MAUMEE RIVER BASIN
AREA OF CONCERN
REMEDIAL ACTION PLAN

Volume 3
Water Quality Problem Matrix

Maumee River
REMEDIAL ACTION PLAN

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MAUMEE RIVER BASIN
AREA OF CONCERN
REMEDIAL ACTION PLAN

Volume 3
Water Quality Problem Matrix

Contents

RAP AREA WATER QUALITY PROBLEM MATRIX

Introduction

This report, the *Water Quality Problem Matrix*, is the third volume of the *Lower Maumee Basin Remedial Action Plan*. The previous volumes dealt with identifying and detailing the water quality problems of the Lower Maumee Basin. Volume 1, the *Investigation Report*, is the documentation that identifies the environmental problems and the water and related uses that are impaired as a result of the problems. It also identifies the known sources of the pollutants. This volume includes a glossery of water quality terminology, acronyms, and abbreviations. Volume 2, the *Investigation Report Appendices* contains the lengthier tables of information collected in the process of writing the *Investigation Report*, and the draft text of Ohio EPA's *Biological Water Quality Report* (BWQR) for the Lower Maumee Basin streams.

RAPs are required in those Areas of Concern (AOC) as identified by the Water Quality Board of the International Joint Commission. Overall, there are 42 identified AOCs for the Great Lakes area. The RAPs are to become a part of the Great Lakes Water Quality Agreement of 1987 between the United States and Canada. This *Agreement* is a commitment to restore the water quality and the beneficial uses of the waters.

The AOC is an area of water impact. In some cases, however, the sources of these impacts are outside of the Lower Maumee River Basin's boundaries. This is particularly true of the agricultural sources. Therefore, implementation of the RAP must not be limited to the AOC's boundaries, if significant water quality improvements are to be made.

The *Water Quality Problem Matrix* assesses the impact of the problems identified in the *Investigation Report* on each stream in the AOC. The streams are divided into sub-drainage basins, or watersheds. The watersheds are listed alphabetically in the Matrix. Each watershed is given a rating for the severity of the impact from each of the thirteen water quality problem areas identified.

More than a hundred persons have had input into the preparation of this first phase work. The Remedial Action Plan Advisory Committee, which has over a hundred members, subdivided itself into seven subcommittees, bringing other persons into the process. These subcommittees included: Water Quality and Water Uses, Dredge Disposal, Agricultural Runoff, Home Sewage Disposal, Landfills and Dumps, Public and Industrial Dischargers, and Fish and Wildlife. The thirteen water quality problem areas were assigned to subcommittees. These committees met and decided on criteria for impact ratings. A listing of what committee dealt with which issue is included at the front of the Matrix. When the subcommittees had finished their work, the full Advisory Committee met to review the ratings. This group discussed the ratings, made some changes, and then approved the Matrix.

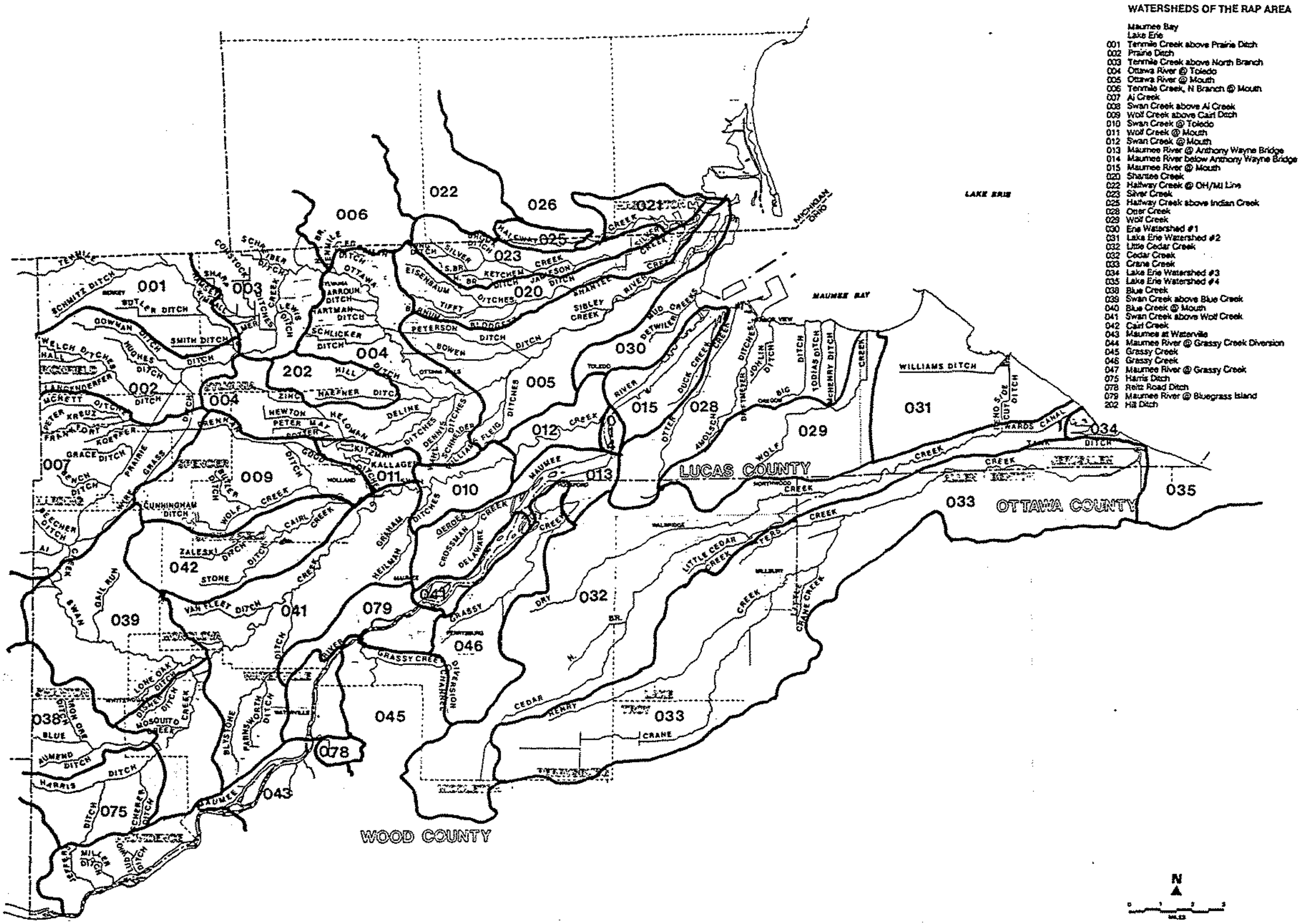
There are three sections to this report:

1. *The Matrix Documentation.* This section discusses how the committees addressed the water quality problems, what criteria were used for determining ratings, and why.
2. *The Area of Concern Watershed Map.* A map showing the watersheds used.
3. *The Matrix.* The listing of each watershed and its impact rating for each of the thirteen water quality problem areas.

The Toledo Metropolitan Area Council of Governments (TMACOG) is participating in a joint venture with Ohio Environmental Protection Agency (Ohio EPA) to prepare the RAP. TMACOG has three primary tasks: preparation of the *Investigation Report*, preparation of recommendations on how to solve the problems, and conducting a program of extensive public involvement in the RAP development so as to have substantial agreement among the public and private sectors for the actions adopted.

This document completes the investigation phase of the RAP process. Using the *Investigation Report* and the Matrix, the RAP subcommittees will prepare recommendations on solutions to the water quality problems. Under the guidance of the Steering Committee, TMACOG staff will merge these recommendations into a cohesive document. This *Recommendations Report* will be reviewed by the full Advisory Committee. When a final version is ready, it will be submitted to Ohio EPA, which will use it to produce the *Remedial Action Plan*. This final Plan will then go to US EPA and the International Joint Commission (IJC).

For information on how to participate in the Remedial Action Plan process, or to obtain a copy of the *Investigation Report*, please contact TMACOG.



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

RAP AREA WATER QUALITY PROBLEM MATRIX

Discussion of Criteria for Water Quality Problem Severity Classifications

RATING SYSTEM

The rating system used classifies the effects of each of the identified water quality problems as:

H	High impact
M	Medium impact
L	Low impact
N	Not applicable to this watershed/None
U	Unknown
US	Unknown, but suspected problem
S	Suspected problem; but no data
HS	Suspected high impact
MS	Suspected medium impact
LS	Suspected low impact

These rating are based on the best available information, as identified by the *Maumee River Basin Area of Concern Remedial Action Plan, Volume 1: Investigation Report* (TMACOG, 1988).

POTWS

The following is a list of POTWs by watershed, and the severity rating assigned. These ratings take into account the quality of the plant effluent, and the quantity of effluent relative to the size of the receiving stream. The Whitehouse is not included here because it is in the process of being abandoned in favor of connecting to the Lucas County system.

A summary of POTW permit violations for 1987 and the first half of 1988 is given below:

POTW	BOD	Cl	Fecal	Phen.	Oil	P	pH	SS	Hg	Total
DuPont Road	0	1	2	2	0	1	0	1	0	7
Haskins	2	0	1	0	0	0	1	1	0	5
Maumee River	0	1	2	0	0	0	0	0	0	3
Perrysburg	6	4	10	0	1	19	0	13	0	53
South Shore Park	15	5	9	0	0	0	0	15	0	44
Toledo	3	1	10	1	0	15	1	10	1	42

The rationale used in assigning these impact ratings is as follows:

In most watersheds, there are no POTW discharges, so the rating is "N".

- The Toledo Bay View plant is a large facility with a significant number of NPDES discharge permit violations. Its impact is rated "H".

- The Oregon South Shore Park and Dupont Road treatment plants discharge to the lake. The DuPont Road plant is under capacity, and had a relatively small number of permit violations; its rating is "M". The South Shore Park plant, however, has severe problems from extraneous water entering the sewers. This plant has many permit violations, and its rating is "H". Together, their impact is rated "H".

- The Maumee River WWTP had few permit violations, and discharges to a sizable stream (the river). Its impact rating is "L".

- The Perrysburg plant is not a large facility, but it has serious problems, and more permit violations than any other POTW. Its impact is rated "H".

- The Haskins plant has a small number of permit violations, but it discharges to a roadside ditch. However, its effect on the Maumee River itself is low. For this reason, its impact is rated "L".

The impact ratings for POTWs are summarized below:

Watershed	POTW Impact	POTW(s)
015	H	Toledo Bay View
028	M	DuPont Road WWTP,
028	H	Oregon South Shore Park WWTP
043	L	Haskins
044	L	Maumee River WWTP
079	H	Perrysburg WWTP

PACKAGE PLANTS

In most cases, the only information regarding package plants is their location and size. A listing of NPDES Permit Violations (*RAP Investigation Report*, Appendix I), however, indicates that even package plants run by trained operators do not discharge very high-quality effluent. Furthermore, even well-run package plants are vulnerable to upsets, and can turn septic in a matter of hours. For this reason, package plants impacts are rated either "N" for None, or "H" for High.

INDUSTRIAL

The listing of NPDES Permit Violations (*RAP Investigation Report*, Appendix I), in many cases agrees with the list of "Problem Dischargers" developed for the *RAP Investigation Report*. The classification of what is industrial and non-industrial is based on Ohio EPA's system. If the NPDES Permit number starts with "2I", it is Industrial. If it starts with "2P", it is not. By this classification, 186 of the 627 NPDES violations, or 30%, were from industrial dischargers.

Of the 186 industrial permit violations listed, 76 of them are from three "Problem" dischargers (Sun Oil 2IG00003, General Mills 2IH00093, and King Road Landfill 2IN00079), for an average of 25 violations. The other five "Problem" dischargers do not show any permit violations at all (Conrail 2IT00015, Conrail 2IT00007, Doehler-Jarvis 2IC00021, LOF 2IN00030, and LOF 2IN00020).

Fourteen non-problem dischargers account for the remaining 110 violations, for an average of 8 apiece. Of these, the Toledo Edison ACME plant (2IB00001) shows 26 violations (mostly suspended solids); DuPont Paint (2IF00016) had 9 (all temperature); Diversitech (2IQ00012) had 9 (mostly oil & grease); Chessie System (CSX Presque Isle, 2IT00013) had 10 (Oil & grease, pH, SS); and the Bowling Green water plant (2IW00010) had 19 (all SS). Based on this information, Diversitech was added to the list of "Problem" Dischargers.

The following criteria were used for defining L/M/H impact for Industrial Dischargers:

- Watersheds which have no industrial dischargers are rated "N".
- Watersheds that have one or more "Problem" industrial dischargers are rated "H".
- A discharger that has more than 8 violations (the average number for non-"Problem" dischargers), is rated "M".
- A discharger with 8 or fewer violations is rated "L".
- Where a watershed has more than one industrial discharge, the most severe impact rating applies.

A tally of NPDES permit violations is shown below.

TALLY OF INDUSTRIAL NPDES PERMIT VIOLATIONS

NPDES Discharger	NPDES #	# Violations	"Problem"?	Impact
Bowling Green WTP	2IW00010	19	No	M
Conrail Emerald Ave.	2IT00015	0	Yes	H
Conrail Stanley Yard	2IT00007	0	Yes	H
CSX Presque Isle	2IT00013	10	No	M
CSX Walbridge	2IT00002	4	No	L
Diversitech	2IQ00012	9	Yes	H
Doehler-Jarvis	2IC00021	0	Yes	H
DuPont Formaldehyde	2IF00017	1	No	L
DuPont Paint	2IF00016	9	No	M
Envirosafe (Fondessy)	2IN00013	5	No	L
France Stone	2IJ00039	1	No	L
General Mills	2IH00093	10	Yes	H
King Road Landfill	2IN00079	17	Yes	H
Liquid Carbonic	2IN00069	5	No	L
LOF #4 & #8	2IN00020	0	Yes	H
LOF #6	2IN00030	0	Yes	H
Reichert Stamping	2IS00008	3	No	L
Standard Oil Refinery	2IG00007	7	No	L
Stoneco	2IJ00052	1	No	L
Sun Oil Refinery	2IG00003	24	Yes	H
Teledyne	2IO00001	3	No	L
Toledo Coke	2ID00011	3	No	L
Toledo Edison ACME	2IB00001	26	No	M
Toledo Edison Bayshore	2IB00000	4	No	L

All other industrial NPDES dischargers reported no permit violations in this period, and are rated as having a low (L) impact on their watersheds.

It may be noted that five of the "Problem" dischargers reported no permit violations. The Public and Industrial Wastewater Subcommittee offers the following notes to account for this:

Conrail, Emerald Avenue (2IT00015)

No explanation for why this discharger does not show violations in its Monthly Operating Reports (MORs). The receiving stream is severely impacted by oil discharge from this facility. Ohio EPA plans to begin enforcement action.

Conrail, Stanley Yard (2IT00007)

The problem at this site is more old spills than present discharges. Again, no explanation why this discharger did not show any violations. The *Investigation Report* (page 80) cites a major oil spill in March, 1988. A spill would not necessarily show up on the MORs.

Doehler-Jarvis (2IC00021)

The suspected problem from this discharger is a *periodic* spill of soluble oils. Being intermittent, it would not necessarily show up on the MORs submitted to Ohio EPA. Periodic discharges to the stream have been documented, and while Doehler-Jarvis is the *suspected* source, the discharge has been traced back to this facility on only one occasion.

LOF, Plants #4 & 8, East Broadway (2IN00020)

Otter Creek used to flow *under* the landfill at this site, and leaching into the creek was a problem. Otter Creek has now been diverted to flow *around* the landfill instead. At present, there is still *some* discharge. The leachate will be collected and pumped to the City of Toledo's sanitary sewer system.

LOF, Plant #6, Rossford (2IN00030)

The main pollutant cited from this discharger was arsenic. No violations were reported, however, because arsenic was not included in the permit (2IN00030*ED). This permit is in the process of being redrafted. Ohio EPA intends to include arsenic on the new permit.

LOF has installed a leachate collection system here, and eliminated the arsenic discharge. The leachate now goes to a treatment lagoon.

LOF has made substantial progress toward cleaning up both its facilities in Rossford/East Toledo. It is anticipated that the improvements made will solved the problem and remove LOF from the "Problem" discharger list. At present, however, new data is not yet available to document this.

CSOs

Watersheds which receive no discharges from CSOs are all rated "N".

TESD data for 1981-1986 indicate the following tallies of fecal coliform counts in excess of 2000/100 ml:

Stream	Fecal Coliform Counts Over 2000	Total Number of Samples	Percent Over 2000/100 ml
Maumee River	79	399	20%
Ottawa River	162	436	37%
Swan Creek	102	224	46%

These numbers show a more severe effect on Swan Creek and the Ottawa River. There are no POTWs discharging to the Ottawa River, and there are few package plants and septic systems in the reach of stream monitored. The most severe bacterial counts were found between mile points 3.1 (Suder Ave.) and 8.9 (Monroe St.), which is in the CSO area.

On Swan Creek, conditions are similar. There are many package plants discharging to Swan Creek, but mostly upstream of the TESD sampling sites. The Whitehouse WWTP was also discharging to a tributary of Swan Creek during this period, but again, far upstream of the TESD sites. The severe bacterial counts were found between mile points 0.6 (St. Clair) and 5 (Detroit Ave.), which is the CSO area.

The Maumee River watersheds with CSOs show fecal coliform violations, but at a lower frequency. Also, the Maumee River CSO area receives effluent from the Toledo and Perrysburg WWTPs, both of which had fecal coliform effluent violations (*RAP Investigation Report*, Appendix I). In addition, water from Swan Creek joins the Maumee in this reach. The POTWs and the two tributaries are sources of fecal coliform besides the local CSOs.

Swan Creek and Ottawa River watersheds with CSOs are both rated "H". The effect of CSOs on Swan Creek due to the Whitehouse bypasses is rated "H". Two segments of Swan Creek are rated "M". Watershed 041 receives the impact of the Whitehouse CSOs at its upstream end, but the rest of the watershed has none. In 010 in Toledo, the upper end of the watershed is above the CSOs, but the lower end has several. Maumee River CSO watersheds are rated "M", not because CSOs are not a problem, but because their effect is less severe due to dilution.

URBAN RUNOFF

No water quality monitoring has ever been performed to document the effects of urban runoff in the RAP Area. Not having any better information, it is assumed that the water quality effects of urban runoff depend only on the degree of urbanization of the watershed.

The LRIS land use database classifies land use into a number of different land use types, each assigned a numerical code. Those classified as "urban land uses" are listed below:

LRIS Watershed Land Use Code	Land Use
8	Commercial-Industrial (undifferentiated)
9	Mixed Urban
10	Residential (undifferentiated)
11	Residential, single family
12	Residential, multiple family
13	Mobile homes
14	Commercial & Services
15	Industrial, light to heavy
16	Institutional
19	Other Urban
72	Construction Activity
81	Improved Roads
82	Unimproved Roads
83	Railroads
84	Airport
85	Utilities
86	Shipping Ports
87	Utility & Rail, undifferentiated, not included in 83 or 85
88	Transportation (undifferentiated)

The table on the following page gives the total acreages in urban land uses for each watershed. At the right hand side of the table, the percent of urban land uses are given, and the impact ranking of L/M/H. Severity is rated "H" for highly urbanized watersheds (over 50%), "M" for moderately-urbanized watersheds (31%-50%), and otherwise "L".

This land use data was collected in 1975. It is the most recent presently available, but there have been some significant land use changes since then. The major growth areas have been:

003	Sylvania & Sylvania Twp.
009	Springfield Twp.
041	Maumee & Monclova Twp.
042	Springfield & Swanton Twps.
046	Perrysburg & Perrysburg Twp.
079	Perrysburg & Perrysburg Twp.

These watersheds are rated "MS" for suspected medium impact from urban runoff. Exception: watershed 079 is rated "M" based on 1975 land use.

WATER SHED	CO.	ALL URBAN AREAS SUM Urban	PERCENT Urban	RANK	NON-RESIDENTIAL URBAN SUM ACRES Non-Res. Urban	PERCENT Non-Res. Urban	RATING
001	L	331.3	3.8%	L	331.3	3.8%	L
002	L	518.2	5.9%	L	518.2	5.9%	L
003	L	2052.8	27.4%	L	2052.8	27.4%	L
004	L	7781.6	47.0%	M	7781.6	47.0%	M
005	L	10075.1	74.4%	H	10075.1	74.4%	H
006	L	314.3	47.4%	M	314.3	47.4%	M
007	L	866.5	6.4%	L	866.5	6.4%	L
008	L	17	9.1%	L	17.0	9.1%	L
009	L	1682.1	19.5%	L	1682.1	19.5%	L
010	L	3364.1	55.1%	H	3364.1	55.1%	H
011	L	586.2	35.6%	M	586.2	35.6%	M
012	L	2557.1	88.5%	H	2557.1	88.5%	H
013	L	4332.6					
013	W	744.1					
013	ALL	5076.7	67.3%	H	.0	.0%	L
014	L	59.5	50.0%	H	59.5	50.0%	H
015	L	2727	60.1%	H	2727.0	60.1%	H
020	L	4859.3	78.0%	H	4859.3	78.0%	H
021	L	34	44.4%	M	34.0	44.4%	M
022	L	115	96.7%	H	115.0	96.7%	H
023	L	3398.1	73.1%	H	3398.1	73.1%	H
025	L	509.7	62.5%	H	509.7	62.5%	H
028	L	4298.6					
028	W	188.3					
028	ALL	4486.9	39.6%	M	.0	.0%	L
029	L	858.1					
029	W	393.5					
029	ALL	1251.6	12.3%	L	.0	.0%	L
030	L	3551	74.0%	H	3551.0	74.0%	H
031	L	994	7.4%	L	994.0	7.4%	L
032	L	322.9					
032	W	3960.8					
032	ALL	4283.7	13.6%	L	.0	.0%	L
033	L	102					
033	W	1625.5					
033	ALL	1727.5	8.1%	L	.0	.0%	L
034	L	8.5	1.2%	L	8.5	1.2%	L
035	L	0					
035	O	74.9					
035	ALL	74.9	2.3%	L	.0	.0%	L
038	L	458.8	8.1%	L	458.8	8.1%	L
039	L	951.5	8.8%	L	951.5	8.8%	L
040	L	603.3	10.1%	L	603.3	10.1%	L
041	L	1231.8	8.8%	L	1231.8	8.8%	L
042	L	1146.9	16.0%	L	1146.9	16.0%	L
043	L	263.4					
043	W	975.4					
043	ALL	1238.8	10.8%	L	.0	.0%	L
044	L	560.7					
044	W	102.7					
044	ALL	663.4	22.5%	L	.0	.0%	L
045	W	1042.8	6.7%	L	1042.8	6.7%	L
046	W	2720.6	29.8%	L	2720.6	29.8%	L
047	L	603.3					
047	W	752.8					
047	ALL	1356.1	37.3%	M	.0	.0%	L
075	L	390.8					
075	W	0					
075	ALL	390.8	5.5%	L	.0	.0%	L
078	W	17.2	2.6%	L	17.2	2.6%	L
079	L	756.2					
079	W	598.9					
079	ALL	1355.1	32.1%	M	.0	.0%	L
202	L	1070	45.8%	M	1070.0	45.8%	M
TOTALS		77,551	25.0%		55,645		

AGRICULTURAL RUNOFF

Determination of the level of agricultural runoff impacts was based on watershed rankings in the *State of Ohio Phosphorus Reduction Strategy for Lake Erie* and the Ohio EPA's *Ohio Nonpoint Source Assessment*. Watersheds with a priority 1 ranking in the *Reduction Strategy* or a nonpoint source impaired *Assessment* ranking were rated H. Watersheds ranked nonpoint source impacted in the *Assessment* were rated M. In those cases where watersheds were ranked differently in the two reports, the higher impact rating was used. The remaining watersheds were rated L.

DUMPS, LANDFILLS, and PITS, PONDS, and LAGOONS

Watersheds which have no identified landfills dumps, pits, ponds or lagoons as displayed in the *Investigation Report* are rated None (N).

Watersheds which have an identified landfill, dump, pit, pond or lagoon as displayed in the *Investigation Report*, but have no known discharge, are rated Medium (M).

Watersheds which have an identified landfill, dump, pit, pond or lagoon as displayed in the *Investigation Report*, and have a known discharge, are rated High (H).

LEAKING UNDERGROUND STORAGE TANKS (LUST)

The best data available for underground tanks at this time merely indicates the number known to exist in each county. There does not yet exist an inventory that gives their locations, ages, and materials, nor whether the tanks are leaking. What the data *does* indicate is that there tend to be higher concentrations of underground tanks in urban areas than in rural areas. For this reason, the impact of underground tanks was rated using the same *degree of urbanization* criteria applied to urban runoff. Watersheds are rated "HS" for highly urbanized watersheds (over 50%), "MS" for moderately-urbanized watersheds (31%-50%), and otherwise "LS".

DREDGE DISPOSAL

The major effects of open lake disposal of dredged materials in the Area of Concern are limited to the Lake Erie and Maumee Bay since the current and proposed open lake disposal sites are located there. Therefore, Lake Erie and Maumee Bay were rated H. Those segments of the Maumee River that make up the shipping channel were rated M. All remaining watersheds were rated N.

HOME SEWAGE DISPOSAL

Watersheds which are in urbanized areas with available sanitary sewers as displayed in the Investigation Report are rated None (N). The Home Sewage Disposal Subcommittee recognizes that some isolated home sewage systems do exist in sewered areas. These, however, are few enough not to have a significant impact on water quality on the watershed level.

Watersheds which have identified on-site systems, but are not identified as problem areas by the County Health Departments as described in the Investigation Report, are rated Medium (M).

Watersheds which have identified on-site systems, and are identified as problem areas by the County Health Departments as displayed in the Investigation Report, are rated High (H).

ATMOSPHERIC DEPOSITION

While no specific information exists for the effects of atmospheric deposition of pollutants in the RAP Area, there is documentation of this source causing water quality problems in Michigan, and other parts of Ohio. A acid rain does not show any harmful effects to streams of the RAP Area because of the buffering capacity of the native limestone. In fact, most streams tend to be alkaline (pH around 7.7). Air quality data, noted in the *Investigation Report*, give reason to suspect potential problems from deposition. All watersheds are rated "US" for "Unknown, but suspected problem".

WTP SLUDGE

Water Treatment Plant sludge deposits are a problem in only a few specific watersheds, and these cases are well-documented. For all other watersheds, the rating is "L".

CONTAMINATED SEDIMENTS

There are no specific standards for pollutant concentration in stream sediments. However, sediment guidelines have been established by Ohio EPA for the following metals: Cadmium, arsenic, chromium, lead, copper, zinc and iron. U.S. EPA has established guidelines for the following parameters: Volatile. Solids, Mercury, Cyanide, Nickel, Ammonia-N, Manganese, Total P, TKN and COD. Other toxic pollutants of concern include PAHs, PCBs and phthalates as these have been found above the detection limits.

Low (L) is applied wherein the Ohio EPA Guidelines Severity Ratings indicate Non-Elevated Concentration and U.S. EPA Guidelines Severity Ratings indicate Non-Polluted for the parameters listed in Table 18 of the Investigation Report (*Corps of Engineers data, 1983*).

Medium (M) is applied wherein the Ohio EPA Guidelines Severity Ratings indicate either Slightly Elevated or Elevated Concentration and the U.S. EPA Guidelines Severity Rating indicate Moderately Polluted for parameters listed in Table 18 of the Investigation Report.

High (H) is applied wherein the Ohio EPA Guidelines Severity Ratings indicated either Highly Elevated Concentration or Extreme Elevated Concentration and U.S. EPA Guidelines Severity Ratings indicated Heavily Polluted for the parameters listed in Table 18 of the *Investigation Report*.

Further, the U.S. EPA Guidelines Severity Ratings indicate Total PCBs of $\geq$ 10 mg/kg is heavily polluted. Criteria to be applied is High (H) to conform with this Guideline.

Dr. Paul Bauman, U.S. Fish & Wildlife, indicated that the concentrations for PAHs and phthalates displayed in Table 29 of the Investigation Report (*ibid*) were "the lower end of the range of values for sites with cancer epizootics. However, I would consider these concentrations to pose a possible problem and to be of concern". Criteria to be applied is High (H) for any concentration above the detection limit as shown on Table 29.

LOWER MAUMEE BASIN
REMEDIAL ACTION PLAN

WATER QUALITY PROBLEM MATRIX

The Remedial Action Plan Advisory Committee (RAPAC) and its subcommittees have identified twelve water quality problem areas that affect the streams of the Lower Maumee Basin. These water quality problems are:

POTW	Publicly-Operated Treatment Works (sewage treatment plants)
IND	Industrial waste effluent discharges
URBAN	Runoff from urban areas
CSOs	Combined sewer overflows
HOME	Private sewage systems (septic systems, privies, etc.)
PKG	Package sewage treatment plants
SEDIMENTS	Contaminated stream sediments
ATMOS	Deposition of air-borne pollutants
WTP SLUDGE	Accumulation of Water Treatment Plant (lime) sludge in a stream
AG	Runoff from agricultural land
DUMPS	Dumps; landfills; and pits, ponds, and lagoons.
LUST	*L*eaking *U*nderground *S*torage *T*anks (e.g., gasoline)
DREDGE	Disposal of material dredged from Toledo Harbor

Each of these water quality problems is being addressed by one of the RAPAC subcommittees; the problem ratings are grouped by subcommittee below. The Agricultural Runoff, Dumps/Landfills, and Dredge Disposal subcommittees are listed under 'other' because each has a single water quality issue to deal with.

Classification of Watersheds are based on the impact of each identified water quality problem. The abbreviations are as follows:

H = High Impact	M = Medium Impact	L = Low Impact
N = No Impact	U = Unknown	S = Suspected, but no data.
HS= Suspected High	MS= Suspected Medium	LS= Suspected Low
US= Unknown, but suspected problem		

For details on the criteria used to determine the impacts for each water quality problem, please see the accompanying *RAP Area Water Quality Problem Matrix documentation.*

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial		Home Sewage	Wtr Qual/Uses	Others

Watershed Name: AI CREEK

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 007	POTW N	URBAN L	HOME H	SEDIMENTS U	AG H
LRIS 007	IND N	CSOs N	PKG H	ATMOS US	DUMPS LS
PEMSO 410102				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES *Spencer Twp. Dump*

Watershed Name: AYRES CREEK

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 033	POTW N	URBAN L	HOME H	SEDIMENTS U	AG H
LRIS 033	IND N	CSOs N	PKG H	ATMOS US	DUMPS H
PEMSO 1610302				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES *Asman Dump, Milbury Dump, Molner Packing Imp., Std. Oil Co. Imp.*

Watershed Name: BLUE CREEK @ MOUTH

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 040	POTW N	URBAN L	HOME M	SEDIMENTS U	AG H
LRIS 040	IND N	CSOs N	PKG H	ATMOS US	DUMPS LS
PEMSO 410103				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES *American Can Impoundment*

Watershed Name: BLUE CREEK ABOVE HARRIS DITCH

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 038	POTW N	URBAN L	HOME M	SEDIMENTS U	AG H
LRIS 038	IND N	CSOs N	PKG H	ATMOS US	DUMPS US
PEMSO 410103				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

Watershed Name: CAIRL CREEK

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 042	POTW N	URBAN MS	HOME M	SEDIMENTS U	AG M
LRIS 042	IND N	CSOs N	PKG H	ATMOS US	DUMPS US
PEMSO 410132				WTP SLUDGE N	DREDGE N
					LUST MS

NOTES

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT Public/Industrial	Home Sewage	Wtr Qual/Uses	Others

Watershed Name: **CEDAR CREEK**

	Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
TMACOG 032 LRIS 032 PEMSO 1610303	POTW N URBAN L IND H CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST LS

NOTES *IND: Conrail/Stanley Yard (2IT00007) H, CSX Walbridge (2IT00002) L, Stoneco Lime City (2IJ00052) L*

Watershed Name: **CRANE CREEK**

	Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
TMACOG 033 LRIS 033 PEMSO 1610302	POTW N URBAN L IND N CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST LS

NOTES

Watershed Name: **DELAWARE CREEK**

	Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
TMACOG 013 LRIS 013 PEMSO 410133	POTW N URBAN H IND N CSOs N	HOME L PKG N	SEDIMENTS U ATMOS US WTP SLUDGE N	AG N DUMPS HS DREDGE N LUST HS

NOTES

Watershed Name: **DRY CREEK**

	Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
TMACOG 032 LRIS 032 PEMSO 1610303	POTW N URBAN L IND N CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST LS

NOTES

Watershed Name: **DUCK CREEK**

	Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
TMACOG 015 LRIS 015 PEMSO 410133	POTW N URBAN H IND L CSOs N	HOME L PKG N	SEDIMENTS H ATMOS US WTP SLUDGE L	AG N DUMPS H DREDGE N LUST HS

NOTES *urbanized*

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers — PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial, Home Sewage, Wtr Qual/Uses, Others

Watershed Name: **GAIL RUN**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 039	POTW N	URBAN L	HOME M	SEDIMENTS U	AG S
LRIS 039	IND N	CSOs N	PKG H	ATMOS US	DUMPS M
PEMSO 410101				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

Watershed Name: **GRASSY CREEK**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 045	POTW N	URBAN L	HOME M	SEDIMENTS U	AG H
LRIS 045	IND M	CSOs N	PKG H	ATMOS US	DUMPS M
PEMSO 410133				WTP SLUDGE L	DREDGE N
					LUST LS

NOTES *WTP SLUDGE: Bowling Green WTP*
IND: BG WTP (2IW00010) M

Watershed Name: **GRASSY CREEK**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 046	POTW N	URBAN MS	HOME L	SEDIMENTS U	AG M
LRIS 046	IND N	CSOs N	PKG H	ATMOS US	DUMPS MS
PEMSO 410133				WTP SLUDGE N	DREDGE N
					LUST MS

NOTES *Rossford Landfill*

Watershed Name: **HALFWAY CR. @ OH/MI LINE**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 022	POTW N	URBAN H	HOME M	SEDIMENTS U	AG M
LRIS 022	IND N	CSOs N	PKG N	ATMOS US	DUMPS US
PEMSO 410302				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES

Watershed Name: **HALFWAY CR. ABOVE INDIAN CR**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 025	POTW N	URBAN H	HOME L	SEDIMENTS U	AG M
LRIS 025	IND N	CSOs N	PKG H	ATMOS US	DUMPS US
PEMSO 410302				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
Watershed Name: **HALFWAY CR. ABOVE SHANTEE CR**				
TMACOG 021 LRIS 021 PEMSO 410302	POTW N URBAN M IND N CSOs N	HOME L PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG M DUMPS L DREDGE N LUST MS
NOTES				
Watershed Name: **HARRIS DITCH**				
TMACOG 075 LRIS 075 PEMSO 410103	POTW N URBAN L IND N CSOs N	HOME M PKG N	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS LS DREDGE N LUST LS
NOTES				
Watershed Name: **HENRY CREEK**				
TMACOG 033 LRIS 033 PEMSO 1610302	POTW N URBAN L IND N CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS H DREDGE N LUST LS
NOTES				
Watershed Name: **HILL DITCH**				
TMACOG 202 LRIS 202 PEMSO 411331	POTW N URBAN M IND N CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG L DUMPS US DREDGE N LUST MS
NOTES				
Watershed Name: **LAKE ERIE**				
TMACOG LRIS PEMSO	POTW N URBAN L IND L CSOs N	HOME L PKG L	SEDIMENTS M ATMOS US WTP SLUDGE N	AG H DUMPS U DREDGE H LUST LS
NOTES				
Watershed Name: **LAKE ERIE WATERSHED #1**				
TMACOG 030 LRIS 030 PEMSO 411133	POTW N URBAN H IND L CSOs N	HOME L PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG N DUMPS H DREDGE N LUST HS
NOTES *Dumps/Landfills: Treasure Island, Willys Park, Stickney Ave.*				

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
Watershed Name: LAKE ERIE WATERSHED #2					
TMACOG 031 LRIS 031 PEMSO 411364	POTW N IND N	URBAN L CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS MS DREDGE N LUST LS
NOTES					
Watershed Name: LAKE ERIE WATERSHED #3					
TMACOG 034 LRIS 034 PEMSO 411363	POTW N IND N	URBAN L CSOs N	HOME H PKG N	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS US DREDGE N LUST LS
NOTES					
Watershed Name: LAKE ERIE WATERSHED #4					
TMACOG 035 LRIS 035 PEMSO 411362	POTW N IND N	URBAN L CSOs N	HOME M PKG N	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS US DREDGE N LUST LS
NOTES					
Watershed Name: LITTLE CEDAR CREEK					
TMACOG 032 LRIS 032 PEMSO 1610303	POTW N IND N	URBAN L CSOs N	HOME H PKG N	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS HS DREDGE N LUST LS
NOTES					
Watershed Name: LITTLE CRANE CREEK					
TMACOG 033 LRIS 033 PEMSO 1610302	POTW N IND N	URBAN L CSOs N	HOME H PKG H	SEDIMENTS U ATMOS US WTP SLUDGE N	AG H DUMPS HS DREDGE N LUST LS
NOTES					

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
Watershed Name: MAUMEE BAY				
TMACOG LRIS PEMSO	POTW N URBAN L IND L CSOs M	HOME L PKG L	SEDIMENTS H ATMOS US WTP SLUDGE N	AG H DUMPS U DREDGE H LUST LS
NOTES				
Watershed Name: MAUMEE RIVER @ ANTHONY WAYNE BR				
TMACOG 013 LRIS 013 PEMSO 410133	POTW N URBAN H IND H CSOs M	HOME L PKG H	SEDIMENTS H ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST HS
NOTES *IND: Conrail 2IT00015*				
Watershed Name: MAUMEE RIVER @ BLUEGRASS IS				
TMACOG 079 LRIS 079 PEMSO 410133	POTW H URBAN M IND N CSOs M	HOME L PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS MS DREDGE N LUST MS
NOTES *POTW: Perrysburg WWTP (=H)*				
Watershed Name: MAUMEE RIVER @ GRASSY CR				
TMACOG 047 LRIS 047 PEMSO 410133	POTW N URBAN M IND H CSOs M	HOME L PKG N	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS MS DREDGE N LUST MS
NOTES *IND: Libbey-Owens-Ford #6 (2IN00030) H*				
Watershed Name: MAUMEE RIVER @ GRASSY CR DIVERSION				
TMACOG 044 LRIS 044 PEMSO 410133	POTW L URBAN L IND L CSOs M	HOME L PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS MS DREDGE N LUST LS
NOTES *POTW: Maumee River WWTP (=L)*				

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial		Home Sewage	Wtr Qual/Uses	Others

Watershed Name: MAUMEE RIVER @ MOUTH

TMACOG 015	POTW H	URBAN H	HOME L	SEDIMENTS H	AG H
LRIS 015	IND M	CSOs M	PKG N	ATMOS US	DUMPS H
PEMSO 410133				WTP SLUDGE N	DREDGE M
					LUST HS

NOTES *SEDIMENTS: PAHs.*
Consaul St. Dump
POTW: Toledo Bay View WWTP = H
IND: Toledo Edison Acme (2IB00001) M, Toledo Coke (2ID00011) L

Watershed Name: MAUMEE RIVER BELOW ANTHONY WAYNE BR

TMACOG 014	POTW N	URBAN H	HOME L	SEDIMENTS H	AG H
LRIS 014	IND N	CSOs M	PKG N	ATMOS US	DUMPS US
PEMSO 410133				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES

Watershed Name: MAUMEE AT WATERVILLE

TMACOG 043	POTW L	URBAN L	HOME H	SEDIMENTS L	AG H
LRIS 043	IND L	CSOs N	PKG N	ATMOS US	DUMPS M
PEMSO 410235				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES *POTW: Haskins WWTP (=L)*

Watershed Name: MOSQUITO CREEK

TMACOG 040	POTW N	URBAN L	HOME M	SEDIMENTS L	AG M
LRIS 040	IND N	CSOs N	PKG N	ATMOS US	DUMPS M
PEMSO 410103				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

Watershed Name: OTTAWA RIVER @ MOUTH

TMACOG 005	POTW N	URBAN H	HOME L	SEDIMENTS H	AG H
LRIS 005	IND H	CSOs H	PKG N	ATMOS US	DUMPS H
PEMSO 411331				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES *Dura dump, et al., and Helfinger Pond*
IND: Diversitech (2IQ00012) H, DuPont (2IF00017) L

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers — PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial | Home Sewage | Wtr Qual/Uses | Others

Watershed Name: **OTTAWA RIVER @ TOLEDO**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 004	POTW N	URBAN M	HOME H	SEDIMENTS H	AG H
LRIS 004	IND H	CSOs N	PKG H	ATMOS US	DUMPS H
PEMSO 411331				WTP SLUDGE N	DREDGE N
					LUST MS

NOTES *IND: King Road Landfill (2IN0079)*

Watershed Name: **OTTER CREEK**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 028	POTW H	URBAN M	HOME H	SEDIMENTS H	AG H
LRIS 028	IND H	CSOs N	PKG H	ATMOS US	DUMPS H
PEMSO 1610364				WTP SLUDGE H	DREDGE N
					LUST MS

NOTES *Evergreen Landfill*
IND: LOF #4 & #8 (2IN00020) H, Sun Oil (2IG00003) H, CSX Presque Isle (2IT00013) M, Fondessey (2IN00013) L, Liquid Carbonic (2IN00069) L, Toledo Edison Bayshore (2IB00000) L, Standard Oil (2IG00007) L
WTP SLUDGE: Toledo WTP
POTW: Oregon DuPont Road (=M) and South Shore Park WWTPs (=H)

Watershed Name: **PRAIRIE DITCH**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 002	POTW N	URBAN L	HOME H	SEDIMENTS U	AG H
LRIS 002	IND N	CSOs N	PKG N	ATMOS US	DUMPS US
PEMSO 410301				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

Watershed Name: **REITZ ROAD DITCH**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 078	POTW N	URBAN L	HOME H	SEDIMENTS L	AG U
LRIS 078	IND N	CSOs N	PKG N	ATMOS US	DUMPS US
PEMSO 411235				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

Watershed Name: **SHANTEE CREEK**

Watershed Numbers	Public/Industrial		Home Sewage	Wtr Qual/Uses	Others
TMACOG 020	POTW N	URBAN H	HOME H	SEDIMENTS L	AG N
LRIS 020	IND H	CSOs N	PKG N	ATMOS US	DUMPS H
PEMSO 410302				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES *Partly on septic systems; mostly sewered.*
IND: Doehler-Jarvis (2IC00021) H, DuPont Paint (2IF00016) M

WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT: Public/Industrial		Home Sewage	Wtr Qual/Uses	Others

Watershed Name: SIBLEY CREEK

TMACOG 005	POTW N	URBAN H	HOME L	SEDIMENTS U	AG H
LRIS 005	IND N	CSOs N	PKG N	ATMOS US	DUMPS H
PEMSO 411331				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES

Watershed Name: SILVER CREEK

TMACOG 023	POTW N	URBAN H	HOME L	SEDIMENTS U	AG L
LRIS 023	IND H	CSOs N	PKG H	ATMOS US	DUMPS US
PEMSO 410302				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES *IND: General Mills (2IH00093) H, Teledyne (2I000001) L*

Watershed Name: SWAN CREEK @ MOUTH

TMACOG 012	POTW N	URBAN H	HOME L	SEDIMENTS H	AG H
LRIS 012	IND N	CSOs H	PKG N	ATMOS US	DUMPS H
PEMSO 410132				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES *South Ave. Dump*

Watershed Name: SWAN CREEK @ TOLEDO

TMACOG 010	POTW N	URBAN H	HOME L	SEDIMENTS M	AG H
LRIS 010	IND N	CSOs M	PKG N	ATMOS US	DUMPS MS
PEMSO 410132				WTP SLUDGE N	DREDGE N
					LUST HS

NOTES *CSO: Lower watershed has CSOs, but upper watershed has none.*

Watershed Name: SWAN CREEK ABOVE AI CREEK

TMACOG 008	POTW N	URBAN L	HOME M	SEDIMENTS L	AG H
LRIS 008	IND N	CSOs N	PKG N	ATMOS US	DUMPS US
PEMSO 410101				WTP SLUDGE N	DREDGE N
					LUST LS

NOTES

WATER QUALITY PROBLEM MATRIX

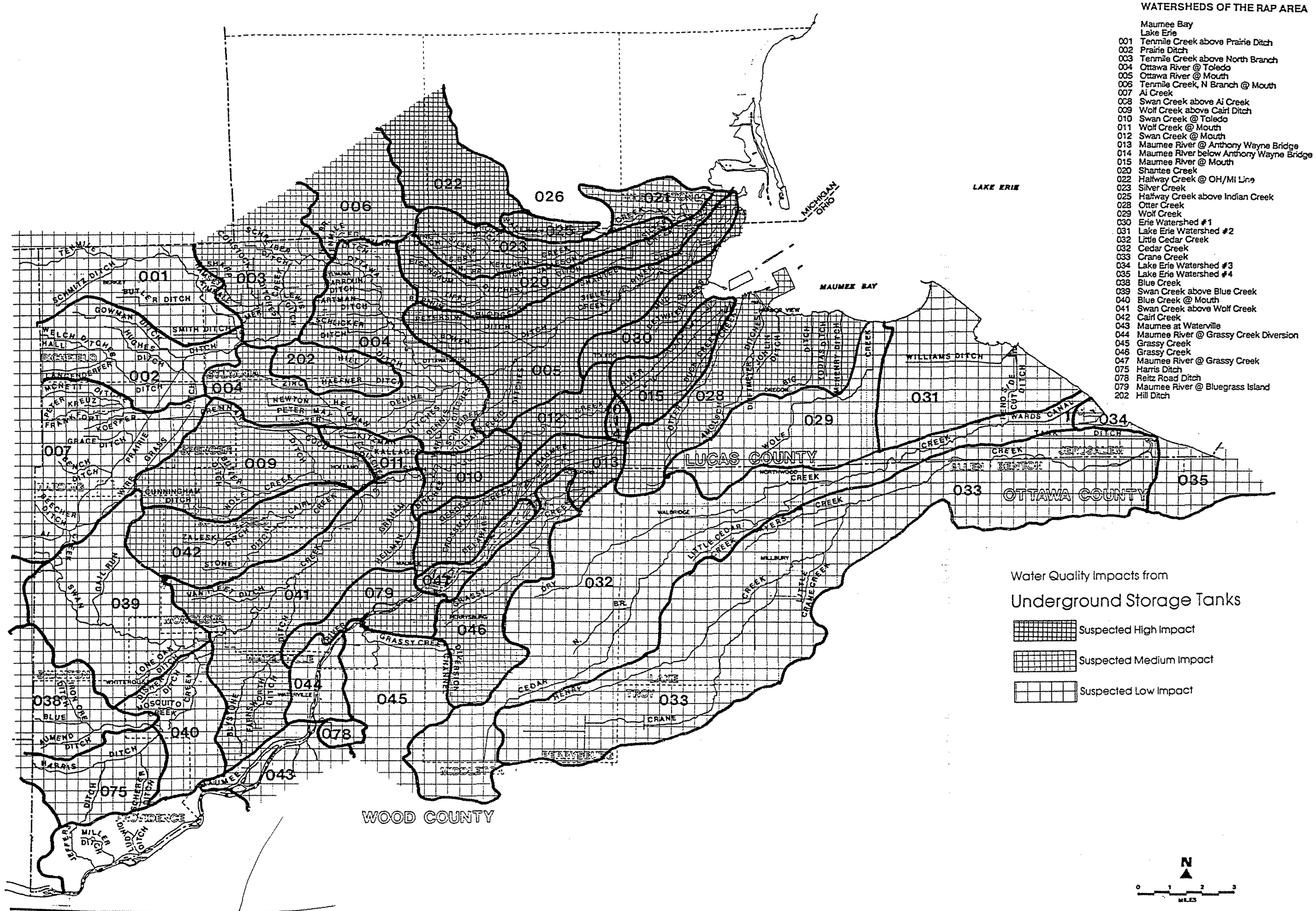
Lower Maumee Basin
Remedial Action Plan

Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
Watershed Name: SWAN CREEK ABOVE BLUE CREEK				
TMACOG 039 LRIS 039 PEMSO 410131	POTW N URBAN L IND N CSOs H	HOME M PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS LS DREDGE N LUST LS
NOTES *CSO: Whitehouse*				
Watershed Name: SWAN CREEK ABOVE WOLF CR				
TMACOG 041 LRIS 041 PEMSO 410132	POTW N URBAN MS IND L CSOs M	HOME H PKG H	SEDIMENTS M ATMOS US WTP SLUDGE N	AG H DUMPS MS DREDGE N LUST MS
NOTES *Partly on septic systems, partly sewered.* *CSO: Below Whitehouse. Most of watershed has none.*				
Watershed Name: TENMILE CREEK ABOVE NORTH BRANCH				
TMACOG 003 LRIS 003 PEMSO 410301	POTW N URBAN MS IND L CSOs N	HOME H PKG H	SEDIMENTS M ATMOS US WTP SLUDGE N	AG H DUMPS HS DREDGE N LUST MS
NOTES *IND: Reichert Stamping (2IS00008) L, France Stone Silica (2IJ00039) L*				
Watershed Name: TENMILE CREEK ABOVE PRAIRIE DITCH				
TMACOG 001 LRIS 001 PEMSO 410301	POTW N URBAN L IND N CSOs N	HOME M PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS US DREDGE N LUST LS
NOTES				
Watershed Name: TENMILE CREEK, N BRANCH @ MOUTH				
TMACOG 006 LRIS 006 PEMSO 410301	POTW N URBAN M IND N CSOs N	HOME H PKG N	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS L DREDGE N LUST MS
NOTES *Partly on septic systems; mostly sewered.*				

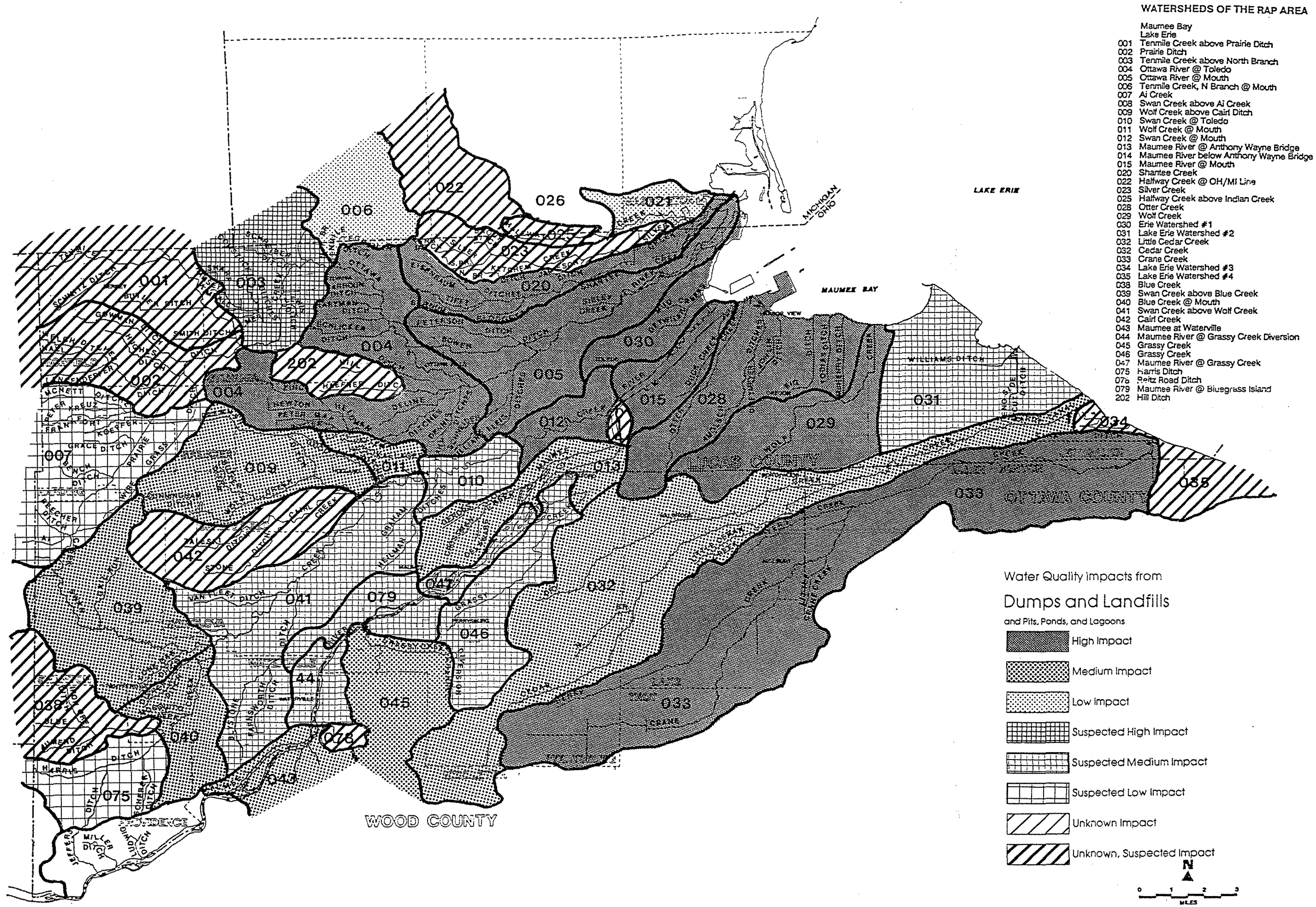
WATER QUALITY PROBLEM MATRIX

Lower Maumee Basin
Remedial Action Plan

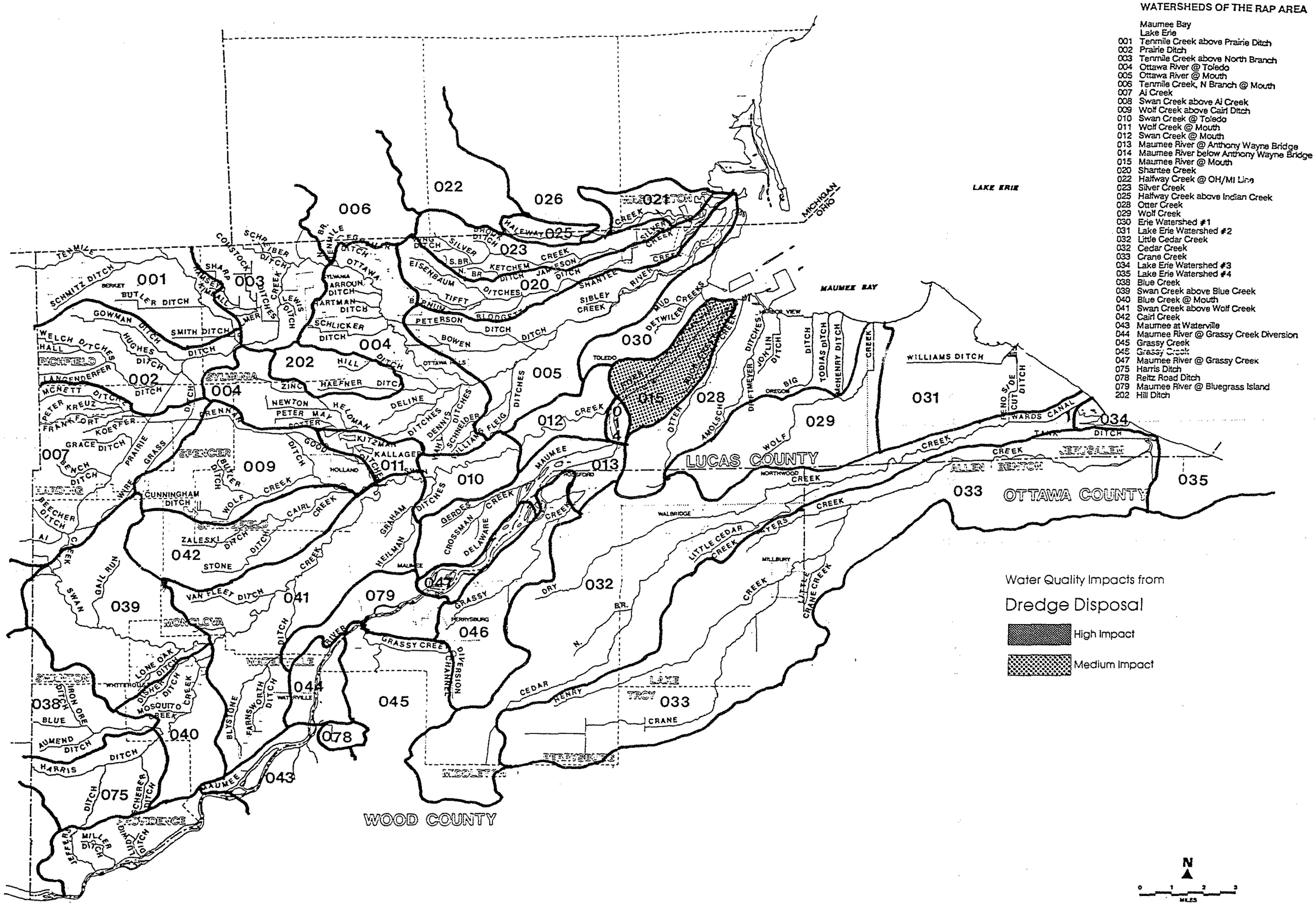
Watershed Numbers	PROBLEM AREAS BY COMMITTEE ASSIGNMENT Public/Industrial	Home Sewage	Wtr Qual/Uses	Others
Watershed Name: WOLF CREEK				
TMACOG 029 LRIS 029 PEMSO 1610364	POTW N URBAN L IND L CSOs N	HOME H PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS H DREDGE N LUST LS
NOTES				
Watershed Name: WOLF CREEK @ MOUTH				
TMACOG 011 LRIS 011 PEMSO 410132	POTW N URBAN M IND N CSOs N	HOME H PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST MS
NOTES *Angola Rd. Dump*				
Watershed Name: WOLF CREEK ABOVE CAIRL DITCH				
TMACOG 009 LRIS 009 PEMSO 0410132	POTW N URBAN MS IND L CSOs N	HOME H PKG H	SEDIMENTS L ATMOS US WTP SLUDGE N	AG H DUMPS M DREDGE N LUST MS
NOTES				



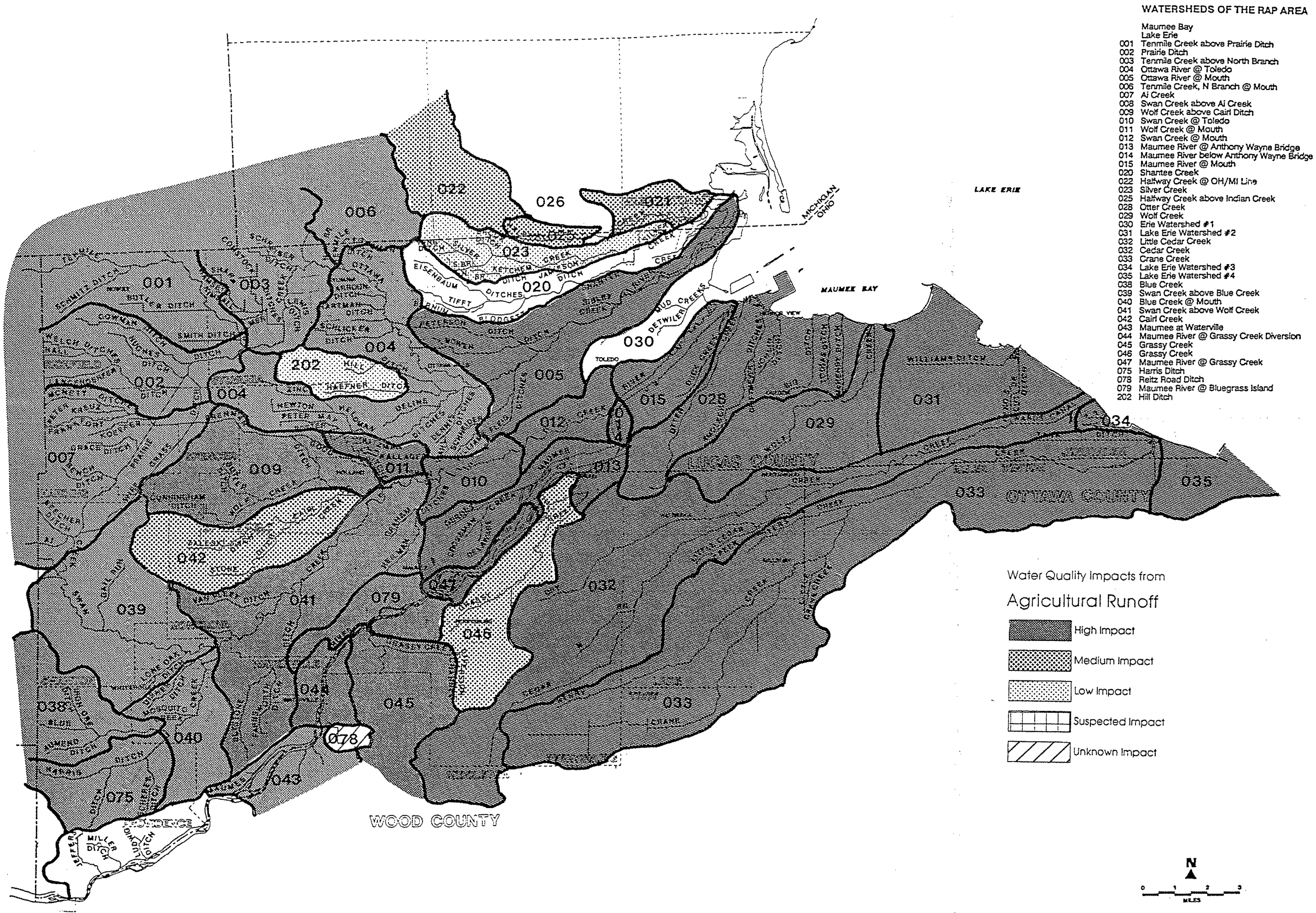
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



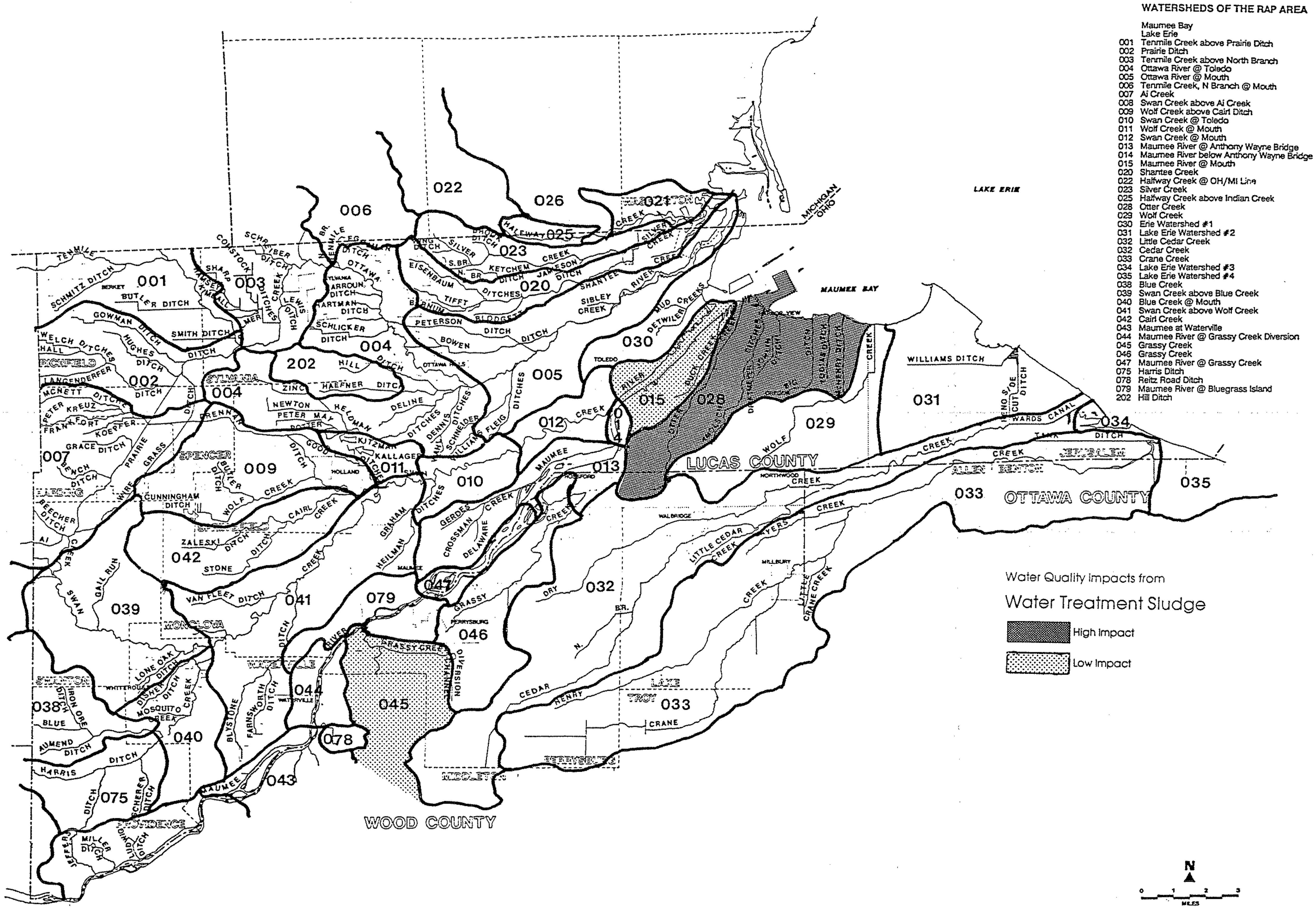
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



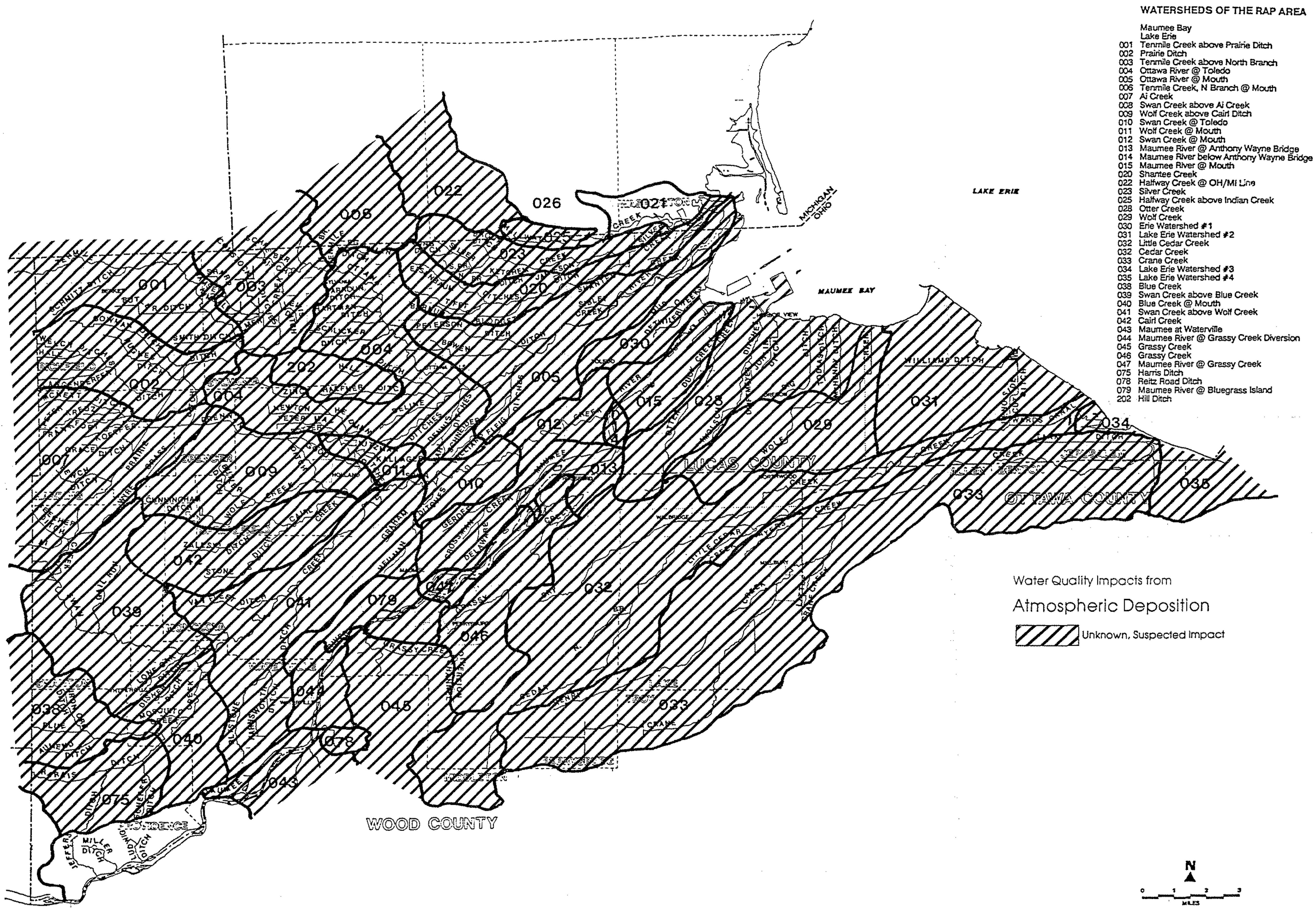
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



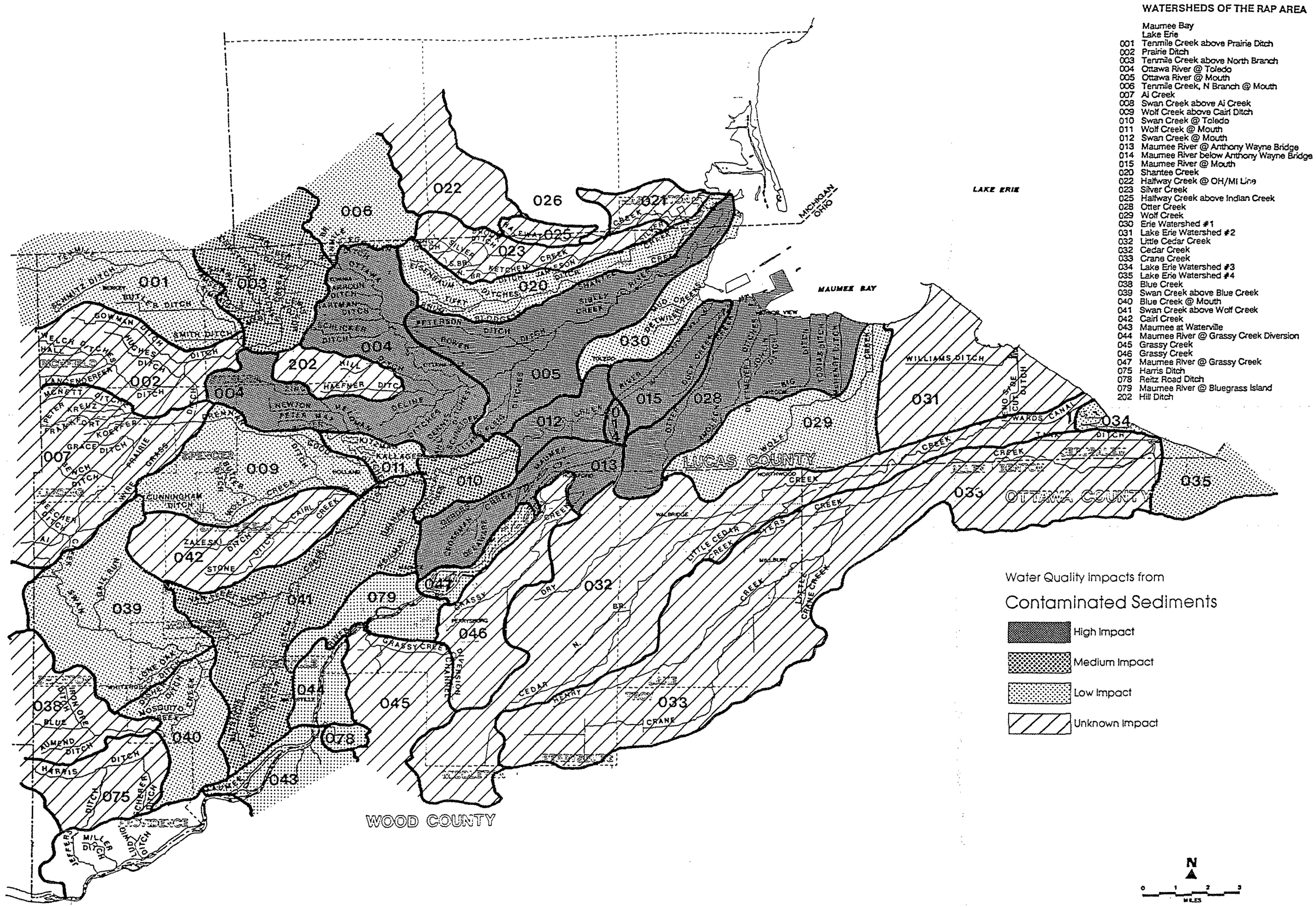
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



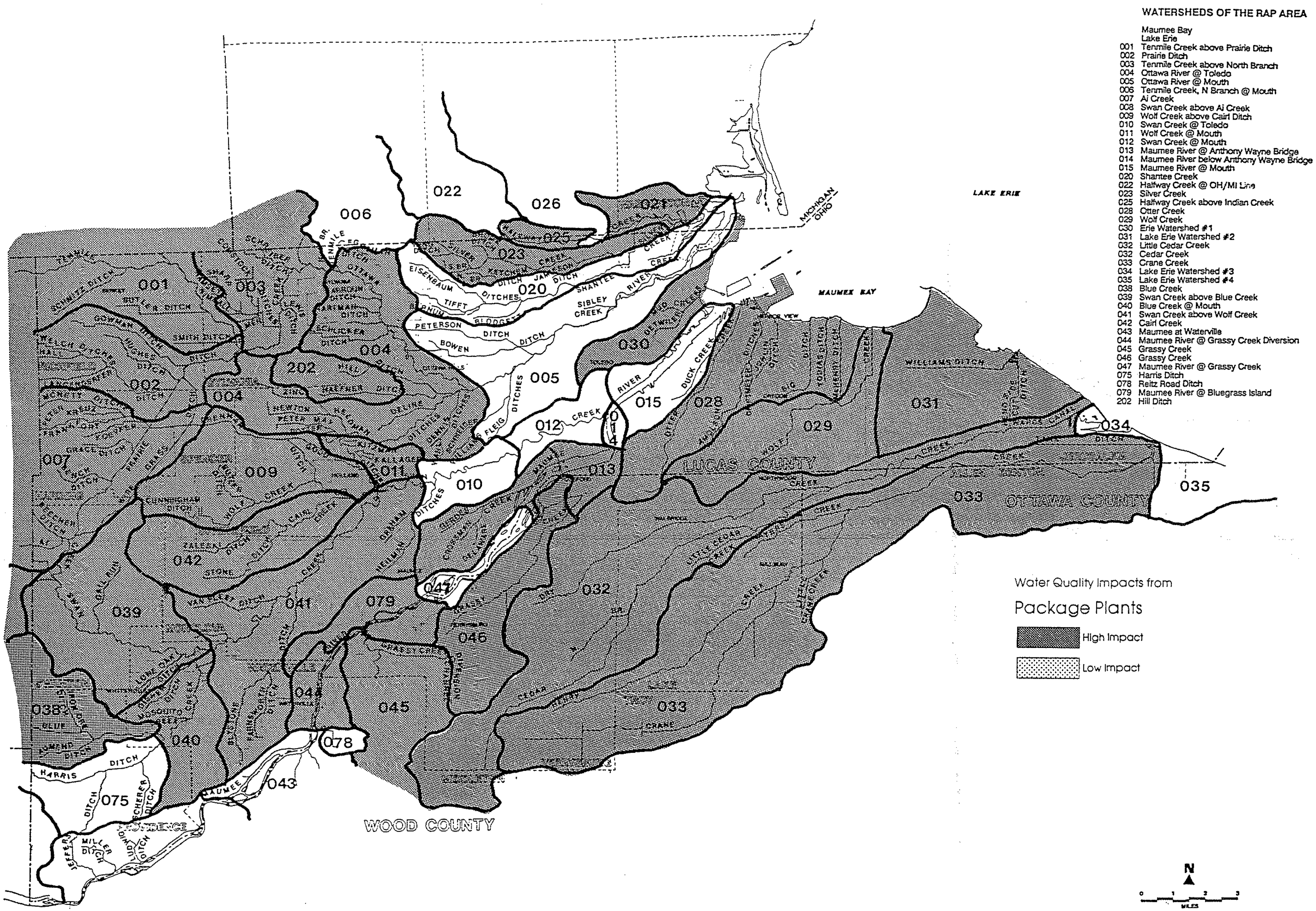
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



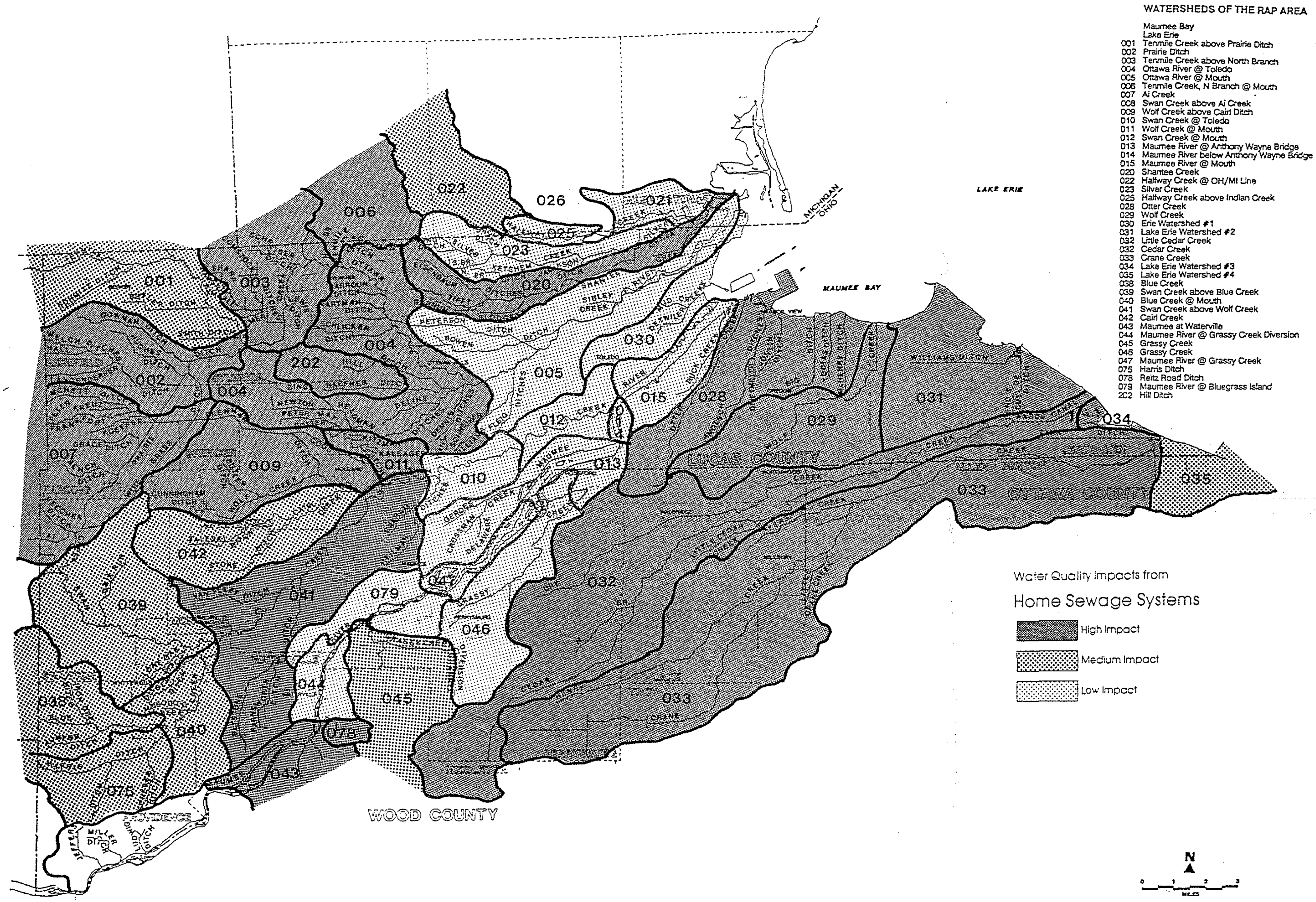
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



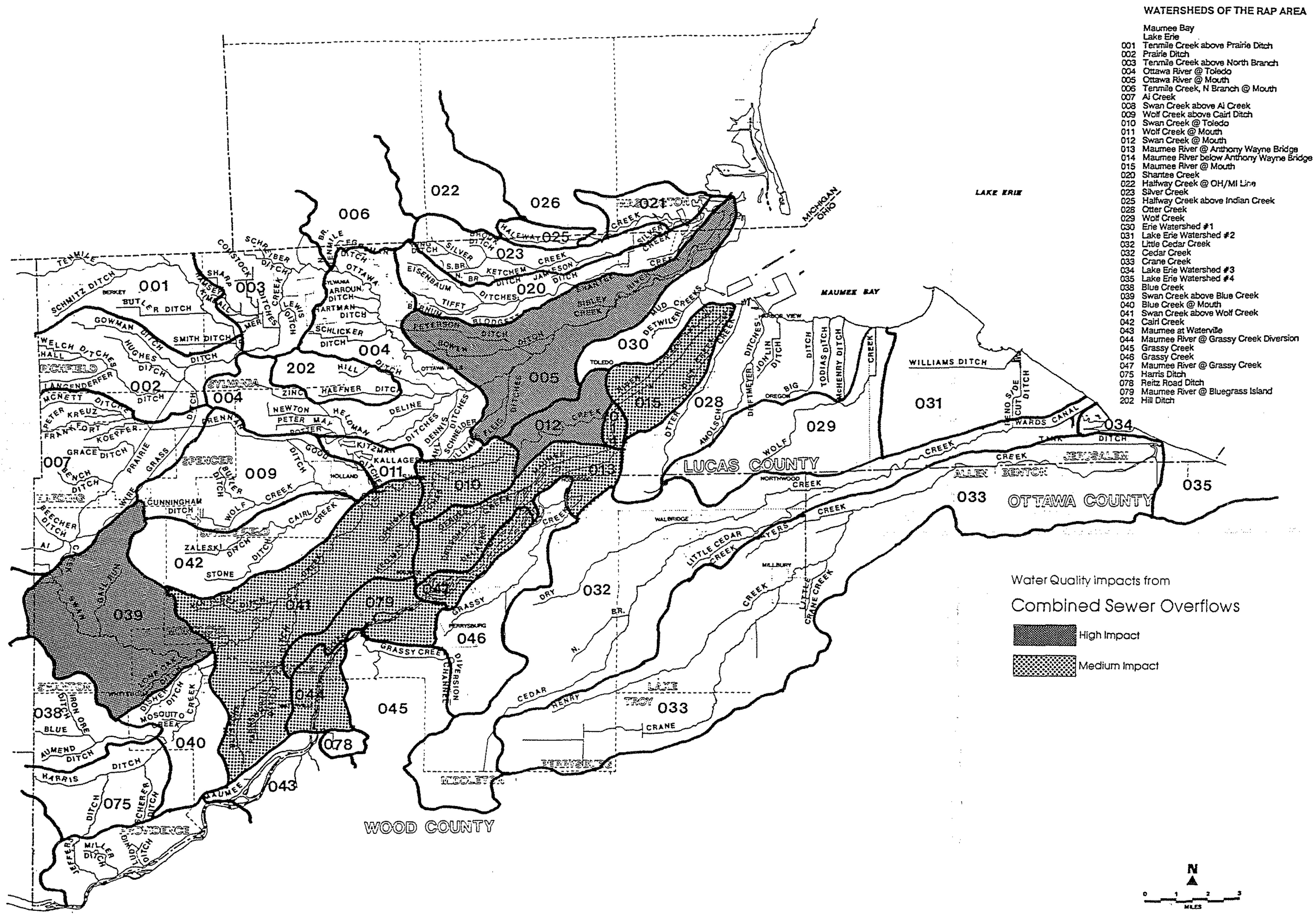
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



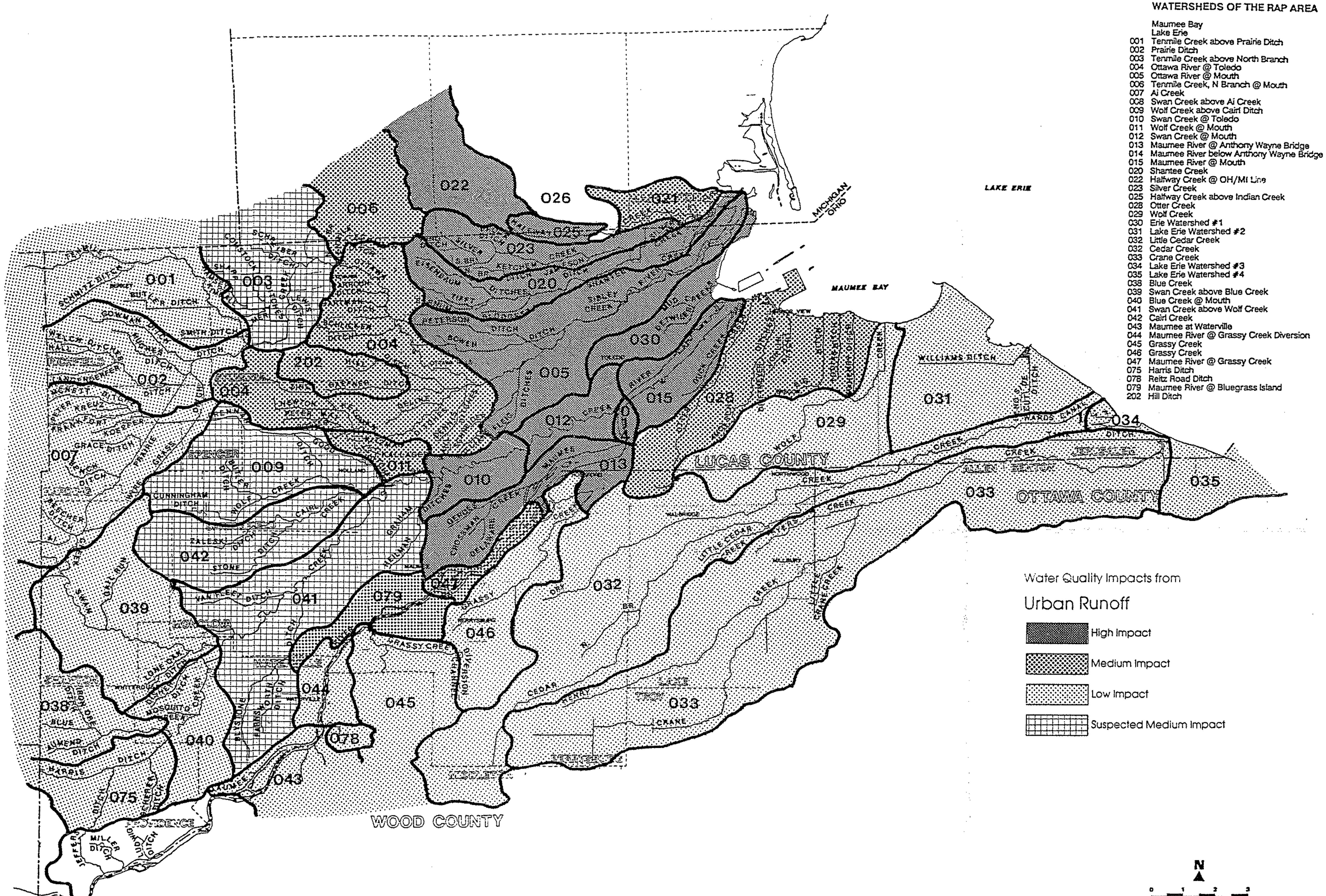
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



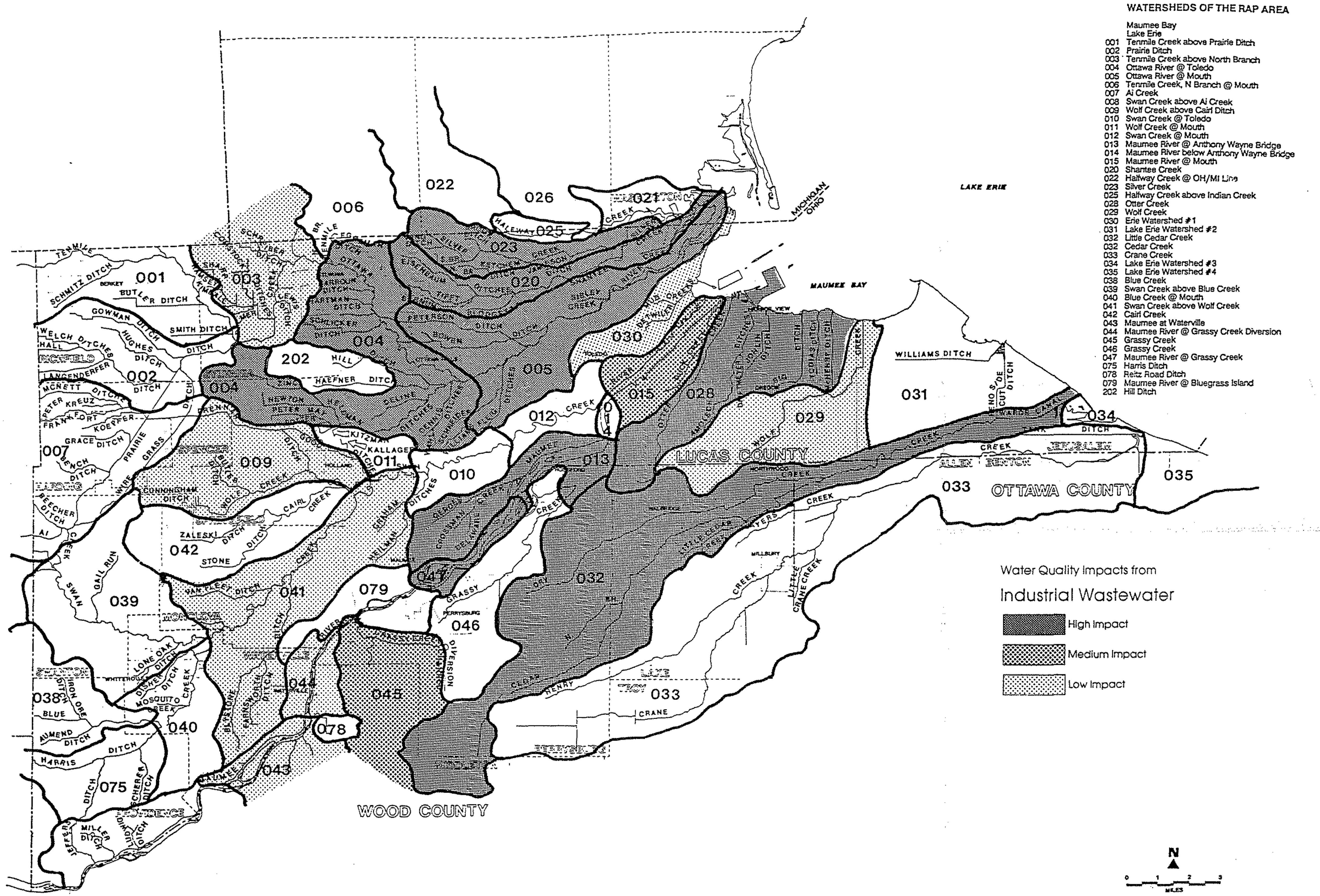
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



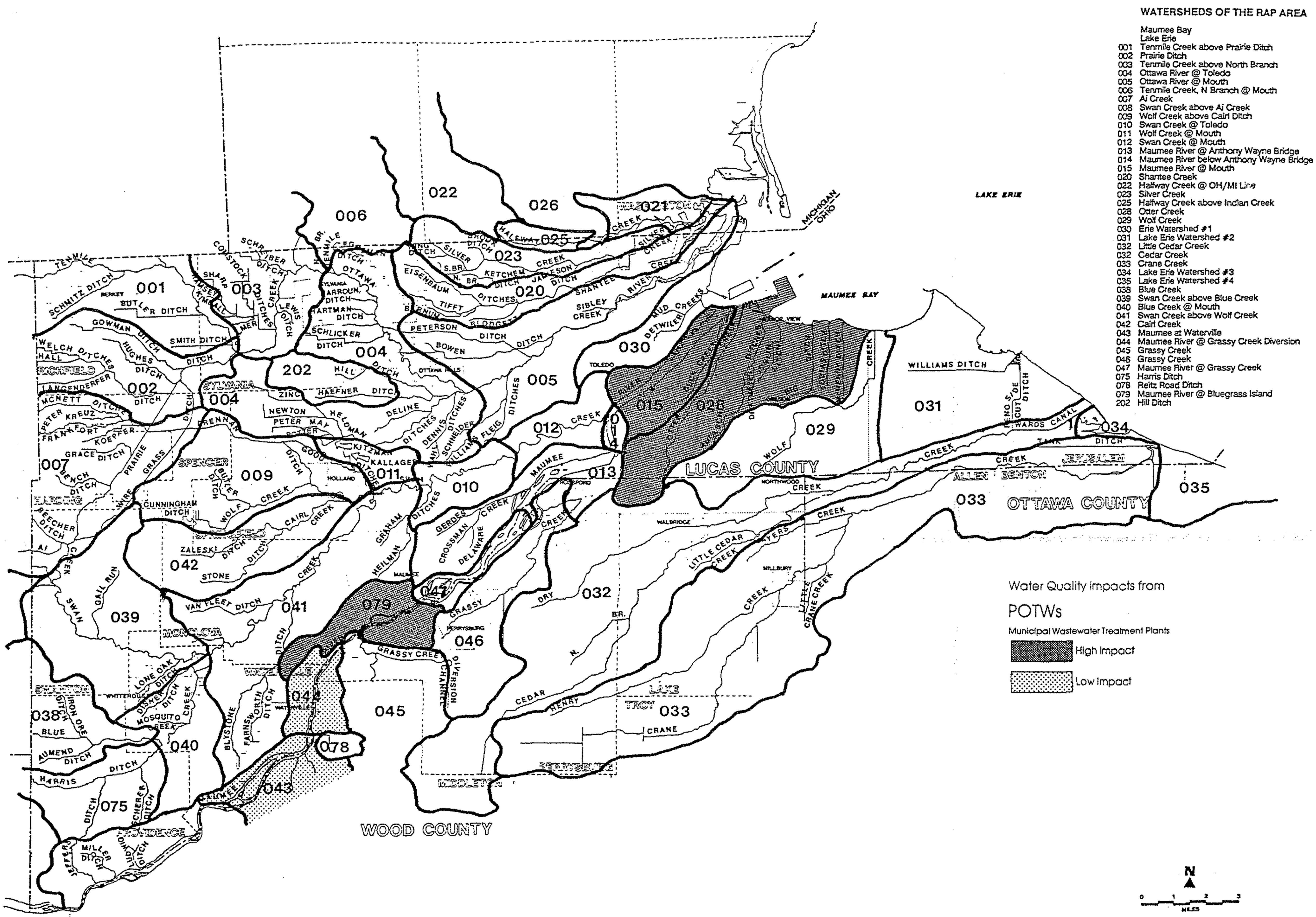
LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

LOWER MAUMEE BASIN

REMEDIAL ACTION PLAN

Volume 2

Investigation Report Appendices

January, 1989

tmacog

TOLEDO METROPOLITAN AREA
COUNCIL OF GOVERNMENTS
123 N. Michigan Street
Toledo, OH 43624-1996
[419] 241-9155

LOWER MAUMEE BASIN

REMEDIAL ACTION PLAN

Volume 2

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Investigation Report Appendices

APPENDIX A

Ohio EPA *Biological Water Quality Report*
Sediment Data: Priority Pollutants

APPENDIX A
SEDIMENT DATA: VOLATILE ORGANICS

MAUMEE RIVER RA 1.0
DOWNSTREAM OF TOLEDO WWTP

: SAMPLE NUMBER :
: :
: V162924 R :

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TMA/ERG
CASE NO: AS035
LAB SAMPLE ID NO: V162924R
QC REPORT NO:
SAMPLE MATRIX: SOIL
CONTRACT NO: _
DATA RELEASE AUTHORIZED BY: Joseph A. Hnatow
DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 12/02/86
DATE ANALYZED: 12/02/86
DIL FACTOR: 9.434 PH 7.30
PERCENT MOISTURE: (NOT DECANTED) 61.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	240. U	78-87-5	1,2-DICHLOROPROPANE . . .	120. U
74-83-9	BROMOMETHANE	240. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	120. U
75-01-4	VINYL CHLORIDE	240. U	79-01-6	TRICHLOROETHENE	120. U
75-00-3	CHLOROETHANE	240. U	124-48-1	DIBROMOCHLOROMETHANE . . .	120. U
75-09-2	METHYLENE CHLORIDE	270. B	79-00-5	1,1,2-TRICHLOROETHANE . .	120. U
67-64-1	ACETONE	180. BJ	71-43-2	BENZENE	120. U
75-15-0	CARBON DISULFIDE	120. U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	120. U
75-35-4	1,1-DICHLOROETHENE	120. U	110-75-8	2-CHLOROETHYLVINYLETHER .	240. U
75-35-3	1,1-DICHLOROETHANE	120. U	75-25-2	BROMOFORM	120. U
156-60-5	TRANS-1,2-DICHLOROETHENE .	120. U	108-10-1	4-METHYL-2-PENTANONE . . .	240. U
67-66-3	CHLOROFORM	120. U	591-78-6	2-HEXANONE	240. U
107-06-2	1,2-DICHLOROETHANE	120. U	127-18-4	TETRACHLOROETHENE	120. U
78-93-3	2-BUTANONE	240. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	240. U
71-55-6	1,1,1-TRICHLOROETHANE . .	120. U	108-88-3	TOLUENE	1300.
56-23-5	CARBON TETRACHLORIDE . . .	120. U	108-90-7	CHLOROBENZENE	120. U
108-05-4	VINYL ACETATE	240. U	100-41-4	ETHYLBENZENE	120. U
75-27-4	BROMODICHLOROMETHANE . . .	120. U	100-42-5	STYRENE	120. U
				TOTAL XYLENES	120. U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
J - REPORTED VALUE IS LESS THAN THE DETECTION LIMIT.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

FORM I

LABORATORY NAME: TMA/ERG
CASE NO: OHIOEPAS035

: SAMPLE NUMBER :
: 162924 :
: :

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 01/27/87
CONC/DIL FACTOR: 1.
PERCENT MOISTURE: (DECANTED) 61.0

GPC CLEANUP X YES NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
108-95-2	PHENOL	850. U	83-32-9	ACENAPHTHENE	850. U
111-44-4	BIS(2-CHLOROETHYL)ETHER .	850. U	51-28-5	2,4-DINITROPHENOL	4100. U
95-57-8	2-CHLOROPHENOL	850. U	100-02-7	4-NITROPHENOL	4100. U
541-73-1	1,3-DICHLOROBENZENE . . .	850. U	132-64-9	DIBENZOFURAN	850. U
106-46-7	1,4-DICHLOROBENZENE . . .	850. U	121-14-2	2,4-DINITROTOLUENE	850. U
100-51-6	BENZYL ALCOHOL	850. U	606-20-2	2,6-DINITROTOLUENE	850. U
95-50-1	1,2-DICHLOROBENZENE . . .	850. U	84-66-2	DIETHYLPHTHALATE	850. BU
95-48-7	2-METHYLPHENOL	850. U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	850. U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	850. U	86-73-7	FLUORENE	250. J
106-44-5	4-METHYLPHENOL	1400.	100-01-6	4-NITROANILINE	4100. U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	850. U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	4100. U
67-72-1	HEXACHLOROETHANE	850. U	86-30-6	N-NITROSODIPHENYLAMINE (1)	850. U
98-95-3	NITROBENZENE	850. U	101-55-3	4-BROMOPHENYL-PHENYLETHER	850. U
78-59-1	ISOPHORONE	850. U	118-74-1	HEXACHLOROBENZENE	850. U
88-75-5	2-NITROPHENOL	850. U	87-86-5	PENTACHLOROPHENOL	4100. U
105-67-9	2,4-DIMETHYLPHENOL	850. U	85-01-8	PHENANTHRENE	1000.
65-85-0	BENZOIC ACID	4100. U	120-12-7	ANTHRACENE	470. BJ
111-91-1	BIS(2-CHLOROETHOXY)METHANE	850. U	84-74-2	DI-N-BUTYLPHTHALATE . . .	850. BU
120-83-2	2,4-DICHLOROPHENOL	850. U	206-44-0	FLUORANTHENE	2100.
120-82-1	1,2,4-TRICHLOROBENZENE . .	850. U	129-00-0	PYRENE	1900.
91-20-3	NAPHTHALENE	380. BJ	85-68-7	BUTYLBENZYLPHTHALATE . . .	850. U
106-47-8	4-CHLOROANILINE	850. U	91-94-1	3,3'-DICHLOROBENZIDINE . .	1700. U
87-68-3	HEXACHLOROBUTADIENE . . .	850. U	56-55-3	BENZO(A)ANTHRACENE	1000.
59-50-7	4-CHLORO-3-METHYLPHENOL .	850. U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	8600. B
91-57-6	2-METHYLNAPHTHALENE . . .	850. U	218-01-9	CHRYSENE	1200.
77-47-4	HEXACHLOROCYCLOPENTADIENE	850. U	117-84-0	DI-N-OCTYL PHTHALATE . . .	2000.
88-06-2	2,4,6-TRICHLOROPHENOL . .	850. U	205-99-2	BENZO(B)FLUORANTHENE . . .	880.
95-95-4	2,4,5-TRICHLOROPHENOL . .	4100. U	207-08-9	BENZO(K)FLUORANTHENE . . .	990.
91-58-7	2-CHLORONAPHTHALENE . . .	850. U	50-32-8	BENZO(A)PYRENE	910.
88-74-4	2-NITROANILINE	4100. U	193-39-5	INDENO(1,2,3-CD)PYRENE . .	890.
131-11-3	DIMETHYL PHTHALATE	850. U	53-70-3	DIBENZ(A,H)ANTHRACENE . .	820. J
208-96-8	ACENAPHTHYLENE	850. U	191-24-2	BENZO(G,H,I)PERYLENE . . .	1100.
99-09-2	3-NITROANILINE	4100. U			

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TW/E.R.G., Inc.
Case No: OEPA AS035

Sample Number: 162924

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-21-86
Date Analyzed: 2-24-87
Conc/Dil Factor: 1
Percent Moisture (decanted): 61

GPC Cleanup ☑Yes ☐No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	21	U
319-85-7	Beta-BHC	21	U
319-86-8	Delta-BHC	21	U
58-89-9	Gamma-BHC (Lindane)	21	U
76-44-8	Heptachlor	21	U
309-00-2	Aldrin	21	U
1024-57-3	Heptachlor Epoxide	21	U
959-98-8	Endosulfan I	21	U
60-57-1	Dieldrin	42	U
72-55-9	4, 4'-DDE	42	U
72-20-8	Endrin	42	U
33213-65-9	Endosulfan II	42	U
72-54-8	4, 4'-DDD	42	U
1031-07-8	Endosulfan Sulfate	42	U
50-29-3	4, 4'-DDT	42	U
72-43-5	Methoxychlor	210	U
53494-70-5	Endrin Ketone	42	U
57-74-9	Chlordane	210	U
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	210	U
11104-28-2	Aroclor-1221	210	U
11141-16-5	Aroclor-1232	210	U
53469-21-9	Aroclor-1242	210	U
12672-29-6	Aroclor-1248	210	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260	420	U
	Mirex	42	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 12 g DRY WT. V_t 1000 ul V_i 3.0 ul

MAUMEE RIVER RM 4.9
AT CHERRY ST. BRIDGE

SAMPLE NUMBER: V162923R3

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TWA/ERG
LAB SAMPLE ID NO: V162923R3
SAMPLE MATRIX: SOIL
DATA RELEASE AUTHORIZED BY: Joseph C. Hnatow
CASE NO: AS035
QC REPORT NO:
CONTRACT NO:
DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 11/21/86
CONC/DIL FACTOR: 1. PH 7.53
PERCENT MOISTURE: (NOT DECANTED) 55.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	22. U	78-87-5	1,2-DICHLOROPROPANE	11. U
74-83-9	BROMOMETHANE	22. U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	11. U
75-01-4	VINYL CHLORIDE	22. U	79-01-6	TRICHLOROETHENE	11. U
75-00-3	CHLOROETHANE	22. U	124-48-1	DIBROMOCHLOROMETHANE	11. U
75-09-2	METHYLENE CHLORIDE	51. B	79-00-5	1,1,2-TRICHLOROETHANE	11. U
67-64-1	ACETONE	44.	71-43-2	BENZENE	11. U
75-15-0	CARBON DISULFIDE	11. U	10061-01-5	CIS-1,3-DICHLOROPROPENE	11. U
75-35-4	1,1-DICHLOROETHENE	11. U	110-75-8	2-CHLOROETHYLVINYLETHER	22. U
75-35-3	1,1-DICHLOROETHANE	11. U	75-25-2	BROMOFORM	11. U
156-60-5	TRANS-1,2-DICHLOROETHENE	11. U	108-10-1	4-METHYL-2-PENTANONE	22. U
67-66-3	CHLOROFORM	11. U	591-78-6	2-HEXANONE	22. U
107-06-2	1,2-DICHLOROETHANE	11. U	127-18-4	TETRACHLOROETHENE	11. U
78-93-3	2-BUTANONE	22. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	22. U
71-55-6	1,1,1-TRICHLOROETHANE	11. U	108-88-3	TOLUENE	11. U
56-23-5	CARBON TETRACHLORIDE	11. U	108-90-7	CHLOROBENZENE	11. U
108-05-4	VINYL ACETATE	22. U	100-41-4	ETHYLBENZENE	11. U
75-27-4	BROMODICHLOROMETHANE	11. U	100-42-5	STYRENE	11. U
				TOTAL XYLENES	11. U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

FORM I

LABORATORY NAME: TMA/ERG
CASE NO: OHIOEPAS035

SAMPLE NUMBER
162923

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 01/27/87
CONC/DIL FACTOR: 1.
PERCENT MOISTURE: (DECANTED) 55.0

GPC CLEANUP X YES NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG		CAS NUMBER		UG/KG	
108-95-2	PHENOL	730.	U	83-32-9	ACENAPHTHENE	1600.	
111-44-4	BIS(2-CHLOROETHYL)ETHER .	730.	U	51-28-5	2,4-DINITROPHENOL	3600.	U
95-57-8	2-CHLOROPHENOL	730.	U	100-02-7	4-NITROPHENOL	3600.	U
541-73-1	1,3-DICHLOROBENZENE	730.	U	132-64-9	DIBENZOFURAN	1300.	
106-46-7	1,4-DICHLOROBENZENE	730.	U	121-14-2	2,4-DINITROTOLUENE	730.	U
100-51-6	BENZYL ALCOHOL	730.	U	606-20-2	2,6-DINITROTOLUENE	730.	U
95-50-1	1,2-DICHLOROBENZENE	730.	U	84-66-2	DIETHYLPHTHALATE	730.	BU
95-48-7	2-METHYLPHENOL	730.	U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	730.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	730.	U	86-73-7	FLUORENE	2500.	
106-44-5	4-METHYLPHENOL	730.	U	100-10-6	4-NITROANILINE	3600.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	730.	U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	3600.	U
67-72-1	HEXACHLOROETHANE	730.	U	86-30-6	N-NITROSODIPHENYLAMINE (1)	730.	U
98-95-3	NITROBENZENE	730.	U	101-55-3	4-BROMOPHENYL-PHENYLETHER	730.	U
78-59-1	ISOPHORONE	730.	U	118-74-1	HEXACHLOROBENZENE	730.	U
88-75-5	2-NITROPHENOL	730.	U	87-86-5	PENTACHLOROPHENOL	3600.	U
105-67-9	2,4-DIMETHYLPHENOL	730.	U	85-01-8	PHENANTHRENE	11000.	
65-85-0	BENZOIC ACID	3600.	U	120-12-7	ANTHRACENE	4400.	B
111-91-1	BIS(2-CHLOROETHOXY)METHANE	730.	U	84-74-2	DI-N-BUTYLPHTHALATE	960.	B
120-83-2	2,4-DICHLOROPHENOL	730.	U	206-44-0	FLUORANTHENE	11000.	
120-82-1	1,2,4-TRICHLOROBENZENE . .	730.	U	129-00-0	PYRENE	7300.	
91-20-3	NAPHTHALENE	770.	B	85-68-7	BUTYLBENZYLPHTHALATE . . .	730.	U
106-47-8	4-CHLOROANILINE	730.	U	91-94-1	3,3'-DICHLOROBENZIDINE . .	1500.	U
87-68-3	HEXACHLOROBUTADIENE	730.	U	56-55-3	BENZO(A)ANTHRACENE	3900.	
59-50-7	4-CHLORO-3-METHYLPHENOL .	730.	U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	1100.	B
91-57-6	2-METHYLNAPHTHALENE	790.		218-01-9	CHRYSENE	4000.	
77-47-4	HEXACHLOROCYCLOPENTADIENE	730.	U	117-84-0	DI-N-OCTYL PHTHALATE . . .	730.	U
88-06-2	2,4,6-TRICHLOROPHENOL . . .	730.	U	205-99-2	BENZO(B)FLUORANTHENE . . .	1900.	
95-95-4	2,4,5-TRICHLOROPHENOL . . .	3600.	U	207-08-9	BENZO(K)FLUORANTHENE . . .	2500.	
91-58-7	2-CHLORONAPHTHALENE	730.	U	50-32-8	BENZO(A)PYRENE	2300.	
88-74-4	2-NITROANILINE	3600.	U	193-39-5	INDENO(1,2,3-CD)PYRENE . .	1500.	
131-11-3	DIMETHYL PHTHALATE	730.	U	53-70-3	DIBENZ(A,H)ANTHRACENE . . .	970.	
208-96-8	ACENAPHTHYLENE	730.	U	191-24-2	BENZO(G,H,I)PERYLENE . . .	1800.	
99-09-2	3-NITROANILINE	3600.	U				

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name TMA/E.R.G., Inc.
Case No OEPA AS035

Sample Number
162923

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-21-86
Date Analyzed: 2-24-87
Conc/Dil Factor: 1
Percent Moisture (decanted) 55

GPC Cleanup ☑Yes ☐No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	18	U
319-85-7	Beta-BHC	18	U
319-86-8	Delta-BHC	18	U
58-89-9	Gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	18	U
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor Epoxide	18	U
959-98-8	Endosulfan I	18	U
60-57-1	Dieldrin	36	U
72-55-9	4, 4'-DDE	36	U
72-20-8	Endrin	36	U
33213-65-9	Endosulfan II	36	U
72-54-8	4, 4'-DDD	36	U
1031-07-8	Endosulfan Sulfate	36	U
50-29-3	4, 4'-DDT	36	U
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin Ketone	36	U
57-74-9	Chlordane	180	U
8001-35-2	Toxaphene	360	U
12674-11-2	Aroclor-1016	180	U
11104-28-2	Aroclor-1221	180	U
11141-16-5	Aroclor-1232	180	U
53469-21-9	Aroclor-1242	180	U
12672-29-6	Aroclor-1248	180	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260	360	U
	Mirex	36	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ______ or W_s 14g DRY WT. V_t 1000 ul V_i 3.0 ul

MAUMEE RIVER RM 9.4

| SAMPLE NUMBER |
| V162922R |

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TMA/ERG
CASE NO: AS035
LAB SAMPLE ID NO: V162922R
QC REPORT NO:
SAMPLE MATRIX: SOIL
CONTRACT NO:
DATA RELEASE AUTHORIZED BY: Joseph A. Hulau
DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/19/86
DATE ANALYZED: 11/19/86
CONC FACTOR: 1.041666 PH 7.58
PERCENT MOISTURE: (NOT DECANTED) 56.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	22. U	78-87-5	1,2-DICHLOROPROPANE . . .	11. U
74-83-9	BROMOMETHANE	22. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	11. U
75-01-4	VINYL CHLORIDE	22. U	79-01-6	TRICHLOROETHENE	6.0J
75-00-3	CHLOROETHANE	22. U	124-48-1	DIBROMOCHLOROMETHANE . . .	11. U
75-09-2	METHYLENE CHLORIDE	15. B	79-00-5	1,1,2-TRICHLOROETHANE . .	11. U
67-64-1	ACETONE	8.0J	71-43-2	BENZENE	11. U
75-15-0	CARBON DISULFIDE	11. U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	11. U
75-35-4	1,1-DICHLOROETHENE	11. U	110-75-8	2-CHLOROETHYLVINYLETHER .	22. U
75-35-3	1,1-DICHLOROETHANE	11. U	75-25-2	BROMOFORM	11. U
156-60-5	TRANS-1,2-DICHLOROETHENE .	11. U	108-10-1	4-METHYL-2-PENTANONE . . .	22. U
67-66-3	CHLOROFORM	11. U	591-78-6	2-HEXANONE	22. U
107-06-2	1,2-DICHLOROETHANE	11. U	127-18-4	TETRACHLOROETHENE	11. U
78-93-3	2-BUTANONE	22. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	22. U
71-55-6	1,1,1-TRICHLOROETHANE . .	11. U	108-88-3	TOLUENE	11. U
56-23-5	CARBON TETRACHLORIDE . . .	11. U	108-90-7	CHLOROBENZENE	11. U
108-05-4	VINYL ACETATE	22. U	100-41-4	ETHYLBENZENE	11. U
75-27-4	BROMODICHLOROMETHANE . . .	11. U	100-42-5	STYRENE	11. U
				TOTAL XYLENES	11. U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
J - REPORTED VALUE IS LESS THAN THE DETECTION LIMIT.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

FORM I

LABORATORY NAME: TMA/ERG
CASE NO: OEPAS035

| SAMPLE NUMBER |
| 162922 |

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 01/28/87
CONC/DIL FACTOR: 1.
PERCENT MOISTURE: (DECANTED) 56.0

GPC CLEANUP X YES NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/MG	CAS NUMBER		UG/KG
108-95-2	PHENOL	750. U	83-32-9	ACENAPHTHENE	750. U
111-44-4	BIS(2-CHLOROETHYL)ETHER .	750. U	51-28-5	2,4-DINITROPHENOL	3600. U
95-57-8	2-CHLOROPHENOL	750. U	100-02-7	4-NITROPHENOL	3600. U
541-73-1	1,3-DICHLOROBENZENE . . .	750. U	132-64-9	DIBENZOFURAN	750. U
106-46-7	1,4-DICHLOROBENZENE . . .	750. U	121-14-2	2,4-DINITROTOLUENE	750. U
100-51-6	BENZYL ALCOHOL	750. U	606-20-2	2,6-DINITROTOLUENE	750. U
95-50-1	1,2-DICHLOROBENZENE . . .	750. U	84-66-2	DIETHYLPHTHALATE	750. BU
95-48-7	2-METHYLPHENOL	750. U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	750. U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	750. U	86-73-7	FLUORENE	750. U
106-44-5	4-METHYLPHENOL	750. U	100-01-6	4-NITROANILINE	3600. U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	750. U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	3600. U
67-72-1	HEXACHLOROETHANE	750. U	86-30-6	N-NITROSODIPHENYLAMINE (1)	750. U
98-95-3	NITROBENZENE	750. U	101-55-3	4-BROMOPHENYL-PHENYLETHER	750. U
78-59-1	ISOPHORONE	750. U	118-74-1	HEXACHLOROBENZENE	750. U
88-75-5	2-NITROPHENOL	750. U	87-86-5	PENTACHLOROPHENOL	3600. U
105-67-9	2,4-DIMETHYLPHENOL	750. U	85-01-8	PHENANTHRENE	750. U
65-85-0	BENZOIC ACID	3600. U	120-12-7	ANTHRACENE	750. BU
111-91-1	BIS(2-CHLOROETHOXY)METHANE	750. U	84-74-2	DI-N-BUTYLPHTHALATE . . .	750. BU
120-83-2	2,4-DICHLOROPHENOL	750. U	206-44-0	FLUORANTHENE	190. J
120-82-1	1,2,4-TRICHLOROBENZENE . .	750. U	129-00-0	PYRENE	750. U
91-20-3	NAPHTHALENE	750. BU	85-68-7	BUTYLBENZYLPHTHALATE . . .	750. U
106-47-8	4-CHLOROANILINE	750. U	91-94-1	3,3'-DICHLOROBENZIDINE . .	1500. U
87-68-3	HEXACHLOROBUTADIENE . . .	750. U	56-55-3	BENZO(A)ANTHRACENE	750. U
59-50-7	4-CHLORO-3-METHYLPHENOL .	750. U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	350. BJ
91-57-6	2-METHYLNAPHTHALENE . . .	750. U	218-01-9	CHRYSENE	750. U
77-47-4	HEXACHLOROCYCLOPENTADIENE	750. U	117-84-0	DI-N-OCTYL PHTHALATE . . .	750. U
88-06-2	2,4,6-TRICHLOROPHENOL . .	750. U	205-99-2	BENZO(B)FLUORANTHENE . . .	750. U
95-95-4	2,4,5-TRICHLOROPHENOL . .	3600. U	207-08-9	BENZO(K)FLUORANTHENE . . .	750. U
91-58-7	2-CHLORONAPHTHALENE . . .	750. U	50-32-8	BENZO(A)PYRENE	750. U
88-74-4	2-NITROANILINE	3600. U	193-39-5	INDENO(1,2,3-CD)PYRENE . .	750. U
131-11-3	DIMETHYL PHTHALATE	750. U	53-70-3	DIBENZ(A,H)ANTHRACENE . .	750. U
208-96-8	ACENAPHTHYLENE	750. U	191-24-2	BENZO(G,H,I)PERYLENE . . .	750. U
99-09-2	3-NITROANILINE	3600. U			

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TW/E.R.G., Inc.
Case No. OEPA AS035

Sample Number
162922

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
GPC Cleanup ☑Yes ☐No
Date Extracted/Prepared: 11-21-86
Separatory Funnel Extraction ☐Yes
Date Analyzed: 2-24-87
Continuous Liquid - Liquid Extraction ☐Yes
Conc/Dil Factor: 1
Percent Moisture (decanted) 56

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	18	U
319-85-7	Beta-BHC	18	U
319-86-8	Delta-BHC	18	U
58-89-9	Gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	18	U
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor Epoxide	18	U
959-98-8	Endosulfan I	18	U
60-57-1	Dieldrin	36	U
72-55-9	4, 4'-DDE	36	U
72-20-8	Endrin	36	U
33213-65-9	Endosulfan II	36	U
72-54-8	4, 4'-DDD	36	U
1031-07-8	Endosulfan Sulfate	36	U
50-29-3	4, 4'-DDT	36	U
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin Ketone	36	U
57-74-9	Chlordane	180	U
8001-35-2	Toxaphene	360	U
12674-11-2	Aroclor-1016	180	U
11104-28-2	Aroclor-1221	180	U
11141-16-5	Aroclor-1232	180	U
53469-21-9	Aroclor-1242	180	U
12672-29-6	Aroclor-1248	180	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260	360	U
	Mirex	36	u

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 13g DRY WT. V_t 1000 ul V_i 3.0 ul

OTTAWA RIVER RM 4.9
AT STICKNEY AVE.

