2.00000	79/04	79/08
			T	6	6.16667	6.57774	18.0000	2.00000	79/03	79/08
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	79/01	79/04
DIETHYLP	HTHALATE	TOTWUG/L	K	4	100.000	.000000	100.000	100.000	79/01	79/08
DIMETHYL	PHTHALAT	TOTWUG/L	K	4	100.000	.000000	100.000	100.000	79/01	79/08

TABLE RD 1-268 (Continued)

STATION NUMBER 504090
41 31 08.0 081 52 46.0 2
CROWN WATER SUPPLY INTAKE
LAKE ERIE (CENTRAL BASIN CLEVELAND AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
ALDRIN		TOT UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
GAMMABHC	LINDANE	TOT.UG/L		3	.000000	.000000	.000000	.000000	79/01	79/08
CHLRDANE	TECH&MET	TOT UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
DDD	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
DDE	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
DDT	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
DIELDRIN		TOTUG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
ENDRIN		TOT UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
TOXAPHEN		TOTUG/L		1	.000000		.000000	.000000	79/08	79/08
			K	2	.500000	.000000	.500000	.500000	79/01	79/03
			T	3	.333333	.288675	.500000	.000000	79/01	79/08
HEPTCHLR		TOTUG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
HPCHLREP		TOTUG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
MTHXYCLR	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
PCBS	WHL SMPL	UG/L	K	4	.500000	.000000	.500000	.500000	79/01	79/08
MALATHN	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
PARATHN	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
DIAZINON	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/08	79/08
			K	2	1.00000	.000000	1.00000	1.00000	79/01	79/03
			T	3	.666667	.577351	1.00000	.000000	79/01	79/08
MPARATHN	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
MIREX	WHL SMPL	UG/L		1	.000000		.000000	.000000	79/08	79/08
			K	2	.250000	.000000	.250000	.250000	79/01	79/03
			T	3	.166667	.144338	.250000	.000000	79/01	79/08
LINDANE	WHL SMPL	UG/L		4	.000000	.000000	.000000	.000000	79/01	79/08
MERCURY	HG,TOTAL	UG/L		3	.500000	.000000	.500000	.500000	79/01	79/04
DEHP	ISOMER	TOT UG/L	K	4	100.000	.000000	100.000	100.000	79/01	79/08
DIBUTYL	NONANDOA	TOT UG/L	K	4	100.000	.000000	100.000	100.000	79/01	79/08

TABLE RD 1-269

STATION NUMBER 504090
41 31 08.0 081 52 46.0 2
CROWN WATER SUPPLY INTAKE
LAKE ERIE (CENTRAL BASIN CLEVELAND AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		13	16.0384	19.0224	74.0000	1.00000	79/10	80/09
TURB	JKSN	JTU		4	12.4500	16.1980	35.8000	1.50000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		8	5.49125	3.13429	12.0000	2.60000	80/01	80/09
CNDUCTVY	FIELD	MICROMHO		10	244.300	18.0008	277.000	220.000	79/10	80/09
DO		MG/L		11	10.1455	2.52838	13.0000	5.60000	79/10	80/09
COD	LOWLEVEL	MG/L		6	6.50000	2.81069	10.0000	4.00000	79/10	80/02
PH		SU		13	7.66922	.337629	8.10000	7.10000	79/10	80/09
T ALK	CACO3	MG/L		12	98.0000	18.1308	155.000	89.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		3	158.000	7.21110	164.000	150.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		4	13.2500	6.50000	23.0000	10.0000	79/10	80/02
			K	1	10.0000		10.0000	10.0000	79/10	79/10
			T	5	12.6000	5.81379	23.0000	10.0000	79/10	80/02
NH3+NH4-	N TOTAL	MG/L		6	.068333	.036009	.140000	.050000	79/10	80/07
			K	7	.050000	.000056	.050000	.050000	80/01	80/09
			T	13	.058462	.025115	.140000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		8	.010000	.000008	.010000	.010000	79/10	80/08
			K	2	.010000	.000000	.010000	.010000	80/01	80/09
			T	10	.010000	.000009	.010000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		13	.339230	.221941	.790000	.070000	79/10	80/09
TOT KJEL	N	MG/L		12	.274999	.139122	.460000	.050000	79/10	80/09
			K	1	.050000		.050000	.050000	80/05	80/05
			T	13	.257692	.147092	.460000	.050000	79/10	80/09
PHOS-TOT		MG/L P		8	.035250	.024040	.090000	.014000	79/11	80/09
			K	3	.020000	.000000	.020000	.020000	80/05	80/08
			T	11	.031091	.021338	.090000	.014000	79/11	80/09
PHOS-DIS		MG/L P		2	.015000	.011314	.023000	.007000	80/03	80/04
			K	2	.020000	.000000	.020000	.020000	80/05	80/09
			T	4	.017500	.007141	.023000	.007000	80/03	80/09
CYANIDE	CN-TOT	MG/L	K	4	.010000	.000000	.010000	.010000	80/01	80/09
TOT HARD	CACO3	MG/L		6	122.167	3.12650	126.000	118.000	79/10	80/09
CHLORIDE	TOTAL	MG/L		12	15.7500	1.95982	19.0000	12.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		12	21.3333	2.53470	25.0000	17.0000	79/10	80/09
FLUORIDE	F,TOTAL	MG/L		4	.162500	.017078	.180000	.140000	80/01	80/09
SILICA	DISOLVED	MG/L		13	.426153	.325181	1.21000	.090000	79/10	80/09
ARSENIC	AS,TOT	UG/L	K	4	10.0000	.000000	10.0000	10.0000	80/01	80/09
CADMIUM	CD,TOT	UG/L	K	4	5.00000	.000000	5.00000	5.00000	80/01	80/09
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	80/03	80/03
			K	3	30.0000	.000000	30.0000	30.0000	80/01	80/09
			T	4	30.0000	.000000	30.0000	30.0000	80/01	80/09
COPPER	CU,TOT	UG/L		3	50.0000	17.3205	70.0000	40.0000	80/01	80/09
			K	1	30.0000		30.0000	30.0000	80/03	80/03

