Maumee River
Remedial Action Plan
Investigation Report: Turtle Creek, Packer Creek, Toussaint River

TMACOG Element Number 90.70/3430
June, 1993

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This document was prepared by the Toledo Metropolitan Area Council of Governments with funding from member local governments, and was financed in part by grants from the U.S. Environmental Protection Agency, through the Ohio Environmental Protection Agency.

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MAUMEE RIVER BASIN
REMEDIAL ACTION PLAN INVESTIGATION REPORT
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Turtle Creek, Packer Creek, and Toussaint River

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The Lower Maumee River Area of Concern is one of forty-three Areas of Concern (AOC) around the Great Lakes that has serious water pollution problems that are not being addressed by existing programs. The Great Lakes Water Quality Agreement, amended in 1987, called for the International Joint Commission (IJC) to identify AOCs, and for the appropriate Federal, State, and Local agencies to prepare and implement Remedial Action Plans (RAPs).

A RAP is a tool for putting a comprehensive water quality clean-up into action. The charge of a RAP Committee is to find ways to remove impairments to "beneficial uses" of water resources. The IJC provides a checklist of beneficial use impairments to consider:[1]

i) Restrictions on fish and wildlife consumption;
ii) Tainting of fish and wildlife flavor;
iii) Degradation of fish and wildlife populations;
iv) Fish tumors or other deformities;
v) Bird or animal deformities or reproduction problems;
vi) Degradation of benthos;
vii) Restrictions on dredging activities;
viii) Eutrophication or undesirable algae;
ix) Restriction on drinking water consumption, or taste and odor problems;
x) Beach closings;
xi) Degradation of aesthetics;
xii) Added costs to agriculture or industry;
xiii) Degradation of phytoplankton and zooplankton populations; and
xiv) Loss of fish and wildlife habitat.

From the problems pollution has caused in this area, the Maumee RAP wishes to add one more category:

xv) Loss of jobs or inhibition of economic development due to pollution

7.0. The Maumee River Area of Concern

The IJC defines an "Area of Concern" as follows:

> *"Area of Concern" means a geographical area that fails to meet the General or Specific Objectives of the Agreement where such failure has caused or is likely to cause impairment of beneficial use or of the area's ability to support aquatic life.*

As originally defined in 1987, the Lower Maumee Area of Concern included "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." The *Maumee RAP Investigation Report* defined the original Area of Concern and its reasons for that designation.[2]

The next major river east of the Maumee is the Portage. The original AOC included some (Crane Creek, Cedar Creek) of the Lake Erie Direct tributaries between the two major basins, but not others (Packer Creek, Turtle Creek, and the Toussaint River). This report addresses the Impaired Beneficial Uses in the Packer Creek, Turtle Creek, and Toussaint River Watersheds for the purpose of including them in the Maumee River AOC. Figure 1 shows the watersheds that were already in the AOC, and the watersheds that are to be added. Table 1 provides watershed data about these areas.