SAMPLE NUMBER
V162930R

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TWA/ERG
CASE NO: AS035
LAB SAMPLE ID NO: V162930R
QC REPORT NO:
SAMPLE MATRIX: SOIL
CONTRACT NO:
DATA RELEASE AUTHORIZED BY: Joseph A. Hinton
DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/19/86
DATE ANALYZED: 11/19/86
CONC FACTOR: 1.023541 PH 7.76
PERCENT MOISTURE: (NOT DECANTED) 34.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	15. U	78-87-5	1,2-DICHLOROPROPANE . . .	7.4U
74-83-9	BROMOMETHANE	15. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	7.4U
75-01-4	VINYL CHLORIDE	15. U	79-01-6	TRICHLOROETHENE	7.4U
75-00-3	CHLOROETHANE	15. U	124-48-1	DIBROMOCHLOROMETHANE . . .	7.4U
75-09-2	METHYLENE CHLORIDE	16. B	79-00-5	1,1,2-TRICHLOROETHANE . .	7.4U
67-64-1	ACETONE	15. U	71-43-2	BENZENE	7.4U
75-15-0	CARBON DISULFIDE	7.4U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	7.4U
75-35-4	1,1-DICHLOROETHENE	7.4U	110-75-8	2-CHLOROETHYLVINYLETHER .	15. U
75-35-3	1,1-DICHLOROETHANE	7.4U	75-25-2	BROMOFORM	7.4U
156-60-5	TRANS-1,2-DICHLOROETHENE .	7.4U	108-10-1	4-METHYL-2-PENTANONE . . .	15. U
67-66-3	CHLOROFORM	7.4U	591-78-6	2-HEXANONE	15. U
107-06-2	1,2-DICHLOROETHANE	7.4U	127-18-4	TETRACHLOROETHENE	7.4U
78-93-3	2-BUTANONE	15. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	15. U
71-55-6	1,1,1-TRICHLOROETHANE . .	7.4U	108-88-3	TOLUENE	7.4U
56-23-5	CARBON TETRACHLORIDE . . .	7.4U	108-90-7	CHLOROBENZENE	7.4U
108-05-4	VINYL ACETATE	15. U	100-41-4	ETHYLBENZENE	7.4U
75-27-4	BROMODICHLOROMETHANE . . .	7.4U	100-42-5	STYRENE	7.4U
				TOTAL XYLENES	7.4U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

FORM I

LABORATORY NAME: THA/ERG
CASE NO: OHIOEPAS035

SAMPLE NUMBER
162930

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 02/03/87
DIL FACTOR: 2.000
PERCENT MOISTURE: (DECANTED) 34.0

GPC CLEANUP X YES NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG		CAS NUMBER		UG/KG	
108-95-2	PHENOL	1000.	U	83-32-9	ACENAPHTHENE	330.	J
111-44-4	BIS(2-CHLOROETHYL)ETHER	1000.	U	51-28-5	2,4-DINITROPHENOL	4800.	U
95-57-8	2-CHLOROPHENOL	1000.	U	100-02-7	4-NITROPHENOL	4800.	U
541-73-1	1,3-DICHLOROBENZENE	1000.	U	132-64-9	DIBENZOFURAN	260.	J
106-46-7	1,4-DICHLOROBENZENE	1000.	U	121-14-2	2,4-DINITROTOLUENE	1000.	U
100-51-6	BENZYL ALCOHOL	1000.	U	606-20-2	2,6-DINITROTOLUENE	1000.	U
95-50-1	1,2-DICHLOROBENZENE	1000.	U	84-66-2	DIETHYLPHTHALATE	1000.	BU
95-48-7	2-METHYLPHENOL	1000.	U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	1000.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	1000.	U	86-73-7	FLUORENE	470.	J
106-44-5	4-METHYLPHENOL	1000.	U	100-01-6	4-NITROANILINE	4800.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	1000.	U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	4800.	U
67-72-1	HEXACHLOROETHANE	1000.	U	86-30-6	N-NITROSODIPHENYLAMINE (1)	1000.	U
98-95-3	NITROBENZENE	1000.	U	101-55-3	4-BROMOPHENYL-PHENYLETHER	1000.	U
78-59-1	ISOPHORONE	1000.	U	118-74-1	HEXACHLOROBENZENE	1000.	U
88-75-5	2-NITROPHENOL	1000.	U	87-86-5	PENTACHLOROPHENOL	4800.	U
105-67-9	2,4-DIMETHYLPHENOL	1000.	U	85-01-8	PHENANTHRENE	4100.	
65-85-0	BENZOIC ACID	4800.	U	120-12-7	ANTHRACENE	870.	BJ
111-91-1	BIS(2-CHLOROETHOXY)METHANE	1000.	U	84-74-2	DI-N-BUTYLPHTHALATE	1000.	BU
120-83-2	2,4-DICHLOROPHENOL	1000.	U	206-44-0	FLUORANTHENE	8400.	
120-82-1	1,2,4-TRICHLOROBENZENE	1000.	U	129-00-0	PYRENE	4900.	
91-20-3	NAPHTHALENE	230.	BJ	85-68-7	BUTYLBENZYLPHTHALATE	4300.	
106-47-8	4-CHLOROANILINE	1000.	U	91-94-1	3,3'-DICHLOROBENZIDINE	2000.	U
87-68-3	HEXACHLOROBUTADIENE	1000.	U	56-55-3	BENZO(A)ANTHRACENE	3200.	
59-50-7	4-CHLORO-3-METHYLPHENOL	1000.	U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	14000.	B
91-57-6	2-METHYLNAPHTHALENE	1000.	U	218-01-9	CHRYSENE	2800.	
77-47-4	HEXACHLOROCYCLOPENTADIENE	1000.	U	117-84-0	DI-N-OCTYL PHTHALATE	3600.	
88-06-2	2,4,6-TRICHLOROPHENOL	1000.	U	205-99-2	BENZO(B)FLUORANTHENE	1000.	U
95-95-4	2,4,5-TRICHLOROPHENOL	4800.	U	207-08-9	BENZO(K)FLUORANTHENE	1000.	U
91-58-7	2-CHLORONAPHTHALENE	1000.	U	50-32-8	BENZO(A)PYRENE	1800.	
88-74-4	2-NITROANILINE	4800.	U	193-39-5	INDENO(1,2,3-CD)PYRENE	1700.	
131-11-3	DIMETHYL PHTHALATE	1000.	U	53-70-3	DIBENZ(A,H)ANTHRACENE	930.	J
208-96-8	ACENAPHTHYLENE	100.	J	191-24-2	BENZO(G,H,I)PERYLENE	1800.	
99-09-2	3-NITROANILINE	4800.	U				

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TMA/E.R.G. Inc.
Case No OEPA AS035

Sample Number
162930

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-21-86
Date Analyzed: 2-24-87
Conc/Dil Factor: 1
Percent Moisture (decanted) 34

GPC Cleanup ☑Yes ☐No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	12	U
319-85-7	Beta-BHC	12	U
319-86-8	Delta-BHC	12	U
58-89-9	Gamma-BHC (Lindane)	12	U
76-44-8	Heptachlor	12	U
309-00-2	Aldrin	12	U
1024-57-3	Heptachlor Epoxide	12	U
959-98-8	Endosulfan I	12	U
60-57-1	Dieldrin	24	U
72-55-9	4, 4'-DDE	24	U
72-20-8	Endrin	24	U
33213-65-9	Endosulfan II	24	U
72-54-8	4, 4'-DDD	24	U
1031-07-8	Endosulfan Sulfate	24	U
50-29-3	4, 4'-DDT	24	U
72-43-5	Methoxychlor	120	U
53494-70-5	Endrin Ketone	24	U
57-74-9	Chlordane	120	U
8001-35-2	Toxaphene	240	U
12674-11-2	Aroclor-1016	120	U
11104-28-2	Aroclor-1221	120	U
11141-16-5	Aroclor-1232	120	U
53469-21-9	Aroclor-1242	2500	
12672-29-6	Aroclor-1248	120	U
11097-69-1	Aroclor-1254	240	U
11096-82-5	Aroclor-1260	240	U
	Mirex	24	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 20g DRY WT. V_t 1000 ul V_i 3.0 ul

OTTAWA RIVER RM 6.4
AT LAGRANGE ST.

SAMPLE NUMBER
V162929 R2

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TMA/ERG
CASE NO: AS035
LAB SAMPLE ID NO: V162929R2
QC REPORT NO:
SAMPLE MATRIX: SOIL
CONTRACT NO:
DATA RELEASE AUTHORIZED BY: Joseph A. Hnatow
DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/19/86
DATE ANALYZED: 11/19/86
CONC FACTOR: 1.034126 PH 7.55
PERCENT MOISTURE: (NOT DECANTED) 35.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	15. U	78-87-5	1,2-DICHLOROPROPANE . . .	7.4U
74-83-9	BROMOMETHANE	15. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	7.4U
75-01-4	VINYL CHLORIDE	15. U	79-01-6	TRICHLOROETHENE	6.8J
75-00-3	CHLOROETHANE	15. U	124-48-1	DIBROMOCHLOROMETHANE . . .	7.4U
75-09-2	METHYLENE CHLORIDE	14. B	79-00-5	1,1,2-TRICHLOROETHANE . .	7.4U
67-64-1	ACETONE	8.3J	71-43-2	BENZENE	7.4U
75-15-0	CARBON DISULFIDE	7.4U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	7.4U
75-35-4	1,1-DICHLOROETHENE	7.4U	110-75-8	2-CHLOROETHYLVINYLETHER .	15. U
75-35-3	1,1-DICHLOROETHANE	7.4U	75-25-2	BROMOFORM	7.4U
156-60-5	TRANS-1,2-DICHLOROETHENE .	7.4U	108-10-1	4-METHYL-2-PENTANONE . . .	15. U
67-66-3	CHLOROFORM	7.4U	591-78-6	2-HEXANONE	15. U
107-06-2	1,2-DICHLOROETHANE	7.4U	127-18-4	TETRACHLOROETHENE	7.4U
78-93-3	2-BUTANONE	15. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	15. U
71-55-6	1,1,1-TRICHLOROETHANE . .	7.4U	108-88-3	TOLUENE	7.4U
56-23-5	CARBON TETRACHLORIDE . . .	7.4U	108-90-7	CHLOROBENZENE	7.4U
108-05-4	VINYL ACETATE	15. U	100-41-4	ETHYLBENZENE	7.4U
75-27-4	BROMODICHLOROMETHANE . . .	7.4U	100-42-5	STYRENE	7.4U
				TOTAL XYLENES	7.4U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
J - REPORTED VALUE IS LESS THAN THE DETECTION LIMIT.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

FORM I

LABORATORY NAME: TMA/ERG
CASE NO: 3035

SAMPLE NUMBER
162929

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
GPC CLEANUP X YES NO
DATE EXTRACTED/PREPARED: 11/21/86
SEPARATORY FUNNEL EXTRACTION YES
DATE ANALYZED: 01/23/87
CONTINUOUS LIQUID-LIQUID EXTRACTION YES
CONC/DIL FACTOR: 1.
PERCENT MOISTURE: (DECANTED) 35.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
108-95-2	PHENOL	510. U	83-32-9	ACENAPHTHENE	510. U
111-44-4	BIS(2-CHLOROETHYL)ETHER .	510. U	51-28-5	2,4-DINITROPHENOL	2500. U
95-57-8	2-CHLOROPHENOL	510. U	100-02-7	4-NITROPHENOL	2500. U
541-73-1	1,3-DICHLOROBENZENE . . .	510. U	132-64-9	DIBENZOFURAN	510. U
106-46-7	1,4-DICHLOROBENZENE . . .	510. U	121-14-2	2,4-DINITROTOLUENE	510. U
100-51-6	BENZYL ALCOHOL	510. U	606-20-2	2,6-DINITROTOLUENE	510. U
95-50-1	1,2-DICHLOROBENZENE . . .	510. U	84-66-2	DIETHYLPHTHALATE	510. BU
95-48-7	2-METHYLPHENOL	510. U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	510. U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	510. U	86-73-7	FLUORENE	510. U
106-44-5	4-METHYLPHENOL	510. U	100-01-6	4-NITROANILINE	2500. U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	510. U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	2500. U
67-72-1	HEXACHLOROETHANE	510. U	86-30-6	N-NITROSODIPHENYLAMINE (1)	510. U
98-95-3	NITROBENZENE	510. U	101-55-3	4-BROMOPHENYL-PHENYLETHER	510. U
78-59-1	ISOPHORONE	510. U	118-74-1	HEXACHLOROBENZENE	510. U
88-75-5	2-NITROPHENOL	510. U	87-86-5	PENTACHLOROPHENOL	2500. U
105-67-9	2,4-DIMETHYLPHENOL	510. U	85-01-8	PHENANTHRENE	2800.
65-85-0	BENZOIC ACID	2500. U	120-12-7	ANTHRACENE	510. BU
111-91-1	BIS(2-CHLOROETHOXY)METHANE	510. U	84-74-2	DI-N-BUTYLPHTHALATE . . .	510. BU
120-83-2	2,4-DICHLOROPHENOL	510. U	206-44-0	FLUORANTHENE	6900.
120-82-1	1,2,4-TRICHLOROBENZENE . .	510. U	129-00-0	PYRENE	510. U
91-20-3	NAPHTHALENE	510. BU	85-68-7	BUTYLBENZYLPHTHALATE . . .	510. U
106-47-8	4-CHLOROANILINE	510. U	91-94-1	3,3'-DICHLOROBENZIDINE . .	1000. U
87-68-3	HEXACHLOROBUTADIENE . . .	510. U	56-55-3	BENZO(A)ANTHRACENE	510. U
59-50-7	4-CHLORO-3-METHYLPHENOL .	510. U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	510. BU
91-57-6	2-METHYLNAPHTHALENE . . .	510. U	218-01-9	CHRYSENE	510. U
77-47-4	HEXACHLOROCYCLOPENTADIENE	510. U	117-84-0	DI-N-OCTYL PHTHALATE . . .	510. U
88-06-2	2,4,6-TRICHLOROPHENOL . .	510. U	205-99-2	BENZO(B)FLUORANTHENE . . .	510. U
95-95-4	2,4,5-TRICHLOROPHENOL . .	2500. U	207-08-9	BENZO(K)FLUORANTHENE . . .	510. U
91-58-7	2-CHLORONAPHTHALENE . . .	510. U	50-32-8	BENZO(A)PYRENE	510. U
88-74-4	2-NITROANILINE	2500. U	193-39-5	INDENO(1,2,3-CD)PYRENE . .	510. U
131-11-3	DIMETHYL PHTHALATE	510. U	53-70-3	DIBENZ(A,H)ANTHRACENE . .	510. U
208-96-8	ACENAPHTHYLENE	140. J	191-24-2	BENZO(G,H,I)PERYLENE . . .	510. U
99-09-2	3-NITROANILINE	2500. U			

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TMA/E.R.G. Inc.
Case No. OEPA AS035

Sample Number
162929

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-21-86
Date Analyzed: 2-25-87
Conc/Dil Factor: 1
Percent Moisture (decanted) 35

GPC Cleanup ☑Yes ☐No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	12	U
319-85-7	Beta-BHC	12	U
319-86-8	Delta-BHC	12	U
58-89-9	Gamma-BHC (Lindane)	12	U
76-44-8	Heptachlor	12	U
309-00-2	Aldrin	12	U
1024-57-3	Heptachlor Epoxide	12	U
959-98-8	Endosulfan I	12	U
60-57-1	Dieldrin	24	U
72-55-9	4, 4'-DDE	24	U
72-20-8	Endrin	24	U
33213-65-9	Endosulfan II	24	U
72-54-8	4, 4'-DDD	24	U
1031-07-8	Endosulfan Sulfate	24	U
50-29-3	4, 4'-DDT	24	U
72-43-5	Methoxychlor	120	U
53494-70-5	Endrin Ketone	24	U
57-74-9	Chlordane	120	U
8001-35-2	Toxaphene	240	U
12674-11-2	Aroclor-1016	120	U
11104-28-2	Aroclor-1221	120	U
11141-16-5	Aroclor-1232	120	U
53469-21-9	Aroclor-1242	860	
12672-29-6	Aroclor-1248	120	U
11097-69-1	Aroclor-1254	710	
11096-82-5	Aroclor-1260	240	U
	Mirex	24	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 20 g DRY WT. V_t 1000 ul V_i 3.0 ul

TENMILE CREEK RM4.1 SYLVANIA AVE.

Sample Number
162273

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: E.R.G., Inc.
Lab Sample ID No: 162273
Sample Matrix: SOIL / SED.
Data Release Authorized By:

Case No: OEPA A4989
QC Report No:
Contract No: 360336 - G1
Date Sample Received: 11/5/86

Volatile Compounds

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11/7/86
Date Analyzed: 11/7/86
Conc/Dil Factor: 1 pH 6.7
Percent Moisture: (Not Decanted) 22

CAS Number		ug/l or (ug/Kg) (Circle One)	
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	16	B
67-64-1	Acetone	13	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1, 1-Dichloroethene	6	U
75-34-3	1, 1-Dichloroethane	6	U
156-60-5	Trans-1, 2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1, 2-Dichloroethane	6	U
78-93-3	2-Butanone	13	U
71-55-6	1, 1, 1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	6	U

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	6
10061-02-6	Trans-1, 3-Dichloropropene	6
79-01-6	Trichloroethene	6
124-48-1	Dibromochloromethane	6
79-00-5	1, 1, 2-Trichloroethane	6
71-43-2	Benzene	6
10061-01-5	cis-1, 3-Dichloropropene	6
110-75-8	2-Chloroethylvinylether	13
75-25-2	Bromoform	6
108-10-1	4-Methyl-2-Pentanone	13
591-78-6	2-Hexanone	13
127-18-4	Tetrachloroethene	6
79-34-5	1, 1, 2, 2-Tetrachloroethane	6
108-88-3	Toluene	6
108-90-7	Chlorobenzene	6
100-41-4	Ethylbenzene	6
100-42-5	Styrene	6
	Total Xylenes	6

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g., 10U) based on necessary concentration/dilution action. (This is not necessarily the instrument detection limit.) The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J — Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g., 10J). If limit of detection is 10 μg/l and a concentration of 3 μg/l is calculated, report as 3J.

C — This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides ≥10 ng/ul in the final extract should be confirmed by GC/MS.

B — This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NR No value required.

LABORATORY NAME: THA/ERG

CASE NO: A4989

| SAMPLE NUMBER |
| 162273 |

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW

DATE EXTRACTED/PREPARED: 11/07/86

DATE ANALYZED: 12/24/86

CONC FACTOR: 1.016260

PERCENT MOISTURE: (DECANTED) 22

GPC CLEANUP YES X NO

SEPARATORY FUNNEL EXTRACTION YES

CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG		CAS NUMBER		UG/KG	
108-95-2	PHENOL	420.	U	83-32-9	ACENAPHTHENE	420.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	420.	U	51-28-5	2,4-DINITROPHENOL	2000.	U
95-57-8	2-CHLOROPHENOL	420.	U	100-02-7	4-NITROPHENOL	2000.	U
541-73-1	1,3-DICHLOROBENZENE	420.	U	132-64-9	DIBENZOFURAN	420.	U
106-46-7	1,4-DICHLOROBENZENE	420.	U	121-14-2	2,4-DINITROTOLUENE	420.	U
100-51-6	BENZYL ALCOHOL	420.	U	606-20-2	2,6-DINITROTOLUENE	420.	U
95-50-1	1,2-DICHLOROBENZENE	420.	U	84-66-2	DIETHYLPHTHALATE	420.	U
95-48-7	2-METHYLPHENOL	420.	U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	420.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	420.	U	86-73-7	FLUORENE	420.	U
106-44-5	4-METHYLPHENOL	420.	U	100-01-6	4-NITROANILINE	2000.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	420.	U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	2000.	U
67-72-1	HEXACHLOROETHANE	420.	U	86-30-6	N-NITROSODIPHENYLAMINE (1)	420.	U
98-95-3	NITROBENZENE	420.	U	101-55-3	4-BROMOPHENYL-PHENYLETHER	420.	U
78-59-1	ISOPHORONE	420.	U	118-74-1	HEXACHLOROBENZENE	420.	U
88-75-5	2-NITROPHENOL	420.	U	87-86-5	PENTACHLOROPHENOL	2000.	U
105-67-9	2,4-DIMETHYLPHENOL	420.	U	85-01-8	PHENANTHRENE	420.	U
65-85-0	BENZOIC ACID	2000.	U	120-12-7	ANTHRACENE	420.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	420.	U	84-74-2	DI-N-BUTYLPHTHALATE	420.	U
120-83-2	2,4-DICHLOROPHENOL	420.	U	206-44-0	FLUORANTHENE	170.	J
120-82-1	1,2,4-TRICHLOROBENZENE	420.	U	129-00-0	PYRENE	110.	J
91-20-3	NAPHTHALENE	420.	U	85-68-7	BUTYLBENZYLPHTHALATE	420.	U
106-47-8	4-CHLOROANILINE	420.	U	91-94-1	3,3'-DICHLOROBENZIDINE	830.	U
87-68-3	HEXACHLOROBUTADIENE	420.	U	56-55-3	BENZO(A)ANTHRACENE	420.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	420.	U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	420.	U
91-57-6	2-METHYLNAPHTHALENE	420.	U	218-01-9	CHRYSENE	420.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	420.	U	117-84-0	DI-N-OCTYL PHTHALATE	420.	U
88-06-2	2,4,6-TRICHLOROPHENOL	420.	U	205-99-2	BENZO(B)FLUORANTHENE	420.	U
95-95-4	2,4,5-TRICHLOROPHENOL	2000.	U	207-08-9	BENZO(K)FLUORANTHENE	420.	U
91-58-7	2-CHLORONAPHTHALENE	420.	U	50-32-8	BENZO(A)PYRENE	420.	U
88-74-4	2-NITROANILINE	2000.	U	193-39-5	INDENO(1,2,3-CD)PYRENE	420.	U
131-11-3	DIMETHYL PHTHALATE	420.	U	53-70-3	DIBENZ(A,H)ANTHRACENE	420.	U
208-96-8	ACENAPHTHYLENE	420.	U	191-24-2	BENZO(G,H,I)PERYLENE	420.	U
99-09-2	3-NITROANILINE	2000.	U				

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TMA/E.R.G., Inc.

Case No: OEPA A4989

| Sample Number |
| 162273 |

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: Low (circled) Medium (Circle One)

Date Extracted/Prepared: 11-7-86

Date Analyzed: 2-3-87

Conc/Dil Factor: 1

Percent Moisture (decanted): 22

GPC Cleanup ☐ Yes ☒ No

Separatory Funnel Extraction ☐ Yes

Continuous Liquid - Liquid Extraction ☐ Yes

CAS Number		ug/l or ug/Kg (Circle One) — ug/Kg circled	
319-84-6	Alpha-BHC	10	U
319-85-7	Beta-BHC	10	U
319-86-8	Delta-BHC	10	U
58-89-9	Gamma-BHC (Lindane)	10	U
76-44-8	Heptachlor	10	U
309-00-2	Aldrin	10	U
1024-57-3	Heptachlor Epoxide	10	U
959-98-8	Endosulfan I	10	U
60-57-1	Dieldrin	20	U
72-55-9	4,4'-DDE	20	U
72-20-8	Endrin	20	U
33213-65-9	Endosulfan II	20	U
72-54-8	4,4'-DDD	20	U
1031-07-8	Endosulfan Sulfate	20	U
50-29-3	4,4'-DDT	20	U
72-43-5	Methoxychlor	100	U
53494-70-5	Endrin Ketone	30	U
57-74-9	Chlordane	100	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	100	U
11104-28-2	Aroclor-1221	100	U
11141-16-5	Aroclor-1232	100	U
53469-21-9	Aroclor-1242	100	U
12672-29-6	Aroclor-1248	100	U
11097-69-1	Aroclor-1254	200	U
11096-82-5	Aroclor-1260	200	U
	MIREX	20	U

V = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 23 g DRY WT. V_t 1000 ul V_i 3.0 ul

SWAN CREEK AT COLLINGWOOD BLVD. RM 1.2

SAMPLE NUMBER
V162928

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TMA/ERG CASE NO: A5035
LAB SAMPLE ID NO: V162928 QC REPORT NO:
SAMPLE MATRIX: SOIL CONTRACT NO:
DATA RELEASE AUTHORIZED BY: [signature] DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/19/86
DATE ANALYZED: 11/19/86
CONC/DIL FACTOR: 1. PH 7.40
PERCENT MOISTURE: (NOT DECANTED) 54.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	22. U	78-87-5	1,2-DICHLOROPROPANE . . .	11. U
74-83-9	BROMOMETHANE	22. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	11. U
75-01-4	VINYL CHLORIDE	22. U	79-01-6	TRICHLOROETHENE	19.
75-00-3	CHLOROETHANE	22. U	124-48-1	DIBROMOCHLOROMETHANE . . .	11. U
75-09-2	METHYLENE CHLORIDE	13. B	79-00-5	1,1,2-TRICHLOROETHANE . .	11. U
67-64-1	ACETONE	22. U	71-43-2	BENZENE	11. U
75-15-0	CARBON DISULFIDE	11. U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	11. U
75-35-4	1,1-DICHLOROETHENE	11. U	110-75-8	2-CHLOROETHYLVINYLETHER .	22. U
75-35-3	1,1-DICHLOROETHANE	11. U	75-25-2	BROMOFORM	11. U
156-60-5	TRANS-1,2-DICHLOROETHENE .	11. U	108-10-1	4-METHYL-2-PENTANONE . . .	22. U
67-66-3	CHLOROFORM	11. U	591-78-6	2-HEXANONE	22. U
107-06-2	1,2-DICHLOROETHANE	11. U	127-18-4	TETRACHLOROETHENE	11. U
78-93-3	2-BUTANONE	22. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	22. U
71-55-6	1,1,1-TRICHLOROETHANE . .	11. U	108-88-3	TOLUENE	11. U
56-23-5	CARBON TETRACHLORIDE . . .	11. U	108-90-7	CHLOROBENZENE	11. U
108-05-4	VINYL ACETATE	22. U	100-41-4	ETHYLBENZENE	11. U
75-27-4	BROMODICHLOROMETHANE . . .	11. U	100-42-5	STYRENE	11. U
				TOTAL XYLENES	11. U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

SWAN CREEK AT COLLINGWOOD BLVD. RM 1.2

SAMPLE NUMBER
V162928R

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

LABORATORY NAME: TMA/ERG CASE NO: A5035
LAB SAMPLE ID NO: V162928R QC REPORT NO:
SAMPLE MATRIX: SOIL CONTRACT NO:
DATA RELEASE AUTHORIZED BY: [signature] DATE SAMPLE RECEIVED: 11/14/86

VOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/20/86
DATE ANALYZED: 11/20/86
CONC/DIL FACTOR: 1. PH 7.40
PERCENT MOISTURE: (NOT DECANTED) 54.0

CAS NUMBER		UG/KG	CAS NUMBER		UG/KG
74-87-3	CHLOROMETHANE	22. U	78-87-5	1,2-DICHLOROPROPANE . . .	11. U
74-83-9	BROMOMETHANE	22. U	10061-02-6	TRANS-1,3-DICHLOROPROENE .	11. U
75-01-4	VINYL CHLORIDE	22. U	79-01-6	TRICHLOROETHENE	6.2J
75-00-3	CHLOROETHANE	22. U	124-48-1	DIBROMOCHLOROMETHANE . . .	11. U
75-09-2	METHYLENE CHLORIDE	56. B	79-00-5	1,1,2-TRICHLOROETHANE . .	11. U
67-64-1	ACETONE	38.	71-43-2	BENZENE	11. U
75-15-0	CARBON DISULFIDE	11. U	10061-01-5	CIS-1,3-DICHLOROPROPENE .	11. U
75-35-4	1,1-DICHLOROETHENE	11. U	110-75-8	2-CHLOROETHYLVINYLETHER .	22. U
75-35-3	1,1-DICHLOROETHANE	11. U	75-25-2	BROMOFORM	11. U
156-60-5	TRANS-1,2-DICHLOROETHENE .	11. U	108-10-1	4-METHYL-2-PENTANONE . . .	22. U
67-66-3	CHLOROFORM	11. U	591-78-6	2-HEXANONE	22. U
107-06-2	1,2-DICHLOROETHANE	11. U	127-18-4	TETRACHLOROETHENE	11. U
78-93-3	2-BUTANONE	22. U	79-34-5	1,1,2,2-TETRACHLOROETHANE	22. U
71-55-6	1,1,1-TRICHLOROETHANE . .	11. U	108-88-3	TOLUENE	11. U
56-23-5	CARBON TETRACHLORIDE . . .	11. U	108-90-7	CHLOROBENZENE	11. U
108-05-4	VINYL ACETATE	39.	100-41-4	ETHYLBENZENE	11. U
75-27-4	BROMODICHLOROMETHANE . . .	11. U	100-42-5	STYRENE	11. U
				TOTAL XYLENES	11. U

B - COMPOUND WAS DETECTED IN THE QC BLANK.
J - REPORTED VALUE IS LESS THAN THE DETECTION LIMIT.
U - COMPOUND ANALYZED FOR BUT NOT DETECTED. THE REPORTED VALUE IS THE MINIMUM ATTAINABLE DETECTION LIMIT FOR THE SAMPLE.

SEE PAGE 1A FOR COMPLETE DEFINITIONS OF THE DATA REPORTING QUALIFIERS.

LABORATORY NAME: TMA/ERG
CASE NO: OHIOEPA5035

SAMPLE NUMBER: 162928

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/21/86
DATE ANALYZED: 02/03/87
DIL FACTOR: 6.000
PERCENT MOISTURE: (DECANTED) 54.0

GPC CLEANUP X YES NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG		CAS NUMBER		UG/KG	
108-95-2	PHENOL	2900.	U	83-32-9	ACENAPHTHENE	5300.	
111-44-4	BIS(2-CHLOROETHYL)ETHER	2900.	U	51-28-5	2,4-DINITROPHENOL	14000.	U
95-57-8	2-CHLOROPHENOL	2900.	U	100-02-7	4-NITROPHENOL	14000.	U
541-73-1	1,3-DICHLOROBENZENE	2900.	U	132-64-9	DIBENZOFURAN	4900.	
106-46-7	1,4-DICHLOROBENZENE	2900.	U	121-14-2	2,4-DINITROTOLUENE	2900.	U
100-51-6	BENZYL ALCOHOL	2900.	U	606-20-2	2,6-DINITROTOLUENE	2900.	U
95-50-1	1,2-DICHLOROBENZENE	2900.	U	84-66-2	DIETHYLPHTHALATE	2900.	BU
95-48-7	2-METHYLPHENOL	2900.	U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	2900.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	2900.	U	86-73-7	FLUORENE	7500.	
106-44-5	4-METHYLPHENOL	2900.	U	100-01-6	4-NITROANILINE	14000.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	2900.	U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	14000.	U
67-72-1	HEXACHLOROETHANE	2900.	U	86-30-6	N-NITROSODIPHENYLAMINE (1)	2900.	U
98-95-3	NITROBENZENE	2900.	U	101-55-3	4-BROMOPHENYL-PHENYLETHER	2900.	U
78-59-1	ISOPHORONE	2900.	U	118-74-1	HEXACHLOROBENZENE	2900.	U
88-75-5	2-NITROPHENOL	2900.	U	87-86-5	PENTACHLOROPHENOL	14000.	U
105-67-9	2,4-DIMETHYLPHENOL	2900.	U	85-01-8	PHENANTHRENE	29000.	
65-85-0	BENZOIC ACID	14000.	U	120-12-7	ANTHRACENE	12000.	B
111-91-1	BIS(2-CHLOROETHOXY)METHANE	2900.	U	84-74-2	DI-N-BUTYLPHTHALATE	610.	BJ
120-83-2	2,4-DICHLOROPHENOL	2900.	U	206-44-0	FLUORANTHENE	26000.	
120-82-1	1,2,4-TRICHLOROBENZENE	2900.	U	129-00-0	PYRENE	22000.	
91-20-3	NAPHTHALENE	2700.	BJ	85-68-7	BUTYLBENZYLPHTHALATE	2900.	U
106-47-8	4-CHLOROANILINE	2900.	U	91-94-1	3,3'-DICHLOROBENZIDINE	5700.	U
87-68-3	HEXACHLOROBUTADIENE	2900.	U	56-55-3	BENZO(A)ANTHRACENE	11000.	
59-50-7	4-CHLORO-3-METHYLPHENOL	2900.	U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	6300.	B
91-57-6	2-METHYLNAPHTHALENE	2800.	J	218-01-9	CHRYSENE	8800.	
77-47-4	HEXACHLOROCYCLOPENTADIENE	2900.	U	117-84-0	DI-N-OCTYL PHTHALATE	590.	J
88-06-2	2,4,6-TRICHLOROPHENOL	2900.	U	205-99-2	BENZO(B)FLUORANTHENE	6500.	
95-95-4	2,4,5-TRICHLOROPHENOL	14000.	U	207-08-9	BENZO(K)FLUORANTHENE	6400.	
91-58-7	2-CHLORONAPHTHALENE	2900.	U	50-32-8	BENZO(A)PYRENE	4800.	
88-74-4	2-NITROANILINE	14000.	U	193-39-5	INDENO(1,2,3-CD)PYRENE	2600.	J
131-11-3	DIMETHYL PHTHALATE	2900.	U	53-70-3	DIBENZ(A,H)ANTHRACENE	1200.	J
208-96-8	ACENAPHTHYLENE	2900.	U	191-24-2	BENZO(G,H,I)PERYLENE	2300.	J
99-09-2	3-NITROANILINE	14000.	U				

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TM/E.R.G. inc.
Case No. OEPA A5035

Sample Number: 162928

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-21-86
Date Analyzed: 2-25-87
Conc/Dil Factor: 1
Percent Moisture (decanted): 54

GPC Cleanup ☑Yes ☐No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	17	U
319-85-7	Beta-BHC	17	U
319-86-8	Delta-BHC	17	U
58-89-9	Gamma-BHC (Lindane)	17	U
76-44-8	Heptachlor	17	U
309-00-2	Aldrin	17	U
1024-57-3	Heptachlor Epoxide	17	U
959-98-8	Endosulfan I	17	U
60-57-1	Dieldrin	34	U
72-55-9	4,4'-DDE	34	U
72-20-8	Endrin	34	U
33213-65-9	Endosulfan II	34	U
72-54-8	4,4'-DDD	34	U
1031-07-8	Endosulfan Sulfate	34	U
50-29-3	4,4'-DDT	34	U
72-43-5	Methoxychlor	170	U
53494-70-5	Endrin Ketone	34	U
57-74-9	Chlordane	170	U
8001-35-2	Toxaphene	340	U
12674-11-2	Aroclor-1016	170	U
11104-28-2	Aroclor-1221	170	U
11141-16-5	Aroclor-1232	170	U
53469-21-9	Aroclor-1242	1600	
12672-29-6	Aroclor-1248	170	U
11097-69-1	Aroclor-1254	340	U
11096-82-5	Aroclor-1260	340	U
	Mirex	34	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 14 g DRY WT. V_t 1000 ul V_i 3.0 ul

OTTER CREEK RM2.1 MILLARD AVE.

Sample Number
162270

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: E.R.G., Inc.
Case No: OEPA A4989
Lab Sample ID No: 162270
QC Report No:
Sample Matrix: SOIL/SED
Contract No: 360336-GS
Data Release Authorized By: [signature]
Date Sample Received: 11/5/86

Volatile Compounds

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 12/2/86
Date Analyzed: 12/2/86
Conc/Dil Factor: 1 pH 6.58
Percent Moisture: (Not Decanted) 53

CAS Number		ug/l or (ug/Kg) (Circle One)	
74-87-3	Chloromethane	21	U
74-83-9	Bromomethane	21	U
75-01-4	Vinyl Chloride	21	U
75-00-3	Chloroethane	21	U
75-09-2	Methylene Chloride	21	B
67-64-1	Acetone	21	B
75-15-0	Carbon Disulfide	11	U
75-35-4	1, 1-Dichloroethene	11	U
75-34-3	1, 1-Dichloroethane	11	U
156-60-5	Trans-1, 2-Dichloroethene	11	U
67-66-3	Chloroform	11	U
107-06-2	1, 2-Dichloroethane	11	U
78-93-3	2-Butanone	21	U
71-55-6	1, 1, 1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
108-05-4	Vinyl Acetate	21	U
75-27-4	Bromodichloromethane	11	U

CAS Number		ug/l or (ug/Kg) (Circle One)	
78-87-5	1, 2-Dichloropropane	11	U
10061-02-6	Trans-1, 3-Dichloropropene	11	U
79-01-6	Trichloroethene	11	U
124-48-1	Dibromochloromethane	11	U
79-00-5	1, 1, 2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-01-5	cis-1, 3-Dichloropropene	11	U
110-75-8	2-Chloroethylvinylether	21	U
75-25-2	Bromoform	11	U
108-10-1	4-Methyl-2-Pentanone	21	U
591-78-6	2-Hexanone	21	U
127-18-4	Tetrachloroethene	11	U
79-34-5	1, 1, 2, 2-Tetrachloroethane	11	U
108-88-3	Toluene	320	
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
	Total Xylenes	11	U

Data Reporting Qualifiers

For reporting results to EPA the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action. (This is not necessarily the instrument detection limit.) The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J — Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero [illegible] 10J). If limit of detection is 10 ug/l and a concentration of [illegible] calculated, report as 3J.

C — This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides ≥10 ng/ul in the final extract should be confirmed by GC/MS.

B — This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NR No value required.

LABORATORY NAME: THA/ERG
CASE NO: A4989

SAMPLE NUMBER
162270

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/07/86
DATE ANALYZED: 01/16/87
CONC FACTOR: 1.007049
PERCENT MOISTURE: (DECANTED) 53

GPC CLEANUP YES X NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG	
108-95-2	PHENOL	890.	
111-44-4	BIS(2-CHLOROETHYL)ETHER	700.	U
95-57-8	2-CHLOROPHENOL	700.	U
541-73-1	1,3-DICHLOROBENZENE	700.	U
106-46-7	1,4-DICHLOROBENZENE	700.	U
100-51-6	BENZYL ALCOHOL	700.	U
95-50-1	1,2-DICHLOROBENZENE	700.	U
95-48-7	2-METHYLPHENOL	700.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	700.	U
106-44-5	4-METHYLPHENOL	1700.	
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	700.	U
67-72-1	HEXACHLOROETHANE	700.	U
98-95-3	NITROBENZENE	700.	U
78-59-1	ISOPHORONE	700.	U
88-75-5	2-NITROPHENOL	700.	U
105-67-9	2,4-DIMETHYLPHENOL	700.	U
65-85-0	BENZOIC ACID	3400.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	700.	U
120-83-2	2,4-DICHLOROPHENOL	700.	U
120-82-1	1,2,4-TRICHLOROBENZENE	700.	U
91-20-3	NAPHTHALENE	700.	U
106-47-8	4-CHLOROANILINE	700.	U
87-68-3	HEXACHLOROBUTADIENE	700.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	700.	U
91-57-6	2-METHYLNAPHTHALENE	700.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	700.	U
88-06-2	2,4,6-TRICHLOROPHENOL	700.	U
95-95-4	2,4,5-TRICHLOROPHENOL	3400.	U
91-58-7	2-CHLORONAPHTHALENE	700.	U
88-74-4	2-NITROANILINE	3400.	U
131-11-3	DIMETHYL PHTHALATE	700.	U
208-96-8	ACENAPHTHYLENE	700.	U
99-09-2	3-NITROANILINE	3400.	U

CAS NUMBER		UG/KG	
83-32-9	ACENAPHTHENE	700.	U
51-28-5	2,4-DINITROPHENOL	3400.	U
100-02-7	4-NITROPHENOL	3400.	U
132-64-9	DIBENZOFURAN	700.	U
121-14-2	2,4-DINITROTOLUENE	700.	U
606-20-2	2,6-DINITROTOLUENE	700.	U
84-66-2	DIETHYLPHTHALATE	700.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	700.	U
86-73-7	FLUORENE	700.	U
100-01-6	4-NITROANILINE	3400.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	3400.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	700.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	700.	U
118-74-1	HEXACHLOROBENZENE	700.	U
87-86-5	PENTACHLOROPHENOL	3400.	U
85-01-8	PHENANTHRENE	700.	U
120-12-7	ANTHRACENE	700.	U
84-74-2	DI-N-BUTYLPHTHALATE	700.	U
206-44-0	FLUORANTHENE	540.	J
129-00-0	PYRENE	710.	
85-68-7	BUTYLBENZYLPHTHALATE	700.	U
91-94-1	3,3'-DICHLOROBENZIDINE	1400.	U
56-55-3	BENZO(A)ANTHRACENE	700.	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	610.	J
218-01-9	CHRYSENE	420.	J
117-84-0	DI-N-OCTYL PHTHALATE	700.	U
205-99-2	BENZO(B)FLUORANTHENE	700.	U
207-08-9	BENZO(K)FLUORANTHENE	700.	U
50-32-8	BENZO(A)PYRENE	260.	J
193-39-5	INDENO(1,2,3-CD)PYRENE	700.	U
53-70-3	DIBENZ(A,H)ANTHRACENE	700.	U
191-24-2	BENZO(G,H,I)PERYLENE	290.	J

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

Laboratory Name: TM/ERG inc.

Case No. OEPA A4989

Sample Number: 162270

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)

GPC Cleanup ☐Yes ☒No

Date Extracted/Prepared: 11-7-86

Separatory Funnel Extraction ☐Yes

Date Analyzed: 2-3-87

Continuous Liquid - Liquid Extraction ☐Yes

Conc/Dil Factor: 1

Percent Moisture (decanted) 53

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	17	U
319-85-7	Beta-BHC	17	U
319-86-8	Delta-BHC	17	U
58-89-9	Gamma-BHC (Lindane)	17	U
76-44-8	Heptachlor	17	U
309-00-2	Aldrin	17	U
1024-57-3	Heptachlor Epoxide	17	U
959-98-8	Endosulfan I	17	U
60-57-1	Dieldrin	34	U
72-55-9	4, 4'-DDE	34	U
72-20-8	Endrin	34	U
33213-65-9	Endosulfan II	34	U
72-54-8	4, 4'-DDD	34	U
1031-07-8	Endosulfan Sulfate	34	U
50-29-3	4, 4'-DDT	34	U
72-43-5	Methoxychlor	170	U
53494-70-5	Endrin Ketone	34	U
57-74-9	Chlordane	170	U
8001-35-2	Toxaphene	340	U
12674-11-2	Aroclor-1016	170	U
11104-28-2	Aroclor-1221	170	U
11141-16-5	Aroclor-1232	170	U
53469-21-9	Aroclor-1242	170	U
12672-29-6	Aroclor-1248	170	U
11097-69-1	Aroclor-1254	340	U
11096-82-5	Aroclor-1260	340	U
	MIREX	34	U

V = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ______ or W_s 14g DRY WT. V_t 1000ul V_i 3.0ul

OTTER CREEK RM 4.0
WHEELING ST.

Sample Number: 162271

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: E.R.G., Inc.

Case No: OEPA A4989

Lab Sample ID No: 162271

QC Report No:

Sample Matrix: SOIL/SED.

Contract No: 360336 - G3

Data Release Authorized By:

Date Sample Received: 11/5/86

Volatile Compounds

Concentration: (Low) Medium (Circle One)

Date Extracted/Prepared: 11/8/86

Date Analyzed: 11/8/86

Conc/Dil Factor: 1 pH 6.5

Percent Moisture: (Not Decanted) 31

CAS Number		ug/l or (ug/Kg) (Circle One)	
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	12	JB
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1, 1-Dichloroethene	6	U
75-34-3	1, 1-Dichloroethane	6	U
156-60-5	Trans-1, 2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1, 2-Dichloroethane	6	U
78-93-3	2-Butanone	13	U
71-55-6	1, 1, 1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	6	U

CAS Number		ug/l or (ug/Kg) (Circle One)	
78-87-5	1, 2-Dichloropropane	6	U
10061-02-6	Trans-1, 3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1, 1, 2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-01-5	cis-1, 3-Dichloropropene	6	U
110-75-8	2-Chloroethylvinylether	13	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1, 1, 2, 2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
	Total Xylenes	6	U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g., 10U) based on necessary concentration/dilution action. (This is not necessarily the instrument detection limit.) The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J — Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g., 10J). If limit of detection is 10 µg/l and a concentration of 3 µg/l is calculated, report as 3J.

C — This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides ≥10 ng/ul in the final extract should be confirmed by GC/MS.

B — This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NR No value required.

LABORATORY NAME: TMA/ERG
CASE NO: A4989

SAMPLE NUMBER: 162271

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/07/86
DATE ANALYZED: 01/14/87
CONC FACTOR: 1.019268
PERCENT MOISTURE: (DECANTED) 31

GPC CLEANUP YES X NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG		CAS NUMBER		UG/KG	
108-95-2	PHENOL	480.	U	83-32-9	ACENAPHTHENE	480.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	480.	U	51-28-5	2,4-DINITROPHENOL	2300.	U
95-57-8	2-CHLOROPHENOL	480.	U	100-02-7	4-NITROPHENOL	2300.	U
541-73-1	1,3-DICHLOROBENZENE	480.	U	132-64-9	DIBENZOFURAN	150.	J
106-46-7	1,4-DICHLOROBENZENE	480.	U	121-14-2	2,4-DINITROTOLUENE	480.	U
100-51-6	BENZYL ALCOHOL	480.	U	606-20-2	2,6-DINITROTOLUENE	480.	U
95-50-1	1,2-DICHLOROBENZENE	480.	U	84-66-2	DIETHYLPHTHALATE	480.	U
95-48-7	2-METHYLPHENOL	480.	U	7005-72-3	4-CHLOROPHENYL-PHENYLETHER	480.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	480.	U	86-73-7	FLUORENE	290.	J
106-44-5	4-METHYLPHENOL	480.	U	100-01-6	4-NITROANILINE	2300.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	480.	U	534-52-1	4,6-DINITRO-2-METHYLPHENOL	2300.	U
67-72-1	HEXACHLOROETHANE	480.	U	86-30-6	N-NITROSODIPHENYLAMINE (1)	480.	U
98-95-3	NITROBENZENE	480.	U	101-55-3	4-BROMOPHENYL-PHENYLETHER	480.	U
78-59-1	ISOPHORONE	480.	U	118-74-1	HEXACHLOROBENZENE	480.	U
88-75-5	2-NITROPHENOL	480.	U	87-86-5	PENTACHLOROPHENOL	2300.	U
105-67-9	2,4-DIMETHYLPHENOL	480.	U	85-01-8	PHENANTHRENE	2300.	-
65-85-0	BENZOIC ACID	2300.	U	120-12-7	ANTHRACENE	830.	
111-91-1	BIS(2-CHLOROETHOXY)METHANE	480.	U	84-74-2	DI-N-BUTYLPHTHALATE	480.	U
120-83-2	2,4-DICHLOROPHENOL	480.	U	206-44-0	FLUORANTHENE	3500.	
120-82-1	1,2,4-TRICHLOROBENZENE	480.	U	129-00-0	PYRENE	3700.	
91-20-3	NAPHTHALENE	480.	U	85-68-7	BUTYLBENZYLPHTHALATE	480.	U
106-47-8	4-CHLOROANILINE	480.	U	91-94-1	3,3'-DICHLOROBENZIDINE	970.	U
87-68-3	HEXACHLOROBUTADIENE	480.	U	56-55-3	BENZO(A)ANTHRACENE	1800.	
59-50-7	4-CHLORO-3-METHYLPHENOL	480.	U	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	650.	-
91-57-6	2-METHYLNAPHTHALENE	480.	U	218-01-9	CHRYSENE	1700.	-
77-47-4	HEXACHLOROCYCLOPENTADIENE	480.	U	117-84-0	DI-N-OCTYL PHTHALATE	480.	U
88-06-2	2,4,6-TRICHLOROPHENOL	480.	U	205-99-2	BENZO(B)FLUORANTHENE	480.	U
95-95-4	2,4,5-TRICHLOROPHENOL	2300.	U	207-08-9	BENZO(K)FLUORANTHENE	480.	U
91-58-7	2-CHLORONAPHTHALENE	480.	U	50-32-8	BENZO(A)PYRENE	1000.	
88-74-4	2-NITROANILINE	2300.	U	193-39-5	INDENO(1,2,3-CD)PYRENE	680.	
131-11-3	DIMETHYL PHTHALATE	480.	U	53-70-3	DIBENZ(A,H)ANTHRACENE	240.	J
208-96-8	ACENAPHTHYLENE	480.	U	191-24-2	BENZO(G,H,I)PERYLENE	750.	
99-09-2	3-NITROANILINE	2300.	U				

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name: TMA/E.R.G. inc.
Case No. OEPA A4989

Sample Number: 162271

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 11-7-86
Date Analyzed: 2-3-87
Conc/Dil Factor: 1
Percent Moisture (decanted): 31

GPC Cleanup ☐Yes ☑No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	12	U
319-85-7	Beta-BHC	12	U
319-86-8	Delta-BHC	12	U
58-89-9	Gamma-BHC (Lindane)	12	U
76-44-8	Heptachlor	12	U
309-00-2	Aldrin	12	U
1024-57-3	Heptachlor Epoxide	12	U
959-98-8	Endosulfan I	12	U
60-57-1	Dieldrin	24	U
72-55-9	4,4'-DDE	24	U
72-20-8	Endrin	24	U
33213-65-9	Endosulfan II	24	U
72-54-8	4,4'-DDD	24	U
1031-07-8	Endosulfan Sulfate	24	U
50-29-3	4,4'-DDT	24	U
72-43-5	Methoxychlor	120	U
53494-70-5	Endrin Ketone	24	U
57-74-9	Chlordane	120	U
8001-35-2	Toxaphene	240	U
12674-11-2	Aroclor-1016	120	U
11104-28-2	Aroclor-1221	120	U
11141-16-5	Aroclor-1232	120	U
53469-21-9	Aroclor-1242	120	U
12672-29-6	Aroclor-1248	120	U
11097-69-1	Aroclor-1254	240	U
11096-82-5	Aroclor-1260	240	U
	MIREX	24	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ______ or W_s 21 g DRY WT. V_t 1000 ul V_i 3.0 ul

OTTER CREEK RM 5.9
OAKDALE AVE.

Organics Analysis Data Sheet
(Page 1)

Sample Number
162272

Laboratory Name: E.R.G., Inc.
Case No: OEPA A4989
Lab Sample ID No: 162272 R
QC Report No:
Sample Matrix: SOIL/SED.
Contract No: 360336 - 95
Data Release Authorized By:
Date Sample Received: 11/5/86

Volatile Compounds

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 12/2/86
Date Analyzed: 12/2/86
Conc/Dil Factor: 1 pH 7.69
Percent Moisture: (Not Decanted) 67

CAS Number		ug/l or (ug/Kg) (Circle One)	
74-87-3	Chloromethane	30	U
74-83-9	Bromomethane	30	U
75-01-4	Vinyl Chloride	30	U
75-00-3	Chloroethane	30	U
75-09-2	Methylene Chloride	39	B
67-64-1	Acetone	49	
75-15-0	Carbon Disulfide	15	U
75-35-4	1, 1-Dichloroethene	15	U
75-34-3	1, 1-Dichloroethane	15	U
156-60-5	Trans-1, 2-Dichloroethene	15	U
67-66-3	Chloroform	15	U
107-06-2	1, 2-Dichloroethane	15	U
78-93-3	2-Butanone	30	U
71-55-6	1, 1, 1-Trichloroethane	15	U
56-23-5	Carbon Tetrachloride	15	U
108-05-4	Vinyl Acetate	30	U
75-27-4	Bromodichloromethane	15	U

CAS Number		ug/l or (ug/Kg) (Circle One)	
78-87-5	1, 2-Dichloropropane	15	U
10061-02-6	Trans-1, 3-Dichloropropene	15	U
79-01-6	Trichloroethene	15	U
124-48-1	Dibromochloromethane	15	U
79-00-5	1, 1, 2-Trichloroethane	15	U
71-43-2	Benzene	15	U
10061-01-5	cis-1, 3-Dichloropropene	15	U
110-75-8	2-Chloroethylvinylether	30	U
75-25-2	Bromoform	15	U
108-10-1	4-Methyl-2-Pentanone	30	U
591-78-6	2-Hexanone	30	U
127-18-4	Tetrachloroethene	15	U
79-34-5	1, 1, 2, 2-Tetrachloroethane	15	U
108-88-3	Toluene	15	U
108-90-7	Chlorobenzene	15	U
100-41-4	Ethylbenzene	15	U
100-42-5	Styrene	15	U
	Total Xylenes	15	U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action. (This is not necessarily the instrument detection limit.) The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J — Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g., 10J). If limit of detection is 10 µg/l and a concentration of 3 µg/l is calculated, report as 3J.

C — This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides ≥10 ng/ul in the final extract should be confirmed by GC/MS.

B — This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NR No value required.

LABORATORY NAME: TRA/ERG
CASE NO: A4989

SAMPLE NUMBER
162272

ORGANICS ANALYSIS DATA SHEET
(PAGE 2)

SEMIVOLATILE COMPOUNDS

CONCENTRATION: LOW
DATE EXTRACTED/PREPARED: 11/07/86
DATE ANALYZED: 12/24/86
CONC FACTOR: 1.007049
PERCENT MOISTURE: (DECANTED) 67

GPC CLEANUP YES X NO
SEPARATORY FUNNEL EXTRACTION YES
CONTINUOUS LIQUID-LIQUID EXTRACTION YES

CAS NUMBER		UG/KG	
108-95-2	PHENOL	960.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	960.	U
95-57-8	2-CHLOROPHENOL	960.	U
541-73-1	1,3-DICHLOROBENZENE	960.	U
106-46-7	1,4-DICHLOROBENZENE	960.	U
100-51-6	BENZYL ALCOHOL	960.	U
95-50-1	1,2-DICHLOROBENZENE	960.	U
95-48-7	2-METHYLPHENOL	960.	U
39638-32-9	BIS(2-CHLOROISOPROPYL)ETHER	960.	U
106-44-5	4-METHYLPHENOL	960.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	960.	U
67-72-1	HEXACHLOROETHANE	960.	U
98-95-3	NITROBENZENE	960.	U
78-59-1	ISOPHORONE	960.	U
88-75-5	2-NITROPHENOL	960.	U
105-67-9	2,4-DIMETHYLPHENOL	960.	U
65-85-0	BENZOIC ACID	4700.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	960.	U
120-83-2	2,4-DICHLOROPHENOL	960.	U
120-82-1	1,2,4-TRICHLOROBENZENE	960.	U
91-20-3	NAPHTHALENE	960.	U
106-47-8	4-CHLOROANILINE	960.	U
87-68-3	HEXACHLOROBUTADIENE	960.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	960.	U
91-57-6	2-METHYLNAPHTHALENE	960.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	960.	U
88-06-2	2,4,6-TRICHLOROPHENOL	960.	U
95-95-4	2,4,5-TRICHLOROPHENOL	4700.	U
91-58-7	2-CHLORONAPHTHALENE	960.	U
88-74-4	2-NITROANILINE	4700.	U
131-11-3	DIMETHYL PHTHALATE	960.	U
208-96-8	ACENAPHTHYLENE	960.	U
99-09-2	3-NITROANILINE	4700.	U

CAS NUMBER		UG/KG	
83-32-9	ACENAPHTHENE	630.	J
51-28-5	2,4-DINITROPHENOL	4700.	U
100-02-7	4-NITROPHENOL	4700.	U
132-64-9	DIBENZOFURAN	390.	J
121-14-2	2,4-DINITROTOLUENE	960.	U
606-20-2	2,6-DINITROTOLUENE	960.	U
84-66-2	DIETHYLPHTHALATE	960.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	960.	U
86-73-7	FLUORENE	830.	J
100-01-6	4-NITROANILINE	4700.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	4700.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	960.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	960.	U
118-74-1	HEXACHLOROBENZENE	960.	U
87-86-5	PENTACHLOROPHENOL	4700.	U
85-01-8	PHENANTHRENE	8700.	
120-12-7	ANTHRACENE	1900.	
84-74-2	DI-N-BUTYLPHTHALATE	960.	U
206-44-0	FLUORANTHENE	12000.	
129-00-0	PYRENE	7500.	
85-68-7	BUTYLBENZYLPHTHALATE	960.	U
91-94-1	3,3'-DICHLOROBENZIDINE	1900.	U
56-55-3	BENZO(A)ANTHRACENE	5000.	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	550.	J
218-01-9	CHRYSENE	3400.	
117-84-0	DI-N-OCTYL PHTHALATE	960.	U
205-99-2	BENZO(B)FLUORANTHENE	3900.	
207-08-9	BENZO(K)FLUORANTHENE	2700.	
50-32-8	BENZO(A)PYRENE	2900.	
193-39-5	INDENO(1,2,3-CD)PYRENE	2200.	
53-70-3	DIBENZ(A,H)ANTHRACENE	1000.	
191-24-2	BENZO(G,H,I)PERYLENE	2600.	

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

FORM I

Laboratory Name TMA/E.R.G. inc.
Case No. OEPA A4989

Sample Number
162272

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: (Low) Medium (Circle One)
Date Extracted/Prepared: 1-7-86
Date Analyzed: 2-3-87
Conc/Dil Factor: 1
Percent Moisture (decanted) 67

GPC Cleanup ☐Yes ☑No
Separatory Funnel Extraction ☐Yes
Continuous Liquid - Liquid Extraction ☐Yes

CAS Number		ug/l or (ug/Kg) (Circle One)	
319-84-6	Alpha-BHC	24	U
319-85-7	Beta-BHC	24	U
319-86-8	Delta-BHC	24	U
58-89-9	Gamma-BHC (Lindane)	24	U
76-44-8	Heptachlor	24	U
309-00-2	Aldrin	24	U
1024-57-3	Heptachlor Epoxide	24	U
959-98-8	Endosulfan I	24	U
60-57-1	Dieldrin	48	U
72-55-9	4, 4'-DDE	48	U
72-20-8	Endrin	48	U
33213-65-9	Endosulfan II	48	U
72-54-8	4, 4'-DDD	48	U
1031-07-8	Endosulfan Sulfate	48	U
50-29-3	4, 4'-DDT	48	U
72-43-5	Methoxychlor	240	U
53494-70-5	Endrin Ketone	48	U
57-74-9	Chlordane	240	U
8001-35-2	Toxaphene	480	U
12674-11-2	Aroclor-1016	240	U
11104-28-2	Aroclor-1221	240	U
11141-16-5	Aroclor-1232	240	U
53469-21-9	Aroclor-1242	240	U
12672-29-6	Aroclor-1248	240	U
11097-69-1	Aroclor-1254	480	U
11096-82-5	Aroclor-1260	480	U
	MIREX	48	U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s ——— or W_s 9.9 g DRY WT. V_t 1000 ul V_i 3.0 ul

APPENDIX B

Package Sewage Treatment Plant Data

APPENDIX B
PACKAGE SEWAGE TREATMENT PLANT EFFLUENT DATA

NOTE: There are many package plants in the RAP Area, and most of them do not have NPDES Discharge Permits; and consequently, there are no data available on what they are discharging. The data in this table covers package plants in Lucas County, most of which are or were operated by the Lucas County Sanitary Engineer, and in all likelihood, are better operated and maintained than the "typical" package plant. Two of these plants (Corey Meadows and Lincoln Green) are no longer in use. Data for these plants is included here as examples of package plant discharge.

SOURCE: Lucas County Facilities Plan[5]

PACKAGE PLANT DATA
Maumee Basin Plants with NPDES Permits

	FLOW RATE	TOTAL FLOW, MG				Avg BOD	TOTAL BOD, POUNDS				Avg SS	TOTAL SS, POUNDS				Avg P	TOTAL P (est), POUNDS				FILTERS?
	Avg, gpd	1979	1980	1981	1982		1979	1980	1981	1982		1979	1980	1981	1982		1979	1980	1981	1982	
Bentbrook	88,200	29.0	30.2	33.8	35.8	934	4,938	6,057	11,892	8,834	902	5,193	6,484	11,010	7,579	940	848	883	985	1,046	N
Corey Meadows	62,100	21.1	22.0	23.3	24.4	136	814	948	1,011	1,449	227	1,458	2,446	1,359	2,193	662	615	642	680	711	N
Lincoln Green	117,800	38.6	42.7	48.7	42.1	1,162	6,099	10,533	13,088	10,235	1,463	11,962	13,544	10,929	11,600	1,256	1,127	1,245	1,422	1,230	N
Oak Openings Ind	48,100	12.6	11.3	19.1	27.2	88	483	339	714	1,594	176	1,109	987	1,349	2,578	293	210	189	318	454	Y
Oak Terrace	61,200	18.8	15.2	33.2	22.2	291	820	526	5,195	4,535	358	1,226	823	7,097	4,226	373	314	254	553	371	Y

EXTENDED AERATION PACKAGE PLANT EFFLUENT DATA

Source: Lucas County Facilities Plan, Appendix F

PACKAGE PLANT NAME: BENTBROOK FARMS
PACKAGE PLANT NUMBER: L-68
NPDES PERMIT NUMBER: G 702 *AD

MONTH/YEAR	FLOW	pH	CL2	BOD	SS	DO	Coliform
January 1979	.079	6.7	.6	23.4	29.3	3.0	71.0
February	.080	6.7	.6	14.3	15.0	3.5	23.0
March	.089	6.7	.6	27.3	31.2	3.5	19.0
April	.101	6.9	.6	18.3	25.8	3.5	31.0
May	.113	6.9	.6	14.0	13.8	3.3	21.0
June	.057	6.9	.6	22.7	17.7	3.2	32.0
July	.066	7.1	.6	10.6	6.8	3.3	11.0
August	.083	6.7	.6	23.3	34.5	3.7	180.0
September	.063	6.7	.6	10.2	7.9	2.8	6.0
October	.058	6.7	.6	11.0	13.7	2.9	9.0
November	.069	6.8	.6	11.5	15.9	3.3	31.0
December	.096	7.0	.6	58.1	45.7	3.6	1,198.0
AVERAGES	79,500	6.8	.6	20.4	21.4	3.3	136.0
TOTALS	348		5.2	175.8	184.8	28.4	
January 1980	.080	7.0	.6	65.2	41.5	3.4	1,319.0
February	.070	6.9	.6	25.0	21.6	3.4	96.0
March	.091	6.9	.6	8.5	13.0	3.3	12.0
April							
May	.114	6.9	.6	6.2	8.2	3.3	3.0
June	.108	6.9	.6	54.7	54.3	2.7	337.0
July	.080	7.1	.6	6.3	7.4	3.2	3.0
August	.116	6.9	.6	7.1	13.3	2.1	6.0
September	.080	7.0	.6	AH	AH	3.6	AH
October	.058	6.9	.6	12.7	26.0	1.6	36.0
November	.062	7.0	.4	42.5	56.7	3.3	1,240.0
December	.052	6.7	.5	11.9	15.0	3.0	302.0
AVERAGES	82,818	6.9	.6	24.0	25.7	3.0	335.4
TOTALS	333		4.7	182.4	195.3	24.8	
January 1981	.075	6.7	AH	107.9	71.6	3.0	AH
February	.132	6.9	AH	84.0	92.0	3.8	AH
March	.076	6.7	AH	47.4	38.3	3.0	AH
April	.072	6.9	AH	43.1	40.2	2.4	AH
May	.090	7.0	.6	32.7	32.9	1.8	54.0
June	.098	6.9	.6	33.3	23.9	2.2	61.0
July	.099	6.8	.6	23.7	24.7	2.2	25.0
August	.079	6.9	.6	12.6	8.5	2.2	15.0
September	.118	6.8	.6	42.3	40.6	2.0	280.0
October	.097	6.8	.6	35.6	35.6	3.1	460.0
November	.088	6.8	.5	30.8	48.2	3.7	1,100.0
December	.085	6.9	AH	13.5	12.8	2.6	AH
AVERAGES	92,417	6.8	.6	42.2	39.1	2.7	285.0
TOTALS	405		3.6	423.3	391.9	26.7	
January 1982	.105	6.8	AH	23.6	18.2	3.0	AH
February	.081	7.0	AH	51.7	49.0	4.0	AH
March	.143	7.0	AH	58.9	50.6	3.1	AH
April	.102	7.0	AH	38.0	26.0	3.4	AH
May	.123	6.9	AH	43.8	43.5	3.3	AH
June	.178	6.8	.5	34.3	39.6	2.3	265.0
July	.118	6.7	.6	7.7	10.5	2.5	56.0
August	.061	6.9	.4	23.0	13.5	2.6	109.0
September	.069	6.8	.5	8.7	7.0	3.0	15.0
October	.055	6.9	.4	22.9	12.4	3.2	100.0
November	.062	6.9	AH	16.9	14.5	3.4	AH
December	.080	7.0	AH	25.3	19.6	3.3	AH
AVERAGES	98,083	6.9	.5	29.6	25.4	3.1	109.0
TOTALS	430		2.4	314.4	269.8	32.9	

PACKAGE PLANT NAME: COREY MEADOWS
PACKAGE PLANT NUMBER: L-75
NPDES PERMIT NUMBER: G 701 *AD

MONTH/YEAR	FLOW	pH	CL2	BOD	SS	DO	Coliform
January 1979	.059	6.7	.6	9.6	20.2	2.7	10.0
February	.047	6.7	.6	2.7	9.9	3.5	2.0
March	.045	6.7	.6	1.8	7.4	3.4	2.0
April	.072	6.8	.6	7.0	7.7	3.6	2.0
May	.068	7.0	.6	1.5	4.0	3.1	1.0
June	.059	6.8	.6	2.0	9.9	3.1	14.0
July	.075	7.0	.6	6.1	5.5	2.8	2.0
August	.051	6.7	.6	3.2	1.3	2.9	3.0
September	.040	6.8	.6	3.8	3.6	1.9	3.0
October	.043	6.7	.6	11.9	15.5	2.5	7.0
November	.051	6.9	.6	1.6	6.0	2.9	1.0
December	.082	7.2	.6	4.4	8.6	3.7	2.0
AVERAGES	57,667	6.8	.6	4.6	8.3	3.0	4.1
TOTALS	253		3.7	29.0	51.9	18.8	
January 1980	.071	6.9	.5	17.4	23.3	3.5	18.0
February	.044	6.9	.6	7.6	12.9	3.2	3.0
March	.070	6.8	.6	2.8	7.8	3.3	2.0
April							
May	.076	6.9	.6	1.0	1.8	3.2	1.0
June	.071	6.8	.6	.6	1.6	2.5	1.0
July	.056	6.7	.6	9.1	53.0	1.6	11.0
August	.082	6.8	.6	6.0	8.4	3.2	5.0
September	.058	6.8	.6	AH	AH	2.8	AH
October	.045	6.7	.6	2.5	8.8	3.3	2.0
November	.043	6.8	.5	1.9	4.9	3.2	156.0
December	.046	6.7	.4	2.8	10.9	2.8	1.0
AVERAGES	60,182	6.8	.6	5.2	13.3	3.0	20.0
TOTALS	242		3.4	28.5	73.7	17.8	
January 1981	.043	7.0	AH	2.9	3.4	3.2	AH
February	.058	6.7	AH	12.5	16.9	3.7	AH
March	.061	6.7	AH	3.6	3.1	2.2	AH
April	.055	6.5	AH	2.2	3.2	2.2	AH
May	.062	6.8	.6	1.0	2.0	2.1	1.0
June	.065	6.8	.6	1.0	1.9	1.9	1.0
July	.064	6.7	.6	1.7	3.3	2.1	1.0
August	.047	6.7	.6	1.9	3.1	2.2	3.0
September	.101	6.7	.6	8.4	9.5	1.7	9.0
October	.068	6.9	.5	10.7	17.7	2.5	13.0
November	.080	6.8	.6	9.8	9.8	3.2	2.0
December	.061	6.8	AH	6.8	10.1	2.6	AH
AVERAGES	63,750	6.8	.6	5.2	7.0	2.5	4.3
TOTALS	279		2.5	36.0	48.4	17.0	
January 1982	.075	6.8	AH	10.1	13.2	3.1	AH
February	.063	6.8	AH	6.3	12.2	3.4	AH
March	.108	7.0	AH	12.6	23.8	2.5	AH
April	.091	6.7	AH	3.7	4.5	3.2	AH
May	.061	6.8	AH	4.6	10.5	3.3	AH
June	.067	6.7	.5	3.4	3.5	2.3	5.0
July	.050	6.7	.5	3.5	3.0	2.2	5.0
August	.047	6.7	.4	2.4	4.6	2.0	11.0
September	.062	6.9	.4	3.1	4.4	2.8	10.0
October	.048	6.9	.4	1.9	1.7	3.0	7.0
November	.055	7.0	AH	32.2	44.6	3.5	AH
December	.073	7.1	AH	1.8	3.6	3.2	AH
AVERAGES	66,667	6.8	.4	7.1	10.8	2.9	7.6
TOTALS	292		1.5	51.6	78.1	20.8	

PACKAGE PLANT LINCOLN GREEN
PACKAGE PLANT L-49
NPDES PERMIT H 704 *AD

MONTH/YEAR	FLOW	pH	CL2	BOD	SS	DO	Coliform
January 1979	.109	6.7	.6	13.5	9.7	3.1	22.0
February	.075	6.8	.6	38.2	44.8	3.4	225.0
March	.105	6.7	.6	7.5	9.3	3.5	14.0
April	.142	6.8	.6	6.4	4.3	3.3	4.0
May	.141	7.0	.6	5.1	8.3	3.2	6.0
June	.094	6.9	.6	3.7	8.6	3.1	8.0
July	.091	6.9	.6	2.9	2.7	3.1	3.0
August	.127	6.8	.6	3.6	5.0	3.5	2.0
September	.092	6.7	.6	3.4	2.9	2.8	3.0
October	.078	6.7	.6	16.5	193.2	2.6	33.0
November	.093	6.8	.6	93.4	128.8	3.5	4,021.0
December	.122	7.0	.6	33.0	28.0	3.7	303.0
AVERAGES	105,750	6.8	.6	18.9	37.1	3.2	387.0
TOTALS	**464**		**6.9**	**217.1**	**425.7**	**37.1**	
January 1980	.119	7.1	.5	64.1	72.6	3.5	103.0
February	.102	6.9	.6	29.4	18.0	3.4	124.0
March	.161	6.9	.6	42.3	51.2	3.5	135.0
April							
May	.143	7.1	.6	6.0	7.5	3.1	6.0
June	.134	6.9	.6	10.4	13.2	3.1	8.0
July	.094	6.8	.6	5.7	4.8	3.2	4.0
August	.106	6.9	.6	20.0	18.3	2.5	40.0
September	.102	7.2	.7	AH	AH	2.4	AH
October	.091	6.9	.6	7.7	9.2	2.1	11.0
November	.093	7.0	.6	89.2	165.5	2.9	779.0
December	.140	6.8	.6	21.2	20.3	2.5	42.0
AVERAGES	116,818	7.0	.6	29.6	38.1	2.9	125.2
TOTALS	**469**		**7.0**	**317.2**	**407.9**	**34.2**	
January 1981	.149	7.0	.6	126.7	117.6	3.3	299.0
February	.144	7.0	.5	106.5	71.5	3.9	533.0
March	.128	7.0	.6	35.7	22.0	3.0	58.0
April	.123	6.7	.6	20.7	13.2	3.1	46.0
May	.131	6.7	.6	24.4	28.9	2.8	56.0
June	.184	6.8	.6	15.8	10.7	2.2	15.0
July	.101	6.6	.6	22.8	24.0	2.8	47.0
August	.101	6.8	.6	6.8	8.6	2.4	4.0
September	.170	6.6	.6	14.7	16.2	2.3	10.0
October	.122	6.9	.5	4.1	5.1	3.3	12.0
November	.118	6.9	.6	3.5	2.4	2.5	2.0
December	.129	6.8	AH	5.0	2.7	2.8	AH
AVERAGES	133,333	6.8	.6	32.2	26.9	2.9	98.4
TOTALS	**584**		**7.8**	**465.8**	**389.0**	**41.4**	
January 1982	.098	6.9	AH	17.4	10.3	3.2	AH
February	.122	6.8	AH	15.7	19.2	2.6	AH
March	.161	6.8	AH	15.8	11.6	2.5	AH
April	.158	6.9	AH	47.2	65.7	3.6	AH
May	.109	6.8	AH	35.4	23.8	3.1	AH
June	.107	6.8	.5	46.8	46.4	2.9	199.0
July	.103	6.8	.5	10.6	6.1	2.4	29.0
August	.095	6.7	.4	5.0	5.8	1.9	16.0
September	.102	6.9	.5	10.5	9.6	3.0	55.0
October	.099	6.8	.4	22.4	30.5	3.8	166.0
November	.107	6.9	AH	21.8	31.2	3.4	AH
December	.123	7.0	AH	101.0	136.0	3.4	AH
AVERAGES	115,333	6.8	.5	29.1	33.0	3.0	93.0
TOTALS	**506**		**2.7**	**364.3**	**412.9**	**37.3**	

PACKAGE PLANT NAME: OAK OPENINGS INDUSTRIAL PARK
PACKAGE PLANT NUMBER: L-52
NPDES PERMIT NUMBER: 2PH00013*CD

MONTH/YEAR	FLOW	pH	CL2	BOD	SS	DO	Coliform
January 1979							
February	.013	6.8	.6	1.5	6.5	3.7	3.0
March	.032	6.8	.6	3.7	11.5	3.5	7.0
April	.037	6.9	.6	3.8	12.1	3.7	5.0
May	.030	7.0	.6	5.2	15.2	3.4	13.0
June	.024	6.8	.6	3.9	13.6	3.3	21.0
July	.027	6.9	.6	5.0	6.4	3.8	7.0
August	.034	6.8	.6	1.6	8.0	3.7	3.0
September	.038	6.8	.6	4.4	2.5	2.7	2.0
October	.034	6.8	.6	2.2	7.4	3.5	1.0
November	.065	6.7	.6	2.8	11.4	4.7	6.0
December	.046	7.2	.6	16.4	21.3	4.5	17.0
AVERAGES	34,545	6.9	.6	4.6	10.5	3.7	7.7
TOTALS	**139**		**2.1**	**15.9**	**36.4**	**12.7**	
January 1980	.052	7.0	.5	4.7	13.0	4.6	7.0
February	.029	6.9	.6	3.6	8.6	4.2	1.0
March	.029	6.9	.6	4.0	12.0	4.1	3.0
April							
May	.025	6.9	.6	3.0	11.1	4.1	2.0
June	.023	6.8	.5	3.1	5.9	4.5	2.0
July	.020	6.7	.6	2.1	5.4	4.0	1.0
August	.021	6.6	.6	2.0	4.9	3.4	3.0
September	.021	6.9	.6	AH	AH	2.4	AH
October	.042	6.8	.6	AH	AH	1.8	2.0
November	.038	7.0	.5	7.0	22.9	2.3	290.0
December	.041	6.7	.4	2.8	10.3	2.9	1.0
AVERAGES	31,000	6.8	.6	3.6	10.5	3.5	31.2
TOTALS	**125**		**1.7**	**9.3**	**27.0**	**10.8**	
January 1981	.037	6.7	AH	3.3	3.8	3.2	AH
February	.046	6.8	AH	6.5	13.4	3.8	AH
March	.051	6.5	AH	5.1	10.8	2.5	AH
April	.044	6.7	AH	4.2	5.3	4.1	AH
May	.052	6.7	.6	2.7	8.6	4.6	5.0
June	.060	6.7	.6	2.6	5.5	4.2	2.0
July	.063	6.7	.6	3.3	6.6	4.0	5.0
August	.048	6.8	.6	3.1	6.0	3.4	4.0
September	.051	6.8	.6	2.7	5.2	4.4	3.0
October	.056	6.8	.6	7.6	11.0	3.1	11.0
November	.062	6.8	.6	7.8	14.5	4.1	15.0
December	.056	6.9	AH	5.0	11.2	3.6	AH
AVERAGES	52,167	6.7	.6	4.5	8.5	3.8	6.4
TOTALS	**229**		**2.1**	**25.4**	**48.0**	**21.2**	
January 1982	.063	6.8	AH	15.3	21.3	3.9	AH
February	.067	7.0	AH	11.1	17.3	3.7	AH
March	.101	6.9	AH	8.3	12.3	4.1	AH
April	.104	6.9	AH	4.5	7.1	3.9	AH
May	.067	6.9	AH	5.6	8.9	3.7	AH
June	.078	6.9	.5	4.1	6.5	3.6	24.0
July	.064	6.8	.6	12.0	12.2	3.2	62.0
August	.063	6.7	.4	2.9	3.7	2.4	13.0
September	.082	6.8	.5	2.8	2.2	3.1	5.0
October	.062	6.8	.4	4.5	7.1	3.5	21.0
November	.075	6.9	AH	9.9	29.5	3.9	AH
December	.068	7.0	AH	3.3	8.2	3.5	AH
AVERAGES	74,500	6.9	.5	7.0	11.4	3.5	25.0
TOTALS	**327**		**1.8**	**56.7**	**91.7**	**28.6**	

PACKAGE PLANT NAME: OAK TERRACE SUBDIVISION
PACKAGE PLANT BER: L-37
NPDES PERMIT NUMBER: 2PH00014*CD

MONTH/YEAR	FLOW	pH	CL2	BOD	SS	DO	Coliform
January 1979							
February							
March							
April							
May							
June				1.3	4.3	6.3	3.0
July	.047	6.8	.6	2.2	1.3	3.5	1.0
August	.037	6.8	.6	2.1	5.1	3.6	3.0
September	.054	6.8	.6	22.1	24.5	2.7	27.0
October	.062	6.8	.6	2.7	8.3	4.0	1.0
November	.045	6.7	.6	2.4	5.2	4.4	3.0
December	.064	7.0	.6	3.8	6.0	4.7	3.0
AVERAGES	51,500	6.8	.6	5.2	7.8	4.2	5.9
TOTALS	113		1.8	18.0	26.9	14.3	
January 1980	.046	7.0	.5	2.0	4.5	4.5	1.0
February	.042	6.9	.6	3.9	6.4	4.2	2.0
March	.031	6.9	.6	2.6	4.6	4.2	1.0
April							
May	.045	6.8	.6	4.3	8.8	4.1	4.0
June	.050	7.0	.6	19.9	17.9	4.0	20.0
July	.040	6.6	.6	2.0	6.0	3.8	2.0
August	.046	6.6	.6	1.5	.7	3.1	1.0
September	.043	6.6	.6	AH	AH	2.2	AH
October	.033	6.8	.6	1.8	4.6	2.1	2.0
November	.033	6.9	.5	1.7	6.1	2.6	1.0
December	.049	6.7	.5	1.8	5.3	3.1	2.0
AVERAGES	41,636	6.8	.6	4.2	6.5	3.4	3.6
TOTALS	167		2.4	15.9	24.8	14.4	
January 1981	.059	6.7	.6	2.9	4.1	3.1	2.0
February	.089	6.8	.5	4.6	4.0	3.7	2.0
March	.201	6.7	.5	5.0	7.3	2.7	6.0
April	.156	6.6	.6	4.3	3.4	3.2	6.0
May	.159	6.6	.6	4.2	5.3	2.4	4.0
June	.106	6.6	.6	3.5	6.7	2.7	5.0
July	.067	6.7	.6	4.5	7.4	2.9	5.0
August	.051	6.9	.6	2.5	2.3	2.9	2.0
September	.042	6.7	.6	11.7	13.3	2.1	47.0
October	.051	6.9	.6	45.1	63.0	4.1	110.0
November	.054	6.7	.6	53.0	44.0	3.8	280.0
December	.055	6.8	AH	84.0	147.0	4.1	AH
AVERAGES	90,833	6.7	.6	18.8	25.7	3.1	42.6
TOTALS	398		5.3	184.9	252.6	30.9	
January 1982	.052	6.8	AH	76.0	49.0	4.2	AH
February	.058	7.0	AH	73.0	69.0	3.4	AH
March	.050	6.8	AH	23.7	18.6	2.9	AH
April	.056	6.8	AH	26.0	22.6	3.8	AH
May	.078	6.8	AH	4.4	6.1	3.4	AH
June	.077	6.8	.5	4.9	4.2	3.3	26.0
July	.059	6.7	.6	4.7	4.4	3.1	24.0
August	.066	6.7	.4	18.4	9.9	2.2	27.0
September	.070	6.8	.4	3.9	3.0	3.1	13.0
October	.049	6.8	.4	30.9	37.2	3.5	111.0
November	.054	6.8	AH	6.6	14.6	4.3	AH
December	.062	6.8	AH	20.8	34.7	4.7	AH
AVERAGES	60,917	6.8	.5	24.4	22.8	3.5	40.2
TOTALS	267		1.4	161.4	150.4	23.1	

APPENDIX C

NPDES Permits in the RAP Area

APPENDIX C
NPDES DISCHARGE PERMITS IN THE RAP AREA

SOURCE: NPDES permits supplied by Ohio EPA

NPDES & PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED #, & RAP STATUS	RIVER MILE	CAPACITY mgd	FLOW NOW mgd	ANNUAL FLOW MG/Year
PKG PLANT: n/a 2IG00006*ED OUTFALL: EXPIR. DATE: 10/24/88 STATUS: Expired	Ashland Oil Company 3147 Jessie St Toledo Terminal Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Runoff, ship ballast	R.M.: 1.8	0.018	0.018	0.5
PKG PLANT: L-68 2PG00002*BD OUTFALL: 001 EXPIR. DATE: 09/13/92 STATUS: To be sewered 1988	Bentbrook Farms 1 Government Center Suite 800 5447 Sturbridge Road Lucas County, Sylvania OLD NAME(S):	WTRSHED NO: 004 BASIN: Maumee SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek VERIFIED? Yes WASTE: Sewage	R.M.: 0.0	0.060	0.120	3.7
PKG PLANT: n/a 2IW00010*AD OUTFALL: 001 EXPIR. DATE: 12/01/79 STATUS: Expired	Bowling Green WTP 304 N. Church St 17549 W. River Rd @ Hull-Prairie Rd Wood County, Plain Twp. OLD NAME(S):	WTRSHED NO: 045 BASIN: Maumee SUB-BASIN: *RAP? Yes *PRE? No STREAM: Hull-Prarie Road Ditch VERIFIED? Yes WASTE: WTP backwash	R.M.: 22.8	8.000	5.550	168.9
PKG PLANT: L-20 2IT00013*BD OUTFALL: EXPIR. DATE: 01/07/87 STATUS: Expired	CSX - Chessie - Presque Isle P.O. Box 45052 Presque Isle, nr Otter Cr & Bayshore Rds Lucas County, Oregon OLD NAME(S): C&O, Chessie	WTRSHED NO: 028 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Runoff, sewage	R.M.: 0.1	0.003	0.003	0.1
PKG PLANT: n/a 2IT00002*CD OUTFALL: EXPIR. DATE: 02/17/92 STATUS: Active	CSX - Chessie - Walbridge Terminal PO Box 45052 Union Street, Walbridge Wood County, Walbridge OLD NAME(S): C&O, Chessie	WTRSHED NO: 032 BASIN: Lake Erie SUB-BASIN: Cedar *RAP? Yes *PRE? No STREAM: Cedar Creek VERIFIED? Yes WASTE: Runoff	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: L-71 2PY00000*DD OUTFALL: 001 EXPIR. DATE: 03/18/93 STATUS: Active	Centennial Manor 3230 Centennial Road 3230 Centennial Road Lucas County, Sylvania Twp. OLD NAME(S):	WTRSHED NO: 003 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek VERIFIED? Yes WASTE: Sewage	R.M.: 2.0	0.030	0.015	0.5
PKG PLANT: L-71 2PY00000*DD OUTFALL: 581 EXPIR. DATE: 03/18/93 STATUS: Active	Centennial Manor Lucas County, Sylvania Twp. OLD NAME(S):	WTRSHED NO: 003 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek VERIFIED? Yes WASTE:	R.M.: 2.0	0.000	0.000	0.0
PKG PLANT: W-19 R 725 *AD OUTFALL: EXPIR. DATE: 06/30/77 STATUS: To be sewered in '88	Charter House Inn I-280 @ Hanley Rd. I-280 @ Hanley Rd. Wood County, Lake Twp. OLD NAME(S):	WTRSHED NO: 033 BASIN: Lake Erie SUB-BASIN: Crane *RAP? Yes *PRE? No STREAM: Crane Creek VERIFIED? Yes WASTE: Sewage	R.M.: 0.0	0.030	0.030	0.9

NPDES & PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED 2, & RAP STATUS	RIVER MILE	CAPACITY mgd	FLOW NOW mgd	ANNUAL FLOW MG/Year
PKG PLANT: n/a 2IT00015*AD OUTFALL: 001 EXPIR. DATE: 04/13/90 STATUS: Active	Conrail 415 Emerald Ave. 415 Emerald Ave. Lucas County, Toledo OLD NAME(S): Penn Central	WTRSHED NO: 013 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River via unnamed trib. VERIFIED? Yes WASTE: Runoff	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2IT00007*CD OUTFALL: EXPIR. DATE: 06/23/91 STATUS: Active	Conrail - Stanley Yard 435 Emerald Ave Stanley Yard, 29460 E Broadway, Moline Wood County, Lake Twp. OLD NAME(S):	WTRSHED NO: 032 BASIN: Lake Erie SUB-BASIN: Cedar *RAP? Yes *PRE? No STREAM: Cedar Creek VERIFIED? No WASTE:	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2IQ00012*BD OUTFALL: EXPIR. DATE: 02/24/92 STATUS: Active	Diversi Tech General PO Box 875 3729 Twinning St. Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ottawa River VERIFIED? Yes WASTE: Runoff	R.M.: 6.0	0.100	0.100	3.0
PKG PLANT: n/a 2IC00021*FD OUTFALL: EXPIR. DATE: 03/20/92 STATUS: Active	Doehler-Jarvis/Farley, Plant 2 1945 Smead Ave., POB 902 5400 N. Detroit Ave. Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 020 BASIN: Maumee Bay SUB-BASIN: *RAP? Yes *PRE? No STREAM: Shantee Creek VERIFIED? Yes WASTE: Cooling water	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2IF00017*CD OUTFALL: EXPIR. DATE: 04/16/90 STATUS: Active	DuPont De Nemours, Formaldehyde Plant PO Box 6568, W. Toledo Stn 700 Matzinger Road Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ottawa River VERIFIED? Yes WASTE: Non-contact cooling water	R.M.: 4.8	1.700	1.700	51.7
PKG PLANT: n/a 2IF00016*DD OUTFALL: 001 EXPIR. DATE: 12/13/92 STATUS: Active	DuPont De Nemours, Paint Plant PO Box 953 1930 Tremainsville Rd., 43613 Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 020 BASIN: Maumee SUB-BASIN: *RAP? Yes *PRE? No STREAM: Blodgett Ditch via storm sewers VERIFIED? Yes WASTE: Non-contact cooling water	R.M.: 0.0	0.490	0.490	14.9
PKG PLANT: n/a 2IF00016*DD OUTFALL: 002 EXPIR. DATE: 12/13/82 STATUS: Active	DuPont De Nemours, Paint Plant County, OLD NAME(S):	WTRSHED NO: 020 BASIN: Maumee SUB-BASIN: *RAP? Yes *PRE? No STREAM: Blodgett Ditch via storm sewers VERIFIED? Yes WASTE:	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2IC00060*AD OUTFALL: 001 EXPIR. DATE: 07/19/93 STATUS: Active	Feinblanking, Ltd. 1510 Albon Rd 1510 Albon Rd Lucas County, Holland OLD NAME(S):	WTRSHED NO: BASIN: Maumee SUB-BASIN: Swan Creek *RAP? Yes *PRE? No STREAM: Wolf Creek VERIFIED? Yes WASTE: Machining, stamping wastes	R.M.: 0.0	0.009	0.009	0.3
PKG PLANT: n/a 2IN00013*CD OUTFALL: 001 EXPIR. DATE: 01/01/93 STATUS: Active	Fondessy / Envirosafe Services of Ohio 876 Otter Creek Rd. 876 Otter Creek Rd. Lucas County, Oregon OLD NAME(S): Fondessey	WTRSHED NO: 028 BASIN: Maumee Bay SUB-BASIN: *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: Runoff, sewage	R.M.: 2.3	0.050	0.050	1.5
PKG PLANT: n/a 2IJ00039*FD OUTFALL: 001 EXPIR. DATE: 03/28/93 STATUS: Active	France Stone Co., Silica Plant PO Box 278, 8130 Brint Rd Centennial Road, Sylvania Lucas County, Sylvania OLD NAME(S):	WTRSHED NO: 003 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek via Schreiber Ditch VERIFIED? Yes WASTE: Dewatering quarry	R.M.: 2.0	0.800	2.000	60.9
2IJ00039*FD OUTFALL: 002 EXPIR. DATE: 03/28/93 STATUS: Active	 County, OLD NAME(S):	SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek via Schreiber Ditch VERIFIED? Yes WASTE: Dewatering quarry	2.0			

NP(PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BAS , SUB-BASIN, WATERSHED 3, & RAP STATUS	RIVER MILE	CAPACITY mgd	FLOW NOW mgd	AL FLOW MG/Year
PKG PLANT: n/a 2IJ00047*BD OUTFALL: 001 EXPIR. DATE: 03/31/87 STATUS: Expired	France Stone Co., Waterville 8130 Brint Road, PO Box 278 700 S.River Rd Lucas County, Waterville Twp. OLD NAME(S):	WTRSHED NO: 044 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Dewatering quarry	R.M.: 22.2	0.300	0.300	9.1
PKG PLANT: L-96 2PH00000*BD OUTFALL: EXPIR. DATE: 04/23/93 STATUS: To be sewered 7/1/88	Fuller's Creekside Estates 1 Government Center Suite 800 6064 Villamar Lucas County, Washington Twp. OLD NAME(S):	WTRSHED NO: 021 BASIN: Maumee Bay SUB-BASIN: Portage *RAP? Yes *PRE? No STREAM: Shantee Creek VERIFIED? Yes WASTE: Sewage	R.M.: 0.0	0.100	0.270	8.2
PKG PLANT: n/a 2IH00093*BD OUTFALL: 001 EXPIR. DATE: 08/31/92 STATUS: Active	General Mills PO Box 923 1250 Laskey Rd. Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 023 BASIN: Maumee Bay SUB-BASIN: Silver Creek *RAP? Yes *PRE? Yes STREAM: Jamieson Ditch VERIFIED? Yes WASTE: Runoff, high BOD	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2PA00012*CD OUTFALL: EXPIR. DATE: / / STATUS: Proposed Facility	Harbor View, Village of 127 Lakeview Dr 127 Lakeview Dr Lucas County, Harbor View OLD NAME(S):	WTRSHED NO: BASIN: SUB-BASIN: *RAP? Yes *PRE? No STREAM: Lake Erie VERIFIED? Yes WASTE: Untreated sewage, septic tank effluent	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2PA00026*CD OUTFALL: EXPIR. DATE: 09/23/88 STATUS: Active	Haskins WWTP Village Hall, Church St. S.R. 64 and King Rd. Wood County, Middleton Twp. OLD NAME(S):	WTRSHED NO: 043 BASIN: Maumee SUB-BASIN: *RAP? Yes *PRE? No STREAM: Liberty High Rd Ditch VERIFIED? Yes WASTE: Municipal Wastewater	R.M.: 21.6	0.100	0.060	1.8
PKG PLANT: n/a 2IC00026*CD OUTFALL: EXPIR. DATE: 08/01/82 STATUS: Expired	Hydra-Matic 3044 W. Grant Blvd. 1455 West Alexis Rd Lucas County, Toledo OLD NAME(S): GMC Chevrolet	WTRSHED NO: 023 BASIN: Maumee Bay SUB-BASIN: *RAP? Yes *PRE? No STREAM: Silver Creek VERIFIED? Yes WASTE: Runoff	R.M.: 0.0	0.000	0.100	3.0
PKG PLANT: n/a 2IC00022*CD OUTFALL: 001 EXPIR. DATE: 01/01/93 STATUS: Active	Jeep 1000 Jeep Pkwy. 940 North Cove Blvd Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? Yes STREAM: Ottawa River VERIFIED? Yes WASTE: Site runoff	R.M.: 7.6	0.030	0.030	0.9
PKG PLANT: n/a 2IC00022*CD OUTFALL: 002 EXPIR. DATE: 01/01/93 STATUS: Active	Jeep 1000 Jeep Pkwy. 940 North Cove Blvd Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? Yes STREAM: Ottawa River VERIFIED? Yes WASTE: Site runoff	R.M.: 7.6	0.030	0.030	0.9
PKG PLANT: n/a 2IC00022*CD OUTFALL: 003 EXPIR. DATE: 01/01/93 STATUS: Active	Jeep 1000 Jeep Pkwy. 940 North Cove Blvd Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? Yes STREAM: Ottawa River VERIFIED? Yes WASTE: Site runoff	R.M.: 7.6	0.030	0.030	0.9
PKG PLANT: n/a 2IC00022*CD OUTFALL: 004 EXPIR. DATE: 01/01/93 STATUS: Active	Jeep 1000 Jeep Pkwy. 940 North Cove Blvd Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? Yes STREAM: Ottawa River VERIFIED? Yes WASTE: Site runoff	R.M.: 7.6	0.030	0.030	0.9