TABLE RD 1-269 (Continued)

STATION NUMBER 504090
41 31 08.0 081 52 46.0 2
CROWN WATER SUPPLY INTAKE
LAKE ERIE (CENTRAL BASIN CLEVELAND AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
COPPER	CU,TOT	UG/L	T	4	45.0000	17.3205	70.0000	30.0000	80/01	80/09
IRON	FE,TOT	UG/L		3	636.666	503.621	1200.00	230.000	80/01	80/09
IRON	FE,DISS	UG/L		1	230.000		230.000	230.000	80/05	80/05
LEAD	PB,TOT	UG/L	K	4	6.25000	2.50000	10.0000	5.00000	80/01	80/09
NICKEL	NI,TOTAL	UG/L	K	4	100.000	.000000	100.000	100.000	80/01	80/09
VANADIUM	V,TOT	UG/L	K	4	10.0000	.000000	10.0000	10.0000	80/01	80/09
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	80/09	80/09
			K	3	30.0000	.000000	30.0000	30.0000	80/01	80/05
			T	4	30.0000	.000000	30.0000	30.0000	80/01	80/09
ALUMINUM	AL,TOT	UG/L		4	300.000	141.421	500.000	200.000	80/01	80/09
SELENIUM	SE,TOT	UG/L	K	4	10.0000	10.0000	25.0000	5.00000	80/01	80/09
FEC COLI	MFM-FCBR	/100ML		5	22.8000	43.1989	100.000	2.00000	79/10	80/09
			K	3	2.50000	.000000	2.50000	2.50000	79/10	80/01
			T	8	15.1875	34.3038	100.000	2.00000	79/10	80/09
FECSTREP	MF M-ENT	/100ML		5	4.70000	4.71169	13.0000	2.00000	79/10	80/09
			K	3	2.50000	.000000	2.50000	2.50000	79/10	80/01
			T	8	3.87500	3.73927	13.0000	2.00000	79/10	80/09
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	80/09	80/09
			K	3	2.00000	.000000	2.00000	2.00000	80/01	80/05
			T	4	2.00000	.000000	2.00000	2.00000	80/01	80/09
DIETHYLP	HTHALATE	TOTWUG/L		1	100.000		100.000	100.000	80/05	80/05
			K	1	100.000		100.000	100.000	80/01	80/01
			T	2	100.000	.000000	100.000	100.000	80/01	80/05
DIMETHYL	PHTHALAT	TOTWUG/L		1	100.000		100.000	100.000	80/05	80/05
			K	1	100.000		100.000	100.000	80/01	80/01
			T	2	100.000	.000000	100.000	100.000	80/01	80/05
ALDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	80/05	80/05
CHLRDANE	TECH&MET	TOT UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
DDD	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
DDE	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
DDT	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
DIELDRIN		TOTUG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
ENDRIN		TOT UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
TOXAPHEN		TOTUG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
HEPTCHLR		TOTUG/L		3	.000000	.000000	.000000	.000000	80/01	80/05

TABLE RD 1-269 (Continued)

STATION NUMBER 504090
41 31 08.0 081 52 46.0 2
CROWN WATER SUPPLY INTAKE
LAKE ERIE (CENTRAL BASIN CLEVELAND AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
HPCHLREP		TOTUG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
MTHXYCLR	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/05	80/05
			K	1	.500000		.500000	.500000	80/01	80/01
			T	2	.250000	.353553	.500000	.000000	80/01	80/05
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/05	80/05
PARATHN	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
DIAZINON	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/05	80/05
MIREX	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	80/03	80/05
LINDANE	WHL SMPL	UG/L		3	.000000	.000000	.000000	.000000	80/01	80/05
MERCURY	HG,TOTAL	UG/L		1	.900000		.900000	.900000	80/09	80/09
			K	3	.500000	.000000	.500000	.500000	80/01	80/05
			T	4	.600000	.200001	.900000	.500000	80/01	80/09
PHTHALIC	TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
DIBUTYL	NONANDOA	TOT UG/L		1	100.000		100.000	100.000	80/05	80/05
			K	1	100.000		100.000	100.000	80/01	80/01
			T	2	100.000	.000000	100.000	100.000	80/01	80/05

TABLE RD 1-270

STATION NUMBER 504130
41 43 34.0 081 22 05.0 2
MENTOR ON L. WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN MENTOR ON THE

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		21	10.6381	7.15238	23.0000	1.00000	78/10	79/09
TURB	JKSN	JTU		21	17.4285	12.0280	38.0000	1.10000	78/10	79/09
COLOR	PT-CO	UNITS		11	24.6363	12.0439	45.0000	7.00000	78/10	78/12
ODOR	THRSH NO	RM. TEMP		13	6.23077	.926816	8.00000	5.00000	78/10	78/12
CNDUCTVY	FIELD	MICROMHO		7	227.143	39.8809	280.000	180.000	78/12	79/09
CNDUCTVY	AT 25C	MICROMHO		12	297.916	31.4050	324.000	233.000	78/10	78/12
DO		MG/L		14	10.3071	1.65924	12.6000	6.60000	78/10	79/09
COD	LOWLEVEL	MG/L		2	7.00000	4.24264	10.0000	4.00000	79/08	79/09
PH		SU		10	7.56999	.245290	8.00000	7.30000	78/12	79/09
LAB	PH	SU		13	8.13614	.205465	8.40000	7.62000	78/10	78/12
T ALK	CACO3	MG/L		22	90.3182	4.33596	100.000	78.0000	78/10	79/09
RESIDUE	TOT NFLT	MG/L		7	20.1428	12.6416	35.0000	5.00000	78/10	79/09
NH3+NH4-	N TOTAL	MG/L		11	.143636	.093089	.320000	.050000	78/11	79/09
NO2-N	TOTAL	MG/L		18	.027778	.018647	.050000	.010000	78/10	79/09
NO3-N	TOTAL	MG/L		19	.341579	.263908	1.10000	.050000	78/10	79/09
TOT KJEL	N	MG/L		11	.723636	.849615	3.20000	.200000	78/11	79/09
T PO4	PO4	MG/L		2	.075000	.035355	.100000	.050000	78/10	78/11
ORTHOPO4	PO4	MG/L		2	.070000	.042427	.100000	.040000	78/10	78/11
PHOS-TOT		MG/L P		11	.060909	.031130	.140000	.020000	78/11	79/09
TOT HARD	CACO3	MG/L		14	128.429	5.66704	140.000	118.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		23	24.4783	7.97083	33.0000	6.00000	78/10	79/09
SULFATE	SO4-TOT	MG/L		10	26.0000	12.5167	58.0000	10.0000	78/12	79/09
SILICA	DISOLVED	MG/L		10	.410000	.320277	1.06000	.050000	78/11	79/09
			K	1	.050000		.050000	.050000	79/08	79/08
			T	11	.377272	.322648	1.06000	.050000	78/11	79/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/08	79/08
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/08	79/08
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	79/08	79/08
LEAD	PB,TOT	UG/L		1	5.00000		5.00000	5.00000	79/08	79/08
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	79/08	79/08
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	79/08	79/08
FEC COLI	MFM-FCBR	/100ML		20	105.925	176.347	520.000	1.00000	78/10	79/09
FECSTREP	MF M-ENT	/100ML		16	75.0000	113.301	330.000	1.00000	78/10	79/09
			K	3	2.16667	.288683	2.50000	2.00000	79/04	79/08
			T	19	63.5000	106.968	330.000	1.00000	78/10	79/09
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	79/08	79/08