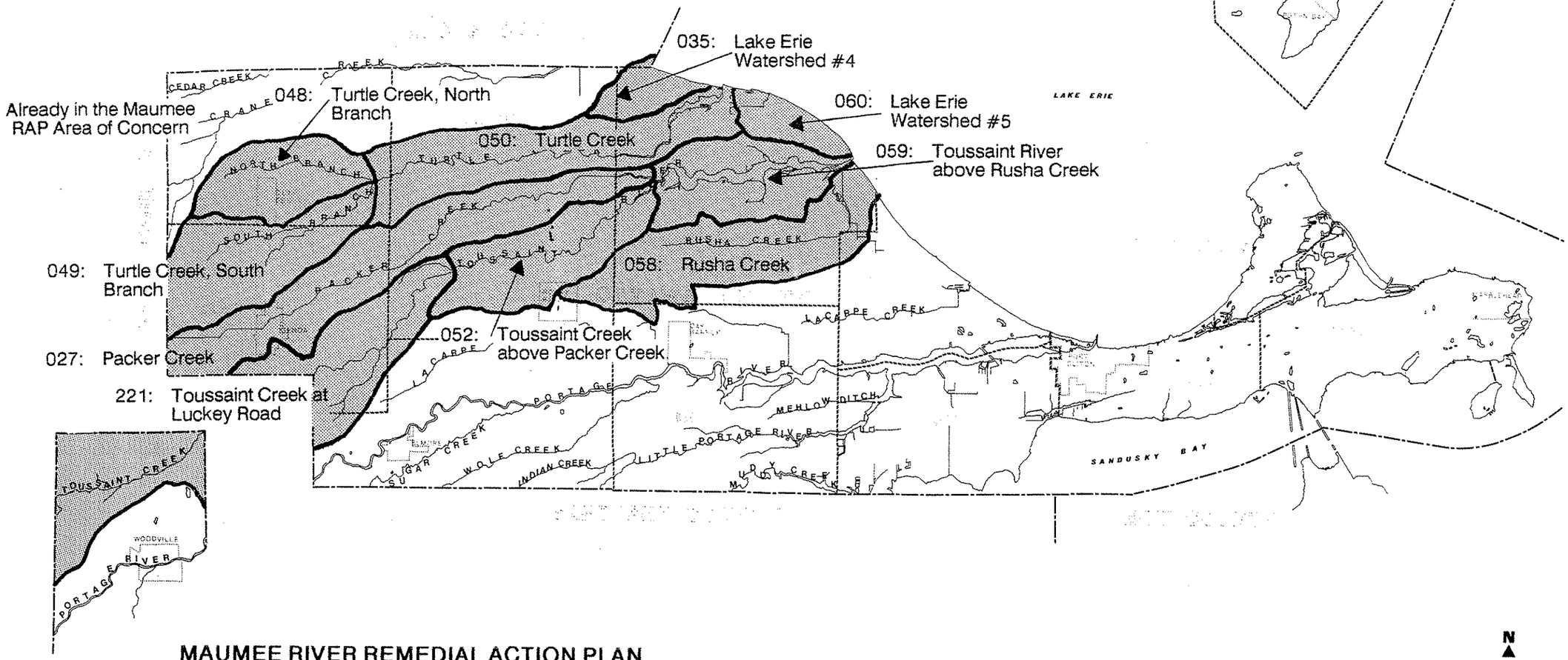
This document does not intend to stand alone as a complete Investigation (Stage I) report for these watersheds. It is an *addition* to the Maumee RAP Stage I completed in 1990, which has

been approved by the IJC. Much of the information in the original Stage I applies equally to the Packer, Turtle, and Toussaint watersheds. Discussions of Sport and Commercial Fishing, and Water Quality Standards are good examples. This report contains only additional information pertaining to these three watersheds. For further background and information, please refer to the *Maumee River RAP Stage I Report.*