NPDES & PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED 4, & RAP STATUS		RIVER MILE	CAPACITY mgd	FLOW NOW mgd	ANNUAL FLOW MG/Year
PKG PLANT: n/a 2IC00056*BD OUTFALL: 001 EXPIR. DATE: 01/01/93 STATUS: Active	Kern-Liebers USA 1510 Albon Rd 1510 Albon Rd Lucas County, Springfield Twp. OLD NAME(S):	WTRSHED NO: 009 SUB-BASIN: Wolf Creek STREAM: Wolf Creek VERIFIED? Yes WASTE: Well water	BASIN: Lake Erie *RAP? Yes *PRE? No	R.M.: 4.1	0.000	0.032	1.0
PKG PLANT: n/a 2IN00079*AD OUTFALL: 001 EXPIR. DATE: 05/19/78 STATUS: Expired	King Road Sanitary Landfill 111 S. McCord Rd 3535 King Rd. Lucas County, Sylvania Twp. OLD NAME(S):	WTRSHED NO: 004 SUB-BASIN: Ottawa River STREAM: Ottawa River VERIFIED? Yes WASTE: Leachate	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 4.5	0.000	0.310	9.4
PKG PLANT: n/a 2IN00020*DD OUTFALL: EXPIR. DATE: 09/27/90 STATUS: Active	Libbey Owens Ford - Plants #4 and #8 811 Madison 1701 E Broadway Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Otter Creek VERIFIED? Yes WASTE: Glass mfg process waste	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 6.6	0.100	0.100	3.0
PKG PLANT: n/a 2IN00030*ED OUTFALL: EXPIR. DATE: 06/30/82 STATUS: Expired	Libbey Owens Ford Float Glass Plant #6 811 Madison 140 Dixie Hwy Wood County, Rossford OLD NAME(S):	WTRSHED NO: 047 SUB-BASIN: Maumee River STREAM: Maumee River VERIFIED? Yes WASTE: Runoff,Cooling, Lagoon effluent	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 6.9	6.500	6.500	197.8
PKG PLANT: L-49 2PH00004*BD OUTFALL: 001 EXPIR. DATE: 09/13/92 STATUS: To be sewered 1988	Lincoln Green Subdivision 1 Government Center Suite 800 6520 Burnham Green Lucas County, Springfield Twp. OLD NAME(S):	WTRSHED NO: 004 SUB-BASIN: Swan Creek STREAM: Potter Ditch VERIFIED? Yes WASTE: Sewage	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.168	0.160	4.9
PKG PLANT: L-25 2IN00069*ED OUTFALL: 001 EXPIR. DATE: 08/11/93 STATUS: Active	Liquid Carbonic Corp. 135 S. LaSalle St 3742 Cedar Point Rd., 43616 Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Otter Creek VERIFIED? Yes WASTE: Sewage	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 1.9	0.002	0.002	0.1
PKG PLANT: n/a 2IG00024*BD OUTFALL: 001 EXPIR. DATE: 10/10/92 STATUS: Active	Marathon Oil Company 4131 Seaman Road 3855 York Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Driftmeyer Ditch VERIFIED? Yes WASTE: Runoff water	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 0.0	0.085	0.085	2.6
PKG PLANT: n/a 2PD00015*AD OUTFALL: EXPIR. DATE: 06/30/77 STATUS: Expired	Maumee Combined Sewer Overflows 214 Illinois Ave 214 Illinois Ave Lucas County, Maumee OLD NAME(S):	WTRSHED NO: 044, 078 SUB-BASIN: STREAM: Maumee VERIFIED? Yes WASTE: Sewage, storm runoff	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.000	0.000	0.0
PKG PLANT: n/a 2PK00000*DD OUTFALL: EXPIR. DATE: 09/15/90 STATUS: Active	Maumee River WWTP 1111 S McCord Rd 5858 North River Road, Waterville Lucas County, Monclova Twp. OLD NAME(S):	WTRSHED NO: 044 SUB-BASIN: Maumee River STREAM: Maumee River VERIFIED? Yes WASTE: Municipal Wastewater	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 18.2	15.000	9.010	274.2
PKG PLANT: n/a 2IN00032 OUTFALL: EXPIR. DATE: 11/30/79 STATUS: Revoked	Medusa Portland Cement Company 2301 Front St., Toledo Sylvania, OH Lucas County, Sylvania OLD NAME(S):	WTRSHED NO: 003 SUB-BASIN: Ottawa River STREAM: Ten Mile Creek VERIFIED? No WASTE:	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 5.3	0.000	0.000	0.0

NP... PACKAGE PLANT NO. ...AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BAS..., SUB-BASIN, WATERSHED 5, & RAP STATUS		RIVER MILE	CAPACITY mgd	FLOW NOW mgd	...JAL FLOW MG/Year
PKG PLANT: n/a 2IN00072* OUTFALL: EXPIR. DATE: 04/13/83 STATUS: Expired, NPR?	Midland-Ross Surface Combustion Div. 2375 Dorr St 2375 Dorr St Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 005 SUB-BASIN: Ottawa River STREAM: Williams Ditch VERIFIED? Yes WASTE:	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.000	0.002	0.1
PKG PLANT: n/a 2IT00005*BD OUTFALL: 001 EXPIR. DATE: 10/25/88 STATUS: Expired	Norfolk Southern RR 8 N. Jefferson St 2750 Front St Lucas County, Toledo OLD NAME(S): N&W RR	WTRSHED NO: 015 SUB-BASIN: Maumee River STREAM: Duck Creek VERIFIED? Yes WASTE: Runoff	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.242	0.242	7.4
PKG PLANT: L-62 2PP00003*CD OUTFALL: EXPIR. DATE: 06/17/89 STATUS: Active	Oak Openings - Fallen Timbers Plaza 682 Prospect Turnpike near Shaffer Road Lucas County, Swanton Twp. OLD NAME(S):	WTRSHED NO: 007 SUB-BASIN: STREAM: Murbach Ditch VERIFIED? Yes WASTE: Sewage	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.150	0.110	3.3
PKG PLANT: L-53 2PH00013*CD OUTFALL: EXPIR. DATE: 06/17/89 STATUS: Active | draft permit	Oak Openings Industrial Park 1 Government Center Suite 800 1771 S. Eber Road @ Geiser Road Lucas County, Springfield Twp. OLD NAME(S):	WTRSHED NO: 009 SUB-BASIN: Swan Creek STREAM: Kujowski Ditch VERIFIED? Yes WASTE: Sewage	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.180	0.110	3.3
PKG PLANT: L-37 2PH00014*CD OUTFALL: EXPIR. DATE: 09/03/89 STATUS: Active	Oak Terrace 1111 S. McCord Rd. 329 Oak Terrace Blvd. (Angola @ Irwin) Lucas County, Spencer Twp. OLD NAME(S):	WTRSHED NO: 009 SUB-BASIN: Swan/Wolf Cr STREAM: Butler Ditch VERIFIED? Yes WASTE: Sewage	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.100	0.100	3.0
PKG PLANT: L-102 2IO00003*AD OUTFALL: 001 EXPIR. DATE: 07/01/84 STATUS: Expired	Ohio National Guard Toledo Express Airport Toledo Express Airport Lucas County, Springfield Twp. OLD NAME(S):	WTRSHED NO: 042 SUB-BASIN: Swan Creek STREAM: Zaleski Ditch VERIFIED? Yes WASTE: Sewage	BASIN: Maumee River *RAP? Yes *PRE? No	R.M.: 0.0	0.029	0.029	0.9
PKG PLANT: n/a 2PB00007*CD OUTFALL: EXPIR. DATE: 06/08/89 STATUS: Active	Oregon South Shore Park WWTP 5350 Seaman Road, POB 7541 5760 Bayshore Rd. Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie VERIFIED? Yes WASTE: Municipal Wastewater	BASIN: Lake Erie *RAP? Yes *PRE? No	R.M.: 0.0	0.225	0.490	14.9
PKG PLANT: n/a 2IW00220*BD OUTFALL: EXPIR. DATE: 04/23/93 STATUS: Active | draft permit	Oregon WTP 5350 Seaman Rd 5350 Seaman Rd Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 029 SUB-BASIN: STREAM: Berger Ditch VERIFIED? Yes WASTE: WTP backwash water	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 0.0	0.320	0.320	9.7
PKG PLANT: n/a 2PD00035*ED OUTFALL: EXPIR. DATE: 09/15/90 STATUS: Active	Oregon WWTP 5330 Seaman Rd Dupont Rd, N of Cedar Point Rd Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Maumee Bay VERIFIED? Yes WASTE: Municipal Wastewater	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 0.0	8.000	4.310	131.2
PKG PLANT: n/a 2IN00075*BD OUTFALL: 001 EXPIR. DATE: 05/26/80 STATUS: Expired	Owens-Illinois, Libbey Plant 27 PO Box 919 940 Ash St Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 030 SUB-BASIN: Maumee River STREAM: Maumee River via Co. Dt. No.1139 VERIFIED? Yes WASTE: Cooling water,non-contact	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.000	0.150	4.6

NPDES & PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED 6, & RAP STATUS	RIVER MILE	CAPACITY mgd	FLOW NOW mgd	ANNUAL FLOW MG/Year
PKG PLANT: n/a 2PD00002*CD OUTFALL: EXPIR. DATE: 06/28/87 STATUS: Expired	Perrysburg WWTP 201 W Indiana 1 West Boundary St Wood County, Perrysburg OLD NAME(S):	WTRSHED NO: 079 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Municipal wastewater	R.M.: 14.5	2.750	3.000	91.3
PKG PLANT: n/a 2IG00013*CD OUTFALL: EXPIR. DATE: 05/10/92 STATUS: Active	Petroleum Fuel & Terminal Co. 2844 Summit Ave. 2844 Summit Ave. Lucas County, Toledo OLD NAME(S): Shell, Apex	WTRSHED NO: 015 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Runoff	R.M.: 2.2	0.000	0.000	0.0
PKG PLANT: n/a 2IF00000*CD OUTFALL: EXPIR. DATE: 03/26/90 STATUS: Active	Plaskon Electronic Materials 2829 Glendale Ave 2829 Glendale Ave Lucas County, Toledo OLD NAME(S): Allied Chemical	WTRSHED NO: 013 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? Yes STREAM: Delaware Creek VERIFIED? Yes WASTE: Cooling water,non-contact	R.M.: 1.2	0.071	0.071	2.2
PKG PLANT: L-86 2IS00008*ED OUTFALL: 002 EXPIR. DATE: 06/15/91 STATUS: Active	Reichert Stamping 8200 W. Central Ave. 8200 W. Central Ave. Lucas County, Syvlania Twp. OLD NAME(S): Toledo Steel Tube	WTRSHED NO: 003 BASIN: Maumee Bay SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Ten Mile Creek via storm sewer VERIFIED? Yes WASTE: Sewage	R.M.: 5.1	0.008	0.008	0.2
PKG PLANT: n/a 2IG00010*DD OUTFALL: 001 EXPIR. DATE: 07/13/93 STATUS: Active	Standard Oil - Hill Ave Terminal 4850 E 49th St. 2450 Hill Ave., 43607 Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 004 BASIN: Maumee SUB-BASIN: Ottawa River *RAP? Yes *PRE? No STREAM: Fleig Ditch VERIFIED? No WASTE: Runoff	R.M.: 11.1	0.003	0.003	0.1
PKG PLANT: n/a 2IG00007*DD OUTFALL: EXPIR. DATE: 09/02/90 STATUS: Active	Standard Oil - Toledo Refinery PO Box 696 SE cor. Cedar Point Rd @ Bay Shore Lucas County, Oregon OLD NAME(S):	WTRSHED NO: 028 BASIN: Maumee SUB-BASIN: *RAP? Yes *PRE? No STREAM: Maumee Bay VERIFIED? Yes WASTE: Refinery & sewage	R.M.: 0.4	25.000	25.000	760.9
PKG PLANT: n/a 2IJ00052*CD OUTFALL: 001 EXPIR. DATE: 06/02/92 STATUS: Active	Stoneco - Lime City Plant PO Box 29A, 221 Allen St. US 20, 8812 Fremont Pike Wood County, Perrysburg OLD NAME(S): Maumee Stone Co.	WTRSHED NO: 032 BASIN: Maumee SUB-BASIN: Cedar Creek *RAP? Yes *PRE? No STREAM: Dry Creek via ditch VERIFIED? Yes WASTE: Quarry runoff	R.M.: 0.0	0.216	0.216	6.6
PKG PLANT: n/a 2IJ00048*CD OUTFALL: 001 EXPIR. DATE: 03/20/93 STATUS: Active	Stoneco - Maumee Plant PO Box 29A, 221 Allen St. 3845 Ford St Lucas County, Monclova Twp. OLD NAME(S): Maumee Stone Co.	WTRSHED NO: 041 BASIN: Maumee SUB-BASIN: Swan Creek *RAP? Yes *PRE? No STREAM: Graham Ditch VERIFIED? Yes WASTE: Dewatering quarry	R.M.: 0.0	0.435	0.435	13.2
PKG PLANT: n/a 2IG00009*CD OUTFALL: EXPIR. DATE: 07/05/92 STATUS: Active (draft)	Sun Petroleum - Marine Terminal PO Box 920 1900-2100 Front Street, Toledo Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Runoff	R.M.: 6.5	0.001	0.001	0.0
PKG PLANT: n/a 2IG00003*FD OUTFALL: EXPIR. DATE: 09/24/89 STATUS: Active	Sun Petroleum - Toledo Refinery PO Box 920 1819 Woodville Rd Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 028 BASIN: Maumee Bay SUB-BASIN: *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: Refinery, runoff, non-contact cooling	R.M.: 4.9	3.000	3.000	91.3

NPD PACKAGE PLANT NO. ..D PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED 7, & RAP STATUS	RIVER MILE	CAPACITY mgd	FLOW NOW mgd	AL FLOW MG/Year
PKG PLANT: n/a 2I000001*BD OUTFALL: 001 EXPIR. DATE: 09/20/92 STATUS: Active	Teledyne Industries 1330 Laskey Road 1330 Laskey Road Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 023 BASIN: Maumee Bay SUB-BASIN: *RAP? Yes *PRE? No STREAM: Silver Creek VERIFIED? Yes WASTE: Runoff, non-contact cooling	R.M.: 0.0	0.069	0.069	2.1
PKG PLANT: n/a 2PF00000*GD OUTFALL: EXPIR. DATE: 12/27/90 STATUS: Active	Toledo Bay View Park WWTP 1 Govt Center, Ste 1500 3900 N Summit, 43611 Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 BASIN: Maumee SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Municipal Wastewater	R.M.: 1.4	102.000	91.150	2774.4
PKG PLANT: n/a 2ID00011*CD OUTFALL: 001 EXPIR. DATE: 01/01/93 STATUS: Active	Toledo Coke 436 7th Ave. 2563 Front Street, Toledo Lucas County, Toledo OLD NAME(S): Koppers	WTRSHED NO: 015 BASIN: Maumee Bay SUB-BASIN: Maumee River *RAP? Yes *PRE? No STREAM: Maumee River VERIFIED? Yes WASTE: Runoff, Non-contact cooling water	R.M.: 1.7	3.730	3.730	113.5
PKG PLANT: n/a 2IW00260*BD OUTFALL: 002 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 003 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Duck Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 004 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 005 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Duck Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 006 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 007 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*BD OUTFALL: 008 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 BASIN: Maumee Bay SUB-BASIN: Maumee Bay *RAP? Yes *PRE? No STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	R.M.: 3.4	0.000	0.000	0.0

NPDES & PACKAGE PLANT NO. AND PERMIT STATUS	FACILITY NAME AND ADDRESS LOCATION, COUNTY, AND CITY	RECEIVING STREAM(S) BASIN, SUB-BASIN, WATERSHED 8, & RAP STATUS		RIVER MILE	CAPACITY FLOW mgd	NOW mgd	ANNUAL FLOW MG/Year
PKG PLANT: n/a 2IW00260*BD OUTFALL: 009 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 SUB-BASIN: Maumee Bay STREAM: Otter Creek VERIFIED? Yes WASTE: WTP Backwash	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 3.4	0.000	0.000	0.0
PKG PLANT: n/a 2IW00260*CB OUTFALL: 001 EXPIR. DATE: 10/23/92 STATUS: Active	Toledo Collins Park WTP PO Box 786 York St @ Collins Park Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 014 SUB-BASIN: Maumee Bay STREAM: Otter Creek VERIFIED? Yes WASTE: Backwash supernatant	BASIN: Maumee Bay *RAP? Yes *PRE? No	R.M.: 3.4	10.500	10.500	319.6
PKG PLANT: n/a 2IB00002*CD OUTFALL: EXPIR. DATE: 01/09/92 STATUS: Active	Toledo Edison 300 Madison Ave 300 Madison Ave Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 SUB-BASIN: Maumee River STREAM: Maumee River VERIFIED? Yes WASTE:	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 4.0	0.000	0.000	0.0
PKG PLANT: n/a 2IB00001*CD OUTFALL: EXPIR. DATE: 08/09/87 STATUS: Expired	Toledo Edison - ACME Station 300 Madison Ave 1401 Front St Lucas County, Toledo OLD NAME(S):	WTRSHED NO: 015 SUB-BASIN: Maumee River STREAM: Maumee River VERIFIED? Yes WASTE: Cooling wtr, Ash ponds	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 4.0	406.000	406.000	12357.6
PKG PLANT: L-100 2IB00000*JD OUTFALL: 604 EXPIR. DATE: 09/15/90 STATUS: Active	Toledo Edison Bayshore Plant 300 Madison Ave. 4701 Bayshore Road (E. of Channel St.) Lucas County, Oregon Twp. OLD NAME(S):	WTRSHED NO: 028 SUB-BASIN: STREAM: Driftmeyer Ditch VERIFIED? Yes WASTE: Sewage & cooling water	BASIN: Lake Erie *RAP? Yes *PRE? No	R.M.: 0.0	0.015	0.015	0.5
PKG PLANT: L-98 2PB00066*AD OUTFALL: EXPIR. DATE: 07/13/93 STATUS: Active	Toledo House of Correction 1 Government Center, Ste. 1710 7846 Schadel Road, 43571 Lucas County, Waterville Twp. OLD NAME(S):	WTRSHED NO: 040 SUB-BASIN: Swan Creek STREAM: Blue Creek VERIFIED? Yes WASTE: Sewage	BASIN: Maumee River *RAP? Yes *PRE? No	R.M.: 0.0	0.040	0.040	1.2
PKG PLANT: W-39 R 724 *AD OUTFALL: EXPIR. DATE: / / STATUS: To be sewered	Union 76 Truck Stop and Restaurant 16000 9-Mi. Rd I-280 & Tpk. (@ Libbey Rd) Wood County, Lake Twp. OLD NAME(S):	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek VERIFIED? Yes WASTE:	BASIN: Lake Erie *RAP? Yes *PRE? No	R.M.: 0.0	0.030	0.030	0.9
PKG PLANT: n/a 2IV00080*BD OUTFALL: EXPIR. DATE: 01/22/89 STATUS: Active	Waterville WTP 16 N 2nd St Waterworks Dr. Lucas County, Waterville OLD NAME(S):	WTRSHED NO: 043 SUB-BASIN: Maumee River STREAM: Maumee River VERIFIED? Yes WASTE: WTP Backwash Water	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 21.1	0.026	0.026	0.8
PKG PLANT: L-60 2PS00002*BD OUTFALL: 001 EXPIR. DATE: 05/12/85 STATUS: Expired	Woodside Terrace Trailer Park 5025 Brinthaven 7717 Angola Rd Lucas County, Springfield Twp. OLD NAME(S):	WTRSHED NO: 009 SUB-BASIN: Swan Creek STREAM: Wolf Creek VERIFIED? Yes WASTE: Sewage	BASIN: Maumee *RAP? Yes *PRE? No	R.M.: 0.0	0.080	0.080	2.4
*** Total ***					596.983	576.369	17543.2

APPENDIX D

Package Sewage Treatment Plants in the RAP Area

APPENDIX D

PACKAGE SEWAGE TREATMENT PLANTS IN THE RAP AREA

SOURCE: TMACOG Package plant database, compiled from OEPA NWDO, County Health Departments, & field investigations

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
** County Totals for Lucas						
* Township Totals for Jerusalem						
PLANT: L-1 BUILT: 1964	Anchor Point Marina (AKA Condo Marine Properties) off Corduroy Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie, via boat lagoon	BASIN: Lake Erie	10000	10000	3.7
PLANT: L-2 BUILT:	Butch and Denny's Bait and Sporting Goods Corduroy Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	1500	1500	0.5
PLANT: L-3 BUILT: 1969	Cooley Canal Yacht Club Bono Rd. - South Side, North of SR 2 Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	4000	4000	1.5
PLANT: L-4 BUILT: 1974	Country Inn 10711 Jerusalem Road Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	2000	2000	0.7
PLANT: L-5 BUILT: 1961	Eisenhower Jr. High School 331 N. Curtice Lucas County, Jerusalem Twp.	WTRSHED NO: 029 SUB-BASIN: Wolf Creek STREAM: Wolf Creek	BASIN: Lake Erie	20000	20000	7.3
PLANT: L-6 BUILT:	Flying Bridge Restaurant Anchor Point, N. side Corduroy Rd., E. of Teachout Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	6000	6000	2.2
PLANT: L-7 BUILT:	Gulish Villa 7802 Jerusalem Road Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie via Anderson Ditch via SR	BASIN: Lake Erie	7000	7000	2.6
PLANT: L-8 BUILT: 1967	Jack's Cardinal Supermarket SE Cor. Howard Rd. & Rachel Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	1000	1000	0.4
PLANT: L-9 BUILT: 1962	Lakemont Landing N. end Coolie Rd., Reno Plat 4, lot 1581 Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	6000	6000	1.1
PLANT: L-10 BUILT: 1967 (expansion)	Our Lady of Mt. Carmel E. Side of Elliston Rd., N. of Veler Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar STREAM: Cedar Creek	BASIN: Lake Erie	4000	4000	1.5
PLANT: L-11 BUILT:	Professional Mechanical Service 406 N. Howard Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	1500	1500	0.5
PLANT: L-12 BUILT: 1965	Wolf Creek Sportsman's Association 349 Teachout Rd. Lucas County, Jerusalem Twp.	WTRSHED NO: 031 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	2000	2000	0.7
* Subsubtotal *				65000	65000	22.6

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
* Township Totals for Monclova						
PLANT: L-14 BUILT: 1967	Chateau Estates 10430 Airport Hwy Lucas County, Monclova Twp.	WTRSHED NO: 009 SUB-BASIN: Swan Creek STREAM: Wolf Creek	BASIN: Maumee River	36000	36000	13.1
PLANT: L-15 BUILT: 1961	Highway Patrol Post 10391 Airport Hwy., E of Turnpike Lucas County, Monclova Twp.	WTRSHED NO: 009 SUB-BASIN: Swan Creek STREAM: Swan Creek	BASIN: Maumee River	1500	1500	0.5
PLANT: L-16 BUILT: 1973	Monclova School (New) Monclova Road & Waterville-Monclova Rd Lucas County, Monclova Twp.	WTRSHED NO: 009 SUB-BASIN: Swan Creek STREAM: Swan Creek	BASIN: Maumee River	5000	5000	1.8
PLANT: L-17 BUILT: 1966	Monclova School (Old) 4526 Lose Rd. Lucas County, Monclova Twp.	WTRSHED NO: 041 SUB-BASIN: Swan Creek STREAM: Swan Creek	BASIN: Maumee River	8500	8500	3.1
* Subsubtotal *				51000	51000	18.6
* Township Totals for Oregon						
PLANT: L-113 BUILT: 1988	Bay Village Condominiums N side Bayshore Rd 1000' W of Stadium Lucas County, Oregon Twp.	WTRSHED NO: SUB-BASIN: STREAM: Lake Erie	BASIN:	200000	200000	73.0
PLANT: L-19 BUILT: 1962	Buckeye Pipeline 3211 York Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Otter Creek	BASIN: Maumee Bay	1500	1500	0.5
PLANT: L-20 T213*BD BUILT: 1957	Chessie System Presque Isle Dock, near Otter Creek & Bayshore Rds Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Maumee Bay	BASIN: Maumee Bay	2500	2500	0.9
PLANT: L-99 BUILT:	Clay School Complex 5633 Seaman Rd., @ NW cor. of Seaman & Stadium Rd Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	30000	30000	11.0
PLANT: L-21 BUILT: 1973	G.A.F. Society Banquet Hall 3624 Seaman Rd. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Amlosch Ditch	BASIN: Lake Erie	3000	3000	1.1
PLANT: L-22 BUILT:	Globe Industries, Inc. 645 N. Lallendorf St. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	6000	6000	2.2
PLANT: L-23 BUILT: 1964	Lakefront Dock & Terminal Co. Otter Creek & Bayshore Rds Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Otter Creek	BASIN: Maumee Bay	3000	3000	1.1
PLANT: L-24 BUILT:	Lakeside Trailer Park 5404 Bayshore Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	2000	2000	0.7
PLANT: L-25 2IN00069 BUILT: 1966	Liquid Carbonic Corp. 3742 Cedar Point Rd. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	1500	1500	0.5

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-26 BUILT: 1981	Lucas County Residential Center 133/157 Wynn Rd. (NW cor. Wynn & Seaman) Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	2000	2000	0.7
PLANT: L-27 BUILT: 1973	National Wire of Ohio, Inc. 832 N. Lallendorf Rd. at York St. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Amlosch Ditch	BASIN: Lake Erie	3500	3500	1.3
PLANT: L-28 BUILT:	Oregon Municipal Building 5330 Seaman Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	5000	5000	1.8
PLANT: L-29 MI 49267 BUILT:	Shuer, Jay J., School 4955 Seaman Rd. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Johlin Ditch -> tile field	BASIN: Maumee Bay	3000	3000	1.1
PLANT: L-30 BUILT: 1958, 1974	Standard Oil Asphalt Plant Cedar Point Rd. at Otter Creek Rd. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Otter Creek	BASIN: Maumee Bay	21500	21500	7.9
PLANT: L-100 2IB00000*ID BUILT:	Toledo Edison Bayshore Plant 4701 Bayshore Road (E. of Channel St.) Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Driftmeyer Ditch	BASIN: Lake Erie	15000	15000	5.5
PLANT: L-31 BUILT:	Vargo Carry Out 5781 Corduroy Rd. Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	2500	2500	0.9
PLANT: L-101 BUILT:	Wynn Elementary School 5633 Bay Shore Rd Lucas County, Oregon Twp.	WTRSHED NO: 028 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	0	0	0.0
* Subsubtotal *				302000	302000	110.3
* Township Totals for Providence						
PLANT: L-33 BUILT: 1970	Peaceful Acres Trailer Park 13555 Waterville-Neapolis Rd. Lucas County, Providence Twp.	WTRSHED NO: 038 SUB-BASIN: Swan Creek STREAM: Blue Creek	BASIN: Maumee River	12500	12500	4.6
* Subsubtotal *				12500	12500	4.6
* Township Totals for Richfield						
PLANT: L-35 BUILT:	Corbett Gentry (Private Residence) 3917 Richfield Center Rd. Lucas County, Richfield Twp.	WTRSHED NO: 001 SUB-BASIN: STREAM:	BASIN:	1500	1500	0.5
PLANT: L-36 BUILT:	Richfield Center Market 3902 Washburn Lucas County, Richfield Twp.	WTRSHED NO: 001 SUB-BASIN: STREAM:	BASIN:	1000	1000	0.4
* Subsubtotal *				2500	2500	0.9
* Township Totals for Spencer						
PLANT: L-37 2PH00014*CD BUILT: 1970	Oak Terrace 329 Oak Terrace Blvd. (off Angola at Irwin) Lucas County, Spencer Twp.	WTRSHED NO: 009 SUB-BASIN: Swan/Wolf Cr STREAM: Butler Ditch->Drennan Dt, Wolf Cr.	BASIN: Maumee River	100000	100000	36.5

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-38 BUILT: 1963	Spencer-Sharples School Unknown Lucas County, Spencer Twp.	WTRSHED NO: 001 BASIN: Maumee River SUB-BASIN: Swan/Wolf Cr STREAM: Butler Ditch->Drennan Dt->Wolf Cr.	15000	0	0.0
* Subsubtotal *					
			115000	100000	36.5
* Township Totals for Springfield					
PLANT: L-39 BUILT: 1960, 1974	Bancroft Trailer Park 6951 Bancroft, Toledo OH 43615 (bet. McCord & King Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Haefner Ditch	6000	6000	2.2
PLANT: L-40 BUILT: 1969	Burroughs Corporation 7300 Airport Highway (W. of Holloway Rd) Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wolf Creek	4000	4000	1.5
PLANT: L-41 BUILT: 1967	Crissey Elementary School #1 Geiser Road (NW corner Crissey & Geiser Roads) Lucas County, Springfield Twp.	WTRSHED NO: 001 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Butler Ditch->Drennan Dt->Wolf Cr.	6000	6000	1.6
PLANT: L-42 BUILT: 1974	Dorr St. Elementary School Dorr and King Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Zink Ditch	13000	13000	4.7
PLANT: L-43 BUILT: 1988	Elizabeth Scott Nursing Home 2720 Albon Rd. Lucas County, Springfield Twp.	WTRSHED NO: BASIN: SUB-BASIN: STREAM: Stone Ditch	15500	11000	4.0
PLANT: L-45 BUILT: 1984, 1958	Glengary Country Club SE cor Hill & Crissey Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Drennan Dt. (effl sprayed->golf)	9000	9000	3.3
PLANT: L-46 BUILT: 1966, 1975	Hidden Lake 7777 W. Bancroft Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Zink Ditch	7200	7200	2.6
PLANT: L-47 BUILT: 1968	Holland Amoco (Station #00648) Airport Highway (SR 2) at I-475, SW corner Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wolf Creek	2000	2000	0.7
PLANT: L-48 BUILT: 1962	Holland Shopping Center 6835 Angola Rd. @ SW cor. Clarion & Angola. Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Drennan Ditch	5000	5000	1.8
PLANT: L-49 H 704 *AD BUILT: 1971 or before	Lincoln Green Subdivision 6520 Burnham Green Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Potter Ditch -> Zink/Heldman Ditch	168000	160000	58.4
PLANT: L-50 BUILT: 1972	Monclova Care Center 9831 Garden Road, 2000 ft E. of Eber Rd. Lucas County, Springfield Twp.	WTRSHED NO: 041 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Cunningham Ditch	8000	8000	2.9
PLANT: L-51 BUILT: 1969	Neville Funeral Home 7438 Airport Highway Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wolf Creek	8000	8000	2.9
PLANT: L-52 BUILT: 1970	Oak Grove Mobile Court 1839 McCord Rd, N. of NW cor. of intersection w/ D Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Haeffner Ditch	8500	8500	3.1

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-53 2PH00013*CD BUILT: 1970	Oak Openings Industrial Park 1771 S. Eber Road @ Geiser Road Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Kujowski Ditch	180000	110000	40.2
PLANT: L-102 BUILT: 1957	Ohio National Guard Near Toledo Express Airport Lucas County, Springfield Twp.	WTRSHED NO: 042 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Zaleski Ditch	28500	28500	10.4
PLANT: L-54 BUILT: 1970	Royal Vilage Mobile Home Park 7519 Dorr St. (betw. Dorr & Nebraska) Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Heidman/Zink Ditch	40000	40000	14.6
PLANT: L-56 BUILT:	Springfield Saloon 904 Clark St. at Angola Road Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Drennan Ditch	6000	6000	2.2
PLANT: L-58 BUILT: 1971	Stairs Apts. 750 S. McCord Road (1000 ft N. of Angola Rd) Lucas County, Springfield Twp.	WTRSHED NO: 011 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Good Ditch	18000	18000	6.6
PLANT: L-57 BUILT: 1968	Sun Oil Company 6405 Airport Highway (at I-475) Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wolf Creek	1500	1500	0.5
PLANT: L-44 BUILT: 1971	Twin Hills Apts. (form. 4S+2) 6653 Dorcas @ SW cor. of Dorcas & Hill Lucas County, Springfield Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Potter Ditch -> Zink Ditch	2000	2000	0.7
PLANT: L-59 BUILT: 1972	Villa West 10005 Garden Road Lucas County, Springfield Twp.	WTRSHED NO: 041 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Cunningham Ditch	15000	15000	5.5
PLANT: L-60 S702*BD BUILT: 1969	Woodside Terrace Trailer Park 7717 Angola Rd Lucas County, Springfield Twp.	WTRSHED NO: 009 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wolf Creek via tributary from north	80000	80000	29.2
* Subsubtotal *			631200	548700	199.9
* Township Totals for Swanton					
PLANT: L-61 BUILT: 1979	Arrowhead Trailer Park 5402 Jerome Road, W. side SR 295, S. of Turnpike Lucas County, Swanton Twp.	WTRSHED NO: 007 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Wiregrass Ditch	35500	35500	13.0
PLANT: L-62 2PP00003*CD BUILT: 1961 or earlier	Oak Openings - Fallen Timbers Service Plaza Turnpike near Shaffer Road Lucas County, Swanton Twp.	WTRSHED NO: 007 BASIN: Maumee River SUB-BASIN: Swan/Wolf Cr STREAM: Murback Ditch->Prairie Ditch->AI Cr	150000	110000	40.2
PLANT: L-63 BUILT:	Ohio Gas Co. Airport Highway Lucas County, Swanton Twp.	WTRSHED NO: 007 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Ai Creek	2000	2000	0.7
PLANT: L-64 BUILT: 1951	Swanton School Airport Highway E. of US 20A (Maumee-Western Road) Lucas County, Swanton Twp.	WTRSHED NO: 039 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Gale Run	6000	6000	1.6

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-65 BUILT: 1963	Valleywood Golf Club 13501 Airport Hwy. @ NW cor Scott & SR 2 Lucas County, Swanton Twp.	WTRSHED NO: 007 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Ai Creek	12500	12500	4.6
* Subsubtotal *			206000	166000	60.1
* Township Totals for Sylvania					
PLANT: L-67 BUILT: 1969	Arbor Hills Jr. High (Sylvania Middle School) 5334 Whiteford Rd @ SE cor. Whiteford & McGregor Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via tributary	18000	18000	6.6
PLANT: L-68 G 702 *AD BUILT: 1972 or earlier	Bentbrook Farms 5447 Sturbridge Road Lucas County, Sylvania Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek	60000	120000	43.8
PLANT: L-69 BUILT: 1971, 1974	Briarfield Rest Home 5757 Whiteford Road (N of Alexis) Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	15000	15000	5.5
PLANT: L-71 Y700*CD BUILT: 1980 (expansion)	Centennial Manor 3230 Centennial Road Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	30000	30000	11.0
PLANT: L-72 BUILT: 1959	Central Avenue Elementary School 7460 W. Central Ave. at NE cor. Centennial Rd. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek	12500	12500	4.6
PLANT: L-73 BUILT: 1963	Central Mobile Village Trailer Park 7924 W Central Ave. (E. of Centennial Rd) Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek	12500	12500	4.6
PLANT: L-76 BUILT: 1974	Courts of Sylvania Centennial Rd. at Little Rd. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek -> tile field	2000	2000	0.7
PLANT: L-77 BUILT:	Design for Living 7640 W. Bancroft St. Lucas County, Sylvania Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Zink Ditch	1000	1000	0.4
PLANT: L-78 BUILT: 1971	Franklin Park Cinemas 5235 Monroe St., 0.5 mi. W of Talmadge Rd. Lucas County, Sylvania Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tifft Ditch via storm sewer	12000	12000	4.4
PLANT: L-79 BUILT: 1971	Garden Court South Apartments 5522 Alexis Rd @ SW cor. of Alexis & Rudyard Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	3000	3000	1.1
PLANT: L-80 BUILT: 1969	General Telephone 3126 McCord Road at Central Ave. Lucas County, Sylvania Twp.	WTRSHED NO: 202 BASIN: Maumee River SUB-BASIN: Swan Creek STREAM: Hill Ditch	1500	1500	0.5
PLANT: L-81 BUILT: 1973	Golden Garden Tavern & Restaurant 8256 W. Central Ave. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	8000	8000	2.9
PLANT: L-83 BUILT: 1967	Home Cafe 5102 W. Alexis Rd (at Whiteford Rd.) Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	3500	3500	1.3

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-85 BUILT: 1970	Oak Tree (Shopping Center) 4024 N. Holland-Sylvania Rd. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	8500	8500	3.1
PLANT: L-86 2IS00008*ED BUILT: 1964	Reichert Stamping 8200 W. Central Ave. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	8000	8000	2.9
PLANT: L-87 2IQ00002 BUILT: 1970	Robintech 3610 Centennial Road Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	1500	1500	0.5
PLANT: L-88 BUILT: 1973	Second Honeymoon (Motel) 8613 W. Central Ave. Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek	7000	7000	2.6
PLANT: L-82 BUILT: 1966	Shed, The 5365 Monroe St (at Sadalia Road) Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via Monroe St. storm	2500	2500	0.9
PLANT: L-90-B BUILT: 1969 (Phase I)	Swiss Aire Chalet Condominiums, Middle plant 4555 to 4615 Holland-Sylvania Rd., Toledo Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	6000	6000	2.2
PLANT: L-90-A BUILT: 1968 (Phase III)	Swiss Aire Chalet Condominiums, North Plant 4555 to 4615 Holland-Sylvania Rd., Toledo Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	12000	12000	4.4
PLANT: L-90-C BUILT: 1967 (Phase II)	Swiss Aire Chalet Condominiums, South Plant 4555 to 4615 Holland-Sylvania Rd., Toledo Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	6000	6000	2.2
PLANT: L-92 BUILT: 1977 (filters)	Toledo Concrete Pipe Company 3756 Centennial Road, (S. of Sylvania Ave.) Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	1500	1500	0.5
PLANT: L-70 BUILT: 1973, 1981	Ventura's Restaurant 7742 W. Bancroft, (west of Hesyler) Lucas County, Sylvania Twp.	WTRSHED NO: 004 BASIN: SUB-BASIN: STREAM: Haeffer Ditch via	7000	7000	2.6
PLANT: L-94 BUILT:	Wayside General Store 7702 W. Bancroft Lucas County, Sylvania Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Zink Ditch	1000	1000	0.4
PLANT: L-95 BUILT: 1966	Whiteford Elementary School 4708 Whiteford Rd Lucas County, Sylvania Twp.	WTRSHED NO: 003 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Tenmile Creek via storm sewer	10000	10000	3.7
* Subsubtotal *			250000	310000	113.2
* Township Totals for Toledo					
PLANT: L-111 BUILT: 1960s	Dial Corp. 6120 N. Detroit Ave Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	0	0	0.0
PLANT: L-109 BUILT: 1982	McDonald's SW cor Alexis & Hagman Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	7000	7000	2.6

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-104 BUILT: 1960	Mill Mfg. Co. 4511 South St. Lucas County, Toledo Twp.	WTRSHED NO: 004 BASIN: Maumee River SUB-BASIN: Ottawa River STREAM: Ottawa River via storm sewer	1500	1500	0.5
PLANT: L-112 BUILT: 1970	Netterfield's Fish & Chips N side Monroe just E of Laskey Lucas County, Toledo Twp.	WTRSHED NO: 004 BASIN: Maumee SUB-BASIN: Ottawa River STREAM: Tifft Ditch?	6000	0	0.0
PLANT: L-107 BUILT: 1980	Pee-Wee Inn Hagman 0.25 mi.N of Alexis Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	6000	0	0.0
PLANT: L-110 BUILT: 1960s	Penney, J.C., Warehouse Benore Rd Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	0	0	0.0
PLANT: L-108 BUILT: 1981	Speedway Truck Stop NE cor Alexis & Hagman Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	1500	1500	0.5
PLANT: L-106 BUILT: 1975	Standard Oil NW cor Alexis & Hagman Lucas County, Toledo Twp.	WTRSHED NO: 023 BASIN: Maumee SUB-BASIN: STREAM: Silver Creek	1500	1500	0.5

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: L-105 BUILT: 1969	State Line Builders Supply NW cor State Line & Ann Arbor RR Lucas County, Toledo Twp.	WTRSHED NO: 025 SUB-BASIN: STREAM: Halfway Creek	BASIN: Maumee	2500	2500	0.9
* Subsubtotal *				26000	14000	5.1
* Township Totals for Washington						
PLANT: L-96 2PH00000*BD BUILT: 1972 or earlier	Fuller's Creekside Estates 6064 Villamar Lucas County, Washington Twp.	WTRSHED NO: 021 SUB-BASIN: Portage STREAM: Halfway Creek	BASIN: Maumee Bay	100000	270000	98.6
* Subsubtotal *				100000	270000	98.6
* Township Totals for Waterville						
PLANT: L-97 BUILT: 1975 (additions)	Sisters of Notre Dame (AKA Lial Convent) 5900 Davis Road, bet. Obee & Weckerly Rds. Lucas County, Waterville Twp.	WTRSHED NO: 039 SUB-BASIN: Swan Creek STREAM: Swan Creek via Lake Lial	BASIN: Maumee River	17500	17500	6.4
PLANT: L-98 BUILT: 1988	Toledo House of Correction (aka Welfare Farm) 1 Government Center, Ste. 1710 Lucas County, Waterville Twp.	WTRSHED NO: 040 SUB-BASIN: Swan Creek STREAM: Blue Creek	BASIN: Maumee River	40000	40000	14.6
* Subsubtotal *				57500	57500	21.0
** Subtotal **				1818700	1899200	691.5
** County Totals for Ottawa						
* Township Totals for Allen						
PLANT: O-2 BUILT: 1958	Allen Park Mobile Court Reservation Line Road Ottawa County, Allen Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar Creek STREAM: Cedar Creek	BASIN: Lake Erie	5000	11700	4.3
PLANT: O-5 OH 0003425 BUILT: 1967	Guardian Industries NW cor Martin-Moline Rd. at SR 51 Ottawa County, Allen Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Little Crane Creek	BASIN: Lake Erie	2000	2750	1.0
PLANT: O-4 BUILT: 1972, 1983	Luther Home of Mercy Corner of Williston and Main St. Ottawa County, Allen Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek	BASIN: Lake Erie	32500	32500	11.9
* Subsubtotal *				39500	46950	17.1
* Township Totals for Benton						
PLANT: O-7 BUILT: 1975	Wayside Inn NE cor SR 579 at SR 2 (& Graytown Rd) Ottawa County, Benton Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek via tributary	BASIN: Lake Erie	3500	3500	1.3
* Subsubtotal *				3500	3500	1.3
** Subtotal **				43000	50450	18.4 ** County Totals

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
* Township Totals for Lake						
PLANT: W-94 BUILT: 1986	795 Fuel Stop (Total Oil & Arxon Motel) I-280 @ SR 795 3510 Moline-Martin Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek	BASIN: Lake Erie	12000	12000	4.4
PLANT: W-16 BUILT:	Ambassador Motor Lodge NE Corner of Rt. 280 and Hanley Rd. Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek	BASIN: Lake Erie	7500	7500	2.7
PLANT: W-17 BUILT:	Berman's Supper Club/Christmas Shop 5104 Walbridge Rd. Wood County, Lake Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar STREAM: Cedar Creek	BASIN: Lake Erie	12000	12000	4.4
PLANT: W-19 R 725 *AD BUILT:	Charter House Inn I-280 @ Hanley Rd. Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek	BASIN: Lake Erie	30000	30000	11.0
PLANT: W-86 BUILT: 1957	Fairlane Motel Hanley Road & I-280 Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek	BASIN: Lake Erie	2500	2500	0.9
PLANT: W-22 BUILT:	Gastown Service Station and Restaurant I-280 @ Libbey Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek	BASIN: Lake Erie	8000	8000	2.9
PLANT: W-23 BUILT: 1978	Great Lakes Diesel Co I-280 @ Libbey Rd., 900 ft E. of I-280 Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek	BASIN: Lake Erie	1500	1500	0.5
PLANT: W-24 BUILT: 1958	Greenbrier Motel & Real Deal Fuel Stop I-280 @ Latcha Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek	BASIN: Lake Erie	4100	4100	1.5
PLANT: W-27 BUILT:	Lusher Trailer Court E. Broadway @ Walbridge Rd. Wood County, Lake Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar Creek STREAM: Dry Creek	BASIN: Lake Erie	2000	2000	0.7
PLANT: W-29 BUILT: 1973, 1984	McDonald's I-280 @ 3486 Libbey Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Crane Creek	BASIN: Lake Erie	20000	20000	7.3
PLANT: W-28 BUILT: 1967	Metcalf Airport Airport Rd (N of NW cor. SR 795 & I-280) Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Ayres Creek	BASIN: Lake Erie	1500	1500	0.5
PLANT: W-33 BUILT: 1982	Rudolph/Libbe Inc. 6494 Latcha Road Wood County, Lake Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar STREAM: Cedar Creek	BASIN: Lake Erie	1500	1500	0.5
PLANT: W-91 BUILT: 1960	Sohio I-280 @ SR 795 Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek	BASIN: Lake Erie	1500	0	0.0
PLANT: W-35 BUILT:	Stony Ridge Inn 3491 Latcha Road @ I-280 Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek	BASIN: Lake Erie	21500	21500	7.9

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN		CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: W-36 BUILT: 1966	Total Oil Station SR 795 @ I-280, 3510 Martin-Moline Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Ayres Creek	BASIN: Lake Erie	1500	1500	0.5
PLANT: W-38 BUILT: 1977, 1985 addns	Truckstops of America I-280 @ Libbey Road Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek	BASIN: Lake Erie	40000	40000	14.6
PLANT: W-39 R 724 *AD BUILT:	Union 76 Truck Stop and Restaurant I-280 & Tpk. (@ Libbey Rd) Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane STREAM: Crane Creek	BASIN: Lake Erie	30000	30000	11.0
PLANT: W-40 BUILT: 1974	Wagoner Apartments 6817 Fremont Pike: US 20, SE of Tracy Rd Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek via storm sewer	BASIN: Lake Erie	5000	5000	1.8
PLANT: W-87-N BUILT: 1958	Wood-Lake Trailer Park NE cor. of Cummings Road crossing under Tpk Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek	BASIN: Lake Erie	15000	15000	5.5
PLANT: W-87-S BUILT: 1965	Wood-Lake Trailer Park NE cor. of Cummings Rd crossing under Tpk Wood County, Lake Twp.	WTRSHED NO: 033 SUB-BASIN: Crane Creek STREAM: Henry Creek	BASIN: Lake Erie	9000	9000	3.3
* Subsubtotal *				226100	224600	82.0
* Township Totals for Middleton						
PLANT: W-47 BUILT:	Southview Estates Mobile Home Park 12865 Five Point Road Wood County, Middleton Twp.	WTRSHED NO: 045 SUB-BASIN: Maumee River STREAM: Maumee River	BASIN: Maumee River	40000	40000	14.6
* Subsubtotal *				40000	40000	14.6
* Township Totals for Northwood						
PLANT: W-98 BUILT: 1957	East Lane Mobile Manor SE cor Florence & Shomberg Sts. Wood County, Northwood Twp.	WTRSHED NO: 013 SUB-BASIN: Maumee River STREAM: Maumee River	BASIN: Maumee River	10000	10000	3.7
* Subsubtotal *				10000	10000	3.7
* Township Totals for Perrysburg						
PLANT: W-100 BUILT:	Abbey Aetna 11140 Avenue Rd Wood County, Perrysburg Twp.	WTRSHED NO: SUB-BASIN: Maumee River STREAM: Grassy Creek?	BASIN: Maumee	3000	3000	1.1
PLANT: W-54 BUILT:	Bayer Trailer Park US 20, E. of Wood County, Perrysburg Twp.	WTRSHED NO: 032 SUB-BASIN: Cedar Creek STREAM: Dry Creek or Grassy Creek	BASIN: Lake Erie	12500	12500	4.6
PLANT: W-55-W BUILT:	Divine Word Prepatory Seminary 26581 West River Road Wood County, Perrysburg Twp.	WTRSHED NO: 044 SUB-BASIN: Maumee River STREAM: Maumee River	BASIN: Maumee River	10000	10000	3.7
PLANT: W-55-E BUILT:	Divine Word Prepatory Seminary 26581 West River Road Wood County, Perrysburg Twp.	WTRSHED NO: 044 SUB-BASIN: Maumee River STREAM: Maumee River	BASIN: Maumee River	5000	5000	1.8

PACKAGE PLANT & NPDES NO. AND YEAR INSTALLED	PACKAGE PLANT NAME AND LOCATION	RECEIVING STREAM(S) AND WATERSHED BASIN	CAPACITY gpd	FLOW NOW gpd	ANNUAL FLOW MG/Year
PLANT: W-56 BUILT:	Five Points Trailer Park 24370 Route 199 @ SE cor int Five Pts/Dunbrdg Rd Wood County, Perrysburg Twp.	WTRSHED NO: BASIN: SUB-BASIN: STREAM:	7000	7000	2.6
PLANT: W-57 BUILT: 1974	Fort Meigs State Memorial Park Off SR 65 bet. Fort & parking lot Wood County, Perrysburg Twp.	WTRSHED NO: 079 BASIN: Maumee River SUB-BASIN: Maumee River STREAM: Maumee River	5000	5000	1.8
PLANT: W-58 H 202 *AD BUILT: 1975	Henry Packing Company 9244 Fremont Pike (US 20) Wood County, Perrysburg Twp.	WTRSHED NO: 046 BASIN: Lake Erie SUB-BASIN: Cedar Creek STREAM: Dry Creek via unnamed tributary	4000	4000	1.5
PLANT: W-59 BUILT: 1948	Lime City School US 20 & Lime City Road Wood County, Perrysburg Twp.	WTRSHED NO: 032 BASIN: Lake Erie SUB-BASIN: Cedar Creek STREAM: Dry Creek via ditch	1840	0	0.0
PLANT: W-61 BUILT:	Perrysburg Estates MHP, SS #5 Lime City Rd, N of Reitz Rd. = 23720 Lime City Rd Wood County, Perrysburg Twp.	WTRSHED NO: 033 BASIN: Lake Erie SUB-BASIN: Crane Creek STREAM: Henry Ditch	25000	25000	9.1
PLANT: W-60 BUILT:	Perrysburg Township Police & Ambulance Building 26609 Lime City Road, N. of US 20 Wood County, Perrysburg Twp.	WTRSHED NO: 032 BASIN: Lake Erie SUB-BASIN: Cedar Creek STREAM: Dry Creek via ditch	1500	1500	0.5
* Subsubtotal *			74840	73000	26.7
* Township Totals for Troy					
PLANT: W-97 BUILT: 1966	Leisure Village Mobile Home Park N side Fremont Pike (US 20) @ Lemoyne Rd Wood County, Troy Twp.	WTRSHED NO: 033 BASIN: Lake Erie SUB-BASIN: Crane Creek STREAM: Crane Creek	4000	4000	1.5
PLANT: W-78 BUILT: 1974	R & L Truck & Trailer Service 3423 Genoa Rd (Rt 163) Wood County, Troy Twp.	WTRSHED NO: 033 BASIN: Lake Erie SUB-BASIN: Crane STREAM: Crane Creek	1500	1500	0.5
* Subsubtotal *			5,500 mgd	5,500 mgd	2.0 MG
** Subtotal **			356,440 mgd	353,100 mgd	129.0 MG
*** Total ***			2,218,140 mgd	2,302,750 mgd	838.9 MG

APPENDIX E

Publicly-Owned Treatment Works in the RAP Area

APPENDIX E
PUBLICLY-OPERATED TREATMENT WORKS IN THE RAP AREA

SOURCE: TMACOG Arewide Water Quality Management Plan[21]

POTW NAME	COUNTY	OPERATED BY	CAPACITY, MGD	PRESENT TREATMENT FACILITIES
** TOTAL FOR COUNTY Lucas				
Bentbrook Farms Subdiv.	Lucas	Lucas County	0.1	0.1 Extended aeration
Fuller's Creek Subdiv.	Lucas	Lucas County	0.1	0.3 Extended aeration
Lincoln Green Subdiv.	Lucas	Lucas County	0.2	0.2 Extended aeration
Maumee River WWTP	Lucas	Lucas County	15.0	9.0 Contact Stab/step feed,aer dig., belt filt
Oak Openings Ind Park	Lucas	Lucas County	0.2	0.0 Extended aeration
Oak Terrace	Lucas	Lucas County	0.1	0.1 Extended aeration, filt, CL2
Oregon South Shore Park	Lucas	Oregon	0.2	0.5 Contact Stabilization
Oregon WWTP	Lucas	Oregon	8.0	4.3 Activated Sludge, phos.
Toledo Bay View WWTP	Lucas	Toledo	102.0	91.2 Act Sludge, anaer dig., phos., belt filt press
Whitehouse WWTP	Lucas	Whitehouse	0.3	0.3 Extended aeration
** Subtotal **				
			126.1	105.9
** TOTAL FOR COUNTY Wood				
Haskins WWTP	Wood		0.1	0.1 Extended aeration, filters, drying beds
Perrysburg WWTP	Wood		2.8	3.0 Act Sldg, pre-aer, phos, anaer digest, vac dry beds
** Subtotal **				
			2.9	3.1
*** Total ***				
			129.0	109.0

APPENDIX F

Publicly-Owned Treatment Works Effluent Data

APPENDIX F
POTW 1986 EFFLUENT DATA

SOURCE: Ohio EPA NPDES effluent data

LUCAS COUNTY

POTW NAME	OEPA PERMIT NO	NPDES PERMIT NO	AVG FLOW MGD	EFFLUENT BOD mg/l	EFFLUENT TSS mg/l	EFFLUENT NH3 mg/l	EFFLUENT NO2 mg/l	EFFLUENT NO3 mg/l	EFFLUENT TOTAL P mg/l	EFFLUENT CBOD mg/l	SLUDGE DRY TONS	SLUDGE VOLUME GALLONS	SLUDGE % TOTAL SOLIDS
FULLER'S CREEKSIDE ESTATES	2PW00000*AD	OH0053732											
January, 1986			.279	10.0	12.5								
February			.463	13.0	12.3								
March			.454	13.3	10.7								
April			.300	12.8	15.2								
May			.299	9.5	14.5								
June			.268	5.7	7.0								
July			.116	7.0	9.5								
August			.095	9.5	11.0								
September			.135	8.8	16.5								
October			.216	37.4	34.0								
November			.201	22.7	17.3								
December			.371	21.3	11.7								
Annual Average			.266	14.2	14.3								
Effluent Limits, 30-day Average				30.0	30.0								
MAUMEE RIVER WWTP	2PK00000*DD	OH0034223											
January, 1986			7.653	8.3	15.4	.6	.1	13.0	.9	6.1	115.2		15.6
February			12.264	9.7	19.6	.6	.1	10.5	.8	7.8	81.6		14.8
March			13.749	16.3	25.1	2.5	.3	9.8	.9	8.4	121.5		16.9
April			9.853	15.1	22.0	1.9	.5	9.0	.9	10.0	94.9		17.6
May			7.178	12.2	11.6	.6	.1	11.2	.8	5.5	91.4		17.8
June			9.450	6.1	12.5	.5	.0	9.3	.8	4.5	128.1		20.5
July			6.893	5.6	12.9	.2	.0	12.5	.9	3.6	264.5		20.3
August			6.657	5.5	8.4	.6	.1	13.1	.7	3.8	98.8		18.4
September			7.152	7.5	11.7	.9	.1	9.5	.8	4.0	90.1		29.3
October			10.268	6.5	14.9	.3	.0	9.6	.8	4.5	80.9		17.6
November			7.478	7.8	13.8	.8	.0	11.7	.8	5.4	112.6		19.7
December			9.557	10.5	14.7	2.6	.1	7.4	.9	6.2	94.1		15.5
Annual Average			9.013	9.3	15.2	1.0	.1	10.6	.8	5.8	114.5		18.7
Effluent Limits, 30-day Average				30.0	30.0				1.0				
OREGON DUPONT RD WWTP	2PD00035*ED	OH0052914											
January, 1986			3.533	6.5	12.4	.4	.0	9.4	1.0	2.4	143.4		2.8
February			5.710	8.0	17.8	.2	.0	7.6	1.0	2.8	43.6		3.0
March			5.949	8.8	15.5	.2	.0	7.4	.9	3.4	3:1		1.9
April			3.922	6.4	10.8	.3	.0	9.5	1.0	2.0	14.6		.5
May			3.913	7.2	15.9	.2	.0	10.5	.9	2.1	34.3		3.3
June													
July			3.448	4.4	5.4	.3	.0	11.0	.9	1.9	98.4		3.3
August			3.104	3.9	7.9	.5	.1	6.7	1.0	1.4			
September			3.347	5.1	8.1	.3	.0	8.8	1.0	1.3	8.5		4.3
October			5.219	5.8	10.2	.2	.0	9.3	1.0	1.7	16.6		4.8
November			3.821	3.9	11.1	.2	.0	12.8	.9	1.7	57.1		3.8
December			5.423	8.6	17.6	.2	.0	8.3	1.0	3.6	50.3		3.8
Annual Average			4.308	6.2	12.1	.3	.0	9.2	.9	2.2	47.0		3.1
Effluent Limits, 30-day Average				20.0	20.0				1.0				

POTW NAME	OEPA PERMIT NO	NPDES PERMIT NO	AVG FLOW MGD	EFFLUENT BOD mg/l	EFFLUENT TSS mg/l	EFFLUENT NH3 mg/l	EFFLUENT NO2 mg/l	EFFLUENT NO3 mg/l	EFFLUENT TOTAL P mg/l	EFFLUENT CBOD mg/l	SLUDGE DRY TONS	SLUDGE VOLUME GALLONS	SLUDGE % TOTAL SOLIDS
OREGON	2PB00007*CD	OH0052591											
SOUTHSHORE													
January, 1986			.343	12.8	24.2	10.2	.3	.8	1.8				
February			.655	23.8	22.3	1.2	3.3	2.2	.1				
March			.705	30.9	32.1	2.5	.0	2.0	1.1				
April			.560	45.9	29.8	3.9	.1	1.8	1.6				
May			.525	39.5	48.5	4.0	.0	.9	.9				
June													
July			.382	41.1	27.9	5.1	.1	.6	1.3	23.6			
August			.296	13.1	11.1	6.2	.2	.5	1.6	8.8			
September			.306	47.8	22.3	1.2	.1	.8	8.8	7.3			
October			.585	43.1	26.8	4.9	.0	.4	.8	30.0			
November			.391	66.9	43.4	10.8	.0	.2	2.7	46.4			
December			.664	32.0	37.1	1.2	.0	2.5	1.9	24.4			
Annual Average			.492	36.1	29.6	4.7	.4	1.2	2.0	23.4			
Effluent Limits, 30-day Average				20.0	25.0								
TOLEDO	2PF00000*GD	OH0027740											
BAY VIEW WWTP													
January, 1986			67.744	36.4	35.5	19.5	.3	1.9	1.4	18.2	1891.1		6.8
February			114.861	18.8	37.6	9.3	.5	1.3	1.0	13.9	1217.8		6.4
March			126.458	17.7	25.2	7.7	.5	1.5	.8	14.8	1117.3		29.9
April			85.022	17.8	24.9	10.5	.3	1.9	.7	13.6	734.3		29.8
May			87.999	19.9	34.8	11.5	.2	2.5	1.0	13.9	517.3		29.4
June			110.340	9.5	39.3	7.9	.3	1.4	1.0	5.8	598.5		30.4
July			81.420	28.0	50.8	9.7	.2	1.5	1.7	8.6	554.8		31.0
August			73.554	16.6	35.9	11.0	.2	2.3	1.0	6.0	895.2		26.0
September			76.705	24.9	75.8	11.7	.1	1.4	1.4	10.4	439.1		27.0
October			102.152	12.1	54.7	9.4	.2	2.2	.8	5.3	521.9		31.1
November			74.819	15.3	53.8	17.5	.2	2.2	1.3	8.8	539.3		26.0
December			92.774	19.6	61.0	10.1	.3	2.2	1.5	11.9	553.5		24.8
Annual Average			91.154	19.7	44.1	11.3	.3	1.9	1.1	10.9	798.3		24.9
Effluent Limits, 30-day Average				40.0	60.0				1.0				
WHITEHOUSE *	2PB00062*CD	OH0053350											
January, 1986			.285	31.4	33.8								
February			.365	14.3	16.3								
March													
April													
May			.289	20.0	19.1	10.0	.0	.1	36.0	21.5			
June			.345	9.8	15.8	18.0	3.7	.5	1.6	17.3	.1		.7
July			.310	7.2	19.4	5.0	1.1	4.1	3.9	9.3	.1		.4
August			.300	9.5	13.3	*4*	*4*	*4*	*4*	20.8	.0		
September			.297	18.6	22.6	6.5	.9	.3	1.0	16.7	.0		.1
October			.377	18.3	33.3	.4	54.0	4.0	1.0	19.7	.0		.7
November			.303	21.0	33.3	.0	.1	6.9	.8	20.1	.1		.4
December			.365	13.0	17.3	1.5	.5	16.0	.6	15.1	.0		.6
Annual Average			.324	16.3	22.4	5.9	8.6	4.6	6.4	17.6	.0		.5
Effluent Limits, 30-day Average (Interim)				30.0	30.0								

POTW NA	OEPA PERMIT NO	NPDES PERMIT NO	AVG FLOW MGD	EFFLUENT BOD mg/l	EFFLUENT TSS mg/l	EFFL NH3 mg/l	EFFLUENT NO2 mg/l	EFFLUENT NO3 mg/l	EFFLUENT TOTAL P mg/l	EFFLUENT CBOD mg/l	SLUDGE DRY TONS	SLUDGE VOLUME GALLONS	SLU % TOT SOLIDS
LINCOLN GREEN	2PH00004*AD	OH0053520											
January, 1986			.106	3.3	5.5								
February			.176	16.3	29.5								
March			.262	13.0	5.7								
April			.148	4.6	5.8								
May			.159	9.5	4.5								
June			.172	15.0	13.3								
July			.107	5.3	4.0								
August			.133	4.3	3.0								
September			.161	7.8	16.0								
October			.284	20.0	13.4								
November			.108	64.7	83.0								
December			.160	83.7	60.7								
Annual Average			.165	20.6	20.4								
Effluent Limits, 30-day Average													
OAK OPENINGS	2PH00013*AD	OH0058483											
January, 1986													
February													
March													
April													
May			.078	21.0	14.5	8.4				20.2			
June			.141	10.3	13.7	.1				7.3			
July			.088	41.3	50.0	14.2				38.4			
August			.108	20.8	33.5	7.8				12.0			
September			.081	34.8	43.0	5.3				31.9			
October			.131	6.8	13.4	.4				5.9			
November			.150	14.0	20.7	11.6				11.4			
December			.133	30.7	31.0	28.1				22.1			
Annual Average			.114	22.4	27.5	9.5				18.7			
Effluent Limits, 30-day Average													
OAK TERRACE	2PH00014*AD	OH0058912											
January, 1986			.059	4.3	4.0	.1				3.3			
February			.069	5.5	6.8	.1				4.2			
March			.080	2.0	1.7	.2				1.4			
April			.084	3.6	5.0	.2				3.3			
May			.050	3.5	3.5	.1				3.2			
June			.097	2.0	2.7	.1				1.5			
July			.134	2.8	3.3	.2				2.4			
August			.139	2.3	1.5	.1				2.2			
September			.133	5.3	8.5	.3				4.6			
October			.158	3.0	1.6	.3				2.2			
November			.107	22.7	39.3	5.8				17.9			
December			.110	6.7	18.7	.4				6.2			
Annual Average			.102	5.3	8.0	.6				4.4			
Effluent Limits, 30-day Average													

POTW N	OEPA PERMIT NO	NPDES PERMIT NO	AVG FLOW MGD	EFFLUENT BOD mg/l	EFFLUENT TSS mg/l	EFF NH mg/l	EFFLUENT NO2 mg/l	EFFLUENT NO3 mg/l	EFFLUENT TOTAL P mg/l	EFFLUENT CBOD mg/l	SLUDGE DRY TONS	SLUDGE VOLUME GALLONS	SLU % TO SOLIDS
SYLVAN ** WOODS	2PG00000*BD	OH0054089											
January, 1986			.189	46.0	33.0								
February			.164	6.5	764.0								
March			.154	28.7	18.3								
April			.096	67.0	66.0								
May													
June													
July													
August													
September													
October													
November													
December													
Annual Average			.151	37.0	220.3								
Effluent Limits, 30-day Average													
COREY ** MEADOWS	2PG00001*BD	OH0053741											
January, 1986			.041	8.5	8.8								
February			.061	3.0	1.5								
March			.076	2.0	3.7								
April			.078	10.8	13.4								
May			.053	8.0	11.0								
June			.096	1.7	4.7								
July			.078	12.5	15.8								
August			.080	6.9	62.6								
September													
October													
November													
December													
Annual Average			.070	6.7	15.2								
Effluent Limits, 30-day Average													
BENTBROOK FARMS	2PG00002*AD	OH0053759											
January, 1986			.080	41.5	32.5								
February			.100	12.8	13.3								
March			.134	16.3	9.7								
April			.157	42.6	52.6								
May			.108	69.0	78.0								
June			.125	143.3	158.7								
July			.087	78.8	129.3								
August			.075	372.5	337.5								
September			.100	110.3	79.8								
October			.136	76.4	41.8								
November			.143	54.3	20.7								
December			.144	92.7	169.3								
Annual Average			.116	92.5	93.6								
Effluent Limits, 30-day Average													

* Plant is scheduled to be abandoned in 1988.
** Plant now out of service; this area has been tapped into the Lucas County sanitary sewer.

POTW NAME	OEPA PERMIT NO	NPDES PERMIT NO	AVG FLOW MGD	EFFLUENT BOD mg/l	EFFLUENT TSS mg/l	EFFLUENT NH3 mg/l	EFFLUENT NO2 mg/l	EFFLUENT NO3 mg/l	EFFLUENT TOTAL P mg/l	EFFLUENT CBOD mg/l	SLUDGE DRY TONS	SLUDGE VOLUME GALLONS	SLUDGE % TOTAL SOLIDS
HASKINS	2PA00026*CD	OH0021873											
January, 1986			.061	5.5	6.3	.4				4.0		.0	.7
February			.073	6.5	6.5	.1				4.0		.0	.1
March			.062	6.3	8.0	.6				6.5		2200.0	.8
April			.067	9.8	2.5	1.2				7.5		.0	.8
May			.052	8.4	5.8	1.0				3.4		7000.0	.9
June			.058	6.5	6.5	1.5				4.5		5000.0	.9
July			.056	7.7	7.0	.7				4.7		12500.0	.8
August			.054	7.3	4.0	.6				1.5		5000.0	.9
September			.061	8.0	2.5	2.4				3.5		3000.0	.8
October			.065	8.8	6.8	1.2				5.6		1500.0	.1
November			.056	10.3	4.8	1.3				8.5		2000.0	.8
December			.064	8.3	7.3	1.0				7.0		2000.0	.1
Annual Average			.061	7.8	5.7	1.0				5.1		3350.0	.6
Effluent Limits, 30-day Average				10.0	12.0								
LUCKEY ***	2PA00080*BD												
Effluent Limits, 30-day Average					65.0					25.0			
PERRYSBURG	2PD00002*CD	OH0021008											
January, 1986			2.423	9.5	43.5	11.8		*4*	.5		11.7		4.5
February			3.190	38.3	80.3	5.8		1.9	1.3		2.8		5.5
March			3.556	15.4	26.6	7.4		1.6	.6		10.5		5.5
April			3.186	17.0	45.0	8.7		.3	.9		13.7		2.9
May			2.598	35.0	64.1	12.2		.4	2.1		12.1		3.9
June			3.351	6.9	17.7	8.8		.4	1.4		18.4		4.0
July			2.856	23.7	46.4	13.2		.4	3.5		6.8		5.5
August			2.467	28.8	71.3	14.6		.4	3.4		7.8		4.2
September			2.484	28.3	49.7	15.0		.4	3.2		4.0		4.2
October			3.273	31.8	38.2	10.9		.4	1.0		16.8		3.3
November			2.896	36.8	65.3	15.5		.7	2.4		12.7		4.8
December			3.752	41.6	86.6	8.0		1.3	2.8		10.1		5.3
Annual Average			3.003	26.1	52.9	11.0		.8	1.9		10.6		4.5
Effluent Limits, 30-day Average				50.0	50.0				1.0				

*** Treatment plant completed and went into use in late 1987.

APPENDIX G

Ohio EPA *Biological Water Quality Report*
Draft Monitoring Report

APPENDIX G

LOWER MAUMEE BASIN
BIOLOGICAL AND WATER QUALITY MONITORING REPORT

D R A F T

Ohio EPA, 1986

Maumee River Macroinvertebrate Data Summary

The macroinvertebrate communities at these sites [M.P. 25.1 to 20.0] were similar to those at Stations 54.9 and 52.3. ICI values ranged from 42 to 54 and diverse mayfly and caddisfly assemblages were again present. Water quality was considered good at Station 32.1 and excellent at Stations 25.1 and 20.9.

Station 15.0 was considered to be at the upper limit of influence of Lake Erie and was upstream from the Perrysburg WWTP and any CSOs. Twenty-two and 15 taxa were collected from the artificial and natural substrates, respectively, including five mayfly taxa. The slack water caddisfly Cyrnellus fraternus was collected in relatively high numbers from the artificial substrates. The ICI score was 24, in the fair range; but given the limiting habitat (pooled conditions) the benthic community was considered indicative of good water quality.

Station 13.6 S (south bank) was downstream from several CSOs and the Perrysburg WWTP; however, the macroinvertebrate community did not indicate any significant impact. A total of four mayfly taxa were collected along with Cyrnellus fraternus. The score was 20 and water quality was considered good.

The ICI score dropped to 14 at Station 13.3 N (north bank) but remained in the fair range. The decreased ICI value was due primarily to the collection of only one qualitative EPT taxa and the absence of mayflies on the artificial substrates. The lack of qualitative EPT taxa in the qualitative sample was attributed to very poor habitat conditions. The loss of mayflies in the quantitative sample may have indicated slight degradation from CSOs. Water quality was considered marginally good.

The ICI increased to 18 at Station 8.8 N and sampling produced three mayfly taxa. However, Cyrnellus fraternus numbers were low and oligochaetes increase substantially. These factors seemed to indicate that Station 8.8 N was slightly more enriched than the stations upstream. Water quality was considered marginally good.

Macroinvertebrate sampling results revealed a depression in water quality between Stations 7.3 and 1.5. Degradation seemed especially apparent along the north bank of the Maumee River. The ICI values for the south bank stations dropped from 20 at Station 13.6 S to 12 at Station 7.3 S and 14 at Station 3.6 S. ICI values for the north bank sites decreased from 18 at Station 8.8 N to 6 at Station 1.5 N.

The discrepancy of ICI values between the north and south indicated that the majority of the degradation was from the numerous CSOs along the North bank with possibly some additional impact from Swan Creek. It is likely that Station 1.5 N was also affected by the Toledo WWTP discharge. This site was immediately upstream from the plant and was in an area heavily influenced by seiches.

Other evidence of a greater problem existing along the north bank of the Maumee River was in the failure to collect any mayfly taxa at Station RM 7.2 N and 4.5 N in failure to collect both mayflies and caddisflies at Station RM 3.1 N and 1.5 N. Conversely, both mayflies and slack-water caddisflies were collected at Station RM 7.3 S and 3.6 S.

The large volume of water carried by the Maumee River apparently provided sufficient dilution to help minimize the impact the CSOs had on the river; however, the depression of the benthic community between river miles 7.3 and 1.5 indicated that the river was unable to fully assimilate the organic loading from one source before being subjected to more wastes farther downstream. Water quality was considered fair at Stations 7.3 S and 3.6 S and marginally fair at Stations 7.2 N, 4.7 N, 3.1 N and 1.5 N.

Water quality appeared to be somewhat improved at Station 9.7 N as a result of dilution of Maumee River water with water from Maumee Bay. Twenty-nine taxa were collected from the artificial substrates including one mayfly taxa and two caddisfly taxa. However, a predominance of oligochaetes indicated moderately enriched conditions. Qualitative sampling yielded nineteen taxa and the ICI score was 16. An impact from the Toledo WWTP was not readily apparent. The plant discharge was probably dispersed prior to reaching this station. Water quality was considered marginally good.

Maumee River Fish Report

Non-point problems are believed to exist in the Maumee River as illustrated by the historic collection record. Historic records (Trautman 1981) show 87 species collected in the Lower Maumee River area. Of these 8/species the Ohio EPA (1986) did not collect 41, a near 50% loss of species. Many of the species missing are occupants of clear vegetated waters, not the kinds of waters associated with intensive agricultural activities. At no time during the survey could one have considered the Maumee River "clear".

[Sites at RM. 19.8 and 17.2] were located in and amongst a series or rapids. Community values were amongst the highest in the study area (IWB 9.0 & 8.6, IWB2 8.5 & 8.1 respectively) here. Higher current levels have kept the bottoms swept clean of silts thus mitigating non-point impacts, and allowing better community structure. In opposition to this, the monotypic habitat probably kept the diversity lower. It should be noted that these four sites were only sampled twice and both passes were during high-water conditions. The collection of darters and small riffle species was nearly impossible though boat maneuverability was much enhanced. RM 14.8 had fair amounts of current in the area and was similar tot he upstream riffle-rapids area. RM 14.1 was similar to RM 14.8 though current was much reduced here. True lake effect conditions (near total lack of current) were realized at RM 13.7. Community values dropped nearly a full point (IWB 7.5 IWB2 7.1). This is most likely a consequence of habitat conditions than any discharge from th Perrysburg WWTP (RM 14.5).

Community conditions remained near this level at RMs 9.4, 7.4, 7.3 and 4.7. Species composition did change at RM 4.7 downstream of Swan Creek. Many of the more sensitive species were absent at this site due to degraded environmental conditions via Swan Creek and also numerous upstream CSOs. IWB ranged from 7.8 to 7.1 while IWB2 ranged from 7.5 to 6.4. The next five downstream stations (RMs 3.6, 3.3, 1.5 & 0.6) also formed an identifiable unit. I group these sites because strong seiche activities move pollution plumes both up and downstream in this area. IWB's for these sites ranged between 7.2 and 6.4 and IWB2's ranged between 6.5 and 5.5, approximately a full point below those sites just upstream. It is believed that upstream movement of the Toledo WWTP plume and the numerous CSOs are the cause of the low community values (primarily the WWTP effect).

The effect of the WWTP is best illustrated by the Maumee Bay sites. Sites 0.1 (Bayshore intake channel) and 0.0 (SE shore Grass Island disposal area) displayed the lowest community values in the Bay Areas. These sites are closest to the Toledo WWTP discharge and showed the best community values in the bay area. When plotted by distance from the WWTP the data show what appears to be a classic DO sag associated impact (RM 0.1). Sites upstream of the WWTP also appear to be effected by the discharge, but not as strongly, and some of this effect is undoubtedly due to accumulating CSO problems.

D.E.L. & T. anomaly data were more confusing. Those sites with the fewest individuals frequently had the lowest values for anomalies, though not always. The strongest statement that can be made is that there is a significant number of anomalies associated with the Bayshore discharge. In light of the use of chlorine at such facilities this type of situation is not surprising.

Lower Maumee River - 1986 Data Summary

1. Background water quality at Grand Rapids dam pool (RM 32.6) was good with D.O. of 5.8 - 10.3 mg/l, low NH_3 (≤0.16 mg/l) and NO_2 (≤0.11 mg/l), phosphorus (≤0.7 mg/l), phenolics (≤ 20 ug/l), cyanide (≤0.005 mg/l), and cadmium, chromium and nickel at or below detection. Three violations of WQS were measured for copper (15, 20, 35 ug/l) along with a slight increase in lead (up to 10 ug/2) and zinc (up to 80 ug/l). NO_3 ranged from 0.35 - 5.0 mg/l and TSS was as high as 297 mg/l but usually averaged 50 mg/l or less.

2. At Waterville (RM 20.1) D.O. increased to 8.1 - 13.3 mg/l (rapids), NO_2 (0.02 - 0.20 mg/l) and NH_3 (≤ 0.09 mg/l), were similar to upstream. Phosphorus of 0.2 - 0.5 mg/l was a little less but TSS stayed high at 55 - 141 mg/l. Cadmium, Chromium, Nickel, Lead, and Zinc stayed the same or declined. Only one WQS violation for Copper (15 ug/l) was detected.

3. Between Waterville and Toledo (RM 17.2) D.O. continued at good levels (6.5 - 11.4 mg/l). NH_3, NO_2, NO_3, Phosphorus, TSS Cd, Cr, Pb, Ni, and Zn were similar to low background. Still had 3 violations of WQS for Copper (15, 15, 30 ug/l).

4. On the south side of Ewing Is. (RM 13.6), downstream of the Perrysburg WWTP and CSOs, D.O. content stayed between 6.2 and 11.1 mg/l. NH_3 generally was low (≤ 0.16 mg/l) and NO_2 (0.02 - 0.17 mg/l) and NO_3 (1-4 mg/l) were similar to upstream. Phosphorus (0.1 - 1.1 mg/l) slightly increased and TSS was elevated (22 - 538 mg/l) particularly in July and late September to October. Cd, Cr and Ni were at or below detection while Pb of 14 ug/l, Zn of 90 ug/l and two violations of WQS for Cu (18, 30 ug/l were collected.

5. The transect at RM 9.4, Eagle Pt. Colony to upstream of Walbridge Marine, had a good range of dissolved oxygen content (6.1 - 10.9 mg/l) and NO_3 was transported in amounts similar to upstream (up to 4.7 mg/l). NO_2 up to 0.18 mg/l also was same as upstream. NH_3 (max. of 0.12 mg/l) generally was as low as upstream. There was typically a greater amount of TSS (22 - 538 mg/l) in bottom samples. Copper violated WQS on 15 and 17 August. Zinc increased to a max. of 100 ug/l but usually was ≤50 ug/l. Cd, Cr, Pb, Ni, phenolics and cyanide were not significant. Phosphorus stayed approximately 1 mg/l. Depths here in the middle of the river typically were greater than 15 feet but less than 20 feet.

6. The next transect at RM 6.5 was located in the turning basin at the upper end of the shipping channel (depths average 30 feet). Dissolved oxygen declined to 5.6 - 8.4 mg/l, usually being greater at top but not by more than 2 mg/l. NO_3 (0.3 - 4.4 mg/l) and NO_2 (≤0.02 - 0.19 mg/l) was in the same range as upstream. However, NH_3 increased a small amount up to 0.28 mg/l particularly later in summer (Aug. - Sept.). Phosphorus continued at <0.05 - 0.60 mg/l while TSS was similar to and occasionally higher than upstream (19 - 280 mg/l) with greater concentrations near the bottom. Copper violations occurred on the same two days in August as upstream. Zinc generally stayed similar to upstream (≤10 - 80 ug/l). Arsenic (source LOF landfill) of up to 23 ug/l and lead of 12 ug/l were detected but usually much less was found. Cyanide, phenolics, oil/grease, Cd, Cr, and Ni were not significant.

7. The Cherry Street Bridge transect (RM 4.9) is downstream from Swan Creek and CSOs. D.O. was further depressed to 3.9 - 7.2 mg/l, and usually <1 mg/l of difference (max. 3 mg/.1) was detected between bottom and surface. The largest decreases in D.O. occurred from July to August. NO_3 of 0.3 - 4.4 mg/l and NO_2 (0.04 - 0.22 mg/l) were similar to upstream. NH_3 definitely increased in late August through September (0.15 - 0.35 mg/l). On July 15 there was a distinct elevation in Arsenic (27 + 34 ug/l); all other days were low. Zinc was similar or occasionally higher than upstream (≤10 - 90 ug/l).

8. One cadmium of 0.6 ug/l was taken near the bottom on August 8 and copper violations primarily occurred in July and early August. Lead was similar to upstream except for one very high value (70 ug/l) which was the only one in the study area and may be due to sampling/analysis error. There was no real change in TSS (18 - 296 mg/l). and Cr, Ni, CN, phenolics and oil/grease were not of note.

9. The Maumee River downstream of I-280 bridge (RM 3.33) also had a lowered range of D.O. (2.6 - 7.4 mg/l) which was similar to upstream except for slight reduction during August (2.6 - 6.0 vs. 3.0 - 7.0 mg/l upstream). NO_3 (0.4 - 4.7 mg/l), NO_2 (.05 - 0.18 mg/l), NH_3 (≤0.05 - 0.37 mg/), phosphorus (0.1 - 0.6 mg/l) and TSS (21 - 165 mg/l) were comparable to upstream. Arsenic increased to 32 (surface) + 40 (bottom) ug/l in July but was similar to upstream at other times. Cadmium was more often above detection limits but ≤0.6 ug/l. Copper was elevated in July and early August, as expected. Lead generally was low and zinc was similar to upstream. Chromium, nickel, phenolics, cyanide and oil/grease all were not significant.

10. Just upstream of the toledo Bayshore WWTP and bypass (RM 1.5) D.O. content of 3.2 - 7.1 mg/l was not much greater than the previous site nearly 2 miles upstream. NO_3 continued to range from 0.5 - 5.0 mg/l while NO_2 usually was a bit higher (0.02 - 0.43 mg/l) than upstream. NH_3 dramatically increased to as much as 2.15 mg/l but never violated WQS. A lot of the impact in this area is due to lake effect carrying bypass waste upstream and holding bypass and effluent in the area. Phosphorus typically was <0.75 mg/l. TSS also was comparable to upstream but elevated in bottom samples on 3 days (142 - 450 mg/l). Arsenic decreased, as did Cd, while Cr, Ni, Pb and Zn were below detection or as low as upstream levels. Copper violations persisted, but never very high.

11. Downstream of the Bayshore WWTP, D.O. generally declined a small amount to 3.3 - 6.3 mg/l while NH_3 was similar to upstream (some higher, some lower) with four days > 1 mg/l. NO_3 (0.5 - 5.0 mg/l) and NO_2 (0.02 - 0.56 mg/l) were comparable to upstream. Zinc on August 27 (170 ug/l) violated WQS; all other days usually were <75 ug/l. similar to upstream. Phosphorus (≤0.7 mg/l), TSS (21 - 258 mg/l), Cu, Pb, Cd, Cr, and Ni were equally low as upstream or near/below detection limits.

12. The last narrow portion of the river before Cullen Park estuary (RM 0.5) had only 1 low D.O. of 3.6 mg/l; at all other times D.O. ranged from 4.0 - 7.3 mg/l, both greater and lesser than upstream. NH_3 generally was less than upstream but still up to 1.2 mg/l was detected. Ranges for NO_3 (0.5 - 5.1 mg/l), NO_2 (0.02 - 0.20 mg/l), phosphorus (≤0.5 mg/l) TSS (23 - 264 mg/l), Cd (≤0.5 mg/l), Cu (≤15 ug/l), and Pb (≤15 ug/l) were similar to upstream. Zinc generally was low (≤65 ug/l) except a bottom sample of 105 ug/l. Cr, Ni Cyanide, and phenolics were less than detection.

13. The Maumee Estuary in the Cullen Park sample area (RM 0.2) was shallow (6 ft. max.). D.O. of 4.5 - 9.7 mg/l was variable in comparison to upstream. NH_3 was similar to upstream (0.09 - 0.97 mg/l) but as high as 1.4 mg/l. Ranges for NO_3 (0.5 - 5.1 mg/l), NO_2 (0.02 - 0.20 mg/l), phosphorus (≤0.5 mg/l) were comparable to upstream. TSS usually was ≤80 mg/l but up to 150 mg/l. Copper typically was ≤10, but in July, 20 ug/l was detected. Zinc was ≤65 ug/l except on August 27 when 140 and 470 ug/l surface and bottom concentrations were found the same day as the violation at RM 1.0 (but not at RM 0.5). As, Cd, Cr, Pb, Ni, and Se were near or below detection.

14. At Maumee estuary RM 0.1 (actually the average 16 - 18 feet deep Bayshore power plant intake channel) the D.O. range was slightly reduced (2.1 - 8.0 mg/l) while NH_3 was frequently lower than the river proper (<0.05 - 0.58 mg/l) but as high as 1.1 mg/l. NO_2 also occasionally was higher (0.02 - 0.27 mg/l) than upstream. NO_3 (0.6 - 5.2 mg/l), phosphorus (≤.5 mg/l), and TSS (23 - 81 mg/l) were similar to lower than upstream. Copper typically was <12 ug/l but with violations in July. Zinc declined to ≤60 ug/l on all dates and depths. As, Cd, Cr, Pb, Ni and Se were near or below detection.

15. Maumee Estuary RM 0.0, which is in more direct line with RM 0.5, had a D.O. content similar to RM 0.5 (3.1 - 7.5 mg/l) while NH_3 (0.05 - 0.86 mg/l) tended on occasion to be a little higher (max. 1.3 mg/l). NO_3 (0.5 - 5.3 mg/l), NO_2 (0.02 - 0.25 mg/l), and phosphorus (≤0.6 mg/l) were comparable while TSS (10 - 121 mg/l) could be a small amount greater than upstream. Copper (up to 20 ug/l) was detected in July and early August. Zinc was elevated on August 27 (same day as the other upstream violations) at bottom to 140 ug/l; otherwise it was ≤ 60 ug/l. Cd, Cr, Pb, Ni and Se were near or below detection.

Swan Creek Macroinvertebrate Data Summary

Swan Creek was sampled at river miles 10.2, 4.9, 3.9, 2.6, 1.2 and 0.6 primarily to evaluate the impact of numerous CSOs which flow into the stream between river miles 4.3 and 0.8. Station 10.2 had a relatively diverse benthic community but was suggestive of moderate enrichment. The ICI scored a 24 which is in the fair range. The artificial substrates yielded 33 taxa numerically predominated by the pollution intermediate mayfly Stenacron. Qualitative sampling resulted in the collection of 31 taxa predominated by isopods and midges. The natural substrates consisted primarily of sand which probably limited taxa richness and density. Water quality was considered fair.

The ICI decreased to 16 at Station 4.9 indicating that urban runoff was degrading the stream. Twenty-eight taxa were collected from the artificial substrates. The mayfly Stenacron was again numerically predominant in the quantitative sample. Qualitative sampling produced 22 taxa with midges predominant. The lower ICI value was due primarily to fewer mayfly and total taxa and the absence of caddisflies. Water quality remained fair.

Station 3.9 was severely degraded apparently by organic wastes and oil from several CSOs. The stream bottom was covered with a thick layer of septic muck and the water surface was coated with a skim of oil. The natural and artificial substrates produced 8 and 20 taxa, respectively; both were predominated by oligochaetes. The ICI scored a 6 at this site. Water quality was considered poor.

Station 2.6 was also severely degraded. The water surface and substrates were very oily and biological conditions were poor. Quantitative and qualitative sampling resulted in the collection of 13 and 7 taxa, respectively. The ICI score was two. The CSOs which enter Swan Creek between river miles 3.9 and 2.6 were at the very least preventing recovery from the degradation observed upstream and were probably contributing significant additional degradation. Water quality continued to be poor.

The CSOs located between river miles 2.6 and 1.2 did not appear to be contributing significant additional organic load to the stream. However, water quality remained poor due to the impact of the CSOs farther upstream. Thirteen taxa were collected from the artificial substrates at Station 1.2 with lung snails of the genus Physella and oligochaetes numerically predominant. a single Stenacron mayfly was also collected in the quantitative sample. The natural substrates supported a low density benthic community with no organisms in predominance.

Water quality was considered poor at Station 0.6. However, a small improvement was noted in the benthic community. Due to deep water at this station, qualitative sampling was greatly limited and the artificial substrates were suspended in the water column under a float. Ten taxa in low density were collected during qualitative sampling. The artificial substrates produced 23 taxa with oligochaetes numerically predominant. Much of the increase in total taxa compared with Station 1.2 is attributable to the collection of additional pollution tolerant midge taxa. Four Stenacron individuals were also collected from the artificial substrates. The ICI remained in the poor range with a score of 8.

Swan Creek Fish Community - 1986

The site at RM 10.2 was upstream from all listed permitted dischargers. A significant portion of the drainage basis was upstream from this site (approximately 66 sq. mi.). Most of this is split between agricultural usage and swamp and marsh land. With that background this control site was definitely impacted or had been impacted and not had a chance to recover. Habitat definitely was not a factor affecting the fish community. This site had very good riffle, pool, run development and diverse instream structure. Despite this, cumulative species was only 19 with an average of 13 species per collection. Biomass and numbers were also lower than expected. I suspect past and probably present agricultural practices have reduced the diversity and productivity at this site. Extensive water quality problems and roller dam downstream would prevent improvement by re-invasion from downstream.

The next site at RM 4.4 was located just upstream from a roller dam which backed the water up making the zone deeper. The zone still had very good flow but was deep enough to require boat electrofishing. The deepened habitat supported more larger river species with a resultant higher cumulative number of species but a lower average number per sampling. Although no CSO;s are listed in the study plan one was noted halfway through the zone and numerous other storm sewer dischargers were also present. The area just upstream was also highly urbanized and these factors account for the lack of improvement in the fish community. Again the dam prevents upstream migration.

Swan Creek was extremely degraded in the lower lake effect area (RMs 3.9, 2.6, 1.2 and 0.5). Most of the impact is believed to originate from the CSO at RM 3.45 (maybe? 3.15). In the vicinity of and downstream of this discharge great quantities of creosote oil were noted on the surface and in the sediments. At one point in the mid summer (1986) a fish kill was observed which left RM 2.6 devoid of fish and RM 1.2 with only a few goldfish. Fish community conditions were poor in all of these areas of Swan Creek with RMs 2.6 and 1.2 being very poor. Faunal conditions were the best at the near mouth site (RM 0.5). This is primarily due to an influx of cleaner Maumee River water during seiches and invasion of Maumee River fishes. Conditions in the most degraded areas of Swan Creek are so severe that even dead rats (Norwegian) were observed floating on the water (during the fish kill incident). Swan Creek is extremely degraded, is effecting the Maumee River main stream, and must be addressed immediately in light of human health hazards associated with creosote oil.

Swan Creek Data Summary 1986

<u>Swan Creek - Eastgate Road (RM 10.2) - upstream water quality</u>

This segment generally had good water quality with D.O. of 6.8 - 9.2 mg/l, low NH_3 (<0.05 mg/l), NO_2 (<0.06 mg/l), phosphorus (<0.5 mg/l), and oil/grease (<2 mg/l). One violation of WQS for phenolics (23 ug/l) was collected. Most metals (As, Cd, Cr, Pb, Ni, Se) were near or below detection. A copper violation of 13 ug/l, a zinc of 45 ug/l, and NO_3 up to 5 mg/l reflected an agricultural watershed (also the Cu and phenolics violations occurred during a period of rainfall runoff.)

<u>Swan Creek - Detroit Avenue (RM 4.9)</u>

Water quality continued to be good with D.O. at 5.6 - 9.5 mg/l but with small to distinct increases in NO_2 (0.02 - 0.18 mg/l), NH_3 (<0.05 - 0.72 mg/l), oil/grease (3.6 mg/l), phosphorus (0.1 - 0.9 mg/l), TSS (20 - 80 mg/l), lead (up to 13 ug/l) and zinc (up to 70 ug/l). A copper violation of 20.3 ug/l was taken during runoff. Sources may be adjacent urban areas. There are no industrial discharges or CSOs upstream.

<u>Swan Creek - Champion Street (RM 3.9) downstream of CSOs (2)</u>

Some degradation occurred in this region particularly during the rainfall events on August 7 and 27. D.O. content typically was good (4.7 - 9.1 mg/l) except for a 2.7 mg/l. This segment of the creek did have the highest values in the study area for BOD_5 (12 mg/l), COD (104 mg/l), NO_2 (0.6 mg/l), NH_3 (2.4 mg/l) and phosphorus (1.7 mg/l) although none were in violation of WQS. Copper of 9 and 17.7 ug/l did violate WQS while increases were noted for lead (17 ug/l), zinc (90 ug/l) and cadmium (0.5 ug/l).

<u>Swan Creek - Hawley Street (RM 2.6)</u>

As with the Champion Street area the D.O. was slightly less (5.8 - 8.0 mg/l) than background but was greatly reduced on occasion to 0.4 - 2.3 mg/l. Nitrogenous compounds and phosphorus typically were similar or less than upstream. A copper violation of 19 ug/l persisted along with higher lead (20 ug/l), zinc (100 ug/l), and TSS (33 - 82 mg/l). The sample location on a bridge precluded detecting much effect of the CSO underneath. A phenolics violation (41 ug/l) is attributable to a discharge from Jennison - Wright (creosote wood treater) to the sanitary sewer. This problem has been terminated.

<u>Swan Creek - Collingwood Blvd. (RM 1.2)</u>

Lake effect could back up flow. D.O. usually was between 4.4 - 8.6 mg/l but bouts of low values from 0.4 - 2.7 mg/l did occur. In addition, increased copper (11.8 and 18.8 mg/l), phenolics (34 ug/l), cadmium (0.7 ug/l) and TSS (100 mg/l) were detected. Nitrogenous compounds and phosphorus were similar to or less than low upstream values. All other parameters were similar to upstream and not of note.

<u>Swan Creek - St. Clair Street (RM. 0.5)</u>

The creek is backed up at times by the Maumee River. D.O. range was slightly lower (3.7 - 8.8 mg/l) with two low values of 0.2 and 2.6 mg/l. NO_2 was as high as 0.46 mg/l and NH_3 of 0.15 - 1.1 was at times higher than upstream. Phosphorus, oil/grease, phenolics, metals, and TSS were similar or less than upstream. Copper violations persisted (10, 12.9 ug/l).

Tenmile Creek Macroinvertebrate Data Summary

Tenmile Creek was sampled using qualitative methods at river miles 5.1, 4.1 and 1.0. Sampling was conducted primarily to determine the impact of Reichert Stamping and the Kings Road landfill on water quality as reflected by indigenous macroinvertebrates.

Station 5.1 was downstream from Reichert Stamping. Station 4.1 was downstream from the Kings Road landfill. Benthic communities were similar at the two stations. Isopods were predominant, and midges and mayflies were common. Overall density was considered low. Twenty-eight and 35 taxa were collected from Stations 5.1 and 4.1, respectively. The increase in number of taxa at Station 4.1 was due largely to the collection of air breathing beetles and hemipterans which are of little value in determining water quality. The stream appeared to be moderately degraded at both sites but cause was not readily apparent. A pipe discharging septic waste was noted at Station 5.1 and indicated that improperly operating septic systems, as well as Reichert Stamping and the Kings Road Landfill, may have been contributing to the degradation at these two sites. Water quality was considered fair to marginally good.

Water quality appeared to be less degraded at Station 1.0. However, enrichment was evident in the high density macroinvertebrate community. Thirty-six taxa were collected with water pennies, heptageniid mayflies, and hydropsychid caddisflies predominant. Water quality was considered marginally good.

Ottawa River Macroinvertebrate Data Summary

The Ottawa River was sampled using quantitative and qualitative methods at river miles 18.5, 11.0, 9.0, 7.4 6.9, 4.9 and 1.6. The sampling was conducted primarily to determine the water quality impacts of numerous CSOs, the AMC Jeep Corp. and the Dura and Stickney landfills.

Station 18.5 was upstream from the previously mentioned sources of degradation and had good riffle/run development and a primarily rubble substrate. The artificial substrates produced 40 taxa but had an ICI score of 24 which is in the fair range. Forty-two taxa were collected from the natural substrates. Though relatively high numbers of taxa were collected, the majority of organisms were pollution intermediate or tolerant. The low number of pollution sensitive types indicated that some degradation was occurring. Water quality was considered fair.

The benthos at Station 11.0 reflected continued moderate degradation apparently due to urban runoff. Twenty-five and 28 taxa were collected from the artificial and natural substrates, respectively. The ICI scored a 14 which is in the fair range. Only one mayfly taxon was collected at this station while seven taxa were present at the previous station. In addition, pollution tolerant black flies and pollution intermediate caddisflies of the genus Cheumatopsyche increased in predominance on the natural substrates. Water quality remained fair but was apparently of somewhat poorer quality than at Station 18.5.

At Station 9.0 the stream was slow flowing and channelized. The effects of this less suitable habitat alone could be expected to lower the ICI value somewhat, however, an ICI value of 6 indicated that degradation from CSOs was greatly impacting the benthos. Twenty-three and 19 largely pollution tolerant taxa were collected from the artificial and natural substrates, respectively. Water quality was considered poor.

Stations 7.4, 6.9, 4.9 and 1.6 were extensively channelized and had either no perceptible current or were affected by sieches. Even though the ICI was developed for use in areas with observable current, it seemed to accurately reflect the poor biological condition at these lower stations on the Ottawa River.

Station 7.4 was downstream from the AMc Jeep Corp. and several CSOs. Water quality was considered poor but, due to degradation which was occurring upstream from the AMC Jeep Corp. from CSOs, the impact of the industrial dis-charges was not readily apparent. The ICI value was six and the benthic community was composed almost exclusively of pollution tolerant organisms.

The biological condition continued to decline at Station 6.9 and 4.9. Diversity was low and ICI scores of 4 and 2 were recorded from the two stations, respectively. Once again, the impact from the multitude of sources upstream precluded an evaluation of degradation due to the Dura and Stickney landfills at Station 4.9. Water quality was poor at both stations.

Water quality appeared to be slightly improved at Station 1.6 probably due to the dilution of degraded river water with cleaner water from Maumee Bay. Diversity remained low with 14 and 18 taxa collected from the quantitative and qualitative sampling, respectively. The ICI value of 6 was in the poor range. The collection of the mayfly genus Caenis from the natural substrates and the caddisfly Cyrnellus fraternus from the artificial substrates were indications that water quality was somewhat improved compared to the previous sites. However, water quality remained poor.

Tenmile/Ottawa River Fish Community 1986

The upstream site RM 5.2 was chosen to serve as a control site for this survey. The habitat has been extensively modified - now consisting of a straight riprapped channel with an occasional riffle. Extensive canopy indicated that this had been done many years ago. Additionally only one permitted discharge was noted in the study plan upstream from the site, Medusa Cement whose discharge was eliminated in 1980(?). Despite these factors I would have expected a more diverse sample with higher biomass sample from this site. High suspended solids from the Medusa Cement Co. could have historically reduced these community attributes but there is sufficient area upstream, from which to adequately recolonize this zone. I suspect an invest-igation into their operation may find sloppy housekeeping. The site at RM 4.2 was downstream from the Kings Road Landfill and several sand and gravel operations (which do not have permits listed). The upstream half of the sampling zone was carpeted with sand. It appeared that these sand and gravel operators have probable been gravel washing which resulted in only site in this survey with sand predominating. Also, if gravel washing was occurring, the high suspended solids may also be contributing to the decline in the fish community seen here. The Kings Road Landfill probably also contributed to the decline, since the lower portions of the sampling zone had sufficient habitat heterogeneity to support more fish and larger fish than encountered. It also appears that the Kings Road Landfill may be impacting as far downstream as the next site RM 1.1. Habitat was much improved at this site with extensive cobble-boulder riffles interspersed with a few nice pools. Despite this improved habitat the only major improvement was in relative number of individuals. Relative weight and mean number of species decline slightly. Three other factors could also contribute to water quality problems at this site (in estimated decreasing order of importance) a CSO at the upstream end of the zone, France Stone Company on an unnamed tributary and the adjacent golf course which dumped fine grass clippings into the stream on a regular basis. The CSO may have contributed to the depressed community at this site especially in the pools and during low flow (some flow from the outfall was evident at all three samplings) although flow and aeration through the riffles should minimize this impact downstream areas. The grass clippings would exert BOD, but I really did not notice any decaying mats of grass causing a problem.

The upstream site on the Ottawa River RM 17.8 showed modest improvement from the downstream site on Tenmile Creek with the number of individuals captured almost doubled and relative weight five times as great (Stream flow also was higher). The next site was considerably further downstream at RM 9.8, adjacent to the Ottawa Park Municipal Golf Course. A very noticeable impact was detected at this site. Cumulative species dropped by 5, mean number of species by over 5, relative numbers were only 25% of the upstream value with relative weight experiencing the same loss. Although habitat was somewhat poorer, a distinct odor of decaying sewage was noticed during all samplings. A portion of the Toledo sanitary sewer system is know to parallel the stream upstream from the zone I & I problems are suspected as the cause for the impact. The next site at RM 8.7, which was sited to be upstream from the Jeep Corp. outfalls (and dst from some CSOs) actually turned out to have some input from the Jeep Corp. in the middle of the sampling zone. What appeared to be thinned silver paint was noted at the 54" CSO at RM 8.45 just upstream from the Jeep Corp. painting operation. On another date a large plume of what appeared to be water miscible oil as detected.

Erosion of the banks is also a problem with trash and debris washing out in spots from where they were originally landfilled and covered. The site at RM 4.7 was downstream from the DuPont Company outfalls. Improvement was noted at this site with seven more species, double the relative number of individual and six times the biomass.

This site is also in the estuary effect and this is reflected by an increase in "lake" species. The community was still severely impacted from upstream sources, i.e. the CSOs, landfills, and DuPont Company, and bears further investigation including characterization of the chemical composition of the landfill leachate and DuPont Company outfall. Bioassays probably also should be considered in view of the location of the Ottawa River mouth in Western Lake Erie. The downstream most site showed dramatic improvement with an increase in all community parameters. This site was essentially a Lake Erie harbor site and the catch reflects that. It appears the dilutions of Ottawa River (polluted) water with Lake Erie water allowed recovery to almost WWH.

Tenmile Creek - Ottawa River Data Summary 1986

Tenmile Creek - Centennial Road (RM 5.1) - Upstream

This segment generally had good water quality with D.O. of 5.2 - 9.7 mg/l. The average nutrient load was moderately low with (<0.18 mg/l) NH_3 (<0.04 mg/l), NO_2 (4.44 mg/l), NO_3 (0.59 mg/l) phosphorus. All phenolic samples were found to be below detectable limits (<20 mg/l) and oil and grease values averaged (<l.35 mg/l). Five metals (Cd, Cr, Pb, Ni, Zn) were near or below detection. There was one copper violation of (9.6 ug/l). The iron values were high and averaged (1,658 mg/l). One total (CN) cyanide sample measured 0.16 mg/l. Agriculture was the primary influence on this segment. The only fecal coliform sample measured out at 7,400 colonies/100 ml.

Tenmile Creek - Sylvania Avenue (RM 4.1)

Water quality continued to be good with D.O. of 6.8 - 9.8 mg/l. There were slight decreases in the average nutrient load. Ammonia levels dropped to <0.11 mg/l, as did NO_3 (4.04 mg/l) and phosphorus (0.17 mg/l). The NO_2 level increased to 0.22 mg/l. Iron values decreased slightly, but were still elevated at 1,565 mg/l. There were two cadmium values measured a5 0.6/ug/l. This site was located between the King Road Landfill and a massive quarry operation.

Tenmile Creek - Old Post Road (RM 1.0)

Data obtained from this station shows that conditions have improved slightly from the already good upstream water quality. D.O. ranged from 8.3 to 11.2 mg/l, and the average value of 9.5 mg/l was found to be the highest in the Tenmile Creek - Ottawa River study area. Average nutrient values continued to diminish with low NH_3 (<0.05 mg/l), NO_2 (<0.04 mg/l), phosphorus (0.12 mg/l), and NO_3 (3.46 mg/l). Most metals measured undetectably low, except iron and zinc, which were found to be (730 ug/l) and (20 mg/l) respectively. Rural agriculture, suburban subdivisions, and a golf course were situated between this site and the last upstream site. The one fecal coliform sample taken here was found to contain 6,100 colonies/100 ml.

Ottawa River - Sturbridge Road (RM 17.9)

Good water quality continued to be exhibited here with D.O. of 6.5 - 11.5 mg/l. Nutrient levels remained low, NH_3 (<0.05 mg/l), NO_2 (<0.05 mg/l), phosphorus (0.12 mg/l), and NO_3 (4.00 mg/l). Metals values remained low. Iron, however, increased on the average to 1,798 mg/l and cadmium values of 0.6 ug/l and 0.7 ug/l were detected in two of the samples. This station was located about two miles downstream from the Sylvania WWTP.

Ottawa River - Bancroft Street (RM 12.2)

Water quality remains good here with a D.O. of 5.8 - 9.0 mg/l. Nutrient levels increased slightly from the last site, but remain low, NH_3 (0.10 mg/l), and NO_3 (<3.64 mg/l). Iron was found to have increased in concentration to a level of 2,405 ug/l. Otherwise, metals were found to be similar to low upstream values. The fecal coliform sample obtained fro this site had 4,600 colonies/100 ml.

Ottawa River - Auburn Avenue (RM 8.9)

Water quality was found to be similar to upstream conditions. Surface D.O. ranged from 4.2 - 10.5 mg/l and averaged (7.1 mg/l), slightly lower than upstream values. Nitrogenous compounds and phosphorus were similar to or less than upstream values. Iron remained high (1,890 - 3,500 ug/l) and showed a small average (2,582 ug/l) increase. Lead 4-13 ug/l) increased slightly as did zinc (15 - 45 ug/l). Oil was observed on the water surface on August 7, and the samples taken were found to contain a high level of COD (50 mg/l) with one corresponding (WWH-WQ) violation for copper (7.6 ug/l). One fecal coliform sample (340,000 colonies/100 ml) was taken after a storm event.

Ottawa River - Berdan Avenue (RM 7.4)

Near surface water quality was similar to upstream conditions, however, D.O. did decline on the average and varied considerably (2.3 - 10.3 mg/l) from sample to sample. On two occasions, diurnal shifts in D.O. were recorded, (2.6 - 0.4 mg/l) on the 14th and 15th of August and (9.2 - 4.7 mg/l) on the 21st and 22nd. In addition, a near bottom measurement of 2.6 mg/l on the 21st as compared to the 9.2 mg/l near surface value indicated that there was a large amount of D.O. stratification occurring here. The depletion of near bottom D.O. may have been due to the presence of a large sludge bed. The discharges of three nearby combined sewer overflows were probably responsible for the deposition of this bed. AMC Jeep Corporation discharges effluent just upstream from this site and may also have contributed. Nutrient levels changed very little from upstream. NO_3 (2.9 mg/l) declined on the average, while NO_2 (0.05 mg/l) remained the same. NH_3 (0.11 mg/l) and phosphorus (0.2 mg/l) had minimal increases. Iron (1,730 - 3,720 ug/l) remained high, while other metals (As, Cd, Cr, Ni, Se, Zn) were at or near detection limits. Copper (6.1 ug/l) and lead (7.0 ug/l) had little average increases. One cadmium sample was measured at 0.6 ug/l. There was a fecal coliform sample (250,000/100 ml) that was very high.