TABLE RD 1-271

STATION NUMBER 504130
41 43 34.0 081 22 05.0 2
MENTOR ON L. WATER SUPPLY INTAKE
LAKE ERIE 060691 (CENTRAL BASIN MENTOR ON TH

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		7	13.4286	7.84978	23.0000	3.00000	79/10	80/09
TURB	JKSN	JTU		5	17.0400	17.0480	42.5000	1.50000	79/10	80/02
TURB	TRBIDMTR	HACH FTU		7	7.72571	7.34040	19.5000	2.00000	80/03	80/09
CNDUCTVY	FIELD	MICROMHO		10	222.500	55.0883	290.000	140.000	79/10	80/09
COD	LOWLEVEL	MG/L		5	6.40000	4.33590	14.0000	4.00000	79/10	80/02
PH		SU		9	7.89999	.463776	8.60000	7.30000	79/10	80/09
T ALK	CACO3	MG/L		12	104.167	27.4321	165.000	86.0000	79/10	80/09
RESIDUE	DISS-105	C MG/L		3	173.333	16.2903	192.000	162.000	79/10	80/02
RESIDUE	TOT NFLT	MG/L		5	38.6000	39.8598	92.0000	10.0000	79/10	80/02
NH3+NH4-	N TOTAL	MG/L		7	.151428	.089709	.310000	.060000	79/10	80/06
			K	5	.050000	.000061	.050000	.050000	80/03	80/09
			T	12	.109166	.084365	.310000	.050000	79/10	80/09
NO2-N	TOTAL	MG/L		8	.011250	.003536	.020000	.010000	79/10	80/08
			K	2	.010000	.000000	.010000	.010000	80/05	80/09
			T	10	.011000	.003162	.020000	.010000	79/10	80/09
NO3-N	TOTAL	MG/L		12	.339166	.212922	.820000	.130000	79/10	80/09
TOT KJEL	N	MG/L		11	.383636	.147802	.670000	.180000	79/10	80/09
PHOS-TOT		MG/L P		9	.048222	.033203	.110000	.014000	79/11	80/09
			K	2	.020000	.000000	.020000	.020000	80/05	80/08
			T	11	.043091	.031817	.110000	.014000	79/11	80/09
TOT HARD	CACO3	MG/L		2	130.500	14.8492	141.000	120.000	79/10	80/01
CHLORIDE	TOTAL	MG/L		12	20.0833	3.36995	27.0000	17.0000	79/10	80/09
SULFATE	SO4-TOT	MG/L		12	23.6667	4.00767	32.0000	17.0000	79/10	80/09
SILICA	DISOLVED	MG/L		12	.422500	.239512	.940000	.090000	79/10	80/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	80/01	80/01
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
COPPER	CU,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
IRON	FE,TOT	UG/L		1	1240.00		1240.00	1240.00	80/01	80/01
LEAD	PB,TOT	UG/L		1	6.00000		6.00000	6.00000	80/01	80/01
NICKEL	NI,TOTAL	UG/L		1	100.000		100.000	100.000	80/01	80/01
ZINC	ZN,TOT	UG/L		1	30.0000		30.0000	30.0000	80/01	80/01
FEC COLI	MFM-FCBR	/100ML		5	236.000	300.736	770.000	52.0000	79/10	80/02
			K	1	2.00000		2.00000	2.00000	80/08	80/08
			T	6	197.000	285.446	770.000	2.00000	79/10	80/08
FECSTREP	MF M-ENT	/100ML		6	70.8333	92.2527	250.000	2.00000	79/10	80/08
PHENOLS	TOTAL	UG/L		1	2.00000		2.00000	2.00000	80/01	80/01
MERCURY	HG,TOTAL	UG/L		1	.500000		.500000	.500000	80/01	80/01