Organization of this Report

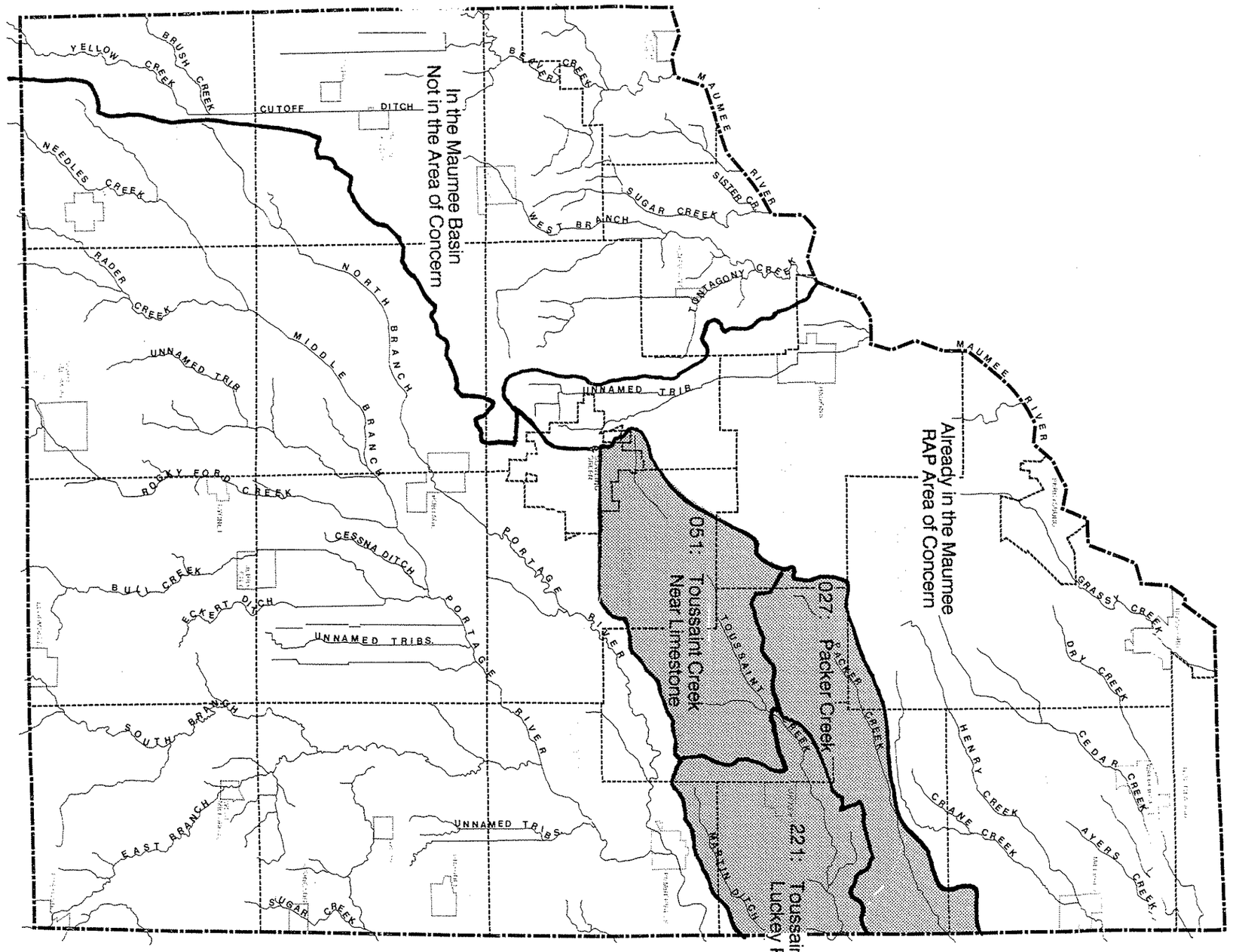
The format of this document is modeled after the *Maumee River Basin Area of Concern Remedial Action Plan: Volume 4, Recommendations for Implementation* (TMACOG, 1991). With some additions, the outline and numbering system has been preserved. Chapter 1 of that report discussed the Environmental Database of the Area of Concern; and Chapter 2 covered the Ecosystem Approach to remedial action planning. Chapters 3 through 6 discussed water quality problems by type of source, and recommended who should do what to clean them up. There was one chapter for each of the major sub-basins in the Area of Concern: 3. The Maumee River Mainstem; 4. Swan Creek; 5. The Ottawa River; and 6. Lake Erie Direct Tributaries (Crane and Cedar Creek).

This document forms Chapter 7, covering the Packer, Turtle, and Toussaint Watersheds.