Ottawa River - Lagrange Street (RM 6.4)

Oxygen levels continued to decrease and varied considerably (1.7 - 10.1 mg/l). The lowest average D.O. value (4.0mg/l) was found to be here. Diurnal sampling indicated major shifts in D.O. levels. These shifts were (6.9 - 1.5 mg/l) on the 14th and 15th of August and (8.5 - 2.6 mg/l) on the 21st and 22nd of August. The near bottom measurement of 1.9 mg/l on the 21st as compared to the 8.5 mg/l near surface value indicated that stratification also occurred here. Nutrient levels remained about the same. NH_3 (0.24 mg/l) increased somewhat. Copper (7.7 ug/l), lead (12.2 ug/l) and zinc (39.2 ug/l) also increased on the average. Iron (1,380 - 4,310 ug/l) increased also and averaged 3.063 ug/l. The other metals were at or below detection limits. Sampling observations from August 6 to 7 indicted that stream flow was reversed (lake effect) as this site. At the same time, a large amount of surface oil was spotted moving upstream along the north bank form some downstream source. Three CSOs located in the vicinity may have been responsible for the oil. The highest fecal coliform value (540,000/100 ml) was found here.

Ottawa River - Stickney Avenue (RM 4.9)

Oxygen levels (3.0 - 9.6 mg/l) varied a lot here and averaged 5.7 mg/l. Significant shifts in D.O. were measured. These shifts were (5.3 - 2.2 mg/l) on the 14th and 15 of August and (6.0 - 2.4 mg/l) on the 21st and 22nd. The near bottom measurement of 1.2 mg/l on the 21st indicated that the D.O. was also stratified. All nutrient values increased at this site. NH_3 (0.12 - .4 mg/l) averaged 0.32 mg/l. NO_3 (0.3 - 9.65 mg/l) varied considerably and rose to a level of 3.74 mg/l. Phosphorus did not vary much (0.15 - 0.27 mg/l) and showed a small average increase (0.22 mg/l). NO_2 (0.04 - 0.08 mg/l) remained about the same at 0.06 mg/l. Iron (2,900 - 4,150 ug/l) increased to an average of 3,488 ug/l. Two copper values (13.3 and 39.6 ug/l) were found to be in violation of WWH-WQ standards. Zinc (40-135 ug/l) concentrations increased and averaged 72.5 ug/l. There was a slight increase in lead (11-17 ug/l) detected and one cadmium value of 0.7 ug/l was recorded. Other metals (As, Cr, Ni, Se) were at or below detection limits. The only fecal coliform sample taken measured out at 4,000 colonies/100 ml.

Duck Creek Macroinvertebrate Data Summary

Duck Creek was sampled at river miles 3.0, 2.1 and 0.4. Station 3.0 was located downstream from the Toledo Edison Acme station ash ponds and immediately adjacent to a large lagoon used by the Toledo WTP. The majority of flow volume, although small, was originating as overflow from this lagoon. Apparently, large amounts of waste lime had previously been discharged from the lagoon into the creek. A thick layer of soft gray much covered the entire stream bottom. Qualitative sampling produced 10 taxa collected primarily from grassy margins. Quantitative sampling yielded 6 taxa and the ICI score was zero. The benthic community was obviously severely affected by the ambient conditions.

The benthic community of Duck Creek improved only slightly at Stations 2.1 and 0.4. Quantitative sampling yielded 16 and 19 largely pollution tolerant taxa from the two sites, respectively. ICI values were in the poor range (12 and 4, respectively). The poor biological condition of the stream was apparently due to continued effect of the deposition of large amounts of lime slurry downstream from the Toledo WTP.

Duck Creek Fish Community - 1986

The Duck Creek fish community was severely impacted at all sites sampled in 1986 as a result of both poor habitat and water quality problems. The upstream-most site at RM 3.0, was situated on the east side of Wheeling Street and downstream from a marsh. The Toledo Edison Acme plant fly ash disposal lagoon was also upstream from the sampling site. If these factors were not enough, the discharge from the Toledo WTP sludge disposal lagoon was situated at the upstream end of the sampling zone. To all of this add that the stream channel was straight as an arrow and lettered with trash and lined with lime or alum sludge and you get a feeling for the habitat and water quality conditions present at the site. Only seven species were captured at this site and except for the stoneroller and mosquitofish all are considered to be tolerant of pollution. The question that this site was to answer was, does the Acme fly ash disposal lagoon impact the Duck Creek biological fish community? Ideally, we would have preferred to situate a site upstream from where we did, but the presence of the marsh prevented that. This prevents us from determining the exact extent to which the discharge from the fly ash lagoon impacts the fish community. If the discharge from the WTP's lagoon was eliminated and the sludge dredged out or allowed to flush out over a period of years, you would expect some improvement in the fish community and then be able to determine the extent of degradation from the Acme lagoon. Unfortun-ately, adjacent to the WTP's upland lagoon, a portion of Duck Creek was culverted with the pipe elevated slightly above the stream's surface, preventing re-invasion of fish from downstream should water quality improve. However, the pipe could be lowered to permit repopulation. The next site downstream, RM 2.1, was still suffering from the effects of extremely poor habitat. The stream channel was considerably larger and discussions with local residents revealed that this sampling site was in an area influenced by Lake Erie. Again it was not possible to determine the extent of the impact cause by the Acme Fly ash lagoon due to the poorness of the habitat. Actually, in all my years sampling, this was probably the most difficult area to sample that I have been exposed to. The bottom consisted of a chest deep mixture of silt, WTP sludge, trash and sticks and branches with the water column being only a few inches covering this morass. Additionally, at the upstream end of the zone was a storm sewer pipe that was leaking raw sewage during the second sampling. Despite the poor habitat and suspected poor water quality five more species and one hybrid were collected at this site than at the upstream site. Three of the additional species were probably immigrants from the lake and the rest were tolerant species. Water from the lake may have diluted any water quality problems in the stream at this site permitting the additional species to survive ambient conditions.

The site at RM 0.5 was sampled by boat and was definitely influenced by water levels in the lower Maumee River and, by extension, Lake Erie. This is reflected in the fish found at this site. Species like walleye, white bass and yellow perch were collected at this site. Despite the presence of these occasional sport species, the fish community appeared impacted with the majority of the species tolerant and generally of small size indicating stress to the community.

Eliminating the WTP's sludge run-off to Duck Creek will definitely help the physical habitat in Duck Creek and quite probably help water quality.

Discharging 2.8 MGD of effluent contaminated with O&G, arsenic and SS cannot help a stream with as small a drainage as duck creek, and improving the quality of the discharge from the Acme fly ash disposal lagoon could only help the situation. Here is where I think the chemistry will help define things. Downstream from the fly ash lagoon is the Gulf Oil Refinery which supposedly ceased discharging in June of 1985. However, local residents stated that it had recently been responsible for several oil spills. I suspect that the WTP sludge would probably trap this in the sediments and would present a water quality problem until it was dredged or flushed out of the river.

Duck Creek Data Summary - 1986

Wheeling Street (RM 3.0) - the beginning of Duck Creek and downstream of Acme Ash ponds.

Water quality at this location was very poor - D.O. content on 3 of 4 days was very low (0.2 - 0.5 mg/l) along with elevated NH_3 (5.7 and 6.5 mg/l) and NO_2 was high as 0.3 mg/l. There was detectable arsenic addition instream (52 - 89 ug/l) due to Acme Ash. NO_3 generally was low (<0.1 - 0.9 mg/l) because of the effluent domination and small urban drainage area. Phosphorus was <1 mg/l. All other metals, cyanide, phenolics and oil/grease were near or below detection limits.

York Street (RM 2.1)

This station was downstream of the Toledo WTP and there was a white precipitate covering substrates. The creek was culverted through large portion of the golf course. D.O. had markedly increased to 2.4 - 7.2 mg/l although a lowered pH of 9.6 was measured and NH_3 continued to elevated (0.4 - 1.2 mg/l) with one violation of WQS for WWH. NO_3, NO_2, phosphorus, cyanide, phenolics, Cd, Cr, Cu, Fe, Pb, Ni, Se, and Zn were similarly as low as upstream. A high TSS of 424 mg/l was collected on September 9. Arsenic declined to 5 - 18 ug/l. Fecal coliform was 51/100 ml. [I am still trying to straighten out the anomalous hardness of 1030 mg/l].

Oberlin Drive (RM 0.4)

D.O. content again declined on 3 of 4 days to 1.9 - 2.6 mg/l. pH was within the acceptable range. NO_3 again increased slightly at 0.4 - 2.0 mg/l, while NH_3 and NO_2 declined. All metals (except an insignificant violation for copper), phosphorus, cyanide, phenolics and oil/grease were as low as upstream.

Otter Creek Macroinvertebrate Data Summary

Otter Creek was sampled using qualitative methods only at Station 7.2 and both qualitatively and quantitatively at Station 6.0, 4.0, 2.0 and 0.3. The sampling was conducted primarily to evaluate the impact of the LOF landfill, the Sun Oil Company refinery and the Fondessy Landfill.

Otter Creek at Station 7.2 was a small ditch-like stream. The stream supported a high density community of primarily pollution tolerant organisms. Fifteen taxa were collected with isopods predominant. The low diversity and absence of pollution sensitive organisms indicated moderate degradation was affecting the stream. Water quality was considered fair.

Severe biological degradation was present at all the quantitative sites where zero ICI values were scored. The stream was essentially devoid of benthic organisms at Station 6.0 after flowing under the LOF Landfill. The stream bottom was coated with a thick deposit of oily gray solids and muck, and a strong chemical odor was present. No organisms were collected from the artificial substrates and only one midge of the Chironmus riparius group and a surface breathing beetle were collected during qualitative sampling. Water quality was considered very poor and toxic.

Very poor water quality and toxic conditions continued at Station 4.0. The artificial substrates produced oligochaetes and one pollution tolerant midge. Oligochaetes and Chironmus riparius group midges were collected from the natural substrates.

Toxicity was apparently diminished slightly at Station 2.0. Thirteen taxa in moderate density were collected from the natural substrates with midges and damselflies predominant. Oligochaetes predominated on the artificial substrates from which three taxa were collected. A strong oily/septic odor was noted. due to the severe degradation from the LOF Landfill the impact of the Sun Oil Refinery and the Fondessy Landfill was not readily apparent. Water quality was considered very poor.

In addition to being grossly polluted by industrial wastes Station 0.3 was also impacted by a thermal discharge from the Sohio Refinery. This discharge has since been relocated to Maumee Bay. Quantitative sampling yielded seven taxa. Ten taxa were collected from the natural substrates. Water quality continued to be very poor.

Otter Creek Fish Community - 1986

The Otter Creek fish community was severely impacted by water quality and habitat problems at all sites sampled in 1986 (Emphasis on water quality problems). The upstream site at RM 7.2, upstream from E. Broadway Street which was supposed to serve as a control site, was a straight channelized agricultural ditch. This site definitely had the potential to become intermittent. Additionally, a railroad yard with its attendant problems, was situated in the upstream portion of the basin. All these factors contributed to the depauperate community found at this site. Also, well documented historical and current water quality problems from RM 6.4 downstream to the mouth would prevent re-invasion of fish into this segment regardless of any improvement in water quality at this site. Proceeding downstream no improvement in water quality as evidenced by improvements in the fish community was noted. The highest cumulative number of species was only three species, with several sites having either no fish or only 1 or 2 individuals collected during a sampl

Physical evidence of chemical contamination was prevalent at all downstream sites. The Pickle Road site - RM 5.7, had a reddish brown flocculent precipitate in backwater areas. Hydrogen sulfide and other unidentified noxious smelling chemicals were released from the sediments when sampling this site. The only permitted entity upstream from this site was the closed LOF facility and its landfill. District personnel revealed a suspected problem with overflow from the landfill. The next site downstream, RM 4.0 - upstream from Wheeling Street, although having poor habitat should have supported more species and a higher density of fish than was collected. The Sun Oil - Toledo Refinery definitely was responsible for further degrad-ation of water quality at this site. The stream bank and sediments were oil soaked in several areas. Wading in these areas released from the sediment streamers and globules of dark black oil with a strong chemical smell different from that noticed at the Pickle Road site. Some areas (i.e. backwater areas with decomposing organic matter) also yielded H_2S when disturbed.

The sites at RM 2.1 and 0.5 were influenced by lake effect. Both sites had riparian vegetation and instream cover adequate to support a higher quality fish community than what was sampled. However, heated effluent (38 oC -- hot enough to cause an outboard engine to overheat and stall) from the Sohio Refinery was periodically forced upstream by seiches. This resulted in very few fish collected at these sites. Apparently the impact did not extend into the Maumee River since very little difference was distinguished between sites upstream and downstream from the mouth.

Otter Creek Data Summary - 1986

Otter Creek - Oakdale Street (RM 5.9) - downstream LOF landfill.

Water quality was severely degraded as evidenced by very low D.O. (0.2 - 0.5 mg/l) on 3 sample days, high pH 8.6 - 10.2, NH_3 (0.4 - 2.5 mg/l), phenolics (> 100 ug/l), As (>350 ug/l), Cd (1.0 ug/l), Cu (17 - 30 ug/l) and slight increase of Pb (4 - 12 ug/l). Up to 0.3 mg/l of NO_2 were detected. Also on two days (August 20, September 10) maximum and minimum for D.O. content were less than 1 mg/l. This degradation was due to leachate from LOF infiltrating the Otter Creek culvert running through the landfill. I was told by Bruce Dunlavy (NWDO industrial WW) that the landfill has been capped and LOF hopes the leaching eventually stops. A fecal coliform count of 1500/100 ml may be due to on-site waste systems.

Otter Creek - Wheeling Street (RM 4.0)

Through almost two stream miles water quality slightly improved in D.O. content (2.4 - 4.2 mg/l) and pH (7.4 - 8.4); however, NH_3 of 0.7 - 1.7 still violated WQS for WWH. NO_2 continued as high as 0.4 mg/l. Phenolics declined to 25 - 49 ug/l and As to approximately 20 ug/l. A Nickel of 120 ug/l was collected and 0.016 mg/l of cyanide was detected on two days (source?). Other metals (Cd, Cu, Pb) were no longer of particular note. Diurnal D.O. fluctuation on two days was between 1.5 - 2.5 mg/l.

Otter Creek - Millard Avenue (RM 2.1) adjacent to Fondessy Landfill

Water quality, although still degraded, had slightly improved (D.O. 2.7 - 5.8 mg/l) with the exception of a D.O. of 0. mg/l, continued NH_3 of 0.9 - 2.4 mg/l), Cyanide (0.011 - 0.016 mg/l) , phenolics of 20 - 34 ug/l, and a Copper of 15 ug/l. All other metals generally were present in low concentrations. Diurnal D.O. was more variable at 1.5 - 5 mg/l and 7 - 8 mg/l on August and September days. Lake effect could really slow the flow through this area.

Otter Creek - Unnamed port road (RM 0.5)

This station is located just upstream of the Sohio - Toledo discharge, and lake effect and winds drive effluent upstream at times (discharge now moved to Maumee Bay).

Some improvement had occurred but D.O. of 4.2 - 5.0 mg/l is lower than expected. Diurnal D.O. also could get very low (0.1 mg/l) with a narrow range (<1 mg/l). Temperature (35 - 38^{o}C) was due to the thermal discharge. NH_3 to 0.1 -0.4 mg/l. Cyanide and phenolics also decreased. High copper (15 - 53 ug/l) and zinc (140 ug/l) were detected but As, Cd, Cr, Pb, Ni, and Se were in low concentration.

Cedar Creek Macroinvertebrate Data Summary

Cedar Creek was sampled at river mile 20.9. It is similar in size and geographic proximity to Otter Creek and Duck Creek and was considered a control station. When sampling was conducted the stream bottom was covered with filamentous algae and flow was nearly intermittent. Qualitative sampling produced 43 taxa with isopods predominant. Hetageniid and ephemeriid mayflies were common and a diverse assemblage of beetle taxa was collected from the natural substrates. Quantitative sampling yielded 34 taxa. An ICI value of 34 at this site was in the good range. Cedar Creek appeared to be enriched by agricultural runoff but the macroinvertebrate community at Station 20.9 indicated that the impact was not severe. Water quality was considered good and should be typical of what could be attained in both Otter Creek and Duck Creek.

Cedar Creek - Oregon Road (RM ?)

This background site was in an agricultural area and usually had low flow when sampled. Water quality was very good (D.O. = 4.3 - 9.9 mg/l, NO_3 = <0.1 - 5.0 mg/l, NO_2 = <0.02 - 0.09 mg/l, NH_3 = 0.1 - 0.4 mg/l, phosphorus = <0.05 - 0.18 mg/l, metals average less than detection) although a NO_3 of 5 mg/l, NH_3 of 0.4 mg/l, and NO_2 of 0.2 mg/l were collected (perhaps due to non-point sources and on-site problems). Diurnal D.O. fluctuation was quite large (2.5 - 15.6 mg/l).

APPENDIX H

Toxic Pollutant Listing
1987 Clean Water Act, §307

APPENDIX H

[Section 307(a)(1) of the Clean Water Act of 1987 refers to the list of toxic pollutants published in Table 1 of Committee Print Number 95-30 of the House Committee of Public Works and Transportation. Following is the text of Table 1:]

SECTION 307
TABLE 1: TOXIC POLLUTANTS

Acenaphthene
Acrolein
Acrylonitrile
Aldrin/Dieldrin
Antimony and compounds*
Arsenic and compounds
Asbestos
Benzene
Benzidine
Beryllium and compounds
Cadmium and compounds
Carbon tetrachloride
Chlordane (technical mixture & metabolites)
Chlorinated benzenes (other than dichlorobenzenes)
Chlorinated ethanes (including 1,2 - dichloroethane, 1,1,1 - trichloroethane, and hexachloroethane)
Chloroalkyl ethers (chloromethyl, chloroethyl, and mixed ethers)
Chlorinated naphthalene
Chlorinated phenols (other than those listed elsewhere; includes trichlorophenois and chlorinated cresols)
Chloroform
2-chlorophenol
Chromium and compounds
Copper and compounds
Cyanides
DDT and metabolites
Dichlorobenzenes (u,2-, 1,3-, and 1,4-dichlorobenzenes)
Dichlorobenzidine
Dichloroethylenes (1,1- and 1,2-dichloroethylene)
2,4-dimethylphenol
Dinitrotoluene
Diphenylhydrazine
Endosulfan and metabolites
Endrin and metabolites
Ethylbenzene
Flouranthene
Haloethers (other than those listed elsewhere; includes chlorophenyl-phenyl ethers, bromophenylphenyl ether, bis(dischloroisopropyl) ether, bis-(chloroethoxy)methane and polychlorinated diphenyl ethers)
Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromide, bromoform, dichlorobromomethane, trichlorofluoromethane, dichlorodifluoromethane)

APPENDIX H continued

Heptachlor and metabolites
Hexachlorobutadiene
Hexachlorocyclohexane (all isomers)
Hexachlorocyclopentadiene
Isophorone
Lead and compounds
Mercury and compounds
Naphthalene
Nickel and compounds
Nitrobenzene
Nitrophenols (including 2,4-dinitrophenol) dinitrocresol)
Nitrosamines
Pentachlorophenol
Phenol
Phthalate esters
Polychlorinated biphenyls (PCSs)
Polynuclear aromatic hydrocarbons (including benzathracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenzathracenes, and indenopyrenes)
Selenium and compounds
Silver and compounds
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
Tetrachloroethylene
Thallium and compounds
Toluene
Toxaphene
Trichloroethylene
Vinyl Chloride
Zinc and compounds

APPENDIX I

NPDES Permit Violations, 1987-1988

APPENDIX I
NPDES PERMIT VIOLATIONS
In the Lower Maumee RAP Area
1987 - 1988

The following Appendix lists violations of NPDES Permits in the RAP Area for 1987 and most of 1988. The listing is grouped by effluent parameter for each outfall of each NPDES Permit.

There are five columns of violations data: the Average Quantity, the Maximum Quantity, the Minimum Concentration, the Average Concentration, and the Maximum Concentration. Under each of these there may or may not be a limitation set in the NPDES permit, depending on the parameter. For example, for pH both maximum and minimum "concentration" limitations are normally set. There may not be a limit based on the average, and "quantity" is not applicable. For BOD_5, there are normally maximum concentration and quantity limits, while for Dissolved Oxygen, the limit is based on minimum concentration.

These data are included as violations because the limit was exceeded in <u>at least</u> one column, <u>but not necessarily in all five</u>. Where there are no applicable effluent limitations, the space is left blank. Where no data was reported, "0" is printed.

The units of the effluent data are shown. Total quantities are in kg/day, and most concentrations are in mg/l or µg/l. "SU" stands for "Standard Units." This abbreviation is used for pH (refers to the standard pH scale of 0 to 14), and for bacteria, which are measured in organisms per 100 ml of water. Very high bacterial counts are often reported as "TNTC," or "too numerous to count." Such cases are given here as 1,000,000. Water temperatures are given as ° Fahrenheit or ° Celsius.

As an example of how to read the table:

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY

```
           ┌Discharge      ┌─Name of            ┌─Effluent       Avg Quantity    Max Quantity    Concentration Limits in µg/l     Number of
           │ Date          │ Discharger         │ Parameter      Limit, kg/day   Limit, kg/day   Minimum┐    ┌─Average  ┌─Maximum  Violations
           ↓               ↓                    ↓
21G00003  02/28/87 Sun Refining & Marketing Co.  Phenolics, Total  └────→ 2       └──→ 4             ←┘    └→100 µg/l └→200 µg/l  └────→ 1
↑         001 ←┐                                                   ┌────→ 1       ┌──→ 5        0 µg/l←┐  ┌→91 µg/l  ┌→497 µg/l
│ NPDES        │                                                   │              │                    │  │          │
└─Number       └─Outfall Number                                    Avg Quantity   Max Quantity   Minimum┘  └─Average  └─Maximum
                                                                   Discharged     Discharged     Concentrations Discharged, µg/l
```

In this example, violations have occurred in both the **maximum quantity** and the **maximum concentration.**

* Subsubtotal * = Number of violations of this specific effluent parameter at this outfall.
** Subtotal ** = Total number of violations of all parameters at all outfalls for this permit.
*** Total *** = Grand total of violations for all permits.

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
** VIOLATIONS FOR NPDES: 21B00000									
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
21B00000	05/31/87	Toledo Edison, Bayshore Plant	Fecal Coliform				1000 SU	2000 SU	1
	604			0	0	0 SU	5000 SU	5000 SU	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: PH									
21B00000	04/30/87	Toledo Edison, Bayshore Plant	pH			6 SU		9 SU	1
	003			0	0	6 SU	0 SU	10 SU	
21B00000	05/31/88	Toledo Edison, Bayshore Plant	pH			6 SU		9 SU	1
	003			0	0	6 SU	0 SU	9 SU	
21B00000	06/30/88	Toledo Edison, Bayshore Plant	pH			6 SU		9 SU	1
	003			0	0	6 SU	0 SU	10 SU	
* Subsubtotal *									3
** Subtotal **									4
** VIOLATIONS FOR NPDES: 21B00001									
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
21B00001	10/31/87	Toledo Edison, ACME Plant	Chlorine, Total Residual	8	23				1
	001			5	45	0 mg/l	0 mg/l	0 mg/l	
21B00001	12/31/87	Toledo Edison, ACME Plant	Chlorine, Total Residual	8	23				1
	001			10	58	0 mg/l	0 mg/l	0 mg/l	
21B00001	02/29/88	Toledo Edison, ACME Plant	Chlorine, Total Residual	8	23				1
	001			20	91	0 mg/l	0 mg/l	0 mg/l	
21B00001	05/31/88	Toledo Edison, ACME Plant	Chlorine, Total Residual	8	23				1
	001			2	29	0 mg/l	0 mg/l	0 mg/l	
21B00001	06/30/88	Toledo Edison, ACME Plant	Chlorine, Total Residual	8	23				1
	001			52	91	0 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									5
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
21B00001	06/30/87	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	466	0 mg/l	0 mg/l	0 mg/l	
21B00001	09/30/87	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	579	0 mg/l	0 mg/l	0 mg/l	
21B00001	11/30/87	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	1022	0 mg/l	0 mg/l	0 mg/l	
21B00001	12/31/87	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	534	0 mg/l	0 mg/l	0 mg/l	
21B00001	01/31/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	568	0 mg/l	0 mg/l	0 mg/l	
21B00001	02/29/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	806	0 mg/l	0 mg/l	0 mg/l	
21B00001	03/31/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	659	0 mg/l	0 mg/l	0 mg/l	
21B00001	04/30/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	806	0 mg/l	0 mg/l	0 mg/l	
21B00001	05/31/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1
	010			0	500	0 mg/l	0 mg/l	0 mg/l	
21B00001	06/30/88	Toledo Edison, ACME Plant	Solids, Total Suspended						1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	010			0	375	0 mg/l	0 mg/l	0 mg/l	
21B00001	07/31/88 010	Toledo Edison, ACME Plant	Solids, Total Suspended	0	318	0 mg/l	0 mg/l	0 mg/l	1
21B00001	01/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	749	0 mg/l	0 mg/l	0 mg/l	1
21B00001	02/28/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	511	0 mg/l	0 mg/l	0 mg/l	1
21B00001	03/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	488	0 mg/l	0 mg/l	0 mg/l	1
21B00001	04/30/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	397	0 mg/l	0 mg/l	0 mg/l	1
21B00001	05/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	261	0 mg/l	0 mg/l	0 mg/l	1
21B00001	06/30/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	534	0 mg/l	0 mg/l	0 mg/l	1
21B00001	07/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	522	0 mg/l	0 mg/l	0 mg/l	1
21B00001	08/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	318	0 mg/l	0 mg/l	0 mg/l	1
21B00001	09/30/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	954	0 mg/l	0 mg/l	0 mg/l	1
21B00001	10/31/87 011	Toledo Edison, ACME Plant	Solids, Total Suspended	0	693	0 mg/l	0 mg/l	0 mg/l	1
* Subsubtotal *									21
** Subtotal **									26

** VIOLATIONS FOR NPDES: 21D00011

* VIOLATIONS FOR PARAMETER: PH

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21D00011	05/31/87 001	Koppers Company, Inc.	pH	0	0	0 SU	7 SU / 6 SU	9 SU / 7 SU	1
21D00011	06/30/87 001	Koppers Company, Inc.	pH	0	0	0 SU	7 SU / 6 SU	9 SU / 7 SU	1
* Subsubtotal *									2

* VIOLATIONS FOR PARAMETER: TEMPERATURE, FAHRENHEIT

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21D00011	04/30/87 001	Koppers Company, Inc.	Temperature, Fahrenheit	0	0	0 °F	0 °F	15 °F / 16 °F	1
* Subsubtotal *									1
** Subtotal **									3

** VIOLATIONS FOR NPDES: 21F00016

* VIOLATIONS FOR PARAMETER: TEMPERATURE, CELSIUS

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21F00016	01/31/88 001	E. I. DuPont Denemours & Co.	Temperature, Celsius	0	0	0 °C	0 °C	20 °C / 55 °C	1
21F00016	02/29/88 001	E. I. DuPont Denemours & Co.	Temperature, Celsius	0	0	0 °C	0 °C	20 °C / 56 °C	1
21F00016	03/31/88 001	E. I. DuPont Denemours & Co.	Temperature, Celsius	0	0	0 °C	0 °C	20 °C / 49 °C	1
21F00016	04/30/88 001	E. I. DuPont Denemours & Co.	Temperature, Celsius	0	0	0 °C	0 °C	20 °C / 21 °C	1
21F00016	06/30/88 001	E. I. DuPont Denemours & Co.	Temperature, Celsius	0	0	0 °C	0 °C	20 °C / 23 °C	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21F00016	07/31/88	E. I. DuPont Denemours & Co.	Temperature, Celsius					20 °C	1
	001			0	0	0 °C	0 °C	22 °C	
21F00016	01/31/88	E. I. DuPont Denemours & Co.	Temperature, Celsius					20 °C	1
	002			0	0	0 °C	0 °C	56 °C	
21F00016	02/29/88	E. I. DuPont Denemours & Co.	Temperature, Celsius					20 °C	1
	002			0	0	0 °C	0 °C	60 °C	
21F00016	07/31/88	E. I. DuPont Denemours & Co.	Temperature, Celsius					20 °C	1
	002			0	0	0 °C	0 °C	25 °C	
* Subsubtotal *									
									9
** Subtotal **									
									9

** VIOLATIONS FOR NPDES: 21F00017

* VIOLATIONS FOR PARAMETER: TEMPERATURE, CELSIUS

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21F00017	08/31/88	E. I. DuPont Denemours & Co.	Temperature, Celsius				15 °C	20 °C	1
	001			0	0	0 °C	13 °C	22 °C	
* Subsubtotal *									
									1
** Subtotal **									
									1

** VIOLATIONS FOR NPDES: 21G00003

* VIOLATIONS FOR PARAMETER: BOD 5

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21G00003	05/31/87	Sun Refining & Marketing Co.	BOD 5	305	568				1
	001			291	730	0 mg/l	0 mg/l	0 mg/l	
21G00003	06/30/87	Sun Refining & Marketing Co.	BOD 5	305	568				1
	001			357	1172	0 mg/l	0 mg/l	0 mg/l	
21G00003	03/31/88	Sun Refining & Marketing Co.	BOD 5	305	568				1
	001			564	945	0 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									
									3

* VIOLATIONS FOR PARAMETER: COD

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21G00003	06/30/87	Sun Refining & Marketing Co.	COD	1820	3410				1
	001			1940	7336	0 mg/l	0 mg/l	0 mg/l	
21G00003	03/31/88	Sun Refining & Marketing Co.	COD	1820	3410				1
	001			2280	6225	0 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									
									2

* VIOLATIONS FOR PARAMETER: OIL AND GREASE

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21G00003	02/29/88	Sun Refining & Marketing Co.	Oil and Grease	146	273		10 mg/l	20 mg/l	1
	001			62	189	0 mg/l	7 mg/l	22 mg/l	
* Subsubtotal *									
									1

* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
21G00003	04/30/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	4 mg/l	7 mg/l	0 mg/l	
21G00003	05/31/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	4 mg/l	6 mg/l	0 mg/l	
21G00003	06/30/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	4 mg/l	6 mg/l	0 mg/l	
21G00003	07/31/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	4 mg/l	6 mg/l	0 mg/l	
21G00003	08/31/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	4 mg/l	6 mg/l	0 mg/l	
21G00003	09/30/87	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	4 mg/l	7 mg/l	0 mg/l	
21G00003	03/31/88	Sun Refining & Marketing Co.	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									7
* VIOLATIONS FOR PARAMETER: PH									
21G00003	03/31/88	Sun Refining & Marketing Co.	pH			6 SU		9 SU	1
	001			0	0	7 SU	0 SU	10 SU	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: PHENOLICS, TOTAL									
21G00003	02/28/87	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			1	5	0 µg/l	91 µg/l	497 µg/l	
21G00003	06/30/87	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			2	13	0 µg/l	226 µg/l	1320 µg/l	
21G00003	10/31/87	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			1	3	0 µg/l	82 µg/l	330 µg/l	
21G00003	12/31/87	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			1	4	0 µg/l	82 µg/l	378 µg/l	
21G00003	01/31/88	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			1	3	0 µg/l	95 µg/l	262 µg/l	
21G00003	02/28/88	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			1	4	0 µg/l	127 µg/l	476 µg/l	
21G00003	03/31/88	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			9	41	0 µg/l	877 µg/l	4495 µg/l	
21G00003	05/31/88	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			0	2	0 µg/l	90 µg/l	401 µg/l	
21G00003	06/30/88	Sun Refining & Marketing Co.	Phenolics, Total	2	4		100 µg/l	200 µg/l	1
	001			0	3	0 µg/l	117 µg/l	821 µg/l	
* Subsubtotal *									9
* VIOLATIONS FOR PARAMETER: SULFIDE, TOTAL									
21G00003	03/31/88	Sun Refining & Marketing Co.	Sulfide, Total	3	6				1
	001			3	8	0 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									1
** Subtotal **									24
** VIOLATIONS FOR NPDES: 21G00007									
* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED									
21G00007	04/30/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	6 mg/l	7 mg/l	0 mg/l	
21G00007	05/31/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	6 mg/l	7 mg/l	0 mg/l	
21G00007	06/30/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	6 mg/l	7 mg/l	0 mg/l	
21G00007	07/31/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	6 mg/l	6 mg/l	0 mg/l	
21G00007	08/31/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	6 mg/l	6 mg/l	0 mg/l	
21G00007	09/30/87	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	002			0	0	6 mg/l	6 mg/l	0 mg/l	
21G00007	07/31/88	Standard Oil Co., Ohio	Oxygen, Dissolved			4 mg/l	5 mg/l		1
	002			0	0	4 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									7
** Subtotal **									7
** VIOLATIONS FOR NPDES: 21H00093									
* VIOLATIONS FOR PARAMETER: BOD 5									
21H00093	09/30/87	General Mills, Inc.	BOD 5					45 mg/l	1
	001			0	0	0 mg/l	56 mg/l	56 mg/l	
21H00093	04/30/88	General Mills, Inc.	BOD 5					45 mg/l	1
	001			0	0	0 mg/l	25 mg/l	48 mg/l	
21H00093	05/31/88	General Mills, Inc.	BOD 5					45 mg/l	1
	001			0	0	0 mg/l	70 mg/l	110 mg/l	
* Subsubtotal *									3
* VIOLATIONS FOR PARAMETER: PH									
21H00093	05/31/87	General Mills, Inc.	pH			6 SU		9 SU	1
	001			0	0	6 SU	0 SU	6 SU	
21H00093	09/30/87	General Mills, Inc.	pH			6 SU		9 SU	1
	001			0	0	5 SU	0 SU	5 SU	
21H00093	10/31/87	General Mills, Inc.	pH			6 SU		9 SU	1
	001			0	0	6 SU	0 SU	6 SU	
21H00093	05/31/88	General Mills, Inc.	pH			6 SU		9 SU	1
	001			0	0	6 SU	0 SU	7 SU	
* Subsubtotal *									4
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
21H00093	05/31/87	General Mills, Inc.	Solids, Total Suspended					45 mg/l	1
	001			0	0	0 mg/l	0 mg/l	56 mg/l	
21H00093	02/29/88	General Mills, Inc.	Solids, Total Suspended					45 mg/l	1
	001			0	0	0 mg/l	35 mg/l	67 mg/l	
21H00093	04/30/88	General Mills, Inc.	Solids, Total Suspended					45 mg/l	1
	001			0	0	0 mg/l	33 mg/l	49 mg/l	
* Subsubtotal *									3
** Subtotal **									10
** VIOLATIONS FOR NPDES: 21J00039									
* VIOLATIONS FOR PARAMETER: PH									
21J00039	06/30/88	The France Stone Company	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	6 SU	
* Subsubtotal *									1
** Subtotal **									1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
** VIOLATIONS FOR NPDES: 2IJ00052									
* VIOLATIONS FOR PARAMETER: PH									
2IJ00052	03/00/00	Stoneco	pH						1
	001			0	0	0 SU	0 SU	0 SU	
* Subsubtotal *									1
** Subtotal **									1
** VIOLATIONS FOR NPDES: 2IN00013									
* VIOLATIONS FOR PARAMETER: AMMONIA NITROGEN									
2IN00013	01/31/87	Fondessy Enterprises Inc.	Ammonia Nitrogen	0	1		3 mg/l	5 mg/l	1
	001			0	0	0 mg/l	6 mg/l	6 mg/l	
2IN00013	06/30/88	Fondessy Enterprises Inc.	Ammonia Nitrogen	0	1		3 mg/l	5 mg/l	1
	001			0	0	0 mg/l	15 mg/l	15 mg/l	
2IN00013	07/31/88	Fondessy Enterprises Inc.	Ammonia Nitrogen	0	1		3 mg/l	5 mg/l	1
	001			0	0	0 mg/l	13 mg/l	15 mg/l	
* Subsubtotal *									3
* VIOLATIONS FOR PARAMETER: PH									
2IN00013	03/31/88	Fondessy Enterprises Inc.	pH			7 SU		9 SU	1
	001			0	0	9 SU	0 SU	9 SU	
2IN00013	03/31/88	Fondessy Enterprises Inc.	pH			7 SU		9 SU	1
	001			0	0	9 SU	0 SU	9 SU	
* Subsubtotal *									2
** Subtotal **									5
** VIOLATIONS FOR NPDES: 2IN00069									
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2IN00069	06/30/87	Liquid Carbonic Corp.	Chlorine, Total Residual				0 mg/l	1 mg/l	1
	601			0	0	5 mg/l	0 mg/l	5 mg/l	
2IN00069	06/30/88	Liquid Carbonic Corp.	Chlorine, Total Residual				0 mg/l	1 mg/l	1
	601			0	0	0 mg/l	4 mg/l	4 mg/l	
* Subsubtotal *									2
* VIOLATIONS FOR PARAMETER: PH									
2IN00069	06/30/87	Liquid Carbonic Corp.	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	6 SU	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2IN00069	03/31/88	Liquid Carbonic Corp.	Solids, Total Suspended					15 mg/l	1
	001			0	0	0 mg/l	0 mg/l	16 mg/l	
2IN00069	06/30/88	Liquid Carbonic Corp.	Solids, Total Suspended					15 mg/l	1
	001			0	0	0 mg/l	0 mg/l	41 mg/l	
* Subsubtotal *									2
** Subtotal **									5

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
** VIOLATIONS FOR NPDES: 2IN00079									
* VIOLATIONS FOR PARAMETER: AMMONIA NITROGEN									
2IN00079	01/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 107 mg/l	5 mg/l 138 mg/l	1
2IN00079	02/28/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 81 mg/l	5 mg/l 120 mg/l	1
2IN00079	03/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 120 mg/l	5 mg/l 155 mg/l	1
2IN00079	04/30/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 151 mg/l	5 mg/l 158 mg/l	1
2IN00079	05/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 111 mg/l	5 mg/l 137 mg/l	1
2IN00079	06/30/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 103 mg/l	5 mg/l 113 mg/l	1
2IN00079	07/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 73 mg/l	5 mg/l 87 mg/l	1
2IN00079	08/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 86 mg/l	5 mg/l 102 mg/l	1
2IN00079	09/30/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 107 mg/l	5 mg/l 115 mg/l	1
2IN00079	10/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 125 mg/l	5 mg/l 163 mg/l	1
2IN00079	11/30/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 115 mg/l	5 mg/l 162 mg/l	1
2IN00079	12/31/87 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 61 mg/l	5 mg/l 80 mg/l	1
2IN00079	01/31/88 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 128 mg/l	5 mg/l 128 mg/l	1
2IN00079	03/31/88 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 63 mg/l	5 mg/l 83 mg/l	1
2IN00079	04/30/88 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 67 mg/l	5 mg/l 86 mg/l	1
2IN00079	05/18/88 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 62 mg/l	5 mg/l 71 mg/l	1
2IN00079	06/30/88 001	King Road Sanitary & Landfill	Ammonia Nitrogen	0	0	0 mg/l	3 mg/l 78 mg/l	5 mg/l 123 mg/l	1
* Subsubtotal *									17
* VIOLATIONS FOR PARAMETER: BOD 5									
2IN00079	01/31/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 73 mg/l	20 mg/l 80 mg/l	1
2IN00079	02/28/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 14 mg/l	20 mg/l 22 mg/l	1
2IN00079	03/31/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 34 mg/l	20 mg/l 40 mg/l	1
2IN00079	04/30/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 60 mg/l	20 mg/l 83 mg/l	1
2IN00079	05/31/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 63 mg/l	20 mg/l 79 mg/l	1
2IN00079	06/30/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 71 mg/l	20 mg/l 84 mg/l	1
2IN00079	07/31/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 62 mg/l	20 mg/l 66 mg/l	1
2IN00079	08/31/87 001	King Road Sanitary & Landfill	BOD 5	0	0	0 mg/l	10 mg/l 58 mg/l	20 mg/l 68 mg/l	1
2IN00079	09/30/87	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 mg/l	67 mg/l	85 mg/l	
2IN00079	10/31/87	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	64 mg/l	68 mg/l	
2IN00079	11/30/87	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	44 mg/l	52 mg/l	
2IN00079	12/31/87	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	60 mg/l	73 mg/l	
2IN00079	01/31/88	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	51 mg/l	51 mg/l	
2IN00079	03/31/88	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	56 mg/l	73 mg/l	
2IN00079	04/30/88	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	25 mg/l	38 mg/l	
2IN00079	05/31/88	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	20 mg/l	29 mg/l	
2IN00079	06/30/88	King Road Sanitary & Landfill	BOD 5				10 mg/l	20 mg/l	1
	001			0	0	0 mg/l	33 mg/l	47 mg/l	
* Subsubtotal *									
									17
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2IN00079	02/28/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	20 mg/l	66 mg/l	
2IN00079	04/30/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	30 mg/l	78 mg/l	
2IN00079	05/31/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	25 mg/l	57 mg/l	
2IN00079	07/31/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	77 mg/l	106 mg/l	
2IN00079	08/31/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	56 mg/l	97 mg/l	
2IN00079	09/30/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	17 mg/l	46 mg/l	
2IN00079	11/30/87	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	68 mg/l	188 mg/l	
2IN00079	03/31/88	King Road Sanitary & Landfill	Solids, Total Suspended				30 mg/l	45 mg/l	1
	001			0	0	0 mg/l	20 mg/l	70 mg/l	
* Subsubtotal *									
									8
** Subtotal **									
									42
** VIOLATIONS FOR NPDES: 2I000001									
* VIOLATIONS FOR PARAMETER: COD									
2I000001	01/31/87	Teledyne Industries	COD	14	26		30 mg/l	100 mg/l	1
	001			9	16	0 mg/l	51 mg/l	105 mg/l	
2I000001	07/31/87	Teledyne Industries	COD	14	26		30 mg/l	100 mg/l	1
	001			11	24	0 mg/l	43 mg/l	76 mg/l	
* Subsubtotal *									
									2
* VIOLATIONS FOR PARAMETER: OIL AND GREASE, TOTAL									
2I000001	06/30/88	Teledyne Industries	Oil and Grease, Total				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	18 mg/l	45 mg/l	
* Subsubtotal *									
									1
** Subtotal **									

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
									3
** VIOLATIONS FOR NPDES: 21Q00012									
* VIOLATIONS FOR PARAMETER: OIL AND GREASE, TOTAL									
21Q00012	03/31/87 001	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 18 mg/l	1
21Q00012	04/30/87 001	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 59 mg/l	1
21Q00012	05/31/87 001	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 20 mg/l	1
21Q00012	02/29/88 001	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 11 mg/l	1
21Q00012	04/30/87 002	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 14 mg/l	1
21Q00012	08/31/87 002	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 12 mg/l	1
21Q00012	10/31/87 002	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 16 mg/l	1
21Q00012	01/31/88 002	Diversitech General Inc.	Oil and Grease, Total	0	0	0 mg/l	0 mg/l	10 mg/l / 17 mg/l	1
* Subsubtotal *									8
* VIOLATIONS FOR PARAMETER: PH									
21Q00012	02/28/87 001	Diversitech General Inc.	pH	0	0	7 SU / 6 SU	0 SU	9 SU / 6 SU	1
* Subsubtotal *									1
** Subtotal **									9
** VIOLATIONS FOR NPDES: 21S00008									
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
21S00008	06/30/87 002	Reichert Stamping Company	Chlorine, Total Residual	0	0	10 mg/l	2 mg/l / 0 mg/l	3 mg/l / 10 mg/l	1
21S00008	07/31/87 002	Reichert Stamping Company	Chlorine, Total Residual	0	0	3 mg/l	2 mg/l / 0 mg/l	3 mg/l / 3 mg/l	1
* Subsubtotal *									2
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
21S00008	02/29/88 002	Reichert Stamping Company	Solids, Total Suspended	0	0	0 mg/l	30 mg/l / 35 mg/l	45 mg/l / 35 mg/l	1
* Subsubtotal *									1
** Subtotal **									3
** VIOLATIONS FOR NPDES: 21T00002									
* VIOLATIONS FOR PARAMETER: OIL AND GREASE									
21T00002	06/30/88 002	The Chessie System	Oil and Grease	0	0	0 mg/l	0 mg/l	10 mg/l / 15 mg/l	1
21T00002	06/30/88 004	The Chessie System	Oil and Grease	0	0	0 mg/l	0 mg/l	10 mg/l / 14 mg/l	1
* Subsubtotal *									2

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
* VIOLATIONS FOR PARAMETER: PH									
2IT00002	12/31/87	The Chessie System	pH			7 SU		9 SU	1
	002			0	0	6 SU	0 SU	7 SU	
2IT00002	12/31/87	The Chessie System	pH			7 SU		9 SU	1
	004			0	0	6 SU	0 SU	7 SU	
* Subsubtotal *									2
** Subtotal **									4
** VIOLATIONS FOR NPDES: 2IT00013									
* VIOLATIONS FOR PARAMETER: OIL AND GREASE, TOTAL									
2IT00013	05/31/88	The Chessie System	Oil and Grease, Total					10 mg/l	1
	003			0	0	0 mg/l	0 mg/l	12 mg/l	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: PH									
2IT00013	12/31/87	The Chessie System	pH			7 SU		9 SU	1
	003			0	0	6 SU	0 SU	6 SU	
2IT00013	12/31/87	The Chessie System	pH			7 SU		9 SU	1
	004			0	0	6 SU	0 SU	6 SU	
2IT00013	05/31/88	The Chessie System	pH			7 SU		9 SU	1
	004			0	0	6 SU	0 SU	6 SU	
2IT00013	06/30/88	The Chessie System	pH			7 SU		9 SU	1
	004			0	0	6 SU	0 SU	6 SU	
2IT00013	12/31/87	The Chessie System	pH			7 SU		9 SU	1
	005			0	0	6 SU	0 SU	6 SU	
2IT00013	06/30/88	The Chessie System	pH			7 SU		9 SU	1
	005			0	0	6 SU	0 SU	6 SU	
* Subsubtotal *									6
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2IT00013	04/30/88	The Chessie System	Solids, Total Suspended		0				1
	004			0	1	0 mg/l	0 mg/l	0 mg/l	
2IT00013	07/31/88	The Chessie System	Solids, Total Suspended		0				1
	004			0	0	0 mg/l	0 mg/l	0 mg/l	
2IT00013	06/30/88	The Chessie System	Solids, Total Suspended					45 mg/l	1
	005			0	0	0 mg/l	0 mg/l	2440 mg/l	
* Subsubtotal *									3
** Subtotal **									10
** VIOLATIONS FOR NPDES: 2IW00010									
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2IW00010	01/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13593 mg/l	14230 mg/l	
2IW00010	02/28/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13760 mg/l	14100 mg/l	
2IW00010	03/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13415 mg/l	14100 mg/l	
2IW00010	04/30/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13216 mg/l	13570 mg/l	
2IW00010	05/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 mg/l	13213 mg/l	13670 mg/l	
2IW00010	06/30/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13395 mg/l	13700 mg/l	
2IW00010	07/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13243 mg/l	13870 mg/l	
2IW00010	08/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13228 mg/l	13560 mg/l	
2IW00010	09/30/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13078 mg/l	13650 mg/l	
2IW00010	10/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	42965 mg/l	13245 mg/l	
2IW00010	11/30/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13158 mg/l	13590 mg/l	
2IW00010	12/31/87	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13082 mg/l	13750 mg/l	
2IW00010	01/31/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13125 mg/l	13680 mg/l	
2IW00010	02/29/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13235 mg/l	13690 mg/l	
2IW00010	03/31/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	12992 mg/l	13790 mg/l	
2IW00010	04/30/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13035 mg/l	13300 mg/l	
2IW00010	05/31/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13270 mg/l	13890 mg/l	
2IW00010	06/30/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13295 mg/l	13590 mg/l	
2IW00010	07/31/88	Bowling Green Water Plant	Solids, Total Suspended				15 mg/l	20 mg/l	1
	001			0	0	0 mg/l	13355 mg/l	13970 mg/l	
* Subsubtotal *									19
** Subtotal **									19

** VIOLATIONS FOR NPDES: 2PA00026

* VIOLATIONS FOR PARAMETER: BOD 5

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PA00026	03/31/87	Village of Haskins	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			3	4	0 mg/l	11 mg/l	18 mg/l	
2PA00026	07/31/87	Village of Haskins	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			3	10	0 mg/l	4 mg/l	7 mg/l	
* Subsubtotal *									2

* VIOLATIONS FOR PARAMETER: FECAL COLIFORM

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PA00026	05/31/88	Village of Haskins	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	1000000 SU	
* Subsubtotal *									1

* VIOLATIONS FOR PARAMETER: PH

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PA00026	05/31/87	Village of Haskins	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	7 SU	
* Subsubtotal *									1

* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PA00026	07/31/87	Village of Haskins	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			3	10	0 mg/l	4 mg/l	7 mg/l	
* Subsubtotal *									
									1
** Subtotal **									
									5
** VIOLATIONS FOR NPDES: 2PB00007									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PB00007	01/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			56	75	0 mg/l	36 mg/l	45 mg/l	
2PB00007	02/28/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			60	69	0 mg/l	46 mg/l	60 mg/l	
2PB00007	03/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			67	80	0 mg/l	42 mg/l	52 mg/l	
2PB00007	04/30/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			62	84	0 mg/l	27 mg/l	33 mg/l	
2PB00007	05/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			49	58	0 mg/l	39 mg/l	42 mg/l	
2PB00007	06/30/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			28	51	0 mg/l	18 mg/l	26 mg/l	
2PB00007	07/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			14	51	0 mg/l	10 mg/l	24 mg/l	
2PB00007	08/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			14	72	0 mg/l	8 mg/l	20 mg/l	
2PB00007	09/30/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			54	81	0 mg/l	47 mg/l	70 mg/l	
2PB00007	11/30/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			69	436	0 mg/l	61 mg/l	367 mg/l	
2PB00007	12/31/87	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			60	67	0 mg/l	25 mg/l	28 mg/l	
2PB00007	01/31/88	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			44	64	0 mg/l	32 mg/l	45 mg/l	
2PB00007	02/29/88	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			46	63	0 mg/l	29 mg/l	38 mg/l	
2PB00007	03/31/88	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			61	176	0 mg/l	32 mg/l	67 mg/l	
2PB00007	04/30/88	South Shore Park WWTP	BOD 5	18	26		20 mg/l	30 mg/l	1
	001			45	70	0 mg/l	29 mg/l	37 mg/l	
* Subsubtotal *									
									15
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PB00007	05/31/87	South Shore Park WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
2PB00007	06/30/87	South Shore Park WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
2PB00007	07/31/87	South Shore Park WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
2PB00007	08/31/87	South Shore Park WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	440 mg/l	
2PB00007	06/30/88	South Shore Park WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
* Subsubtotal *									
									5
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PB00007	05/31/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 SU	588695 SU	349428 SU	
2PB00007	06/30/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	1000000 SU	
2PB00007	07/31/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	2365 SU	189736 SU	
2PB00007	08/31/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	3961 SU	69282 SU	
2PB00007	09/30/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	439364 SU	4300002 SU	
2PB00007	10/31/87	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	180 SU	7007 SU	
2PB00007	05/31/88	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	4255 SU	36660 SU	
2PB00007	06/30/88	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	706 SU	3072 SU	
2PB00007	07/31/88	South Shore Park WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	340 SU	2549 SU	
* Subsubtotal *									
									9
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PB00007	01/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			45	106	0 mg/l	29 mg/l	38 mg/l	
2PB00007	02/28/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			40	47	0 mg/l	28 mg/l	39 mg/l	
2PB00007	03/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			82	107	0 mg/l	42 mg/l	53 mg/l	
2PB00007	04/30/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			68	136	0 mg/l	26 mg/l	38 mg/l	
2PB00007	05/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			44	61	0 mg/l	30 mg/l	36 mg/l	
2PB00007	06/30/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			59	166	0 mg/l	30 mg/l	57 mg/l	
2PB00007	07/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			10	30	0 mg/l	7 mg/l	15 mg/l	
2PB00007	09/30/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			28	37	0 mg/l	24 mg/l	29 mg/l	
2PB00007	10/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			17	43	0 mg/l	16 mg/l	27 mg/l	
2PB00007	11/30/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			98	391	0 mg/l	82 mg/l	331 mg/l	
2PB00007	12/31/87	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			72	189	0 mg/l	22 mg/l	37 mg/l	
2PB00007	01/31/88	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			54	119	0 mg/l	33 mg/l	52 mg/l	
2PB00007	02/29/88	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			58	112	0 mg/l	32 mg/l	64 mg/l	
2PB00007	03/31/88	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			26	47	0 mg/l	15 mg/l	17 mg/l	
2PB00007	04/30/88	South Shore Park WWTP	Solids, Total Suspended	22	30		25 mg/l	35 mg/l	1
	001			33	52	0 mg/l	23 mg/l	26 mg/l	
* Subsubtotal *									
									15
** Subtotal **									
									44

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
** VIOLATIONS FOR NPDES: 2PB00062									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PB00062	05/31/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			41	47	0 mg/l	41 mg/l	48 mg/l	
2PB00062	06/30/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			42	61	0 mg/l	36 mg/l	42 mg/l	
2PB00062	08/31/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			40	53	0 mg/l	34 mg/l	37 mg/l	
2PB00062	09/30/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			34	38	0 mg/l	36 mg/l	38 mg/l	
2PB00062	10/31/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			30	42	0 mg/l	37 mg/l	44 mg/l	
2PB00062	11/30/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			22	24	0 mg/l	36 mg/l	36 mg/l	
2PB00062	12/31/87	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			44	60	0 mg/l	33 mg/l	39 mg/l	
2PB00062	01/31/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			30	33	0 mg/l	33 mg/l	35 mg/l	
2PB00062	02/29/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			43	56	0 mg/l	31 mg/l	34 mg/l	
2PB00062	03/31/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			49	56	0 mg/l	38 mg/l	42 mg/l	
2PB00062	04/30/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			434	54	0 mg/l	35 mg/l	39 mg/l	
2PB00062	05/31/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			44	54	0 mg/l	35 mg/l	39 mg/l	
2PB00062	05/31/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			49	50	0 mg/l	43 mg/l	44 mg/l	
2PB00062	06/30/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			28	33	0 mg/l	45 mg/l	48 mg/l	
2PB00062	07/31/88	Village of Whitehouse	BOD 5	40	60		30 mg/l	45 mg/l	1
	001			42	45	0 mg/l	42 mg/l	46 mg/l	
* Subsubtotal *									15
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PB00062	05/31/87	Village of Whitehouse	Chlorine, Total Residual					1 mg/l	1
	001			0	0	1 mg/l	0 mg/l	1 mg/l	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PB00062	05/31/87	Village of Whitehouse	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PB00062	06/30/87	Village of Whitehouse	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PB00062	07/31/87	Village of Whitehouse	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PB00062	09/30/87	Village of Whitehouse	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PB00062	10/31/87	Village of Whitehouse	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
* Subsubtotal *									5
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PB00062	05/31/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			39	45	0 mg/l	39 mg/l	42 mg/l	

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PB00062	06/30/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			43	67	0 mg/l	37 mg/l	45 mg/l	
2PB00062	07/31/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			33	51	0 mg/l	32 mg/l	34 mg/l	
2PB00062	08/31/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			41	52	0 mg/l	34 mg/l	37 mg/l	
2PB00062	09/30/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			36	41	0 mg/l	39 mg/l	41 mg/l	
2PB00062	10/31/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			26	33	0 mg/l	33 mg/l	43 mg/l	
2PB00062	11/30/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			23	24	0 mg/l	37 mg/l	40 mg/l	
2PB00062	12/31/87	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			40	46	0 mg/l	31 mg/l	39 mg/l	
2PB00062	01/31/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			30	38	0 mg/l	32 mg/l	37 mg/l	
2PB00062	02/29/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			43	58	0 mg/l	31 mg/l	32 mg/l	
2PB00062	03/31/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			49	68	0 mg/l	37 mg/l	42 mg/l	
2PB00062	04/30/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			43	55	0 mg/l	35 mg/l	41 mg/l	
2PB00062	05/31/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			48	49	0 mg/l	42 mg/l	45 mg/l	
2PB00062	06/30/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			29	34	0 mg/l	46 mg/l	48 mg/l	
2PB00062	07/31/88	Village of Whitehouse	Solids, Total Suspended	40	60		30 mg/l	45 mg/l	1
	001			39	48	0 mg/l	38 mg/l	44 mg/l	
* Subsubtotal *									
									15
** Subtotal **									
									36

** VIOLATIONS FOR NPDES: 2PD00002

* VIOLATIONS FOR PARAMETER: BOD 5

2PD00002	04/30/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			565	687	1 mg/l	44 mg/l	60 mg/l	
2PD00002	05/31/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			570	633	1 mg/l	53 mg/l	72 mg/l	
2PD00002	08/31/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			585	1256	1 mg/l	56 mg/l	94 mg/l	
2PD00002	09/30/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			504	640	0 mg/l	56 mg/l	77 mg/l	
2PD00002	10/31/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			478	543	0 mg/l	56 mg/l	63 mg/l	
2PD00002	11/30/87	Perrysburg, City of	BOD 5	522	678		50 mg/l	65 mg/l	1
	001			437	893	0 mg/l	43 mg/l	86 mg/l	
* Subsubtotal *									
									6

* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL

2PD00002	01/31/87	Perrysburg, City of	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
2PD00002	05/31/87	Perrysburg, City of	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
2PD00002	06/30/87	Perrysburg, City of	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PD00002	01/31/88	Perrysburg, City of	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
* Subsubtotal *									
									4
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PD00002	02/28/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	3156 SU	9794 SU	
2PD00002	03/31/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PD00002	04/30/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PD00002	05/31/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1287 SU	1978 SU	
2PD00002	06/30/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	523 SU	5023 SU	
2PD00002	10/31/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	82 SU	4071 SU	
2PD00002	12/31/87	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	2522 SU	21037 SU	
2PD00002	02/29/88	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	2670 SU	11505 SU	
2PD00002	03/31/88	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	2301 SU	2672 SU	
2PD00002	04/30/88	Perrysburg, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1686 SU	10993 SU	
* Subsubtotal *									
									10
* VIOLATIONS FOR PARAMETER: OIL AND GREASE									
2PD00002	02/28/87	Perrysburg, City of	Oil and Grease					5 mg/l	1
	001			0	0	0 mg/l	0 mg/l	6 mg/l	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: PHOSPHORUS, TOTAL									
2PD00002	07/31/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			8	13	0 mg/l	1 mg/l	2 mg/l	
2PD00002	01/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			26	35	0 mg/l	2 mg/l	3 mg/l	
2PD00002	02/28/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			24	39	0 mg/l	2 mg/l	3 mg/l	
2PD00002	03/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			31	34	0 mg/l	2 mg/l	3 mg/l	
2PD00002	04/30/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			24	33	0 mg/l	2 mg/l	3 mg/l	
2PD00002	05/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			36	48	0 mg/l	3 mg/l	4 mg/l	
2PD00002	06/30/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			11	16	0 mg/l	1 mg/l	1 mg/l	
2PD00002	07/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			18	36	0 mg/l	2 mg/l	2 mg/l	
2PD00002	08/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			32	95	0 mg/l	3 mg/l	6 mg/l	
2PD00002	09/30/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			30	58	0 mg/l	3 mg/l	5 mg/l	
2PD00002	10/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			17	37	0 mg/l	2 mg/l	3 mg/l	

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2PD00002	11/30/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			32	61	0 mg/l	3 mg/l	6 mg/l	
2PD00002	12/31/87	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			26	41	0 mg/l	1 mg/l	2 mg/l	
2PD00002	01/31/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			28	42	0 mg/l	2 mg/l	3 mg/l	
2PD00002	02/29/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			26	36	0 mg/l	2 mg/l	2 mg/l	
2PD00002	03/31/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			18	21	0 mg/l	1 mg/l	2 mg/l	
2PD00002	04/30/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			23	38	0 mg/l	2 mg/l	2 mg/l	
2PD00002	05/31/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			35	48	0 mg/l	4 mg/l	6 mg/l	
2PD00002	06/30/88	Perrysburg, City of	Phosphorus, Total	10	16		1 mg/l	2 mg/l	1
	001			20	26	0 mg/l	3 mg/l	3 mg/l	
* Subsubtotal *									
									19
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PD00002	01/31/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			491	927	0 mg/l	43 mg/l	58 mg/l	
2PD00002	02/28/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			440	1051	0 mg/l	33 mg/l	74 mg/l	
2PD00002	03/31/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			772	1161	0 mg/l	56 mg/l	80 mg/l	
2PD00002	04/30/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			413	826	0 mg/l	28 mg/l	42 mg/l	
2PD00002	05/31/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			700	1091	0 mg/l	59 mg/l	76 mg/l	
2PD00002	06/30/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			459	779	0 mg/l	38 mg/l	65 mg/l	
2PD00002	08/31/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			721	2270	0 mg/l	57 mg/l	146 mg/l	
2PD00002	09/30/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			737	1236	0 mg/l	80 mg/l	99 mg/l	
2PD00002	11/30/87	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			467	1548	0 mg/l	42 mg/l	141 mg/l	
2PD00002	01/31/88	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			437	1106	0 mg/l	28 mg/l	65 mg/l	
2PD00002	02/29/88	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			427	850	0 mg/l	25 mg/l	47 mg/l	
2PD00002	04/30/88	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			267	735	0 mg/l	18 mg/l	44 mg/l	
2PD00002	05/31/88	Perrysburg, City of	Solids, Total Suspended	522	678		50 mg/l	65 mg/l	1
	001			538	830	0 mg/l	63 mg/l	97 mg/l	
* Subsubtotal *									
									13
** Subtotal **									
									53
** VIOLATIONS FOR NPDES: 2PD00035									
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PD00035	05/31/87	DuPont Road WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
* Subsubtotal *									
									1

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* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PD00035	07/31/87	DuPont Road WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PD00035	08/31/87	DuPont Road WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
* Subsubtotal *									
									2
* VIOLATIONS FOR PARAMETER: PHENOLICS, TOTAL									
2PD00035	04/30/87	DuPont Road WWTP	Phenolics, Total					27 µg/l	1
	001			0	0	0 µg/l	0 µg/l	60 µg/l	
2PD00035	06/30/88	DuPont Road WWTP	Phenolics, Total					27 µg/l	1
	001			0	0	0 µg/l	0 µg/l	110 µg/l	
* Subsubtotal *									
									2
* VIOLATIONS FOR PARAMETER: PHOSPHORUS, TOTAL									
2PD00035	07/31/87	DuPont Road WWTP	Phosphorus, Total	31	46		1 mg/l	2 mg/l	1
	001			15	26	0 mg/l	1 mg/l	1 mg/l	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PD00035	06/30/87	DuPont Road WWTP	Solids, Total Suspended	607	910		20 mg/l	30 mg/l	1
	001			254	381	0 mg/l	15 mg/l	33 mg/l	
* Subsubtotal *									
									1
** Subtotal **									
									7
** VIOLATIONS FOR NPDES: 2PF00000									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PF00000	01/31/88	Toledo, City of	BOD 5	19713	29569		40 mg/l	60 mg/l	1
	001			13201	13446	0 mg/l	49 mg/l	55 mg/l	
2PF00000	02/29/88	Toledo, City of	BOD 5	19713	29569		40 mg/l	60 mg/l	1
	001			19232	27425	0 mg/l	53 mg/l	66 mg/l	
2PF00000	03/31/88	Toledo, City of	BOD 5	19713	29569		40 mg/l	60 mg/l	1
	001			15442	23800	0 mg/l	40 mg/l	63 mg/l	
* Subsubtotal *									
									3
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PF00000	04/30/87	Toledo, City of	Chlorine, Total Residual					1 mg/l	1
	001			0	0	21 mg/l	0 mg/l	149 mg/l	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PF00000	04/30/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	05/31/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	06/30/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	07/31/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	08/31/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	09/30/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	10/31/87	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	04/30/88	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	05/31/88	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
2PF00000	07/31/88	Toledo, City of	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1000000 SU	100000000 SU	
* Subsubtotal *									
									10
* VIOLATIONS FOR PARAMETER: MERCURY, AS HG									
2PF00000	07/31/88	Toledo, City of	Mercury, as Hg					0 µg/l	1
	001			0	0	0 µg/l	0 µg/l	1 µg/l	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: PH									
2PF00000	02/29/88	Toledo, City of	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	8 SU	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: PHENOLICS, TOTAL									
2PF00000	07/31/88	Toledo, City of	Phenolics, Total					16 µg/l	1
	001			0	0	0 µg/l	0 µg/l	41 µg/l	
* Subsubtotal *									
									1
* VIOLATIONS FOR PARAMETER: PHOSPHORUS, TOTAL									
2PF00000	01/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			252	523	0 mg/l	1 mg/l	2 mg/l	
2PF00000	02/28/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			314	451	0 mg/l	1 mg/l	2 mg/l	
2PF00000	03/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			540	803	0 mg/l	2 mg/l	2 mg/l	
2PF00000	04/30/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			267	785	0 mg/l	1 mg/l	2 mg/l	
2PF00000	06/30/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			423	659	0 mg/l	1 mg/l	3 mg/l	
2PF00000	07/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			399	613	0 mg/l	2 mg/l	3 mg/l	
2PF00000	08/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			502	665	0 mg/l	2 mg/l	3 mg/l	
2PF00000	09/30/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			424	649	0 mg/l	2 mg/l	3 mg/l	
2PF00000	10/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			228	393	0 mg/l	1 mg/l	1 mg/l	
2PF00000	12/31/87	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			512	933	0 mg/l	1 mg/l	2 mg/l	
2PF00000	01/31/88	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			440	484	0 mg/l	2 mg/l	2 mg/l	
2PF00000	02/29/88	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			529	849	0 mg/l	1 mg/l	2 mg/l	
2PF00000	03/31/88	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			492	798	0 mg/l	1 mg/l	2 mg/l	
2PF00000	05/31/88	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			218	413	0 mg/l	1 mg/l	2 mg/l	
2PF00000	06/30/88	Toledo, City of	Phosphorus, Total	493	740		1 mg/l	2 mg/l	1
	001			281	396	0 mg/l	1 mg/l	2 mg/l	
* Subsubtotal *									
									15
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PF00000	03/31/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			34359	43934	0 mg/l	110 mg/l	124 mg/l	
2PF00000	04/30/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			20316	57101	0 mg/l	50 mg/l	137 mg/l	
2PF00000	06/30/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			20351	33570	0 mg/l	65 mg/l	134 mg/l	
2PF00000	07/31/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			19112	28208	0 mg/l	77 mg/l	119 mg/l	
2PF00000	08/31/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			18842	22947	0 mg/l	79 mg/l	99 mg/l	
2PF00000	12/31/87	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			23438	43898	0 mg/l	62 mg/l	97 mg/l	
2PF00000	01/31/88	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			21743	22426	0 mg/l	80 mg/l	81 mg/l	
2PF00000	02/29/88	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			30351	57789	0 mg/l	78 mg/l	117 mg/l	
2PF00000	03/31/88	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			34598	42243	0 mg/l	94 mg/l	111 mg/l	
2PF00000	04/30/88	Toledo, City of	Solids, Total Suspended	29569	44354		60 mg/l	90 mg/l	1
	001			20653	28330	0 mg/l	62 mg/l	101 mg/l	
* Subsubtotal *									
									10
** Subtotal **									
									42
** VIOLATIONS FOR NPDES: 2PG00002									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PG00002	01/31/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			63	83	0 mg/l	215 mg/l	300 mg/l	
2PG00002	02/28/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			20	28	0 mg/l	63 mg/l	96 mg/l	
2PG00002	03/31/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			9	12	0 mg/l	27 mg/l	44 mg/l	
2PG00002	04/30/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			73	134	0 mg/l	146 mg/l	300 mg/l	
2PG00002	06/30/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			4	6	0 mg/l	11 mg/l	17 mg/l	
2PG00002	07/31/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			5	10	0 mg/l	11 mg/l	16 mg/l	
2PG00002	10/31/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			7	10	0 mg/l	26 mg/l	34 mg/l	
2PG00002	11/30/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			7	9	0 mg/l	25 mg/l	30 mg/l	
2PG00002	12/31/87	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			5	6	0 mg/l	13 mg/l	13 mg/l	
2PG00002	01/31/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			7	12	0 mg/l	19 mg/l	26 mg/l	
2PG00002	02/29/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			12	24	0 mg/l	32 mg/l	77 mg/l	
2PG00002	03/31/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			5	5	0 mg/l	13 mg/l	16 mg/l	
2PG00002	04/30/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			4	6	0 mg/l	12 mg/l	19 mg/l	
2PG00002	05/31/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			11	18	0 mg/l	44 mg/l	70 mg/l	
2PG00002	06/30/88	Lucas County Bentbrook Farms	BOD 5	4	6		18 mg/l	25 mg/l	1
	001			4	3	0 mg/l	24 mg/l	12 mg/l	
* Subsubtotal *									
									15
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PG00002	05/31/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PG00002	06/30/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PG00002	07/31/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PG00002	08/31/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PG00002	09/30/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PG00002	10/31/87	Lucas County Bentbrook Farms	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
* Subsubtotal *									
									6
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PG00002	05/31/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	1261 SU	5300 SU	
2PG00002	06/30/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	11994 SU	25800 SU	
2PG00002	07/31/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	1058 SU	370 SU	
2PG00002	08/31/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	993 SU	1600 SU	
2PG00002	09/30/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	1522 SU	13500 SU	
2PG00002	10/31/87	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	146325 SU	292000 SU	
2PG00002	05/31/88	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	10000 SU	10000 SU	
2PG00002	06/30/88	Lucas County Bentbrook Farms	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	10275 SU	34000 SU	
* Subsubtotal *									
									8
* VIOLATIONS FOR PARAMETER: FLOW, TOTAL									
2PG00002	10/31/87	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	01/31/88	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	02/29/88	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	03/31/88	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	04/30/88	Lucas County Bentbrook Farms	Flow, Total		0				1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	05/31/88	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PG00002	06/30/88	Lucas County Bentbrook Farms	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
* Subsubtotal *									
									7
* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED									
2PG00002	10/31/87	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PG00002	11/30/87	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PG00002	01/31/88	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	5 mg/l	0 mg/l	0 mg/l	
2PG00002	04/30/88	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PG00002	05/31/88	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PG00002	06/30/88	Lucas County Bentbrook Farms	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									
									6
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PG00002	01/31/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			67	84	0 mg/l	218 mg/l	252 mg/l	
2PG00002	02/28/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			27	40	0 mg/l	86 mg/l	120 mg/l	
2PG00002	03/31/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			10	17	0 mg/l	32 mg/l	62 mg/l	
2PG00002	04/30/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			127	239	0 mg/l	254 mg/l	536 mg/l	
2PG00002	06/30/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			4	8	0 mg/l	12 mg/l	20 mg/l	
2PG00002	07/31/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			8	16	0 mg/l	17 mg/l	26 mg/l	
2PG00002	10/31/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			10	13	0 mg/l	33 mg/l	40 mg/l	
2PG00002	11/30/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			9	17	0 mg/l	29 mg/l	40 mg/l	
2PG00002	12/31/87	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			6	11	0 mg/l	15 mg/l	19 mg/l	
2PG00002	01/31/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			9	19	0 mg/l	22 mg/l	43 mg/l	
2PG00002	02/29/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			23	46	0 mg/l	61 mg/l	148 mg/l	
2PG00002	03/31/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			9	8	0 mg/l	24 mg/l	25 mg/l	
2PG00002	04/30/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			7	10	0 mg/l	20 mg/l	32 mg/l	
2PG00002	05/31/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			15	26	0 mg/l	60 mg/l	102 mg/l	
2PG00002	06/30/88	Lucas County Bentbrook Farms	Solids, Total Suspended	5	8		20 mg/l	35 mg/l	1
	001			16	2	0 mg/l	92 mg/l	9 mg/l	
* Subsubtotal *									
									15
** Subtotal **									

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
									57

** VIOLATIONS FOR NPDES: 2PH00000

* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL

2PH00000	06/30/88	Fuller's Creekside Estates	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	1 mg/l	
* Subsubtotal *									1

* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED

2PH00000	05/31/88	Fuller's Creekside Estates	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PH00000	06/30/88	Fuller's Creekside Estates	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									2

* VIOLATIONS FOR PARAMETER: PH

2PH00000	06/30/88	Fuller's Creekside Estates	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	7 SU	
* Subsubtotal *									1
** Subtotal **									4

** VIOLATIONS FOR NPDES: 2PH00004

* VIOLATIONS FOR PARAMETER: BOD 5

2PH00004	01/31/87	Lincoln Green	BOD 5	13	23		20 mg/l	35 mg/l	1
	001			29	43	0 mg/l	45 mg/l	108 mg/l	
2PH00004	02/28/87	Lincoln Green	BOD 5	13	23		20 mg/l	35 mg/l	1
	001			70	268	0 mg/l	154 mg/l	594 mg/l	
2PH00004	04/30/87	Lincoln Green	BOD 5	13	23		20 mg/l	35 mg/l	1
	001			13	55	0 mg/l	27 mg/l	114 mg/l	
* Subsubtotal *									3

* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL

2PH00004	05/31/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00004	06/30/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00004	07/31/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00004	08/31/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00004	09/30/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	3 mg/l	
2PH00004	10/31/87	Lincoln Green	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
* Subsubtotal *									6

* VIOLATIONS FOR PARAMETER: FECAL COLIFORM

2PH00004	05/31/87	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	458 SU	10500 SU	
2PH00004	06/30/87	Lincoln Green	Fecal Coliform				200 SU	400 SU	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 SU	8272 SU	25700 SU	
2PH00004	07/31/87	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	909 SU	6800 SU	
2PH00004	08/31/87	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	6095 SU	16100 SU	
2PH00004	09/30/87	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	24016 SU	46000 SU	
2PH00004	05/31/88	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	6000 SU	6000 SU	
2PH00004	06/30/88	Lincoln Green	Fecal Coliform				200 SU	400 SU	1
	001			0	0	0 SU	24150 SU	90000 SU	
* Subsubtotal *									
									7
* VIOLATIONS FOR PARAMETER: FLOW, TOTAL									
2PH00004	11/30/87	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PH00004	12/31/87	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PH00004	01/31/88	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PH00004	02/29/88	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PH00004	03/31/88	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
2PH00004	04/30/88	Lincoln Green	Flow, Total		0				1
	001			0	0	0 mgd	0 mgd	0 mgd	
* Subsubtotal *									
									6
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PH00004	01/31/87	Lincoln Green	Solids, Total Suspended	21	33		32 mg/l	52 mg/l	1
	001			23	55	0 mg/l	44 mg/l	140 mg/l	
2PH00004	02/28/87	Lincoln Green	Solids, Total Suspended	21	33		32 mg/l	52 mg/l	1
	001			29	108	0 mg/l	64 mg/l	240 mg/l	
2PH00004	04/30/87	Lincoln Green	Solids, Total Suspended	21	33		32 mg/l	52 mg/l	1
	001			22	96	0 mg/l	44 mg/l	200 mg/l	
* Subsubtotal *									
									3
** Subtotal **									
									25
** VIOLATIONS FOR NPDES: 2PH00013									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PH00013	01/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			12	21	0 mg/l	35 mg/l	54 mg/l	
2PH00013	02/28/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			12	37	0 mg/l	43 mg/l	126 mg/l	
2PH00013	03/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			7	16	0 mg/l	20 mg/l	41 mg/l	
2PH00013	04/30/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			5	17	0 mg/l	20 mg/l	50 mg/l	
2PH00013	05/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			5	13	0 mg/l	26 mg/l	68 mg/l	
2PH00013	06/30/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			2	4	0 mg/l	12 mg/l	20 mg/l	
2PH00013	08/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			2	7	0 mg/l	12 mg/l	31 mg/l	
2PH00013	10/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			3	4	0 mg/l	16 mg/l	24 mg/l	
2PH00013	11/30/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			2	5	0 mg/l	13 mg/l	30 mg/l	
2PH00013	12/31/87	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			6	7	0 mg/l	31 mg/l	45 mg/l	
2PH00013	02/29/88	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			2	2	0 mg/l	11 mg/l	14 mg/l	
2PH00013	05/31/88	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			6	12	0 mg/l	34 mg/l	57 mg/l	
2PH00013	06/30/88	Oak Openings Industrial Park	BOD 5	7	10		10 mg/l	15 mg/l	1
	001			6	7	0 mg/l	32 mg/l	23 mg/l	
* Subsubtotal *									13
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PH00013	05/31/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00013	06/30/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00013	07/31/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00013	08/31/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00013	09/30/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00013	10/31/87	Oak Openings Industrial Park	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
* Subsubtotal *									6
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PH00013	05/31/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	9402 SU	17000 SU	
2PH00013	06/30/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	23263 SU	97000 SU	
2PH00013	07/31/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	3946 SU	4500 SU	
2PH00013	08/31/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	8878 SU	43200 SU	
2PH00013	09/30/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	7807 SU	24000 SU	
2PH00013	10/31/87	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	54034 SU	167000 SU	
2PH00013	05/31/88	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	130000 SU	130000 SU	
2PH00013	06/30/88	Oak Openings Industrial Park	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	20325 SU	42500 SU	
* Subsubtotal *									8
* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED									
2PH00013	01/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00013	02/28/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00013	03/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PH00013	04/30/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
2PH00013	05/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
2PH00013	06/30/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00013	07/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00013	08/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00013	09/30/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PH00013	10/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00013	11/30/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PH00013	12/31/87	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PH00013	01/31/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	5 mg/l	0 mg/l	0 mg/l	
2PH00013	02/29/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00013	03/31/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00013	05/31/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00013	06/30/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00013	07/31/88	Oak Openings Industrial Park	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									18
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PH00013	01/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			12	18	0 mg/l	37 mg/l	60 mg/l	
2PH00013	02/28/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			34	118	0 mg/l	117 mg/l	404 mg/l	
2PH00013	03/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			11	23	0 mg/l	34 mg/l	70 mg/l	
2PH00013	04/30/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			8	20	0 mg/l	30 mg/l	60 mg/l	
2PH00013	05/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			11	39	0 mg/l	63 mg/l	210 mg/l	
2PH00013	06/30/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			2	4	0 mg/l	13 mg/l	21 mg/l	
2PH00013	08/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			6	16	0 mg/l	30 mg/l	77 mg/l	
2PH00013	09/30/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			2	2	0 mg/l	12 mg/l	19 mg/l	
2PH00013	10/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			9	20	0 mg/l	56 mg/l	132 mg/l	
2PH00013	11/30/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			2	5	0 mg/l	15 mg/l	29 mg/l	
2PH00013	12/31/87	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			16	37	0 mg/l	79 mg/l	168 mg/l	
2PH00013	01/31/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1

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	001			3	4	0 mg/l	14 mg/l	19 mg/l	
2PH00013	02/29/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			3	6	0 mg/l	17 mg/l	36 mg/l	
2PH00013	03/31/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			3	5	0 mg/l	15 mg/l	28 mg/l	
2PH00013	04/30/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			3	3	0 mg/l	13 mg/l	15 mg/l	
2PH00013	05/31/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			26	64	0 mg/l	134 mg/l	308 mg/l	
2PH00013	06/30/88	Oak Openings Industrial Park	Solids, Total Suspended	818	12		12 mg/l	18 mg/l	1
	001			35	45	0 mg/l	174 mg/l	152 mg/l	
* Subsubtotal *									
									17
** Subtotal **									
									62

** VIOLATIONS FOR NPDES: 2PH00014

* VIOLATIONS FOR PARAMETER: BOD 5

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PH00014	03/31/87	Oak Terrace	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			13	51	0 mg/l	47 mg/l	180 mg/l	
2PH00014	06/30/87	Oak Terrace	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			3	7	0 mg/l	8 mg/l	17 mg/l	
2PH00014	08/31/87	Oak Terrace	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			14	47	0 mg/l	38 mg/l	128 mg/l	
2PH00014	12/31/87	Oak Terrace	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			39	154	0 mg/l	99 mg/l	384 mg/l	
2PH00014	06/30/88	Oak Terrace	BOD 5	4	6		10 mg/l	15 mg/l	1
	001			9	0	0 mg/l	24 mg/l	1 mg/l	
* Subsubtotal *									
									5

* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PH00014	05/31/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	06/30/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	07/31/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	08/31/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	09/30/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	10/31/87	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	05/31/88	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	06/30/88	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	4 mg/l	
2PH00014	07/31/88	Oak Terrace	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	2 mg/l	
* Subsubtotal *									
									9

* VIOLATIONS FOR PARAMETER: FECAL COLIFORM

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
2PH00014	05/31/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1020 SU	2000 SU	
2PH00014	06/30/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 SU	7829 SU	20600 SU	
2PH00014	07/31/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1166 SU	800 SU	
2PH00014	08/31/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1786 SU	106000 SU	
2PH00014	09/30/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1261 SU	5900 SU	
2PH00014	10/31/87	Oak Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	1784 SU	12000 SU	
* Subsubtotal *									
									6
* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED									
2PH00014	01/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
2PH00014	02/28/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
2PH00014	03/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00014	04/30/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
2PH00014	05/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00014	06/30/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00014	07/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00014	08/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00014	09/30/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00014	12/31/87	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	2 mg/l	0 mg/l	0 mg/l	
2PH00014	02/29/88	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	4 mg/l	0 mg/l	0 mg/l	
2PH00014	07/31/88	Oak Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	3 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									
									12
* VIOLATIONS FOR PARAMETER: PH									
2PH00014	02/28/87	Oak Terrace	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	7 SU	
2PH00014	09/30/87	Oak Terrace	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	8 SU	
2PH00014	10/31/87	Oak Terrace	pH			7 SU		9 SU	1
	001			0	0	6 SU	0 SU	7 SU	
* Subsubtotal *									
									3
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PH00014	03/31/87	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			37	145	0 mg/l	132 mg/l	510 mg/l	
2PH00014	06/30/87	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			3	7	0 mg/l	8 mg/l	18 mg/l	
2PH00014	08/31/87	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			133	507	0 mg/l	359 mg/l	1368 mg/l	
2PH00014	12/31/87	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			256	1019	0 mg/l	640 mg/l	2540 mg/l	
2PH00014	02/29/88	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			4	13	0 mg/l	13 mg/l	43 mg/l	
2PH00014	04/30/88	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			4	8	0 mg/l	6 mg/l	10 mg/l	
2PH00014	06/30/88	Oak Terrace	Solids, Total Suspended	5	7		12 mg/l	18 mg/l	1
	001			47	2	0 mg/l	120 mg/l	7 mg/l	
* Subsubtotal *									7
** Subtotal **									42
** VIOLATIONS FOR NPDES: 2PK00000									
* VIOLATIONS FOR PARAMETER: CHLORINE, TOTAL RESIDUAL									
2PK00000	05/31/87	Maumee River WWTP	Chlorine, Total Residual					1 mg/l	1
	001			0	0	0 mg/l	0 mg/l	5 mg/l	
* Subsubtotal *									1
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PK00000	05/31/88	Maumee River WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	253 SU	54327 SU	
2PK00000	06/30/88	Maumee River WWTP	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	267 SU	61111 SU	
* Subsubtotal *									2
** Subtotal **									3
** VIOLATIONS FOR NPDES: 2PS00002									
* VIOLATIONS FOR PARAMETER: BOD 5									
2PS00002	01/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			6	7	0 mg/l	18 mg/l	20 mg/l	
2PS00002	02/28/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			7	11	0 mg/l	18 mg/l	29 mg/l	
2PS00002	03/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			12	15	0 mg/l	32 mg/l	41 mg/l	
2PS00002	04/30/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			10	13	0 mg/l	27 mg/l	36 mg/l	
2PS00002	05/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			7	12	0 mg/l	20 mg/l	33 mg/l	
2PS00002	06/30/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			13	23	0 mg/l	36 mg/l	67 mg/l	
2PS00002	07/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			10	13	0 mg/l	26 mg/l	34 mg/l	
2PS00002	08/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			6	7	0 mg/l	16 mg/l	19 mg/l	
2PS00002	09/30/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			6	14	0 mg/l	17 mg/l	37 mg/l	
2PS00002	10/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			3	6	0 mg/l	9 mg/l	16 mg/l	
2PS00002	11/30/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			3	5	0 mg/l	9 mg/l	14 mg/l	
2PS00002	12/31/87	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			9	12	0 mg/l	26 mg/l	32 mg/l	
2PS00002	01/31/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			8	10	0 mg/l	21 mg/l	28 mg/l	
2PS00002	02/29/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			8	12	0 mg/l	23 mg/l	32 mg/l	
2PS00002	03/31/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			9	13	0 mg/l	25 mg/l	35 mg/l	
2PS00002	04/30/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			9	26	0 mg/l	24 mg/l	70 mg/l	
2PS00002	05/31/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			5	7	0 mg/l	14 mg/l	20 mg/l	
2PS00002	07/31/88	Woodside Terrace	BOD 5	3	5		10 mg/l	15 mg/l	1
	001			3	5	0 mg/l	8 mg/l	14 mg/l	
* Subsubtotal *									
									18
* VIOLATIONS FOR PARAMETER: FECAL COLIFORM									
2PS00002	05/31/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	2907 SU	6000 SU	
2PS00002	06/30/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	14091 SU	50000 SU	
2PS00002	07/31/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	20596 SU	25600 SU	
2PS00002	08/31/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	18886 SU	20175 SU	
2PS00002	09/30/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	13500 SU	17600 SU	
2PS00002	10/31/87	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	3613 SU	12400 SU	
2PS00002	05/31/88	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	17110 SU	23200 SU	
2PS00002	07/31/88	Woodside Terrace	Fecal Coliform				1000 SU	2000 SU	1
	001			0	0	0 SU	15111 SU	19000 SU	
* Subsubtotal *									
									8
* VIOLATIONS FOR PARAMETER: OXYGEN, DISSOLVED									
2PS00002	01/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	02/28/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	03/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	04/30/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	05/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	06/30/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	07/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	08/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	09/30/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	10/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	11/30/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	12/31/87	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	01/31/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	02/29/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	1 mg/l	0 mg/l	0 mg/l	
2PS00002	03/31/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1

NPDES PERMIT NUMBER	DATE & OUTFALL NUMBER	NAME OF FACILITY/OWNER	NAME OF PARAMETER VIOLATED	AVG QUANTITY in kg/day Lim/Measured	MAX QUANTITY in kg/day Lim/Measured	MIN CONC Lim/Measured	AVG CONC Lim/Measured	MAX CONC Lim/Measured	TALLY
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	04/30/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	05/31/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
2PS00002	07/31/88	Woodside Terrace	Oxygen, Dissolved			5 mg/l			1
	001			0	0	0 mg/l	0 mg/l	0 mg/l	
* Subsubtotal *									18
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PS00002	01/31/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			12	17	0 mg/l	35 mg/l	48 mg/l	
2PS00002	02/28/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			10	15	0 mg/l	27 mg/l	42 mg/l	
2PS00002	03/30/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			10	15	0 mg/l	28 mg/l	40 mg/l	
2PS00002	04/30/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			7	14	0 mg/l	19 mg/l	38 mg/l	
2PS00002	05/31/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			8	15	0 mg/l	21 mg/l	41 mg/l	
2PS00002	06/30/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			7	9	0 mg/l	20 mg/l	25 mg/l	
2PS00002	08/31/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			7	8	0 mg/l	17 mg/l	21 mg/l	
2PS00002	09/30/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			6	11	0 mg/l	16 mg/l	29 mg/l	
2PS00002	10/31/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			5	9	0 mg/l	14 mg/l	25 mg/l	
2PS00002	11/30/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			5	6	0 mg/l	15 mg/l	17 mg/l	
2PS00002	12/31/87	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			6	9	0 mg/l	16 mg/l	24 mg/l	
2PS00002	01/31/88	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			8	12	0 mg/l	22 mg/l	33 mg/l	
2PS00002	02/29/88	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			7	14	0 mg/l	19 mg/l	39 mg/l	
2PS00002	03/31/88	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			8	13	0 mg/l	22 mg/l	36 mg/l	
2PS00002	04/30/88	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			13	16	0 mg/l	35 mg/l	43 mg/l	
2PS00002	05/31/88	Woodside Terrace	Solids, Total Suspended	4	6		12 mg/l	18 mg/l	1
	001			10	18	0 mg/l	27 mg/l	48 mg/l	
* Subsubtotal *									16
** Subtotal **									60
** VIOLATIONS FOR NPDES: 2PY00000									
* VIOLATIONS FOR PARAMETER: SOLIDS, TOTAL SUSPENDED									
2PY00000	03/31/88	Centennial Manor	Solids, Total Suspended	1			18 mg/l		1
	001			2	0	0 mg/l	37 mg/l	0 mg/l	
* Subsubtotal *									1
** Subtotal **									1
*** Total ***									627

LOWER MAUMEE BASIN

REMEDIAL ACTION PLAN

Volume 1

Investigation Report

October, 1988

tmacog

TOLEDO METROPOLITAN AREA
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ACKNOWLEDGMENTS

The Toledo Metropolitan Area Council of Governments would like to acknowledge the members of the Remedial Action Plan Advisory Committee and their alternates for their participation in developing the Investigation Report. This project would have been impossible without their input.

LOWER MAUMEE RIVER

REMEDIAL ACTION PLAN

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Dale Asmus	Wood County SWCD	Sue Horvath	League of Women Voters
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PREFACE

INVESTIGATION REPORT

The *Investigation Report* on the Lower Maumee River Basin is the supporting documentation that identifies the environmental problems and the water and related uses that are impaired as a result of the problems. It also identifies the known sources of the pollutants. This document is Volume I, the first of two phases in the development of the Remedial Action Plan (RAP).

The Maumee Basin AOC addressed in this document, has been identified as the area extending along the Maumee River from the Bowling Green water intake to the Maumee Bay, including the entire bay and nearshore waters from the Michigan state line to Crane Creek State Park in Ohio. The area includes direct drainage into these waters that are within Lucas, Ottawa and Wood Counties. This includes Swan Creek, Ottawa River (Ten Mile Creek), Duck Creek, Otter Creek, Cedar Creek, Grassy Creek, and Crane Creek. Figure 1 is a map of the area.

The AOC is an area of water quality impacts. In some cases, however, the sources of these impacts are outside of the Lower Maumee River boundaries. This is particularly true of the agricultural sources. Therefore, implementation of the RAP must not be limited to the AOC's boundaries, if significant water quality improvements are to be achieved. The focus of this document is on the Lower Maumee River Basin.

First, this report discusses existing water uses and includes current water quality and sediment quality data. It also describes intensive or short-term monitoring surveys which have occurred in the RAP area along with an analysis of the water quality and sediment quality data.

Secondly, this report describes ten different water pollution sources within the RAP area and the impacts of each of these sources. These include phosphorus sources, NPDES wastewater discharge permits for industrial and municipal sectors, package treatment plants, agricultural runoff, open water disposal of dredged materials, urban stormwater, home sewage disposal, active and closed landfills/dumpsites and pits, ponds and lagoons, and atmospheric deposition related to acid rain.

Lastly, key tables and maps are included with this document to assist the reader in reviewing the information. A glossary is included which defines various terms and agencies found within this document. The appendices have been printed as a separate document and are available upon request to TMACOG.

More than a hundred persons have had input into the preparation of this first phase work. The 74 member Remedial Action Plan Advisory Committee subdivided itself into six major subcommittees, bringing other persons into the process. These subcommittees included: Water Quality and Water Uses, Dredge Disposal, Agricultural Runoff, Home Sewage Disposal, Landfills and Dumps, and Public and Industrial Dischargers.

TMACOG assumes responsibility for the accuracy of this Investigation Report. Therefore, any errors or omissions should be directed to TMACOG.

Lower Maumee Basin

Remedial Action Plan

Volume 1
Investigation Report

October, 1988

Toledo Metropolitan Area Council of Governments
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INTRODUCTION

The Lower Maumee River Area of Concern has a wide variety of pollution problems. Although there have been dramatic water quality improvements over the past decade, serious problems still exist that affect not only water quality itself, but also the area's fish, wildlife, wetlands and public uses. These problems are being caused by excess sediments, nutrients and toxics entering the system. The result has been the need to issue fish consumption advisories, curtailment of body contact water use, and increased stress for endangered species.

An Area of Concern (AOC) is an area recognized by the International Joint Commission where water uses are impaired or where objectives of the Great Lakes Water Quality Agreement or local environmental standards are not being achieved. Heavy metals and organic chemical contamination has led to the Lower Maumee River being classified as an Area of Concern.[1]

The Lower Maumee River AOC is one of 42 areas identified in the Great Lakes basin. In 1985, independent state members of the International Joint Commission's (IJC) Water Quality Board, identified four AOCs in Ohio: Ashtabula, Cuyahoga, Black and Maumee. Ohio EPA is the lead agency for the effort in Ohio. Such identification requires that Remedial Action Plans (RAP) be prepared for each of the AOCs, by the responsible jurisdictions. The RAP is an agreement between federal, state and local governments with the support of area citizens to restore the water quality and beneficial uses.

The requirement to develop RAPs also became a part of the Great Lakes Water Quality Agreement of 1987.[2] This agreement was signed in Toledo at the 1987 Biennial meeting of the IJC. It was determined at this time that RAPs should also include commitments to the IJC for implementation of the Great Lakes Water Quality Agreement of 1987.

The Maumee River contributes the largest tributary load of suspended sediments and phosphorus to Lake Erie. The major source is agricultural runoff upstream from the AOC. Phosphorus is considered the critical nutrient contributing to the cultural eutrophication of Lake Erie.

Sediment is the most prevalent nonpoint pollutant by volume and is a result of soil erosion. The problem stems from the predominance of agricultural land use, the extensive use of row crop agricultural systems, and the soil characteristics of the Maumee River basin. In spite of a low per acre erosion rate, the 1.2 million metric tons annually cause a significant water quality problem.

Nitrogen is an essential plant nutrient that is applied to cropland as a fertilizer. Nitrates are soluble and are carried to waterways with the runoff water, rather than with the sediment. Field tile effluent often carries nitrates to waterways. Nitrate concentrations have exceeded standards on the Maumee River, causing both Waterville and Bowling Green to have drinking water alerts during the spring and early summer.

The Maumee River is classified as either moderately or heavily polluted for heavy metals from a point at Rossford to the Maumee Bay, with the highest concentrations of most metals in the sediment found at or slightly above the mouth near Toledo's Wastewater Treatment Plant to River Mile 2 (vicinity of Norfolk Southern Railroad Bridge). Metals of concern include: chromium, copper, lead, nickel, zinc, manganese and arsenic.

Aquatic life use attainment for the Maumee River becomes non-attainment at Rossford (RM 9.4) and persists all the way into Maumee Bay. Arsenic seems to be the most significant industrial problem at RM 7.4. The combined sewer overflows begin at River Mile 4.7 (area of Portside) and become a real problem after the confluence with Swan Creek.

Below the Martin Luther King Bridge the Dissolved Oxygen is very low (fish cannot live without adequate DO values) and continues to the mouth. Ammonia and nitrites are elevated starting at the Norfolk Southern Railroad Bridge. Zinc is elevated above the mouth.

Documented investigation of fish species for the Maumee River show a 50% decline since 1981. Fish community composite and quality values drop 2 points from the Grand Rapids dam to the mouth. It is thought that the upstream movement of the Toledo WWTP plume and the numerous combined sewer overflow discharges are the cause of the low community values. From the Toledo WWTP into the Maumee Bay area of the Toledo Edison intake channel are displayed the lowest fish community values.

Then, too, are the categories of toxic pollutants of concern including poly-nuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and phthalates. These toxic chemicals, as well as the heavy metals, are known to biomagnify, bioaccumulate, or are suspected of causing cancer and are acutely toxic to aquatic organisms.

PAHs and phthalates have been found at detectable levels in the Maumee shipping channel. Studies of Toledo Harbor sediments that have been available for review have not shown sediment bound pesticides at levels high enough to arouse concern. Dioxins and furans, however, have not been studied. The PAH concentrations are at the lower end of the range of values for sites with cancer epizootics, pose a possible problem and must be of concern.

Bottom dwelling organisms avoid or cannot exist in areas which are highly contaminated with toxic compounds. They may however survive in areas where low levels of toxicants are found. This means that they are constantly exposed to these contaminants throughout their life spans. After accumulating toxicants, these organisms, if eaten, are the starting point for toxicants to move up the food chain to fish, then onto fish-eating birds and/or humans where they can accumulate.

Impacting water quality on the Ottawa River are the wall-to-wall dumps once sited in the floodplains which leak solvents, conventional pollutants and organic priority pollutants. The Dura Dump leachate, for example, contains high BOD, COD and organics, among which include PCBs. The City of Toledo has posted the area advising persons to avoid contact with the water, sediments and fish.

The degradation of Otter Creek is directly related to arsenic leaking from settling ponds created over thirty years ago. This creek has been a known "industrial sewer" for over twenty years, with oil soaked banks, and nickel and cyanide being detected in its waters. Swan Creek has poor water quality from its mouth to four miles upstream. Heavy metals, with the heaviest impact between Hawley Street and Collingwood Blvd., have helped to cause a 50% decline of fish species since 1981.

STREAM SEGMENTS OF THE MAUMEE RAP AREA

The Maumee and its tributaries are divided into a number of segments, according to their drainage areas. Each stream segment is classified as being a part of a major drainage basin. In the Maumee RAP Area, the basin is generally the Maumee River. A few streams in the RAP Area actually flow directly into the Maumee Bay/Lake Erie and are not tributary to the Maumee River. Within each basin, stream segments may be classified as part of a sub-basin. Each segment drains one or more watersheds.

There are three systems in use for classifying watersheds. These are:

> Ohio EPA uses the *Planning and Engineering Data Management System for Ohio* (PEMSO) system. Each stream segment has a unique PEMSO number.
>
> TMACOG uses smaller watersheds, which are generally a subset of the PEMSO watersheds.
>
> The third system is *Land Resources Information System* (LRIS), developed for the 208 program, and further defined for the Lake Erie Wastewater Management Study (LEWMS).[3] LRIS watersheds are usually, but not always, the same as TMACOG's.

Stream segments are also categorized by their uses. They are assigned aquatic life use designations by the Ohio EPA, and each stream's water quality standards are based on its' use designations. All of the Maumee RAP Area streams are classified Warmwater Habitat (WWH), Agricultural and Industrial Water Supply, and Primary Contact Recreation (PCR). Any portions of the AOC that are within 500 yards of an existing public water supply intake are designated Public Water Supply.

A listing of RAP Area stream segments and their classifications is given in Table 1. The stream reaches are shown in Figure 2.

LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

TMACOG

TABLE 1
RAP AREA STREAM SEGMENTS AND USE DESIGNATIONS

STREAM, BASIN, AND SUB-BASIN	WATERSHED NUMBERS	STREAM SEGMENT USES	LENGTH (Miles)
Ai Creek BASIN: Maumee SUB-BASIN: Swan NOTES: Swan Creek, West Fork	TMACOG: 007 LRIS: 007 PEMSO: 410102 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	9.10
Ayres Creek BASIN: Lake Erie SUB-BASIN: Crane Creek NOTES:	TMACOG: 033 LRIS: 033 PEMSO: 1610302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	0.60
Blue Creek BASIN: Maumee SUB-BASIN: Swan NOTES:	TMACOG: 038,040 LRIS: 038,040 PEMSO: 410103 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	11.90
Cairl Creek BASIN: Maumee SUB-BASIN: Swan/Wolf NOTES:	TMACOG: 042 LRIS: 042 PEMSO: 410132 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	7.40
Cedar Creek BASIN: Lake Erie SUB-BASIN: Cedar NOTES:	TMACOG: 032 LRIS: 032 PEMSO: 1610303 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	8.50
Crane Creek BASIN: Lake Erie SUB-BASIN: Crane NOTES:	TMACOG: 033 LRIS: 033 PEMSO: 1610302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	12.70
Delaware Creek BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 013 LRIS: 013 PEMSO: 410133 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	2.50
Dry Creek BASIN: Lake Erie SUB-BASIN: Cedar Creek NOTES:	TMACOG: 032 LRIS: 032 PEMSO: 1610303 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	11.50
Duck Creek BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 015 LRIS: 015 PEMSO: 410133 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	3.00
Gail Run BASIN: Maumee SUB-BASIN: Swan NOTES:	TMACOG: 008 LRIS: 008 PEMSO: 410101 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	4.70
Grassy Creek BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 046,045 LRIS: 046,045 PEMSO: 410133 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	2.50
Halfway Creek BASIN: Maumee SUB-BASIN: North Maumee Bay NOTES:	TMACOG: 025,022,021 LRIS: 025,022,021 PEMSO: 410302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	3.50
Harris Ditch BASIN: Maumee SUB-BASIN: Swan/Blue NOTES: Swan Creek, South Fork	TMACOG: 075 LRIS: 075 PEMSO: 410103 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	5.60

TABLE 1, CONTINUED
RAP AREA STREAM SEGMENTS AND USE DESIGNATIONS

STREAM, BASIN, AND SUB-BASIN	WATERSHED NUMBERS	STREAM SEGMENT USES	LENGTH (Miles)
Henry Creek BASIN: Lake Erie SUB-BASIN: Crane Creek NOTES:	TMACOG: 033 LRIS: 033 PEMSO: 1610302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	9.00
Hill Ditch BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 202 LRIS: 202 PEMSO: 411331 STATE RESOURCE? No	HABITAT: WATER SUPPLY: RECREATIONAL: RAP? Yes	0.00
Lake Erie Watershed #1 BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 030 LRIS: 030 PEMSO: 411133 STATE RESOURCE? No	HABITAT: WATER SUPPLY: RECREATIONAL: RAP? Yes	0.00
Lake Erie Watershed #2 BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 031 LRIS: 031 PEMSO: 411364 STATE RESOURCE? No	HABITAT: WATER SUPPLY: RECREATIONAL: RAP? Yes	0.00
Lake Erie Watershed #3 BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 034 LRIS: 034 PEMSO: 411363 STATE RESOURCE? No	HABITAT: WATER SUPPLY: RECREATIONAL: RAP? Yes	0.00
Little Cedar Creek BASIN: Lake Erie SUB-BASIN: Cedar Creek NOTES:	TMACOG: 032 LRIS: 032 PEMSO: 1610303 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	2.50
Little Crane Creek BASIN: Lake Erie SUB-BASIN: Crane Creek NOTES:	TMACOG: 033 LRIS: 033 PEMSO: 1610302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	3.50
Maumee River, Mouth-Perrysburg BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 013,014,015,047 LRIS: 013,014,015,047 PEMSO: 410133 STATE RESOURCE? Yes	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	6.90
Maumee River, Perrysburg-Waterville BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 079, 044 LRIS: 079, 044 PEMSO: 410133 STATE RESOURCE: Yes	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	
Maumee River, Waterville-BG Water Intake BASIN: Maumee SUB-BASIN: Maumee River NOTES:	TMACOG: 078, 043 LRIS: 043 PEMSO: 410235 STATE RESOURCE? Yes	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	3.50
Mosquito Creek BASIN: Maumee SUB-BASIN: Swan/Blue NOTES:	TMACOG: 040 LRIS: 040 PEMSO: 410103 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	0.80
Ottawa River at Toledo (Berdan to UT) BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 005 LRIS: 005 PEMSO: 411331 STATE RESOURCE? Yes	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	3.50
Ottawa River at Toledo (Mouth to Berdan) BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 005 LRIS: 005 PEMSO: 411331 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	7.40

TABLE 1, CONTINUED
RAP AREA STREAM SEGMENTS AND USE DESIGNATIONS

STREAM, BASIN, AND SUB-BASIN	WATERSHED NUMBERS	STREAM SEGMENT USES	LENGTH (Miles)
Ottawa River at Toledo (UT to North Branch) BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 005,004 LRIS: 005,004 PEMSO: 411331 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	0.00
Otter Creek BASIN: Maumee SUB-BASIN: Maumee Bay NOTES:	TMACOG: 028 LRIS: 028 PEMSO: 1610364 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	6.00
Prairie Ditch BASIN: Maumee SUB-BASIN: Ottawa River NOTES:	TMACOG: 002 LRIS: 002 PEMSO: 410301 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	5.90
Reitz Road Ditch BASIN: Maumee SUB-BASIN: NOTES:	TMACOG: 078 LRIS: 078 PEMSO: 411235 STATE RESOURCE? No	HABITAT: WATER SUPPLY: RECREATIONAL: RAP? Yes	0.00
Shantee Creek BASIN: Maumee SUB-BASIN: North Maumee Bay NOTES:	TMACOG: 020 LRIS: 020 PEMSO: 410302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	4.60
Sibley Creek BASIN: Maumee SUB-BASIN: Ottawa NOTES:	TMACOG: 005 LRIS: 005 PEMSO: 411331 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	5.20
Silver Creek BASIN: Maumee SUB-BASIN: North Maumee Bay NOTES:	TMACOG: 023 LRIS: 023 PEMSO: 410302 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	7.30
Swan Creek (Mouth to Blue Creek) BASIN: Maumee SUB-BASIN: Swan Creek NOTES:	TMACOG: 012,010,041 LRIS: 012,010,041 PEMSO: 410132 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	22.20
Swan Creek above Ai Creek BASIN: Maumee SUB-BASIN: Swan Creek NOTES:	TMACOG: 008 LRIS: 008 PEMSO: 410101 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	7.93
Swan Creek above Blue Creek BASIN: Maumee SUB-BASIN: Swan Creek NOTES:	TMACOG: 039 LRIS: 039 PEMSO: 410131 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	8.40
Tenmile Creek above North Branch BASIN: Maumee SUB-BASIN: Ottawa River NOTES:	TMACOG: 001,003 LRIS: 001,003 PEMSO: 410301 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	34.80
Tenmile Creek, North Branch BASIN: Maumee SUB-BASIN: Ottawa River NOTES:	TMACOG: 006 LRIS: 006 PEMSO: 410301 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	6.50
Wolf Creek BASIN: Maumee SUB-BASIN: Swan NOTES:	TMACOG: 011 LRIS: 011 PEMSO: 410132 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	7.00
Wolf Creek BASIN: Maumee SUB-BASIN: Maumee Bay NOTES:	TMACOG: 029 LRIS: 029 PEMSO: 1610364 STATE RESOURCE? No	HABITAT: WWH WATER SUPPLY: AI RECREATIONAL: PCR RAP? Yes	2.80

EXISTING WATER USES

PUBLIC WATER SUPPLY

One of the surface water uses in the Lower Maumee River AOC is water supply. The primary use is for public water supply. Several industries use surface waters for industrial water supply as well.