TABLE RD 1-272

STATION NUMBER 504240
41 41 33.0 083 15 33.0 2
OREGON WATER SUPPLY INTAKE
LAKE ERIE 060491 (WESTERN BASIN-TOLEDO AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		2	5.75000	1.34350	6.70000	4.80000	78/12	79/03
TURB	JKSN	JTU		3	15.7333	15.4536	33.0000	3.20000	78/11	79/03
CNDUCTVY	AT 25C	MICROMHO		11	340.727	112.108	568.000	197.000	78/10	79/08
DO		MG/L		2	12.3500	.777805	12.9000	11.8000	78/12	79/03
BOD	5 DAY	MG/L		2	1.50000	.141426	1.60000	1.40000	79/05	79/07
COD	LOWLEVEL	MG/L		5	21.8200	17.6167	51.5000	8.20000	79/05	79/08
LAB	PH	SU		11	7.80909	.238659	8.00000	7.40000	78/10	79/08
T ALK	CACO3	MG/L		8	99.2500	11.7321	121.000	88.0000	78/10	79/08
RESIDUE	DISS-105	C MG/L		6	225.500	59.9191	302.000	154.000	79/03	79/08
RESIDUE	TOT NFLT	MG/L		11	29.8182	23.2285	82.0000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		10	.100000	.057735	.230000	.050000	78/10	79/08
			K	1	.050000		.050000	.050000	79/07	79/07
			T	11	.095454	.056809	.230000	.050000	78/10	79/08
NO2-N	TOTAL	MG/L		10	.028000	.018738	.060000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		11	1.72454	2.21502	6.43000	.050000	78/10	79/08
TOT KJEL	N	MG/L		11	1.00727	.803157	2.48000	.300000	78/10	79/08
ORTHOPO4	PO4	MG/L		2	.050000	.000061	.050000	.050000	78/10	79/02
PHOS-TOT		MG/L P		10	.096000	.068670	.250000	.050000	78/10	79/08
			K	1	.050000		.050000	.050000	79/07	79/07
			T	11	.091818	.066606	.250000	.050000	78/10	79/08
PHOS-DIS		MG/L P		4	.055000	.010000	.070000	.050000	78/12	79/06
			K	1	.050000		.050000	.050000	79/07	79/07
			T	5	.054000	.008944	.070000	.050000	78/12	79/07
T ORG C	C	MG/L		7	5.22857	3.47021	10.4000	1.00000	78/10	79/05
CYANIDE	CN-TOT	MG/L		1	.010000		.010000	.010000	78/11	78/11
TOT HARD	CACO3	MG/L		9	150.111	36.8833	213.000	110.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		10	15.7000	10.1330	34.0000	5.00000	78/10	79/08
SULFATE	SO4-TOT	MG/L		6	28.6667	10.6333	45.0000	17.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		5	.190000	.078740	.300000	.120000	78/11	79/08
SILICA	DISOLVED	MG/L		7	1.41714	1.79384	5.28000	.050000	78/12	79/07
ARSENIC	AS,TOT	UG/L		9	10.0000	.000000	10.0000	10.0000	78/11	79/08
CADMIUM	CD,TOT	UG/L		8	5.00000	.000000	5.00000	5.00000	78/11	79/08
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	9	5.55556	1.66667	10.0000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	8	30.0000	.000000	30.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		4	712.500	317.109	1090.00	320.000	78/11	79/08

TABLE RD 1-272 (Continued)

STATION NUMBER 504240
41 41 33.0 083 15 33.0 2
OREGON WATER SUPPLY INTAKE
LAKE ERIE 060491 (WESTERN BASIN-TOLEDO AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
IRON	FE,DISS	UG/L		1	40.0000		40.0000	40.0000	79/07	79/07
LEAD	PB,TOT	UG/L		9	7.77778	3.70061	16.0000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		1	30.0000		30.0000	30.0000	78/11	78/11
MANGNESE	MN,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		4	100.000	.000000	100.000	100.000	78/11	79/05
VANADIUM	V,TOT	UG/L		1	10.0000		10.0000	10.0000	78/11	78/11
ZINC	ZN,TOT	UG/L		8	30.0000	.000000	30.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	9	30.0000	.000000	30.0000	30.0000	78/11	79/08
ALUMINUM	AL,TOT	UG/L		4	375.000	125.831	500.000	200.000	78/11	79/08
SELENIUM	SE,TOT	UG/L		2	55.0000	63.6396	100.000	10.0000	78/11	79/08
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	3	40.0000	51.9615	100.000	10.0000	78/11	79/08
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
BETA	TOTAL	PC/L		1	2.00000		2.00000	2.00000	78/10	78/10
FEC COLI	MFM-FCBR	/100ML		7	34.4286	77.6699	210.000	1.00000	78/10	79/05
FECSTREP	MF M-ENT	/100ML		3	20.6667	34.0637	60.0000	1.00000	78/12	79/05
PHENOLS	TOTAL	UG/L		3	2.00000	.000000	2.00000	2.00000	78/11	79/02
MBAS		MG/L		1	.050000		.050000	.050000	79/07	79/07
ALDRIN		TOT UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
GAMMABHC	LINDANE	TOT.UG/L		1	.000000		.000000	.000000	78/11	78/11
CHLRDANE	TECH&MET	TOT UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
DDD	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
DDE	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
DDT	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
DIELDRIN		TOTUG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
ENDRIN		TOT UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
HEPTCHLR		TOTUG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
HPCHLREP		TOTUG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
MTHXYCLR	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
PCBS	WHL SMPL	UG/L	K	1	.500000		.500000	.500000	78/10	78/10
MALATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
PARATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
MPARATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
LINDANE	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	78/10	78/11
MERCURY	HG,TOTAL	UG/L		8	.712500	.601041	2.20000	.500000	78/11	79/08
			K	1	.500000		.500000	.500000	79/07	79/07
			T	9	.688889	.566667	2.20000	.500000	78/11	79/08