MAUMEE RIVER REMEDIAL ACTION PLAN
Proposed Streams to Include in the Area of Concern

OTTAWA COUNTY STREAMS



MAUMEE RIVER REMEDIAL ACTION PLAN
Proposed Streams to Include in the Area of Concern

WOOD COUNTY STREAMS

TABLE 1
RAP Area Stream Segments and Use Designations

STREAM, BASIN, AND SUB-BASIN	WATERSHED NUMBERS	STREAM SEGMENT USES	LENGTH Miles	LRIS Acres
Lake Erie Watershed #4 BASIN: Lake Erie SUB:	TMACOG: 035 LRIS: 035 STATE PEMSO: 1610362 RESOURCE: No	HABITAT: WATER SUPPLY: RECREATION:		2,904.6
Lake Erie Watershed #5 BASIN: Lake Erie SUB:	TMACOG: 060 LRIS: 060 STATE PEMSO: 1610361 RESOURCE: No	HABITAT: WATER SUPPLY: RECREATION:		1,919.4
Packer Creek BASIN: Lake Erie SUB: Toussaint	TMACOG: 027 LRIS: 027 STATE PEMSO: 1610202 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	24.4	22,043.6
Rusha Creek BASIN: Lake Erie SUB: Toussaint	TMACOG: 058 LRIS: 058 STATE PEMSO: 1610231 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	7.6	4,798.5
Toussaint Creek Near Limestone BASIN: Lake Erie SUB: Toussaint	TMACOG: 051 LRIS: 051 STATE PEMSO: 1610201 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P		21,846.3
Toussaint Creek above Packer Creek BASIN: Lake Erie SUB: Toussaint	TMACOG: 052 LRIS: 052 STATE PEMSO: 1610231 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P		6,471.7
Toussaint Creek at Luckey Road BASIN: Lake Erie SUB: Toussaint	TMACOG: 221 LRIS: 221 STATE PEMSO: 1610201 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	17.9	21,714.7
Toussaint River above Rusha Creek BASIN: Lake Erie SUB: Toussaint	TMACOG: 059 LRIS: 059 STATE PEMSO: 1610231 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	24.4	8,246.7
Turtle Creek BASIN: Lake Erie SUB:	TMACOG: 050 LRIS: 050 STATE PEMSO: 1610301 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	9.5	7,898.5
Turtle Creek, North Branch BASIN: Lake Erie SUB: Turtle Creek	TMACOG: 048 LRIS: 048 STATE PEMSO: 1610301 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	6.0	5,252.5
Turtle Creek, South Branch BASIN: Lake Erie SUB: Turtle Creek	TMACOG: 049 LRIS: 049 STATE PEMSO: 1610301 RESOURCE: No	HABITAT: WW WATER SUPPLY: AI RECREATION: P	6.4	7,685.2
		Total Acres ------->		110,781.7

7.0.1. Water Quality Data

Packer, Turtle, and the Toussaint are small streams. Consequently, they have often been left out of stream monitoring programs, and there is relatively little data available. A listing of the available water quality data sources is presented in Appendix A.[3]

CLEAR Nearshore Sampling

The Center for Lake Erie Area Research (CLEAR) sampled many Lake Erie nearshore sites in 1978-9. Two sites were near the mouth of the Toussaint. Parameters included many conventional parameters, metals, pesticides, biological parameters, and sediments.

Ohio DNR Fish and Wildlife Reports

ODNR reports annually on spills and fish kills reported in Ohio streams. There are several on record in these streams. These reports are also listed in Appendix A.

Facility Plans and Sanitary Surveys

As a part of preparing a sewerage *Facility Plan* for a community, engineering consultants often requested stream and/or storm tile sampling to document the need for sanitary sewers. These sampling efforts are limited to local ditches and streams to show the immediate impact of raw

sewage. Such sampling was performed in conjunction with the *Luckey Facilities Plan*,[4] and for a TMACOG study documenting on-site sewage disposal problems in Clay Township of Ottawa County.[5] The data is presented under Home Sewage Disposal in this report. Both of these studies found high fecal coliform counts. Luckey has since installed a sewerage system.