As far as public water supply is concerned, two surface water bodies in the AOC are the sources of four public water supply systems. The Maumee River is the public water source for both the City of Bowling Green and the Village of Waterville. Lake Erie is the source for both the City of Oregon and the City of Toledo. According to 1980 population estimates, these four systems service a combined population of just over 524,000.

Three of the four public water supply systems are located in Lucas County. Most of the county is serviced by these systems except for Jerusalem, Richfield, Harding and Providence Townships and portions of Spencer and Swanton Townships. The three lower townships of Monroe County, Michigan and the northern portion of Wood County, Ohio are also serviced by these water supply systems. The Village of Whitehouse uses ground water as its public water supply source.

Oregon

The City of Oregon obtains its water supply directly from Lake Erie. The water is pumped from the low service pumping station in Jerusalem Township to the Water Treatment Plant (WTP) where approximately 8.0 million gallons per day (mgd) are purified and softened.

After treatment, a portion of the water is stored at the water treatment plant in a 1.5 million gallon (MG) reservoir and a 1.0 MG elevated tank at Coy Road. The rest is distributed to approximately 7,000 customers and serves a total population of 25,000 in Oregon and parts of Lucas, Wood and Ottawa Counties. Specifically, Oregon supplies water to the City of Oregon, the Village of Harbor View, the Village of Genoa and a portion of the City of Northwood.

Overall, the Oregon WTP has been able to maintain good water quality. Basically, the raw lake water is softened, disinfected and clarified before it is suitable for public use.

The three major water quality problems which cause the treatment plant the most trouble are sediments, turbidity and phosphates. Sediments and turbidity are problematic in the treatment process because they must be removed from the water. Therefore, the greater the amount of suspended sediment and turbidity, the greater the effort and cost required to remove them.

Phosphates create problems for the WTP because they stimulate algae growth. Algae blooms can cause taste and odor problems in potable water. When water containing increased numbers of algal cells or their metabolic and decay products (or other organic matter) is chlorinated for disinfection purposes, increased levels of trihalomethane result.[4,5,6]

Toledo

The City of Toledo obtains its water directly from Lake Erie. The water is pumped from the low service pumping station in Jerusalem Township to the Collins Park Water Treatment Plant in East Toledo. The Collins Park WTP purifies and softens approximately 120 mgd of lake water.

The Toledo water system constitutes the largest physical plant in the region for supplying treated water. Toledo supplies water to the entire county except Jerusalem, Richfield, Harding and Providence Townships, parts of Spencer and Swanton Townships and those areas serviced by the Oregon WTP. It also supplies water to portions of northern Wood County and the lower Townships of Monroe County, Michigan. Specifically, the Cities of Toledo, Sylvania, Maumee, Perrysburg, Rossford, Luna Pier and a portion of the City of Northwood receive their water from Toledo. In addition, the Villages of Holland, Ottawa Hills and Walbridge are served by Toledo. Toledo supplies water to just under 120,000 customers and services a total population of approximately 464,000.

Overall, Collins Park WTP has been able to maintain good water quality. The lake water is softened, clarified and disinfected before it is distributed as public supply. The water quality problems that give the treatment plant the most trouble are the same as those already mentioned with regard to the Oregon WTP, sediments, turbidity and phosphates. Occasional taste and odor problems stemming from excessive algae growth have been the primary problems for the treatment plant.[4,5,6]

Waterville

The Village of Waterville obtains its water supply directly from the Maumee River. The river water is pumped to the water treatment facilities where it is softened and purified. The WTP treats about 0.8 mgd.

The treated water is distributed to approximately 1,500 customers and serves a population of approximately 5,300 in the Village of Waterville and Lucas County. Specifically, portions of Monclova and Waterville Townships are serviced by this system in addition to the Village of Waterville. The current facilities will probably not be able to meet future needs without expansion. Therefore, the system may eventually be replaced by the Toledo system.

The river water is softened, disinfected and clarified before distribution. Generally, the water quality maintained by the treatment facility has been good. However, there have been cases, usually in the spring, when Nitrate and Trihalomethane levels have exceeded drinking water standards. The water quality problems which cause the most trouble for the WTP are sediment, turbidity, phosphates, nitrates and herbicides. These problems are discussed in the following section on the City of Bowling Green WTP.[4,5,6]

Bowling Green

The Bowling Green Water System is the only public water supply system in the AOC which is located in Wood County. Approximately 90% of the public water used in Wood County is provided by surface water. Of that 90%, 80% is supplied by the Maumee River.

Bowling Green obtains its supply directly from the Maumee River. The City of Bowling Green WTP has the capacity to soften and purify 6.0 mgd.

After treatment, the water is distributed to just over 5,000 customers and serves a population of approximately 30,000 in Wood County. Specifically, the City of Bowling Green and the surrounding area of Wood County, the Villages of Haskins, Tontogany, Portage and the Miltonville area along River Road are supplied by the Bowling Green water system.

The river water is softened, disinfected and clarified before it is distributed. The Bowling Green Water System has recognized water quality problems which are related to the water quality of the Maumee River. Primarily, sediment, turbidity, phosphates, nitrates and herbicides are the most problematic.

High levels of turbidity require great efforts for removal. Turbidity units can reach very high levels in the Maumee River, especially in the spring, fall and during storm events.

Nitrates and herbicides present a difficult problem for treatment because they cannot be removed from the water with current installed treatment technologies. The best that can be done by the WTP is to dilute the water to reduce the concentrations of these substances. Therefore, there are times when the Bowling Green water supply contains high levels of nitrates and herbicides. This occurs at those times when the Maumee River has high levels of these substances which normally happens in the spring. The City is considering building a reservoir which would help dilute high nitrate water and provide greater reserve capacity in the event of a chemical spill on the river or abnormally low flow preventing the plant from pumping from the river.

Bowling Green occasionally has trouble with trihalomethanes. This usually occurs when there are increased amounts of algae present in the Maumee River. Algae cause increased amounts of organic matter in water. Chlorination of this organic matter during the disinfection process increases the formation of trihalomethane.[4,5,6]

Summary

Generally speaking, the problems experienced by each of the public water supply systems can be attributed to sediment, nutrient and phosphorus loadings to the Maumee River. Non point sources are primarily responsible for these loadings. These non point sources include agricultural runoff and urban storm-water runoff.

A summary table which outlines the various characteristics of each public water systems has been provided (Table 2). The primary source of the information for the table was a TMACOG report, *Existing Water Supply Systems in the Toledo Metropolitan Area*[5], which was prepared in June, 1983. Additional information was obtained from the Ohio Department of Natural Resource (ODNR), report, *Northwest Ohio Water Supply Plan, 1985 Edition.*[4]

TABLE 2
SUMMARY OF PUBLIC WATER SUPPLY SYSTEMS IN THE RAP AREA

Characteristics	Oregon	Toledo	Waterville	Bowling Green	TOTAL
Source of Supply	Lake Erie	Lake Erie	Maumee River	Maumee River	
Est. Pop. Served	25,000	463,940	5,255	30,000	524,195
Customers Served	6,800	118,585	1,500	5,287	132,172
Area Served	Oregon, Harbor View, Genoa, Northwood*, Wood County*, Lucas County*, Ottawa County*	Toledo, Sylvania, Holland, Perrysburg, Ottawa Hills, Maumee, Walbridge, Rossford, Northwood*, Monroe County*, Wood County*, Lucas County*	Waterville, Monclova Township*, Waterville Township*	Bowling Green, Haskins, Tontogany, Wood County*, Miltonville Area#	
Type of Treatment	Softening & Disinfection	Softening & Disinfection	Softening & Disinfection	Softening & Disinfection	
Water Quality Problems	Turbidity, Sediments & Phosphates	Turbidity, Sediments & Phosphates	Turbidity, Nitrates, Sediments & Herbicides	Turbidity, Nitrates, Sediments & Herbicides	
Treatment Process					
Coagulation/ Recarbonization	Alum, Lime, Soda Ash	(Hydraulic Mixing) Alum, Lime, Soda Ash	Alum, Lime	Ferric Chloride, Lime	
Flocculation	Slow Mechanical Mix	Slow Mechanical Mix	Slow Mechanical Mix	Slow Mechanical Mix	
Filtration	Rapid Sand Filters	Rapid Sand Filters	Rapid Sand Filters	Rapid Sand Filters	
Taste & Order Control	Activated Carbon, Chlorine Dioxide	Activated Carbon, Chlorine Dioxide	Activated Carbon, Chlorine Dioxide	Potassium Permanganate, Chlorine Dioxide, Activated Carbon	
Corrosion Control & Stabilization	Phosphate Compounds	Phosphate Compounds, Carbon Dioxide	@	Carbon Dioxide	
Fluoridation	Sodium Silicofluoride	Sodium Silicofluoride	Sodium Fluoride	Hydroflusilicic Acid	
Disinfection	Chlorine	Chlorine	Chlorine	Chlorine	

* Portions of
\# Area along River Road
@ Unspecified

Source: TMACOG Report, "Water Supply Systems in the Toledo Metropolitan Area," June, 1983.

SPORT AND COMMERCIAL FISHING

The surface waters in the Area of Concern are used for sport and commercial fishing. The primary areas for sport fishing are the Maumee River and Maumee Bay, however, sport fishing occurs throughout the Area of Concern. Commercial fishing has been limited to the Bay.

Data on sport fishing in the Maumee River are collected by the ODNR, Division of Wildlife. Spring Creel Surveys are taken periodically. A summary of these surveys from 1975 to 1987 has been provided (Table 3). The increase of walleye caught in 1987 probably reflects the good year of spawning experienced in 1982.

Walleye and white bass are the principle sport fish in the Maumee River. The spring Walleye run is an important sport fishing event which has drawn people from as far away as Alaska. Sport fishing occurs all along the Maumee River. Other fish which can be found in the Maumee include yellow perch, channel catfish, smallmouth bass, sauger and white perch.

The ODNR, Division of Wildlife does not take Creel Surveys for other streams in the AOC, therefore, it would be difficult to estimate the number of sport fish caught in this area. However, sport fishing is widespread throughout the AOC. The selection of a fishing site is only limited by the sport fisherman's experience and imagination. Limited fishing occurs in the Ottawa River and Swan Creek. Sport fishermen are commonly found at private ponds and small lakes such as Evergreen Lake in the Oak Openings Metropark.

Both sport and commercial fishing occur in the Maumee Bay. The Western Basin of Lake Erie has been considered one of the best fishing locations on Lake Erie. It has been well known for its walleye fisheries, being called the walleye capital of the world. Although the Walleye fisheries had declined in the early 1970's, they have made a comeback since 1975. The ODNR, Division of Wildlife, collects sport and commercial fishing data for Maumee Bay and Lake Erie. ODNR grids 801 and 802 are at least partially located in the Area of Concern (Figure 3). Summary data on sport boat angler hours and harvest from 1980 to 1987 has been provided (Tables 4-6). A summary of commercial harvest have also been provided (Tables 7-9). Yearly variations are largely due to the number of surveys taken in a given year.

An indication of the importance of fishing as a water use in the Area of Concern might be obtained by looking at the number of fishing related organizations. To date, 8 sportsmen organizations and 11 charter boat services have been identified and it is likely that more exist.

A public health advisory was issued in 1987 and 1988, against consumption of carp and channel catfish taken from Lake Erie, which affects Maumee Bay and the estuarine portion of the Maumee River. PCB levels have been detected in these species which frequently exceed the U.S. Food and Drug Administration's (USFDA) tolerance limit of two parts per million in the edible portions. While compliance with the advisory is voluntary for sport fishermen, USFDA has charged commercial fisheries with ensuring that fish which may enter interstate commerce fall within federal tolerance limits for contaminants.

Fish kills are investigated by the ODNR Division of Wildlife. An annual report, *Water Pollution, Fish Kill, and Stream Litter Investigations,* is published, which summarizes the fish kills for the year. In the 1987 report, Table 2 ("Wild Animal Kills Resulting from Water Pollution Incidents Investigated in 1987) notes that 2,227 fish and invertebrates were killed in Swan Creek on July 30, 1987. The suspected pollutant was sewage.

TABLE 3

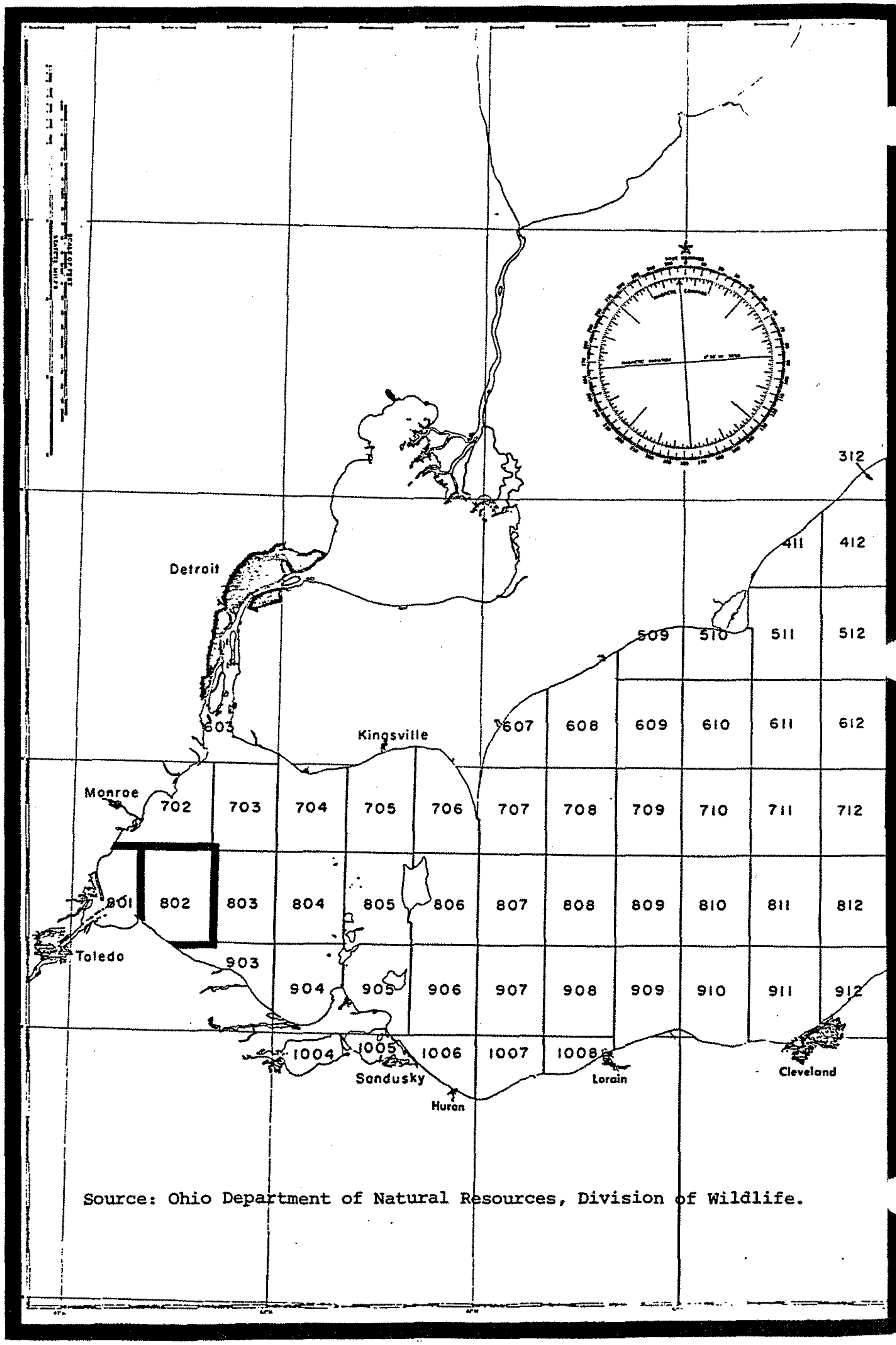
SUMMARY OF ANGLER HOURS, CATCH AND CATCH RATES IN THE SPRING CREEL SURVEYS: MAUMEE RIVER FROM 1975-1987

Year	ANGLER HOURS Walleye*	ANGLER HOURS White Bass@	ANGLER HOURS TOTAL	WALLEYE Catch*	WALLEYE CPUE$	WHITE BASS Catch@	WHITE BASS CPUE$
1975	112,500	43,800	214,100	15,475	.14	36,731	.84
1976	36,700	81,600	186,800	5,336	.15	124,235	1.52
1977	41,600	40,800	125,700	6,163	.15	79,995	2.00
1978#	73,900	---	---	22,747	.29	---	---
1979#	184,800	---	---	33,614	.18	---	---
1980	155,800	46,700	230,800	38,442	.23	87,700	1.34
1981	161,700	93,200	298,200	21,415	.11	165,500	1.48
1982	201,400	133,100	368,900	37,300	.16	172,372	1.05
1983+	---	---	---	---	---	---	---
1984	143,200	59,900	210,100	28,899	.17	137,091	1.56
1985+	---	---	---	---	---	---	---
1986+	---	---	---	---	---	---	---
1987	247,000	56,100	339,500	69,871	.25	66,633	.75
TOTAL	1,358,600	555,200	1,974,100	279,262		870,257	

* Anglers Seeking Walleye.
@ Anglers Seeking White Bass.
# Walleye Fishery Only Surveyed.
+ No River Surveys were Conducted.
$ Catch Per Unit of Effort

Source: Unpublished data. Ohio Department of Natural Resources, Division of Wildlife.

Ohio Department of Natural Resources Wildlife Grid



Source: Ohio Department of Natural Resources, Division of Wildlife.

TABLE 4
SPORT BOAT ANGLER HOURS AND HARVEST 1980-87
GRID 801: MAUMEE BAY

Year	Angler Hours	Yellow Perch	Walleye	White Bass	Freshwater Drum	Channel Catfish	Smallmouth Bass	Other Fish	TOTAL HARVEST
1980	127,622	306,802	14,744	5,574	4,208	1,677	0	91	333,096
1981	4,313	2,702	0	4	65	71	0	124	2,966
1982	24,135	6,919	8,663	0	524	84	0	0	16,190
1983	8,524	0	3,400	0	0	0	0	0	3,400
1984	61,123	175,096	22,501	9,926	340	2,178	0	0	210,041
1985	0	0	0	0	0	0	0	0	0
1986	70,973	206,742	3,744	2,814	676	2,260	0	2,260	218,496
1987	31,788	65,157	1,132	16,489	650	2,302	0	0	85,730
TOTAL	328,478	763,418	54,184	34,807	6,463	8,572	0	2,475	869,919

TABLE 5
SPORT BOAT ANGLER HOURS AND HARVEST 1980-87
GRID 802: LAKE ERIE

Year	Angler Hours	Yellow Perch	Walleye	White Bass	Freshwater Drum	Channel Catfish	Smallmouth Bass	Other Fish	TOTAL HARVEST
1980	879,233	2,219,818	299,644	1,394	13,013	2,357	0	153	2,536,379
1981	0	0	0	0	0	0	0	0	0
1982	936,765	2,151,747	171,101	4,946	11,346	5,930	0	3,555	2,348,625
1983	214,710	248,315	28,426	43,778	1,276	1,942	0	0	323,737
1984	619,241	783,467	442,336	9,103	1,875	322	71	58	1,237,232
1985	283,056	503,427	126,506	1,472	2,392	3,658	0	2,364	639,819
1986	416,866	527,887	157,418	1,494	8,394	3,881	0	12,763	711,837
1987	331,105	341,588	148,754	8,268	4,889	2,113	0	0	505,612
TOTAL	3,680,976	6,776,249	1,374,185	70,455	43,185	20,203	71	18,893	8,303,241

Source: Unpublished data. Ohio Department of Natural Resources, Division of Wildlife.

TABLE 6
SPORT BOAT ANGLER HOURS AND HARVEST 1980-87
GRIDS 801 & 802: MAUMEE BAY AND LAKE ERIE

Year	Angler Hours	Yellow Perch	Walleye	White Bass	Freshwater Drum	Channel Catfish	Smallmouth Bass	Other Fish	TOTAL HARVEST
1980	1,006,855	2,526,620	314,388	6,968	17,221	4,034	0	244	2,869,475
1981	4,313	2,702	0	4	65	71	0	124	2,966
1982	960,900	2,158,666	179,764	4,946	11,870	6,014	0	3,555	2,364,815
1983	223,234	248,315	31,826	43,778	1,276	1,942	0	0	327,137
1984	680,364	958,563	464,837	19,029	2,215	2,500	71	58	1,447,273
1985	283,056	503,427	126,506	1,472	2,392	3,658	0	2,364	639,819
1986	487,839	734,629	161,162	4,308	9,070	6,141	0	15,023	930,333
1987	362,893	406,745	149,886	24,757	5,539	4,415	0	0	591,342
TOTAL	4,009,454	7,539,667	1,428,369	105,262	49,648	28,775	71	21,368	9,173,160

Source: Unpublished data. Ohio Department of Natural Resources, Division of Wildlife.

TABLE 7
COMMERCIAL HARVEST IN POUNDS 1983-86.
GRID 801: MAUMEE BAY

	1983	1984	1985	1986	TOTAL
Yellow Perch	339	11	---	---	350
Carp	107,900	106,650	83,030	53,500	351,080
White Bass	19,592	7,998	44,926	11,856	84,372
Channel Catfish	7,972	8,427	19,829	7,130	43,358
Drum	13,647	50	223	425	14,345
Bullhead	4,703	2,724	1,664	4,918	14,009
Buffalo	195	234	287	154	870
Goldfish	---	---	---	20	20
Suckers	---	30	363	180	573
Quillback	810	60	---	1,725	2,595
Gizzard Shad	---	---	2,424	---	2,424
White Perch	---	---	---	540	540
TOTAL	155,158	126,184	152,746	80,448	514,536

TABLE 8
COMMERCIAL HARVEST IN POUNDS 1983-86.
GRID 802: LAKE ERIE

	1983	1984	1985	1986	TOTAL
Yellow Perch	11,906	2,347	6,104	26,504	46,861
Carp	20,180	10,310	218,576	10,791	259,857
White Bass	124,100	204,770	205,081	72,805	606,756
Channel Catfish	6,684	10,739	15,012	6,767	39,202
Drum	31,657	12,975	18,966	22,793	86,391
Bullhead	5,112	10,177	15,195	9,904	40,388
Buffalo	3,459	5,757	7,163	4,107	20,486
Goldfish	---	414	1,011	275	1,700
Suckers	14,949	3,141	6,210	3,120	27,420
Quillback	11,395	13,041	10,904	7,691	43,031
Gizzard Shad	125	---	---	---	125
White Perch	14,755	42,208	38,019	27,993	122,975
TOTAL	244,322	315,879	542,241	192,750	1,295,192

Source: Unpublished data. Ohio Department of Natural Resources, Division of Wildlife

TABLE 9
COMMERCIAL HARVEST IN POUNDS 1983-86
GRIDS 801 & 802: MAUMEE BAY AND LAKE ERIE

	1983	1984	1985	1986	TOTAL
Yellow Perch	12,245	2,358	6,104	26,504	47,211
Carp	128,080	116,960	301,606	64,291	610,937
White Bass	143,692	212,768	250,007	84,661	691,128
Channel Catfish	14,656	19,166	34,841	13,897	82,560
Drum	45,304	13,025	19,189	23,218	100,736
Bullhead	9,815	12,901	16,859	14,822	54,397
Buffalo	3,654	5,991	7,450	4,261	21,356
Goldfish	0	414	1,011	295	1,720
Suckers	14,949	3,171	6,573	3,300	27,993
Quillback	12,205	13,101	10,904	9,416	45,626
Gizzard Shad	125	0	2,424	0	2,549
White Perch	14,755	42,208	38,019	28,533	123,515
TOTAL	399,480	442,063	694,987	273,198	1,809,728

Source: Unpublished data. Ohio Department of Natural Resources, Division of Wildlife

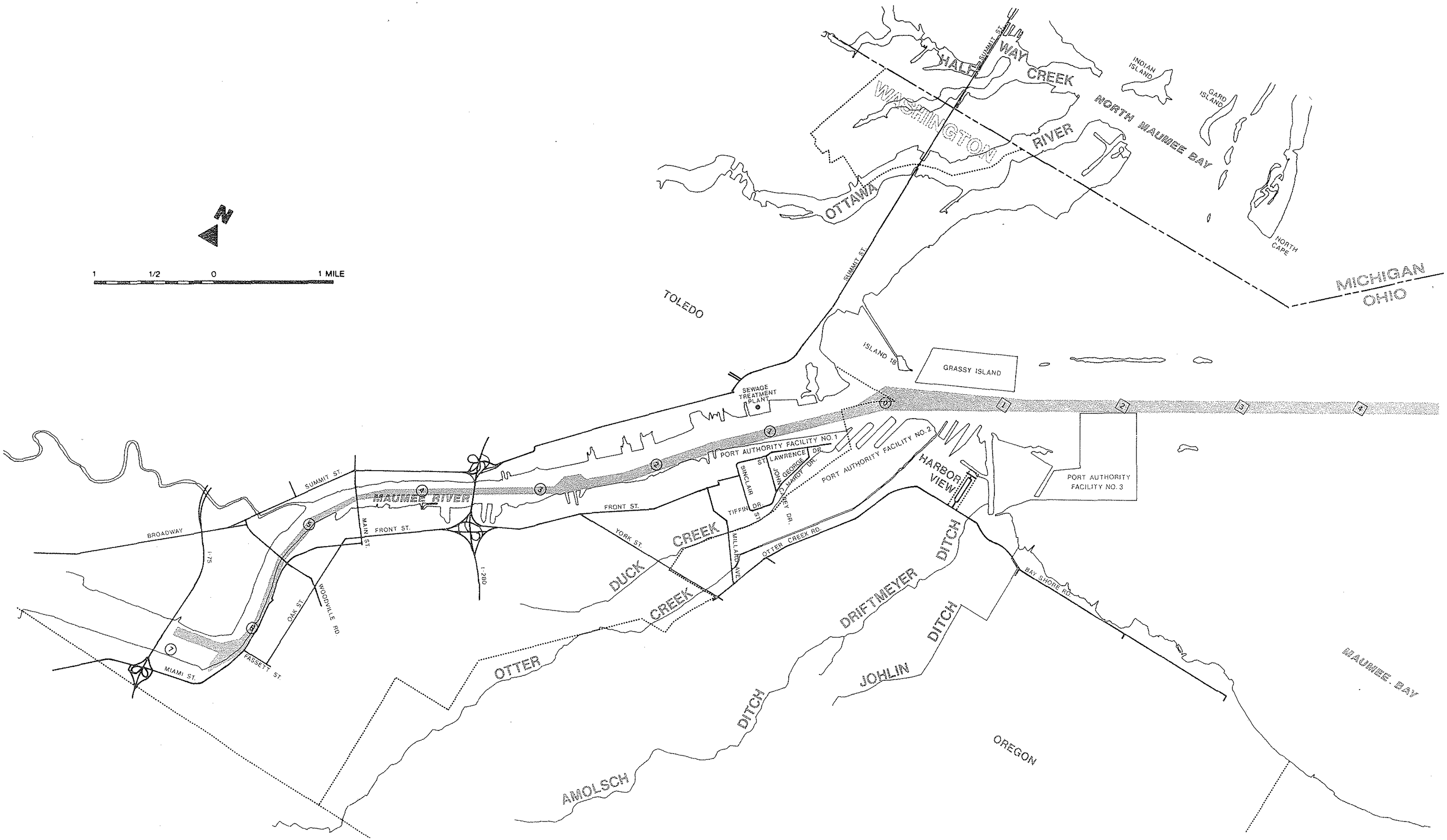
COMMERCIAL NAVIGATION

One of the most important uses of the Maumee River and Bay has been commercial navigation. The Toledo shipping channel which begins at river mile (RM) 7.0 near the I-75 bridge and extends out into the Maumee Bay to lake mile (LM) 18 is vitally important to the economic well being of the region and is the only commercial navigation route in the AOC (Figure 4). Toledo is the third largest port on the Great Lakes.[7] Its location makes it a logical turn around point for St. Lawrence Seaway traffic and it serves one of the largest rail centers in the nation.[8] Various goods are shipped to and received from domestic, Canadian and overseas locations. Summaries of domestic and Canadian and over-seas cargo shipped from the port from 1976 to 1986 have been provided (Tables 10 & 11).

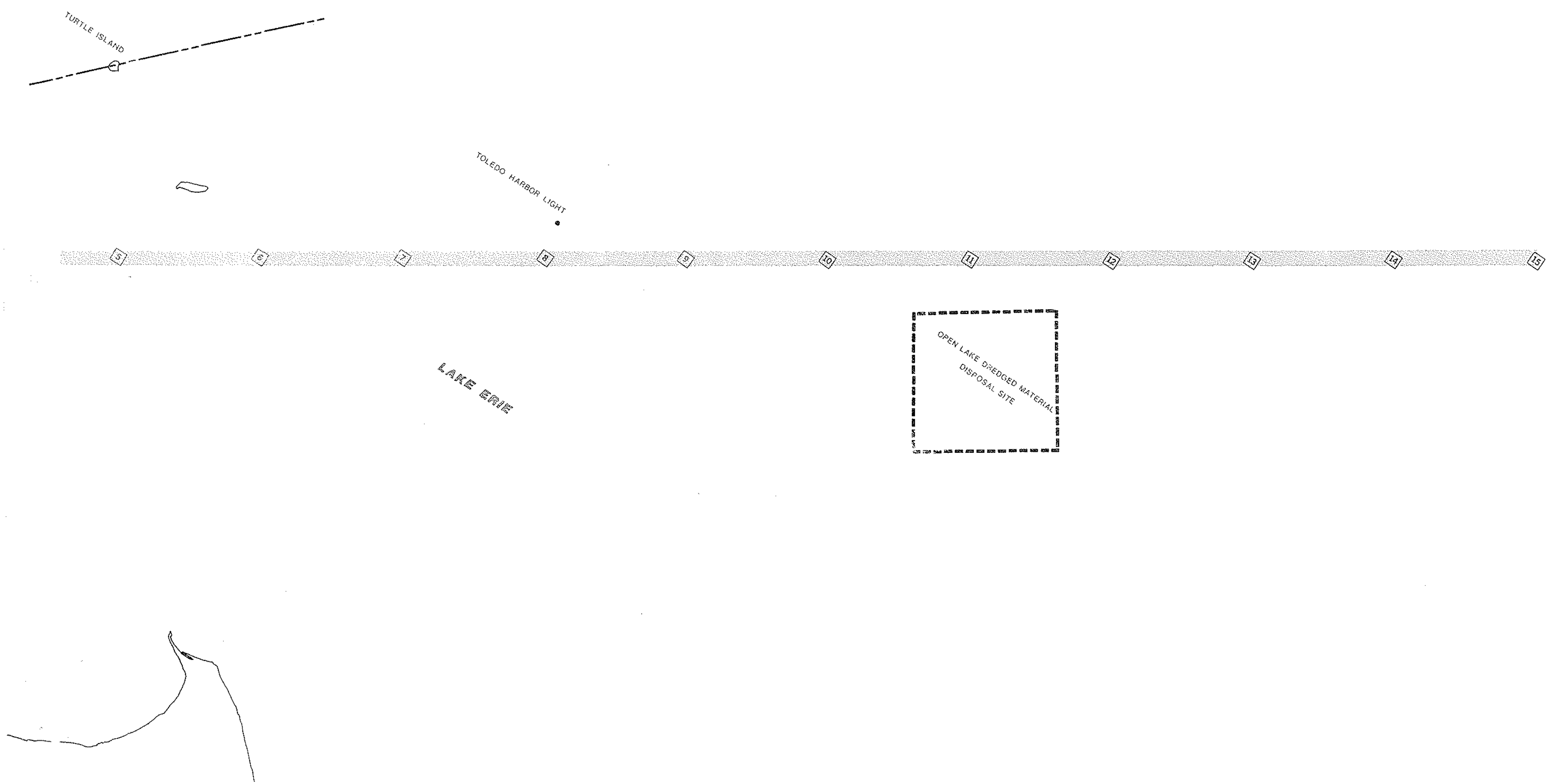
The channel is 18 miles long, 500 feet wide and 28 feet deep in the Maumee Bay. The Maumee River channel is 7 miles long, 400 feet wide and 27 feet deep.[7] Those depths are maintained by the U.S. Army Corps of Engineers (COE) through frequent channel dredging. Due to the heavy sediment loading to the Maumee River and the shallowness of the Western Lake Erie Basin (25 foot average)[7] sedimentation is the primary obstacle for navigation on the Maumee River and Bay.

The COE dredges approximately one million cubic yards of materials from the channel each year. Prior to 1975, those materials were disposed of in confined disposal facilities (CDF) or by open lake disposal. From 1975 to 1985, dredge spoils were placed in the currently active CDF, Facility #3, to protect the environment from contaminated sediments. In 1985, U.S. EPA approved of open lake disposal of materials dredged from less polluted areas of the channel if chemical analysis showed that the materials to be disposed of were similar to sediment in certain areas of the Western Basin where disposal had occurred in the past.[9]

Open lake disposal requires 401 certification from the Ohio EPA. The 1987 401 Certification stated that it is the intention of the Ohio EPA to condition future 401 certifications to eventually phase out open lake disposal. However, it is the responsibility of the City of Toledo and the Toledo-Lucas County Port Authority to develop reuse alternatives for dredged materials.



MAUMEE RIVER SHIPPING CHANNEL



TURTLE ISLAND
TOLEDO HARBOR LIGHT
5
6
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12
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14
15
LAKE ERIE
OPEN LAKE DREDGED MATERIAL
DISPOSAL SITE

TABLE 10
SEAPORT STATISTICS: 1976-1986, FOR SEASON THROUGH DECEMBER 31
TOLEDO HARBOR DOMESTIC & CANADIAN CARGO (Short Tons)

Commodity	1976 Season	1977 Season	1978 Season	1979 Season	1980 Season	1981 Season
Coal	14,542,037	13,393,777	14,194,776	14,570,580	12,588,982	12,159,605
Iron Ore	4,804,137	3,541,824	5,649,765	5,331,354	2,784,646	3,956,278
Newsprint	48,024	56,324	44,307	47,923	37,900	38,820
Pig Iron	57,328	18,818	46,851	12,541	19,901	34,015
Salt	264,052	325,312	266,089	261,988	159,438	70,465
Cement	88,645	104,874	---	---	---	---
Grain	1,936,632	1,872,738	2,547,278	2,592,774	3,766,650	3,353,742
Petro.Prod.	862,398	804,733	793,179	879,412	609,794	390,143
Oth.Dry Bulk	116,609	122,100	211,677	260,231	548,089	854,121
Oth.Liq.Bulk	8,294	---	---	---	---	---
Gen. Cargo	---	---	---	---	---	---
TOTAL	22,728,156	20,240,500	23,753,922	23,956,803	20,515,400	20,857,189

Commodity	1982 Season	1983 Season	1984 Season	1985 Season	1986 Season	TOTAL
Coal	8,803,621	11,155,130	12,042,839	10,498,225	10,675,904	134,625,476
Iron Ore	2,653,474	2,889,808	3,559,609	2,940,010	3,178,676	41,289,581
Newsprint	---	---	31,434	21,050	12,880	338,662
Pig Iron	6,353	16,024	18,498	25,436	14,010	269,775
Salt	192,965	23,721	257,955	215,582	203,952	2,241,519
Cement	---	---	---	---	---	193,519
Grain	2,410,340	1,052,130	1,471,378	1,602,664	916,678	23,523,004
Petro.Prod.	339,636	575,059	384,677	420,874	206,382	6,266,287
Oth.Dry Bulk	740,966	703,250	890,556	951,027	899,262	6,297,888
Oth.Liq.Bulk	---	---	---	---	6,506	14,800
Gen. Cargo	---	---	1,259	---	---	1,259
TOTAL	15,147,355	16,415,122	18,658,205	16,674,868	16,114,250	215,061,770

Source: Toledo-Lucas County Port Authority.[10]

TABLE 11
SEAPORT STATISTICS: 1976-1986, FOR SEASON THROUGH DECEMBER 31
TOLEDO HARBOR OVERSEAS CARGO (Short Tons)

Commodity	1976 Season	1977 Season	1978 Season	1979 Season	1980 Season	1981 Season
Direct Grain Shipments	11,535,384	2,128,653	2,316,088	1,630,622	1,018,702	---
Dry Bulk	24,145	74,469	480,745	111,911	---	---
Fertilizer	---	---	---	---	66,966	---
Oth. Dry Bulk	---	---	---	---	149,439	---
Gen.& Misc. Cargo	494,102 (Fac.#1)	763,895 (Fac.#1)	532,416 (Fac.#1)	441,732 (Fac.#1)	181,189	---
Coal	---	---	---	---	---	---
Petrol. Prod.	---	---	1,013	---	---	---
Liquid Bulk	24,806 (Fac.#1)	30,195 (Fac.#1)	29,025 (Fac.#1)	27,385 (Fac.#1)	30,204	---
Military Cargo	---	---	---	---	---	---
TOTAL	12,078,437	2,997,212	3,359,287	2,211,650	1,446,500	

Commodity	1982 Season	1983 Season	1984 Season	1985 Season	1986 Season	TOTAL
Direct Grain Shipments	945,220	623,178	1,143,852	1,023,168	1,224,506	23,589,373
Dry Bulk	---	---	---	---	---	691,270
Fertilizer	85,435	52,808	61,062	71,678	82,519	420,468
Oth. Dry Bulk	59,153	9,769	6,208	12,761	67,495	304,825
Gen.& Misc. Cargo	135,120	248,713	285,900	226,044	300,246	3,609,357
Coal	---	---	23,659	21,959	69,663	115,281
Petrol. Prod.	---	---	---	---	---	1,013
Liquid Bulk	30,295	36,796	15,423	34,450	55,440	314,019
Military Cargo	---	---	---	---	4,673	4,673
TOTAL	1,255,223	971,264	1,536,104	1,390,060	1,804,542	29,050,279

Source: Toledo-Lucas County Port Authority.[10]

RECREATION

The use of surface waters for recreation is widespread throughout the AOC. According to state studies, Lake Erie is the number one location for water recreation in the area, as it is for the state.[11,12,13] In addition, the Maumee River and the Ottawa River are utilized for their recreational potential as well.

Water-based recreation activities play an important role in outdoor recreation in the AOC as does the aesthetic quality of the waters. Water based recreation has been divided into two categories, contact and non-contact activity. Contact activity has been defined as any water recreation activity which results in frequent or continuous body contact with the water. Such activities would include swimming, water skiing and sail boarding. Non-contact activity has been defined as any water recreation activity which does not result in coming into frequent or continuous body contact with the water. Sailing and power boating are examples of non-contact activities.

The principle water-based recreational activities in the AOC have been sailing, canoeing, power boating, fishing, swimming, sail boarding, jet skiing, waterfowl hunting, birding, and water skiing. According to the Ohio Water Quality Standards, all of the surface waters in the AOC have a primary contact use designation. Therefore, any of these water-based recreational activities could be performed on any surface water body in the area, assuming that it was large enough to handle the activity. Due to size alone, many activities have been limited to Maumee Bay and Lake Erie, the Maumee River and the Ottawa River.

The importance of the scenic value of the area's waters should not be overlooked. Two state parks and five metroparks are directly linked to the surface waters in the AOC. The state parks are located in the eastern portion of Lucas County along the shore of Maumee Bay and Lake Erie. The metroparks are located along the Maumee River, the Ottawa River and Swan Creek.

The Toledo area, based on current and projected recreation pressure, has been identified in the Lake Erie access study, ODNR, as a priority area for launch ramp projects, ODNR or public agency acquisition of boat access sites and shore based fishing projects.[12] The public has demonstrated a strong desire to use the waters in the AOC for recreation.

Natural Areas

The Maumee River watershed in the AOC provides a great diversity of vital habitats for at least one thousand species of plants and thousands of species of animal life ranging from the white tail deer to rare insects. This variety results from landforms which range from dry sand dunes to damp prairies and swamp woodlands. It is also a corridor for migrating birds. Eagle and osprey sightings occur in the area. Over 80 plants are listed as endangered or threatened species in the State of Ohio within the AOC. The future of their existence depends directly upon improvements in water and air quality in the area.

This habitat takes the form of green space which is under the stewardship of the following organizations: The Nature Conservancy, Metropark District of the Toledo Area, various municipal parks, and several divisions of the ODNR.

Significant archaeological findings have shown that the natural area has provided abundantly for human needs for at least 6,000 years.

A number of research projects by the Ohio State University and the Ohio Department of Natural Resources have shown the Maumee River to be an important spawning and nursery area for every species of game and forage fishes. Large numbers of walleye from both Lake Erie and Lake St. Clair congregate in the riffles between Perrysburg and Waterville to spawn every April. This same river section is used during May by a large spawning stock of white bass. The estuarine portion of the river is used as a spawning area by gizzard shad and freshwater drum from Lake Erie and is also an important nursery area for young white bass, gizzard shad and fresh water drum. Several studies have suggested that the Maumee River may be the single most important production area on Lake Erie for gizzard shad, which are critical forage for many commercial and sport fish species.

The decline of wetland habitat in the AOC is significant historically beginning in the late 1800s and continuing up to the present. Early accounts reported vast marshes along the Lake Erie shoreline stretching for miles inland. South of the Maumee River was a wet forest called the Great Black Swamp. Large wet prairies existed south of the river and north in west central Lucas County.

These wetland habitats served as natural storage areas for rainfall, allowing water to filter through soil maintaining the water table at a higher level than present day. Broad marshes allowed water to evaporate back into the atmosphere or to slowly flow in streams and rivers to Lake Erie. The affects of precipitation were moderated because water spread out over a large area of wet prairies, swamp forest and marshes.

With settlement came clearing and draining of wetlands. The underlying soil was criss-crossed with drain tiles and ditches which carried the runoff to streams and rivers. With the introduction of agriculture into the area excess water needed to be quickly drained away to streams to prevent flooded crops in fields.

The natural area has been drastically altered by agriculture and development. Removal of trees and draining and filling of wetlands have reduced the time water is allowed to remain in an area.

The effect is that more water enters streams at a faster rate carrying with it sediment. Frequent downstream flooding and increased erosion can be expected with further development. The brownish color of water in the rivers and streams of the AOC is caused by fine soil particles in suspension, resulting from erosion from agricultural run-off and developmental storm drainage sewers.

The value of preserving plants and natural areas in general, is both for what we know about them and for what we may learn from them in future years. Natural areas and resources have historically provided for basic human needs and life itself.

Lake Erie and Maumee Bay

Water-based recreational activities on Maumee Bay and Lake Erie consist of sailing, power boating, fishing, swimming, sail boarding, jet skiing and water skiing. The primary water quality problems have been sediment and nutrient loading which increase turbidity and algae growth. Boating and fishing are probably the most important recreational activities occurring on the Lake and Bay.

Maumee Bay State Park is located along the south shore of Maumee Bay adjacent to the City of Oregon. Camping and hiking are the principle activities at the park at this time. Shoreline fishing is another recreation activity which occurs at the park. There are plans to create a beach at the park which would facilitate swimming and related activities, although some concern over the water quality in the Bay has been expressed. The problem of suspended sediments has been the primary concern.

Crane Creek State Park is located at the extreme eastern corner of Lucas County and marks the eastern most limit of the AOC. The primary recreational activities at Crane Creek State Park are swimming, boating and related activities. Activities at the park are centered around the beach. The adjacent bird trail at Magee Marsh annually attracts thousands of visitors from many states.

Maumee River

Water-based recreational activities on the Maumee River are the same as those on the Bay and include canoeing. Certain stream segments are more appropriate for one activity than another. As described under sport and commercial fishing, fishing on the River normally occurs upstream from the Maumee-Perrysburg Bridge. Sailing and power boating occur from Perrysburg to the mouth of the Maumee River, as do the other water-based activities. Canoeing is popular both upstream and downstream from the Maumee-Perrysburg Bridge, with the up stream area being the most important. The lower portion of the River (RM 7) including areas just below RM 5, at the Swan Creek confluence near Portside, is considered polluted. This also happens to be one of the areas most impacted by combined sewer overflows (CSO). Despite the pollution, people swim, ski and sail board in this area.

The Maumee River, upstream from the Maumee-Perrysburg Bridge, is a State Resource Water because ODNR designated it as a scenic river. The Side Cut Metropark is located in this stream segment along the banks of the Maumee River south of the City of Maumee. The principle activities at the park include canoeing, wildlife observation, hiking and fishing. Blue Grass Island can be reached from the park which is an area often used for nature exploration and is world famous for Walleye fishing. The park is also an important source of historical information on the Maumee River and its impact on the development of the region.

Farnsworth Metropark is also located in this stream segment southwest of the Village of Waterville. Farnsworth is an important area for canoeing, wildlife watching and summer shore bird watching. The area around Farnsworth is important for duck hunting.

Ottawa River

Like the Maumee River, the Ottawa River is important for non-contact recreation such as sailing and power boating. Boating is mostly restricted to the area down stream from Suder Avenue due to the difficulty of getting large boats past that point. Smaller boats can make it upstream as far as Stickney Avenue and just beyond. The primary boating lanes are down stream from Suder Avenue to the Bay. The Ottawa River was one of the most important water skiing areas in the region, however, water skiing and other contact activities no longer occur to any large extent due to severe water pollution. The City of Toledo has posted the area near the Dura Landfill advising persons to avoid contact with the water, sediment and fish.

Farther up stream, the Ottawa River flows through the Wildwood Preserve Metropark north of the Village of Ottawa Hills. The major activities at the park include wildlife observation and hiking. The park also serves as an important wildlife corridor for animals such as deer.

Swan Creek

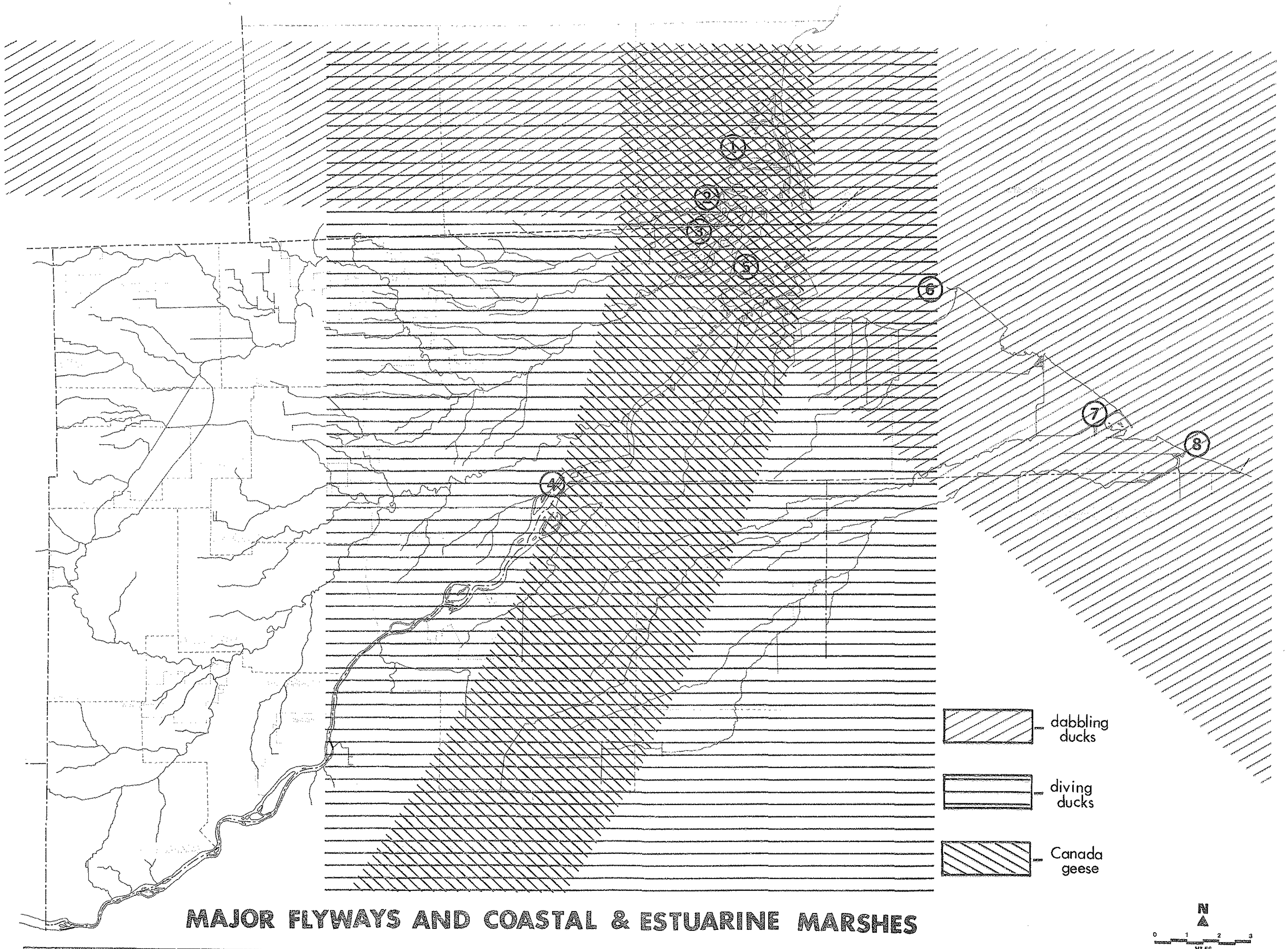
Due to water pollution problems and the physical characteristics of Swan Creek, contact and non contact recreational use of Swan Creek is uncommon. The upper reaches of Swan Creek however do have important aesthetic values. The Swan Creek Preserve Metropark is located in the western portion of the City of Toledo in a rapidly developing urban area. Swan Creek flows through this park and is its primary natural feature. The park is an important resource for the area not only because of its location, but also because it is probably the best example of flood plain habitat in the region.

Swan Creek also flows through the Oak Openings Preserve Metropark in western Lucas

Coastal and Estuarine Marshes

The Maumee Bay lies at the mouth of the Maumee River and is formed by Little Cedar Point on the east and Woodtick Peninsula on the west. These two sand spits provide the shelter necessary for wetland development on their landward side. The former lies within the Cedar Point National Wildlife Refuge (administered as part of the Ottawa National Wildlife Refuge) and the latter lies partially within the Erie State Game Area (administered by the Michigan Department of National Resources). The Cedar Point marshes extend westward along the south shore of the bay to Maumee Bay State Park. Estuarine wetlands also occur along the Maumee River valley, between Rossford and the first bedrock riffles at Perrysburg, and in the lower reaches of the Ottawa River.[14]

The marshes in the bay are protected by dikes and are managed for waterfowl. The estuarine wetlands are more undisturbed wherein the water level is not controlled. At one time the Ohio shoreline of western Lake Erie in its natural state was generally a marsh area fronted by low barrier beaches. Today there are some 23 square miles of coastal and estuarine marshes remaining which are depicted in Figure 5. These eight areas as numbered on the map are described in Table 12.[14]



MAJOR FLYWAYS AND COASTAL & ESTUARINE MARSHES

LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

tmacog

TABLE 12
COASTAL AND ESTUARINE MARSHES

Map No.	Name	Ownership	Size	Water Level Control
1	Woodtick Peninsula Marsh	SC/PM	L	Diked/Uncontrolled
2	North Maumee Bay Marsh	C/PM	L	Diked/Uncontrolled
3	Ottawa River Estuary	PM	S	Uncontrolled
4	Maumee River Estuary	PM	L	Uncontrolled
5	Toledo Harbor Wetlands (spoil area)	F/M PS	S	Diked
6	Cedar Point Marsh	F	L	Diked
7	Metzger Marsh	S	S	Diked
8	Ottawa Marsh	F	L	Diked

SC - Shooting Club
PM - Private, multiple owners
F/M - Federal/Municipal
F - Federal
S - State
PS - Private, single owner
L - Over 1,235.5 Acres (500 ha)
S - Under 1,235.5 Acres (500 ha)

Adapted from Appendix B, *The Ecology of the Coastal Marshes of Western Lake Erie: a Community Profile*, Biological Report 85(7.9), February 1987.

The major plant species thriving in the Maumee Bay marshes include narrow-leaf cattail, broad-leaved cattail, jewelweeds, swamp rosemallow, blue-joint grass and swamp milkweed. In the transition zone between open water and the cattail stands, soft-stem bulrush and three-square bulrush are the dominant species.[14]

Fish found in the Maumee Bay wetlands include: bowfin, carp, yellow perch, largemouth bass, white bass, green sunfish, yellow bullhead, gizzard shad and walleye.[14]

The most common waterfowl are mallard, black duck, green-winged teal, blue-winged teal, northern shoveler, and American coot. Tundra swans and snow geese also utilize the area for resting during spring migration. The historical occurrence of the rare Foster's tern has been reported for these wetlands (Campbell and Trautman 1936). A bald eagle nest is active on Little Cedar Point.[14]

These wetlands are also a part of two major flyways, the Atlantic and the Mississippi (see figure 5). Western Lake Erie marshes attract large numbers of migratory waterfowl, causing a crossing point of these two flyways, as shown on Figure 5. Basically, there are four distinctive flyways identified for North America. Each flyway has its own individual population of birds making the semiannual flights between breeding grounds and wintering grounds.[14]

Canada geese and diving ducks, including canvasbacks, redheads and scaup, come from

Canada geese and diving ducks, including canvasbacks, redheads and scaup, come from their breeding grounds on the great northern plains of central Canada on the Atlantic flyway to winter over in the Chesapeake and Delaware Bays. The dabbling ducks such as mallards, black ducks and bluewinged teals that have gathered in southern Ontario during the fall, cross western Lake Erie and proceed southwest to the Mississippi delta and the Gulf of Mexico coasts.[14]

Coastal marshes and stream mouths commonly attract migrating dabbling ducks, with the diving ducks concentrating on the open water shorelines. Canada geese and mallards also feed heavily on waste grains in agricultural fields.[14]

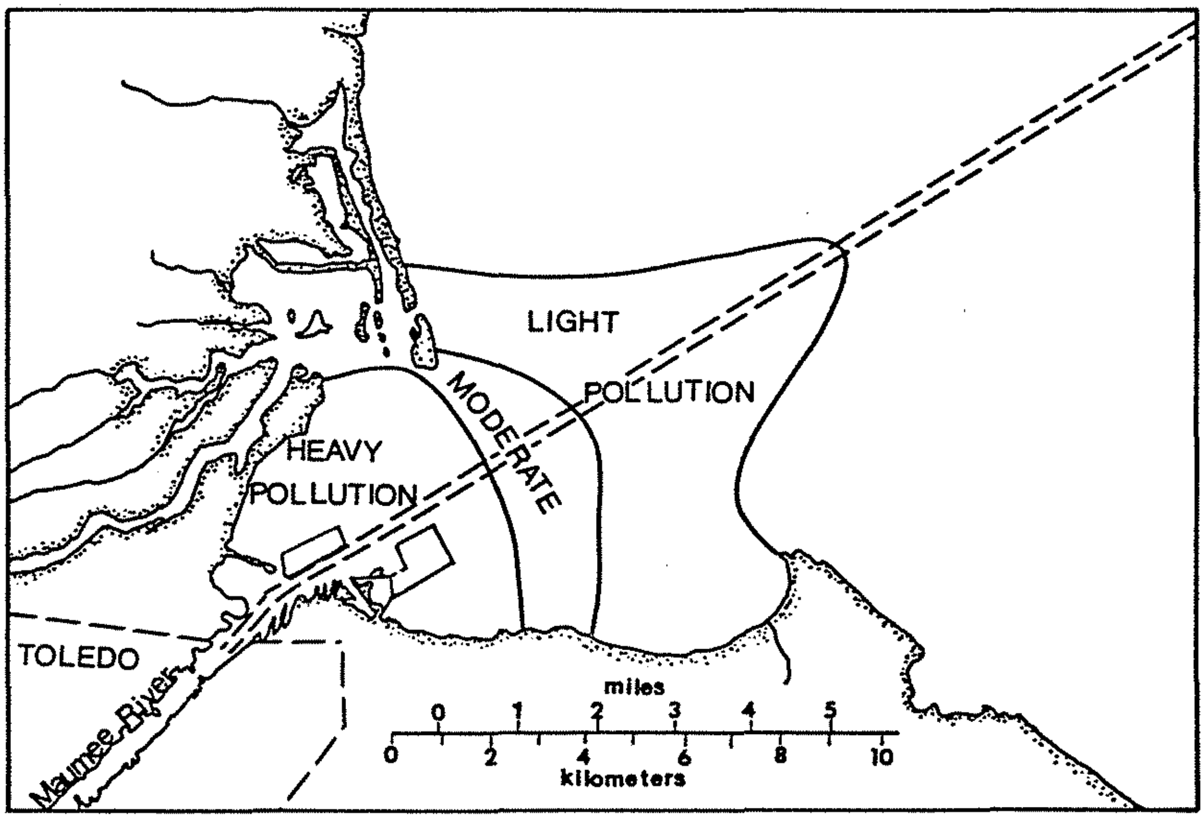
Wading birds such as herons and egrets arrive in the western Lake Erie region in early March and migrate southward in October. Upon their arrival, court- ships and nest building begin immediately. They usually forage on the shorelines of the tributary streams and coastal marshes, feeding upon fish and insects.[14]

Gulls and terns also use these coastal marshes, but the ring-billed gull are becoming more common and are now known to use the Toledo-Lucas County Port Authority Facility No. 3 (dredge disposal facility). Terns also use the diked spoil areas near the Toledo Harbor. Herring gulls are also prevalent and feed on dead fish, refuse and other organic debris along the shoreline, including landfills as their food supply.[14]

The estuarine and coastal marshes of Western Lake Erie serve as sinks for many of pollutants. Maumee Bay exhibits elevated numbers of tubificid worms, an indication of high organic pollution. Note Figure 6 which displays pollution zones in the Maumee Bay as indicated by concentration of tubificids (sludge worms) in the bottom sediments [14,15]. Turbidity throughout Maumee Bay and many of the estuarine and coastal marshes is high. The average concentration of suspended solids in Maumee Bay is 37 milligrams per liter (mg/l), but nearshore levels are generally over 50 mg/l.[14]

FIGURE 6

POLLUTION IN MAUMEE BAY AS INDICATED BY CONCENTRATION OF TUBIFICIDS (SLUDGE WORMS) IN THE BOTTOM SEDIMENTS. (WRIGHT 1955; PINSAK AND MEYER 1976).



LIGHT = 100 - 999 Tubificidae per square meter

MODERATE = 1,000 - 5,000

HEAVY = more than 5,000

Source: Maumee River Basin Level B Study.

WATER QUALITY STANDARDS

Most of the streams in the Maumee Basin RAP Area are classified as Warmwater Habitat, Agricultural Water Supply. The reaches of the Maumee in the immediate vicinity of the Bowling Green and Waterville intakes are classified as Public Water Supply. There are standards that apply for many water quality parameters depending on the stream reach's classification for habitation, water supply, and contact type. Table 13 gives the water quality standards that apply to *most* streams in the RAP Area. For an exhaustive listing of all water quality standards, refer to the Water Quality Standards in the Ohio Revised Code.[16]

TABLE 13
WATER QUALITY STANDARDS

Parameters for which Warmwater Habitat Standard is Critical

Water Quality Parameter	Average	Maximum
Free CN, µg/l	8.1	38
DO, mg/l (minimum values)	5.0	4.0
TDS, mg/l	1500	
Fe, total recoverable, mg/l	1.0	
Pb, total recoverable, µg/l	30	
MBAS, mg/l		0.5
Cl, residual, µg/l	11	19
Cr, hex., dissolvable, µg/l	10	19
Hg, total recoverable, µg/l	0.2	2.2
Oil & Grease, mg/l	10	
Phenol, µg/l	10	
P	*see note below*	
Polychlorinated biphenyls, (PCBs) µg/l		0.001
Ag, total recoverable, µg/l	1.3	Depends on $CaCO_3$
pH	Minimum	Maximum
	6.5	9.0

Standards that Depend on Hardness

	@ 200 ppm as $CaCO_3$	@ 400 ppm as $CaCO_3$
Cu, total recoverable, µg/l	29	55
Ag, total recoverable, µg/l	5.3	17
Zn, total recoverable, µg/l	495	880

Parameters for which Agricultural Water Supply Standard is Critical

Water Quality Parameter	Average	Maximum
Arsenic, As, total recoverable, µg/l		100
Beryllium, Be, total recoverable, µg/l		100
Cadmium, Cd, total recoverable, µg/l		50
Chromium, Cr, total recoverable, µg/l		400
Nickel, Ni, total recoverable, µg/l		200
Selenium, Se, total recoverable, µg/l		50

TABLE 13 continued

Phosphorus

There is no specific water quality standard for phosphorus. OEPA's *Water Quality Standards* state: "*Total phosphorus as P shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality criteria ... or, for public water supplies, that result in taste or odor problems. In areas where such nuisance growths exist, phosphorus discharges from point sources determined significant by OEPA shall not exceed a daily average of 1.0 ppm.. or such stricter requirements as may be imposed by OEPA ...*"

Ammonia: NH_3

NH_3 water quality standards depend on the temperature of the water, its pH, and what time of year it is. Related note: No NO_3 standard is given here, but OEPA requires the community to issue a drinking water warning when NO_3 level rises above 10 ppm.

	Dec.-Feb.	March-Nov.
@ pH 7.0 and 25°C	--	2.9 ppm
@ pH 8.0 and 0-10°C	3.3 ppm	2.4 ppm
@ pH 8.0 and 25°C	--	0.8 ppm
@ pH 7.5 and 25°C	--	1.8 ppm

These are *examples* of average NH_3 standards. Ohio Water Quality Standards contain full information in its 7-3. Maximum concentrations for NH_3 are presented in Table 7-5 of the Water Quality Standards.

Nitrate and Nitrite: $NO_3 + NO_2$

For most stream reaches in the AOC, the Agricultural Water Supply standard of 100 ppm would apply. For the reaches that are used for public water supply, the standard is 10 ppm.

Bacterial Standards

	Fecal Coliform #/1000 ml		*E. Coli* #/1000 ml	
	Avg	Max	Avg	Max
Bacterial:				
Bathing waters	200	400	126	235
Primary Contact	1000	2000	126	298
Secondary Contact	---	5000	126	576

Sediment Quality Guidelines

Metal	Non-Elevated	Slightly Elevated	Elevated	Highly Elevated	Extreme Elevated
As	< 13	>13	>18	>28	>47
Cd	< 0.38	≥0.38	≥0.60	≥1.03	≥1.90
Cr	< 9	≥9	≥11	≥16	≥24
Cu	< 15	≥15	≥19	≥27	≥44
Fe	< 27,724	≥27,724	≥36,112	≥52,887	≥86,439
Pb	< 21	≥21	≥28	≥43	≥73
Zn	< 83	≥83	≥108	≥156	≥253

Sediment metal guidelines are in units of are μg/l.

Pesticides

Pesticide	Public Water Supply[a], µg/l	Aquatic Life Habitat, µg/l
Aldrin[b]	0.000074[c]	0.01
Benzene Hexachloride	--	0.1
Chlordane	0.00046[c]	0.01
Chlorophenoxy herbicides		
2,4-D	100.0	--
2,4,5-TP (Silvex)[b]	10.0	--
Ciodrin	--	0.1
Coumaphos	--	0.001
Dalapon	--	110.0
DDT[b]	0.000024[c]	0.001
Demeton	--	0.1
Diazinon	--	0.009
Dicamba	--	200.0
Dichlorvos	--	0.001
Dieldrin[b]	0.000071[c]	0.005
Diquat	--	0.5
Dursban	--	0.001
Endosulfan	74	0.003
Endrin	1.0	0.002
Guthion	--	0.005
Heptachlor[b]	0.00028[c]	0.001
Heptachlor Epoxide	0.1	--
Lindane	0.019[c]	0.01
Malathion	--	0.1
Methoxychlor	100.0	0.005
Mirex	--	0.001
Naled	--	0.004
Parathion	--	0.008
Phosphamidon	--	0.03
Simazine	--	10.0
TEPP	--	0.4
Toxaphene	0.00071[c]	0.005

a Pesticides are not to exceed the concentrations in this table, or the Safe Drinking Water Act, whichever is more stringent.

b Use has been banned.

c For protection of human health from the potential carcinogenic effects, at a 10^6 incremental increase of cancer risk over the lifetime, due to exposure through ingestion of contaminated water and contaminated aquatic organisms.

The TMACOG *Inventory of Water Quality Monitoring Sites and Sampling Programs*[17] (1988) lists a large number of sampling sites in the Maumee Basin Area of Concern. The major monitoring programs are summarized below:

ON-GOING MONITORING PROGRAMS

Toledo Environmental Services Division (TESD)

The most substantial body of water quality data for the Toledo area is that analyzed by TESD. Water is sampled and analyzed from approximately monthly, to less than eleven to nine times per year. Parameters include conventional pollutants: BOD_5, P, NO_2, NO_3, NH_3, DO, Cl^-, SS, and bacterial counts.

TESD Monitoring Sites

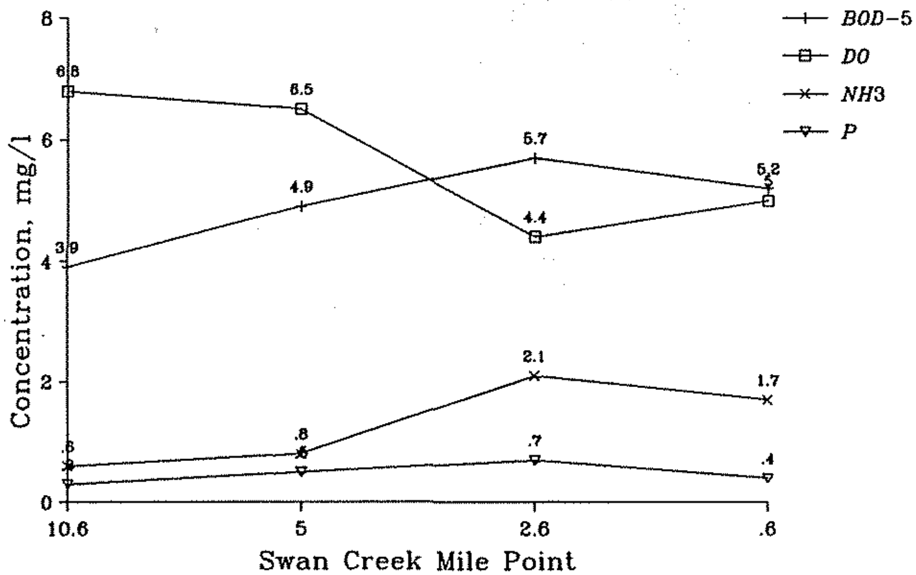
Maumee River:	8 stations from Mouth to Waterville
Otter Creek	1 station
Delaware Creek	1 station
Grassy Creek	1 station
Ottawa River	8 stations from Summit St to Sylvania Ave
Hill Ditch	1 station
Swan Creek	4 stations from St. Clair St. to Eastgate Road
Heilman Ditch	1 station
Silver Creek	1 station
Shantee Creek	1 station

TESD data are published in six-year intervals[18] and are not reprinted in this report. Figures 7-34 summarize the 1981-1986 data. There are four sets of graphs: Swan Creek, Tenmile Creek/Ottawa River, Maumee River, and other tributaries. There are eight graphs in each group. For Swan Creek (Figures 7-14), the graphs first display the 1981-86 average July Nutrients (BOD_5, DO, NH_3 and P) and average July Bacteria counts by concentration and river mile. July averages are used because low stream flows and high temperatures create "worse case" conditions. The second set displays the six year average for nutrients and bacteria counts by concentration and river mile. The third set displays the yearly concentrations for nutrients and bacteria counts for an upstream station, while the fourth set displays these same parameters for a downstream station which show the poorest water quality.

These data are then displayed for Ottawa River (Figures 15-22) and the Maumee River (Figures 23-30), applying the same format as used for Swan Creek. The graphs (Figures 31-34), display these same data for Otter Creek, Delaware Creek, Grassy Creek, Hill Ditch, Silver Creek, Shantee Creek and Heilman Ditch.

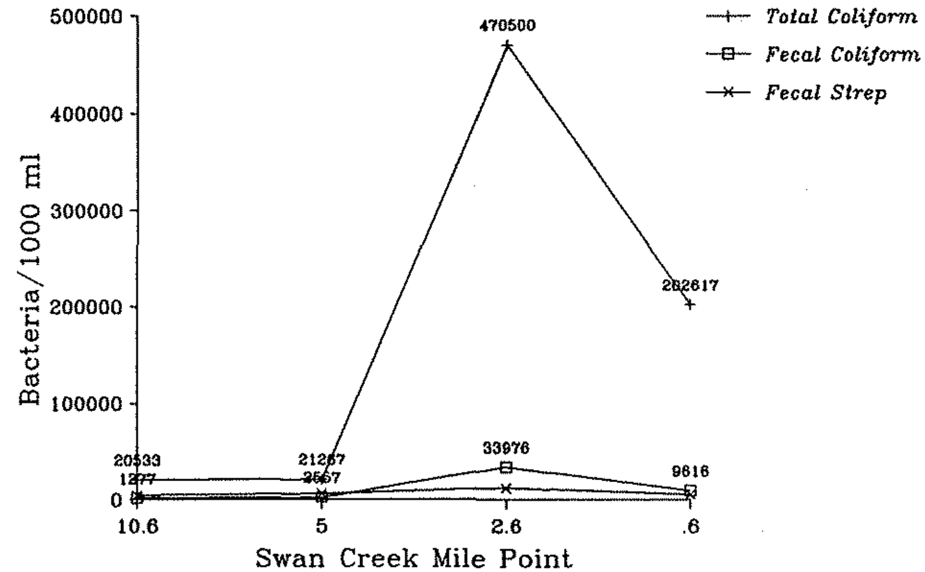
TESD DATA, 1981-1986: SWAN CREEK

Figure 7: July Nutrient Parameters



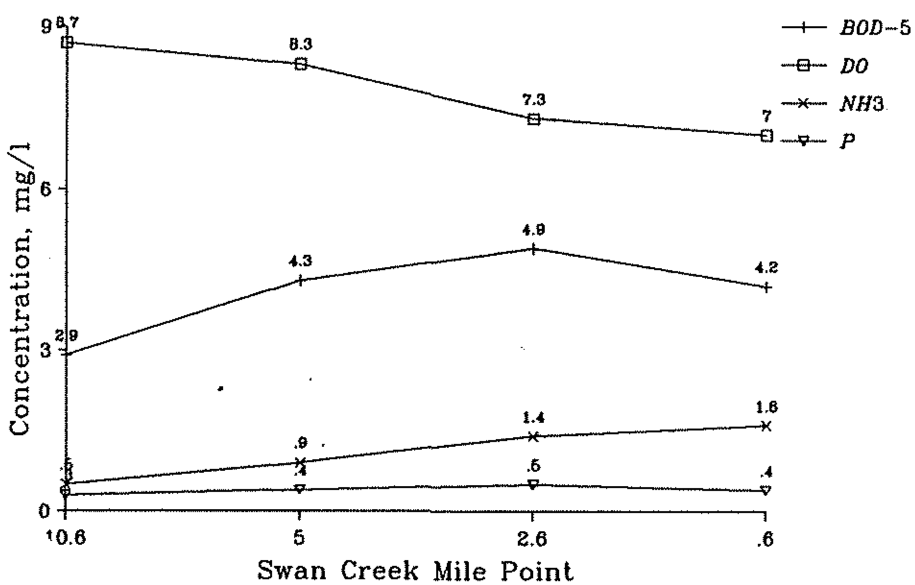
TESD DATA, 1981-1986: SWAN CREEK

Figure 8: July Bacteriological Parameters



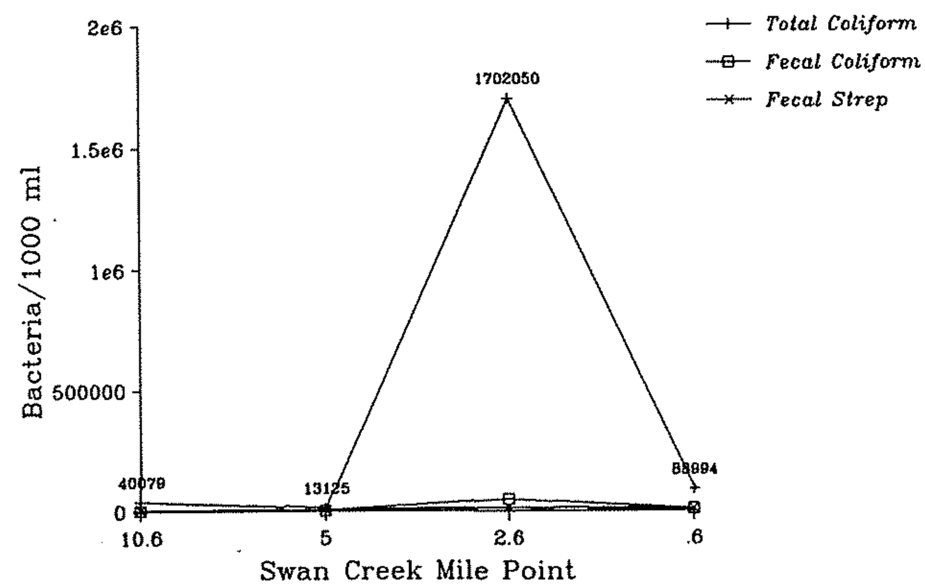
TESD DATA, 1981-1986: SWAN CREEK

Figure 9: Average Nutrient Parameters



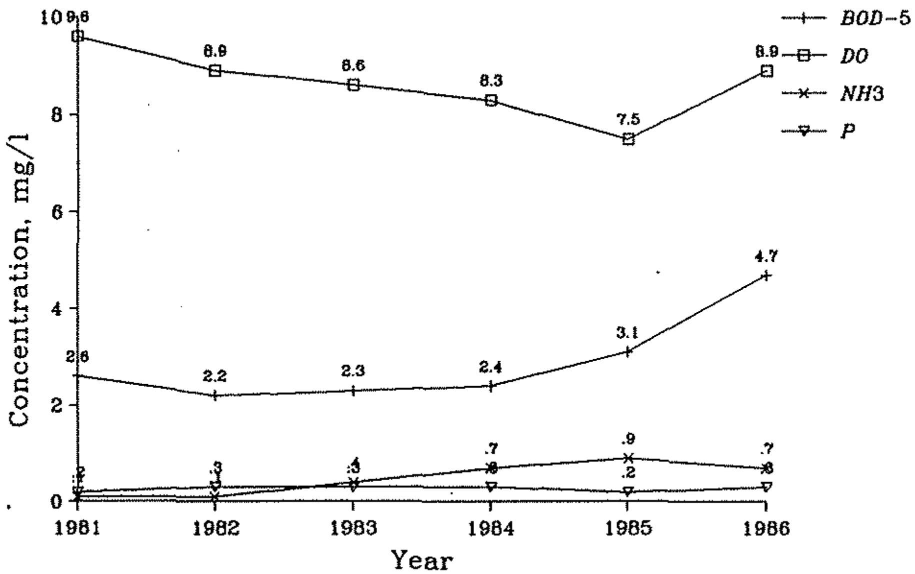
TESD DATA, 1981-1986: SWAN CREEK

Figure 10: Average Bacteriological Parameters



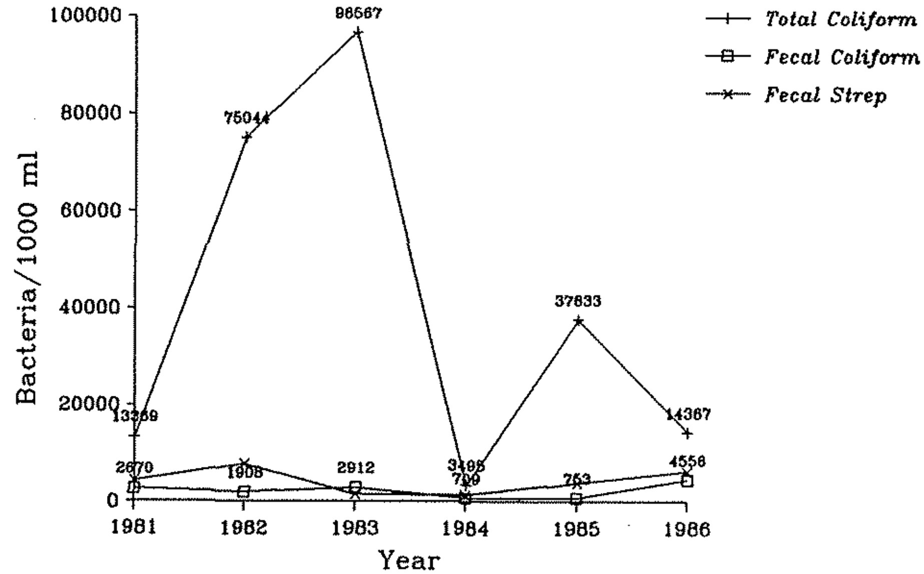
TESD DATA, 1981-1986: SWAN CREEK

Figure 11: Eastgate Rd. Nutrients by Year



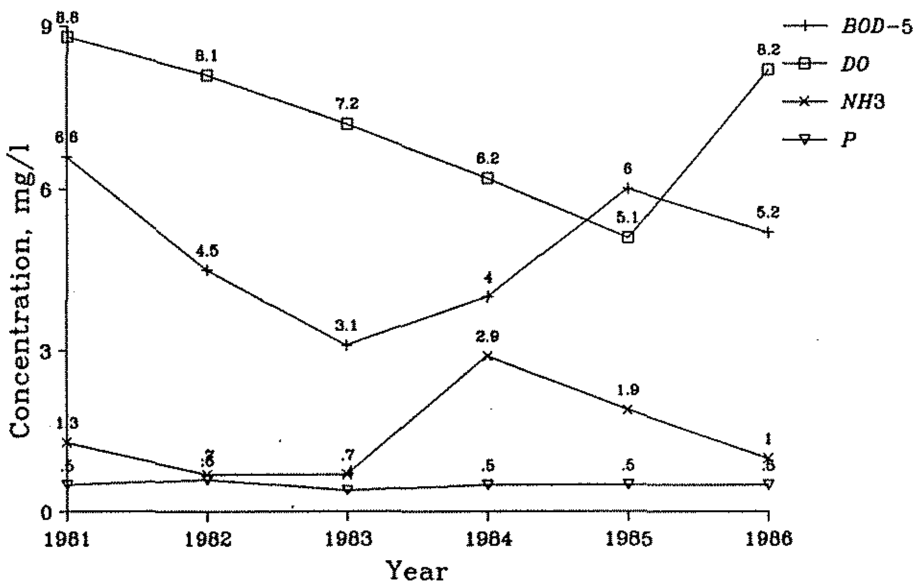
TESD DATA, 1981-1986: SWAN CREEK

Figure 12: Eastgate Rd. Bacteria by Year



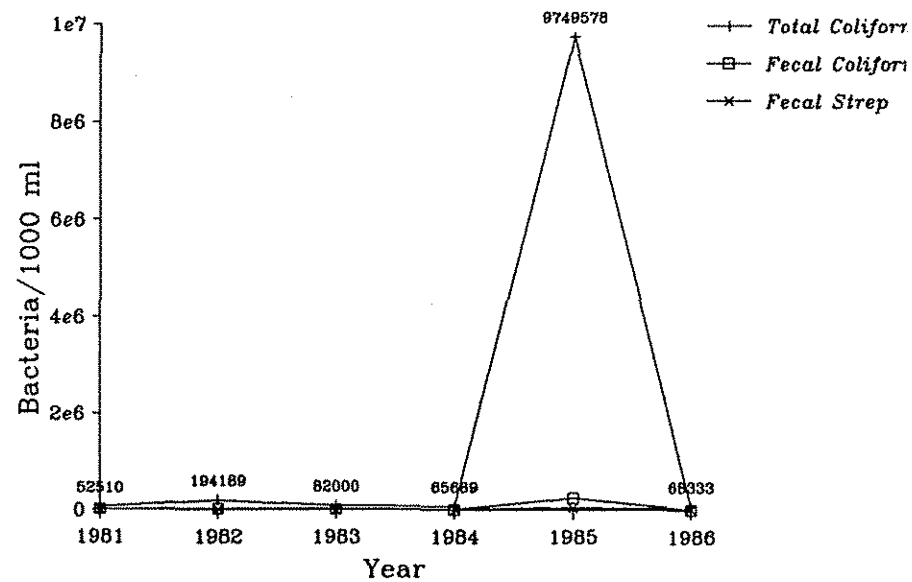
TESD DATA, 1981-1986: SWAN CREEK

Figure 13: Hawley St. Nutrients by Year



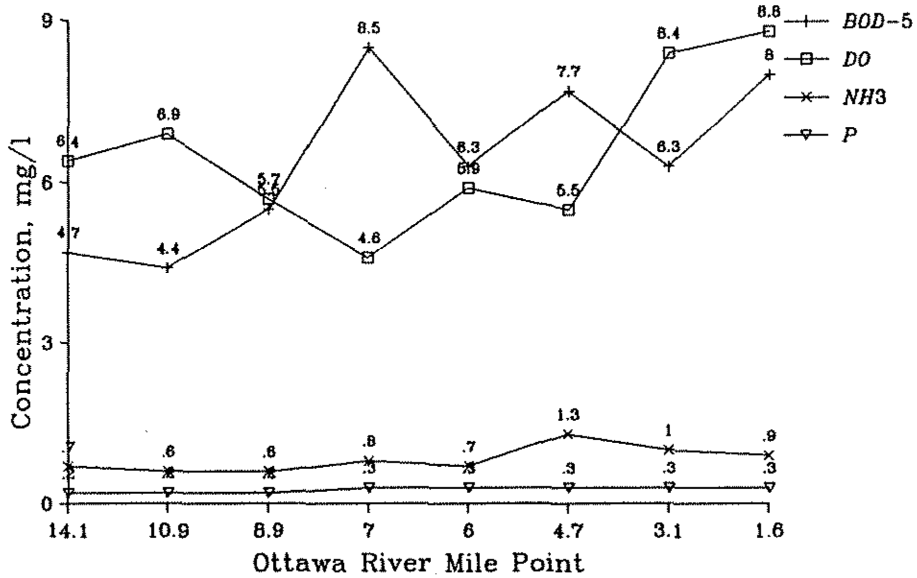
TESD DATA, 1981-1986: SWAN CREEK

Figure 14: Hawley St. Bacteria by Year



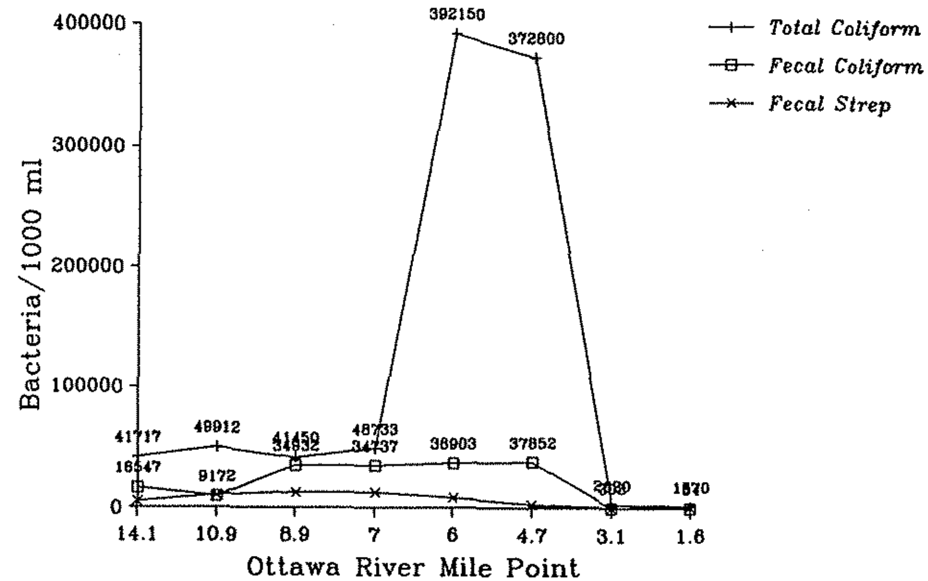
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 15: July Nutrient Parameters



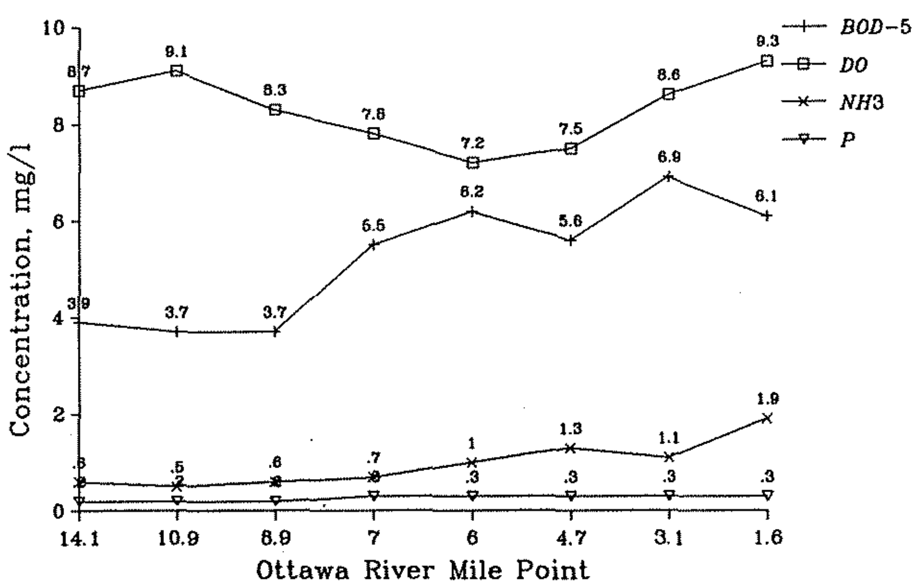
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 16: July Bacteriological Parameters



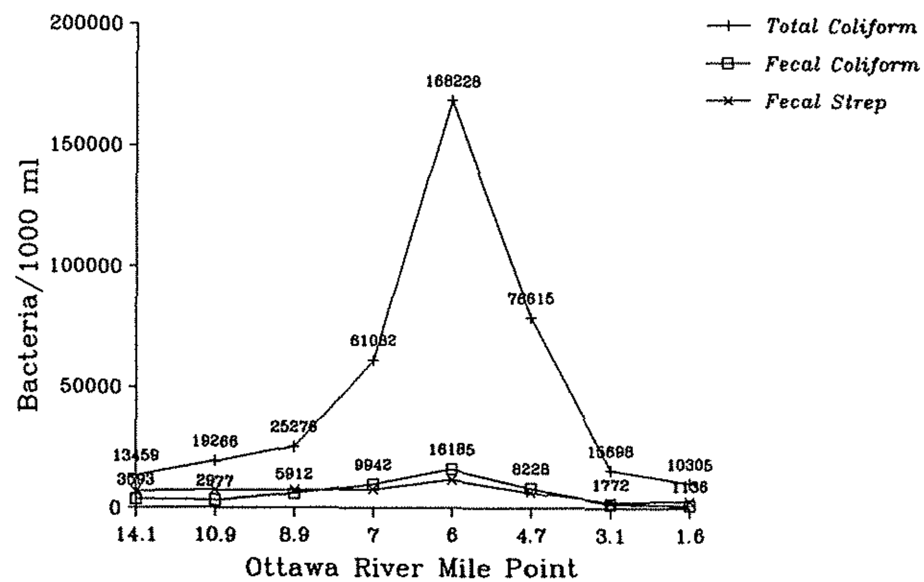
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 17: Average Nutrient Parameters



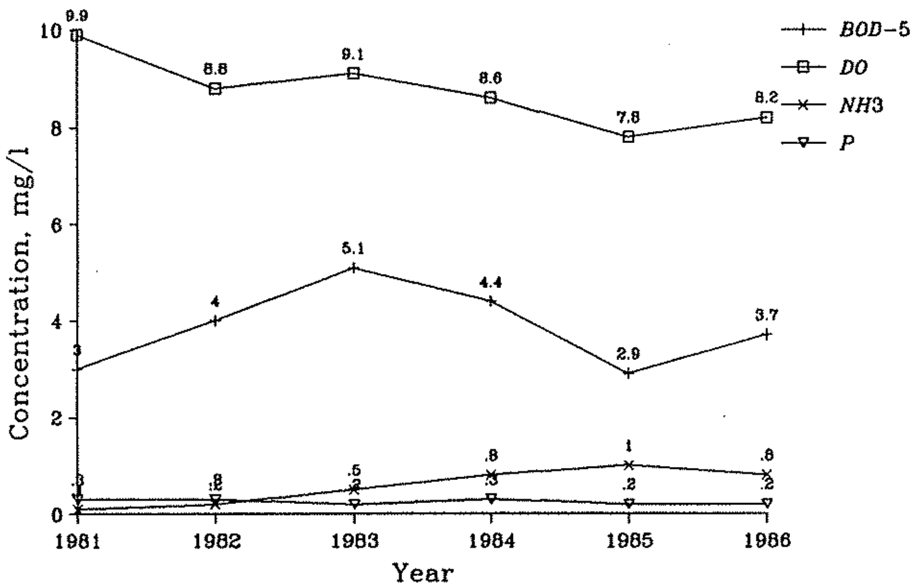
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 18: Average Bacteriological Parameters



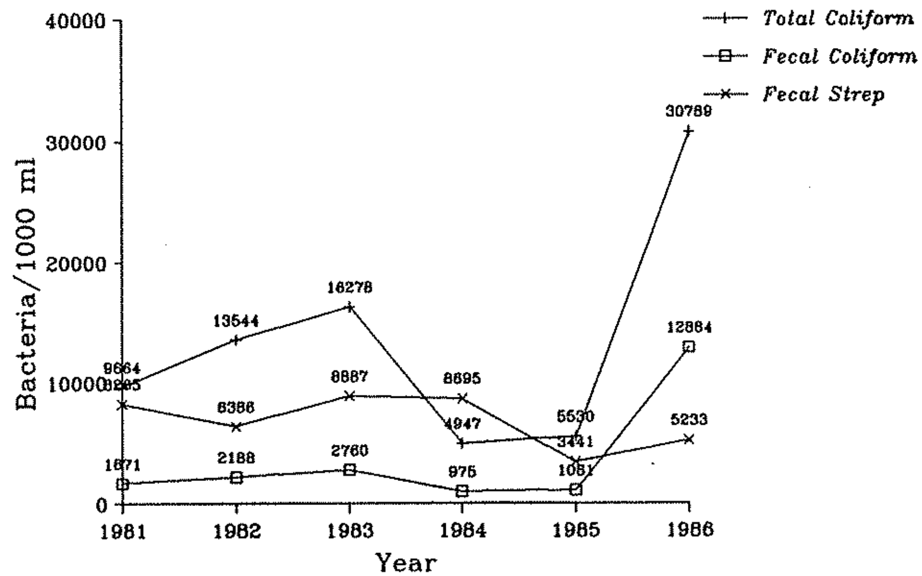
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 19: Sylvania Ave Nutrients by Year



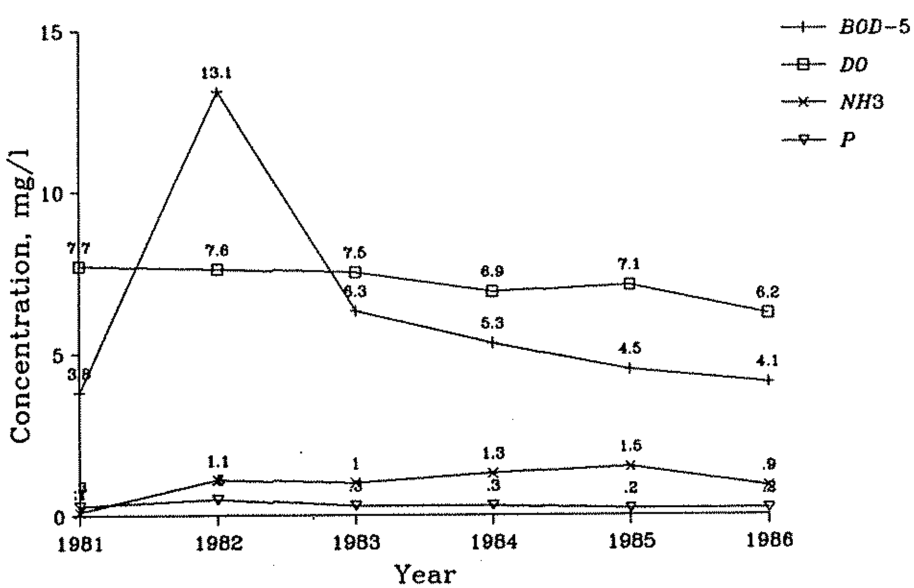
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 20: Sylvania Ave Bacteria by Year



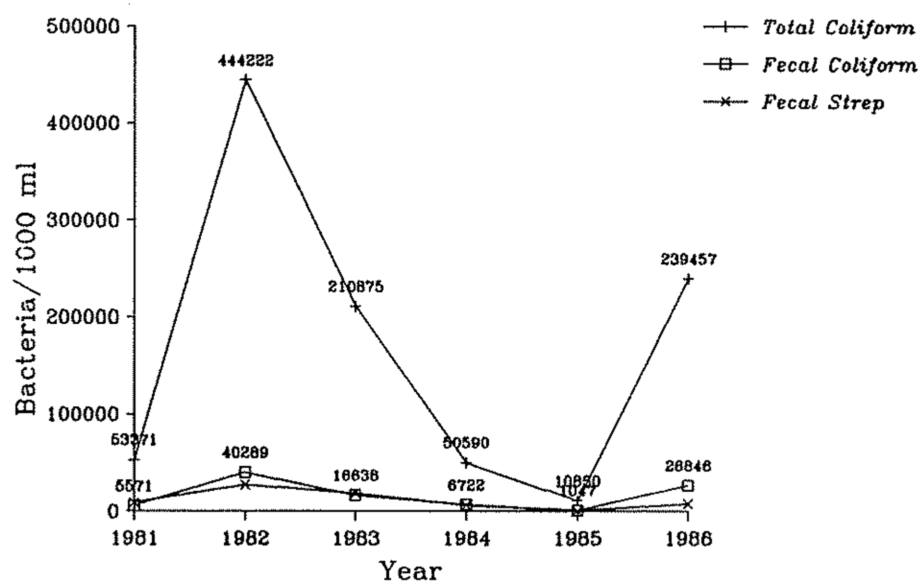
TESD DATA, 1981–1986: OTTAWA RIVER

Figure 21: Lagrange Nutrients by Year

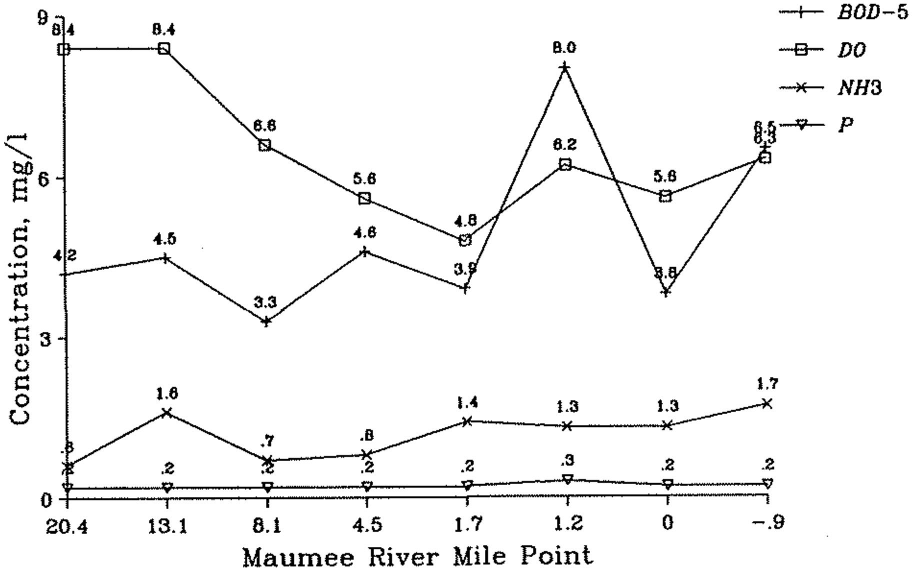


TESD DATA, 1981–1986: OTTAWA RIVER

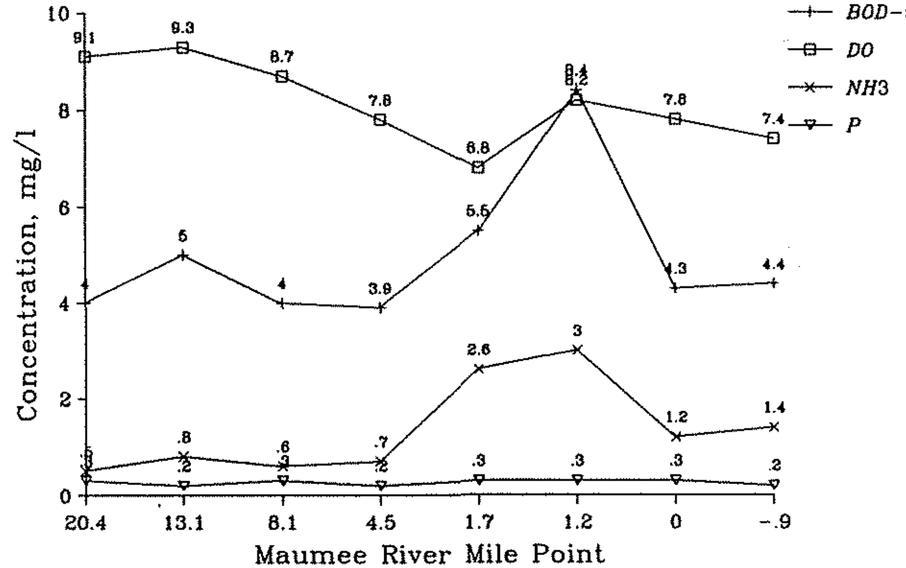
Figure 22: Lagrange Bacteria by Year



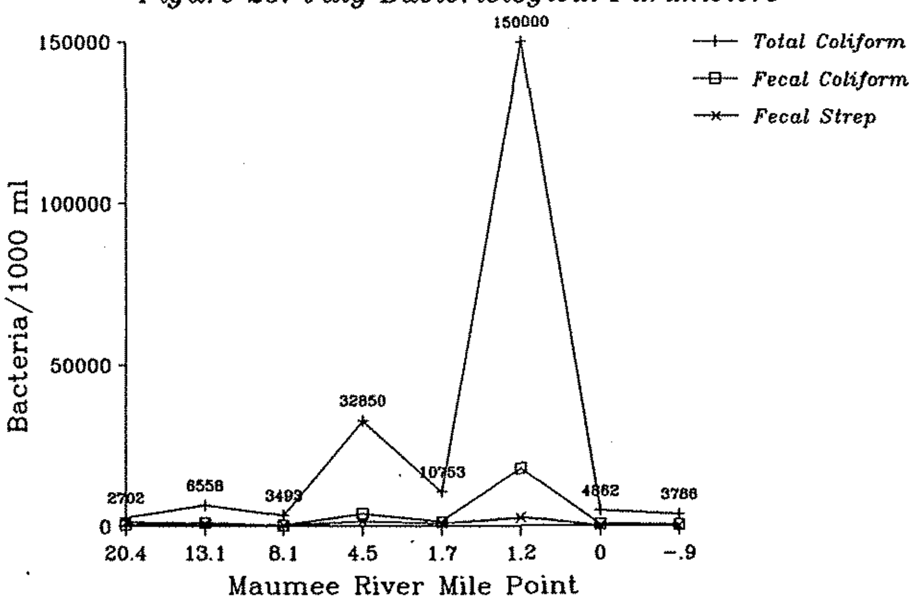
TESD DATA, 1981–1986: MAUMEE RIVER
Figure 23: July Nutrient Parameters



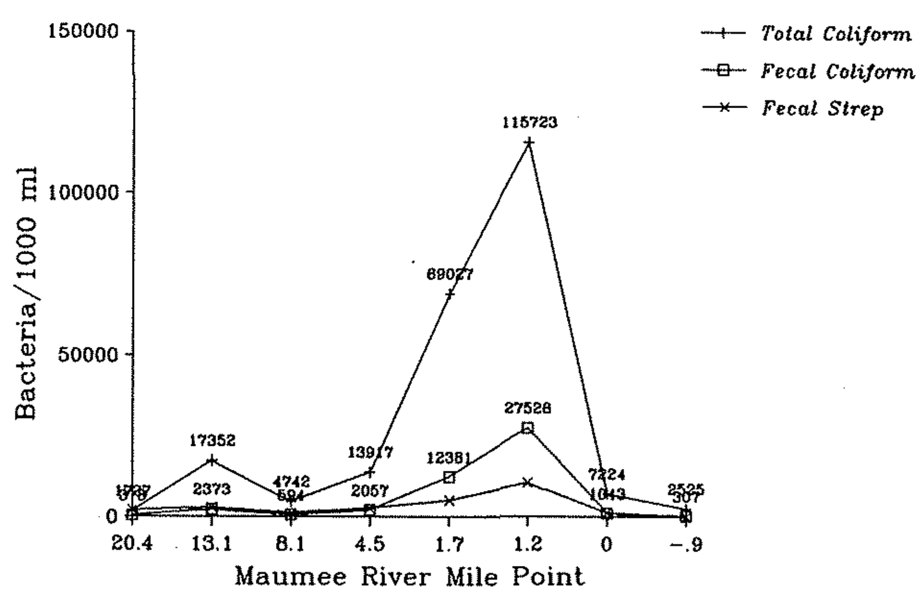
TESD DATA, 1981–1986: MAUMEE RIVER
Figure 24: Average Nutrient Parameters



TESD DATA, 1981–1986: MAUMEE RIVER
Figure 25: July Bacteriological Parameters

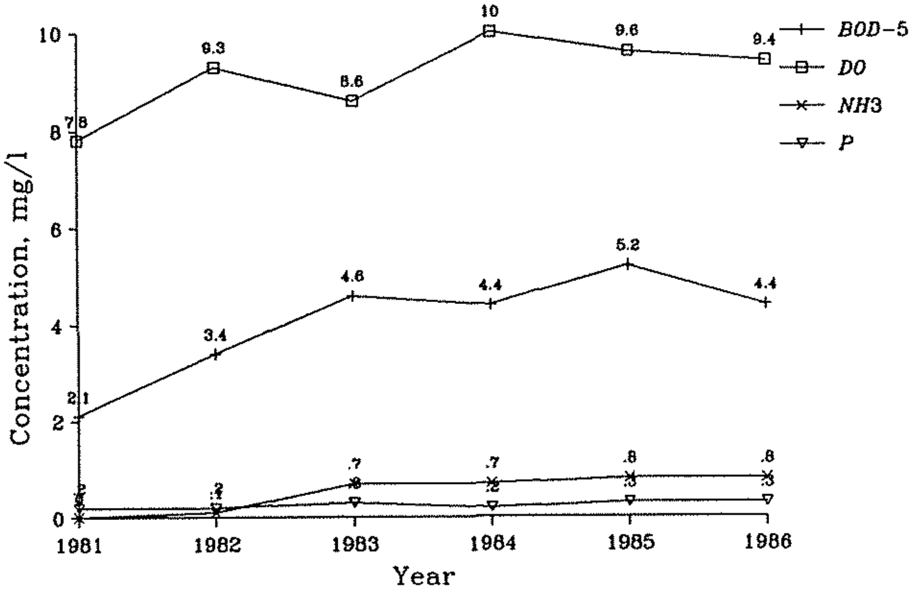


TESD DATA, 1981–1986: MAUMEE RIVER
Figure 26: Average Bacteriological Parameters



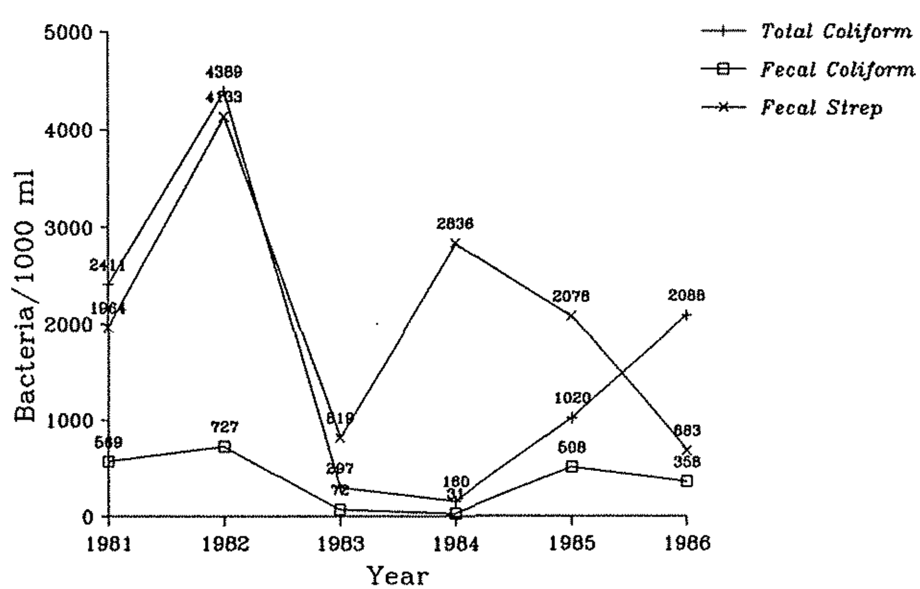
TESD DATA, 1981–1986: MAUMEE RIVER

Figure 27: Waterville Nutrients by Year



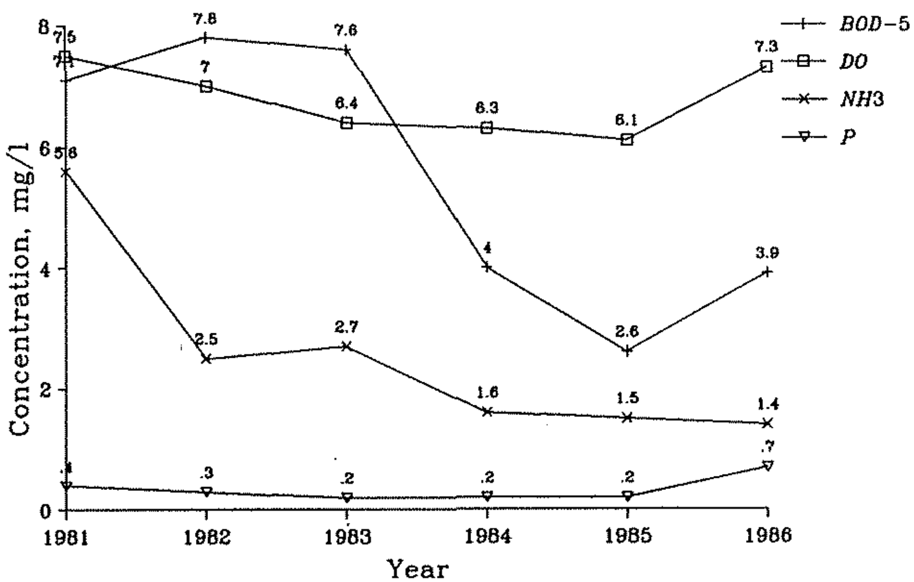
TESD DATA, 1981–1986: MAUMEE RIVER

Figure 28: Waterville Bacteria by Year



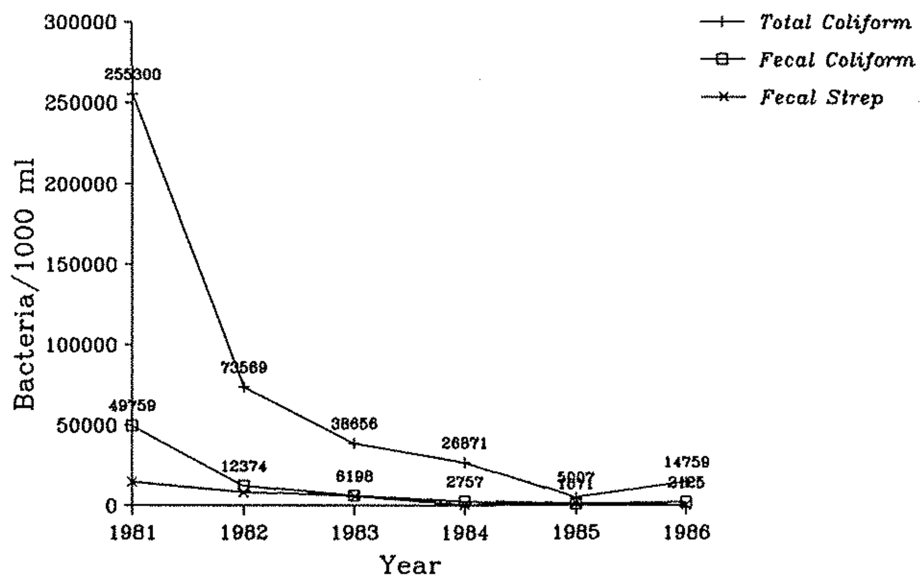
TESD DATA, 1981–1986: MAUMEE RIVER

Figure 29: TT Bridge Nutrients by Year



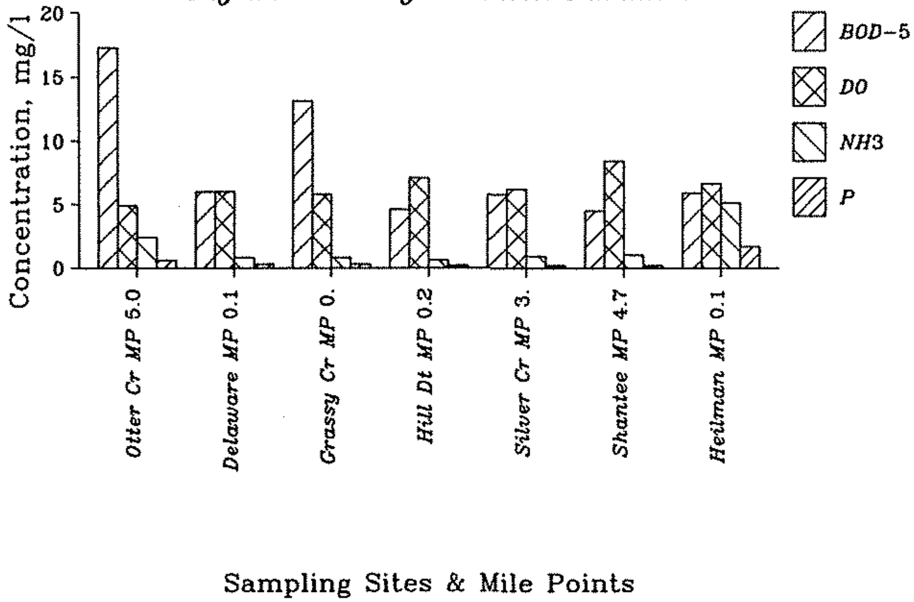
TESD DATA, 1981–1986: MAUMEE RIVER

Figure 30: TT Bridge Bacteria by Year



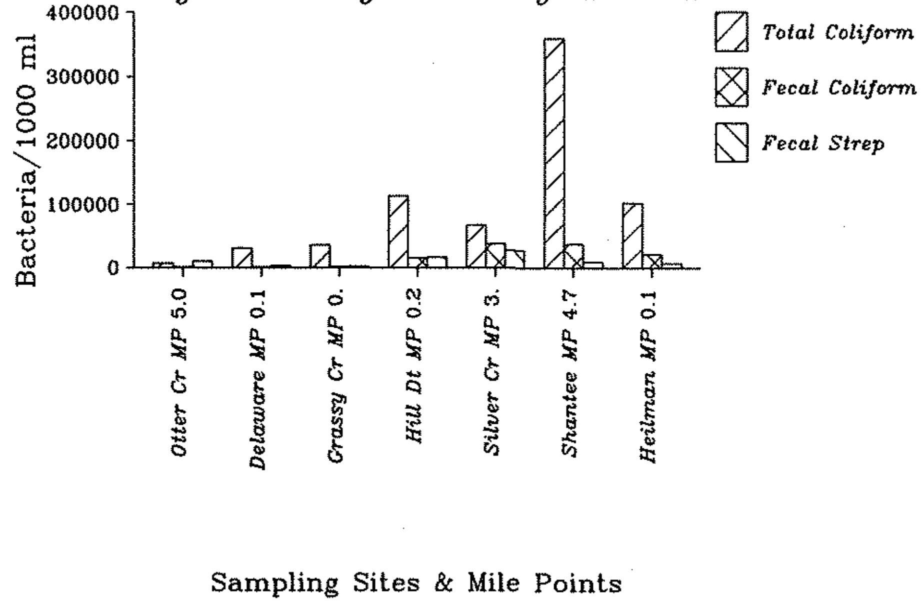
TESD DATA, 1981-1986: TRIBUTARY STREAM

Figure 31: July Nutrient Parameters



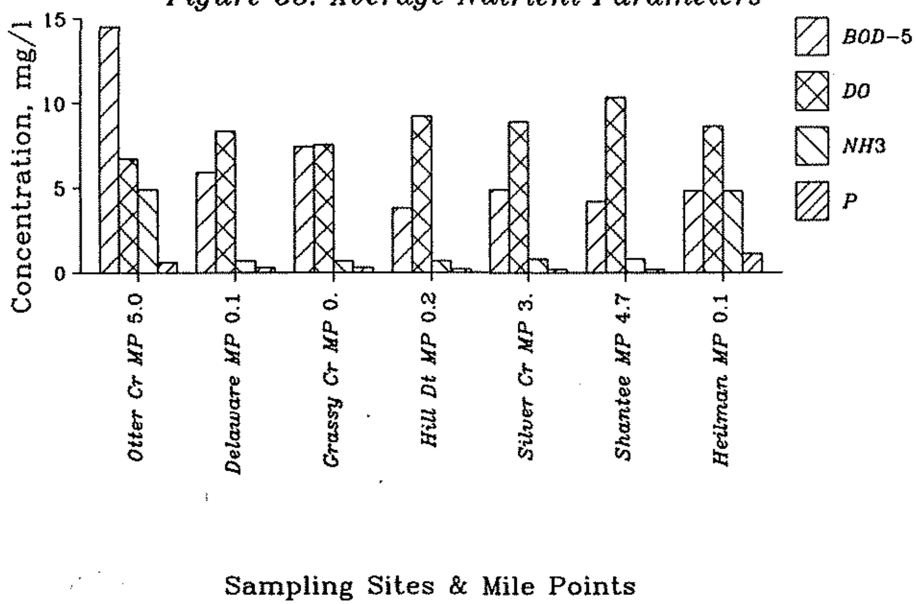
TESD DATA, 1981-1986: TRIBUTARY STREAM

Figure 32: July Bacteriological Parameters



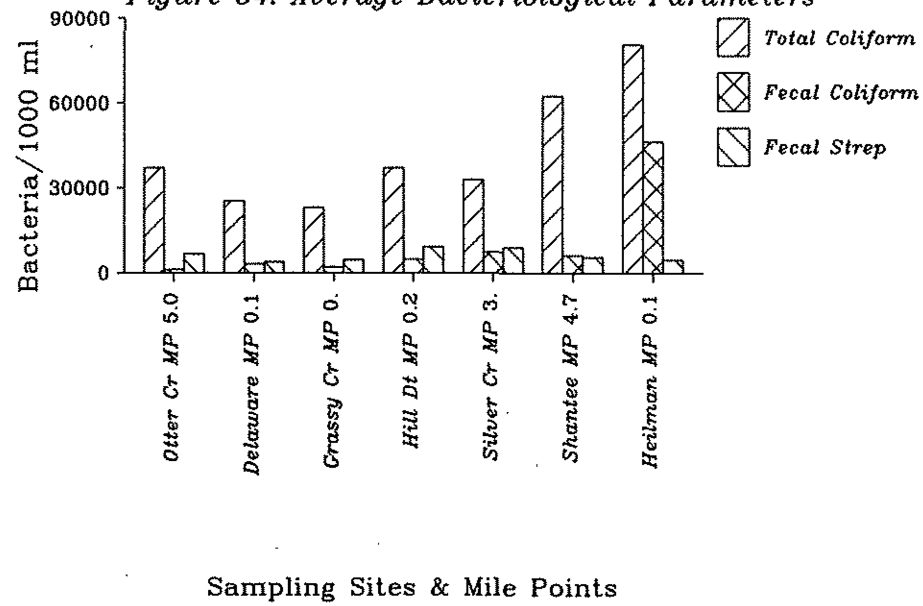
TESD DATA, 1981-1986: TRIBUTARY STREAM

Figure 33: Average Nutrient Parameters



TESD DATA, 1981-1986: TRIBUTARY STREAM

Figure 34: Average Bacteriological Parameters



United States Geological Survey (USGS)

USGS has an on-going sampling network, although the number of sites and amount of monitoring done has been decreasing over the years. Monitoring stations in the Maumee RAP Area include:

Maumee River	Mile point 22.8 above Waterville mile point 20.8 at Waterville mouth of the Maumee (discontinued 1975)
Ottawa River	mile point 10.8 at U.T. bridge (1977 only)
Crane Creek	near Curtice in Ottawa County; sampled semi-annually from 1980-82. Parameters: DO, Ca, Mg, Na, K, SO_4, Cl, F, TDS, TKN, NH_3, NO_3+NO_2, P, Fe, Mn.
Cedar Creek	mile point 6.9 at Curtice in Lucas County. Same monitoring details as Crane Creek site.