TABLE RD 1-273

STATION NUMBER 504240
41 41 33.0 083 15 33.0 2
OREGON WATER SUPPLY INTAKE
LAKE ERIE 060491 (WESTERN BASIN-TOLEDO AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	20.5000		20.5000	20.5000	80/06	80/06
TURB	JKSN	JTU		3	196.833	124.890	325.000	75.5000	80/03	80/05
TURB	TRBIDMTR	HACH FTU		3	196.833	124.890	325.000	75.5000	80/03	80/05
CNDUCTVY	AT 25C	MICROMHO		4	321.750	48.5069	387.000	270.000	79/11	80/09
DO		MG/L		1	6.30000		6.30000	6.30000	80/06	80/06
BOD	5 DAY	MG/L		6	1.91667	1.11967	4.00000	1.00000	79/11	80/09
			K	1	1.00000		1.00000	1.00000	80/07	80/07
			T	7	1.78571	1.07924	4.00000	1.00000	79/11	80/09
COD	LOWLEVEL	MG/L		6	27.7333	28.5634	73.0000	4.00000	79/11	80/09
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	7	24.3428	27.5746	73.0000	4.00000	79/11	80/09
LAB	PH	SU		7	7.66428	.348628	8.00000	7.00000	79/11	80/09
T ALK	CACO3	MG/L		4	102.000	19.6638	130.000	84.0000	80/03	80/09
RESIDUE	DISS-105	C MG/L		6	225.500	69.0500	336.000	163.000	79/11	80/07
RESIDUE	TOT NFLT	MG/L		7	98.4286	77.0105	212.000	14.0000	79/11	80/09
NH3+NH4-	N TOTAL	MG/L		6	.306666	.402575	1.10000	.050000	79/11	80/07
NO2-N	TOTAL	MG/L		7	.067143	.054989	.170000	.010000	79/11	80/09
NO3-N	TOTAL	MG/L		7	2.52857	2.26239	6.42000	.110000	79/11	80/09
TOT KJEL	N	MG/L		7	.490000	.236573	.970000	.310000	79/11	80/09
PHOS-TOT		MG/L P		7	.169285	.139297	.380000	.045000	79/11	80/09
T ORG C	C	MG/L		3	17.3333	12.5033	30.0000	5.00000	80/03	80/09
TOT HARD	CACO3	MG/L		7	157.571	31.9474	205.000	112.000	79/11	80/09
CHLORIDE	TOTAL	MG/L		7	19.4286	4.19758	25.0000	13.0000	79/11	80/09
SULFATE	SO4-TOT	MG/L		7	38.2857	14.9412	58.0000	18.0000	79/11	80/09
FLUORIDE	F,DISS	MG/L		1	.170000		.170000	.170000	79/11	79/11
FLUORIDE	F,TOTAL	MG/L		3	.303333	.066583	.380000	.260000	80/03	80/05
ARSENIC	AS,TOT	UG/L	K	6	10.0000	.000000	10.0000	10.0000	80/03	80/09
CADMIUM	CD,TOT	UG/L		1	5.00000		5.00000	5.00000	79/11	79/11
			K	6	5.83333	2.04125	10.0000	5.00000	80/03	80/09
			T	7	5.71428	1.88983	10.0000	5.00000	79/11	80/09
CHROMIUM	CR,TOT	UG/L		1	30.0000		30.0000	30.0000	79/11	79/11
			K	6	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	7	30.0000	.000000	30.0000	30.0000	79/11	80/09
COPPER	CU,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	80/03
			K	5	30.0000	.000000	30.0000	30.0000	80/04	80/09
			T	7	30.0000	.000000	30.0000	30.0000	79/11	80/09
IRON	FE,TOT	UG/L		7	4379.28	4811.74	12800.0	580.000	79/11	80/09
LEAD	PB,TOT	UG/L		5	8.80000	3.89873	13.0000	5.00000	79/11	80/09
			K	2	5.00000	.000000	5.00000	5.00000	80/06	80/07
			T	7	7.71428	3.68395	13.0000	5.00000	79/11	80/09
MANGNESE	MN	UG/L		5	70.0000	58.3095	170.000	30.0000	79/11	80/06

TABLE RD 1-273 (Continued)

STATION NUMBER 504240
41 41 33.0 083 15 33.0 2
OREGON WATER SUPPLY INTAKE
LAKE ERIE 060491 (WESTERN BASIN-TOLEDO AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
MANGNESE	MN	UG/L	K	2	30.0000	.000000	30.0000	30.0000	80/07	80/09
			T	7	58.5714	51.4550	170.000	30.0000	79/11	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
ZINC	ZN,TOT	UG/L		4	52.5000	20.6155	70.0000	30.0000	79/11	80/09
			K	3	30.0000	.000000	30.0000	30.0000	80/05	80/07
			T	7	42.8571	18.8983	70.0000	30.0000	79/11	80/09
ALUMINUM	AL,TOT	UG/L		7	3714.29	5688.41	16000.0	300.000	79/11	80/09
ALPHA	TOTAL	PC/L		1	7.00000		7.00000	7.00000	80/04	80/04
			K	2	1.00000	.000000	1.00000	1.00000	79/11	80/03
			T	3	3.00000	3.46410	7.00000	1.00000	79/11	80/04
BETA	TOTAL	PC/L		1	6.00000		6.00000	6.00000	80/04	80/04
			K	2	2.00000	.000000	2.00000	2.00000	79/11	80/03
			T	3	3.33333	2.30940	6.00000	2.00000	79/11	80/04
FEC COLI	MFM-FCBR	/100ML		2	190.000	56.5685	230.000	150.000	80/03	80/04
			K	3	10.0000	.000000	10.0000	10.0000	80/05	80/07
			T	5	82.0000	102.567	230.000	10.0000	80/03	80/07
MBAS		MG/L		3	.070000	.026458	.100000	.050000	79/11	80/06
			K	2	.050000	.000061	.050000	.050000	80/04	80/09
			T	5	.062000	.021680	.100000	.050000	79/11	80/09
ALDRIN		TOT UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
GAMMABHC	LINDANE	TOT.UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
CHLRDANE	TECH&MET	TOT UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
DDD	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
DDE	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
DDT	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
DIELDRIN		TOTUG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
ENDRIN		TOT UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
TOXAPHEN		TOTUG/L		1	.000000		.000000	.000000	80/06	80/06

TABLE RD 1-273 (Continued)

STATION NUMBER 504240
41 41 33.0 083 15 33.0 2
OREGON WATER SUPPLY INTAKE
LAKE ERIE 060491 (WESTERN BASIN-TOLEDO AREA)