In 1984 the US Army Corps of Engineers sampled sediments at three sites at or near the mouth of the Toussaint. The analyses were part of the environmental review prior to beginning maintenance dredging on the Toussaint. The sediment data is discussed in more detail under "Restriction on Dredging Activities" and "Dredge Disposal."

7.0.2. Discussion of Water Quality Data

The few water quality sampling programs within the watersheds do not tell the whole story. The sampling on record has been in response to specific localized problems. These problems are of concern, but the primary reason for considering the watersheds as part of an Area of Concern is for their impact on Lake Erie itself.

Lake Erie water quality problems caused by eutrophication were discussed in the *Stage I Report,* as were lake-wide fish advisories, and toxics. The primary concerns about toxics relate to PCBs and PAHs. The Packer, Turtle, and Toussaint watersheds are not believed to be major sources of these chemicals.

These are primarily agricultural watersheds. They contribute sediment, phosphorus, nitrogen, and pesticides to Lake Erie. Excess phosphorus has been identified as the critical nutrient in causing nuisance algae blooms, and hastening the eutrophication of Lake Erie. Consequently, reducing sediment and phosphorus loadings by reducing erosion has been the focus of much work by the US Soil Conservation Service (SCS) and Soil and Water Conservation Districts (SWCD) for the past decade.

Nitrogen is also a nutrient of concern, but primarily in streams that serve as drinking water supplies. There are no public water supply sources in the Packer, Turtle, or Toussaint watersheds. There are private drinking water supplies that use Lake Erie as a source. Two such private systems are the Green Cove Condominiums and the Davis Besse Nuclear Power Station, both in Carroll Township, Ottawa County.

Since the streams flow directly into Lake Erie, they transport sediments and attached nutrients to the Lake more quickly than tributaries to the larger streams. In 1991, a working group consisting of Ohio EPA, ODNR, TMACOG, SCS, and County SWCD staffs designed a non-point source water pollution grant proposal. The group designated the Lake Erie Direct tributaries as "Phase 1" (highest priority) because they offer sediment and phosphorus a short route to the Lake.[6]

7.0.3. Impaired Beneficial Uses

Beneficial uses of water resources are impaired or threatened in the Packer, Turtle, and Toussaint watersheds. In this section, the impairments will be discussed briefly. More detail can be found later in this report in the sections describing pollutant sources.

i) Restrictions on fish and wildlife consumption

Fish consumption advisories have been issued for carp and channel catfish for all of Lake Erie, due to PCB contamination.

ii) Tainting of fish and wildlife flavor

None reported.

iii) Degradation of fish and wildlife populations

A ring-billed gull colony at the mouth of the Maumee has suffered an even more alarming die-off. This colony of thousands of birds and about 2,000 nests has produced some 2,500 young each year. In 1991, the colony had total reproductive failure. Every egg simply failed to hatch. There was no apparent cause—no tampering with the nests, no known oil or chemical spills. The extent and suddenness of the failure is unprecedented anywhere in the Great Lakes. After the hatch failure of 1991, the colony did not return to the site in 1992.

The gull nesting site is not in the Toussaint watershed, but it is "upstream" of the coastal marshes. If chemical contamination was the cause of the hatch failure, it could impact the coastal marshes as well.

iv) Fish tumors or other deformities

Studies by the US Fish and Wildlife Service (FWS)[7] in 1987 found tumors (chromatophoromas) on the skin surface of freshwater drum *(Aplodinotus grunniens)* collected by commercial fishermen in Sandusky Bay. The tumor rate was about 10%. In 1990 the FWS participated in a similar study with Dr. Dave Johnson and Mr. Joe Smith of Ohio State University. The 1990 study of 2 sites in Sandusky Bay and one off Camp Perry in Lake Erie showed somewhat higher tumor frequencies, ranging between 10% and 20%. Drum data from the Central Basin of Lake Erie collected by the Fairport Harbor office of the Ohio Division of Wildlife in 1991 showed a frequency of a little over 2% in those length classes that had fish with tumors. As part of these studies the FWS also investigated the tumor frequencies in freshwater drum collected in the Ohio River in the years from 1987 through 1991 at six navigation locks. The Ohio River drum showed no tumors at all on any of the thousands of drum examined. From these and other studies it is apparent that the drum population of Sandusky Bay, and probably the Western Basin of Lake Erie, show a relatively high frequency of external tumors.