Only conductance, pH, temperature, and DO are sampled above Waterville. Conventional pollutants and metals (As, Ba, Cd, Cr, Cu, Fe Pb, Mn, Hg, Se, Ag, Zn) are monitored at the Waterville site; these parameters were also sampled at the two other discontinued sites.

Ohio State University Center for Lake Erie Area Research (CLEAR)

CLEAR does primarily open-lake and near-shore water quality studies. Their most intensive period of monitoring activity within the Maumee RAP Area was in 1975. Sampling that year included many sites in Maumee Bay and in the river itself as far upstream as Perrysburg (mile point 12). Sampling included conventional pollutants, and fecal coliform. It is no longer an on-going program.

Ohio EPA 305b Water Quality Inventories

Ohio EPA publishes a biannual report on the status of the various stream reaches in Ohio. The purpose of this report is to establish whether Ohio surface waters are meeting the "fishable, swimmable" criteria of the Clean Water Act (CWA). The 1986 305b report's assessment of water quality for Maumee/Ottawa River Basin is shown in Table 14.

TABLE 14
1986 305b ASSESSMENTS OF WATER QUALITY

Use Attainment		ALL STREAMS Miles	ALL STREAMS % Total	PRINCIPAL STREAMS Miles	PRINCIPAL STREAMS % Total
Meets CWA Criteria:	Yes	564	25	373	49
	Partial	287	12	180	24
	No	153	7	65	8
Total evaluated		1004	44	618	81

The area covered by the biennial report includes the Maumee Basin in Ohio which is substantially larger than the RAP Area. It includes all of Fulton, Henry, Defiance, Paulding, Putnam, Van Wert, and Allen Counties, and large portions of Lucas, Wood, Hancock, Auglaize, and Mercer Counties. The Ottawa River mentioned refers to the Ottawa River that flows through Lima, not the Ottawa River in Lucas County known locally as Tenmile Creek.

The 305b study summarizes the conditions of stream segments in the RAP Area. These summaries are shown in Table 15 by stream reach and includes the stream designations and the Clean Water Act (CWA) use attainment. Cedar and Crane Creeks, which the 305b classifies as being in the Portage River Basin, were not evaluated.

TABLE 15
1986 305b SUMMARIES

STREAM	MILE POINTS	REACH	COND.	CWA	DESG
Maumee	14.1-37.7	Maumee-Perrysburg Bridge-Napoleon	Good	Yes	WWH
Maumee	7.2-14.1	Estuary reach	Fair	Part.	WWH
Maumee	0.0-7.2	Ship channel	Fair	Part.	WWH
Maumee Bay			Fair	Part.	ELEH
Swan Creek	14.0-41.2	I-475 to headwaters	Fair	Part.	WWH
Swan Creek	0.0-14.0	Mouth to I-475	Poor	No	WWH

Heidelberg College River Studies Laboratory

The Water Quality Laboratory at Heidelberg College has contributed significant research on the movement and loadings of sediment, nutrients, and more recently pesticides in the Maumee River Basin. Utilizing the data available from the U.S. Geological Survey at the Waterville Survey Station and data collected by the Water Quality Laboratory,[3] they have analyzed sediment, phosphorus, nitrogen, chlorides, and 19 different pesticides. These data provide a record of water quality conditions in the Maumee River and have been collected continuously throughout the years which allows for the development of loading data. These data have been used extensively in the Agricultural Pollution Abatement section of this report. Major reports of these data are included in several documents available from the Water Quality Laboratory.[19, 20, 21]

INTENSIVE OR SHORT-TERM MONITORING SURVEYS

There has been a substantial body of water quality data collected since 1970 through various one-time sampling programs.

Maumee Basin Biological Water Quality Report (BWQR)

Ohio EPA has established five different classes for its biological criteria (fish) for determining water quality use designations and attainment of the Clean Water Act (CWA) goals. Class I (Exceptional) and Class II (Good) meets CWA goals. Class III (Fair), Class IV (Poor) and Class V (Very Poor) do not meet CWA goals. For formal use attainment assessment, Ohio EPA uses both fish (IBI and IWB) indices and invertebrates (ICI). For full attainment, all three indices must meet the criteria. For partial attainment, at least one index meets the criteria with the other two indicating at least fair performance. For non-attainment, none of the indices meet criteria or one or two indicate very poor or poor performance.

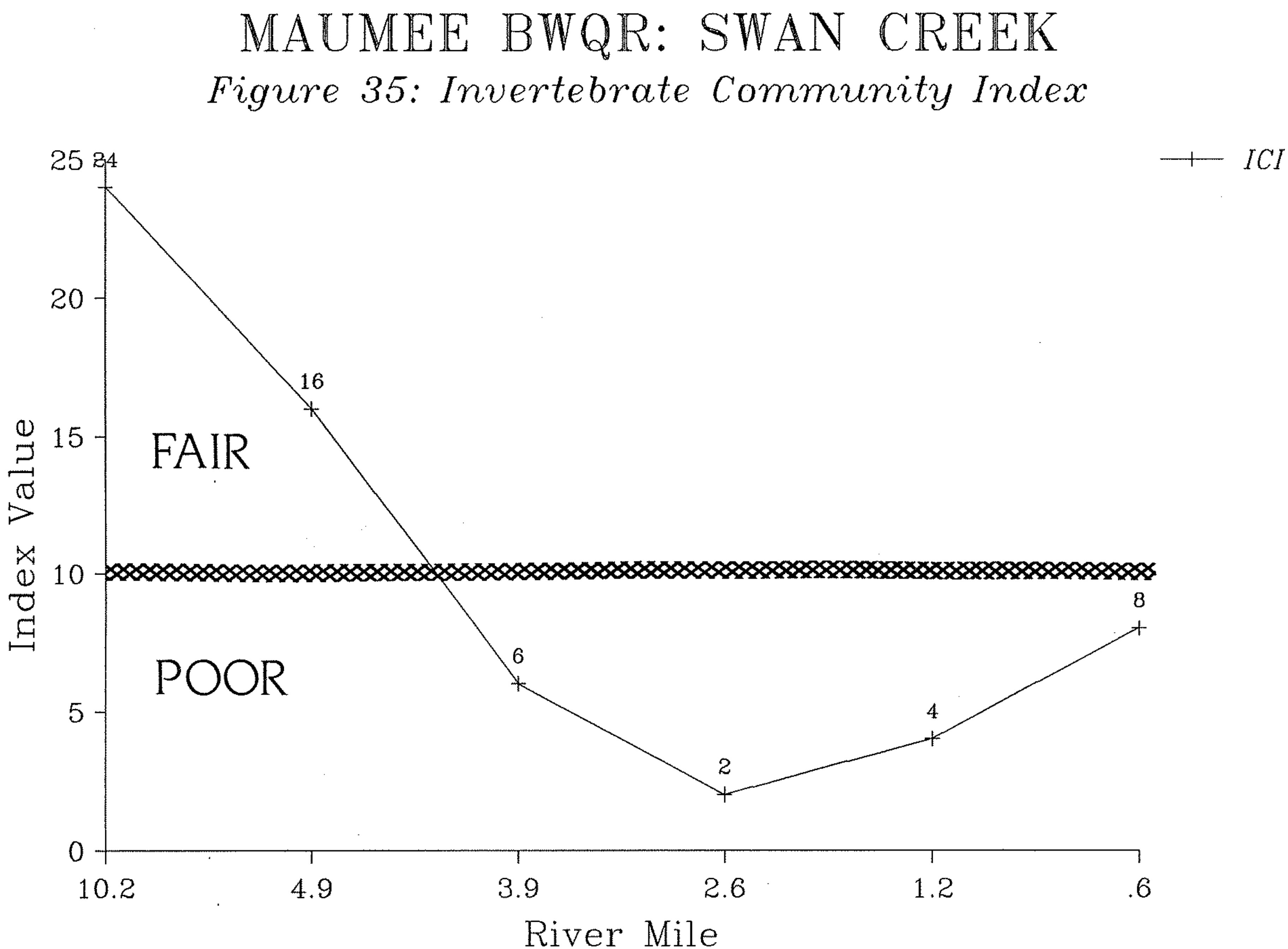
As a part of its Biological and Water Quality Report, Ohio EPA analyzed sediments for heavy metal concentrations in early 1987 at certain stations on the Maumee River (Grand Rapids Dam, Eagle Point Colony, Cherry Street Bridge and Toledo WWTP), Swan Creek (at Collingwood Blvd.), Ottawa River (Lagrange Street and Stickney Avenue), Otter Creek (Oakdale Avenue, Wheeling Street, and Millard Avenue), and Duck Creek (York Street).

A summary of water quality data collected for the BWQR is presented in Table 16. BWQR data is plotted by river miles in Figures 35 to 43. Parameters are plotted for the three major streams: Swan Creek, Tenmile Creek/Ottawa River, and the Maumee River. There are three figures for each: Invertebrate Community Index (ICI), Macroinvertebrate Densities, and Sediment Metals.

The ICI and Macroinvertebrate Densities get to the heart of measuring a stream's water quality. They indicate the ability of the stream to sustain life. High values for these indices indicate good water quality. The sediment metal data is a measure of accumulated metals at the bottom of the stream. The metals tested are toxic, so low values indicate a good environment for bottom-dwelling animals.

TABLE 16
LOWER MAUMEE BIOLOGICAL WATER QUALITY REPORT

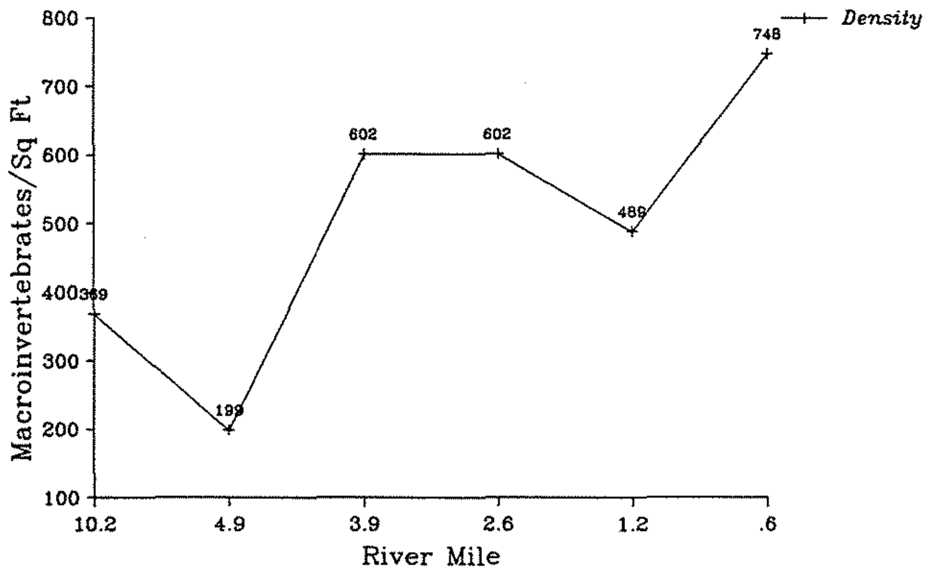
STREAM	LOCATION	RATING	BANK	MILE	ICI	DENSITY	Cd	Cr	Cu	Pb	Ni	Zn	As
Maumee	Grand Rapids Dam	Good		32.1	42	1697	.24	5.9	5.3	15.3	4.8	24.5	
Maumee	Woodcock Island	Excellent		25.1	52	1384							
Maumee	SR 64	Excellent		20.9	54	1627							
Maumee	US 20	Good		15	24	544							
Maumee	Maple St. Boat Launch	Good	S	13.6	20	405							
Maumee	Carey St. Boat Launch	Marginally Good	N	13.3	14	467							
Maumee	Eagle Point	Fair		9.4			.95	43.2	36.3	52.3	44.8	178	21.5
Maumee	Walbridge Park	Marginally Good	N	8.8	18	913							
Maumee	Libbey-Owens-Ford	Fair	S	7.3	12	688							
Maumee	I-75	Marginally Fair	N	7.2	8	440							
Maumee	Cherry St. Bridge	Marginally Fair	N	4.7	8	544	1.52	33.4	65.3	108	34.4	190	10.1
Maumee	Consaul St.	Fair	S	3.6	14	706							
Maumee	Riverside Park	Marginally Fair	N	3.1	10	387							
Maumee	Harrison Marina	Marginally Fair	N	1.5	6	579							
Maumee	Bay View Park	Marginally Good	N	.7	16	1166	1.46	57.2	45.5	52.5	46.2	384	12.9
Swan Creek	Eastgate Road	Fair		10.2	24	369							
Swan Creek	Detroit Ave.	Fair		4.9	16	199							
Swan Creek	Champion St.	Poor		3.9	6	602							
Swan Creek	Hawley St.	Poor		2.6	2	602							
Swan Creek	Collingwood Blvd.	Poor		1.2	4	489	1.39	27.2	18.6	165	29.8	285	13.5
Swan Creek	Mouth	Poor		.6	8	748							
Duck Creek	Wheeling Road	Very poor		3	0	145							
Duck Creek	York Street	Poor		2.1	12	190	.6	14	21.2	72.8	14	115	13.9
Duck Creek	Port Authority	Poor		.4	4	43							
Otter Creek	East Broadway	Fair		7.2	15								
Otter Creek	Oakdale Ave.	Very poor		6	0	0	.52	32	30	49	22	170	26.1
Otter Creek	Wheeling Road	Very poor		4	0	166	.66	149	46	142	26	163	14.4
Otter Creek	Millard Ave.	Very poor		2	0	1623	.53	54	71	68	19	129	7.7
Otter Creek	Mouth	Very poor		.3	0	299							
Tenmile Creek	Centennial Road	Fair/marg. good		5.1	28								
Tenmile Creek	Sylvania Ave.	Fair/marg. good		4.1	35								
Tenmile Creek	Old Post Road	Marginally Good		1	36								
Ottawa River	Sturbridge Road	Fair		18.5	24	382							
Ottawa River	Centennial Hall, UT	Fair		11	14	297							
Ottawa River	South Cove Blvd.	Poor		9	6	272							
Ottawa River	Berdan Ave.	Poor		7.4	6	365							
Ottawa River	Lagrange St.	Poor		6.9	4	551	1.77	72.2	71.4	195	53.4	333	6.2
Ottawa River	Stickney Ave.	Poor		4.9	2	388	.52	23.4	87.2	116	21.2	124	4.3
Ottawa River	US 24-A	Poor		1.6	6	616							
Cedar Creek	US 20	Good		20	34	90							



MAUMEE BWQR: SWAN CREEK
Figure 35: Invertebrate Community Index
ICI
Index Value
25
20
15
10
5
0
24
16
6
2
4
8
FAIR
POOR
10.2
4.9
3.9
2.6
1.2
.6
River Mile

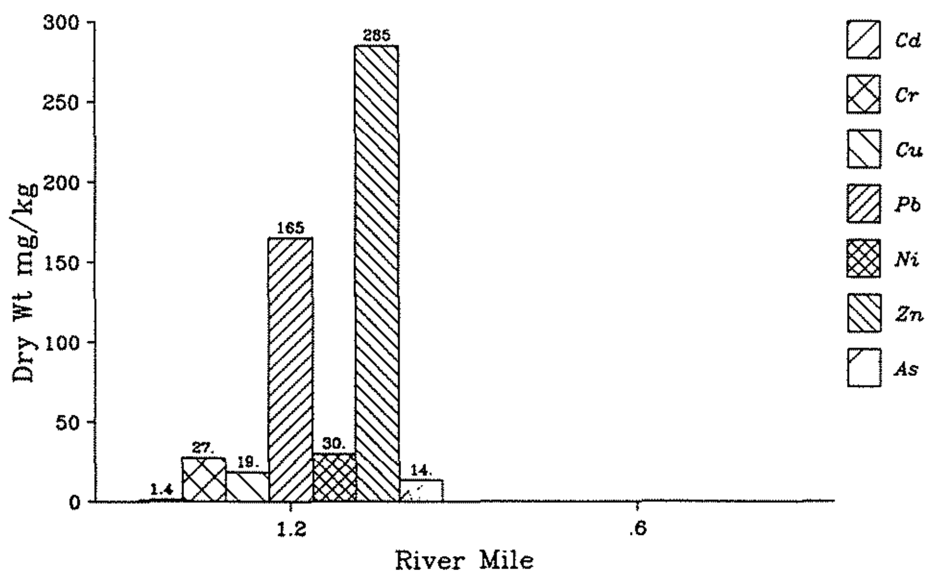
MAUMEE BWQR: SWAN CREEK

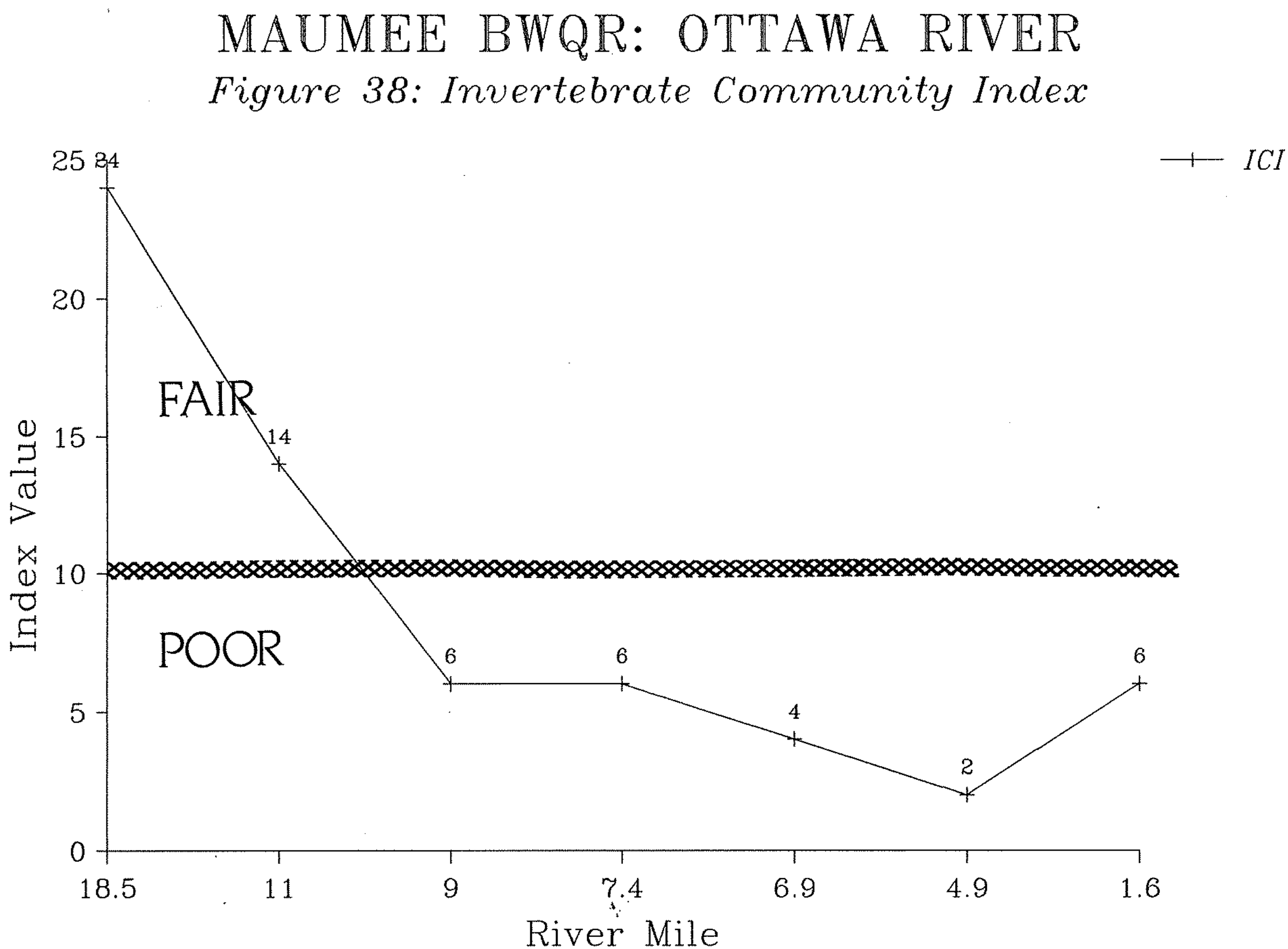
Figure 36: Macroinvertebrate Densities



MAUMEE BWQR: SWAN CREEK

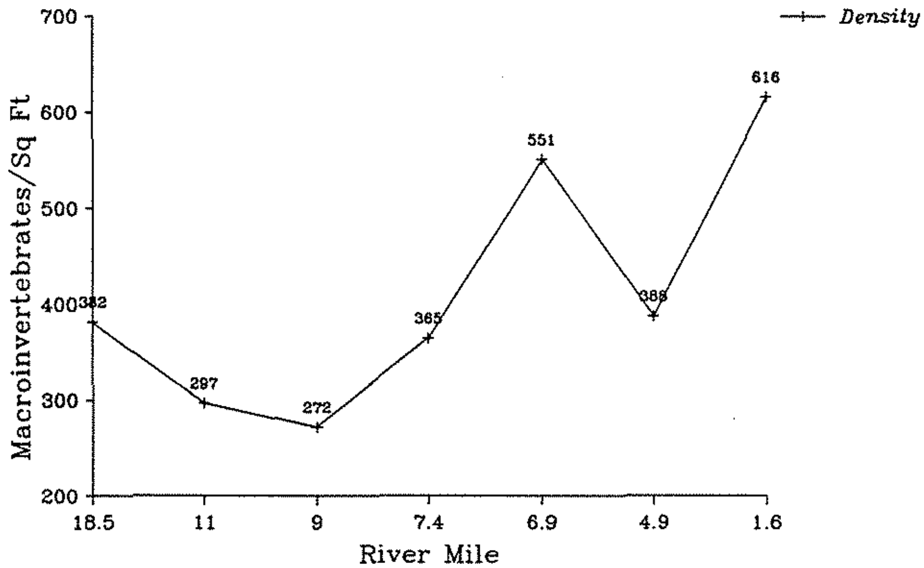
Figure 37: Sediment Metals




MAUMEE BWQR: OTTAWA RIVER
Figure 38: Invertebrate Community Index
ICI
Index Value
River Mile
FAIR
POOR
25
20
15
10
5
0
24
14
6
6
4
2
6
18.5
11
9
7.4
6.9
4.9
1.6

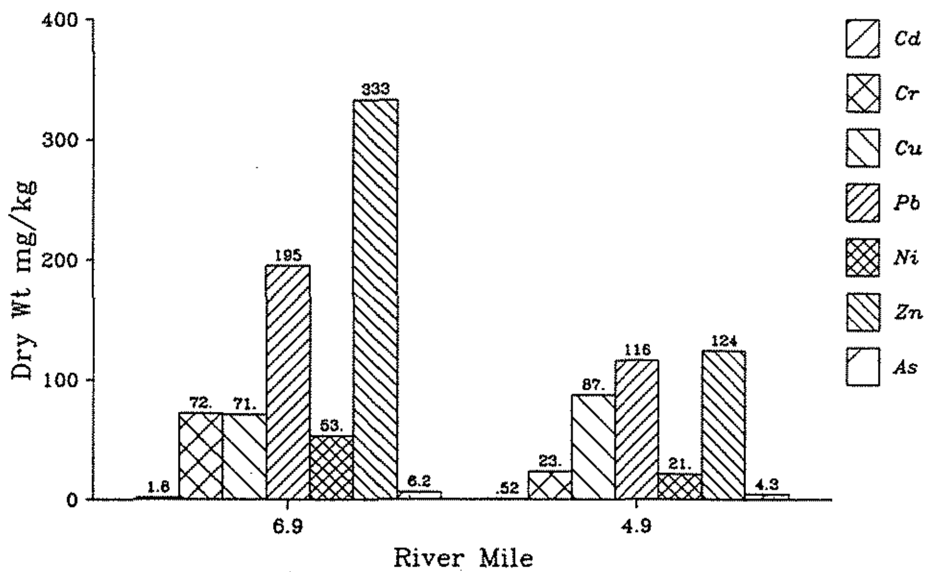
MAUMEE BWQR: OTTAWA RIVER

Figure 39: Macroinvertebrate Densities



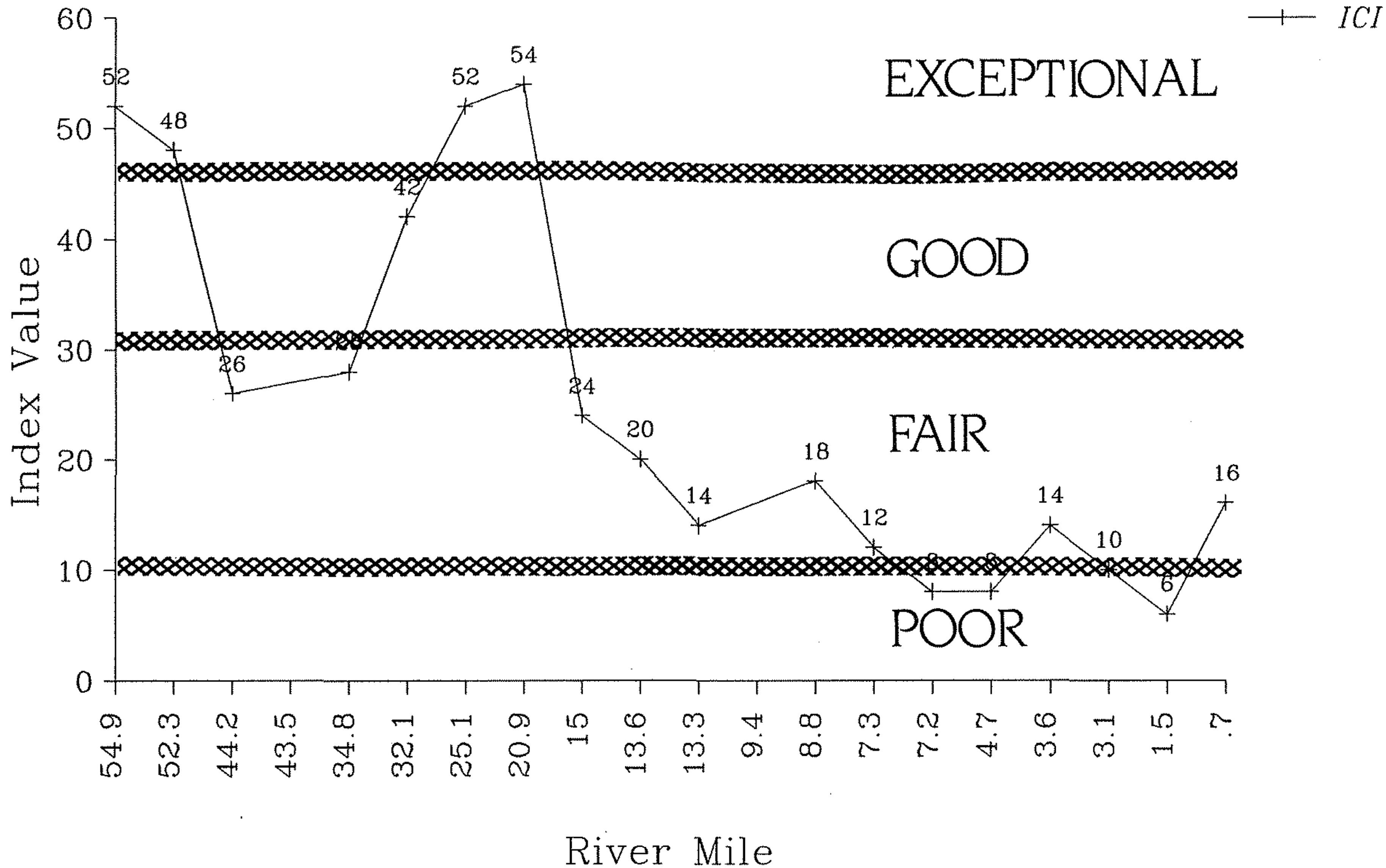
MAUMEE BWQR: OTTAWA RIVER

Figure 40: Sediment Metals



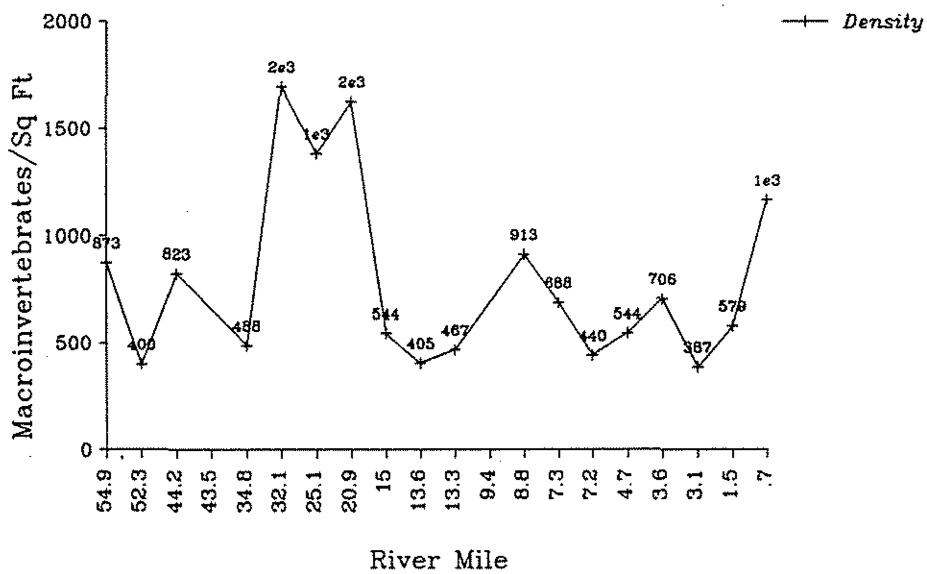
MAUMEE BWQR: MAUMEE RIVER

Figure 41: Invertebrate Community Index



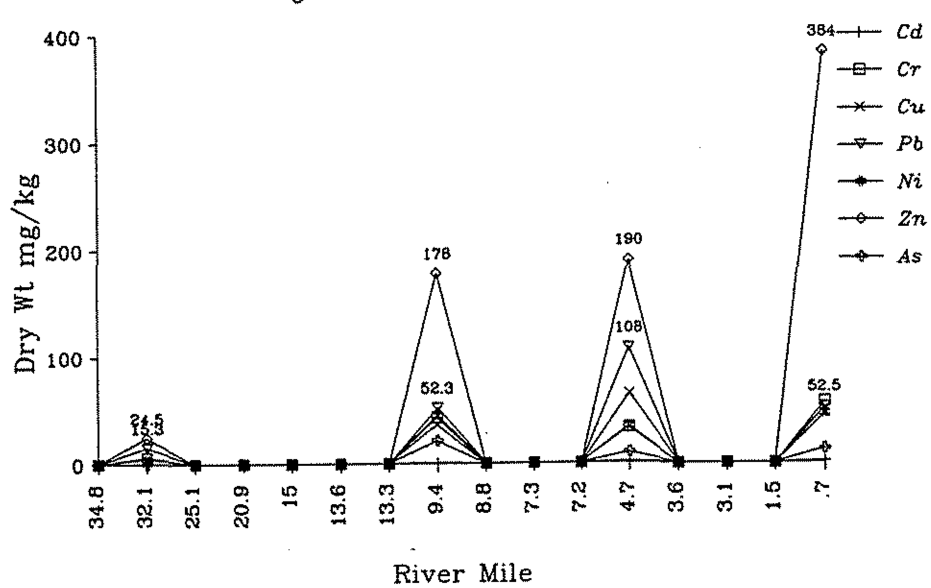
MAUMEE BWQR: MAUMEE RIVER

Figure 42: Macroinvertebrate Densities



MAUMEE BWQR: MAUMEE RIVER

Figure 43: Sediment Metals

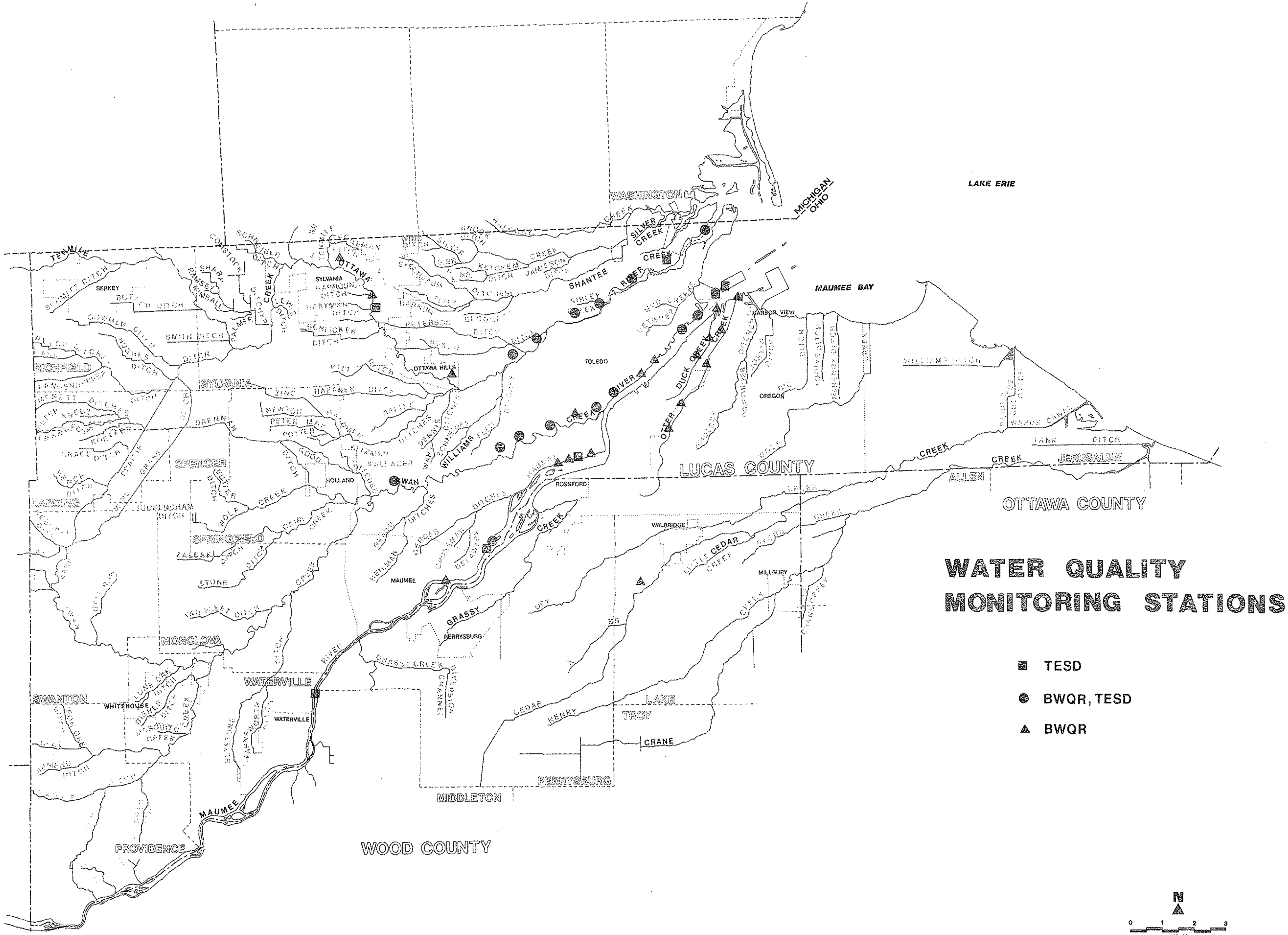


Ohio EPA also analyzed sediment samples from the Maumee River, Swan Creek, and the Ottawa River for a variety of volatile organic compounds. The complete sampling records are presented in Appendix A. Table 17 gives the sediment data in summary form, listing only those samples where detectable amounts of the volatile organics were found. A summary of the draft *BWQR Report* is presented in Appendix G. It presents Ohio EPA's field observations and a discussion of the data in greater detail.

TABLE 17
BWQR SEDIMENTS: PRIORITY POLLUTANT DATA

CAS Number	Volatile Compound	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg	Conc µg/kg
	Stream ⟹	Maumee	Maumee	Maumee	Swan	Swan	Otter	Otter	Otter	Ottawa	Ottawa
	River Mile ⟹	9.4	4.9	1	1.2	1.2	5.9	4	2.1	6.4	4.9
	Station ⟹	Eagle Pt	Cherry St	WWTP	Collingwood	Collingwood	Oakdale	Wheeling	Millard	Lagrange	Stickney
67-64-1	Acetone		44			38	49				
108-05-4	Vinyl Acetate					39					
79-01-6	Trichloroethene				(19)?						
108-88-3	Toluene	1300							320		
108-95-2	Phenol								890		
106-44-5	4-Methylphenol			1400					1700		
91-57-6	2-Methylnaphthalene		790								
83-32-9	Acenaphthene		1400			5300					
132-64-9	Dibenzofuran		1300			4900					
86-73-7	Fluorene		2500			7500					
85-01-8	Phenanthrene		11000	1000		29000	8700	2300		2800	4100
120-12-7	Anthracene						1900	830			
206-44-0	Fluoranthene		11000	2100		26000	12000	3500		6900	5400
129-00-0	Pyrene		7300	1900		22000	7500	3700	710		4900
85-68-7	Butylbenzylphthalate										4300
56-55-3	Benzo(a)anthracene		3900	1000		11000	5000	1800			3200
117-81-7	Bis(2-ethylhexyl) Phthalate (DEHP)							650			
218-01-9	Chrysene		4000	1000		8800	3400	1700			2800
117-84-0	Di-n-octyl Phthalate			1200							3600
205-99-2	Benzo(b)Fluoranthene		1900	2000		6500	3900				
207-08-9	Benzo(k)Fluoranthene		2500	880		4400	2700				
50-32-8	Benzo(a)Pyrene		2300	990		4800	2900	1000			1800
193-39-5	Indeno(1,2,3-cd)Pyrene		1500	910			2200	680			1700
53-70-3	Dibenz(a,h)Anthracene		970	890			1000				
191-24-2	Benzo(g,h,i)Perylene		1800	1100			2600	750			1800
53469-21-9	Aroclor-1242					1600					2500

Figure 44 shows the sampling sites for both TESD and Ohio EPA for the major waterways. The "square" indicates only TESD sites, the "circle" indicates both agencies, while the "triangle" indicates the sampling sites for the BWQR investigative team.



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

U.S. Army Corps of Engineers 1983 Toledo Harbor Sediment Analyses

In 1983, Floyd Browne Associates and Aquatech, under contract from the U.S. Army Corps of Engineers, collected and analyzed sediments from Toledo Harbor. These data collected under this project are presented in Table 18.[22] Included in this table are the severity ratings for various parameters when applying either the Ohio EPA guidelines or the US EPA guidelines. Figures 45-48 show how the parameters tested vary by river (or lake) mile. Figure 45 shows Phenol, Hg, CN, and Cd; Figure 46 shows As, Cr, Pb, Cu, and Ni; Figure 47 shows Zn, NH_3, Mn, P, and TKN; and Figure 48 shows Fe and COD.

TABLE 18
US ARMY CORPS OF ENGINEERS, 1983
TOLEDO HARBOR SEDIMENT DATA

PARAMETER	Abbrev.	R-7-M	R-6-M	R-5-M	R-4-M	R-3-M	R-2-M	R-1-M	0-M	L-1-M	L-2-M	L-3-M	L-4-M	L-5-M	L-6-M	L-7-M
	There are no sediment guidelines for the following parameters:															
Tot Solids, %	TS	44.7	43.1	53.3	47.4	38	39.9	52.8	39.5	36.7	53.5	34.7	51.7	47.7	32.3	38
Phenols	Phenol	.1	.1	.3	.1	.1	1.3	.3	.2	.1	.3	1.4	.1	.1	.1	.1
	US EPA has established sediment guidelines for the following parameters:															
Vol. Solids, %	TVS	6.14	5.22	5.61	5.94	6.55	6.99	5.8	5.48	6.69	4.21	5.1	4.31	4.43	6.19	4.85
Severity		C	C	C	C	C	C	C	C	C	A	C	A	A	C	A
Mercury	Hg	.2	.1	.4	.1	.2	.1	.2	.3	.2	.1	.1	.1	.2	.2	.3
Severity		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Cyanide	CN	.18	.92	2.1	.27	.37	1	1.6	2.5	.8	.52	.05	.32	.28	.46	.49
Severity		C	E	E	E	E	E	E	E	E	E	A	E	E	E	E
Nickel	Ni	48	51	47	57	54	61	59	59	53	38	50	41	42	49	38
Severity		C	E	C	E	E	E	E	E	E	C	E	C	C	C	C
Ammonia-N	NH3-N	191	139	132	150	170	275	716	260	236	133	169	146	192	205	116
Severity		C	C	C	C	C	E	E	E	E	C	C	C	C	E	C
Manganese	Mn	488	510	382	480	491	482	467	504	580	382	576	481	434	555	445
Severity		C	E	C	C	C	C	C	E	E	C	E	C	C	E	C
Total P	P	952	1030	1030	1200	1210	1340	2120	1470	1050	827	869	749	804	812	900
Severity		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
TKN	TKN	988	1980	1570	1650	1740	847	1630	2540	2410	1510	2550	1570	1820	1330	2050
Severity		A	C	C	C	C	A	C	E	E	C	E	C	C	C	E
COD	COD	76000	73200	54400	61700	60900	82700	84700	91900	95600	56400	102000	77700	76600	95000	77600
Severity		C	C	C	C	C	E	E	E	E	C	E	C	C	E	C
	Ohio EPA has established sediment guidelines for the following metals:															
Cadmium	Cd	1.4	1.4	1.6	1.2	1.8	2	4	2.2	2	1.2	1.4	1	1.2	1.6	1.2
Severity		D	D	D	D	D	E	E	E	E	D	D	C	D	D	D
Arsenic	As	13.2	18	8.5	16.4	12.3	18.6	9.9	18.2	12.4	10.3	13.8	11.6	10.5	13.4	11.8
Severity		B	C	A	B	A	C	A	C	A	A	B	A	A	B	A
Chromium	Cr	28	26	26	29	34	43	71	50	34	23	30	22	24	31	24
Severity		E	E	E	E	E	E	E	E	E	D	E	D	E	E	E
Lead	Pb	22	28	55	37	40	42	135	36	29	19	27	20	25	26	24
Severity		B	C	D	C	C	C	E	D	D	A	B	A	B	B	B
Copper	Cu	38	39	46	53	46	51	76	52	43	30	43	35	35	40	31
Severity		D	D	E	E	E	E	E	E	D	D	D	D	D	D	D
Zinc	Zn	140	145	149	158	184	213	303	211	161	106	142	106	120	142	112
Severity		C	C	C	D	D	D	E	D	D	B	C	B	C	C	C
Iron	Fe	31100	32600	20300	31800	34900	37000	30200	33100	32600	23000	30500	24500	25300	30400	22900
Severity		B	B	A	B	B	C	B	B	B	A	B	A	A	B	A

Except where noted, units are mg/kg.

Key to Severity Ratings:

	Ohio EPA Guidelines	US EPA Guidelines
A	Non-Elevated concentration	Non-Polluted
B	Slightly Elevated concentration	
C	Elevated concentration	Moderately Polluted
D	Highly Elevated concentration	
E	Extreme Elevated concentration	Heavily Polluted

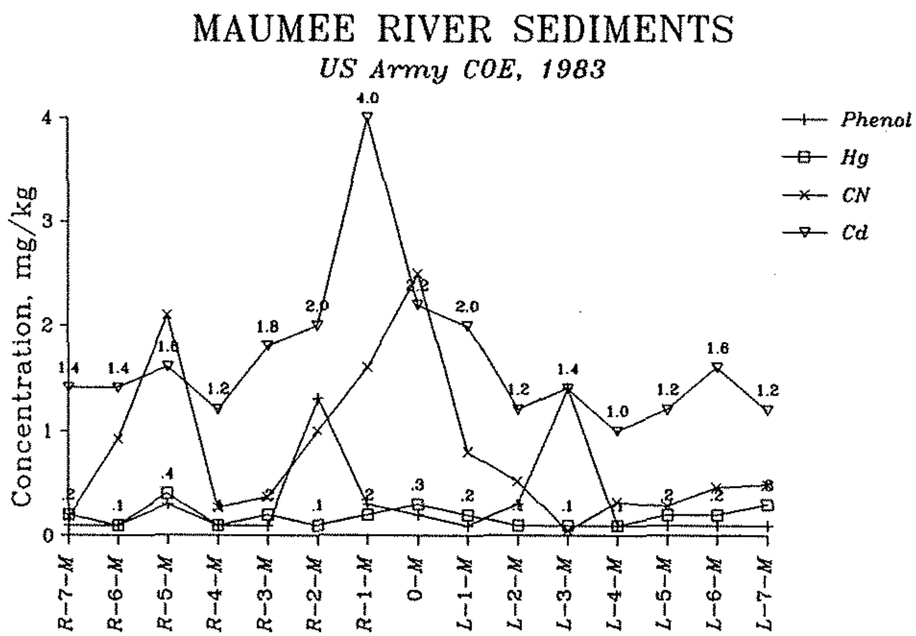


Figure 45

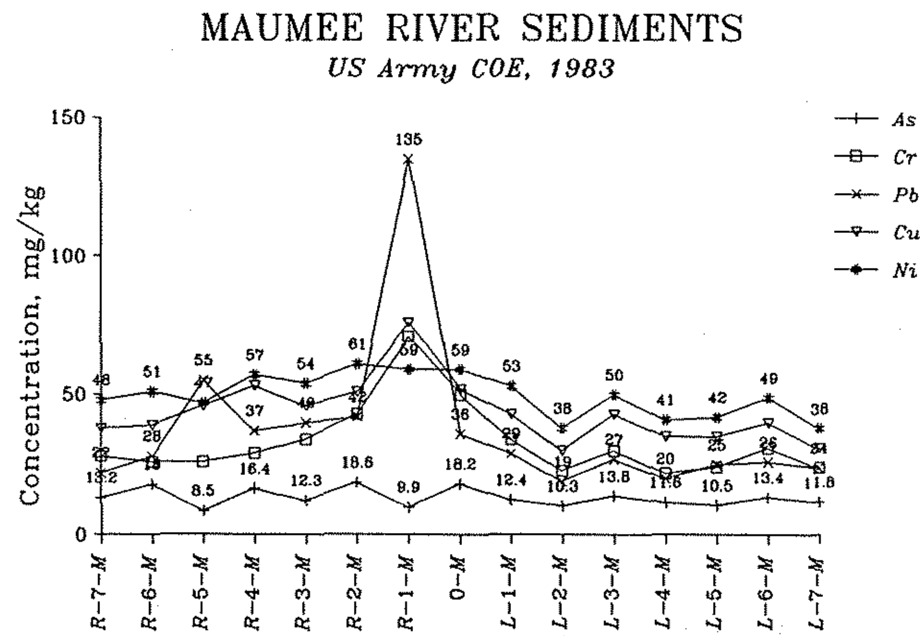


Figure 46

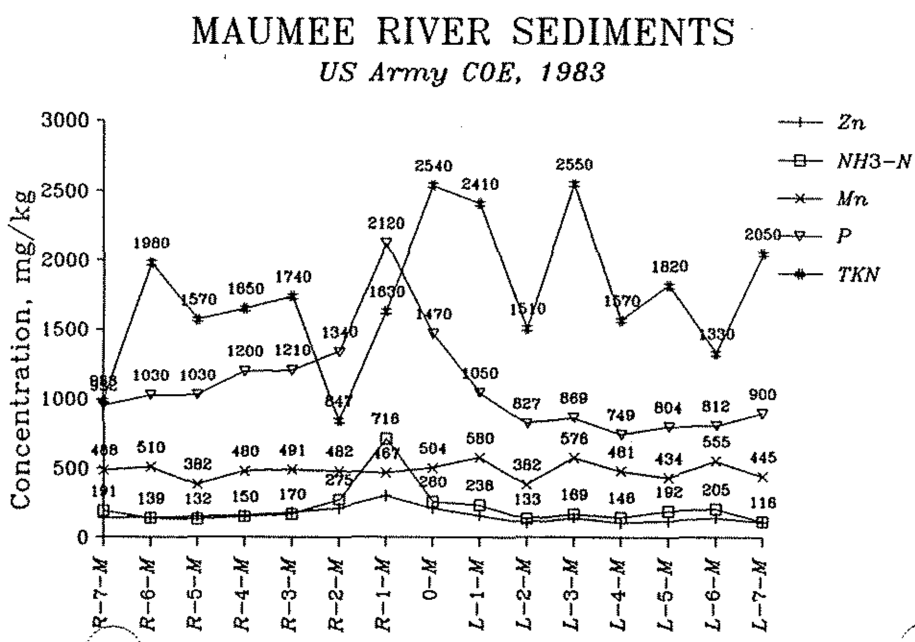


Figure 47

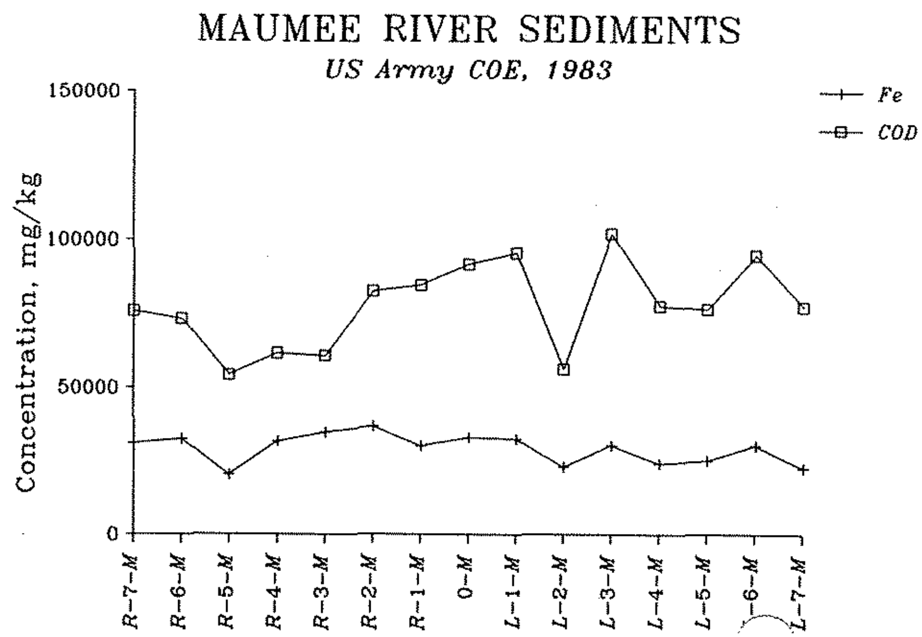


Figure 48

Facilities Plans

Facilities Plans are the first step in an application for Construction Grant funding from EPA. They include an assessment of the present situation in the study area, including water quality, and a forecast of future needs. Many Facilities Plans involved stream sampling to document water quality problems, especially septic tank discharges or other problems which new sewers or treatment plant improvements would alleviate.

Lucas County Facilities Plan

Finkbeiner, Pettis, and Strout performed water quality sampling on many streams in western Lucas County for the *Lucas County Plan Update*[23]. On the smaller ditches, data collected for the Facilities Plan are still the only samples on record. The parameters tested, for the most part, were NH_3-N, BOD_5, DO, Fecal Coliform, and Fecal Strep. Data for each station includes the ratio of coliform to strep, which is used for a basis for determining whether bacterial contamination is due to animal wastes or human wastes. Many violations of water quality standards were noted, but will not be reiterated here. The data is available in Appendix G of the Facilities Plan. Since 1981, portions of the problem areas have been sewered, and it is probable that water quality violations in those areas have been eliminated.

Table 19 is an updated summary of this facilities plan data. The sampling points listed are:

a. Points at which water quality violations were found in 1981, and

b. Are still unsewered, or are immediately downstream from unsewered areas, and

c. Indicated (in 1981) that contamination was due to human wastes.

TABLE 19
LUCAS COUNTY FACILITIES PLAN:
WATER QUALITY MONITORING FOR 1983 UPDATE

SITE NO	STREAM	APPROXIMATE LOCATION	PARAMETER VIOLATED	NOTES
1	Tenmile Cr	Sylvania & Mitchaw	NH_3, FC	
2	Tenmile Cr	Sylvania & Silica	FC	
3 *	Ottawa River	Sylvania W of Corey	FC	Bentbrook to be sewered
5 *	Tenmile Cr	Centennial & Silica	FC	
9 *	Smith Dt	Central & King	FC	
11	Smith Dt	Bancroft E of McCord	FC	Subdiv upstrm sewered
12*	Vanderpool Dt	Bancroft & King	FC	
13*	Heldman Dt	Dorr & King	FC	
16*	Heldman Dt	Nebraska & McCord	NH_3, FC	Immediate area sewered
17*	Heldman Dt	McCord SE of Nebraska	NH_3, FC	Immediate area sewered
20*	Haefner Dt	Dorr & McCord	FC	
24*	Butler Dt	Old St Line & Irwin	FC	
28*	Butler Dt	Airport E of Crissey	NH_3, FC	
29*	Kujowski Dt	Crissey S of Airport	FC	
30	Cunningham Dt	Crissey N of Garden	FC	
31	Zaleski Dt	Eber & Salisbury	FC	
32	Wolf Cr	Albon & Airport	FC	
33	Wolf Cr	Gunn & Airport	FC	
34	Wolf Cr	Off Airport W of Holloway		
38*	Good Dt	Angola @ I-475	NH_3, FC	
39*	Butler Dt	Old St Line W of Crissey	FC	
45*	Wiregrass Dt	Soul Rd E of Wilkins	FC	
46*	Wiregrass Dt	Wilkins @ 20A	FC	

*In designated area planned for sanitary sewer service in *Areawide Water Quality Management Plan*

Fish kills, cited by a 1979 ODNR report, are also mentioned in the *Lucas County Facilities Plan Update*. They occurred in 1976 on Wolf Creek, due to a chlorine solution, and in 1976 on Swan Creek due to a municipal sewage discharge.

Additional sampling was conducted in 1985 for a Facilities Plan update[24], which was written to apply for funding to construct sanitary sewers for the Dorcas Farms and South Hill Park subdivisions in Springfield Township, northeast of Holland. As yet, these sewers have not been built, so these samples, which are summarized in Table 20, may still be considered current.

TABLE 20
LUCAS COUNTY FACILITIES PLAN:
1985 MONITORING FOR DORCAS FARMS & SOUTH HILL PARK

SITE NO	1983 SITE NO	STREAM	APPROXIMATE LOCATION	SAMPLE NO	BOD_5	DO	NH_3	FC
1	38	Good Dt	Angola W of I-475	1	164.0	1.6*	26.3*	2,600,000*
			Below S Hill Park	2	46.0	2.9*	13.9*	550,000*
				3	24.0	1.8*	7.4*	1,600,000*
				AVG	78.0	2.1*	15.8*	1,583,333*
2	n/a	Good Dt	Above Wolf Creek	1	5.4	7.8	.4	380
				2	4.8	7.4	.0	120
				3	2.1	7.2	.4	320
				AVG	4.1	7.5	.3	273
3	n/a	Wolf Cr	Below Good Ditch	1	1.4	8.4	.0	1,200
				2	2.0	8.4	.0	630
				3	1.6	8.0	.1	630
				AVG	1.7	8.3	.1	820
4	n/a	Swan Cr	Below Wolf Creek	1	1.1	8.6	.0	680
				2	1.8	7.4	.0	560
				3	1.4	8.0	.1	460
				AVG	1.4	8.0	.0	567

*A water quality violation based on 2000 fecal coliform/100 ml, 0.5 ppm NH_3, and 5.0 ppm DO. There is no water quality standard for BOD_5, but in clean water, it should be close to 0.

Good Ditch flows through the subdivisions, and sampling site #1 is immediately downstream. Houses in the development presently use septic systems, and failures of these systems are widespread and well-documented. The sampling data clearly show pollution from untreated sewage.

Toledo Facilities Plan

The *Toledo Facilities Plan* was written in a number of volumes. It included separate volumes for different phases of sewerage system improvements, and there was a *Combined Sewer Overflow Study* (CSO) written in 1978[25], and updated in 1987.

The 1978 study included the following water quality monitoring:

1. Rainfall quantity vs. overflow quantity from various combined sewage regulators.

2. Sediments were collected at five sites along Swan Creek from the mouth to Byrne Road; and at six sites on the Maumee ranging from river mile 0 to river mile 8. Samples were analyzed for BOD_5, COD_5, P, TKN, Organic Nitrogen, NH_3, NO_2, NO_3, Oil & Grease, Fe, and Zn.

The *Tenmile Creek Facilities Plan*[26] included similar sediment sampling at four sites on Tenmile Creek, ranging from mile point 6.2 to mile point 15.0. Parameters tested were BOD_5, COD_5, P, TKN, Organic Nitrogen, NH_3, NO_2, NO_3, Oil & Grease, Fe, and Zn.

Oregon Facilities Plan

Seven ditches and creeks were sampled for the 1974 *Oregon Facilities Plan*,[27] Drainage areas sampled were Amlosch/Driftmeyer Ditches, Heckman Ditch, Big Ditch, Tobias Ditch, and Wolf Creek. Fifteen samples were taken between 12/3/73 and 6/26/74. Parameters recorded were Cond., DO, BOD_5, P, Total Coliform, Fecal Coliform, Fecal Strep., Turb., Cl, NH_3, NO_2, and NO_3.

Additional sampling was done for the Harbor View Area update of the *Oregon Facilities Plan*.[28] Samples were collected at five sites, catch basins or ditches, and analyzed for DO, BOD_5, SS, P, fecal coliform, and fecal strep. One site had a DO of 4.4 ppm, and another had 5.1 ppm; the other three were under 1.5 ppm. Fecal coliform counts ranged from 25,000 to 1.1 million. BOD_5 ranged from 1.0 ppm to 148 ppm. These parameters indicated the presence of sewage.

Ohio EPA collected grab samples from seven ditches or storm sewers in July, 1981 following thunder storms. The only parameter analyzed was fecal coliform. Two sites had counts under 100. One was 360 bacteria/100 ml; and the other four ranged from 1000 to 360,000. These samples also indicate sewage.

Luckey Facilities Plan

One grab sample was taken at each of 27 sites in local streams and ditches. Parameters analyzed were BOD_5, fecal coliform, and DO. These samples showed the presence of sewage in the streams. The Village of Luckey presently has a combined sewerage system. The system collects dry-weather sewage flows and treats the wastewater in a lagoon WWTP, which is operated by the Village. This system was placed in operation in late 1987.

Maumee Combined Sewer Overflow Study

Maumee's combined sewer overflows were studied in detail in this report. This study is discussed in more depth in the section under CSOs.

The TMACOG 208 Program

When the Clean Water Act (PL 92-500) was originally enacted in 1972, funding was included to perform intensive water quality assessment and planning. Water quality parameters analyzed included SS, C, N, P, CODs and BODs of various durations and fecal coliform. One site in the Maumee Basin was monitored in 1974, and eight sites in 1975-76.

Maumee Bay Environmental Quality Studies

In 1974 and again in 1977, detailed investigations of the environmental conditions of the Maumee Bay were conducted by a team of researchers directed by Dr. Peter Fraleigh of the University of Toledo. These studies represented an examination of Maumee Bay before and after the construction of the Confined Disposal Facility (Facility #3) in Maumee Bay at the mouth of the River. The studies examined water quality, water mixing patterns, sedimentation and erosion patterns, and the biological characteristics of the Bay. Major reports of the studies are:

The Maumee Bay Environmental Quality Study 1974-Final Report, Toledo Lucas Port Authority, September 1975.

The Maumee Bay Environmental Quality Study 1977-Final Report, Toledo Lucas County Port Authority, January 1979.

BOD, bacteria counts, nitrogen compounds (NO_3, NO_2, NH_3, TKN), and phosphorus compounds are "conventional pollutants," and are commonly used to test for sewage. Nitrogen and phosphorus parameters are also commonly measured to determine the effects of agricultural runoff on a stream. Most of the water quality collected in the Maumee basin consists of tests for these "conventional" pollutants.

The USGS station at Waterville provides a long history of water quality data for the Maumee as it comes into the Toledo area. TESD data provides a similar history for water quality in the Toledo area. The BWQR monitoring covered many of the same parameters, but also took at detailed look at the streams' biology, and sampled sediments.

TOLEDO ENVIRONMENTAL SERVICES DATA

Discussion of TESD Data

TESD sampling includes the "conventional" pollutants: solids, phosphorus, BOD_5, nitrogen compounds, bacteria counts, conductivity, chloride, and pH. The sampling program is geared toward detecting pollution from untreated sewage. The reason for this is to record the effects of CSOs, which have long been known as a major source of pollution in Toledo streams.

Swan Creek

Bacteria Counts

The average July bacteria counts were less than the year-round averages for Swan Creek. The creek reaches its worst around MP 2.6 (Hawley St). At this point the annual average total coliform was over 1.5 million, and the July average was around 500,000. Fecal coliform counts were also high (50,000 annual average and 34,000 July average). Bacteria counts decreased below MP 2.6.

Pollution Counts

Annual average DO ranged from 9.7 ppm at MP 10.6 (Eastgate Rd), down to 7 ppm at MP 0.6 (St. Clair St). July averages showed the lowest reading at MP 2.6, of 4.4 ppm. DO increased to 5.0 ppm at MP 0.6.

NH_3 showed a marked increased at MP 2.6 for July averages. Annual average NH_3 also showed a steady increase heading downstream.

Average phosphorus concentrations were in the range of 0.4 to 0.5 ppm, and did not seem to change much from station to station. For July averages, phosphorus peaked at 0.7 ppm at MP 2.6.

Year-to-Year Comparisons

Upstream at Eastgate Road, BOD_5 was nearly constant from 1981-4, and showed increases in 1985 and 1986. Downstream at Hawley St, it decreased in 1982 and 1983. At Eastgate, DO decreased each year from 1981-5, and showed a marked improvement in 1986, but at Hawley, the pattern was the same.

At Eastgate, NH_3 showed a constant increase from 1981-5, and dropped in 1986. At Hawley, there were small increases in 1982 and 1983, and a large one in 1984. NH_3 decreased in 1985 and 1986 overall. Phosphorus was fairly constant at both stations.

Bacteria counts showed big peaks at Eastgate in 1982 and 1983, and a smaller peak in 1985. At Hawley, there was a large peak in 1985, but counts were relatively constant the other years.

Tenmile Creek/Ottawa River

Bacteria Counts

Bacteria counts peaked at MPs 6 (Lagrange St) and 4.7 (Stickney Ave). July averages for total coliform at these points were close to 400,000. Annual average peaked at MP 6 with a count of around 150,000. Fecal coliform showed less of a sharp peak; July averages at four consecutive stations (MP 8.9, 7, 6, and 4.7) were over 30,000.

Pollution Counts

Annual average DO ranged from 9.1 ppm at MP 10.9 (UT Bridge), dropped to 7.2 at MP 6, and increased back to 9.2 at MP 1.6 (Summit St). The lowest DO readings were found at MP 7. Below MP 3.1 (Suder Ave), DO was over 8 ppm. BOD_5 averaged 3-4 ppm above MP 7 (Berdan Ave), where it increased sharply. All averages below MP 7 were over 5 ppm.

NH_3 ranged from 0.2 ppm at MP 14.1 (Sylvania Ave) to 1.9 ppm at MP 1.6. Phosphorus remained steady at 0.2 to 0.3 ppm at all stations. The patterns for July averages were similar.

Year-to-Year Comparisons

Upstream at Sylvania Ave, BOD_5 increased in 1982-3, dropped in 1984-5, and rose again in 1986. Downstream at Lagrange Street, there was a big peak in 1982, and steady decreases in 1983-6. At Sylvania, DO showed fluctuations from year to year, but appear to be slowly decreasing over the six-year period. Lagrange showed the same pattern in DO.

NH_3 showed a general increase at Sylvania, with a slight decrease in 1986. This pattern was repeated at Lagrange. Phosphorus remained constant at both stations.

Bacteria counts showed increases in 1982 and 1983, improvement the next two years, and a big peak in 1986 at Sylvania. At Lagrange, there was a big peak in 1982, then improved, but still had a high count the next year; more decreases in 1984-5, and a peak back to 1983 levels in 1986.

Maumee River

Note: Sampling at MP 1.2 (NE corner WWTP) was discontinued after 1983. No samples were taken at this site in July or August 1981-3. June, 1982 data is used in Figures 23 and 25.

Bacteria Counts

The Maumee River also showed a sharp peak in bacterial counts. The peak stations were MP 1.2 with an annual average count of 115,000 total coliform, and 10,000 fecal coliform.

Pollution Counts

For annual averages, BOD_5 and NH_3 both peaked at MP 1.2 (8.4 ppm and 3.0 ppm, respectively). One station upstream at MP 1.7 (Toledo Terminal bridge), both parameters were notably higher than further upstream. Below MP 1.2, both parameters dropped sharply.

DO reached its lowest level (6.6 ppm) at MP 1.7, and increased to 8.2 ppm at MP 1.2. Further downstream, average DO was over 7 ppm.

Year-to-Year Comparisons

Upstream at Waterville, BOD_5 appears to show a general increase without big peaks. In 1986 levels were lower than 1985, however. Near the mouth (Toledo Terminal bridge), BOD_5 shows a declining trend instead, with an especially large drop in '84. There was an increase in 1986. DO at Waterville appears to show a slight general increase, although with a peak average DO of 10 ppm in 1984. The trend appears reversed near the mouth, with drops in DO from 1982-1985, and improvement in 1986.

At Waterville, NH_3 was low in 1981-2, and showed a marked increase in 1983, which was maintained in 1984-6. Near the mouth, NH_3 showed a general decline, with a big drop in 1982. Concentrations were lower than upstream.

At Waterville, P was steady throughout the period. At the mouth, P remained fairly steady through the period, although with a peak in 1986.

Bacterial counts at Waterville showed large variations with no noticeable trend. Generally all three bacterial parameters (total coliform, fecal coliform, and fecal strep) follow the same pattern, with total coliform showing the highest numbers and greatest fluctuations. In 1986, however, total coliform and fecal strep decrease at Waterville, while fecal coliform showed a sharp increase. Near the mouth, there appears to be a very clear trend. Bacterial counts showed a sharp decrease in 1982, and continued dropping in 1983-5. In 1986 there was a slight increase again.

Tributaries

Bacteria Counts

The annual average fecal coliform counts for all sampling stations exceeded 1000, the average standard for warmwater habitat primary contact streams. Otter Creek, Delaware Creek, and Grassy had average fecal coliform counts under 2000 for July (the maximum standard), which the other stations exceeded that limit as well. Hill Ditch had an average July fecal coliform count of 15,000; Silver Creek had 37,000; Shantee Creek had 37,000; and Heilman Ditch had 21,000.

Pollution Counts

Otter Creek and Grassy Creek both showed high BOD_5 levels, and lower DO than the other creeks. Grassy Creek had an average BOD_5 of 14.5, and a July average of 17. DO averaged about 7 ppm, and 4.9 ppm in July. Grassy Creek BOD_5 averaged 7.4 ppm, and was 13.1 ppm in July. DO averaged 7.5 ppm, and was 5.8 ppm in July. The other creeks had 5 to 6 ppm BOD_5, without a significant July peak.

NH_3 was in the 0.7 to 0.8 ppm range for all creeks except Otter and Heilman, which averaged close to 5 ppm. None of the creeks showed a July peak; Otter Creek's July NH_3 level dropped to 2.1 ppm. All creeks had P concentrations in the 0.2 to 0.3 ppm range, except Otter (0.6 ppm) and Heilman (1.1 ppm). Heilman was the only creek to show a July peak for phosphorus, which was 1.7 ppm. By comparison, a major sewage treatment plant's effluent is required to contain less than 1.0 ppm P.

Trends from TESD Data

Table 21 compares the year-to-year increases and decreases in the average BOD_5, DO, NH_3, P, and fecal coliform values at the upstream and downstream stations.

TABLE 21
TESD DATA: WATER QUALITY TRENDS

	1982	1983	1984	1985	1986
SWAN CREEK					
Eastgate BOD_5	-	+	+	+	+
Hawley BOD_5	-	-	+	+	-
Eastgate DO	-	-	-	-	+
Hawley DO	-	-	-	-	+
Eastgate NH_3	+	+	+	+	-
Hawley NH_3	-	x	+	-	-
Eastgate P	+	+	-	-	+
Hawley P	+	-	+	+	x
Eastgate Fecal coliform	+	-	-	-	+
Hawley Fecal coliform	+	-	-	+	-
OTTAWA RIVER					
Sylvania Ave BOD_5	-	+	-	-	+
Lagrange BOD_5	+	-	-	-	-
Sylvania Ave DO	-	+	-	-	+
Lagrange DO	-	-	-	+	-
Sylvania Ave NH_3	+	+	+	+	-
Lagrange NH_3	+	-	+	+	-
Sylvania Ave P	-	-	+	-	x
Lagrange P	+	-	x	-	x
Sylvania Ave Fecal coliform	+	+	-	+	+
Lagrange Fecal coliform	+	-	-	-	+
MAUMEE RIVER					
Waterville BOD_5	+	+	-	+	-
TT* Bridge BOD_5	+	-	-	-	+
Waterville DO	+	-	+	-	-
TT Bridge DO	-	-	-	-	+
Waterville NH_3	+	+	x	+	x
TT Bridge NH_3	-	+	-	-	-
Waterville P	x	+	x	+	x
TT Bridge P	-	-	x	x	+
Waterville Fecal coliform	+	-	-	+	-
TT Bridge Fecal coliform	-	-	-	-	+

KEY:

\+ This parameter showed *improvement* from the previous year
\- This parameter showed *lower water quality* than the previous year
x This parameter showed *little or no change* from the previous year

* TT = Toledo Terminal rail bridge over the Maumee River

DISCUSSION OF LOWER MAUMEE BWQR DATA

The Maumee Basin BWQR gives substantially the same picture of water quality in area streams as the TESD data. In general, the three major streams (Maumee River, Ottawa River, and Swan Creek) have their best water quality upstream of the RAP Area, continually decline until just above the mouth of the stream,and then show some improvement. The point where each of these streams is most severely degraded, according to BWQR data, corresponds closely to the "worst point" shown by TESD data. This is not absolutely true for every parameter sampled, but overall, the generalization holds. For additional detail, refer to Figures 35-43, which graph the BWQR data for each of the three major streams; and Appendix A, which gives the BWQR data.

BWQR Sediment Samples

There are no specific standards for pollutant concentrations in stream sediments. US EPA, Ohio EPA and the Ontario MOE offer guidelines for metals, nutrients, and PCBs, but none for the volatile organics found in the BWQR samples of November, 1986.

Table 22 displays the results of Ohio EPA's analyses of the 1986 sediment sampling at eleven locations for seven heavy metals, when applying the US EPA Sediment Quality Guidelines. Only cadmium is classed as "non-polluting" at all locations. None of these metals are considered a pollution factor upstream at the Grand Rapids Dam. As shown, the other three locations on the Maumee River are classed "heavily polluted" for arsenic, with the Cherry Street Bridge location classed as "heavily polluted" for both lead and copper, with the Toledo WWTP location classed as "heavily polluted" for zinc. Chromium, copper, lead, nickel and zinc are classed as "moderately polluted" at the remainder locations.

For Swan Creek at the Collingwood Blvd. location, lead, zinc and arsenic are classed as "heavily polluted", chromium and nickel as "moderately polluted", and copper as "non-polluting".

For the Ottawa River, classed as "heavily polluted" are copper, lead, nickel and zinc for the Lagrange Street location, with the Stickney Avenue location similarly classed for copper and lead. Chromium is classed an "non-polluting" for the Stickney Avenue location, with the remaining metals for these two locations on the Ottawa River being classed as "moderately polluted".

For Otter Creek, the Wheeling Street location is classed as "heavily polluted" for chromium, lead and arsenic, with the Oakdale Avenue location similarly classed for arsenic, and Millard Avenue for copper. Copper is classed as "non-polluting" for the Oakdale Avenue location, with the remaining metals for these three locations on Otter Creek being classed as "moderately polluted".

Duck Creek at York Street is classed as "heavily polluted" for arsenic, with zinc and lead as "moderately polluted", and the remaining three metals as "non-polluting".

TABLE 22
RATING OF HEAVY METALS IN SEDIMENT BY STREAM LOCATION
(by US EPA Classification)

STREAM	LOCATION	RM	Cd	Cr	Cu	Pb	Ni	Zn	As
Maumee	Grand Rapids Dam	32.6	NP	NP	NP	NP	NP	NP	--
Maumee	Eagle Point	9.4	NP	MP	MP	MP	MP	MP	HP
Maumee	Cherry Street	4.9	NP	MP	HP	HP	MP	MP	HP
Maumee	Toledo WWTP	1.0	NP	MP	MP	MP	MP	HP	HP
Swan Creek	Collingwood Blvd.	1.2	NP	MP	NP	HP	MP	HP	HP
Ottawa River	Lagrange Street	6.4	NP	MP	HP	HP	HP	HP	MP
Ottawa River	Stickney Avenue	4.9	NP	NP	HP	HP	MP	MP	MP
Otter Creek	Oakdale Avenue	5.9	NP	MP	NP	MP	MP	MP	HP
Otter Creek	Wheeling Street	4.0	NP	HP	MP	HP	MP	MP	HP
Otter Creek	Millard Avenue	2.1	NP	MP	HP	MP	MP	MP	MP
Duck Creek	York Street	2.1	NP	NP	NP	MP	NP	MP	HP

Key

HP	Heavily Polluted
MP	Moderately Polluted
NP	Non-polluted

Source: Table C-5, Biological and Water Quality Report, Ohio EPA

BWQR Fish Indices

As a part of the Biological and Water Quality Report conducted by Ohio EPA in the summer of 1986, investigators based on electrofishing collections, compared fish species documented in the Maumee River study area as reported in Trautman (1981).[29] Trautman reported 87 different species in 1981, with Ohio EPA reporting 50, finding four new species, with 41 missing species. The four new species were: smallmouth buffalo, ghost shiner, mosquitofish, and white perch.

The investigative team reported for Swan Creek 39 species compared to Trautman's 75, with three new species, totaling 36 missing species. For the Ottawa River, Trautman had reported 79 species in 1981, with the investigative team reporting 44 species, five new species, totaling 38 missing species. For Duck and Otter Creeks, Trautman reported 62 species, with the investigative team reporting 25, one new species, totaling 38 missing species.

This investigative team reported the percentage of fish with external anomalies for Swan Creek. The investigation began at Eastgate Road (RM 10.2) where faunal conditions were the best, going downstream to St. Clair Street (RM 0.5). Eastgate Road is upstream from all listed permitted dischargers with results being 9.3% light blackspot, 0.6% light anchor worm, and 0.9% lesions. The Detroit Avenue station (RM 4.9), the point of the upstream lake effect on Swan Creek, results were: 3.1% light blackspot, 1.5% heavy blackspot, and 3.1% deformities. Above the Roller Dam (RM 4.4) results were: 7% light blackspot, 0.6% deformities, 1.4% eroded fins, and 0.8% lesions. At Champion Street (RM 3.9), where the combined sewers begin, results were: 0.7% light blackspot, 0.7% heavy blackspot, 1.7% light anchor worm, 0.7% deformities, 1.7% eroded fins, 2.9% lesions, and 0.7% other. At

Hawley Street (RM 2.6), still in the combined sewer area, the results were: 1.5% light anchor worm, 1.5% eroded fins and 1.5% lesions.

The investigative team reported that fish community conditions were poor in all of these areas of Swan Creek with RMs 2.6 and 1.2 being very poor. Collingwood Blvd. (RM 1.2) the results were: 6.2% lesions and 1.8% external parasites. At St. Clair Street (RM 0.5), near the mouth where the Maumee River dilutes Swan Creek, the results were: 0.4% light anchor worm, 1.2% lesions, and 0.8% other.

The mean fish community indices based on electrofishing samples for both Duck Creek and Otter Creek as conducted by the investigative team indicated Class V or very poor, except for the near the mouth of Duck Creek which was poor, or Class IV.

The investigative team in its fish report for the Maumee River started upstream at RM 45.7 (downstream of Napoleon WWTP and Campbell Soup Co.), where fish community values were high (IWB=9.0, IWB2=8.7), though the team states that the community composition and quality were not that exceptional. At RMs 38.5 and 33, upstream of the Grand Rapids dam (RM 32.2), community values displayed a significant drop (IWB=6.9 and 6.7, IWB2=6.5 and 6.5 respectively).

The next four sites were located amongst the rapids, RMs 31.5, 26.7, 19.8 and 17.2, the community values were amongst the highest these (IWB=9.2, 8.8, 9.0 and 8.6, IWB2=9.0, 8.6 and 8.1 respectively). At RM 13.7, below the Perrysburg WWTP (RM 14.5) and at the point of the beginning of the lake effect, the community values dropped nearly a full point (IWB=7.5, IWB2=7.1). It is reported that the community values remained near this level at RMs 9.4, 7.4, 7.3 and 4.7. However, species composition did change at RM 4.7 downstream of Swan Creek. The IWB ranged from 7.8 to 7.1 while IWB2 ranged from 7.5 to 6.4.

The next five downstream stations (RMs 3.6, 3.3, 1.5 and 0.6), an area where strong seiche activities move pollution plumes both up and downstream, the IWB ranged from 7.2 and 6.4 and IWB2's ranged from 6.5 and 5.5, approximately a full point below those sites just upstream. It was thought that the upstream movement of the Toledo WWTP plume and the numerous combined sewer overflow discharges are the cause of the low community values.

The report states that the Toledo WWTP also effects the Maumee Bay wherein the Maumee Bay area (0.1 Toledo Edison intake channel and 0.0 southeast of Grassy Island disposal area) displayed the lowest community values, while site 0.4 in the Bay, farthest from the WWTP showed the best community values in the bay area.

Fish Tissue Sampling

Biological monitoring is a valuable tool for determining water quality because it provides a direct measure of the effects of pollutants on aquatic life. Fish tissue sampling answers the question of what pollutants, and how much, are being taken into the food chain. Fish which contain unacceptable levels of PCBs, heavy metals, or other toxics, cannot be used for human consumption. Even if people do not eat the contaminated fish, however, the toxics will stay in the food chain, and may ultimately find their way to the dinner table. Table 23 gives details of fish tissue sampling done in the Lower Maumee from 1976 to date.[30]

TABLE 23
PCB CONTENT OF FISH TISSUE, LOWER MAUMEE RIVER

YEAR	SAMPLE NUMBER	SPECIES	SAMPLE TYPE	RM	LOCATION	TOTAL PCBs (ppm)
1985	85	Rock bass	W.B.C.	20.6	Waterville	0.5
1985	87	Carp	W.B.C.	20.6	Waterville	1.0
1985	89	Carp	W.B.C.	20.6	Waterville	0.2
1978	--	Carp	W.B.C.	20.6	Waterville	0.3
1986	61	Green sunfish	W.B.C.	4.7	Maumee ?	3.9
1986	56	Yellow perch	W.B.C.	0.7	Cullen Park	4.0
1986	57	Carp	W.B.C.	0.7	Cullen Park	6.8
1985	83	Carp	W.B.C.	0.7	Cullen Park	3.0
1985	84	Bluegill	W.B.C.	0.7	Cullen Park	1.0
1978	--	Carp	W.B.C.	0.7	Cullen Park	4.8
1986	58	White perch	W.B.C.	0.0	Maumee Mouth	7.0
1986	59	Channel catfish	F.	0.0	Maumee Mouth	3.8
1986	60	Carp	W.B.C.	0.0	Maumee Mouth	5.5
1982	--	Carp	W.B.C.	0.0	Maumee Mouth	11.5
1979	--	Spottail shiner	W.B.C.	0.0	Maumee Mouth	3.3
1979(b)	--	Spottail shiner	W.B.C.	0.0	Maumee Mouth	2.9
1979	--	Northern pike	W.B.	0.0	Maumee Mouth	4.9
1979(b)	--	Northern pike	W.B.	0.0	Maumee Mouth	4.9
1979	--	Carp	W.B.C.	0.0	Maumee Mouth	5.9
1979	--	Yellow perch	W.B.C.	0.0	Maumee Mouth	2.1
1976	--	Carp/Catfish	W.B.C.	0.0?	Maumee Mouth?	5.4
			<u>SWAN CREEK</u>			
1986	62	Carp	W.B.C.	0.5	Swan Creek	5.9
			<u>TENMILE CREEK</u>			
1986	73	Carp	W.B.C.	4.1	Tenmile Creek	6.8
			<u>OTTAWA RIVER</u>			
1986	74	Largemouth Bass	W.B.C.	1.6	Ottawa River	12.0
1986	76	Carp	W.B.C.	1.6	Ottawa River	25.4
1986	75	Carp	W.B.C.	Dst	Stickney Ave	15.1

a. Data rounded to the nearest tenth; W.B.C. = whole body composite sample; F = fillet sample; RM = river mile.
b. Sample analyzed twice.

US ARMY CORPS OF ENGINEERS SEDIMENT DATA

Ohio EPA has established guidelines for sediment quality for seven metals, but there are no guidelines for COD, Volatile Solids, TKN, NO_3, Oil & Grease, CN, Ni, Mn, Ba, Hg, or PCBs in sediments. US EPA has one set of guidelines for these parameters,[31] the Ontario Ministry of the Environment (MOE) has another set,[32] and the IJC has yet another.[33] Wisconsin also has a set of guidelines. There are significant differences between these sets of guidelines. Whether or not sediments are "polluted," or how polluted they are can depend on which set of guidelines is being used.

The US EPA and Ontario MOE guidelines for sediment quality parameters[31] not covered by Ohio EPA guidelines are presented in Table 24.

TABLE 24
US EPA AND ONTARIO MOE
GUIDELINES FOR SEDIMENT QUALITY
FOR GREAT LAKES HARBORS

	US EPA CLASSIFICATION			MOE LIMIT
	Non-Polluted	Moderately Polluted	Heavily Polluted	
Volatile Solids (%)	< 5	5 - 8	> 8	6
COD	< 40,000	40,000-80,000	> 80,000	50,000
TKN	< 1000	1000-2000	> 2000	2000
Oil & Grease (Hexane Solubles)	< 1000	1000-2000	> 2000	1500
NH_3	< 75	75 - 200	> 200	100
CN	< 0.1	0.1 - 0.25	> 0.25	0.1
P	< 420	420 - 650	> 650	---
Ni	< 20	20 - 50	> 50	25
Mn	< 300	300 - 500	> 500	---
Ba	< 20	20 - 60	> 60	---
Hg			≥ 1	0.3
Total PCB			≥ 10	0.05

All units are mg/kg dry weight unless otherwise indicated.

US Army Corps of Engineers shipping channel sediment data collected in 1983 show a serious heavy metal contamination problem. The metals of particular concern are Cd, Cr, Pb, Cu, Mn and Ni. In nearly all cases, the concentrations of these parameters are highest at and slightly above the mouth of the Maumee, between RM-2 and LM-1. Most parameters show some improvement past the mouth, in the Bay (LM-2 and beyond).

Table 27 displays the concentration levels of metals as found in the 1983 shipping channel sediments when applying the Ohio EPA sediment guidelines and the concentration levels of the remainder parameters for these same sediments when applying the US EPA sediment guidelines.

TABLE 25
CONCENTRATION LEVELS OF METALS AND CHEMICALS
IN 1983 SHIPPING CHANNEL SEDIMENTS

Arsenic (As)	Non-elevated to Elevated
Cadmium (Cd)	Highly to Extreme Elevated
Chromium (Cr)	Extreme Elevated
Copper (Cu)	Highly to Extreme Elevated
Iron (Fe)	Non-elevated to Slightly Elevated
Lead (Pb)	Non-elevated to Elevated
Zinc (Zn)	Elevated to Highly Elevated
Cyanide (CN)	Heavily Polluted
Chemical Oxygen Demand (COD)	Polluted to Heavily Polluted
Mercury (Hg)	Non-Polluted
Manganese (Mn)	Polluted to Heavily Polluted
Nickel (Ni)	Polluted to Heavily Polluted
Nitrate (NO_3)	Polluted to Heavily Polluted
Phosphorus (P)	Heavily Polluted
Total Kjeldahl Nitrogen (TKN)	Polluted to Heavily Polluted
Volatile Solids (VS)	Moderately Polluted

SUMMARY OF TOXIC POLLUTANTS

This section is concerned with those chemicals which are known to biomagnify, bioaccumulate, or are suspected of causing cancer as well as those which are acutely toxic to aquatic organisms. Categories of toxic pollutants of concern, in the AOC, include polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), phthalates, and metals. Other categories of toxics which have not been studied in the Toledo Area include the dioxins and furans. Studies of Toledo Harbor sediments have not shown sediment bound pesticides at levels high enough to arouse concern, at least in the data available for review.

The Great Lakes International Surveillance Plan, 1986, states that, "The chemical contaminants issue, especially persistent toxic substances, is the major focus of the 1978 Great Lakes Water Quality Agreement and the monitoring and surveillance plans. The effects of toxic substances on the health of the Great Lakes ecosystem, including man, are not well understood. However, some obvious problems including closed fisheries, fish morphological abnormalities, fish kills, and impairment of reproduction and deformities in aquatic birds have been well documented. Present levels of certain substances are adversely affecting growth and reproduction in some Great Lakes biota, and contaminant levels in many top predator fish still exceed the guidelines for human consumption set by public health agencies in Canada and the United States." [1] To understand where and how these substances interact, both biotic and abiotic components of the system must be scrutinized. It is important to know the quantities and distribution of chemical contaminants and to identify the sources and fates of contaminants.

The 1986 Plan goes on to say that, "The Lake Erie Basin is the most seriously impacted of all the Great Lakes, having a total of eight Areas of Concern (including both Connecting Channels)." There is a lack of thorough quantitative pollution data bases for any of these areas (except Raisin River). "It has been documented that the most conspicuous problem found in the Areas of Concern centers around sediment contamination." [1] The current knowledge and understanding of geochemical and biological processes, and their contaminated sediment problems, are limited.

Further, the 1986 Plan states that, "The Maumee River contributes over 50% of the total non-point tributary loading to Lake Erie (excluding the Detroit River). It is the most important source of agricultural nutrients and suspended sediment to the lake and particularly to the Western Basin. Records of metal and organic contaminants, as well as nutrients preserved in the sediments, measure the change in status of the lake since before the beginning of man's influence. However, due to the widespread occurrence and activity of benthic organisms in recent lake sediments and generally low sedimentation rates, annual contributions of material are mixed with older sediments so that on the average two decades of input are smeared together (Robbins, 1983). As a result of this mixing, changes in the state of the Great Lakes can be detected in the sedimentary records only on multi-decade time scales. However, in certain areas of Lake Erie sedimentation rates are so high that the time resolution may be as low as 3 to 5 years. This means that the changes in the status of Lake Erie may be more closely monitored using these areas having high sedimentation rates." [1]

Nriagu and Simmons in their 1984 study found that the Total Suspended Matter (TSM) in Lake Erie (4-8 mg/l) is greater than any of the other Great Lakes. In the upper lakes 90% of the PAH is in the dissolved phase, but in nearshore areas of Western Lake Erie a substantial fraction of the PAH is associated with particles. Resuspension of sediments from the western basin of Lake Erie is extensive but release rates of sediment contaminants are unknown. [34]

Lake Erie inputs are less than the other Great Lakes except Ontario. The atmosphere is the largest source of PAH to the Great Lakes. Atmospheric inputs of benzo(a)pyrene (BaP) to Toledo area waters had been declining steadily until 1979, the last year for which there was available data. [34]
Table 26 displays Nriagu and Simmons findings for 1982 PAH levels in Lake Erie.

TABLE 26
1982 PAH LEVELS IN LAKE ERIE

	Sediment ng/g(ppb)	Atmospheric input (metric tons per year)
phenanthrene	345±92	1.5
anthracene	?	1.5
fluoranthene	569±442	?
pyrene	391±91	2.6
BaP	255±52	2.5
Ba Anthracene	?	1.5
Perylene	?	1.5

Source: Nriagu and Simmons, 1984, p. 200-201

Frank, et al, 1977, found that in Lake Erie, the Western Basin sediments had the highest concentration of PCB (660 ng/g [ppb]). This amount is twice the level of PCB in sediments of the Central Basin and Eastern Basin of Lake Erie.[35] Nriagu and Simmons found that PCB concentrations are highest in areas of recent sedimentation and lowest in areas of scour where faster water currents prevent sediment accumulation. For Lake Erie waters an average PCB concentration of 27 ng/l has been reported. From 1968 - 1976 the average PCB concentration in Lake Erie fish was 0.88 μg/g (ppm) with a range from 0.1 to 9.3 μg/g. [34]

The 1986 Plan states that, "Heavy metal contamination problems associated with Lake Erie have been recognized for many years. For example, mercury concentration of Lakes Erie and St. Clair from 1950 - 1970 led to a ban of commercial fishing in both systems during the early 1970's. Nriagu, *et al.*, 1979 estimated loading of Cu, Pb and Zn into Lake Erie from various sources and found over 1 x 10^6 kg/yr of Cu and Pb and over 3 x 10^6 kg/yr of Zn to be retained in the lake annually. A significant portion of the load was attributed to sources originating from the Detroit River Connecting Channel System. In addition, metal contamination problems have been identified at numerous smaller tributaries entering Lake Erie's southern shore. Metal and organic contamination has led to the classification of six tributaries as Areas of Concern. As a result, the dispersion of metals into the open lake remains a concern and needs to be addressed." [1]

Lead concentrations in sediment tend to be highest in depositional zones and least in shallow nearshore zones. One exception is the "plume" of high sediment lead concentration emanating from Toledo. Levels of lead in Lake Erie waters range from 0.46 to 3.5 μg/l. Concentrations in sediments average 154$\pm$43 mg/kg. [34]

Carbon uptake in plants is a measure of growth or photosynthesis. Munawar and Thomas, 1984, found that standard elutriates of Toledo Harbor sediments caused significant inhibition of C^{14} uptake by ultraplankton (5-20 μm) in algal fractionation bioassays (AFB). Such phytoplankton are abundant, have very short generation times, and are fragile and sensitive to environmental perturbations. They are also primary producers - the food source upon which the rest of the aquatic food web is ultimately dependent.[36]

All Toledo standard elutriates caused significant inhibition of the ultra-plankton C^{14} uptake compared to the control (a reduction of 29% to 35% at a 20% elutriate concentration. (A standard elutriate was prepared by mixing one part sediment (v) with 4 parts (v) of filtered (.45 μm) lake water. This was then agitated 30 minutes by air, settled for one hour, and filtered (.45 μm). The liquid filtrate was then used in the AFB tests.) [36]

Mac and Willford, 1986, found that Toledo Harbor sediments (see Table 27) contained 0.210 μg/g (ppm) PCBs, most of which resembled Aroclor 1248. In a bioassay, there was no death of fathead minnows exposed to Toledo Harbor sediments and in a similar test of earthworms 36% died, although these were all in one tank in which an increase in temperature and a decrease in oxygen concentration occurred.

TABLE 27
PHYSICAL AND CHEMICAL CHARACTERISTICS OF TEST SEDIMENTS

	Physical Composition (% dry wt)				Contaminants (μg/g dry wt)		
Sediment	Sand	Silt	Clay	Volatile Solids	Oil & Grease	PCBs	Hg
Toledo Harbor	23.8	35.5	40.7	13.1	3700	0.210	0.314

Source: Mac and Willford, 1986, p.86

"Preliminary review of PCBs in fathead minnows exposed to the Toledo Harbor sediments, Mac and Willford (Table 2) suggested a slight increase in residues during the exposure. However, the apparent increase was not statistically significant. Interpretation of the results was confounded by the finding of relatively high background levels of PCBs (pre-exposure = 4.46 μg/g) in the fathead minnows used for testing. The presence of elevated background concentrations of PCBs in the fish most likely interfered with accumulation of PCBs as compared to that noted in earthworms."[37]

"Residues of Hg in fathead minnows showed no significant change after exposure to Toledo Harbor sediments. These results thus confirmed those results obtained with earthworms indicating no significant accumulation of Hg from Toledo Harbor sediments."[37]

"The bioaccumulation test is but one of several procedures available for evaluating sediments and, in dredging operations, for helping in evaluation of disposal options. The test appears to be most valuable in determining the bioavailability of contaminants present in sediments that are not considered highly contaminated or acutely toxic to aquatic organisms. When a particular sediment greatly exceeds bulk criteria for accumulable contaminants or is acutely toxic to organisms, there is little need or value in performing a bioaccumulation test." [37]

"Toledo Harbor sediments represent the type of materials for which bioaccumulation tests appear useful. Although the sediments contained relatively low levels of PCBs (0.21 μg/g), the earthworms accumulated 2.56 μg/g during a 10-day exposure. Even though we were unable to confirm significant accumulation of PCBs in the fathead minnows, we nevertheless believe that the test was successful in demonstrating the potential for bioaccumulation of PCBs by earthworms. The information thus should be helpful for use in selecting appropriate disposal options for dredged sediments that will protect against significant accumulation of contaminants in the tissues of organisms." [37]

McFarland and Peddicord, 1986, studied the potential for bioaccumulation from Toledo Harbor sediments. The four organisms tested were fathead minnows, golden shiner, Japanese Medaka, and Asiatic clams. When challenged with Toledo Harbor sediments, no priority pollutants other than phthalates were detected in tissues of these organisms, and these may have been from laboratory contamination. Also, fewer than 6% mortalities occurred during bioassays on the four test species. Table 28 displays the results of their analyses of Toledo Harbor sediments related to levels of organic priority pollutants.[38]

McFarland and Peddicord, 1986 concluded that polynuclear aromatic hydrocarbons (PAH) were the compounds most likely to be bioaccumulated from Toledo Harbor sediments. Based on fluoranthene (a PAH) concentration in sediments (1.5 ppm) they calculated a thermodynamically-defined bioaccumulation potential for fluoranthene of 80.6 ppm in animal lipids. This translated to the following body burden for test animals:

Corbicula (2.4% lipid)	Medaka (9.8% lipid)	Fathead (.5% lipid)	Shiner (1.5% lipid)
1.94 ppm	7.90	4.03	1.21

No PAH were found in actual tissue. This can be explained by the fact that, unlike chlorinated hydrocarbons with similar octanol/water partition coefficients, PAHs are quickly broken down by the organisms mixed function oxidase system. Tissue residues of PAH are inversely correlated with the mixed function oxidase activity of an organism.[38]

Chapman, et al, 1986, conducted bioassays with Toledo Harbor sediment on several organisms. "Prater-Anderson test series indicated little or no acute mortality of either *Daphnia* or *Hexagenia* exposed to the Toledo sediment system; although *Hexagenia* suffered 20% mortality in Toledo sediments; although *Hexagenia* suffered 20% mortality in Toledo sediments, control mortality was 13% indicating a possible problem with organism vitality."[39]

In beaker tests *Daphnia* mortality was 14 and 0% in freshly-prepared test systems with sediments from Toledo and Porter Lake control, respectively. However, after sitting for one week, the systems produced essentially no *Daphnia* mortality during the second bioassay. "One can speculate that aged samples and elutriates tend to be closer to equilibrium than unequilibrated unmixed sediment-water systems. This could be the common thread linking the results of these toxicity tests; equilibrated systems lacked the toxicity of newly-interfaced sediment and water. Would this phenomenon have occurred if we had used Toronto to Toledo Harbor water? Would these harbor waters have been toxic in their own chemistry?"[39] Table 28 displays the levels of organic priority pollutants found in the analyses of Toledo Harbor sediments by McGarland and Peddicord and Peddicord and Chapman, *et al.*

TABLE 28
ORGANIC PRIORITY POLLUTANTS IN TOLEDO HARBOR SEDIMENTS
(in parts per million)

	McFarland and Peddicord, 1986	Chapman, et al, 1986
Methylene chloride	0.036	
Dichlorobiphenyls (PCB)	0.120	
Trichlorobiphenyls (PCB)	0.220	
Tetrachlorobiphenyls (PCB)	0.680	
Pentachlorobiphenyls (PCB)	0.100	
Hexachlorobiphenyls (PCB)	0.180	
Total PCB	1.300	
BIS (2 ethylhexyl) phthalate	8.800	8.500-10.600
Acenaphthene (PAH)		0.100
Acenaphthylene (PAH)		0.062-0.065
Fluorene (PAH)		0.089.0.160
Naphthalene (PAH)		0.140-0.610
Anthracene (PAH)	0.98	0.077
Fluoranthene (PAH)	1.500	0.210-0.600
Phenanthrene (PAH)	0.980	0.480-0.610
Benzo(a)anthracene		0.670-0.730
Benzo(k)Fluoranthene (PAH)		1.100-5.909
Chrysene (PAH)		1.000-5.909
Pyrene (PAH)	2.000	0.580-0.870
Benzo(ghi)perylene (PAH)		0.600
Benzo(a)pyrene (PAH)		0.600-0.770

To determine whether the concentration levels for PAHs in the Toledo Harbor sediments should be of concern, TMACOG forwarded the 1983 Corps of Engineer's data results (see Table 29) to Dr. Paul Baumann, U.S. Fish & Wildlife. These data included the Corps station number by lake and river mile along with the concentrations for the following chemicals: Phenanthrene, Fluoranthene, Pyrene, B(a)A, Chrysene B(k)F and B(a)P. Baumann stated in written communication that "PAH concentrations at these sites are at the lower end of the range of values for sites with cancer epizootics. However, I would consider these concentrations to pose a possible problem and to be of concern."[40]

Further, Baumann stated, "Since PAHs are not very soluble in water and stay in sediment close to the point source (concentrations after decline as a log function from the point source), and especially since RM 1 values are often higher than RM 2 or RM 3 values but lower than RM 4 values, it appears as if you have at least two separate point sources, one near RM 1 and one near RM 4. With additional sampling and some checking of what industries have outfalls in these areas (any coke plants associated with steel companies?), you should be able to track down the sources."[40]

Table 29 lists only those chemicals that *were* detected in Toledo Harbor sediments. It also gives the river or lake monitoring station at which the chemical was detected, the concentration found, and detection limits for the testing procedures used.