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
HEPTCHLR		TOTUG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
HPCHLREP		TOTUG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
MTHXYCLR	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
PCBS	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
			K	1	.500000		.500000	.500000	79/11	79/11
			T	2	.250000	.353553	.500000	.000000	79/11	80/06
MALATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
PARATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
DIAZINON	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
MPARATHN	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
MIREX	WHL SMPL	UG/L		1	.000000		.000000	.000000	80/06	80/06
LINDANE	WHL SMPL	UG/L		2	.000000	.000000	.000000	.000000	79/11	80/06
RESIDUE	DISS-180	C MG/L		2	177.000	76.3675	231.000	123.000	79/11	80/09
MERCURY	HG,TOTAL	UG/L		3	.533333	.057740	.600000	.500000	79/11	80/05
			K	5	.500000	.000000	.500000	.500000	80/03	80/09
			T	8	.512500	.035357	.600000	.500000	79/11	80/09
ALK	CACO3	STABL		1	84.0000		84.0000	84.0000	80/09	80/09

TABLE RD 1-274

STATION NUMBER 504030
41 27 51.0 082 38 50.0 2
SANDUSKY WATER SUPPLY INTAKE
LAKE ERIE 060292 (CENTRAL BASIN SANDUSKY AREA

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		3	3.83333	2.40069	5.60000	1.10000	78/12	79/03
TURB	JKSN	JTU		2	17.1500	21.0011	32.0000	2.30000	78/11	78/12
CNDUCTVY	AT 25C	MICROMHO		11	314.000	24.9720	363.000	280.000	78/10	79/08
DO		MG/L		2	13.0000	1.41421	14.0000	12.0000	78/12	79/01
BOD	5 DAY	MG/L		1	1.20000		1.20000	1.20000	79/05	79/05
COD	LOWLEVEL	MG/L		5	5.62000	1.74128	8.20000	4.00000	79/05	79/08
PH		SU		1	8.00000		8.00000	8.00000	79/03	79/03
LAB	PH	SU		11	7.82727	.332008	8.40000	7.40000	78/10	79/08
T ALK	CACO3	MG/L		9	90.2222	21.3003	117.000	38.0000	78/10	79/08
RESIDUE	DISS-105	C MG/L		6	177.167	10.5919	190.000	162.000	79/03	79/08
RESIDUE	TOT NFLT	MG/L		11	29.4545	53.1495	188.000	10.0000	78/10	79/08
NH3+NH4-	N TOTAL	MG/L		11	.074545	.036432	.150000	.050000	78/10	79/08
			K	1	.050000		.050000	.050000	79/07	79/07
			T	12	.072500	.035452	.150000	.050000	78/10	79/08
NO2-N	TOTAL	MG/L		11	.012727	.004671	.020000	.010000	78/10	79/08
NO3-N	TOTAL	MG/L		11	.650909	.576567	1.94000	.090000	78/10	79/08
TOT KJEL	N	MG/L		11	.610909	.492614	1.80000	.100000	78/10	79/08
ORTHOPO4	PO4	MG/L		3	.050000	.000075	.050000	.050000	78/10	79/02
PHOS-TOT		MG/L P		9	.106667	.098995	.330000	.050000	78/10	79/08
			K	2	.027500	.031820	.050000	.005000	79/06	79/07
			T	11	.092273	.094693	.330000	.005000	78/10	79/08
PHOS-DIS		MG/L P		3	.050000	.000075	.050000	.050000	78/12	79/05
			K	2	.027500	.031820	.050000	.005000	79/06	79/07
			T	5	.041000	.020125	.050000	.005000	78/12	79/07
T ORG C	C	MG/L		7	5.60000	2.35019	9.50000	2.60000	78/10	79/05
TOT HARD	CACO3	MG/L		11	127.091	6.90652	143.000	118.000	78/10	79/08
CHLORIDE	TOTAL	MG/L		10	13.5000	5.25463	19.0000	5.00000	78/10	79/08
SULFATE	SO4-TOT	MG/L		6	29.0000	5.76194	39.0000	25.0000	78/11	79/08
FLUORIDE	F,DISS	MG/L		4	.140000	.045461	.200000	.100000	79/05	79/08
SILICA	DISOLVED	MG/L		7	.578571	.481194	1.37000	.090000	78/12	79/07
ARSENIC	AS,TOT	UG/L		7	10.0000	.000000	10.0000	10.0000	78/11	79/08
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	8	10.0000	.000000	10.0000	10.0000	78/11	79/08
CADMIUM	CD,TOT	UG/L		7	5.00000	.000000	5.00000	5.00000	78/11	79/08
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	8	5.00000	.000000	5.00000	5.00000	78/11	79/08
CHROMIUM	CR,TOT	UG/L		7	30.0000	.000000	30.0000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	8	30.0000	.000000	30.0000	30.0000	78/11	79/08
COPPER	CU,TOT	UG/L		8	46.2500	14.0789	70.0000	30.0000	78/11	79/08
IRON	FE,TOT	UG/L		3	770.000	720.902	1600.00	300.000	79/06	79/08

TABLE RD 1-274 (Continued)

STATION NUMBER 504030
41 27 51.0 082 38 50.0 2
SANDUSKY WATER SUPPLY INTAKE
LAKE ERIE 060292 (CENTRAL BASIN SANDUSKY AREA