TABLE 29
TOLEDO HARBOR CHEMICAL SEDIMENT ANALYSES
US ARMY CORPS OF ENGINEERS DATA

CHEMICAL	DETECTION LIMIT	CORPS STATION	CONCENTRATION mg/kg (dry wt. basis)
Bis(2ethylhexyl)Phthalate	0.20	LM3	0.24
		LM2	0.23
		LM1	0.42
		MOUTH	1.69
		RM1	0.22
		RM2	1.20
		RM3	0.49
		RM4	1.50
		RM5	0.94
		RM6	0.48
Phenanthrene (PAH)	0.10	RM1	0.15
		RM2	0.17
		RM3	0.10
		RM4	1.45
		RM5	0.35
Anthracene (PAH)	0.10	RM4	0.10
Fluoranthene (PAH)	0.10	RM1	2.70
		RM2	0.25
		RM4	3.03
		RM5	0.79
		RM6	0.26
Pyrene (PAH)	0.10	RM1	1.24
		RM4	2.24
		RM5	0.62
		RM6	0.20
Benzo(a)Anthracene (PAH)	0.10	RM4	1.01
Chrysene (PAH)	0.20	RM4	1.43
Benzo(k)Fluoranthene (PAH)	0.20	RM4	0.77
Benzo(a)Phrene (PAH)	0.20	RM1	0.74
		RM4	0.62

Table 30 displays a comparison of the analytic results of these four studies of the Toledo Harbor sediments with the Great Lakes International Surveillance Plan, 1986, analysis of heavy metals on Western Basin sediments. Cyanide and PCB levels, where available, are also included in the table.

TABLE 30
COMPARISON OF TOLEDO HARBOR AND WESTERN BASIN SEDIMENTS
(in parts per million)

	Western Basin Background Levels GLWQB	Toledo Harbor Munawar & Thomas	Toledo Harbor Chapman, et al	Toledo Harbor McFarland & Peddicord	Toledo Harbor Mac & Willford
Hg	0.1	0.130-0.625	-	0.63	0.314
Pb	28.0	49.0-88.0	62.0	65.0	-
Zn	70.0	166.0-285.0	23.0	220.0	-
Cu	30.0	34.0-55.0	47.0	50.0	-
Cd	2.0	-	4.0	2.8	-
Mn	600.0	-	-	-	-
As	N/A	11.0-17.0	-	-	-
Cr	N/A	117.0-177.0	100.0	57.0	-
Ni	N/A	30.0-36.0	83.0	48.0	-
Cyanide	N/A	-	-	2.7	-
PCB	N/A	0.279-0.678	-	-	0.210

One of the problems with the existing sediment data in Toledo Harbor is that most of it comes from areas of the harbor that are periodically dredged by the Corps of Engineers. We perceive a need to sample the harbor and tributaries in a uniform manner covering areas previously unsampled for priority pollutants. Sampling should be thorough enough to allow the plotting isopleths. Tributaries to Toledo Harbor which are likely sources of priority pollutants such as the Maumee River, Ottawa River, and Otter Creek should also be sampled.

Unfortunately, nationwide sediment quality criteria currently do not exist. It is our understanding that EPA at the national level is developing national sediment quality criteria, but a final document is 1-3 years away. However, some preliminary attempts at criteria development have been completed. The EPA has developed guidelines for the pollution classification of Great Lakes harbor sediments for evaluation of dredged material disposal. As part of EPA's evaluation process for the development of sediment criteria, a paper entitled "A Discussion of PCB Target Levels in Aquatic Sediments" has been prepared by Mr. Jay Field of the Ocean Assessments Division, National Oceanic and Atmospheric Administration. The conclusion in this paper is that although toxic effects may occur at lower levels, a sediment concentration of 0.1 ppm PCBs appears to be a reasonable preliminary target level for use in assessing environmental hazards from PCB contamination and the need for remedial action. This compares to an average value of 0.21 to 1.3 ppm for the area of Maumee Bay dredged for navigation. Although national sediment quality criteria have not been completed, it appears that the sediments of the AOC are of concern and may be above future criteria levels.

Summary of Toxic Pollutants

1. Toxic substances have caused injuries to Lake Erie. There is at the present time a health advisory against eating carp or channel catfish from Lake Erie due to high PCB levels (over 2 ppm) in their flesh.

2. Sediment contamination is the most conspicuous problem in all the AOCs. There is a lack of thorough quantitative pollution data for the Toledo AOC.

3. A larger portion of Lake Erie PAHs are associated with particles than any of the other Great Lakes. Sediments in the Western Basin of Lake Erie have twice the PCB levels of the Central Basin and Eastern Basin. Contaminant release rates from resuspended sediments are unknown.

4. Some of Lake Erie's metal pollution originates on Lake Erie's southern shore. A "plume" of high sediment lead levels emanates from Toledo.

5. Chapman, 1986, speculated that equilibrated sediment/water systems are less toxic than newly interfaced sediment and water. This has direct bearing on the effects of dredging and other disturbances of bottom sediments. Further study could be required.

6. Laboratory studies by Munawar and Thomas, 1986, indicate that Toledo sediment elutriate caused up to 35% reduction in algae growth when diluted to 20% of its original strength.

7. Mac and Willford, 1986, demonstrated that earthworms accumulated PCBs from Toledo Harbor sediments. The AOCs contribution to Lake Erie's PCB pollution problem requires further study and quantification.

8. Most of the data here reviewed comes from the navigation channel and may not adequately reflect pollutants in other parts of the AOC.

RAP AREA WATER QUALITY: OVERVIEW & CONCLUSIONS

The *Maumee Basin BWQR* provides a clear summary of how good or bad the water quality is at many points along each major stream. Each segment is rated for its water quality, and the sampling points range from "very poor" to "excellent."

The BWQR graphs give a clear picture of water quality along Swan Creek, the Ottawa River, and the Maumee. In all three cases, water is cleanest far upstream. The Maumee River upstream water quality (the Napoleon area around river mile 50) was excellent, Tenmile Creek upstream water quality was fair to marginally good and Swan Creek was rated as fair. The streams get progressively worse as they approach and enter Toledo. All three show some recovery near their mouths, which may be due to the occasional inflow of relatively clean water from Lake Erie.

The data provided by other sampling programs supports the BWQR's conclusions. The TESD data provides substantially the same picture of water quality, and the US Army Corps of Engineers' sediment data points to the same problem areas along the major streams.

One of the things the BWQR data misses is the seasonally high concentration of NO_3 in the Maumee which occurs in the spring and fall. However, the BWQR was not designed to measure seasonality. NO_3 in the Maumee at these times of year often makes the water unacceptable as a public water supply source.

The USGS/Heidelberg University data collected at the Waterville station on the Maumee provides a record of water quality as it enters the RAP Area. It includes a substantial body of information on water quality parameters associated with agricultural runoff, which are not monitored anywhere else in the RAP Area.

The majority of other studies are focused on documenting specific known water quality problems. The Facilities Plans, for example, provide information on CSO problems, malfunctioning package plants, and failed septic systems. They are especially useful in determining severe effects of untreated sewage on small streams. In terms of the greater Lake Erie Basin, these problems are not significant, but pose a serious health threat, and are disastrous to the water quality of local streams.

In addition, the Invertebrate Community Indices, fish tissue data, and sediment analyses show violations of the "swimmable-fishable" goals of the Clean Water Act for the tributaries to the Maumee Bay. Further, there is the inability to meet the specific objectives of the Great Lakes Water Quality Agreement for these lower stream reaches due to toxic pollutants.

Aquatic life use attainment for the Maumee River becomes non-attainment at RM 9.4 and persists all the way into Maumee Bay. The fish species investigation in 1986 for both the Maumee River and Swan Creek show a 50% decline since 1981. The fish community composite and quality values drop 2 points on the Maumee River from upstream at the Grand Rapids dam to the Swan Creek confluence. From there these values drop another point to the mouth.

PAHs and phthalates have been found at detectable levels in the Maumee River shipping channel sediments, wherein the PAH concentrations could pose a possible problem and must be of concern. Studies of the Toledo Harbor sediments have not shown sediment bound pesticides at levels high enough to arouse concern. Dioxins and furans have not been studied.

Impacting water quality on the Ottawa River are the wall-to-wall dumps which leak conventional and organic priority pollutants. The degradation of Otter Creek is directly related to arsenic leaking from settling ponds, with oil soaked banks, and nickel and cyanide being detected in its waters.

In terms of the greater Lake Erie Basin, phosphorus is considered the critical nutrient contributing to eutrophication. Ohio EPA's Phosphorus Reduction Strategy for the Lake Erie Basin states that a total loading reduction of 1365 tons P/year needs to be achieved[33]. This is for the entire Lake Erie Basin in Ohio, in which, the Maumee Basin is one of the major sources. Total phosphorus loadings to the basin from various sources in the RAP Area are estimated and displayed in Table 31.

TABLE 31
TOTAL PHOSPHORUS LOADINGS FROM RAP AREA SOURCES

PHOSPHORUS SOURCE	ESTIMATED LOADING Tons P/year
Agricultural Runoff	1197
POTWs	189
Urban Runoff	21
Package Plants	9
CSOs	Insufficient data
Industrial Wastewater	Refer to Appendix I
Home Sewage Disposal	Insufficient data
Landfills & Dumpsites	Insufficient data
Atmospheric Deposition	Insufficient data
TOTAL:	**1416**

WATER POLLUTION SOURCES

INDUSTRIAL WASTEWATER DISCHARGES

Industrial wastewater dischargers cover a broad range of types of facilities. Examples include treated chemical discharges from plating operations, cooling water from power generating stations, quarry dewatering from crushed stone producers, lime sludge from municipal water treatment plants, and treated process wastes from diverse manufacturers, such as food processing, automotive, plastics, and glass. Some NPDES permits fall into more than one category. For example, a manufacturer may have process wastes, site runoff, and a package sewage treatment plant. An NPDES permit deals with this situation by issuing discharge standards for three different outfall points.

At present, there are 60 NPDES permits in the Maumee RAP Area which breakdown as follows:

0 Agricultural
2 Electric Utility
30 Industrial and Miscellaneous
2 Landfill
4 Quarry & Crushed Stone Producer
18 Municipal and other Sewage Treatment Plants
4 Municipal Water Treatment Plants

Out of these 60 permits, the status is as follows:

24 or 40% were not current on January 1, 1988
42 or 70% are active
4 or 6% are being sewered
1 or 1% are revoked or inactive
12 or 20% are expired

An "Active" permit is presently in operation. "Being sewered" means that the permit is active, but a sewer line is being built which will eliminate the discharge. A permit that is "Revoked" has been revoked by Ohio EPA because the facility is no longer discharging. "Inactive" means the facility is not presently discharging. "Expired" means the facility is in operation and discharging, but the permit has not yet been renewed.

There are presently no Findings and Orders for industrial NPDES dischargers in the Maumee Basin RAP Area. A list of NPDES Permits in the RAP Area, with notes on their present status and compliance, is given in Table 32. The source of these notes is from discussion with personnel of Ohio EPA NW District Office and Toledo Environmental Services Division, and the files of those agencies.

A complete listing of NPDES permits is given in Appendix C.

Ohio EPA is considering issuing NPDES permits for stormwater runoff to other facilities that presently have no permits. One is the Evergreen Landfill, in Northwood. Others are the truck stops in the Interchange-Five area of Lake Township, in Wood County. The truck stops and their effect on local streams will be evaluated after the sanitary sewer to serve the area has been completed in Summer, 1988.

TABLE 32
NOTES ON NPDES DISCHARGERS

NPDES DISCHARGER	STREAM	RM	NOTES
ASHLAND OIL COMPANY NPDES: 2IG00006*ED OLD NAME:	Maumee River	1.8	Permitted to treat ship ballast, but does not receive much, usually 2 to 4 times/year. Stormwater, 17,300 gpd, is treated separately.
BENTBROOK FARMS NPDES: 2PG00002 OLD NAME:	Ten Mile Creek	--	
BOWLING GREEN WTP NPDES: 2IW00010 OLD NAME:	Maumee River	22.8	Presently backwash solids are being discharged to the Maumee River. Backwash lagoons are being designed, and in the future, backwash water will be recycled. New permit is being processed.
CSX-CHESSIE-PRESQUE ISLE NPDES: 2IT00013 OLD NAME: C&O, Chessie	Maumee River	0.1	Has had oil leak problems in the past. No information is available on the sewage treatment plant. A new permit is being processed, and the facility will be inspected before issuance.
CSX-CHESSIE-WALBRIDGE TERMINAL NPDES: 2IT00002*CD OLD NAME: C&O, Chessie	Cedar Creek	--	Site runoff is treated, which includes a lot of oil and grease. Effluent quality is good.
CENTENNIAL MANOR NPDES: 2PY00000*DD OLD NAME:	Ten Mile Creek	2.0	
CHARTER HOUSE INN NPDES: R 725 *AD OLD NAME:	Crane Creek	--	
CONRAIL NPDES: 2IT00015*AD OLD NAME: Penn Central	Unnamed Tributary	--	********** Problem Discharger ********** This facility has massive oil problems. Discharge goes to an unnamed tributary of the Maumee. The receiving stream is, in effect, being used to treat the runoff. There are baffles across the stream, which are used to trap the oil. They are located about 30 or 40 feet above a culvert the stream enters before flowing into the Maumee.
CONRAIL-STANLEY YARD NPDES: 2IT00007*CD OLD NAME:	Cedar Creek	--	********** Problem Discharger ********** There was a major oil spill from this facility in March '88, and oil in the effluent is a continuing problem. The treatment lagoons are old, and need improvements for better control.
DIVERSI TECH GENERAL NPDES: 2IQ00012*BD OLD NAME:	Ottawa River	6.0	Has had oil problems in effluent in the past. New oil separator has been installed, with a Permit To Installed being submitted after the fact. A white solid (resin) in the effluent has been an occasional problem (TESD notes: twice in the past ten years). Toxic organics (in low concentrations) have been found in the effluent. The present NPDES permit does not have limits for these chemicals. Ohio EPA expects to add them the next time the permit is renewed.
DOEHLER-JARVIS/FARLEY, PLANT 2 NPDES: 2IC00021*FD	Shantee Creek	--	********** Problem Discharger ********** Effluent includes a milky-white discharge (machine coolant). Both TESD and Ohio EPA have received complaints about this facility.
DUPONT DE NEMOURS, FORMALDEHYDE PLANT NPDES: 2IF00017*CD	Ottawa River	4.8	There was at one time a formaldehyde leak to the stormwater lagoon (the NPDES Permit for this facility is for non-contact cooling water). Since that time, the lagoon has been eliminated. Ohio EPA plans reinspection.
DUPONT DE NEMOURS, PAINT PLANT NPDES: 2IF00016*DD	Blodget Ditch	--	Effluent quality is good.
FONDESSY ENTERPRISES NPDES: 2IN00013*CD OLD NAME: Envirosafe	Otter Creek	2.3	One outfall had a problem with NH3 violations several years ago, but is now meeting effluent limits. Runoff covered by this permit is from the truck area, not the landfill. Landfill runoff goes to Otter Creek. Runoff from the Land Farm collected and taken to a storage tank, sampled, and discharged to the Toledo sewer system. It is sampled and discharged to the Toledo sanitary sewer system and is subject to Toledo's pretreatment program. The land farm is located at Cedar Point & Wynn, and was used for disposal of oily wastes. This practice has been discontinued. Wastes are collected, trucked, and sampled by Millren.

FRANCE STONE CO., SILICA PLANT NPDES: 2IJ00039*FD	Ten Mile Creek	2.0	This facility is in compliance with its NPDES permit.
FRANCE STONE CO., WATERVILLE NPDES: 2IJ00047	Maumee River	22.2	This facility is in compliance with its NPDES permit. Old permit records had the address as 600 S. River Road, while the '87 Toledo phone book says 700 River Rd. I'm leaving the old phone number in the database; the best the new phone book has to offer is a number for the lab, which is 878-9606.
FULLER'S CREEKSIDE ESTATES NPDES: 2PH00000*BD	Shantee Creek	--	
GENERAL MILLS NPDES: 2IH00093*BD OLD NAME:	Jamieson Ditch	--	********** Problem Discharger ********** Effluent has shown violations of BOD, SS, and pH limits. BOD has shown some improvement. The problem comes from organic matter from the air pollution control equipment on the roof. This material is washed off the roof by rain, and results in a high-BOD wastewater.
HARBOR VIEW, VILLAGE OF NPDES: 2PA00012*CD OLD NAME:	Maumee Bay	--	This facility is not in compliance with its NPDES Permit. Findings and Orders have been issued. See discussion under POTWs for details.
HASKINS WWTP NPDES: 2PA00026*CD OLD NAME:	Liberty Hwy. Ditch	21.6	This facility is in compliance with its NPDES permit. Haskins WWTP is at RM 1.0 of Liberty High Rd Ditch. It empties into the Maumee at RM 21.6.
HYDRA-MATIC NPDES: 2IC00026*CD OLD NAME: GMC Chevrolet	Silver Creek	--	State of the art stormwater system. This facility is in compliance with its NPDES permit.
JEEP CORPORATION NPDES: 2IC00022 OLD NAME:	Ottawa River	7.6	New NPDES Permit is being drafted. Process waste goes to Toledo sanitary sewer. This permit is for site runoff. There are other outfalls (runoff) that are not covered by the permit. High water levels in the Ottawa River cause stream water to backflow into the treatment system. There is a lot of garbage (litter) in the stream at this site. It comes not from Jeep, but its employees
KERN-LIEBERS USA NPDES: 2IC00056 OLD NAME:	Wolf Creek	4.1	This facility is in compliance with its NPDES permit. Ohio EPA is processing a draft permit for renewal.
KING ROAD SANITARY LANDFILL NPDES: 2IN00079*AD	Ottawa River	4.5	********** Problem Discharger ********** Ohio EPA enforcement actions are pending on this facility. OEPA's Draft Plan of Study for the Maumee BWQR notes that NH3 discharged here is 'highly elevated.' Contamination of local groundwater has been documented. This facility is an old dump. When closed, the dump was covered with sand, which allows rain water to infiltrate. In places, the cover has worn away, leaving garbage exposed on the surface. Because of the lack of impermeable cover, there is no runoff from the site. Rain water soaks into the dump and enters the Ottawa River as leachate, which contains high concentrations of BOD and NH3. What needs to be done: * Hydrogeological study of the area * City water for residents * Clay cap on the old dump * Fence to prohibit new dumping
LIBBEY OWENS FORD - PLANTS #4 AND #8 NPDES: 2IN00030*DD	Otter Creek	6.6	********** Problem Discharger ********** Even though this plant is no longer producing, it still has an active NPDES permit. There is leachate from the lagoon through weep-holes. The lagoon has been dewatering faster than expected, and flow from weep-holes has gradually decreased. Leachate running out of banks is collected and discharged to the Toledo sanitary sewer system. The problem is that Otter Creek runs through an old, leaky sewer under the lagoon. This facility formerly produced laminated car glass. Leachate contains phthalate esters, dienoctyl Phthalate, and 2-m-butyl Phthalate. Monitor for As also, but none has been found. LOF's plans call for 1] dewatering the lagoon at this site, 2] divert Otter Creek so that it will no longer flow under the lagoon. Time frame for completion of this work is march, 1989.

LIBBEY OWENS FORD FLOAT GLASS PLANT #6 NPDES: 2IN00030*ED	Maumee River	6.9	********** Problem Discharger ********** An outfall from this facility discharging to the Maumee at the Rossford Marina was discovered in Fall, 1987. Samples from this effluent contained Arsenic. A system of perforated collection tiles was completed in September, 1988. The leachate is be pumped to the Toledo sanitary sewer system.
LINCOLN GREEN SUBDIV. NPDES: H 704 *AD OLD NAME:	Potter Ditch	--	
LIQUID CARBONIC CORP. NPDES: 2IN00069 OLD NAME:	Otter Creek	1.9	Discharge is from package sewage treatment plant, which is oversized for the number of employees. But the site is unsuited for a septic system.
MARATHON OIL COMPANY NPDES: 2IG00024*BD OLD NAME:	Driftmeyer Ditch	--	This facility is in compliance with its NPDES permit.
MAUMEE RIVER WWTP NPDES: 2PK00000*DD OLD NAME:	Maumee River	18.2	This facility is in compliance with its NPDES permit.
MEDUSA PORTLAND CEMENT COMPANY NPDES: 2IN00032	Tenmile Creek	5.3	Medusa Cement shut down in '82 or '83, but may have resumed operations. Hasn't reapplied for a discharge permit.
MIDLAND-ROSS SURFACE COMBUSTION DIV. NPDES: 2IN00072*	Williams Ditch	--	This facility is in operation, but may have eliminated its discharge.
NORFOLK SOUTHERN RR NPDES: 2IT00005*BD OLD NAME: N&W RR	Duck Creek	--	This facility is in compliance with its NPDES permit. The wastewater from this facility is runoff containing oil. A treatment lagoon is used.
OAK OPENINGS - FALLEN TIMBERS PLAZA NPDES: 2PP00003*CD	Murbach Ditch	--	
OAK OPENINGS INDUSTRIAL PARK NPDES: 2PH00013*CD	Kujawski Ditch	--	This facility is in compliance with its NPDES permit.
OAK TERRACE NPDES: 2PH00014*CD OLD NAME:	Butler Ditch	--	This facility is in compliance with its NPDES permit.
OREGON SOUTH SHORE PARK WWTP NPDES: 2PB00007*CD	Maumee Bay	--	This facility is not in compliance with its NPDES Permit. Findings and Orders have been issued.
OREGON WTP NPDES: 2IW00220*BD OLD NAME:	Berger Ditch	--	This facility is in compliance with its NPDES permit.
OREGON WWTP NPDES: 2PD00035*ED OLD NAME:	Maumee Bay	--	This facility is in compliance with its NPDES permit.
OWENS-ILLINOIS, LIBBEY PLANT 27 NPDES: N 275 *AD	County Ditch #1139	--	Ohio EPA is processing a new permit for this facility. A reinspection is planned.
PERRYSBURG WWTP NPDES: 2PD00002 OLD NAME:	Maumee River	14.5	This facility is not in compliance with its NPDES Permit. Findings and Orders have been issued. See discussion under POTWs.
PETROLEUM FUEL & TERMINAL CO. NPDES: 2IG00013 OLD NAME: Shell, Apex	Maumee River	2.2	This facility is in compliance with its NPDES permit.
PLASKON ELECTRONIC MATERIALS NPDES: 2IF00000*CD OLD NAME: Allied Chem.	Delaware Creek	1.2	This facility is in compliance with its NPDES permit.
REICHERT STAMPING NPDES: 2IS00008*ED OLD NAME: Tol. Steel Tube	Ten Mile Creek	5.1	This facility is in compliance with its NPDES permit.
STANDARD OIL - HILL AVE TERMINAL NPDES: 2IB00010*CD	Fleig Ditch	11.1	This facility has occasional effluent quality problems, but is generally in compliance with its NPDES Permit. The effluent has been sampled for organic chemicals. None were found.

STANDARD OIL - TOLEDO REFINERY NPDES: 2IG00007*DD	Maumee Bay	0.4	This facility is in compliance with its NPDES permit. Package sewage treatment plant(s), tributary to the main treatment plant may be in use here.
STONECO - LIME CITY PL. NPDES: 2IJ00052*CD OLD NAME: Maumee Stone Co.	Dry Creek	--	This facility is in compliance with its NPDES permit. Sewage was once treated with a package plant here. It has been replaced by a septic system.
STONECO - MAUMEE PLANT NPDES: 2IJ00048*CD OLD NAME: Maumee Stone Co.	Graham Ditch	--	This facility is in compliance with its NPDES permit.
SUN PETROLEUM - MARINE TERMINAL NPDES: 2IG00009*CD OLD NAME:	Maumee River	6.5	This facility is in compliance with its NPDES permit.
SUN PETROLEUM - TOLEDO REFINERY NPDES: 2IG00003*FD	Otter Creek	4.9	********** Problem Discharger ********** There have been overflow bypasses from this facility. Effluent sampling has found oil, phenol, Cr, Sulfide. A new Permit for this facility will be issued in 1989.
TELEDYNE INDUSTRIES NPDES: 2I000001*BD OLD NAME:	Silver Creek	--	This facility is in compliance with its NPDES permit.
TOLEDO BAY VIEW PARK WWTP NPDES: 2PF00000*GD	Maumee River	1.4	This facility is in compliance with its NPDES permit. See discussions under POTWs and CSOs for detailed information.
TOLEDO COKE NPDES: 2ID00011 OLD NAME: Koppers	Maumee River	1.7	This facility is in compliance with its NPDES permit.
TOLEDO COLLINS PARK WTP NPDES: 2IE00260*BD OLD NAME:	Duck Creek	3.4	This facility is in compliance with its NPDES permit. There was a major spill of backwash (lime) sludge in the past, which is in the process of being excavated from Duck Creek: 6000-8000 cy in '87, and 9000 cy planned for '88. The backwash lagoons are nearly full of sludge, and will be excavated: 20-30 kcy '88, 70 kcy in '89, and 90 kcy for each of the next three years.
TOLEDO EDISON - ACME STATION NPDES: 2IB00001*CD	Maumee River	4.0	This facility is in compliance with its NPDES permit.
TOLEDO EDISON BAYSHORE PLANT NPDES: 2IB00000*ID	Driftmeyer Ditch	--	This facility is in compliance with its NPDES permit. Besides cooling water and sewage, the Bayshore plant also has ash ponds, which are rarely used. They exist, and Toledo Edison has them on the discharge permit only in case of emergency. Exception: the bottom ash pond is in constant use.
UNION 76 TRUCK STOP AND RESTAURANT NPDES: R 724 *AD	Crane Creek	--	
WATERVILLE WTP NPDES: 2IV00080*BD OLD NAME:	Maumee River	21.1	This facility is in compliance with its NPDES permit.
WHITEHOUSE WWTP NPDES: 2PB00062*CD OLD NAME:	Discher Ditch	--	This facility is not in compliance with its NPDES Permit. See discussion under POTWs for details. An interceptor to tie Whitehouse into the Lucas County sanitary sewer system is expected to be in use by the end of 1988.
WOODSIDE TERRACE TRAILER PARK NPDES: S702*BD	Wolf Creek	--	
ATLANTIC RICHFIELD, INC.	--	--	Inactive facility
GERKEN MATERIALS	--	--	Inactive facility
NORTHERN ASPHALT PAVING CO.	--	--	Inactive facility

LOF Comments on NPDES Discharges

LOF, in cooperation with the City of Northwood, has for some time been working toward the diversion of the major branch of Otter Creek from its current path beneath the former settling ponds. The settling ponds were established to hold grinding and polishing materials utilized in the glass manufacturing process at the LOF East Toledo Facility. LOF anticipates concluding its agreement with the City of Northwood for the diversion in the very near future, with work beginning soon after that.

While it is true that constituents from the liquid effluent in the settling ponds enter Otter Creek, LOF does monitor this discharge monthly, and that data is reported to both Ohio EPA and U.S. EPA, Region V. Due to the nature of this discharge, it is thought that the impact is minimal as shown by the NPDES samples.

The draft report specifically notes the presence of phthalates in the discharge. This is true, however, the levels of phthalates recorded by the NPDES monitoring are thought to be too low to have a significant impact on water quality. In fact, some monitoring reports have recorded no detectable levels of phthalates.

Another subject mentioned in the report is a discharge from the former settling ponds at the Rossford Float Glass Plant #6. These settling ponds are very similar in nature to those at the East Toledo Facility, which were described previously. LOF applied for, and has received from Ohio EPA, a Permit-to-Install for an Aggregate Drainage Collection System at the Rossford facility. This system will collect a discharge from the former settling ponds and direct it to the Rossford wastewater treatment facility. Construction of this system is well underway, with a projected completion date of early August, 1988.

MUNICIPAL WASTEWATER DISCHARGES

There are twelve municipal sewage treatment plants, or "Publicly-Operated Treatment Works" (POTWs) in the RAP Area. These include city, county, and village sewage treatment plants, plus package plants that serve suburban or rural developments. The RAP Area POTWs are given in Table 33, with 1986 effluent data. This table includes information on what treatment plant served each area in 1986, and what treatment plant is planned to serve the area in 2005. Table 33 also includes present and projected populations, flow rates, and BOD_5, SS, and P discharges in tons per year (tpy). Projected discharges for BOD_5, SS, and P assume that the plants will produce the same quality effluent in 2005 as they did in 1986.

Phosphorus Loadings

As noted in Table 31, the total phosphorus discharge from RAP Area POTWs in 1986 was 188.5 tons. Many of the plants in the table are shown as discharging zero phosphorus. That is not because their effluent contains no phosphorus, but because these smaller plants are not required to monitor it. Using an estimated effluent phosphorus concentration of 2 ppm for extended aeration plants with filters, and 4 ppm without filters, the actual total phosphorus discharge would be higher than 188.5 tons per year. TMACOG has calculated that smaller plants contribute at least 9.4 tons per year (see section on Package Sewage Treatment Plants).

TABLE 33
MAUMEE BASIN RAP AREA POTWs
Populations and Discharge Loadings

SANITARY SEWER SERVICE AREA	1980 & 2005 POP.	DSGN, 1986, & 2005 FLOWS	1986 & 2005 BOD LOADS	1986 & 2005 TSS LOADS	1986 & 2005 P LOADS
** LUCAS COUNTY **					
Bentbrook Farms ***	1980 POP: 1,654	CAPACITY: 0.06 mgd			
1986: Bentbrook Farms WWTP	2005 POP: 1,831	1986: 0.12 mgd	1986: 16.2 tpy BOD	1986: 16.4 tpy TSS	1986: 0.0 tpy P
2005: Maumee River	1986 Flow: 72 gpcd	2005: 0.13 mgd	2005: 18.0 tpy BOD	2005: 18.2 tpy TSS	2005: 0.0 tpy P
Fuller's Cr Est ***	1980 POP: 714	CAPACITY: 0.10 mgd			
1986: Fuller's Creekside Estates	2005 POP: 714	1986: 0.27 mgd	1986: 5.8 tpy BOD	1986: 5.8 tpy TSS	1986: 0.0 tpy P
2005: Toledo	1986 Flow: 378 gpcd	2005: 0.00 mgd	2005: 5.8 tpy BOD	2005: 5.8 tpy TSS	2005: 0.0 tpy P
Lincoln Green ***	1980 POP: 2,352	CAPACITY: 0.17 mgd			
1986: Lincoln Green Subdivision	2005 POP: 2,861	1986: 0.16 mgd	1986: 5.1 tpy BOD	1986: 5.1 tpy TSS	1986: 0.0 tpy P
2005: Maumee River	1986 Flow: 68 gpcd	2005: 0.00 mgd	2005: 6.2 tpy BOD	2005: 6.2 tpy TSS	2005: 0.0 tpy P
Lucas County	1980 POP: 33,397	CAPACITY: 15.00 mgd			
1986: Maumee River WWTP	2005 POP: 40,257	1986: 9.01 mgd	1986: 127.2 tpy BOD	1986: 209.1 tpy TSS	1986: 11.5 tpy P
2005: Maumee River	1986 Flow: 163 gpcd	2005: 12.42 mgd	2005: 155.4 tpy BOD	2005: 255.4 tpy TSS	2005: 14.0 tpy P
Oak Openings	1980 POP: 0	CAPACITY: 0.18 mgd			
1986: Oak Openings Industrial Park	2005 POP: 0	1986: 0.11 mgd	1986: 3.8 tpy BOD	1986: 4.7 tpy TSS	1986: 0.0 tpy P
2005: Maumee River	1986 Flow: 67 gpcd	2005: 0.00 mgd	2005: 4.7 tpy BOD	2005: 5.8 tpy TSS	2005: 0.0 tpy P
Oak Terrace	1980 POP: 0	CAPACITY: 0.00 mgd			
1986: Oak Terrace WWTP	2005 POP: 0	1986: 0.10 mgd	1986: 0.7 tpy BOD	1986: 1.2 tpy TSS	1986: 0.0 tpy P
2005: Maumee River	1986 Flow: 70 gpcd	2005: 0.00 mgd	2005: 0.7 tpy BOD	2005: 1.1 tpy TSS	2005: 0.0 tpy P
Oregon **	1980 POP: 31,763	CAPACITY: 8.00 mgd			
1986: Oregon WWTP	2005 POP: 38,365	1986: 4.31 mgd	1986: 40.9 tpy BOD	1986: 79.0 tpy TSS	1986: 6.2 tpy P
2005: Oregon DuPont	1986 Flow: 114 gpcd	2005: 5.41 mgd	2005: 49.4 tpy BOD	2005: 95.8 tpy TSS	2005: 7.4 tpy P
Oregon S Shore	1980 POP: 1,400	CAPACITY: 0.23 mgd			
1986: Oregon South Shore WWTP	2005 POP: 1,670	1986: 0.49 mgd	1986: 27.0 tpy BOD	1986: 22.1 tpy TSS	1986: 1.4 tpy P
2005: Oregon DuPont	1986 Flow: 350 gpcd	2005: 0.00 mgd	2005: 32.3 tpy BOD	2005: 26.4 tpy TSS	2005: 1.8 tpy P
Toledo **	1980 POP: 388,194	CAPACITY: 102.00 mgd			
1986: Toledo Bay View WWTP	2005 POP: 388,851	1986: 91.15 mgd	1986: 2,737.3 tpy BOD	1986: 6,123.6 tpy TSS	1986: 157.6 tpy P
2005: Toledo	1986 Flow: 234 gpcd	2005: 91.48 mgd	2005: 2,741.9 tpy BOD	2005: 6,133.8 tpy TSS	2005: 157.9 tpy P
Whitehouse	1980 POP: 2,819	CAPACITY: 0.29 mgd			
1986: Whitehouse WWTP	2005 POP: 3,915	1986: 0.32 mgd	1986: 8.0 tpy BOD	1986: 10.9 tpy TSS	1986: 3.1 tpy P
2005: Maumee River	1986 Flow: 113 gpcd	2005: 0.00 mgd	2005: 11.1 tpy BOD	2005: 15.3 tpy TSS	2005: 4.3 tpy P
** WOOD COUNTY **					
Haskins	1980 POP: 568	CAPACITY: 0.10 mgd			
1986: Haskins WWTP	2005 POP: 723	1986: 0.06 mgd	1986: 0.7 tpy BOD	1986: 0.5 tpy TSS	1986: 0.0 tpy P
2005: Haskins	1986 Flow: 105 gpcd	2005: 0.08 mgd	2005: 0.9 tpy BOD	2005: 0.7 tpy TSS	2005: 0.0 tpy P
Perrysburg *	1980 POP: 17,612	CAPACITY: 2.75 mgd			
1986: Perrysburg WWTP	2005 POP: 26,010	1986: 3.00 mgd	1986: 119.2 tpy BOD	1986: 241.8 tpy TSS	1986: 8.7 tpy P
2005: Perrysburg	1986 Flow: 160 gpcd	2005: 4.48 mgd	2005: 177.8 tpy BOD	2005: 360.6 tpy TSS	2005: 13.1 tpy P
** TOTAL PHOSPHORUS LOADING, 1986 **					188.5 tpy P

* The Perrysburg plant is being expanded to 5.4 mgd

** Toledo and Oregon each own and operate one package plant not listed here, because these plants do not have NPDES permits. The Oregon plant is a 5000 gpd unit that serves the City Municipal Building on Seaman Road. The Toledo plant is a 40,000 gpd package plant that serves the House of Correction in Waterville Township.

*** This plant is soon to be replaced with a tap to the Lucas County sanitary sewer system. All three facilities listed are presently in the design or bid phase.

NOTE: Zero population denotes no information available. Zero flow for 2005 means this plant is expected to be abandoned by then.

Further details are given on these facilities in Appendix E.

Ohio EPA has current Findings and Orders issued for a number of POTWs. Holders of NPDES permits are required under the Clean Water Act to be in compliance with their permits by July 1, 1988. That is the deadline for all Findings and Orders. Current Findings and Orders are detailed in Table 34.

TABLE 34
POTW FINDINGS AND ORDERS

SERVICE AREA/FACILITY	OWNER/OPERATOR	NPDES NO.	ORDERS TO:	DATE	
Harbor View	Harbor View	2PA00012*CD	Build or tap into system	1985	
Interchange-Five Area	Wood Co S.D. #120	None		1986	To be sewered
Maumee	Maumee	None	CSOs	1985	4-Phase CSO project
Oregon S. Shore Park	Oregon	2PB00007*CD	Effluent Limits	1986	
Perrysburg	Perrysburg	2PD00002*DD	Effluent Limits	1985	Expand WWTP
Whitehouse	Whitehouse	2PB00062*BD	CSOs, effluent limits	1987	To tap into County system

Status Of Facilities With Findings And Orders

Harbor View

Harbor View has sanitary sewers, but cannot use them. The City of Oregon received a grant for a Facilities Plan for Harbor View and the surrounding portions of Oregon. The Facilities Plan[28] recommended construction of an interceptor sewer to serve the area. HUD awarded a grant to the Village of Harbor View for construction of local sanitary sewers, among other improvements, but EPA did not award a grant for construction of the interceptor.

Interchange-Five Area

Sanitary sewers to serve the Interchange Five area are being designed. These sewers will connect to the existing Wood County sanitary sewer system. Wastewater will receive treatment at the Toledo Bay View WWTP.

Luckey

The Village of Luckey has constructed interceptor sewers and a sewage treatment lagoon system. They went into operation in late 1987.

Maumee

The City of Maumee is separating its combined sewers in four-phases, spaced at three-year intervals. The first phase has been completed. The separation program is scheduled for completion in 1996. This construction program will result in the elimination of 90% of the combined sewage bypasses. User fees, direct assessments and City funds will be used to finance the estimated $4 million cost of these improvements.

The existing combined sewer will serve as a sanitary sewer, and will be smoke tested to remove as many "clean water connections" (downspouts) as possible. The regulators will remain in place with slide gates controlling overflow to the river. It is estimated that a 10% inflow component from foundation drains will remain in the system. The construction schedule by district is as follows:

White Street District	1987
Sackett Street District	1990
Allen Street District	1993
Duane Street District	1996

Oregon South Shore Park

The subdivision of South Shore Park in Oregon is served by sanitary sewers and its own treatment plant. The system, however, has a severe inflow problem, and the plant is overloaded by excess flow. The City of Oregon plans to construct an interceptor along Bayshore Road to connect South Shore Park to the main wastewater treatment plant on DuPont Road. When the Bayshore Road interceptor is built, the South Shore Park treatment plant will be abandoned. Construction of this interceptor will also be necessary to extend service to the Harbor View area.

Perrysburg

Perrysburg is expanding its treatment plant from 2.75 mgd to 5.4 mgd. The expansion of the primary treatment facilities has been completed; expansion of the second treatment facilities is in progress. Vacuum-assisted drying beds have also been added to the plant to improve sludge-handling capabilities.

Whitehouse

The *Whitehouse Facilities Plan*[41] calls for the Village of Whitehouse to abandon its existing sewage treatment plant, and tie into the Lucas County system. The Village of Whitehouse has submitted plans to Ohio EPA for construction of an interceptor to tie into the County system. Construction will be completed in 1988.

PACKAGE SEWAGE TREATMENT PLANTS

Package treatment plants frequently cause water quality problems. These are privately and publicly-owned treatment plants that serve mobile home parks, marinas, or restaurants in an unsewered area that produce too much wastewater for a septic tank. There are quite a few package plants in the Swan Creek watershed, especially around Toledo Express Airport, and on the fringes of the Toledo and Lucas County sewer systems.

Package plants are not a large source of pollution, in terms of the overall Great Lakes Basin. They are estimated to contribute roughly 1% of the phosphorus which reaches Lake Erie.[42] However, an improperly operated package plant can have a severe effect on its receiving stream, resulting in a local health problem.

Past Work

TMACOG staff has worked with OEPA and County Health Departments in the past on constructing inventories of package plants, and working with the owners and operators of the facilities to improve performance.

Problem Summary

Most package plants use the "extended aeration" process, which is similar to the "conventional activated sludge" process commonly used by municipal sewage treatment plants. Package plants cause problems for a number of reasons, which are discussed below. The discussion below should be taken as a broad generalization. There are nearly a hundred package plants in Lucas County, and some of them *are* well-operated and maintained.

LACK OF TRAINING AND IMPROPER OPERATION

The extended aeration treatment process is complicated, and unless the operator has received training, he probably will not understand it. Operating a package plant usually falls to a janitor, the manager, or the owner, depending on the particular situation. In most cases, the person operating the package plant has not had any training at all.

For municipal sewage treatment plants and other treatment facilities which have NPDES permits, the Operator is required to have a License; obtaining that License includes taking courses and passing tests. Most package plants are not required to have NPDES permits for the reason that there are too many around to keep track of, let alone inspect and regulate. Ohio EPA *does* issue NPDES permits for package plants under five conditions, however:

1. If the plant is operated by the County, or a municipality,
2. If the facility requires an NPDES permit for another wastewater discharge,
3. If the package plant is a known and continuing problem,
4. If the facility is PUCO regulation, and
5. If it is a State operated facility.

LACK OF MAINTENANCE

The maintenance problem is closely-related to the operation problem. Failure of the plant operator to understand proper operation directly results in many maintenance problems. Another maintenance problem is that the work tends not to get done for the simple reason that most people consider working on the sewage plant an unpleasant job. Unless somebody from EPA or the Health Department comes around to remind them, they tend not to do it.

LACK OF ENFORCEMENT

Ohio EPA has responsibility for enforcement for package plants. The main problem is that there are a lot of package plants around. Just keeping track of them has been a problem. Lack of staff to do field inspections and write letters has also been a problem.

Under a law passed in 1985, the County Health Department may contract with Ohio EPA to perform inspections and charge license fees for package plants under 25,000 gpd. Wood County has signed such a contract, but Lucas and Ottawa Counties have not. Lucas County, however, uses nuisance abatement and health statutes to conduct inspections, and attempts to visit plants monthly. They do not inspect plants which have NPDES permits. Enforcement actions remain the responsibility of Ohio EPA.

Phosphorus

In most cases, there is no data on what a given package is discharging, in terms of quantity of flow or nutrients. However, work *has* been done on what the effluent quality of an extended aeration package plant "typically" is. WPCF[43] and EPA[44] suggest figures of 2 ppm with filters and 4 ppm without. However, these values were obtained using trained plant operators. For purposes of estimating phosphorus loadings from package plants in the RAP Area, a figure of 4 ppm P will be used.

Using an estimated total package plant effluent volume of 2.09 mgd (see Appendix D), the total phosphorus contribution would be 12.7 tons/year. Deducting package plants listed in Appendix D which are *also* POTWs (Oak Terrace, Oak Openings Industrial Park, Bentbrook, Fuller's Creekside Estates, and Lincoln Green: see Appendix B) leaves a contribution of 9.4 tons P/year for the remaining plants. This number is an approximation, intended to put the phosphorus loading from this source in perspective with the other sources.

AGRICULTURAL RUNOFF WATER POLLUTION

The croplands of the Maumee River Basin are major sources of sediment, phosphorus, nitrate and pesticide loadings to the Maumee River System. These pollutants originate primarily upstream of the AOC and are transported to the lower Maumee River and Lake Erie where they negatively affect water quality.

We are fortunate to have an extensive record of sediment and nutrient loads for the Maumee River. The U. S. Geological Survey water quality monitoring site at Waterville Ohio has been in existence since 1950. The drainage area above the gauge is 6,330 square miles.[45]

Sediment and nutrient loads for the Maumee have been reported by the Water 2Quality Laboratory of Heidelberg College as shown in Table 35.

TABLE 35
HISTORICAL SEDIMENT & NUTRIENTS FOR THE MAUMEE AT WATERVILLE
(in metric tons)

YEAR	NO_3+ NO_2 NITROGEN	SUSPENDED SOLIDS	TOTAL PHOSPHORUS	SOLUBLE REACTIVE PHOSPHORUS
1982	1,280,000	2,820	576	28,400
1983	947,000	2,080	286	26,200
1984	1,080,000	2,660	389	35,450
1985	897,000	1,900	128	24,100
1986	1,221,000	2,434	---	30,800

Source: Heidelberg College Water Quality Lab

The extent to which these loads are attributable to non-point sources and particularly agriculture has been the topic of several significant studies and reports. Studies performed by TMACOG, the U.S. Army Corps of Engineers Lake Erie Wastewater Management Study, Pollution from Land Use Activities Reference Group (PLUARG) of the International Joint Commission, Great Lakes National Program Office, and Water Quality Laboratory of Heidelberg College have documented the magnitude and nature of the problems affecting the Maumee River. In addition, the Ohio EPA has prepared the *State of Ohio Phosphorus Reduction Strategy for Lake Erie* which in turn is included in the *United States Task Force Plan for Phosphorus Load Reductions from Non-Point and Point Sources on Lake Erie, Lake Ontario, and Saginaw Bay.*

The conclusions of these numerous studies provide the basis for our knowledge of the fact that agriculture is a major source of pollutants (sediment, phosphorus, nitrogen, pesticides) to the Maumee River. Phosphorus and sediment have received the majority of the attention because phosphorus has been identified as the key limiting nutrient in Lake Erie and sediment has been identified as the vehicle for transporting phosphorus. Nitrogen and pesticides have both received greater attention in recent years as public health issues.

Each of the pollutants originating from agricultural sources in the Maumee River and their impacts are discussed in the following sections of this report.

Sediment

Sediment is considered to be the most prevalent non-point source pollutant by volume. By Ohio law (Agricultural Pollution Abatement and Urban Sediment Pollution Abatement Law), sediment is defined as "solid material", both mineral and organic, in suspension and being transported, or moved from its site of origin by air, water, gravity, or ice and has come to rest on earth's surface either above or below sea level." Therefore, soil particles are not considered sediment until they are detached and are being transported or have come to rest on the earth's surface.

Soil erosion is the removal and loss of soil from the land by rainfall, flowing water or wind action. Sedimentation is the resulting build-up of this soil in the downstream areas and Lake Erie.

Soil erosion rates (per acre) in the Maumee River Basin are generally low, but because of the amount of land in agriculture, erosion from cropland poses a major pollution problem. The fine textured soils of the Maumee Basin are easily displaced and washed away by the rain. The sediment load in the Maumee River at high flow has been measured to exceed 150 thousand tons per day. The average annual sediment load from the Maumee River is 1.2 million tons per year, but it can accumulate to nearly 2 million tons per year.

There are numerous problems created by suspended and deposited sediment. These problems include:

1. Increased treatment costs of water supplies due to increased levels of suspended sediment. The taste and odor of the treated water can also be affected by these increased levels;

2. The reduced aesthetic quality of water for recreation purposes;

3. Reduced light penetration caused by turbidity which reduces photosynthesis thereby preventing aquatic plant growth, disrupting the food chain and impairing biological systems;

4. Decreased visibility in the water which affects the ability of fish to feed as well as create a safety hazard for boaters, swimmers, and water skiers; and

5. Provides a vehicle for the transport of phosphorus and other pollutants.

6. Cause species extirpations and impacts on biological communities.

Deposited sediment problems include:

1. Navigation problems in Toledo Harbor and the necessity to provide annual maintenance dredging of 1 million cubic yards per year.

2. Impaired biological systems due to covering of the bottom spawning and feeding areas of fish. In addition, deposited sediment reduces the productivity of many species of aquatic organisms which are food for fish.

3. Filled drainage ditches which require expensive ditch maintenance and environmentally destructive channelization and modification to restore usage.

The Lake Erie Wastewater Management Study was conducted by the U.S. Army Corps of Engineers pursuant to Section 108 of the Clean Water Act of 1972. The LEWMS used the Land Resources Information System (initially developed by TMACOG) to calculate existing Potential Gross Erosion for the Lake Erie Basin. The Maumee River Basin in its entirety was identified as having 2,596,736 acres of cropland which contributed 9,092,447 tons of potential gross erosion, or an average of 3.5 tons of soil loss to the acre under 1978 conditions.[46]

The *State of Ohio Phosphorus Reduction Strategy for Lake Erie* (1985) divided the Lake Erie drainage area (Ohio portion only) into 34 hydrologic groups. Table 36 identifies 14 of these hydrologic groups that make up the Maumee River Basin in Ohio.[33] Table 34 shows that there was 3,322,095 total acres in the Ohio portion of the Maumee River Basin and the Lower Maumee River Area of Concern in 1980. These were estimated to yield 6,384,071 tons of sediment at the edge of the field or 1.9 tons/acre/year.

This difference between the Ohio Strategy and the LEWMS is likely the result of higher levels of erosion in the Indiana and Michigan portions of the basin and a difference in methodology. In either instance, both studies support the concept that there are many acres with low levels of erosion which add up to a substantial contribution of sediment to the streams and rivers of the Maumee River Basin.

These calculations of Potential Gross Erosion by the LEWMS and for the Ohio Phosphorus Strategy have been designed to develop a relationship between soil erosion on the croplands and the sediment that is actually transported to Lake Erie and its tributaries. The calculation of Potential Gross Erosion reflects the soil loss from the field. The transport of the soil particles may or may not continue for some distance until it actually arrives downstream. The sediment delivery ratio reflects the percentage of material that actually is transported to an area of deposition. The LEWMS calculated the sediment delivery ratio for the Maumee as 9.2%.[47] The Ohio Phosphorus Strategy calculated a delivery ratio of 13.7% for the Maumee.[33]

TABLE 36
SEDIMENT AND PHOSPHORUS AFFECTING THE MAUMEE AOC

BASIN NAME (Ohio Basins Only)	TOTAL AREA (ACRES)	1980 GROSS EROSION (TONS/YR)	1980 PHOS YIELD (MT/YR)
Ten Mile Creek (Ottawa River)	107,134	140,722	118
Maumee River Mainstem	181,444	235,881	185
Maumee River Mainstem	203,296	327,952	182
Maumee River Mainstem	308,683	461,697	290
Tiffin River	357,200	626,537	337
Auglaize River Mainstem	251,952	636,346	236
Little Auglaize River	261,142	680,900	316
Auglaize River Headwaters	249,105	571,666	275
Blanchard River	490,220	788,072	364
Ottawa River	233,700	515,773	256
Maumee River Mainstem	129,748	357,212	140
St. Mary's River	289,600	642,317	312
St. Joseph River	151,347	216,764	106
Lake Erie Direct (partial)*	107,517	182,232	111
TOTAL	3,322,095	6,384,071	3,234

* Includes 46% of Group 14 watersheds from the Ohio Phosphorus Strategy. This includes all of the drainage between Crane Creek and the Maumee River.

Source: State of Ohio Phosphorus reduction Strategy for Lake Erie (1985).

Phosphorus

The phosphorus associated with sediment, as well as the phosphorus from other sources such as urban runoff, combined sewer overflows and industrial and municipal discharges, has been identified as the principle limiting nutrient in the cultural eutrophication of Lake Erie. It is also responsible for eutrophic conditions in the Lower Maumee River, Maumee Bay and the tributaries of both.

Eutrophication is a natural aging process generally describing the fertility (mainly aquatic plant productivity) of lakes. Over time, a lake will become filled with sediment and organically derived material from streams draining its watershed and from atmospheric deposition. These processes occur naturally and will fill in a lake on a geologic time scale. However, man's activities within a drainage basin can alter the natural processes in a watershed and accelerate this (extinction) process. This latter situation is referred to as cultural eutrophication to distinguish it from the natural process of aging of a lake.

Cultural eutrophication is caused by the excessive loads of aquatic plant nutrients (usually phosphorus) to natural waters. These nutrients, in turn, can produce nuisance growths of algae and higher aquatic plants which interfere with man's use of the water. While some lakes are naturally eutrophic, in that they receive a sufficient supply of phosphorus and nutrients from other sources to produce nuisance growths, an increased nutrient load to a water body has most often been associated with an intensification of human activity in the drainage area surrounding the water body.

A major focus of the Lake Erie Wastewater Management Study was to assess the relative importance of point source and non-point source contributions of phosphorus and other pollutants. Their conclusion was that even after the major wastewater treatment plants had achieved the 1 mg/l standard for phosphorus, there would still be a need to reduce phosphorus contributions to Lake Erie from non-point sources by 47% in order to upgrade the Western and Central Basins of Lake Erie to a stable trophic condition. Such improvement would generally be associated with improved water quality in that the fertility levels would be moderated and nuisance growths would be eliminated.

The Water Quality Agreement of 1983 between the United States and Canada includes Annex III which establishes a phosphorus loading target for Lake Erie of 11,000 metric tons per year. It also called upon the United States and Canada to prepare strategies to achieve this load reduction. The *United States Task Force Plans for Phosphorus Load Reductions to Lake Erie, Lake Ontario, and Saginaw Bay* establishes a total Lake Erie reduction of 1700 metric tons of which Ohio is responsible for 1,390 metric tons.

Ohio has prepared the *Phosphorus Reduction Strategy for Lake Erie* which sets out Ohio's plan to reduce 1390 metric tons of phosphorus. Agricultural sources are considered to contribute about 64% of the total phosphorus load to the Lake. Therefore, they have been assigned 64% of the reduction, or 890 metric tons/year of phosphorus. The strategy identifies 112 watersheds in the Lake Erie Basin that are to receive priority treatment with conservation tillage. To meet the required reductions, conservation tillage practices are to be adopted on 50% of these acres.

The Maumee River Basin contains 57 of these watersheds which are divided into watershed groups according to the Planning and Engineering Data Management system for Ohio (PEMSO) developed by OEPA (Table 37). These watersheds contain 1,095,979 acres of cropland which contribute 1,197 metric tons of phosphorus. The strategy proposed that this contribution would be reduced by 447 metric tons. This is about half of the required Ohio phosphorus reduction from agriculture.

Achieving this reduction will improve water quality in the lower Maumee River and Maumee Bay as well as Lake Erie. However, most of this problem originates upstream from the AOC and will have to be addressed in these upstream areas.

TABLE 37
PROPOSED PHOSPHORUS REDUCTIONS
FOR PRIORITY WATERSHEDS BY PEMSO WATERSHED GROUP
Maumee River Basin

PEMSO WATERSHED Group #	CROPLAND Acres	AGRICULTURAL PHOSPHORUS M Tons	PHOSPHORUS REDUCTION M Tons
1. Ten Mile Creek	51,364	74	26
2. Maumee River Mainstem	90,468	116	41
4. Maumee River Mainstem	56,005	41	20
5. Tiffin River	159,418	132	63
6. Auglaize River Mainstem	78,059	73	28
7. Little Auglaize River	143,374	146	54
8. Auglaize River Headwaters	140,398	139	55
10. Blanchard River	74,189	161	42
11. Maumee River Mainstem	46,549	55	21
12. St. Mary's River	192,277	181	69
14. Lake Erie Direct (Partial)	63,878	78	28
TOTAL	1,095,979	1,197	447

Source: State of Ohio Phosphorus Reduction Strategy for Lake Erie (1985)

Nitrogen

Nitrogen is an essential plant nutrient and is applied to cropland as a fertilizer. Nitrogen is also a nutrient for aquatic plants although it is less of a limiting factor than phosphorus, and therefore, has not received the same level of attention in water quality control strategies. The concentrations of nitrate nitrogen increase during runoff events. However, nitrates are soluble and are carried to the waterway with the runoff rather than adsorbed to sediment as is phosphorus. Tile effluent often carries nitrates to the waterways.

Dr. David Baker of Heidelberg College reports that the nitrogen export rate for the Maumee River Basin is 19 kg/hectare/year (17.1 lb./acre/year) and that this is much higher than national averages. This represents an amount equal to about 50% of the amount of fertilizers applied by farmers in the basin each year and represents a significant loss to these farmers.

Table 35 shows that the annual load of nitrate/nitrite nitrogen in recent years has ranged from 24,100 metric tons to 35,450 metric tons. The 1982 water year which has been selected as a typical or average year for the Great Lakes had an annual load 28,400 metric tons of nitrate/nitrite nitrogen.

Nitrate nitrogen levels in the Great Lakes have been increasing. Lake Erie has experienced an increase of 7.95 ppb/year over the period of 1970 to 1986. The International Joint Commission has expressed concern about this increase and has recommended that research be performed to identify the effects of these increases.

Nitrate concentrations have exceeded the 10 mg/l standard on the Maumee River.This usually occurs during the spring when fertilizer application and runoff events are likely.

The standard was exceeded 92% of the time during May, June or July. Peak concentration for the period of time ranged from 10.3 to 12.3 mg/l. Public health concerns about nitrate nitrogen have constituted the major effect of these events. The solubility of nitrate nitrogen adds to the public health concerns about nitrates because they are difficult to remove through the standard drinking water treatment process. As a result, drinking water alerts have been issued for communities that utilize the Maumee River for their drinking supply.

Pesticides

A recent report by the Water Quality Laboratory of Heidelberg College entitled *Lake Erie Agro-Ecosystem Program: Sediment, Nutrient, and Pesticide Export Studies* (prepared for the Great Lakes National Program Office) is the most thorough review of pesticide loads in the Maumee River. A summary of the situation as reported in this document follows.

During spring and early summer, the concentrations of many currently used pesticides increase in Lake Erie Tributaries. In general, the concentrations of herbicides are much higher than the concentration of insecticides, and concentrations of both are generally proportional to their usage. The herbicide concentrations in these rivers appear to be higher than in many other rivers draining cropland. The effects of these herbicides on ambient water quality remain uncertain. Because of the low acute toxicity, the relatively low persistence and the insignificant bioaccumulation of most herbicides, direct toxic effects on animal life in streams and rivers appear unlikely. However, the concentrations of herbicides observed in these streams are within the range where effects on both algal and higher aquatic plant communities could be expected. Such effects may already be manifest in the existing algal and rooted aquatic plant communities in this region's streams and rivers, and within their associated wetlands and bays. Changes in these plant communities could affect the fish and invertebrate communities in streams and rivers. Also the herbicide concentrations could possibly induce behavioral responses in animals that could be detrimental to these communities.

Most of the pesticides present in streams occur primarily in the dissolved state rather than attached to the sediments. Consequently, the removal of sediments at drinking water treatment plants does not remove most pesticides. Since other aspects of conventional water treatment, such as chlorination, do not remove or alter these compounds, finished tap water has very similar concentrations of these pesticides to those found in the raw water. At present, the U.S. Environmental Protection Agency has not established maximum contaminant levels in drinking water for any of the herbicides monitored in these studies, even though this set of herbicides makes up about 85% by weight of the herbicides used in Ohio. Standards for several of the major herbicides should be set by the federal government in the near future.

For the present several states are establishing their own drinking water standards and the National Agricultural Chemicals Association has also suggested interim health guidance levels for some compounds (NACA 1985). The concentrations of herbicides in Lake Erie tributaries do exceed some of these guidelines, for relatively short periods of maximum concentration. Activated carbon can be used to remove these compounds at water treatment plants and research is underway to evaluate other possible treatment techniques.

Table 38 contains information about the concentrations of pesticides in the Maumee River at Waterville (at the upstream end of the Area of Concern) and their extrapolated loads to the lower Maumee River. The accuracy of the load estimates is dependent on the frequency and representiveness of the pesticide samples and the flow data. Infrequent pesticide samples are more often the limiting factor than is inadequate flow data.

TABLE 38
PESTICIDE CONCENTRATIONS AND EXTRAPOLATED LOADS

PESTICIDE	TRADE NAME	1983 Conc. ppb	1983 Load kg	1984 Conc. ppb	1984 Load kg	1985 Conc. ppb	1985 Load kg
Siamazine	Princep	0	0	0.185	290.95	0.165	67.33
Carbofuran	Furadan	0.175	245.95	0.188	509.38	0.046	27.41
Atrazine	Aatrex	1.751	2476.11	2.975	4807.74	1.902	727.89
Terbufos	Counter	0.001	2.35	0	.53	0.001	0.34
Fonofos	Dyfonate	0	0	0.002	6.45	0	0.53
Metribuzin	Sencor, Lexone	0.443	700.06	0.448	1816.42	0.254	125.68
Alachlor	Lasso	1.046	2053.38	1.756	5251.98	0.472	264.131
Linuron		0.036	46.86	0.040	54.96	0.013	19.81
Metolachlor	Dual	1.308	1763.06	1.574	3056.82	1.316	618.73
Cyanazine	Bladex	0.662	1160.87	1.146	2888.98	0.322	137.28
Penoxalin		--	59.91	--	118.51	--	0

Concentration is the "Time Weighted Mean Concentration" and is calculated for the time period of April 15 to August 15.

Source: Lake Erie Agro-Ecosystem Program: Sediment, Nutrient, and Pesticide Export Studies[48]

OPEN WATER DISPOSAL OF DREDGED MATERIAL

The Corps of Engineers (COE) annually conducts maintenance dredging of the Toledo Harbor in order to maintain the depth of the shipping channel. This dredging produces between 800,000 to 1,000,000 cubic yards of dredged material annually. In recent years (since 1970s), about 90 to 95% of the material was placed in one of the confined disposal facilities (CDF) at the mouth of Maumee Bay. In September 1984, the COE proposed to change operations to open lake dispose of about 60% of the dredged material from the Maumee Bay portion of the channel (and upper 2 miles of river channel) due to cleaner sampling. The remainder of the more polluted material was to be placed in the CDF.

US EPA found that portions of the material were suitable for open lake disposal with the following stipulation:

> "Potentially adverse impacts of open-water disposal should be minimized by locating the open-water disposal sites in areas where the sediment will remain in-place and where biological productivity is relatively low."[49]

Ohio EPA has provided annual Section 401 Water Quality Certifications (required for dumping operations) with special stipulations. In 1985 and 1986 the COE was required by Ohio EPA to conduct monitoring operations and the Toledo-Lucas County Port Authority and the City of Toledo were to explore alternatives for the reuse and or disposal of the material other than open lake disposal. In 1987, the annual 401 certification also included the following stipulations:

> The Ohio EPA intends to impose the following conditions on any future 401 Certifications to dredge the federal navigation channel at Toledo harbor from lake mile 2 outward over the next four years. These conditions will be imposed provided the lake channel sediments remain classified by USEPA as suitable for open lake disposal.
>
> 1988 - The Corps shall open lake dispose an amount not to exceed 90% of the material dredged from the lake channel. The Toledo-Lucas County Port Authority and the City of Toledo are responsible for identifying reuse alternatives for at least 10% of the dredged material. This volume shall either be placed in a confined disposal facility, with the commitment that an equal amount be removed from a confined disposal facility prior to 1989 lake channel dredging, or used in a (direct) reuse project.
>
> 1989 - Same as 1988 except that the open lake disposal is restricted to 70% of the material and 30% is to be subjected to reuse alternatives.
>
> 1990 - Same as 1988 except that open lake disposal is restricted to 50% of the material and 50% is to be reused.
>
> No open lake disposal of dredged material will take place after 1991. The Toledo-Lucas County Port Authority and the City of Toledo are responsible for identifying reuse alternatives for 100% of the dredged material. This volume shall either be placed in a confined disposal facility, with the commitment that an equal amount be removed from a confined disposal facility prior to the following year's lake channel dredging, or used in a direct reuse project.[50]

Differences of Opinion

There are several effects of open water disposal that have or may have negative impacts on the Area of Concern. These effects have been described and documented by various sources, however, there are still considerable differences in opinion over the extent of the impacts. Therefore, COE comments on the problems summarized below have been included.

COE Comment: Open lake disposal is considered to be environmentally suitable for disposal at the present disposal site by USEPA. Furthermore, the most recent and most specific studies and testing indicates that overall there may be no measurable negative impacts due to lake disposal. It even seems likely that lake disposal could have beneficial effects related to covering polluted bottom areas and in providing better contoured underwater habitat for fish.

Local Comment: The material does not stay at the disposal site but is dispersed by the currents and wave action. The current open lake dump site was previously used as a part of a 155 acre site one which material was dumped. The COE reports that 3,840,000 cubic yards were dumped on the site from 1965 to 1975. When the site was put back into use in 1985, water depths ranged from 20 - 24 feet which were very similar to the area surrounding the dump site. Had the 3,840,000 cubic yards that were placed on the site remained, then it would have formed a column rising 15.5 feet off the bottom and would result in water depths that averaged about 7 feet. Since this is not the case, and the material is gone, it is evident that it erodes away over a relatively short period of time.[51]

COE Comment: Soundings clearly indicate that material dumped from 1965 - 1975 is basically still there. The dump site depths are not similar to the surrounding bottom (see attached sketch). Calculations of depths (above) are in error due to an error in area (640 acres vs. 155 acres). Several years of capacity remain at the present site.

Local Comment: Material from the Lake portion of the shipping channel is not similar in physical composition to the lake bottom surrounding the dump site: more silt (46% in dredged material compared to 27% in lake sediments near the disposal site); more clay (29% to 13% in lake sediments); and much less sand (25% in dredged material and 69% in lake bottom sediment). The dredged material is also higher in phosphorus.[52] Therefore, the erosion and resuspension of the dredged materials resulting in the bottom sediments of the surrounding areas to be covered with lower quality dredged material.

COE Comment: The physical characteristics of dredge material varies somewhat from area to area and depending on how deep the dredge is dredging. The bottom of the Bay is certainly similar in some aspects to the dredge material because most, if not all, of the material in the Bay originally came from the same upland sources of the Maumee River. Both dredge and bottom material have also been subject to much of the same pollutant sources. Thus it seems more correct to say that both are similar than not similar overall.

SUSPENDED PARTICULATES / TURBIDITY

Local Comment: During the dumping operations, a turbidity plume is created that is persistent for the duration of dumping operations and extends well beyond the one square mile of the dump site. This turbidity plume has been observed by numerous individuals and has been extensively photographed. This corresponds with the fact that dissolved solids violated water quality standards during dumping operations.[53]

COE Comment: Turbidity plumes need further study as to how much material is transported or suspended. Even a trace of material may be visible and the Corps position is that practically all the material goes immediately to the bottom. Remaining quantities at the disposal site support this.

Local Comment: Laboratory tests have shown that 24% of the material remains in suspension after 24 hours.[54] A 1972 study has shown that the current moving across the Western Basin of Lake Erie will move 0.3 feet/second.[55] Therefore, the material could move 25920 feet or 4.9 miles in 24 hours. Herdendorf has shown the average velocity of Detroit River water flow in western Lake Erie is approximately 0.5 feet/second.[56] This also demonstrates that the material can be spread around the Western Basin.

COE Comment: Hopper dredge disposal as done in the Bay with a split-hull dredge does not leave the amounts suspended as with an agitated laboratory sample. The dredge load "slides" to the bottom essentially in bulk. Most, if not essentially all, of the material is still in place after 20 years in site #2 so actual resuspension after 24 hours appears to be drastically lower than the 24% from lab testing. The remaining material in site #2 also undermines the conjecture that substantial amounts of resuspended material are transported for miles around the Bay. Survey lines one-quarter mile from site #2 also showed no change from 1985 to 1987 thus indicating no detectable movement of material.

WATER QUALITY

Local Comment: Pursuant to the provisions of the Section 401 Water Quality Certification issued by Ohio EPA, the COE conducted monitoring of water quality conditions on the dump site and in surrounding water in both 1985 and in 1986. A change in pH that violated Lake Erie Water Quality Standards was reported for 1985.[57] The 1986 monitoring program detected several violations of Lake Erie Water Quality Standards both on and off the dump site, including copper, cadmium, iron, mercury, and dissolved solids.[53] This was acknowledged by COE.[58] The 1986 monitoring program has also shown several impacts on water quality conditions around and off the dump site.[59, 60] In addition, an early algal bloom was identified by Robert Stevenson of the Toledo Division of Water. This was the earliest recorded at the Toledo Water Intake since 1976. He attributes this to the dumping of dredged material.[60]

COE Comment: The Corps interpretation of the monitoring of 1985 and 1986 was that there were no violations that could be attributed to the disposal operations. One violation noted above was from sampling done before disposal started. Other apparent violations were not true violations because simultaneous remote reference results indicated that conditions were no worse at the disposal site than at the remote reference sites. Algae blooms are common to Maumee Bay and it is only conjecture to attribute these to dredge disposal miles away. A Corps bioassay report on the Bay is to be complete in April 1988. This hopefully should clarify some environmental misunderstandings.

Local Comment: The effect of the open water disposal on phosphorus loads has also been a topic of study. Bioavailable phosphorus concentrations in the Lake portion of the shipping channel are higher than those of the surrounding Lake according to work performed by DePinto.[54] Annual loading of bioavailable phosphorus is 101 metric tons/year or 28% of the average annual Maumee River load.[52]

COE Comments: Annual loadings of bioavailable phosphorous is .4 to .6% not 28% as reported above (per CENCB-ED from DePinto research).

EFFECT ON MUNICIPAL WATER SUPPLIES

Local Comment: City of Toledo has repeatedly stated that the current dump site is within an area where current will carry the material to the water intake and requested that the dump site be moved further to the East and North. Stevenson has stated that water from the dump site does arrive at the water intake.[60] This conforms to the prediction of movement of the material over a 24 hour period that was described above. Movement of the material may carry toxics or other organic chemicals whose limits are below the level of sensitivity of testing performed by the COE.[61]

COE Comment: As stated previously this is largely conjecture, and data needs to be developed on resuspension and its effect on phosphorous levels.

CDF Alternatives

An economically feasible and environmentally acceptable site or method for future disposal of dredged materials that are unacceptable for open-lake disposal will be required within two to five years. Within this time period, the existing active 242-acre CDF will be filled to capacity.

Disposal alternatives that have been mentioned for consideration include: upland use of the dredged material at Maumee Bay State Park, Buckeye Basin Greenbelt Parkway, and various old landfill sites; construction of a CDF along the east side of Woodtick Peninsula to prevent the continued erosion of the peninsula and provide some protection to the marshes, marinas, and other lands west of the peninsula; increasing the height of the dike around the active 242-acre CDF or around the old Island 18 (Grassy Island) CDF to increase disposal capacity; or constructing a new CDF at one of the four potential alternative locations adjacent to the navigation channel.

The preferred action identified by the COE in the Draft Environmental Impact Statement involves the construction of a new lake shore CDF (Alternative 1C) bounded on the northeast and southeast sides by the existing 242-acre CDF, on the south side by the Port Authority CDF, and on the west and northwest sides by a 4,265 foot long dike to be built to a top elevation of 23.5 feet above the LWD elevation of 568.6 feet (IGLD, 1955). The new CDF would occupy about 176 acres of Maumee Bay and would provide about 162 acres of disposal area.

As long as the water quality of the lower Maumee River is significantly degraded, rapid mixing of river and bay waters appears to be important in minimizing the zone of influence of the river water in Maumee Bay. It is expected that water quality in the lower Maumee River will continue to improve, but the process will be a very gradual one. A new CDF at three of the sites considered, or even an expansion of Grassy Island to the northwest would result in reduced mixing in the "shadow zone" of the CDF. Even the construction of a CDF at the preferred site near the existing active CDF will have some impact on mixing by eliminating the 176-acre embayment area as a mixing zone and shifting the mixing zone to the north of the site.

The impacts of this construction on mixing might be greater if it were not for two ameliorating factors. First, much of the river flow does not pass by the preferred site due to an average withdrawal rate of about 1149 cfs by the Toledo Edison Bayshore Power Plant, the mouth of whose intake canal is located at the southwest corner of the proposed CDF site. Comparing this average withdrawal rate to the discharge frequency data for the Maumee River at Waterville indicates that for the period of June through August, the river flow exceeds the power plant withdrawal rate less than 50 percent of the time. Thus, for perhaps half of the time during the summer months, water may be moving from the bay across the face of the site to the power plant intake, rather than from the river into the bay area. The second ameliorating influence is the additional water mass mixing produced by winds and seiches. The resulting movement of water masses can cause bay water to move several miles into the lower Maumee River. Thus, even when river flow rates substantially exceed the withdrawal rate of the power plant, the site will often be under the influence of bay water due to a wind or seiche induced movement of bay water up into the Maumee River estuary area.

The preferred site was selected primarily due to the fact that the amount of diking required, and thus the cost of construction, would be much lower than at any other location in Maumee Bay. Even the most efficient of designs for a 176-acre CDF at another location, such as an extended semi-circular CDF expansion of the northwest side of Grassy

Island, would require a dike approximately 60 percent longer than the one proposed. Only the most serious of water quality impacts or the elimination of the most unique of fish and wild-life habitats might have precluded the selection of this site for construction of a new CDF. The water quality impacts of this alternative should be relatively minor, and the fish and wildlife resources of the site are significant but not unique.

Environmental Conditions

In 1986, the Ohio EPA conducted an extensive biological and water quality survey of the lower Maumee River, with some additional fisheries surveys in Maumee Bay. The data are presently being analyzed by the agency. A preliminary data set of surface and bottom DO readings were taken on 8 to 10 dates between July 14 and October 8, 1986. The combined mean for River Mile 1.0 is about 5.1 ppm (range 3.3 to 6.3 ppm), for River Mile 0.5 about 5.4 ppm (range 3.6 to 7.3 ppm), and for the mouth near Presque Isle about 5.5 ppm (range 3.1 to 7.5 ppm). These values are somewhat higher than values from earlier studies indicating that some improvement in water quality has occurred between the early 1970's and the mid-1980's.

While Maumee Bay has historically been influenced by the degraded water quality of the lower river, and this influence has been increased by the construction of the 242-acre CDF, the aquatic community of the site and of the rest of Maumee Bay is not a depauperate assemblage. The application of the pollution classification of Wright (1955)[62] to benthic invertebrate data indicates that the area southeast of the navigation channel is lightly polluted, the navigation channel and the area northwest of the channel is moderately polluted, and the area near the Toledo Sewage Treatment Plant discharge is heavily polluted (see Figure 6).

Just as the water quality in the bay has apparently improved and will continue to improve, the sediment quality also appears to have improved significantly. A prime example would be that the dredged sediments from Lake Mile 2 to Lake Mile 8 are now considered suitable for open-lake disposal. Another indication of this change is the change in the benthic community of the bay. In 1930, 1961, and 1982, a series of stations throughout the western end of the western basin of Lake Erie were sampled for benthic macrofauna. From 1930 to 1961, the stations in and near Maumee Bay either remained at high level of pollution or became much more polluted, as evidenced by the number of oligochaets per square mile and by loss of pollution intolerant organisms such as *Hexagenia* mayfly nymphs.

By 1982, the trend had dramatically reversed itself, at least concerning the numbers of oligochaets. The 1930 survey results are presented in Wright (1955)[62] and the 1961 survey results in Carr and Hiltunen (1965).[63] The 1982 data Manny, Hiltunen and Judd (unpublished)[64] are preliminary, have not yet been statistically analyzed, and are subject to some modification. Note that while the density of oligochaets has decreased at stations in and near Maumee Bay, the densities at most stations further offshore have remained relatively the same or increased.

CDF Impact on Fish Habitat

In spite of obvious water quality problems in the lower Maumee River and in Maumee Bay, these areas serve as valuable nursery habitat and perhaps spawning habitat for white bass and other sport and commercial species such as walleye, yellow perch, freshwater drum, and channel catfish. Mizera (1981) found the average density of larval white bass in Maumee Bay was more than five times greater than the average density east of the bay and more than seven times greater than the average density north of the bay.[65] A similar pattern was found for freshwater drum. For larval walleye, the density found in Maumee Bay was slightly greater than that north of the bay but considerably less than that east of the bay. The density of yellow perch larvae in the bay was high but was slightly below that of the other two areas. Heniken (1977) also found somewhat similar patterns of larval distributions in his summarization of data from 1975 and 1976 for the Ohio portion of the western basin.[66]

Based on the larval surveys of 1975 and 1976, Heniken (1977)[66] indicates that gizzard shad production in the Ohio portion of the western basin appears to be centered mainly in Maumee Bay and that concentrations often exceeded 1,000 per 100 square mile. Gizzard shad are the most important forage species for walleye in the western basin of Lake Erie.

The data show that the preferred CDF site presently consists of a diversity of valuable aquatic habitats and that without the implementation of the proposed project, the value of these habitats would continue to increase with the improvement of water quality in the lower Maumee River. The value of these resources is sufficient to qualify their loss as significant, and that loss should be appropriately mitigated.

The propose CDF will neither take on the appearance of an island nor add diversity to the area. It will reduce the diversity that presently exists in the CDF peninsula by reducing the shoreline length of the peninsula and eliminating the varied aquatic habitats in the existing 176-acre embayment. It is unlikely that the short-term increased utilization of the CDF area by water birds during the filling phase will outweigh the long-term loss of use of the existing 176 acres of Maumee Bay by herons, egrets, and particularly by diving ducks.

The proposed CDF is but one in a series of CDFs that have been constructed in Maumee Bay and the lower Maumee River. With the construction of the proposed CDF, almost 5 percent of the surface area of Maumee Bay will be occupied by CDFs. The cumulative impacts to fisheries have been significant and there has been no mitigation of fish habitat losses resulting from the construction of any of these existing CDFs. If a CDF is constructed at the preferred site, a combination of in-kind and out-of-kind mitigation could partially offset fish habitat losses and such mitigation should be made a part of the project.

URBAN RUNOFF

Urban runoff encompasses combined sewer overflows, as well as a significant non-point source of pollution. Any type of street debris that is small and light enough to be washed away by a heavy rain will end up in Lake Erie in some form, sooner or later. Contaminants in urban runoff cover a broad range, but typically include pollutants washed out of the air by rainfall, animal droppings, construction sediment, leaves, litter, salt, and oil. Some of these occur naturally; the pollution problem results from the high rate of runoff from urban areas.

A number of studies on the problems and possible solutions to urban runoff pollution have been conducted. Subjects investigated include urban soil sediment, and street cleaning. Urban runoff is higher in suspended solids than sanitary sewage; the BOD is lower than in sewage, but not low enough for runoff to be considered clean water.

In developed urban areas, rainwater runs off of roof tops, sidewalks, and streets, and becomes polluted as it dissolves or washes away debris. Any debris on the street or sidewalk sooner or later ends up in a nearby stream. There are two ways to reduce urban runoff pollution from developed areas. Collect the water and treat it, or reduce the sources of pollutants by keeping debris from being washed into storm sewers to start with. This is a matter of urban housekeeping.

In newly developing areas, there are special problems related to sediment and debris from construction sites. While of limited duration, the impact of large quantities of sediment can be substantial.

Urban runoff is a significant source of nutrients: it is estimated[32] to contribute 0.8 lb of available phosphorus per urbanized acre per year. This estimate was based on runoff samples taken from urban areas in the Great Lakes region. On the basis of this loading, it was estimated that for the Swan Creek watershed[42] phosphorus loadings from urban areas total roughly 13% of agricultural runoff. This would make urban runoff the second largest source of phosphorus in the sub-basin. Applying the 0.8 pound of available phosphorus per urbanized acre per year, a total of 3,922 pounds or 21 tons, is the estimated phosphorus loadings per year for the RAP area. These calculated loadings are displayed in Table 40 by municipality and by TMACOG watershed.

TABLE 39
ESTIMATED URBAN RUNOFF PHOSPHORUS LOADINGS

MUNICIPALITY	TOTAL HECTARES	TOTAL ACRES	URBAN HECTARES	URBAN ACRES	LB. PHOSPHORUS	TMACOG WATERSHED(S)
LUCAS COUNTY						
Berkey	1,052	2,599	52	128	103	1
Harbor View	4	10	4	10	8	28
Holland	112	277	84	208	166	9
Maumee	2,536	6,266	1,236	3,054	2,443	10, 41, 47, 79
Oregon	7,432	18,364	1,776	4,388	3,511	28, 29
Ottawa Hills	448	1,107	308	761	609	6
Sylvania	1,464	3,618	808	1,997	1,597	3
Toledo	21,704	53,631	14,840	36,670	29,336	2, 6, 10,13,14,15,22,23,25,26,30
Waterville	568	1,404	232	573	459	41, 43, 44
Whitehouse	792	1,957	200	494	395	39, 40
TOTAL	36,112	89,233	19,540	48,283	38,627	
WOOD COUNTY						
Haskins	408	1,008	64	158	127	122
Luckey	160	395	80	198	158	83
Millbury	248	613	72	178	142	115
Northwood	2,052	5,070	496	1,226	980	43
Perrysburg	1,076	2,659	676	1,670	1,336	121, 122
Rossford	728	1,799	432	1,067	854	115
Walbridge	264	652	164	405	324	28, 29, 32
TOTAL	4,936	12,197	1,984	4,902	3,922	
TOTAL FOR AREA	41,048 Acres	101,430 Acres	21,524 Acres	53,186 Acres	21 Tons P/Yr	

Apart from the estimate that urban runoff yields 0.8 pound of Phosphorus per acre per year to Lake Erie, no other monitoring or sampling data specifically aimed at urban runoff is known in the Maumee RAP Area.

Salt for deicing streets is a potential source of water pollution from urban runoff. If present in high enough concentrations, salt can be toxic to aquatic life. No data is available to indicate whether deicing salt causes problems in the Toledo area.

Present Urban Runoff Control Practices

Typically, there are no urban runoff control practices in use in the older, developed urban areas. However, the City of Toledo and Lucas County enforce site drainage design regulations for new development. These regulations limit the allowable discharge rate of stormwater to a storm sewer. Any flow above the rate at which runoff occurred from a 25 year storm before development must be retained.

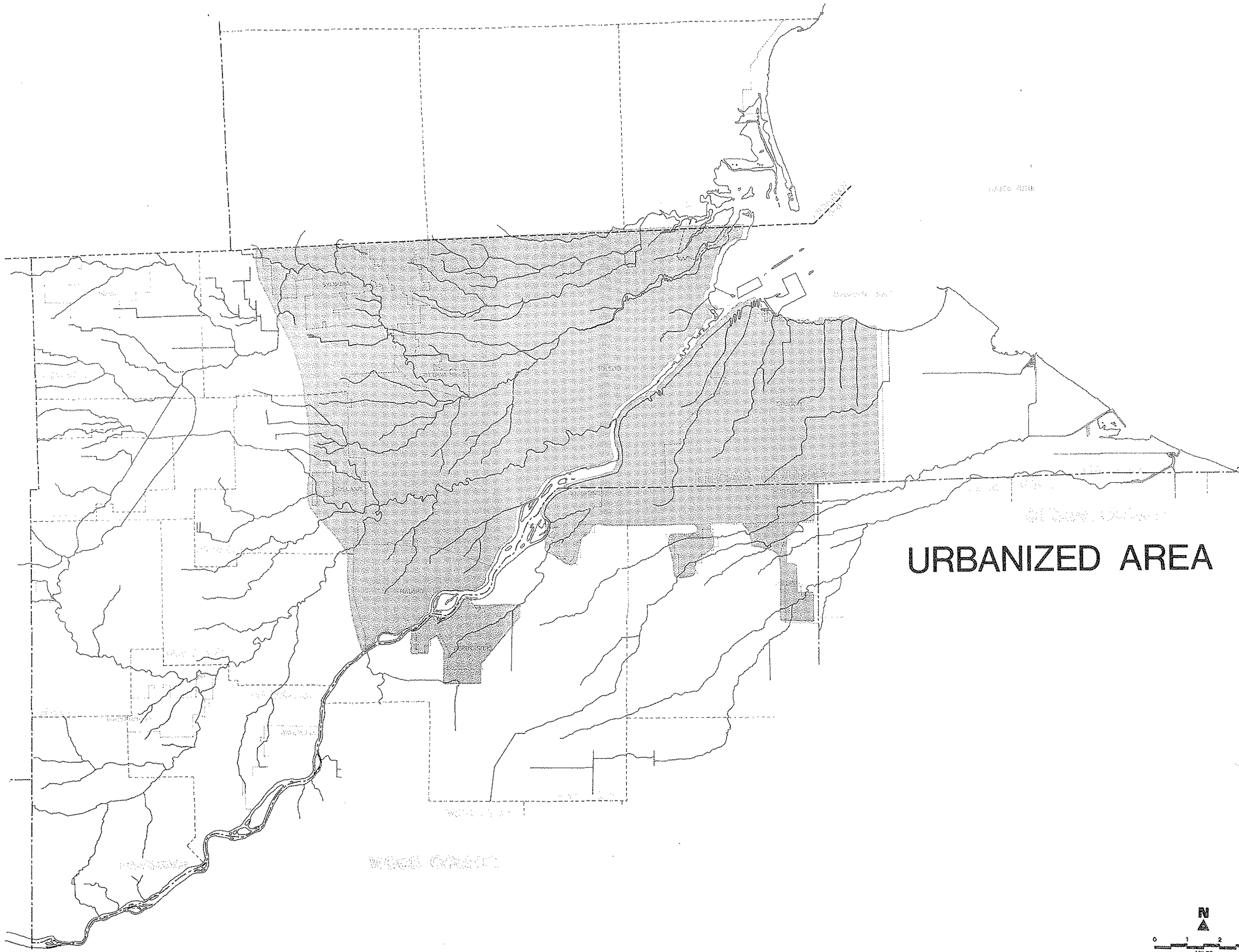
Retention/detention basins, and rooftop and parking lot stormwater storage are frequently used, as are swales and oversized ditches with restricted outlets. Design standards call for the use of passive stormwater control facilities that will work without having to be operated; e.g., the outlet from a retention basin is controlled by a small outlet to restrict flow, rather than a valve. Also, a valve can be easily removed by the owner, defeating the purpose of the basin.

- There are some problems and shortcomings with the present regulations. They are not stringently enforced. Regulation may be no more than paying a fee for a permit.
- Training of inspection personnel is a problem. Better awareness of the purpose of these stormwater facilities, especially relating to water pollution control, would be beneficial.
- There is no enforcement for proper maintenance of stormwater control facilities.

Proposed NPDES Permit Requirements for Storm Sewers

US EPA[67] has been developing NPDES requirements for separate storm sewer outfalls over the past several years. The regulations developed required communities to classify storm sewers as "Group I" or "Group II," depending on the type of area drained by the sewer, and the likelihood of contaminated runoff. The filing deadline for permit applications was set at December 31, 1987. The area affected by the regulation was defined as "*the most current criteria established by the Bureau of Census*." A map showing the areas classified as "urbanized" by the 1980 Census[68] is included as Figure 49. However, a lawsuit was filed, and in December, 1987, a Court of Appeals threw out the regulation (CFR 2/12/88[67]). The issue of how to regulate stormwater discharges has been remanded to US EPA for further rule making.

EPA intends to issue new regulations codifying storm water provisions found in sections 401, 405, and 503 of the Clean Water Act of 1987 in the near future. Details and proposed rules will published for public comment in the *Federal Register*.



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

Combined Sewer Overflows

Storm runoff causes a serious pollution problem resulting from combined sewer overflows, or "CSOs." Almost every town has areas where sewage and runoff use the same, or "combined" sewers. During a storm, runoff overloads these sewers, and causes a mixture of rainwater and raw sewage to overflow into the nearest creek.

This is a serious problem, not only because of the pollution it causes, but also because it's difficult and expensive to correct. During a heavy rain, the amount of storm water flowing through the sewers is likely to be much greater than the amount of sewage.

Designing a sewage treatment plant for this peak flow rate would be expensive, and would be significantly oversized for normal flow rates. But if this peak flow surge is allowed to go through the treatment plant, it can upset the treatment processes and keep the plant from doing a good job of treating sewage for days or weeks afterward.

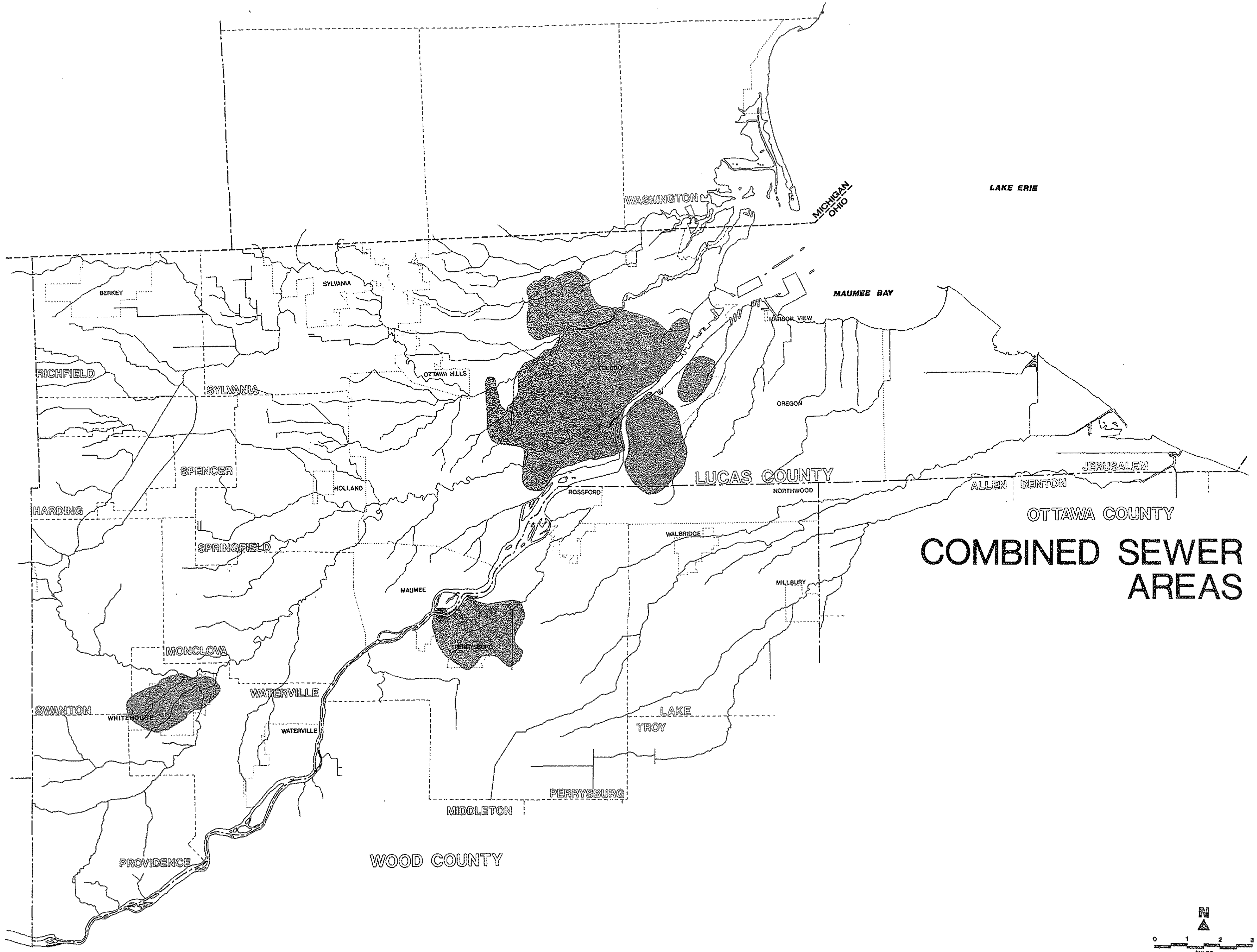
The best way to eliminate pollution from CSOs, from a purely environmental standpoint, is to build a separate system of storm sewers. It is standard practice to do so in new developments, and has been for many years, but in the older parts of every town, combined sewers are the rule. Separating the sewers for even a small town could cost in the millions of dollars and would require digging up the streets. These are two big reasons why separate sewer systems are rarely added to existing neighborhoods.

US EPA does not award construction grants for CSO abatement projects, but allows individual states the alternative of setting aside up to 20% of total grant money statewide for otherwise nonfundable projects. In Ohio, 5% is earmarked for CSOs. The City of Toledo has been a major benefactor of this program, receiving a grant of $6.3 million for Phases I and II or its CSO abatement project.

The municipalities in the Maumee Basin Area of Concern which have CSOs are Toledo, Maumee, Northwood, Perrysburg, and Whitehouse. Areas served by combined sewer systems are shown in Figure 50. Listings of these overflow points are given in Tables 41 through 45. In Toledo, 8902 acres are tributary to the CSO regulators;[25,69,70] in Maumee, 456 acres;[71] and in Perrysburg, 882 acres.[71]

Most of Northwood is served by separate sanitary sewers. The western portion of the city is served by combined sewers. The *Northwood Facilities Plan*[72] notes: *Wet weather from the combined sewer, which bypasses the existing intercepting manhole at Andrus Road and Sheffield Place, discharges into the Maumee River through a storm sewer of the City of Toledo. The two discharge points (overflow from Regulator No. 9 and the storm sewer) are located approximately 300 feet apart.*

COMBINED SEWER OVERFLOW AREAS



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

Toledo Combined Sewer Overflows

Toledo's combined sewer system presently has 34 overflow points to the Maumee River, the Ottawa River, and Swan Creek. The problems associated with these overflows are well-known, and have been documented in past studies.[70,73] They severely degrade water quality, and are aesthetically offensive.

Combined sewer overflows are controlled by float-operated gates called *regulators*. They are designed to direct all sewage flow to the treatment plant during normal conditions. They should bypass only when the sewer system is overloaded with stormwater. However, regulators can experience problems which cause them to bypass during dry weather.

Toledo has experienced problems with river water entering the sanitary sewer system through the regulators. This phenomenon occurred when northeast winds caused the river levels to rise. In 1987, Toledo began installing tide gates on the regulators. Most are now in place. It is too early to tell whether the new tide gates will show a significant improvement in water quality.

Toledo's regulators experience other problems as well.[73] One is that most of them are below Lake Erie's mean annual flood elevation. Another is debris, which causes the regulator gate to stick in the open position, and continue bypassing when it shouldn't. The regulators can experience problems from collapse of pipelines and other mechanical failures. The regulators are inspected an average of about 12-15 times per year. Also, telemetering equipment records the status of each regulator, and how many hours each day the discharge gate is open.

Toledo plans a 9-phase CSO abatement program for these areas, to be completed in 1996. Phases 1 and 2 will be a downtown combined sewage tunnel for storing surge storm flows. The downtown tunnel will catch a 0.2" first flush, which is estimated to contain 85% of the pollution. Similar smaller tunnels will be built along Swan Creek as phases 3 and 4, will be designed to catch a first flush of 0.55".

Other rehabilitative work is included in the CSO abatement program. The tide gates are now in place on nearly all of the regulators. Repairs and/or improvements will be made to a number of the regulators. Some sewer separation will also be done. Once the present 9-phase program is complete, Toledo plans to reevaluate the situation to determine whether improvements are needed for the remaining CSO areas along the Maumee.

A listing of Toledo's CSO points[73] is given in Table 41, and a summary of regulator bypasses for October 1986-February 1987[73] is presented in Table 42.

TABLE 40
CITY OF TOLEDO COMBINED SEWAGE REGULATORS

Regulator No.	Name	Stream	R.M.	Size, "	Drainage Area Sanitary (Acres)	Storm	Location
4	Paine	Maumee (E)	3.2	84	380.2	296.0	2201 Front @ Paine
5	Dearborn	Maumee (E)	4.1	90	523.7	352.0	1547 Front @ Dearborn
6	Main	Maumee (E)	4.82	60,54	207.8	174.7	Main @ Sports Arena
7	Nevada	Maumee (E)	5.8	60	581.6	608.0	609 Nevada @ Miami
8	Fassett	Maumee (E)	6.5	48	116.9	104.6	1152 Miami @ Fassett
9	Oakdale	Maumee (E)	6.85	93	638.2	467.1	1435 Miami @ Oakdale
22	New York	Maumee (W)	2.37	60	116.8	44.9	212 New York @ Summit
23	Columbus	Maumee (W)	2.85	48,102	675.9	204.9	214 Columbus @ Summit
24	Gales	Maumee (W)	3.25	30	27.6	27.5	216 Galena @ Summit
25	Ash	Maumee (W)	3.6	48	75.7	101.9	200 Ash @ Summit/I-280
26	Magnolia	Maumee (W)	4.2	48	143.3	121.2	210 Magnolia @ Summit
27	Locust	Maumee (W)	4.66	75,60	141.2	111.5	215 Locust between Water & Summit
28	Jackson	Maumee (W)	4.9	72	630.2	630.2	216 Jackson between Water & Summit
29*	Adams	Maumee (W)	4.98	24			215 Adams @ Portside
30	Jefferson	Maumee (W)	5.2	60	435.9	440.3	215 Jefferson between Water & Summit
31	Bostwick	Maumee (W)	0.07	36			315 Monroe @ Summit
32	Williams	Maumee (W)			70.3	59.9	
33	Maumee	Maumee (W)	7.5	60	345.5	343.6	502 Maumee @ Orchard
41	Knapp	Swan Cr.	0.8	48	77.3	57.8	328 St. Clair @ Williams
42	Erie	Swan Cr.	0.93	24	40.2	37.5	42 Erie St @ Hamilton
43	Hamilton	Swan Cr.	1.1	60	292.7	349.8	Hamilton & Ant. Wayne Tr.
44	City Park	Swan Cr.	1.58	30	37.9	22.2	City Pk, S. of bridge
45	Ewing	Swan Cr.	1.9	48	261.9	220.2	Ewing & Hamilton
46	Hawley	Swan Cr.	2.65	60	508.3	470.9	Hawley, S. of bridge
47	Junction	Swan Cr.	3.15	96	867.4	841.3	Pere West, E. of Gibbons St.
48	Hillside	Swan Cr.	3.45	24	190.5	49.3	Hillside & Chester St
49	Woodsdale	Swan Cr.	4.3	--	547.3	17.9	Woodsdale & South St.
50	Highland	Swan Cr.	4.22	--	230.6	209.3	Fearing St. in Highland Pk.
61	Lagrange	Ottawa R.	6.45	60	555.2	167.1	3503 LaGrange @ Manhattan Blvd
62	Windermere	Ottawa R.	6.7	--	958.3	865.6	202 Manhattan @ Windermere
63	DeVilbiss	Ottawa R.	6.8	72	933.7	921.4	3646 Detroit @ Phillips
64	Lockwood	Ottawa R.	7.75	114			3627 Lockwood @ I-475
65	Ayres	Ottawa R.	8.65	54	283.5	213.4	2584 Ayres @ S. Cove
66	Monroe	Ottawa R.	9.2	36	3763.0	0	3708 Monroe @ S. Cove W. of bridge

* Data refers to old regulator, which was replaced by a new unit at the end of Adams Street.

TABLE 41
TOLEDO REGULATOR BYPASSES, 10/86-2/87

Receiving Stream	No. of Regulators	October 1986	November 1986	December 1986	January 1987	February 1987
Maumee East	6	1400	1255	2376	2081	626
Maumee West	11	2089	3156	2668	2769	2871
Swan Creek	9	2404	2019	2627	2463	2028
Tenmile Creek	6	96	44	50	0	0

Maumee Combined Sewer Overflows

The City of Maumee published its CSO study in 1982.[71] It included detailed analysis of the overflow with regard to correlation between rainfall quantity, intensity, combined sewage bypasses, and their effect on the water quality of the Maumee River. While the primary focus of this study was the City of Maumee, it also included sampling on the Perrysburg side of the river. Samples were collected at two outfalls in Perrysburg, and three in Maumee. Rainfall data was collected in Maumee at four locations to correlate the response of the combined sewer system in terms of measured overflow. Sampling included primary sites (quality and quantity discharged), and secondary sites (quality only). Results of this sampling indicated high levels of BOD_5 and nutrients, and high bacteria counts.

The Maumee CSO Study concluded that rainfalls as low as 0.05" resulted in bypasses. These bypasses resulted in violations of the fecal coliform standards for the Maumee River, but did not have a serious impact on dissolved oxygen. The study recommended the City of Maumee proceed with a sewer separation program. A list of Maumee combined sewage regulators is given in Table 43.

TABLE 42
CITY OF MAUMEE COMBINED SEWAGE REGULATORS[71]

Regulator No. Name	Stream	Size, Inches	Drainage Area Sanitary Storm (Acres)	Location
1	Maumee	12		Broadway & Ford
2	Maumee	18	38	Wayne & Kingsbury
3	Maumee	20	136	Broadway & Conant
4 *	Maumee	15	39	Broadway & Elizabeth
5	Maumee	12		Front & Ford
6 *	Maumee	24		Front & Kingsbury
7 *	Maumee	20		Front & Conant
8 *	Maumee	15		Front & Gibbs
9	Maumee	12		Key & River Rd
10*	Maumee	36	113	Waite & Sackett

* The City of Maumee's combined sewer system includes 10 regulators. Combined sanitary and storm water overflows to the Maumee at six locations: these are 33", 60", 20", 18", 15", and 60" inches in diameter, starting at the one furthest upstream. Those regulators marked with an asterisk (*) are directly above outfalls.

Perrysburg Combined Sewer Overflows

The City of Perrysburg's CSO study was prepared in 1982.[74] River sampling data showed significant CSO-related increases in fecal coliform bacteria concentrations, but no serious impacts on dissolved oxygen and other water quality parameters. The study included the development of combined sewer network and receiving water quality models to evaluate various CSO control alternatives.

The *Perrysburg CSO Study* concluded that rainfall as low as 0.05-inch resulted in CSOs. The study recommended the capture and conveyance of CSOs to a swirl concentrator with chlorination facilities. The treated CSO would then be discharged to the Maumee River. Considering problems experienced with swirl concentrators during the years since the preparation of the CSO study, the City currently favors a combined sewer system separation project. Such a separation project would reduce the average annual CSO volume to the Maumee River by 90%.

The City of Perrysburg's discharge permit[74,75] lists overflows and bypasses as shown in Table 41.

TABLE 43
CITY OF PERRYSBURG, OHIO
BYPASS AND OVERFLOW POINTS

OEPA STATION NO.	DESCRIPTION	RECEIVING STREAM
D702002	Louisiana Ave - Water St.	Maumee River
D702003	Elm St. north of Front St.	Maumee River
D702004	Cherry St. - Water St.	Maumee River
D702005	Gorman View Subdivision	Grassy Creek
D702006	Hickory St. along Grassy Creek	Grassy Creek
D702007	Louisiana Ave. along Grassy Creek	Grassy Creek
D702008	Elm St. along Grassy Creek	Grassy Creek
D702009	West Boundary at Second	Blocked. No discharge

Whitehouse Overflow Points

Like Perrysburg, the Village of Whitehouse's treatment plant does not have adequate capacity to treat combined sewage. Average 1986 flow was 0.32 mgd, not including bypassed sewage, to the 0.29 mgd WWTP. Whitehouse's sewer system suffers from a severe inflow/infiltration (I/I) problem.

The storm sewers are connected indirectly to the sanitary sewer system. Within the system are 8 overflow points where storm flow may be diverted to the sanitary line. Seven overflow locations discharge storm water to Disher Ditch; One overflow discharges to Lone Oak Ditch.

The Village of Whitehouse has submitted plans for construction of an interceptor sewer to tie into the Lucas County sanitary sewer system. When this project it complete, Whitehouse will be served by the Lucas County WWTP, and will abandon its existing WWTP. The Village is working toward the goal of eliminating all CSOs by the end of 1989. The Village of Whitehouse's CSO points are listed in Table 42.

TABLE 44
VILLAGE OF WHITEHOUSE CSO POINTS

Regulator No. Name	Stream	Size	Location
Texas St.	Disher Ditch	8"	Texas St. S. of Waterville St.
Field Ave.	Disher Ditch	18"	Weckerly, East, Field Streets
Gilead St.	Disher Ditch	15"	South, Toledo, Maumee, Providence, Gilead Streets
Heller Rd.	Disher Ditch	12"	Heller S. of Waterville St.
Texas St.	Lone Oak Dt.	8"	Texas N. of Shepler
Gilead St.	Disher Ditch	15"	Waterville St & Alley NE of Providence St.
Providence St	Disher Ditch	10"	Providence St. S. of Otsego St.
Otsego St.	Disher Ditch	10"	Providence St. south of Otsego St.

HOME SEWAGE DISPOSAL

As reported in the *Groundwater Quality Baseline Report*[76], June 1982, individual home sewage disposal systems affect groundwater quality. The Lucas County Health Department reported leachate problems in the following areas within the county:[77] See Figure 51.

Sylvania Township:

Area bounded by Michigan line, Whiteford Road, Alexis Road and Sylvania corporation limits.

Area bounded by King Road on west, Gower Road on east, Brint Road on south, Sylvania corporation limits on north.

Winterhaven Road and area near the intersection of Centennial and Sylvania-Metamora Roads.

Villa Farms Subdivision bounded by Central Avenue on the north, Centennial Road on east.

Monclova Township

Coder Road Area, Village of Monclova

Springfield Township

South Hill Park, Dorcas Farms, Layer Road, Village of Holland, Culley Road, Haven Park and Fairhaven Subdivisions, Devonshire Lane Subdivision.

Spencer Township

Most of township

Jerusalem Township

All areas subject to flooding.

City of Oregon

Entire area from Lallendorf Road east to City limits.

Three of the above identified problem areas, Sylvania and Springfield Townships and the City of Oregon, are of significant concern due to projected population increases. While public sewers have been targeted for these areas, facility planning must be stepped up. With implementation of the Western Lucas County Facility Plan and related segmented plans, many troublesome areas can be eliminated with tie-in to public water and sewers.

These improvements will eliminate some package treatment plants and improve water quality in minor receiving streams. Because of the costs and cutbacks in federal funding, delays in bringing these areas on-line will continue to thwart the effect of public health improvements. Conditions will continue to worsen in areas where densities are high and existing on-site systems are failing. The soil and groundwater conditions are such that at best, with a strong operation and maintenance program, the situation could be stabilized, but not significantly improved. It is imperative that those areas targeted for facility treatment system be given highest priority to reduce the health risks associated with contaminated surface and groundwater conditions.

A second area of concern is in areas which are not targeted for correction in the near future. These are areas in eastern Lucas County and extreme western Lucas County outside of sewered areas, and are not near any sewer system. These on-site systems will continue to be a problem and like the on-site systems in the targeted areas of high density and priority, a sound operation and maintenance program would help, but often will not overcome the soil conditions, densities, lot size and high water table problems which are part of the landscape. Development bans are difficult to enforce and at times met with strong opposition.

The third area of concern is development in areas where soil and conditions warrant development bans or areas where systems are failing because of poor site selection in the past. These situations have resulted largely from inappropriate planning decisions and often left the health department in a reactive position rather than in a guidance and advisory role for the development.

Table 46 displays the number of septic systems and privies by minor civil division within Lucas County, including 1980 population with forecasted 1990 population and the percent change between these two decades, along with the status of active 201 facility projects as of June 1983. These statistics were taken from Table 3 and Table 8 of the TMACOG publication *Home Sewage Disposal Priorities*, December 1983.[77]

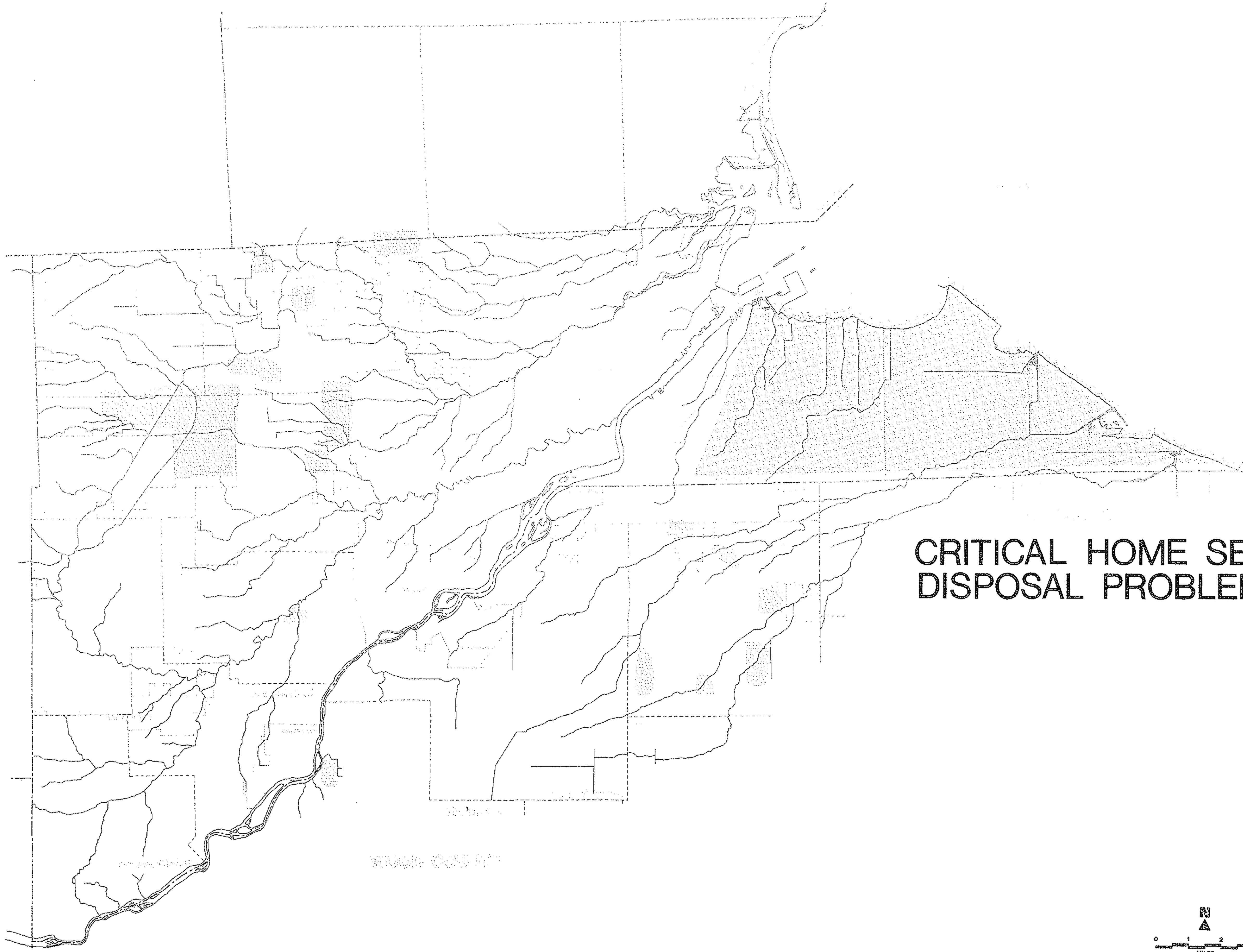
Wood County and Ottawa County

The Wood County Health Department experienced a 6% decline of on-site systems from 1970 to 1980. This has resulted from many unsewered communities being sewered and much of the new development being confined to sewered areas. Although bans in some areas have been enforced, problems areas still exist and have increased. The area of major concern within Wood County is largely confined to the urbanizing areas of Lake Township which are outside of sewer districts and in sewered areas where final tie-ins have not been enforced. These areas are specifically include: Tracy Road, Millbury, areas along I-280 and Stony Ridge within the RAP study area.(See Figure 51)

Health departments for both Wood and Ottawa Counties have reported problems for individual home sewage disposal systems in areas of shallow rock (less than 4 feet to bedrock) throughout their counties. Improper water well construction and abandoned water wells also cause localized problems affecting groundwater.

Table 47 page displays the number of septic systems and privies by those minor civil divisions within the AOC for Wood and Ottawa Counties, including 1980 population with forecasted 1990 population and the percent change between these two decades, along with the status of active 201 facility projects as of June 1983. These statistics were taken from Table 6 and Table 11 for Wood County from Table 4 and Table 9 for Ottawa County of the TMACOG publication *Home Sewage Disposal Priorities*, December 1983.[77]

CRITICAL HOME SEWAGE DISPOSAL PROBLEM AREAS



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

TABLE 45
LUCAS COUNTY STATISTICS BY MINOR CIVIL DIVISION
AND POTENTIAL CONCENTRATIONS OF ON-SITE SYSTEMS
(by Year-Round Housing Units)

	Septic	Other	1980	1990a	% Chg.	To be[b] Sewered	Sewered
Harbor View Village	52	7	164	154	-6.1	Step 1*	+
Harding Township	188	7	631	639	1.3	Step 1(pt.)*	
Jerusalem Township	1,101	26	3,327	3,376	1.5		
Maumee City	69	5	15,747	16,072	2.1	Step 1*	x
Monclova Township	903	25	4,285	4,467	4.2	Step 1*	
Oregon City	1,396	45	18,675	20,111	7.7	Step 1*	x(pt.)
Ottawa Hills Village	40	7	4,065	4,126	1.5	Step 2*	x
Providence Township	828	20	2,702	2,917	8.0	Step 1 (pt.)*	
Richfield Township							
Berkey Village	96		306	319	4.2		
Twp. balance	347	1	1,095	1,044	-4.5	Step 1 (pt.)*	
Spencer Township	446	36	1,744	1,758	0.8	Step 1 (pt.)*	
Springfield Township							
Holland Village	292	2	1,048	1,139	8.7	Step 1*	
Twp. balance	2,311	37	15,043	17,440	15.9	Steps 1 & 2*	
Swanton Township	975	43	3,379	3,453	2.2	Step 1 (pt.)*	
Sylvania Township							
Sylvania City	191	12	15,527	18,226	17.4		x
Twp. balance	3,844	46	17,534	18,698	6.6	Steps 1,2&3*	x(pt.)
Toledo City	750	426	354,635	336,565	-5.1	Steps 1&2*	x
Washington Township	167	4	4,000	4,159	4.0	Steps 3*	x(pt.)
Waterville Township							
Waterville Village	18	--	3,884	4,537	16.8	Step 1*	x
Whitehouse Village	100	1	2,137	2,640	23.5	Step 1*	x
Twp. balance	494	8	1,813	2,030	12.0	Step 1 (pt.)*	

1980 Census, STF 3A Table 108[68]

+ - Sewers constructed, but not connected to treatment facility.
a - TMACOG Draft Population Forecast for Lucas County 1985 through 2010.
b - TMACOG Status of Active 201 Facility Projects June 1983.
* - Out of Funding Range to receive USEPA grants in the next five years according to the Northwest District Office Ohio EPA.

(Excerpts from Table 3 and Table 8 - Home Sewage Disposal Priorities, December 1983, TMACOG)

TABLE 46

SEGMENTS OF WOOD AND OTTAWA COUNTIES WITHIN AOC DEALING WITH STATISTICS BY MINOR CIVIL DIVISION AND POTENTIAL CONCENTRATIONS OF ON-SITE SYSTEMS

(by Year-Round Housing Units)

	Septic	Other	1980	1980a	% Change	To be[b] Sewered	Sewered
WOOD COUNTY:							
Lake Township							
Millbury village	15	--	955	1,452	52		
Walbridge village	44	--	2,900	2,941	1.4	under construction	
Twp. balance	1,099	23	7,044	8,306	17.9	Step 3 (pt.)*	x(pt.)
Middleton Township							
Haskins village	22	--	568	655	15.3		x
Twp. balance	594	30	1,880	2,409	28.1		
Northwood city	150	37	5,495	6,730	22.5		x
Perrysburg city	60	--	10,215	11,559	13.2	Step 1&2*0	x
Perrysburg Township	1,325	77	10,651	14,235	33.6	Step 1 (pt.)*	x (pt.)
Rossford city	8	--	5,978	6,235	4.3	Step 1*	x
Troy Township							
Luckey village	263	8	895	932	4.1	Step 1*0	
Twp. balance	861	33	2,663	3,088	16.0	Step 1 (pt.)*	
OTTAWA COUNTY:							
Allen Township							
Clay Center Village	91	6	327	336	2.8	Plan of Study*	
Twp. balance	878	23	2,995	3,319	10.8	Plan of Study*	
Benton Township							
Rocky Ridge Village	130	3	457	472	3.3		
Twp. balance	667	28	1,989	2,050	3.1		

1980 Census, STF 3A Table 108[68]

a - TMACOG Draft Population Forecast for Wood & Ottawa Counties 1985 through 2010, December 1983

b - TMACOG Status of Active 201 Facility Projects June 1983.

* - Out of Funding Range to receive USEPA grants in the next five years according to the Northwest District Office Ohio EPA.

0 - Proceeding without Federal Funds.

(Excerpts from Tables 4, 6, 9 and 11 - Home Sewage Disposal Priorities, December 1983, TMACOG)

ACTIVE AND CLOSED LANDFILLS/DUMPSITES

As reported in the Groundwater Quality Baseline Report,[76] June 1982, active and closed landfills and/or dumpsites affect groundwater quality. In past years, many dumpsites were created by private companies and local governments. Every political subdivision has had its dumpsite, usually in a low area along a stream just at the edge of its most populated area. These dumps were not designed to prevent leaching of chemicals and liquidized substances into surface waters or groundwater. These dumps are often sources of groundwater contamination and are not monitored for their impact. The location of some dumpsites are not even known today and periodically one is found because the buried material has moved upward to the surface, or someone begins to dig a garden, or children find a leachate seep or spring to play in.

Within the past twenty years, the practice has been to site "sanitary" landfills with dependence upon clay soils to prevent leachate problems. They were still sited along a stream applying the trench and fill method, with no consideration that seasonal high water table could be within one to five feet of the surface. Underdraining with leachate collection systems were not required. In many instances during excavation, groundwater had to be pumped with collapsible hoses in order to place the solid wastes in a dry trench. Leachate is generated by the infiltration of precipitation and surface runoff.

Past operational permits generally concentrated upon daily cover of the trench. Therefore, information on old sites is at best sketchy due to the fact that monitoring wells were not required. Today, however, monitoring wells and methane venting is required for new sites, or when a new cell is being established at a currently operating landfill.

Only two industrial landfills were identified in the 1981 Ohio EPA Open Dump Inventory. The National Castings Midland Ross Corporation contains a 2 acre onsite landfill that contains only foundry sand. The landfill is 2,500 feet from the Maumee River.

The second site is the Rossford Landfill, a 26 acre parcel located 25 feet from Grassy Creek within the City of Rossford. The city employs the trench method using 10 acres overall. Its use is restricted to Rossford residents and businesses. There is an indication that contaminants are leaching into surface water and the Ohio EPA Northwest District Office believes that the site warrants further investigation. It has no leachate collection system, groundwater monitoring plan or methane gas detection system. Depth to seasonal high water table is 1 foot.

Although it was excluded from this Ohio EPA list, there are abandoned ponds on Libbey-Owens-Ford Company property from which leachate is infiltrating Otter Creek via deteriorated sewer lines which run underneath the abandoned site. These grinding sand settling ponds, or lagoons, covered 50 acres and were used to settle fine particles of silica and felt waste products from the polishing and grinding of glass. They were abandoned prior to December 1971 and were covered with a layer of clay and are most likely unlined. It is important to note that no monitoring information from these sites is available for analysis. However, the Ohio EPA Northwest District Office reports that the leachate discharging from the Libbey-Owens-Ford waste glass settling ponds in Rossford contains arsenic.

<u>Licensed Solid Waste Landfills</u>

There currently 7 landfill sites in the AOC which are licensed by its respective local health department to operate. Two of these, the National Castings Landfill and the Rossford Landfill, are discussed above. The other five are described briefly following the table which displays them. These are all listed in Table 47 and displayed in Figure 52.

TABLE 47
LIST OF LICENSED SOLID WASTE LANDFILLS

License #	Health Department	Landfill	Map #	Status
48-00-01	Lucas County	Fondessy Enterprises* Landfill #1 York St & Otter Creek Rd Oregon, Ohio	A	Closed
48-00-05	Lucas County	Westover Landfill 820-920 Otter Creek Rd Oregon, Ohio	B	Closed
48-00-09	Lucas County	Toledo Edison Co. Bay Shore Ash Landfill Oregon, Ohio	C	Active
48-00-06	Toledo	Hoffman Road Landfill 4545 Hoffman Road Toledo, Ohio	D	Active
48-01-06	Toledo	National Casting Landfill Midland Ross Corp. 1414 East Broadway Toledo, Ohio	E	Active
87-00-01	Wood County	Evergreen Landfill Waste Management 2625 E. Broadway Northwood, Ohio	F	Active
87-00-02	Wood County	Rossford Landfill 8250 Wales Road Rossford, Ohio	G	Active

* Envirosafe Services of Ohio

Fondessy Landfill

A 135 acre parcel located in the Otter Creek watershed in Oregon is operated as a hazardous waste site by Envirosafe Services of Ohio, Inc. It was first operated as a landfill for solid wastes for municipal and industrial disposal in the 1960's. Since the early 1980's the site has accepted only hazardous waste for disposal. These earlier solid waste cells known as landfill areas 1 and 2 and the Millard Avenue Landfill have no leachate collection system or synthetic liners. Cell F, designed for hazardous wastes, has no synthetic liner but does have a leachate collection system. However, newer cells have both. In November 1981 the Ohio Hazardous Waste Facility Board granted permission to dispose of certain types of hazardous wastes at the site under a Part A Interim Status provision under RCRA.

Two raw water supply lines owned and maintained by the City of Toledo traverse the site. The first of these water lines was installed in 1940, before the facility existed. This line is made of 78-inch coated steel pipe, lying between 11 and 21 feet below the ground surface. The second water line was installed in 1964, using 60-inch precast, prestressed concrete pipe. Together the lines deliver an average of 73 million gallons of water per day to the

Collins Park Water Treatment Plant serving over one-half million people in the Toledo metropolitan area. The company maintains monitoring trenches along the water lines.

In 1983, Conversion Systems, Inc., a subsidiary of the IU International Company, acquired the Fondessy facility. The parent company later reorganized to place Fondessy under the management of Envirosafe Services, Inc., which continues to operate the site as a hazardous waste disposal facility. In the spring of 1988, NEOAX, a Hartford, Connecticut firm, acquired more than 90% of the IU International stock.

Westover Landfill

A small parcel permitted to establish operations in the floodplain of Otter Creek, it is now closed. It received municipal wastes from the residents of the City of Oregon and also industrial sludges, solvents, and paint wastes from the Dana Corporation, Johns-Manville, and two refineries, Sun and Standard. A severe leachate problem developed, with a leachate collection system being recently installed. Therefore, seepage only occurs when erosion problems opens an access for it. But erosion control systems are being installed.

Bay Shore Ash Pit

The Toledo Edison Company operates a monofill for its flyash at its location on Bay Shore Road adjacent to Maumee Bay.

Hoffman Road Landfill

A 262 acre parcel located south of the Ottawa River within the City of Toledo, with permit approval granted for Phase I in 1974. A second permit was approved in 1983 for above-grade filling to 30 feet, which relates to Area D. Generally, there are four "areas" of construction, with areas "A" and "C" considered above grade fill only, with area "B" consisting of above and below grade fill yet to be constructed. An increase in elevation was submitted in the form of a Permit-to-Install in December of 1986. An Ohio EPA Memo dated April 3, 1987 discusses the hydrogeologic and surface drainage of the site. Briefly, the Memo indicated a problem with high water table showing a mounding effect from filled cells and a discharge effect from excavated cells, and concerns with the relatively higher permeability soils in the upper 20 to 25 feet which indicate the potential for leachate migration. As a consequence of these findings, area "B" will be required to have a leachate collection system, if leachate is detected on the site, or is draining from the site. In addition, a groundwater monitoring plan, a methane gas monitoring plan and synthetic liners are required.

Evergreen Landfill

A 265 acre parcel located in the Otter Creek watershed in Northwood, Ohio, was established in the mid-1950's as the Benton Landfill. The site was purchased by Ohio Waste Systems a subsidiary of Waste management in the mid-1970's. In December 1981 the Ohio Hazardous Waste Facility Approval Board granted permission to dispose of certain types of hazardous wastes at the site under a Part A Interim Status provision under RCRA. In November 1985, the company withdrew its application for Part B status, and now only again functions as a solid waste disposal facility. None of the cells at the site have synthetic liners and only recently has a leachate collection system been installed. It has an active methane gas monitoring system, and is working to upgrade its groundwater monitoring system.

The Ohio EPA Northwest District Office reports that there is a staff gauge at the Evergreen Landfill. There are unusual water level fluctuations going on in the bedrock wells following storm events. The purpose of the gauge is to record water level rises in the bedrock immediately following the occurrence of rain. This monitor or staff gauge was installed by the United States Geological Survey, Columbus District Office, in connection with the Northwood Investigation of this site. Waste Management is currently conducting an additional investigation of the site.

Closed Dumpsites

With the assistance of the Northwest District Ohio EPA, the local health departments, the Toledo Environmental Services Division, and TMACOG files, a list of the known landfills and dumps are presented in Table 48 by watershed. It is as complete a list as possible. Included with the listing is the current known status of each of the sites. Many of the sites need further investigation and remedial action plans to correct problems.

There are 49 known closed dumpsites within the AOC. Each received during its active life different types of wastes and each has different types of problems. Many were located in low areas or floodplains along the Maumee River, the Ottawa River, Swan Creek, Otter Creek, etc. These closed sites are listed in Table 48 by watershed areas along with current known status and Map number locations as displayed in Figure 52:

TABLE 48
LIST OF CLOSED DUMPSITES BY WATERSHED

MAP #	WATERSHED	SITE NAME	CURRENT KNOWN STATUS
1	Maumee	Manhattan Dump now known as Miracle Park 2020 Manhattan Blvd. 21-34 acres, closed 1976 Deeded to Toledo in 1976	Demolition Dump had underground fires from alumina oxide powder, but no fire hazard today; past leachate migration, none at present; has vegetative cover, but closure status is uncertain
2	Maumee	Treasure Island Landfill Manhattan, New York & Counter Streets 150 acres, closed 1965	Industrial & Municipal Wastes Had chemical & underground fires; but no fire hazard today; Magnesium was the cause of the fires; has a 6" to 12" clay caps. Planned to become a park. Consideration is being given to to add flyash from Toledo Edison Co. to enhance such development.
3	Maumee	South Avenue Dump at the Maumee River 50 acres in low area. Operated 1950 to 1957 - constructed over the fill are the Anderson & Cargill Grain Elevators, Ohio Bell & Kuhlman Concrete	Mixed municipal and industrial wastes with heavy metals and organics. Cargill installed sumps 20 to 30 feet deep in 1983, was discharging to Maumee River, but, holding tanks are being installed in order to treat the discharge.
4	Maumee	NL Industries aka Bunting Brass & Bronze, 715 Spencer 10 acres, 1916 to 1980 currently Eagle-Picher Bearing Co.	Presumed storage of drosses which would contain heavy metals

TABLE 48 continued

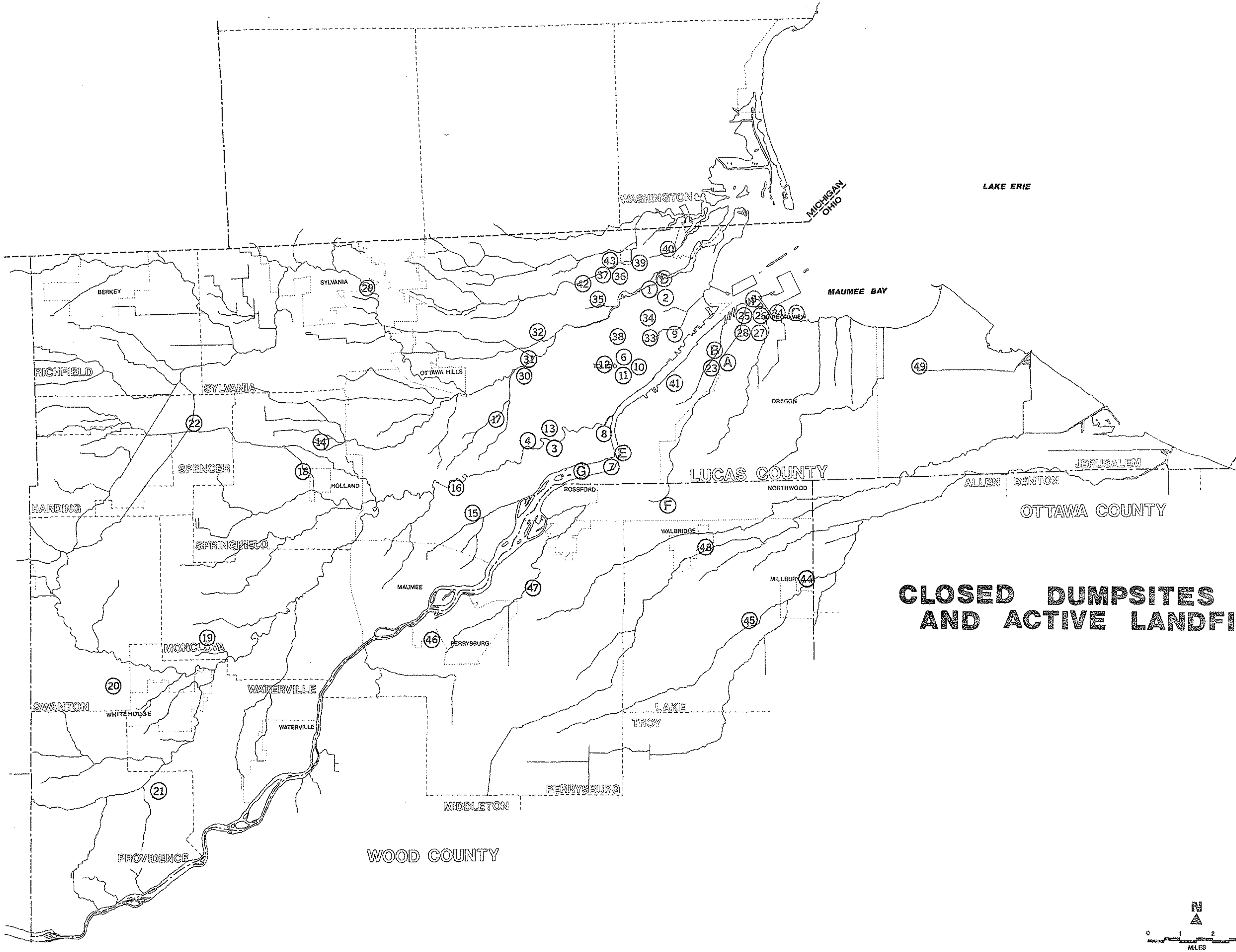
MAP #	WATERSHED	SITE NAME	CURRENT KNOWN STATUS
5	Maumee	Gulf Oil Refinery 2935 Front Street 2.75 acres sediments & sludges, 1953 to 1981 4 acre landfarm 4 separator ponds	Hazardous Wastes - Principal concerns are the landfarm with leaded sludge, followed by weathering area, the landfill and sludge pit areas
6	Maumee	Owens-Illinois, Inc. Libbey Plant 27 940 Ash Street 1883 to present	In 1800s some 10,000 cu. ft. of old furnaces and other waste materials are buried at the site containing arsenic & chromium
7	Maumee	Florence Street	Was an open dump
8	Maumee	St. Mary's Street	Was an open dump
9	Maumee	Columbus Street	Was an open dump
10	Maumee	Buckeye Street	Was an open dump
11	Maumee	Mulberry Street	Was an open dump
12	Maumee	Buckeye Basin	Was an open dump
13	Swan	Western Avenue	
14	Swan	Angola Road Mobile Home Park constructed over site	Leachate contains iron
15	Swan	Arlington Avenue	
16	Swan	Swan Creek Landfill Glendale at Swan Creek	Demolition Dump
17	Swan	Scott Park	
18	Swan	Holland Village	
19	Swan	Springfield-Monclova Twps.	
20	Swan	Swanton Township	
21	Swan	Providence Township	
22	Swan	Spencer Township	
23	Otter	Sun Oil of Pennsylvania 1819 Woodville Road 1940-1950 tank bottoms contaminated with lead disposed in 37 pits within the dikes of the tank farm.	Contents of 37 pits later excavated and disposed of in onsite landfill adjacent to tank farm; monitoring wells are in place.
24	Otter	Union Oil co. of CA (UNOCAL) 1840 Otter Creek Road Operated as refinery until 1967 when sold to SOHIO, but still operated a petroleum products storage terminal	Concern for tank diked area to retention pond which is for oil and water separation, an NPDES permit is in preparation.

TABLE 48 continued

MAP #	WATERSHED	SITE NAME	CURRENT KNOWN STATUS
25	Otter	Heist Corporation 3816 Cedar Point Road In 1981, old oil sludge pit in depressed area filled in.	Problems surfaced again in 1983 with black oily sludge breaking through earth cover; problem corrected but began oozing again in 1985 - no known offsite discharge currently
26	Otter	Standard OIl Co. (SOHIO) 4100 Cedar Point Road 1970s start of 5 acre landfarm for sludges, emulsions; leaded tank bottoms buried in small pits within tank farm.	Monitoring operation in place; all stormwater is collected and treated.
27	Otter	Westover 820 Otter Creek Road Municipal wastes, industrial sludges, solvents & paint wastes	Leachate collection system recently installed and erosion control system being developed
28	Otter	Fondessy Landfill #1 site west of Otter Creek Rd. demolition wastes	Monitoring operation to be expanded
29	Ten Mile	King Road Landfill 3535 King Road, 44 acres Operated by Lucas County from 1954 to 1976	Groundwater contamination from leachate migration containing metals--cadmium, chromium, lead, enforcement action pending
30	Ottawa	Owens-Illinois, Inc. Technical Center 1700 North Westwood On-site Landfill	Chromium and lead sludges; test borings performed show no contamination discovery
31	Ottawa	Owens-Illinois, Inc. Hilfinger Site 1800 North Westwood Hilfinger landfilled on-site electroplating & metal finishing wastes. Closed in late 1970s.	Soil had been contaminated by heavy metals--chromium, arsenic, cadmium, nickel, zinc. Clean up completed with polyethylene liner and monitoring wells. Currently a parking lot.
32	Ottawa	South Cove Blvd.	
33	Ottawa	Willys Park	Part of North Cove Blvd. AMC investigation
34	Ottawa	Joe E. Brown Park Manhattan Blvd.	Presently a ball field
35	Ottawa	North Cove Landfill North Cove & Drexel Dr. Operated by AMC as land-fill from 1941 to 1970. Industrial residues i.e. solvents & sludges, now owned by City of Toledo	During installation of a sanitary sewer west of site in 1979, hydrocarbon fumes were encountered. Groundwater sampling performed indicating presence of hydrocarbons and low boiling solvents. AMC is planning to conduct a remedial investigation/feasibility study.

TABLE 48 continued

MAP #	WATERSHED	SITE NAME	CURRENT KNOWN STATUS
36	Ottawa	Sheller-Globe Corp., Armored Plastics, Lint & Dura Avenues Approx. 100 drums of Paint Residues disposed	Solvent portion believed to have evaporated leaving only residue.
37	Ottawa	Tyler Street Dump Operated by City of Toledo, located end of Tyler St. north of Ottawa River Municipal & industrial wastes	Leachates to Ottawa River
38	Ottawa	Stickney Avenue Landfill Owned by American Motors Corp. located southeast of Ottawa River Industrial wastes i.e. solvents & sludges	Leachates to Ottawa River composed of low conventional pollutants and organics
39	Ottawa	Dura Dump, 55 acres Operated by City of Toledo Located northwest of river Municipal, Industrial and Demolition Wastes - Opened 1952, closed 1980.	Leachates to Ottawa River containing PCBs, organics. Under investigation with a remedial action plan being developed.
40	Ottawa	DuPont Waste Lagoon Matzinger Road 2% formaldehyde solution	Lagoon filled in. Site drainage patterns unknown, but no discharge to river.
41	Duck Creek	Consaul Street Dump Operated by City of Toledo from 1948-1966, now site of Parkway Mobile Home Park solvents & paint sludges	Leachate collection system to sanitary sewer; water table within 6 feet of surface Methane Gas Venting; ongoing Ohio Dept of Health Study
42	Silver/ Shantee	Jackman Road	Was an open dump
43	Silver/ Shantee	NL Industries/Doehler-Jarvis/Farley Metals Inc. 5400 N. Detroit Avenue Toledo, Ohio	Past on-site storage for Plating Sludges
44	Crane	Millbury Village	Leachate problem; solid wastes
45	Crane	Asman Dump St. Rt. 795 & Fostoria Rd.	Leachate problem; solid and hazardous waste
46	Grassy	Perrysburg Township	
47	Grassy	Perrysburg City St. Rt. 795 & Glenwood Rd.	
48	Cedar	Walbridge-Lake Township	
49	Wolfe	Jerusalem Township	



CLOSED DUMPSITES AND ACTIVE LANDFILLS

LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

TMACOG

Underground Storage Tanks

The federal definition of an Underground Storage Tank (U.S.T.) is any tank including underground piping connected to the tank that has at least 10 percent of its volume underground. Not included in this definition are the tens of thousands of unregulated domestic heating oil tanks or other private fuel tanks. Several types of underground tanks are currently exempt from federal regulation:

farm and residential tanks holding less than 1,100 gallons of motor fuel used for non-commercial purposes;

tanks storing heating oil burned on the premises where it is stored;

tanks on or above the floor of underground areas, such as basements or tunnels;

septic tanks and systems for collecting storm water and waste water;

and flow-through process tanks.

Hazardous waste tanks are regulated under Subtitle C of the Resource Conservation and Recovery Act (RCRA). Waste oil tanks may eventually also be regulated under Subtitle C. The great majority of U.S.T.s nationwide (more than 96 percent) contain petroleum fuels; the remainder store raw chemicals. U.S.T.s are found virtually everywhere in the industrialized world. US EPA estimates that approximately one quarter of the U.S.T.'s leak.[78]

In Ohio more that 70,000 commercial U.S.T.s currently in use are registered with the State Fire Marshal. Because the registry is still being developed, the Fire Marshal's Bureau of Underground Storage Tank Regulation estimates that there are actually close to 100,000 U.S.T.s in Ohio subject to regulation. As of May 1988, the registry was still incomplete. There are 2,834 U.S.T.s for Lucas County, 879 for Wood County, and 284 for Ottawa County. Because U.S.T.s are associated with business and industry, it appears that they are found in higher concentrations in areas of greater population.[78]

Statewide, there have been more than 1,800 leaks from U.S.T.s reported to Ohio EPA since 1978. Ohio EPA's Office of Emergency Response reports that during this period there have been 50 reported leaks for Lucas County, 22 for Wood County, and 12 for Ottawa County. The majority (65 to 75 percent) of U.S.T. leaks came from tanks at gas stations.

Leaking U.S.T.s occur in every locale. Leaks are typically very small compared to tank size, and traditional inventory control measures such as the graduated dipstick pole and tallying volumes of liquid withdrawn are not accurate enough to detect most leaks. U.S.T.s have contaminated groundwater and surface water, saturated soil with gasoline or other flammable or toxic substances, and created fire and explosion hazards when vapors enter buildings through foundation cracks or sump pumps. Gasoline from U.S.T.s in developed areas frequently is first discovered in utility company manholes, where it can destroy wiring and cause an explosion due to the concentration of gasoline vapors and a health hazard for workers due to the concentration of residual benzene in a confined space.[78]

Pits, Ponds and Lagoons

The Ohio EPA conducted a statewide assessment and inventory of surface impoundments during 1978 and 1979. The purpose was to determine their polluting effect upon underground drinking water sources. This project was referred to as the Surface Impoundment Assessment (SIA). By definition, surface impoundments include any earthen pond, pit or lagoon used for the storage, treatment or disposal of wastewaters and other fluids related to industrial, municipal, agricultural, mining, and oil and gas related activities.

With the assistance of the Northwest District Ohio EPA, TMACOG examined the SIA file for the Counties of Lucas, Wood and Ottawa. A list of the known pits, ponds and lagoons as listed in this SIA file are presented in this section by watershed in Table 49. It is as complete a list as possible. Included with the listing is the Map #, watershed name, Facility Identification No., the number of impoundments at the site, the purpose of the impoundment, the age at the time of the survey, the size of impoundments, the recorded gallons per day if known, and the scored groundwater contamination potential rating (GWCPR). The highest groundwater contamination potential rating a site could receive is "29" while the lowest is "1". The NPDES number is also included if such number had been assigned.

There are 36 sites which includes some 68 impoundments within the AOC. None of the impoundments as shown in the SIA file were lined by today's standards, nor were monitoring wells in place for water quality sampling purposes. Generally, this ten year old SIA file indicated that it was "unknown" whether the impoundment had an adverse affect by seepage to water quality of drinking water wells in the area. The SIA was based on a file review by Ohio EPA. The groundwater contamination potential ratings were not based on field observations. A map (Figure 53) displaying these impoundment sites follows the table.

TABLE 49
LIST OF IMPOUNDMENTS BY WATERSHED

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
1	Maumee	09581858MUN00236 NPDES OH003719 Waterville Water Treatment 16 North Second Street Waterville, OH 43566	(SIC 4941) 1 impoundment waste storage sludge 4 years; 0.03 acres	13
2	Maumee	09581858IND00274 NPDES OH0002631 Johns-Manville Products Corp. 6055 River Road Waterville, OH 43566	(SIC 3222) 3 impoundments wastewater stabilization 13 years; 0.12 acres, total - 0.35 acres 120,000 gallons/day	17

TABLE 49 continued

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
3	Maumee	09581858IND00275 NPDES OH0054011 Johns-Manville Products Corp. U.S. 24 & Dutch Road Waterville, OH 43566	(SIC 3222) 3 impoundments wastewater stabilization 13 years; 0.15 acres, total - 0.5 acres 36,000 gallons/day	16
4	Maumee	09577000IND00866 Consolidated Dock, Inc. Western Division 636 Paine Avenue Toledo, OH 43605	(SIC) 1 impoundment wastewater retention 3 years: 0.06 acres Note from SIA file: stormwater runoff = salt piles, coal, slag, etc.	19
5	Maumee	09577000IND00207 NPDES OH0002810 Gulf Oil Co. U.S. Div. Gulf Oil Corp. 2935 Front Street Toledo, OH 43697 (Ceased operation)	(SIC 2911) 4 impoundments waste treatment settling; 15 years 0.5 acres, total - 1.0 acres; 864,000 gals/day	16
6	Maumee Bay	09558730IND00239 NPDES OH0002925 Toledo Edison Co. 4701 Bay Shore Road Oregon, OH 43616	(SIC 491) 3 impoundments wastewater settling 4 years; 31 acres, total - 50 acres 3,100,000 gallons/day	17
7	Maumee Bay	09558730MUN00244 NPDES OH0041815 Oregon Water Supply 935 North Curtice Road Oregon, OH 43616	(SIC 4941) 1 impoundment waste storage of sludge; 18 years 1.5 acres	18
8	Swan	09584770IND00863 American Can Co. 10444 Waterville-Swanton Rd. Whitehouse, OH 43571	(SIC 3411) 1 impoundment wastewater retention 4 years; 0.5 acres; 30,000 gallons/day	17

TABLE 49 continued

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
9	Otter	17341328IND00225 NPDES OH0002453 Libbey-Owens-Ford Co. 811 Madison Avenue Toledo, Ohio 43624 1701 East Broadway Toledo, OH 43605	(SIC 3211) 4 impoundments waste treatment settling 30 years; 21 acres, total - 67 acres LAST YEAR OF OPERATION 1966 Note from SIA file- Abandoned & capped (with clay) "sand ponds" with leachate problems, LOF pond "J"	16
10	Otter	09577000IND00226 NPDES OH0002453 Libbey-Owens-Ford Co. 1701 East Broadway Toledo, OH 43605 (Ceased operation)	(SIC 3211) 2 impoundments waste treatment settling; 6 years 7.5 acres, total - 19.5 acres	14
11	Otter	09577000IND00206 NPDES OH0002763 Sun Oil Co. of Penn. Toledo Refinery P.O. Box 920 Toledo, OH 43693	(SIC 2911) 3 impoundment waste treatment equalization 29 years; 7.5 acres, total - 8.5 acres 3,600,000 gallons/day	16
12	Otter	09577000IND00894 NPDES OH0058581 Phillips Petroleum Co. 275 Millard Avenue Toledo, OH 43605	(SIC 3624) 4 impoundment wastewater settling 10 yrs; 0.26 acres, total - 1.04 acres	13
13	Otter	0957700IND00892 C.H. Heist Corp. 3805 Cedar Point Road Toledo, OH 43694	(SIC 299) 3 impoundments waste storage 7 years; 0.03 acres, total - 0.09 acres	14
14	Otter	09558730IND00223 NPDES OH0058629 Commercial Oil Services, Inc. 3600 Cedar Point Road Oregon, OH 43616 (Ceased operation)	(SIC 2999) 3 impoundments waste disposal 13 years; 0.18 acres, total - 1.43 acres	18

TABLE 49 continued

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
15	Otter	09558730IND00865 Bills' Road Oil Services 3500 York Street Oregon, OH 43616	(SIC 2899) 2 impoundments waste disposal 9 years; 0.12 acres, total - 0.25 acres	17
16	Otter	09558730IND00249 NPDES OH0053864 Fondessy Enterprises, Inc. 876 Otter Creek Road Oregon, OH 43616	(SIC 2999) 1 impoundment waste disposal 11 years; 1.2 acres	17
17	Otter	09577000IND000208 NPDES OH0002461 Standard Oil of Ohio Toledo Refinery P.O. Box 696 Toledo, OH 43694	(SIC 2911) 2 impoundments waste storage oil sludge 33 years; 2 acres, total - 10 acres	16
18	Ten Mile	09576022IND00278 NPDES OH0058521 Northern Ohio Asphalt Paving 7920 Sylvania Avenue Sylvania, OH 43460	(SIC 2952) 1 impoundment wastewater settling 2 years; 0.25 acres 144,000 gallons/day	17
19	Ten Mile	09572452IND00276 NPDES OH0033715 Medusa Cement Co. P.O. Box 310 Silica Plant Sylvania, OH 44350	(SIC 3241) 1 impoundment wastewater settling 6 years; 0.25 acres 500,000 gallons/day	15
20	Ottawa	09577000IND00233 Cleveland Metal Abrasive Co. 2351 Hill Avenue Toledo, OH 43607	(SIC 3291) 1 impoundment waste treatment settling; 6 years 0.03 acres 460,800 gallons/day Note from SIA file - 2 cell settling - av. flow value is design flow.	16

TABLE 49 continued

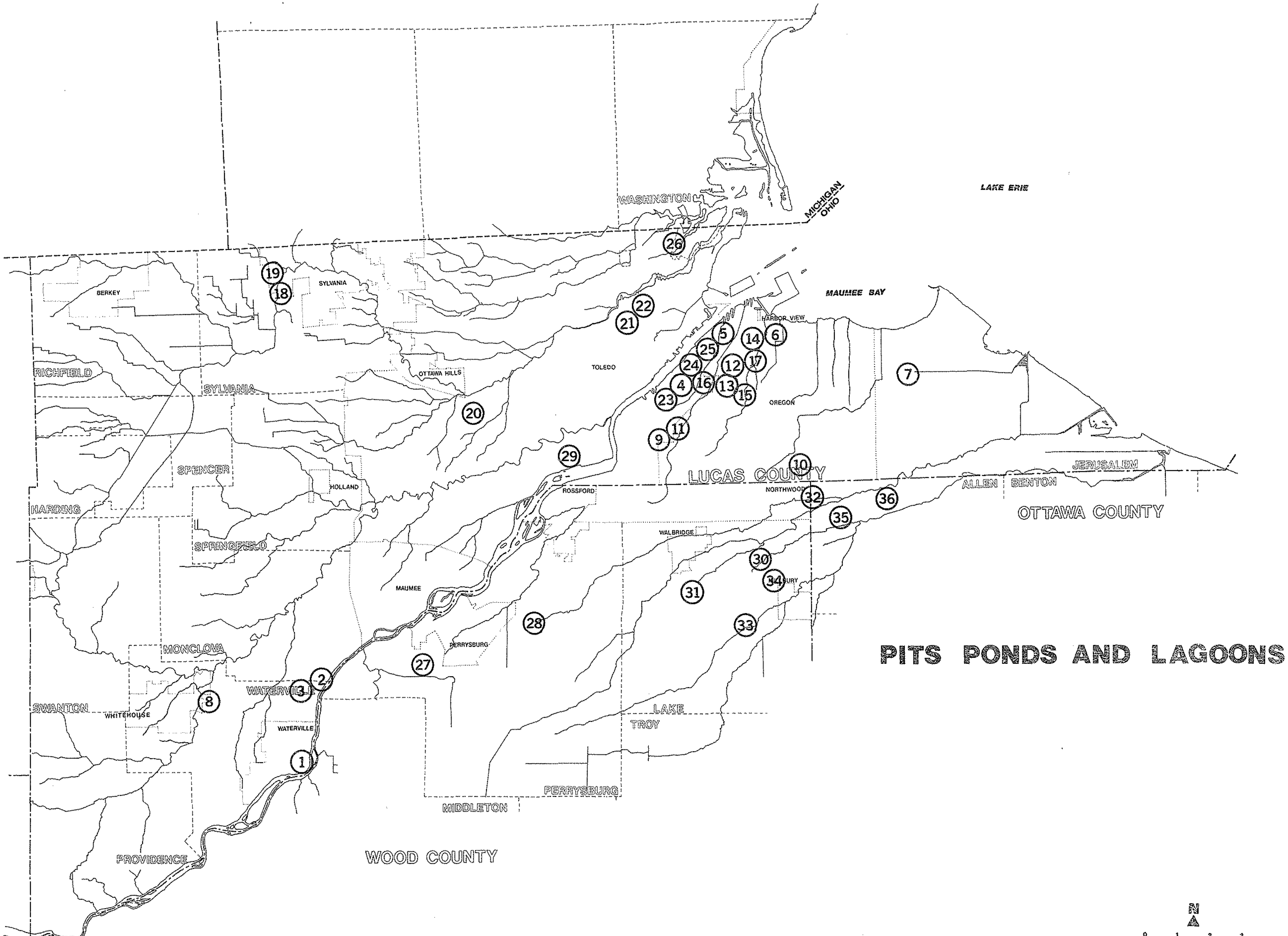
MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
21	Ottawa	09577000IND00864 Incorporated Crafts, Inc. 3905 Stickney Avenue Toledo, OH 43608	(SIC 2899) 2 impoundments waste disposal 14 years; 1.5 acres, total - 3 acres	17
22	Ottawa	09577000IND00891 Royster Co., Inc. Creekside Avenue P.O. Box 6986 Toledo, OH 43612	(SIC 2875) 1 impoundment waste water retention 28 years; 2 acres note - surface runoff pond was developed to collect discharge	15
23	Duck	09577000MUN00249 NPDES OH0030759 Toledo Water Treatment Plant 600 Collins Park Avenue Toledo, OH 43605	(SIC 4941) 2 impoundments Waste Storage Sludge 26 years; 16 acres, total - 48 acres	16
24	Duck	09537478IND00277 NPDES OH0003000 Norfolk & Western Railway Ironville Yard 2750 Front Street Toledo, OH 43605	(SIC 4011) 1 impoundment wastewater retention 8 years; 0.5 acres	18
25	Duck	09577000IND00895 Westway Trading Corp. Ind Molasses Division Box 186, Station A 431 John Q. Carey Drive Toledo, OH 43605	(SIC 2875) 2 impoundments (SIA Sheet was missing from the file)	
26	Silver/ Shantee	09577000IND00234 NPDES OH0002640 General Motors Corp. 1455 West Alexis Road Toledo, OH 43612	(SIC 3714) 1 impoundment waste treatment retention; 20 years 0.75 acres 100,000 gallons/day	18

TABLE 49 continued

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
27	Grassy	17362148IND00217 NPDES OH0003107 Owens-Illinois, Inc. P.O. Box 1035 Toledo, OH 43601 25875 U.S. Route 25 Perrysburg, OH 43551	(SIC 2893) 1 impoundment waste treatment polishing 12 years; 7 acres 20,000 gallons/day Note from SIA file - old DOT borrow pit - age uncertain	14
28	Cedar/ Crane	17343610IND00876 NPDES OH0003573 Maumee Stone Co. Perrysburg Plant 8812 Fremont Pike Perrysburg, OH 43551	(SIC 1422) 4 impoundments wastewater settling 14 years; 0.5 acres 138,000 gallons/day	23
29	Maumee	17351114IND00228 NPDES OH0057835 Penn Central Transportation 6 Penn Center Philadelphia, PA 19103 Stanley Diesel Shop 435 Emerald Avenue Toledo, OH 43602	(SIC) 1 impoundment wastewater retention 25 years; 7 acres 5,000 gallons/day Note from SIA file-old old borrow pit, age unknown	18
30	Cedar/ Crane	17380486IND00227 NPDES OH0002488 Chesapeake & Ohio Railway Co. P.O. Box 1800 Huntington, WV 25718 Walbridge, OH 43465	(SIC) 1 impoundment wastewater retention 9 years; 0.12 acres clay liner	15
31	Cedar/ Crane	17341328IND00910 NPDES OH0003212 Burndy Corporation Richards Avenue Norwalk, OH 06856 Toledo Facility P.O. Box 817 Toledo, OH 43601	(SIC 3471) 1 impoundment waste treatment retention 11 years; 0.25 acres 65,000 gallons/day Ceased operation in 1976	17

TABLE 49 continued

MAP #	WATERSHED	FACILITY IDENT. #	SIA FILE STATUS	GWCPR
32	Cedar/ Crane	17357190IND00880 Hirzel Canning Co. 411 Lemoyne Road Toledo, OH 43616	(SIC 2033) 3 impoundments wastewater aerated 11 years; 1.25 acres, total - 3.75 acres 30,000 gallons/day	16
33	Cedar/ Crane	1735020IND00908 Standard Oil Co. of Ohio 1800 L. Midland Bldg. Cleveland, OH 44115 1-280 & S.R. 795 Millbury, OH 43447	(SIC 299) 1 impoundment waste treatment retention 3 years; 0.02 acres bentonite modified liner	15
34	Cedar/ Crane	17350260IND00229 NPDES OH0003221 Molnar Packing Co. Pemberville Road Millbury, OH 43447	(SIC 2011) 1 impoundment wastewater aerated 7 years; 1.2 acres 7,050 gallons/day Note from SIA file - two celled lagoon	13
35	Cedar/ Crane	12301322IND00231 NPDES OH0003425 Permaglass Div. Guardian Industries Routes 51 & 795 Millbury, OH 43447	(SIC 0321) 1 impoundment waste treatment biologic 9 years; 2.3 acres 30,000 gallons/day	13
36	Cedar/ Crane	12319736IND00210 NPDES OH0002755 Stokely-Van Camp, Inc. 941 N. Meridan Street Indianapolis, IN 46206 at Curtice, OH 43412 (Ceased operation)	(SIC 2033) 2 impoundments waste treatment aerated; 26 years 2.5 acres, total - 4.4 acres range 150,000 to 269,000 gallons/day CEASED OPERATION in 1979 Note in SIA file - 2 lagoons inventoried, but 2nd lagoon partitioned to form 2 for a total of 3 lagoons.	17



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

Water Quality Impacts

The Subcommittee's greatest concern deals with the Dura Dump, the LOF Grinding Sand Settling Ponds, and the King Road Landfill. Of obvious concern, too, are the wall-to-wall dumps once sited in the floodplains of the Ottawa River. The various closed sites have degrading impacts on water quality as shown when analyzing the Ohio EPA Water Quality Data Summary conducted during the summer of 1986.

The headwaters of the Ottawa River start in Michigan and flow through western Lucas County where it is known as the Ten Mile Creek. Upstream of the King Road Landfill at River Miles 5.2 and 5.1 (Centennial Road) the water quality is considered good, the primary influence being agriculture. The Dissolved Oxygen is 5.2 to 9.7 mg/l. Metals are near or below the detection limit, as are phenolic samples.

The King Road Landfill is located below River Mile 4.1 where water quality is considered fair to marginally good. This site was closed in 1976, with leachate problems developing in 1972. Heavy metals flowing from the site caused Lucas County to provide a municipal water line to those homes whose water wells were contaminated. Midwest Environmental Consultants has prepared an environmental assessment for the site, and has made recommendations for further investigations. Existing conditions at the site include loose garbage on the surface, insufficient grade, ponding of water, and serious erosion in many areas.

The North Cove Landfill site along the banks of the Ottawa River at River Mile 8.7, was formerly owned by American Motors. It operated from 1941 until 1970 where industrial residues were disposed of. During the installation of a sanitary sewer west of the site in 1979, hydrocarbon fumes were encountered. Groundwater sampling was performed and indicated the presence of hydrocarbons and low boiling solvents. A site assessment was done for the landfill and a remedial investigation/feasibility study is to be conducted by AMC.

Lake Erie dilutes the polluted Ottawa River from River Mile 4.9 to downstream. The Dura, Stickney and Tyler dumps all owned by the City of Toledo, are located along the Ottawa River wherein a lake estuary effect takes place. Also in the vicinity are three Combined Sewer Overflows, and discharges from DuPont and AMC. Leachate samples from the Stickney Avenue site contain low to moderate levels of conventional pollutants and very low levels of organic priority pollutants.

At the Dura Dump the leachate contains high BOD, COD and organics. Among these organic chemicals are PCBs. The range of concentration of PCBs in the Ottawa River Sediment from sampling taken October 1986 is 0.86 to 9.7 parts per million. One sample taken from the river bank was as high as 135 parts per million. The six leachate seeps to the Ottawa River have been calculated to be 60,000 gallons per day. The City of Toledo has initiated a Remedial Investigation/Feasibility Study being conducted by URS Corp. Actions have been to control leaching and runoff at the site. Clean up costs have been estimated to be $40 million.

The degradation of Otter Creek is directly related to the LOF site. At River Mile 5.9 (Oakdale Street) downstream of the LOF site, the Dissolved Oxygen is 1 mg/l, pH ranges from 8.6 to 10.2; Arsenic is 350 μg/l; Copper ranges from 17 to 30 μg/l. The water quality is considered to be very poor. Only upstream at River Mile 7.2, where Otter Creek is a small ditch-like stream, is the water quality considered to be fair.

At River Mile 5.7 (Pickle Road) there are noxious smelling chemicals, a reddish brown flocculent, hydrogen sulfide, etc., with the stream and banks at River Mile 4.0 (Wheeling Street) being oil soaked, with nickel and cyanide also being detected. The Sun Oil Refinery discharge is upstream at this point. At River Mile 2.1 (Millard Avenue), while the water quality is still degraded, it is slightly improved due to the Lake effect on Otter Creek. It is important to remember that Evergreen, Fondessy, and Westover sites each have leachate collection systems in place.

The ten dump sites on Swan Creek do not appear to have severe water quality impact but this may be due to lack of thorough investigation of sediments and fish sampling.

For the Maumee River, the Ohio EPA Northwest District Office reports that Jennison-Wright (J-W) has entered into a consent decree with OEPA on February 4, 1987. Pursuant to the terms of this agreement J-W has prepared a Remedial Investigation Work Plan (utilizing Woodward Clyde Consultants). This work plan was approved, with conditions by OEPA on January 27, 1988. A draft RI report is expected from J-W on July 25, 1988 (180 days from approval of the RIWP). J-W has not yet begun to complete the RI; however, work is expected to start in the near future. The RI is designed to provide a data-base for determining the best remediation alternative and extent of contamination.

Storm, sanitary, and treated process waters flow from the 26 acre site, located at 2332 Broadway, into the municipal sewer system. A 12" overflow from the city sewer flows through the J-W property into the Maumee River. The office parking lot, at 3463 Broadway, borders the Maumee's west bank. Contamination and remediation alternatives will be addressed by the RI/FS for this also.

RCRA Facilities

Hazardous waste regulations are implemented by Ohio EPA's Office of Solid and Hazardous Waste Management, and cover generation, storage, transportation, and treatment or disposal of hazardous wastes as defined in RCRA and the 1984 Hazardous and Solid Waste Amendments. Ohio's hazardous waste regulations were passed in 1980. Permits to operate hazardous waste facilities are issued by the Ohio Hazardous Waste Facility Board with monitoring and enforcement of the regulations being carried out by Ohio EPA.

Within the area of concern there are 13 different RCRA facilities licensed to operate as shown in Table 50. However, the Evergreen Landfill, operated by Ohio Waste Systems, a subsidiary of Waste Management, did operate as a hazardous waste facility until November 1985. The Fondessy Landfarm (Fondessy Enterprises Site #2) has not received refinery sludges for well over one year, with Ohio EPA recommending that the site be closed due to seasonal high water table and other problems.

TABLE 50
LIST OF RCRA FACILITIES

OHD #	Name	Address	
OHD045245271	Cast America Products	4243 South Ave.	43615
OHD005045992	Doehler-Jarvis Castings	5400 N. Detroit Ave.	43612
OHD005041843	E.I. Dupont deNemours	1930 Tremainsville	43613
OHD045243706	Fondessy *	876 Otter Creek Rd.	43616
OHD000721415	Fondessy * Landfarm Site #2	Cedar Point & Wynn	43616
OHD980279376	General Tire & Rubber	3729 Twining St.	43608
OHD005562020	Owens-Illinois Tech. Center	1700 N. Westwood	43607
OHD980586804	S.M. Allen, Inc.	3903 Stickney Ave.	43608
OHD018354894	Sheller-Globe Corp.	Lint & Dura Aves.	43612
OHD063717565	Sheller-Globe Corp.	4444 N. Detroit Ave.	43612
OHD005057542	Standard Oil Co.	Cedar Point Road	43614
OHD004044128	American Cyanamid Co.	12600 Eckel Road	43551
OHD043642958	Motor Wheel**	212 Luckey Road	43443

* Now Envirosafe
** Formerly Goodyear

Status of Superfund Sites

There are no designated Superfund sites in the AOC at this time (i.e., no sites have been included in the National Priority List under Superfund/CERCLA). All the preliminary assessments, or the paper trail, have been done for the sites listed in the following table. This is the first step in potential Superfund listing. Those sites listed in the Table 51 have the possibility of being named hazardous waste sites. All the sites listed are considered unregulated sites and each has been ranked high (H), medium (M), Low (L), or no priority (0).

The Ohio EPA Northwest District Office reports that Allied Automotive Toledo Stamping, Owens-Illinois (Hilfinger), Phillips Petroleum, and Webstrand sites have been cleaned up. In cases where responsible companies can be identified, the EPA will try to get funding for cleanup from the businesses involved. The list of possible hazardous waste sites was compiled because of the federal Superfund Law, which required each company to report its hazardous waste activities of the past. The list not only includes these sites, but also sites reported by residents and anonymous tips.

Table 51 includes the US EPA assigned number, the site name and address where known, the US EPA Federal Investigation Team (FIT) ranking, and the Ohio EPA priority ranking.

TABLE 51
POSSIBLE HAZARDOUS WASTE SUPERFUND SITES

OHD #	Name and Address		FIT	Ohio EPA
OHD980678379 348-0024	Allen Charles Waste Removal Address Unreported (Transporter) Toledo	99999	L	L
Not Assigned 348-1027	Allied Automotive Toledo Stamping 525 Hamilton Street Toledo	99999		
OHD980823801 348-0045	Anderson's 439 Illinois Avenue Maumee	43537	M	L
Not Assigned 348-1029	Champion Spark Plug Address Unreported	99999		
OHD980611636 348-0175	City Owned Dump (AMC, North Cove) Foot of Drexel Dr. I-75 & Cove Toledo	43610	—	H
OHD000816843 348-0197	Commercial Oil Service, Inc. 3600 Cedar Point Road Oregon	43616	—	—
OHD980826119 348-0200	Consaul Street Landfill 2510 Consaul Street Toledo	43624	O	L
OHD043636463 348-0207	Coulton Chemical 6600 Sylvania Road Sylvania	43560	—	—
OHD020260188 348-0208	Coulton Chemical Corp. 1400 Otter Cheek Road Oregon	43616	L	L
OHD068081595 348-0211	Cousins Waste Management 2611 W. Center Toledo	43609	L	L
OHD990777930 348-0248	DuPont E.I. Denemours & Co., Inc. Matzinger Rd., P.O. Box 6568 Toledo	43612	L	M
Not Assigned 348-1031	Erie Coatings Address Unreported	99999		
OHD980613640 348-0286	Essex Group, Inc. 5101 Telegraph Road Toledo	43612	O	O
OHD045243706 348-0303	Fondessy 876 Otter Creek Road Oregon	43616	L	H

TABLE 51 continued

OHD #	Name and Address		FIT	Ohio EPA
Not Assigned 348-1034	Greise Brothers Address Unreported	99999		
OHD005052410 348-0365	Gulf Oil Co., Toledo Refinery 2935 Front Street Toledo	43697	M	M
OHD000608695 348-0367	Gulf Oil Toledo Terminal 2774 Front Street Toledo	43605	—	—
Not Assigned 348-1032	Harrison Junkyard Address Unreported	99999		
OHD981097157 348-0385	Heist Cleaning Service 3804 Cedar Point Road Oregon	43616	L	M
OHD000605295 348-0441	King Road Lucas County San. 3535 King Road Toledo	43617	M	M
OHD005050349 348-0463	Libbey-Owens-Ford Co., Plants 4 & 8 1769 E. Broadway Toledo	43605	—	—
OHD981529092 348-0482	Manhattan Dump 2020 Manhattan Blvd. Toledo	43612	L	L
OHD980615801 348-0502	Maston Septic Service 7202 Providence Whitehouse	43571	O	L
OHD980704381 348-0503	Matlack Trucking Co. 1728 Drouillard Road Toledo	44309	L	L
OHD005045992 348-0568	NL Industries 5400 N. Detroit Avenue Toledo	43612	L	L
OHD005051180 348-0569	NL Industries, Inc. Bearings Div. 715 Spencer Street Toledo	43609	L	L
OHD000720268 348-0576	North American Car Corp. 4545 Hoffman Road Toledo	43611	O	L
OHD980679427 348-0588	Oberly Ray DSPL 3812 Twining Street Toledo	43608	O	L
OHD980615934 348-0589	Oberly Robert Waste Removal 3903 Stickney Toledo	43608	L	L

TABLE 51 continued

OHD #	Name and Address		FIT	Ohio EPA
OHD980991798 348-0616	Owens Illinois Hilfinger 1800 N. Westwood Avenue Toledo	 43606	M	M
OHD005034459 348-0621	Owens-Illinois Libbey Plant 27 940 Ash Street Toledo	 43611	L	L
OHD005562020 348-0622	Owens-Illinois Tech. Center 1700 N. Westwood Avenue Toledo	 43607	L	L
OHD980901276 348-0633	Phillips Petroleum Property Front St. & Millard Ave. Toledo	 43605	L	L
OHD018354894 348-0730	Sheller-Globe Corp. Cy Auto Stamping Div. Lint & Dura Avenue Toledo	 43612	L	M
OHD005057542 348-0767	Standard Oil Co. (Ohio) Lallendorf & Cedar Point Road Oregon	 43616	O	L
OHD005046511 348-0781	Sun Oil Co. Of Pennsylvania 1819 Woodville Road Oregon	 43616	L	L
OHD980679419 348-0787	Swan Creek Landfill Glendale Avenue Toledo	 43614	L	L
OHD000605956 348-0812	Toledo City of Stickney Ave. Dspl. Site 3900 Stickney Avenue Toledo	 43612	M	H
OHD980611685 348-0813	Toledo Edison Co. Coke Oven Gas Line Front & Cherry Streets Toledo	 43652	L	L
OHD980509905 348-0814	Toledo Ldfl. City of Aka Dura San Ldfl. Dura Ave. Toledo	 43612	L	M
OHD980611677 348-0815	Toledo Powdered Metal Cross Street Toledo	 43623	L	L
OHD980510499 348-0816	Toledo Sewage Disposal Plant Bay View Park Toledo	 43611	L	L
OHD980611305 348-0818	Treasure Island Landfill Counter & Kalamazoo & York Sts. Toledo	 43611	M	M
OHD980510523 348-0829	Tyler Street Dump Tyler St. Toledo	 43612	Y	M

TABLE 51 continued

OHD #	Name and Address	FIT	Ohio EPA
OHD005055777 348-0839	Union Oil Co., Toledo Refinery 1840 Otter Creek Road Oregon 43616	L	L
OHD980510580 348-0918	W/S Ave. Toledo Mun San Landfill South Ave & Maumee River Toledo 43615	L	M
OHD981525710 348-0895	Webstrand Corp. 525 Hamilton Street Toledo 43602	L	L
OHD000606368 348-0901	Westover Corp. San Landfill 820-920 Otter Creek Road Oregon 43616	M	M
OHD005044128 387-0033	American Cyanamid Co. 12600 Eckel Road Perrysburg 43551	O	O
OHD980610935 387-0071	Asman's Landfill Rt. 795 & Fostoria Road Millbury 43447	M	M
OHD041350323 387-0167	Chrysler Corp. Toledo Machining Plant 8000 Chrysler Drive Perrysburg 43551	L	L
OHD087050019 387-0190	Coastal Tank Lines 6622 SR-795 Walbridge 43465	L	L
OHD068111327 387-0294	Evergreen Landfill 6525 Wales Road Northwood 43619	L	M
OHD981529084 387-0454	Lake Township Dump Hanley Road & Cummings Road Walbridge 43465	L	L
OHD005050406 387-0462	Libbey-Owens-Ford Co. Plant 6 140 Dixie Hwy. Rossford 43460	L	L

ATMOSPHERIC DEPOSITION

According to the Summary of the Report of the Great Lakes Water Quality Board to the International Joint Commission dated November 1987, atmospheric transport and deposition into the Great Lakes basin, either directly onto the water surface or indirectly into the drainage basin with subsequent transport, has been clearly demonstrated. Going on, this summary report states that even though the magnitude of the input (relative to other sources and pathways) has not been fully defined, the available evidence indicates that atmospheric deposition is a major pathway for contamination of the Great Lakes ecosystem.

Continuing, the summary report states that releases of lead to the atmosphere, primarily from automotive exhausts, have decreased as the use of leaded gasoline in the United States and Canada has decreased, and that atmospheric transport and deposition of certain pesticides (e.g. DDT) into the Great Lakes continues today, even though their use has been banned or severely restricted in both the United States and Canada. These chemicals are still manufactured and used in great quantities in other locations in the world. Short of a worldwide ban on the manufacture, transport and use of these contaminants, appreciable contamination of the Great Lakes ecosystem will continue indefinitely.

The authority to regulate emissions into the atmosphere are based on clean air requirements, but legislative provision to control emissions of persistent toxic substances into the atmosphere need to be incorporated. The Ohio Alliance for the Environment in its March 1987 *Newsletter* reports that since 1987 improvements have been made in reducing the amount of discharge from direct sources of toxic contaminants, but much more research and action is still needed to restore the lakes to a healthy level; and that little is known about the specific effects and possible controls for toxic chemicals into the air.

The Ohio Alliance for the Environment's report goes on to say, that seven million chemical compounds now exist, 30,000 of which are in substantial commercial use; that approximately 1,000 new chemicals are developed each year; that over 1,000 chemicals are suspected carcinogens. It is important to note that some of these chemicals occur naturally, which means that manufactured chemicals are not the only source of toxic substances.

Air emissions of such substances are a concern because the atmosphere serves as a pathway into the environment as a whole. Large lakes such as the Great Lakes, tend to act as a "sink" for pollution from all sources. It has been shown that with the upper Great Lakes, the input of toxic chemicals such as PCBs and lead comes from atmospheric deposition.

The current US EPA and Ohio EPA ambient air quality standards are displayed in Table 52 on the following page. The Toledo Environmental Services Division functions as the air pollution enforcement arm of the Ohio EPA in the Toledo area. This Division was interviewed in order to secure information regarding attainment/non-attainment status regarding the pollutants listed in this table, with such status reported as follows:

TABLE 52
US EPA & OHIO EPA AMBIENT AIR QUALITY STANDARDS*

POLLUTANT	DURATION	RESTRICTION	MAXIMUM ALLOWABLE CONCENTRATION** PRIMARY	SECONDARY
Particulate Matter - PM10	Annual geometric mean	Not to be exceeded	50 mg/m^3	50 mg/m^3
	24 - hour concentration	Not to be exceeded more than once per year	150 mg/m^3	150 mg/m^3
Sulfur Dioxide	Annual arithmetic mean	Not to be exceeded	80 $\mu m/m^3$ (0.03 ppm)	
	24-hour arithmetic mean concentration	Not to be exceeded more than once per year	365 $\mu m/m^3$ (0.14 ppm)	
	3-hour arithmetic mean concentration	Not to be exceeded more than once per year		1300 $\mu m/m^3$ (0.5 ppm)
Carbon Monoxide	8-hour arithmetic mean concentration	Not to be exceeded more than once per year	10 mg/m^3 (9.0 ppm)	
	1-hour mean concentration	Not to be exceeded more than once per year	40 mg/m^3 (35.0 ppm)	
Ozone	1-hour mean concentration	Not to be exceeded on more than one day per year, average over three years	0.12 ppm (244 $\mu m/m^3$	
Nitrogen Dioxide	Annual arithmetic mean	Not to be exceeded	.53 ppm (100 $\mu m/m^3$	
Lead	3-month arithmetic mean concentration	Not to be exceeded	1.5 $\mu m/m^3$	

NOTES:

Primary standards are established for the protection of public health
Second standards are established for the protection of public welfare
$\mu m/m^3$ = micrograms per cubic meter
ppm = parts per million
mg/m^3 = milligrams per cubic meter

* US EPA & Ohio EPA Air Quality Standards are Identical
** 40CFR 50.4 - 50.12

LEAD: Attainment

Lead is a toxic metal released into the atmosphere primarily through the exhaust of automobiles using leaded fuels. Lead accumulates in the human body and can interfere with the blood-forming process, and the normal nervous and renal system functions. Young children are most susceptible to the ill effects of lead. The level of this pollutant has dropped substantially since the early 1970s. Because of enforcement activities related to fuel switching and the further reduction of lead levels in leaded gasoline, the data from recent years shows that the air quality in the area of concern related to lead is approximately 10 times cleaner than the national standard.

NITROGEN DIOXIDE: Attainment

Nitrogen dioxide is a brown gas, formed during high temperature combustion, which reacts with hydrocarbons in the presence of sunlight to produce photo-chemical oxidants or smog. It is also a pollutant in its own right, and can affect lung tissue, reduce resistance to disease, contribute to bronchitis and pneumonia, and aggravate chronic lung disorders. It is also a contributor to acid rain. The level of this pollutant has dropped with no violation ever having been recorded in the area of concern. In fact, routine monitoring of this pollutant was ended in July 1981, but reestablished in 1984 through a scaled-down sampling system in order to keep abreast of any new trend.

OZONE: non-attainment

Ozone is a colorless, pungent, toxic gas, formed by a series of chemical reactions where hydrocarbons, nitrogen oxides from automobiles and other sources, are exposed to sunlight. Ozone is the principal constituent of smog, and is a severe irritant, impairing lung function and aggravating existing respiratory disorders. The level of this pollutant has dropped with only one violation of the standard in 1983, and no violations for succeeding years. Significant reduction in hydrocarbon emissions have taken place in recent years with redesignation expected by US EPA to attainment status.

CARBON MONOXIDE: attainment

Carbon monoxide is a colorless, odorless, tasteless, toxic gas produced by incomplete combustion of fossil fuels. The automobile engine is the main source of this pollutant. It is quickly absorbed by the blood, and reduces the oxygen available to the tissues, impairing visual perception and alertness. Continued exposure to elevated carbon monoxide levels can threaten life. Persons with cardiovascular diseases are especially vulnerable to this type of pollution. The level of this pollutant dropped measurable in 1976 and 1983. Two violations were measured in 1984, but none in the intervening years.

SULFUR DIOXIDE: non-attainment for area east of Route 23 and west of eastern boundary for City of Oregon attainment for remainder area.

Sulfur dioxide is a heavy, pungent, colorless gas formed primarily by the combustion of sulfur-bearing fuels such as coal. It reacts readily with other atmospheric compounds and pollutants to form sulfates, a group of compounds that aggravate respiratory ailments such as bronchitis, emphysema, asthma and heart disease. Sulfates, combined with moisture in the atmosphere, produce acid rain. The area of concern is classified as non-attainment for sulfur dioxide, but there have been no violations, either primary or secondary, of the US EPA Standards since 1979.

PARTICULATE MATTER: attainment for primary sources, but non-attainment secondary sources for areas of East Toledo and Oregon, with attainment for secondary sources in the remainder area.

Particulate matter relates to particles in the air (such as soot, ash, etc.), including non-toxic materials (dust and dirt), as well as toxic substances (lead, asbestos and sulfates). Natural and man-made sources can contribute to adversely affect human respiratory systems to various degrees, depending on particle size and composition. Data show no violation of either primary or secondary standards for 1983, 1984 or 1985 with the Toledo Environmental Service Division petitioning for redesignation to total primary and secondary attainment for the entire area. However, there is a small area, mainly in East Toledo, where the monitoring station is located, that indicated a secondary violation for 1986.

Acid Rain

The Great Lakes National Program Office, US EPA, has operated the Great Lakes Atmospheric Deposition (GLAD) network since early 1981. A precipitation sampling station as a part of GLAD had been located by Toledo Environmental Services Division in Oregon, Ohio at Bay Shore and Stadium Roads, from 1981 through 1985. Due to budget constraints this local sampling station was thereafter eliminated, with the nearest stations being Put-in-Bay, Ohio on South Bass Island, and Mount Clemons, Michigan.

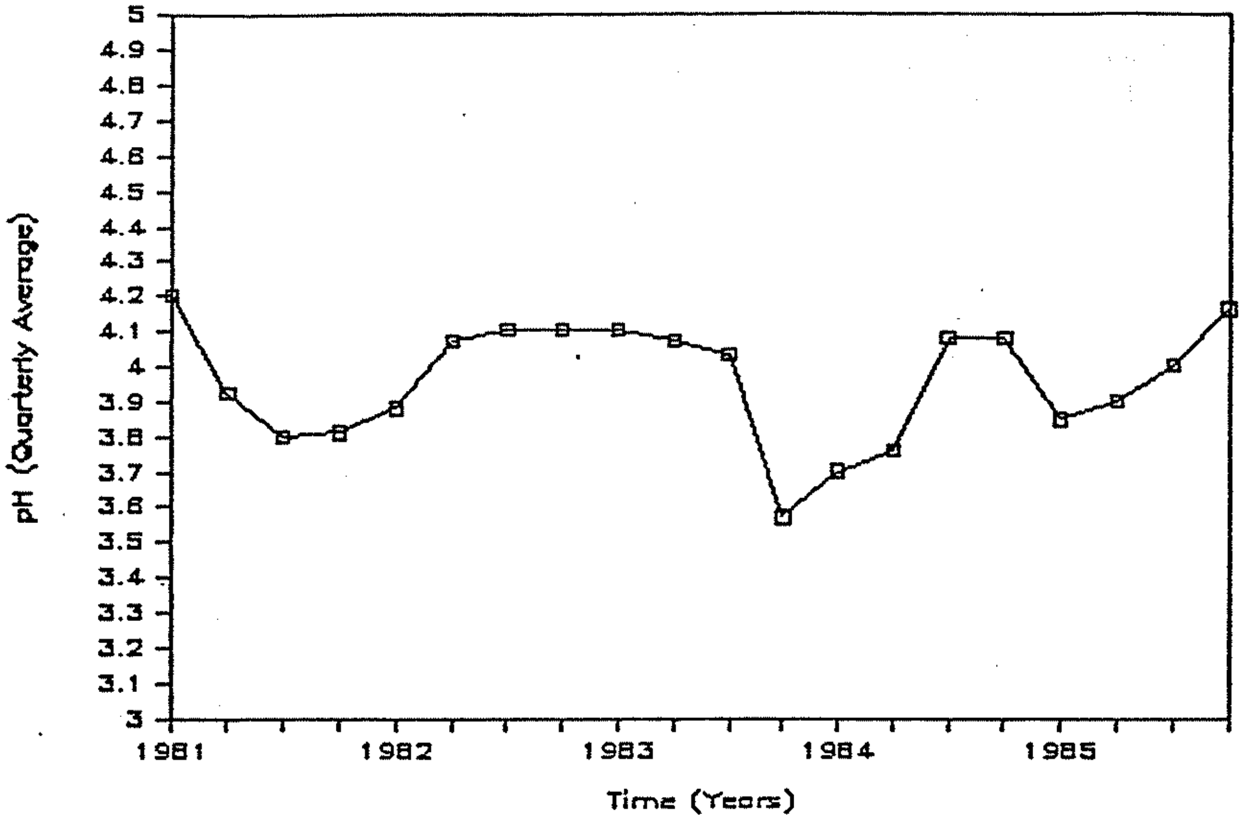
During the period when local precipitation sampling station was in operation, the process consisted of collecting weekly samples and checking for pH and conductivity before sending the sample to the GLAD laboratory for further analysis. The pH of unpolluted rain is about 5.6. Because the pH scale is logarithmic, rain with a pH of 4.6 is ten times as acidic as "normal" rain, while rain with a pH of 3.6 would be 100 times as acidic. Figure 54 graphically displays the quarterly pH averages for the period covering 1981 through 1985 as developed by the Toledo Environmental Services Division. The quarterly averages indicate that rainfall in the Toledo area is often 50 to 100 times more acidic than normal rainfall. The GLAD laboratory analysis for chemical pollutants was available for only one year, therefore, weighted calculations were not conducted.

The area of concern is most fortunate in that the acidic rainfall is buffered by our natural occurring limestone bedrock and local soils which mitigate the ecological effects of acid rain. However, even though most of the ecological effects to the local area are mitigated, there is substantial damage being caused locally by acid rain. Buildings and statues are being corroded, cars rust more quickly and their paints are damaged, and synthetic materials ranging from clothes and nylons to windshield wipers become more rapidly unusable. In addition, heavy metals are leached more readily from structures and soils, so the acid rain may be contributing to the presence of toxic substances in the water. Reduced productivity of farm crops, particularly soybeans, and forest resources has also been linked to acid rain. The buildings, statues, cars, trees and agricultural products all are impacted by the precipitation before it can be neutralized by the soil and bedrock of the area.

Wildlife resources locally may also be experiencing degradation due to the acidity. Many animal resources rely in early spring on temporary ponds and marshes for their breeding areas and important food resources. Most affected are the amphibians and waterfowl that move into these ponds and wetlands even before the snow has melted. Since the ground is still frozen, its ability to neutralize the acidity may be greatly limited. The most acidic precipitation of the year often falls as snow in fall and winter. The spring snow melt may be sending a rush of still acidic water to the ponds and marshes at a critical time. For instance, most salamander species move into the breeding ponds for a brief period, beginning before the ice melts off of the pond. Salamander mortality has been directly linked to the acidity of their breeding ponds.

The decline of black duck populations is also now believed to be linked at least in part to the acidity of their feeding ponds when they arrive in early spring. Other migratory waterfowl are also finding reduced abundance of aquatic insects because the spring flush of acidic waters reduces populations at a time when food needs are high in order to fuel migration and prepare for the breeding season.

FIGURE 54
PRECIPITATION pH vs. TIME



SOURCE: 1985 ANNUAL REPORT, ENVIRONMENTAL SERVICES AGENCY, CITY OF TOLEDO, p. 20

Despite the acidity of rain water in the RAP Area, water in streams is generally alkaline, as shown by Table 53. The pH averages 7.7 to 7.8 for all streams, with the exception of Otter Creek, which is notably more alkaline than any other stream in the area.

TABLE 53
pH VALUES IN RAP AREA STREAMS
TESD DATA, 1981-1986[18]

Stream Sampled	pH <0.6	6.0-.9	7.0-.9	8.0-.9	9.0-.9	>10.0	Avg	# Samples
All streams	1	79	809	486	28	1	7.8	1404
Swan Cr.	0	9	153	54	0	0	7.7	216
Ottawa River	0	27	255	134	4	1	7.7	421
Maumee River	0	23	196	165	3	0	7.8	387
Heilman Dt.	0	1	34	15	0	0	7.7	50
Silver Cr.	0	3	32	19	0	0	7.7	54
Shantee Cr.	0	2	33	19	0	0	7.8	54
Grassy Cr.	0	6	30	20	0	0	7.7	56
Delaware Cr.	1	5	33	16	0	0	7.6	55
Hill Dt.	0	3	36	16	0	0	7.7	55
Otter Cr.	0	0	7	28	21	0	8.7	56

TESD Air Sampling

TESD has eleven air sampling network sites. These are described in Table 54 by station number, location, and type of testing performed. The table also includes map numbers which correlate with Figure 55, a map that displays the location of air sampling sites.

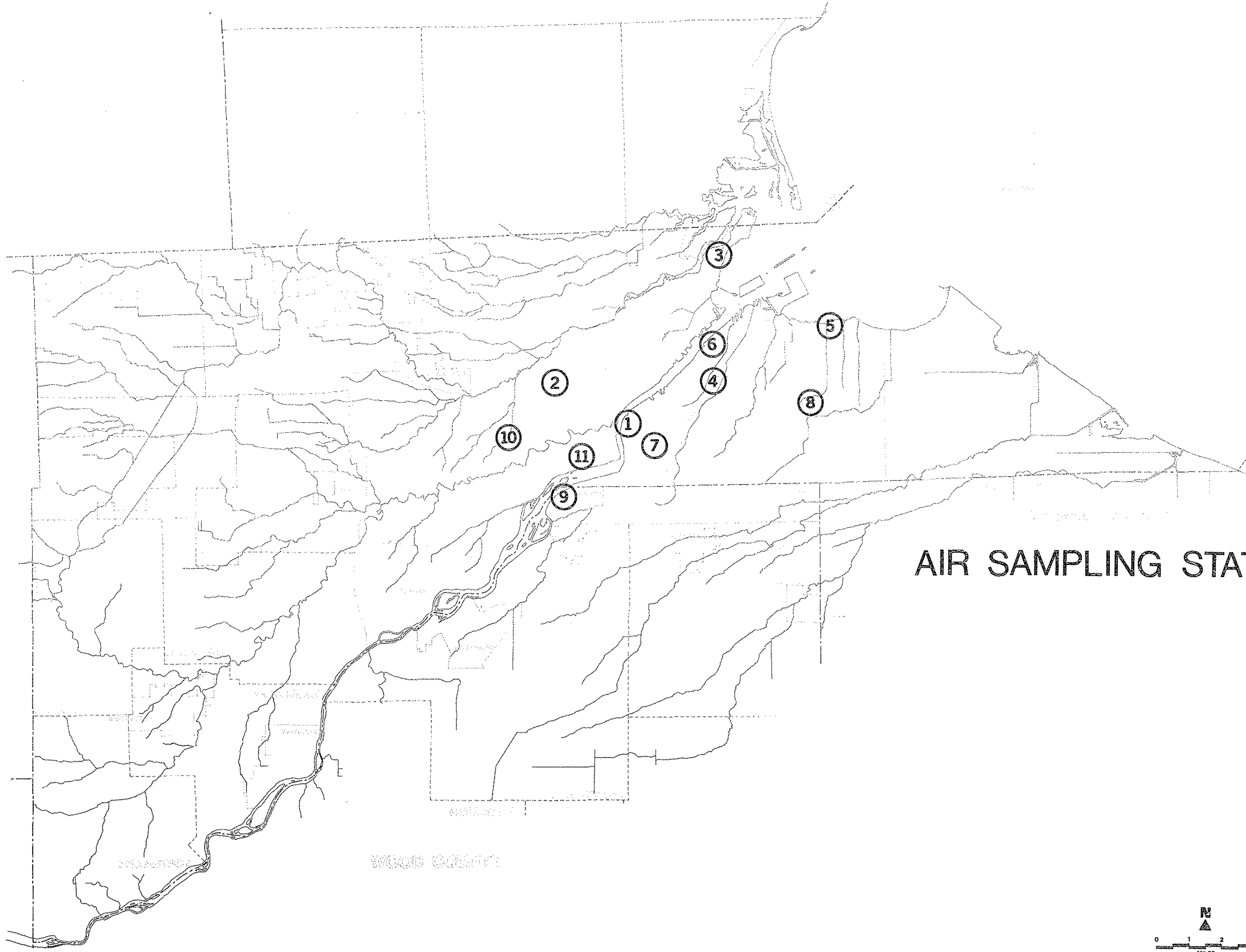
TABLE 54
TESD AIR SAMPLING NETWORK SITES

Map #	TESD STATION	LOCATION	TESTS PERFORMED
6	1	East Side Sewage Pumping Station Lee and Front St.	T.S.P.
7	2	East Side Central School 825 Navarre Ave. at Berry St.	T.S.P
8	3	Oregon Municipal Building 5330 Seaman	T.S.P.
9	4	Rossford Municipal Building 133 Osborn Street	T.S.P.
10	5	60 N. Westwood at Hill (soon moving to U.T. Comm. Tech. and converted to P.M. 10)	T.S.P
11	6	1503 Broadway at South	T.S.P.
2	7	2927 Monroe (at Bancroft & Detroit) (heavy traffic intersection)	CO
3	8	2930 - 131st. Street	O_3
4	9	Water Filtration Plant 600 Collins Park	SO_2
5	10	Acid Rain Monitoring Site	Acid Rain
1	11	Toledo Environmental Services Bldg.	T.S.P., SO_2,

T.S.P. Total Suspended Particulates
CO Carbon Monoxide
SO_2 Sulfur Dioxide
O_3 Ozone
NO_2 Nitrogen Dioxide
Acid Rain
PM-10 Particulate Matter - 10 microns (a more refined T.S.P. Test; other T.S.P Sites may be converted at a later date)

Source: Rick Uscilowski - Chief Chemist, Toledo Environmental Services Div. (TESD)

AIR SAMPLING STATIONS



LOWER MAUMEE RIVER REMEDIAL ACTION PLAN - AREA OF CONCERN

REFERENCES AND SOURCES OF BACKGROUND INFORMATION

1. *Great Lakes International Surveillance Plan*, 1986, Part 5, Lake Erie Surveillance Plan prepared by the Lake Erie Task Force for the Surveillance Work Group of the Great Lakes Water Quality Board.

2. Revised Great Lakes Water Quality Agreement of 1978 as amended by Protocol signed November 18, 1987, Annex 2.

3. *Lake Erie Wastewater Management Study*, US Army Corps of Engineers, 1973.

4. *The Northwest Ohio Water Plan 1985 Edition* Columbus: Ohio Department of Natural Resources, Division of Water, 1985.

5. *Existing Water Supply Systems in the Toledo Metropolitan Area* Toledo: Toledo Metropolitan Area Council of Governments, 1983.

6. Personal communication with water treatment plant operator, February 1988.

7. Hull Consulting. "Preliminary Report of Alternative Dredge Disposal Methods for the Toledo, Ohio Harbor." Prepared for Toledo Metropolitan Area Council of Governments, Toledo-Lucas County Port Authority and Ohio Department of Transportation. Toledo: Hull Consulting, 1987.

8. Horowitz, J., Adams, J.R. and Bazel, L.A. "Water Pollution Investigation: Maumee and Toledo Area". Prepared for U.S. Environmental Protection Agency. Region V. Toledo: Enviro-Control, Inc., 1975.

9. U.S. Department of Commerce. National Oceanic and Atmospheric Administration. Great Lakes Environmental Research Laboratory. "Maumee River Basin Level B Study: Environmental Baseline for Maumee Bay". By A.P. Pinsak and T.L. Meyer. Ann Arbor: NOAA, Great Lakes Environmental Research Laboratory, 1976.

10. Toledo-Lucas County Port Authority, Annual Reports 1977 through 1982.

11. Commission on Ohioans Outdoors. "Outdoor Recreation In Ohio: Status of Direction". Prepared for Governor Richard F. Celeste. Columbus, 1986.

12. Ohio Department of Natural Resources. Office of Outdoor Recreation Services. "Lake Erie Access Study". Columbus: Ohio Department of Natural Resources, 1984.

13. Ohio Department of Natural Resources. Office of Outdoor Recreation Services. "1980-1985 Ohio Statewide Comprehensive Outdoor Recreation Plan". Columbus: Ohio Department of Natural Resources, 1980.

14. Herdendorf, C.E., *The Ecology of the Coastal Marshes of Western Lake Erie: A Community Profile.* U.S. Fish and Wildlife Service Biol. Report 85(7,9). pp.4-9. pp.65-74. pp. 104-113. Appendices A,B. 1987.

15. Pinsak, A.P. and Meyer, T.L. *Environmental Baseline for the Maumee Bay* Environmental Research Laboratories, National Oceanic and Atmospheric Administration, Ann Arbor, Michigan. pp. 72, (Figure 32. Pollution zones in Maumee Bay, 1929-from Wright, 1955, cited in Pinsak), 1976.

16. *Ohio Water Quality Standards, Ohio Administrative Code 3745-1*, Ohio EPA, *draft revisions*, August, 1987.

17. *Water Quality in the TMACOG Region: An Inventory of Monitoring Sites and Sampling Programs, 1970-1988*, TMACOG, 1988.

18. *Toledo Area River and Stream Water Quality Data Report: 1981-1986*, November, 1987; Toledo Environmental Services Agency, Toledo Department of Public Utilities, University of Toledo: Moline, Uscilowski, Fraleigh, & Clarke.

19. *Studies of Sediment, Nutrient, and Pesticide Loading in Selected Lake Erie and Lake Ontario Tributaries*, U.S. EPA Region V, 1983.

20. *Fluvial Transport and Processing of Sediments and Nutrients in Large Agricultural River Basins*, U.S. EPA ERL, Athens Georgia, 1984.

21. *Lake Erie Agro-Ecosystem Program: Sediment, Nutrient, and Pesticide Export Studies*, U.S. EPA Great Lakes National Program Office, 1987.

22. *Analysis of Sediment from Toledo Harbor/Maumee River*, Floyd Browne & Associates, 1984 for US Army Corps of Engineers.

23. *Lucas County Facilities Plan Update*, Finkbeiner, Pettis, & Strout, 1983

24. *Lucas County Facilities Plan Update: Springfield Township (Dorcas Farms/South Hill Park)*, Finkbeiner, Pettis, & Strout, 1985.

25. *City of Toledo Combined Sewer Overflow Study*, Jones & Henry, Ltd., January, 1978.

26. *Toledo/Tenmile Creek Service Area Facilities Plan*, Jones & Henry Engineers, Ltd., 1976.

27. *Oregon Facilities Plan*, Finkbeiner, Pettis, & Strout, Ltd., September, 1974.

28. *Oregon Facilities Plan: Harbor View and Seaman Road Areas*, Finkbeiner, Pettis, & Strout, Ltd., 1981.

29. Trautman, M.B., 1981. *The Fishes of Ohio*, The Ohio State University Press, Columbus, Ohio 782 p.

30. PCB Fish Sampling Data. Ohio EPA(?)

31. *Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments*, US EPA, April, 1977.

32. *Lake Erie Wastewater Management Study: Methodology Report*, US Army Corps of Engineers, March, 1979.

33. *Water Quality Management Plan: Phosphorus Strategy for Lake Erie*, Ohio EPA, Office of the Planning Coordinator, June, 1985

34. Nriagu and Simmons, 1984, (p. 200-201)

35. Frank, et al, 1977

36. Munawar and Thomas, 1984

37. Mac and Willford, 1986

38. McFarland & Peddicord, 1986

39. Chapman, et al, 1986

40. Written communication dated March 14, 1988 from Dr. Paul C. Baumann, Leader, Field Research Station, The Ohio State University, Museum of Zoology, (U.S. Fish and Wildlife Services)

41. *Village of Whitehouse Facilities Plan*, Finkbeiner, Pettis & Strout and Lester Poggemeyer, Inc., 1978

42. *Swan Creek Watershed Improvement Strategy: Watershed Baseline Report, Volume 1* (TMACOG/WQ/85/03), Toledo Metropolitan Area Council of Governments, October, 1985.

43. *Manual of Practice No 8: Wastewater Treatment Plant Design*, Water Pollution Control Federation, 1977. Table 1-V

44. *Onsite Wastewater Treatment and Disposal Systems*, Table 6-13, US EPA Technology Transfer 625/1-80-012, 1980.

45. Water Resources Data, Ohio: Water Year 1982, Volume 2. St. Lawrence River Basin, U.S. Geological Survey Water Data Report OH-82-2, 1983, p.34.

46. Urban,D.R., J.R. Adams, and T.J. Logan Application of Universal Soil Loss Equation, Appendix I, Lake Erie Wastewater Management Study, U.S. Army Engineer District, Buffalo, 1978, p.129.

47. Final Report, Lake Erie Wastewater Management Study, U.S. Army Engineer District, Buffalo, 1982, p.71.

48. *APPENDIX II: Time Weighted Mean Pesticide Concentrations and Pesticide Loadings at Lake Tributary Monitoring Stations, 1983-1985 Water Years*, Water Quality Laboratory, Heidelberg College, 1987. A description of the monitoring and analysis methodology is in *Lake Erie Agro-Ecosystem Program: Sediment, Nutrient, and Pesticide Export Studies*, Heidelberg College, 1987 Chapter 7.

49. Letter from Larry G. Reed, U.S. EPA Region V to Colonel Robert Hardiman, Buffalo District, U.S. Army Corps of Engineers, May 9, 1984.

50. Letter from Warren W. Tyler, Director, Ohio EPA to Buffalo District, Corps of Engineers, March 30, 1987.

51. TMACOG, City of Toledo, Ohio EPA., Report: "Sediment Reclassification, Toledo Harbor, October 1986, p.13.

52. Fraleigh, Peter, Memorandum: "Concerns Regarding Open-Lake Disposal of Dredged Material", January 27, 1987.

53. Tyler, Warren. Letter to Col. Daniel Clark, U.S. Army Corps of Engineers, November 21, 1986.

54. DePinto, Joseph, et al., Report: "Effect of Open Lake Disposal of Toledo Harbor Dredged Material on Bioavailable Phosphorus", September 30, 1986, p.34.

55. Kovacik, Thomas, Ohio Journal of Science: "Information on the Velocity and Flow Pattern of Detroit River Water in Western Lake Erie Revealed by an Accidental Salt Spill", March 1972.

56. Herdendorf, C.E., 1969. *Water Masses and Their Movements in Western Lake Erie.* Ohio Div. Geol. Survey Rept. No. 74 p.7.

57. Fraleigh, Peter, Letter to Colonel Daniel Clark and attachments, February 12, 1986.

58. Clark, Col. Daniel, Letter to Warren Tyler, Ohio Environmental Protection Agency, December 18, 1986.

59. Fraleigh, Peter, Memorandum: "Effects of Open-lake Disposal", January 22, 1987.

60. Stevenson, Robert, Memorandum: "Open Lake Disposal of Dredge Material", January 26, 1987.

61. TMACOG, City of Toledo, Ohio EPA., Report: "Sediment Reclassification, Toledo Harbor, October 1986.

62. Wright, S., 1955. Limnological survey of western Lake Erie. *U.S. Fish and Wildlife Service Spec. Sci. Rept., Fisheries, 139.* 341 pp.

63. Carr, J.F., and J.K. Hiltunen. 1965. Changes in the bottom fauna of western Lake Erie from 1930 to 1961. Limnol. Oceanogr. 10(4):551-569.

64. Manny, B.A., J.K. Hiltunen, and J. Judd. 1987. Survey of macrozoobenthos in western Lake Erie, 1982. U.S. Fish and Wildlife Serv., National Fish. Center, Ann Arbor, Mich., preliminary data from unpublished report.

65. Mizera, J.J. 1981. Distribution and entrainment of larval fishes in western and central Lake Erie. Ohio State Univ., Columbus, Center for Lake Erie Area Res. Tech. Rept. No. 215. 225 pp.

66. Heniken, M.R. 1977. Distribution and abundance of larval fish in western Lake Erie. Ohio State Univ., Columbus, Center for Lake Erie Area Res. Tech. Rept. 69, 95 pp.

67. *Federal Register*, 9/16/84, pg 37,998; 3/7/85, pp 9362-66; 8/12/85, pp 35249-52; 8/29/85, pp 35200-02; 10/21/87, page 39,240.

68. *1980 Census*, STF 3A Table 108

69. *City of Toledo, Ohio: Report on Regulator Telemetering,* Jones & Henry Engineers, Ltd., November, 1973.

70. *Report of Investigation: Combined Sewer Pollution: City of Toledo*, Earthview, Inc., Environmental Scientists, February, 1973.

71. *Combined Sewer Overflow Study: Maumee, Ohio; Lucas County, Ohio*, Finkbeiner, Pettis, and Strout, Ltd., October, 1982.

72. *Northwood Facilities Plan*, Finkbeiner, Pettis, and Strout, Ltd., 1979.

73. *City of Toledo Combined Sewer Overflow Study*, Jones & Henry Engineers, Ltd., Update: April, 1987.

74. *Perrysburg Segmented Facilities Plan*, Finkbeiner, Pettis, & Strout, Ltd., 1980.

75. National Pollution Discharge Elimination System (NPDES) permit D702*CD issued to the City of Perrysburg 6/29/82. Current permit is 2PD00002*DD.

76. *Groundwater Quality Baseline Report*, Toledo Metropolitan Area Council of Governments, June, 1982

77. *Home Sewage Disposal Priorities*, TMACOG, 1983

78. *20,000 Leaks Under Ohio: Environmental and Health Threats from Leaking Underground Storage Tanks in Ohio,* Ohio Environmental Council, August, 1988.

305b	A biennial report from the state to US EPA which describes the quality of the water of the state. Specifically, whether it meets the "fishable and swimmable" criteria mandated by the Clean Water Act. The term "305b" refers to the section of the Act requiring this report.
$\mu g/l$	Micrograms/liter (parts per billion)
Ag	Silver
As	Arsenic
BOD, BOD_5	*Biochemical Oxygen Demand*. This is a water quality parameter which serves as an indirect measure of the amount of organic matter (food) available for bacteria in a water sample. It measures the amount of oxygen, in pounds, needed to support the growth of bacteria in a water sample over a specified period of time; usually 5 days.
Ba	Barium, a "heavy metal"
Be	Beryllium, a "heavy metal"
BWQR	Biological Water Quality Report: a detailed water quality survey of a stream reach conducted by OEPA. BWQRs were formerly known as CWQRs (Comprehensive WQR).
Bypass	A point in a sanitary sewer system where untreated sewage can overflow directly to a stream instead of continuing to the treatment plant.
C	Carbon
CDF	*Confined Disposal Facility*. Diked areas in Maumee Bay which are used to hold and dewater sediments dredged off the bottom of the shipping channel.
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act* of 1980, more commonly known as *"Superfund,"* which provides authority for Federal cleanup of abandoned toxic waste sides and response to releases of hazardous substances into the environment.
CLEAR	*Center for Lake Erie Area Research*, a Lake Erie water quality monitoring program, sponsored by Ohio State University.
CN	Cyanide
COD	*Chemical Oxygen Demand*. An indirect measurement of the amount of carbon (food) in a water sample. This test is somewhat similar to the BOD test, in that it measures the pounds of oxygen needed to use up (oxidize) the carbon in a water sample. The COD uses chemicals to determine the amount of oxygen needed, while the BOD test is a biological test.
CSO	Combined sewer overflow
$CaCO_3$	Calcium carbonate: "scale." Used as a standard in measuring water hardness.
Cd	Cadmium, a "heavy metal"
Cl, Cl^-	Chlorine, chloride. Chlorine is a poisonous gas commonly used to kill germs in treated sewage or drinking water. Chloride is an electrolyte, a "salt" (sodium chloride), and is not a disinfectant
CoE	US Army Corps of Engineers
Combined sewage	Sanitary sewage and stormwater combined. Ideally, sanitary sewage and stormwater are carried in separate pipelines. In many inner-city areas, however, there is only one sewer system, and it carries combined sewage.
Cond.	Conductivity: a specific laboratory test for determining the conductivity of a water sample. It indicates the quantity of dissolved electrolytes in a sample.
Cr	Chromium, a "heavy metal"

Cu	Copper
DO	Dissolved oxygen. Amount of oxygen dissolved in a water sample (in mg/l or ppm). DO is necessary for the survival of fish and other aquatic life
EPA	Environmental Protection Agency. US EPA is the Federal agency, and Ohio EPA is Ohio's statewide equivalent.
Eutrophication	A natural aging process generally describing the fertility (mainly aquatic plant productivity) of lakes. This process is speeded up if a lake receives an excess amount of nutrient pollutants, especially phosphorus.
F	Fluoride
Fe	Iron
Fecal Coliform	Bacteria which when found in large numbers in a water sample, indicate the presence of untreated sewage.
HUD	Housing and Urban Development. A Federal Agency which provides funding to assist cities and villages with housing and infrastructure problems
Hg	Mercury, a "heavy metal"
I/I	Infiltration and Inflow: excess storm and/or ground water entering a sanitary sewer system
ICI	Invertebrate Community Index: a numerical measure of water quality as reflected by a stream's ability to support aquatic life
IJC	International Joint Commission
K	Potassium
kg	Kilogram(s): 1000 grams. A kilogram is slightly more than two pounds.
LEWMS	Lake Erie Wastewater Management Study
LM	Lake mile. How many miles downstream (and out into Lake Erie) a given point is from the mouth of the Maumee
Leachate	Liquid that leaks out of a landfill or dump; usually ground or surface water highly contaminated with wastes from the dump or landfill.
MBAS	Methylene Blue Active Substance: a measure for the presence of surfactants in water or wastewater. Surfactants ("surface- active agents") are large organic molecules that cause water to foam or produce suds when agitated.
MG	Million gallons
mg	Milligram(s): a thousandth of a gram. There are 454 grams to a pound.
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter (= ppm)
mgd	Million gallons per day
ml	Milliliter(s): a thousandth of a liter. A liter is slightly less than a quart.
MOE	(Ontario) Ministry of the Environment. Equivalent of EPA.
MP	Mile point. How many miles upstream (above) the mouth of a stream a given point is. See RM.
Methane	Natural gas. Formed by the decomposition of organic matter in the absence of oxygen.
Mn	Manganese
N	Nitrogen: one of the chemical elements which in certain forms is a nutrient necessary for life.
NH_3	Ammonia: a form of nitrogen, which is a pollutant.
NO_2	Nitrite(s): a form of nitrogen, which is a pollutant.
NO_3	Nitrate(s): a form of nitrogen, which is a pollutant.
ng/g	Nanograms/gram. "Nano" is a prefix which means *"one billionth"*, or 10^{-9}. ng/g=ppb.

NPDES	National Pollutant Discharge Elimination System. Refers to a permit which is required in order to discharge wastewater to a stream. This permit dictates how clean the water must be before it can be discharged.
Na	Sodium
Ni	Nickel, a "heavy metal"
O/G	Oil and grease. In water quality monitoring, refers to a specific chemical test for amount of oils in a sample.
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
P	Phosphorus. Considered the critical nutrient in the pollution of the Great Lakes. By limiting amount of phosphorus discharged to Lake Erie, the lake's eutrophication can be controlled.
PAH	*P*olynuclear *A*romatic *H*ydrocarbons
Pb	Lead, a "heavy metal"
PCB	Polychlorinated Biphenyls. Organic chemicals which, during the 50 years they were manufactured and used, an estimated 400 million pounds entered the environment, according to US EPA Hazardous Waste laboratory. Their use ranged from dielectric oils to carbonless paper production. A colorless liquid, it was used as an insulating fluid in electrical equipment: e.g., transformers, capacitors, because of its stability and heat resistance. PCBs are a suspect carcinogen. A significant health impact has been linked to incomplete combustion of PCBs. The oxidation of PCBs form dioxins and furans, the most toxic of all man-made substances. They have been found in measurable concentrations in waterways and sediments throughout the world, and are widely-spread contaminants of fish and wildlife resources. PCB contamination began in an era when industrial wastes were disposed of by flushing them directly into waterways, local sewage treatment plants, or landfills.
PEMSO	*P*lanning and *E*ngineering *D*ata *M*anagement *S*ystem for *O*hio (PEMSO) system, which Ohio EPA uses for classifying stream segments, modeling pollution sources, and their effects on water quality. Related watershed classification systems: TMACOG uses smaller watersheds, which are generally a subset of the PEMSO watersheds. The third system is *L*and *R*esources *I*nformation *S*ystem (LRIS), developed for the 208 program, and further defined for the Lake Erie Wastewater Management Study (LEWMS).[3] LRIS watersheds are usually, but not always, the same as TMACOG's.
pH	A measure of acidity or alkalinity, on a scale of 1 to 14. Neutral is 7.0; lower values are acidic, and higher values are alkaline (basic).
POTW	Publicly-Operated Treatment Works. A wastewater treatment facility operated by a city, village, or county that treats primary domestic sewage. Usually refers to a municipal sewage treatment plant.
ppb	Parts per billion ($= \mu g/l$)
ppm	Parts per million (= mg/l)
RCRA	*Resource Conservation and Recovery Act* of 1976. Deals with the transport, storage, treatment, or disposal of hazardous wastes and their associated facilities.
RM	River mile: how many miles upstream (above) the mouth of a stream
Regulator	A device used to control the bypass of untreated combined sewage to a stream. The purpose of the regulator is to allow the system to bypass combined sewage when the system is overloaded from stormwater; but to prevent bypasses during dry weather
S.D.	Sewer District

SO_4	Sulfate(s)
SS	Suspended solids: in water quality sampling, the weight of solids (in mg) suspended in a milliliter (ml) of water.
Se	Selenium
Superfund	See CERCLA
TDS	Total dissolved solids
TESD	Toledo Environmental Services Division: a division of the City of Toledo which is responsible for performing air and water quality monitoring in Toledo. Formerly TESA (*Agency*).
TKN	Total Kjeldahl Nitrogen: a specific chemical test used to determine how much of certain forms of nitrogen are in a water sample. It includes organic and ammonia nitrogen, but excludes nitrites and nitrates.
TMACOG	Toledo Metropolitan Area Council of Governments: regional planning agency for Lucas, Wood, Ottawa, Sandusky and Erie Counties in Northwest Ohio, and Erie, Bedford, and Whiteford Townships in Monroe County, Michigan
tpy	Tons per year
Turb.	Turbidity: a measure of whether or not water is clear. When used in terms of water quality monitoring, it refers to a specific test used to quantity *how* turbid a water sample is.
USGS	United States Geological Survey. Federal agency involved in detailed mapping of the U.S., and surface and groundwater monitoring.
WQ	Water quality
WTP	Water Treatment Plant. Usually refers to a municipal plant for producing city drinking water.
WWH	Warmwater Habitat: a stream classification used by Ohio EPA to set the water quality standards for a stream. Warmwater standards are not as stringent as Coldwater.
WWTP	Wastewater Treatment Plant. Usually refers to a municipal treatment facility, and often used interchangeably with "Sewage Treatment Plant"
Zn	Zinc, a "heavy metal"