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
IRON	FE,DISS	UG/L	K	1	30.0000		30.0000	30.0000	79/07	79/07
LEAD	PB,TOT	UG/L		7	5.71428	1.25357	8.00000	5.00000	78/11	79/08
			K	1	5.00000		5.00000	5.00000	79/07	79/07
			T	8	5.62500	1.18773	8.00000	5.00000	78/11	79/08
MANGNESE	MN	UG/L		1	150.000		150.000	150.000	79/07	79/07
MANGNESE	MN,DISS	UG/L		1	100.000		100.000	100.000	79/07	79/07
NICKEL	NI,TOTAL	UG/L		3	100.000	.000000	100.000	100.000	78/11	79/05
ZINC	ZN,TOT	UG/L		7	40.0000	26.4575	100.000	30.0000	78/11	79/08
			K	1	30.0000		30.0000	30.0000	79/07	79/07
			T	8	38.7500	24.7487	100.000	30.0000	78/11	79/08
ALUMINUM	AL,TOT	UG/L		3	400.000	346.410	800.000	200.000	79/06	79/08
SELENIUM	SE,TOT	UG/L		1	100.000		100.000	100.000	79/08	79/08
			K	1	10.0000		10.0000	10.0000	79/07	79/07
			T	2	55.0000	63.6396	100.000	10.0000	79/07	79/08
ALPHA	TOTAL	PC/L		1	1.00000		1.00000	1.00000	78/10	78/10
BETA	TOTAL	PC/L		1	2.00000		2.00000	2.00000	78/10	78/10
FEC COLI	MFM-FCBR	/100ML		8	18.5000	34.7563	100.000	1.00000	78/10	79/07
FECSTREP	MF M-ENT	/100ML		1	1.00000		1.00000	1.00000	79/05	79/05
MBAS		MG/L	K	1	.050000		.050000	.050000	79/07	79/07
ALDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
CHLRDANE	TECH&MET	TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
DDD	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DDT	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
DIELDRIN		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
ENDRIN		TOT UG/L		1	.000000		.000000	.000000	78/10	78/10
HEPTCHLR		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
HPCHLREP		TOTUG/L		1	.000000		.000000	.000000	78/10	78/10
MTHXYCLR	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PCBS	WHL SMPL	UG/L	K	2	.500000	.000000	.500000	.500000	78/10	78/12
MALATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
PARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MPARATHN	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
LINDANE	WHL SMPL	UG/L		1	.000000		.000000	.000000	78/10	78/10
MERCURY	HG,TOTAL	UG/L		7	1.22857	1.92762	5.60000	.500000	78/11	79/08
			K	1	.500000		.500000	.500000	79/07	79/07
			T	8	1.13750	1.80312	5.60000	.500000	78/11	79/08

TABLE RD 1-275

STATION NUMBER 504030
41 27 51.0 082 38 50.0 2
SANDUSKY WATER SUPPLY INTAKE
LAKE ERIE 060292 (CENTRAL BASIN SANDUSKY AR

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
WATER	TEMP	CENT		1	19.2000		19.2000	19.2000	80/06	80/06
TURB	JKSN	JTU		2	68.1500	60.3162	110.800	25.5000	80/03	80/04
TURB	TRBIDMTR	HACH FTU		3	49.6000	53.3978	110.800	12.5000	80/03	80/05
CNDUCTVY	AT 25C	MICROMHO		5	312.800	23.4491	337.000	282.000	79/11	80/09
DO		MG/L		1	7.90000		7.90000	7.90000	80/06	80/06
BOD	5 DAY	MG/L		7	1.72857	.715805	3.10000	1.00000	79/11	80/09
			K	1	1.00000		1.00000	1.00000	80/07	80/07
			T	8	1.63750	.711008	3.10000	1.00000	79/11	80/09
COD	LOWLEVEL	MG/L		7	13.3857	22.1185	63.0000	2.00000	79/11	80/09
			K	1	4.00000		4.00000	4.00000	80/04	80/04
			T	8	12.2125	20.7449	63.0000	2.00000	79/11	80/09
LAB	PH	SU		8	7.63124	.401674	8.00000	6.80000	79/11	80/09
T ALK	CACO3	MG/L		4	94.5000	1.73205	96.0000	92.0000	79/12	80/05
RESIDUE	DISS-105	C MG/L		7	162.143	45.4256	234.000	100.000	79/11	80/07
RESIDUE	TOT NFLT	MG/L		6	42.8333	48.5486	140.000	8.00000	79/11	80/09
			K	2	10.0000	.000000	10.0000	10.0000	80/06	80/07
			T	8	34.6250	43.7556	140.000	8.00000	79/11	80/09
NH3+NH4-	N TOTAL	MG/L		5	.086000	.069498	.170000	.020000	79/11	80/07
			K	2	.050000	.000061	.050000	.050000	80/04	80/06
			T	7	.075714	.059402	.170000	.020000	79/11	80/07
NO2-N	TOTAL	MG/L		7	.018571	.014639	.040000	.000000	79/11	80/07
NO3-N	TOTAL	MG/L		8	1.14500	1.05547	3.05000	.080000	79/11	80/09
TOT KJEL	N	MG/L		8	.325000	.150334	.580000	.050000	79/11	80/09
PHOS-TOT		MG/L P		7	.075857	.050926	.180000	.040000	79/11	80/09
			K	1	.020000		.020000	.020000	80/05	80/05
			T	8	.068875	.051117	.180000	.020000	79/11	80/09
T ORG C	C	MG/L		3	12.6667	8.08291	20.0000	4.00000	80/03	80/09
TOT HARD	CACO3	MG/L		7	133.286	12.0658	148.000	116.000	79/11	80/07
CHLORIDE	TOTAL	MG/L		7	16.1428	3.07837	20.0000	12.0000	79/11	80/07
SULFATE	SO4-TOT	MG/L		7	31.7143	7.93130	42.0000	22.0000	79/11	80/07
FLUORIDE	F,DISS	MG/L		2	.130000	.000000	.130000	.130000	79/11	79/12
FLUORIDE	F,TOTAL	MG/L		3	.253333	.023094	.280000	.240000	80/03	80/05
SILICA	DISOLVED	MG/L		2	.545000	.134353	.640000	.450000	80/05	80/06
ARSENIC	AS,TOT	UG/L		1	10.0000		10.0000	10.0000	79/12	79/12
			K	6	10.0000	.000000	10.0000	10.0000	80/03	80/09
			T	7	10.0000	.000000	10.0000	10.0000	79/12	80/09
CADMIUM	CD,TOT	UG/L		2	5.00000	.000000	5.00000	5.00000	79/11	79/12
			K	6	5.83333	2.04125	10.0000	5.00000	80/03	80/09
			T	8	5.62500	1.76777	10.0000	5.00000	79/11	80/09
CHROMIUM	HEX-VAL	UG/L		1	30.0000		30.0000	30.0000	79/12	79/12
CHROMIUM	CR,TOT	UG/L		2	30.0000	.000000	30.0000	30.0000	79/11	79/12

TABLE RD 1-275 (Continued)

STATION NUMBER 504030
41 27 51.0 082 38 50.0 2
SANDUSKY WATER SUPPLY INTAKE
LAKE ERIE 060292 (CENTRAL BASIN SANDUSKY AREA

PARAMETER			R	NO	MEAN	STAN DEV	MAXIMUM	MINIMUM	BEG	END
CHROMIUM	CR,TOT	UG/L	K	6	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	8	30.0000	.000000	30.0000	30.0000	79/11	80/09
COPPER	CU,TOT	UG/L		7	37.1428	7.55944	50.0000	30.0000	79/11	80/09
			K	1	30.0000		30.0000	30.0000	80/03	80/03
			T	8	36.2500	7.44024	50.0000	30.0000	79/11	80/09
IRON	FE,TOT	UG/L		8	1418.75	1739.39	5600.00	330.000	79/11	80/09
LEAD	PB,TOT	UG/L		5	7.00000	2.00000	9.00000	5.00000	79/11	80/07
			K	3	5.00000	.000000	5.00000	5.00000	80/05	80/09
			T	8	6.25000	1.83225	9.00000	5.00000	79/11	80/09
MANGNESE	MN	UG/L		6	65.0000	42.7785	120.000	30.0000	79/11	80/09
			K	2	30.0000	.000000	30.0000	30.0000	80/03	80/07
			T	8	56.2500	39.6187	120.000	30.0000	79/11	80/09
NICKEL	NI,TOTAL	UG/L	K	1	100.000		100.000	100.000	80/03	80/03
ZINC	ZN,TOT	UG/L		4	45.0000	30.0000	90.0000	30.0000	79/11	80/07
			K	4	30.0000	.000000	30.0000	30.0000	80/03	80/09
			T	8	37.5000	21.2132	90.0000	30.0000	79/11	80/09
ALUMINUM	AL,TOT	UG/L		7	1214.29	1903.01	5500.00	300.000	79/11	80/09
ALPHA	TOTAL	PC/L	K	2	1.00000	.000000	1.00000	1.00000	80/03	80/04
BETA	TOTAL	PC/L		1	9.00000		9.00000	9.00000	80/04	80/04
			K	1	2.00000		2.00000	2.00000	80/03	80/03
			T	2	5.50000	4.94975	9.00000	2.00000	80/03	80/04
FEC COLI	MFM-FCBR	/100ML		3	24.0000	13.8564	40.0000	16.0000	80/03	80/07
			K	2	10.0000	.000000	10.0000	10.0000	80/05	80/06
			T	5	18.4000	12.4419	40.0000	10.0000	80/03	80/07
MBAS		MG/L		3	.083333	.057735	.150000	.050000	79/11	80/03
			K	2	.050000	.000061	.050000	.050000	80/04	80/06
			T	5	.070000	.044721	.150000	.050000	79/11	80/06
RESIDUE	DISS-180 C	MG/L		2	194.500	23.3345	211.000	178.000	79/11	80/09
MERCURY	HG,TOTAL	UG/L		2	.500000	.000000	.500000	.500000	79/11	79/12
			K	6	.500000	.000000	.500000	.500000	80/03	80/09
			T	8	.500000	.000000	.500000	.500000	79/11	80/09

TABLE RD 1-276

The following low flow stations were not sampled during the period from October 1, 1978 through September 30, 1980. Monitoring was discontinued October 1, 1978.

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION
MINOR OHIO TRIBUTARIES					
Bullskin Creek near Cedron (Cedron Rd)	3.1 (K-6)	609100	SWDO	OEPA (LF)	WWH
Captina Creek near Powhatan Point (SR 148)	3.2 (S-4)	609210	SEDO	OEPA (LF)	WWH
Cross Creek near Mingo Junction (Twp Rd 167)	1.7 (S-2)	609250	SEDO	OEPA (LF)	WWH
Duck Creek near Marietta (SR 26)	1.8 (R-1,2)	609180	SEDO	OEPA (LF)	WWH
Eagle Creek near Ripley (CR 49)	3.7 (L-3)	609120	SEDO	OEPA (LF)	EWH
Indian Guyan Creek near Bradrick (SR 243)	2.5 (N-5)	609150	SEDO	OEPA (LF)	WWH1
Leading Creek near Middleport (SR 7)	1.4 (O-4)	609160	SEDO	OEPA (LF)	WWH
Little Muskingum River near Reno (CR 9)	2.3 (R-2)	609190	SEDO	OEPA (LF)	WWH
Little Scioto River near Sciotoville (Twp Rd 248)	2.1 (N-4)	609130	SEDO	OEPA (LF)	EWH
McMahon Creek near Bellaire (SR 147)	1.3 (S-4)	609220	SEDO	OEPA (LF)	WWH
Pine Creek near Garden City (SR 52)	4.1 (N-4)	609140	SEDO	OEPA (LF)	WWH
Shade River near Keno (Twp Rd 114)	5.9 (O-4)	609170	SEDO	OEPA (LF)	EWH
Short Creek near Rayland (SR 150)	3.9 (S-3)	609240	SEDO	OEPA (LF)	WWH

TABLE RD 1-276 (Continued)

STATION DESCRIPTION	RM (MAP)	STATION #	DISTRICT	PURPOSE	USE DESIGNATION
Sunfish Creek near Cameron (SR 78)	6.8 (S-4)	609200	SEDO	OEPA (LF)	WWH
Symmes Creek near Chesapeake (SR 7)	0.4 (N-3)	609270	SEDO	OEPA (LF)	
Ten Mile Creek near New Palestine (SR 749)	1.1 (K-6)	609050	SWDO	OEPA (LF)	WWH
Wheeling Creek near Bridgeport (CR 24)	1.5 (S-3)	609230	SEDO	OEPA (LF)	WWH
White Oak Creek below Georgetown (Rt. 221)	5.7 (L-1)	609110	SEDO	OEPA (LF)	WWH
Yellow Creek near Hammondsville (SR 213)	2.5 (S-2)	609260	SEDO	OEPA (LF)	WWH