Drum appear to be sensitive to the carcinogenic effects of contaminants and this could be one cause of tumors. However, there may also be genetic factors which could cause a high frequency of tumors in some populations. As part of continuing studies the FWS is investigating the genetic differences between drum populations in the Central and Western Basins of Lake Erie, and the Ohio and Mississippi Rivers.

v) Bird or animal deformities or reproduction problems

The bald eagle has nested throughout the Great Lakes basin since the last ice age some 12,000 years ago. Lately, the bald eagle, which symbolizes our nation's strength and courage, has also served a far more utilitarian role as a "miner's canary" for the degree of toxic contamination of the great lakes.

In the 1960s and 1970s, the Great Lakes bald eagle population was decimated due to DDT and other organochlorine-based pesticides. DDT was banned, and the bald eagle made a remarkable recovery, particularly around Lake Erie. With the help of some very innovative management practices, in 1992 there were 20 nesting pairs of eagles in Ohio, mostly along the marshy shoreline stretching from Toledo to Sandusky. Twenty pairs, compared to a low of four, was the goal for 2000.

Until 1990, the birds were reproducing successfully. This success suffered an unexpected and dramatic reversal in 1990 and 1991. In 1990, 4 or 5 eaglets were lost during the first 4 weeks after hatching, while 10 young were fledged. Last year 7 to 13 eaglets were lost with only 4 fledged.

Although no specific cause was identified, toxic chemicals were strongly suspected for the eaglet losses. The eaglet mortality resembled that of colonial water birds in the upper great lakes due to high levels of PCBs and other organochlorine compounds. In 1990, the total

PCB content of unhatched eagle eggs ranged from 17 to 33 ppm, with an average of 25 ppm. This is roughly 5 times the "no effect" level.

In 1992, there was a record hatch. Concentrations of DDT and its breakdown products in eagle eggs have been steadily declining over the years; DDE levels are a third what they were ten years ago. Toxic problems have not all been solved, however; in the same period, PCB levels have risen.

vi) Degradation of benthos

Combined Sewer Overflows, chemical discharges from industries or landfill leachate, and accumulation of water treatment plant sludge on stream bottoms are known to degrade macroinvertebrate populations in direct Maumee River and Bay tributaries. There is no macroinvertebrate data for Packer, Toussaint, or Turtle Creeks. There may be some benthos degradation in some areas, particularly downstream from combined sewer overflows (below Luckey and Genoa), and in areas with many failed septic systems (Turtle Creek below Genoa). It is unlikely that benthos problems are anywhere near as serious as Otter or Duck Creeks, however.

vii) Restrictions on dredging activities

US Army Corps of Engineers samples analyzed in 1984 provide the only record of sediment quality in the area. A COE memo accompanying the results notes:[8]

> *"...According to the Bulk Chemical Analyses of Inorganics (using US EPA Region V Guidelines), Site 1A* [top two feet of sediment, 1700 feet out into the Lake] *is highly polluted in Barium, Copper, and Lead. Site 1B* [same site, two to eight feet deep] *shows the sample to be highly polluted for Barium and Iron. Pesticides and PCBs were not detected at any of the sites. Overall, Site 1 appears to be moderately-to-highly polluted. Sites 2* [at the Mouth of the Toussaint and its confluence with Rusha Creek] *and 3* [650 feet out into the Lake] *are basically non-polluted...*
>
> *"...The non-polluted material is located nearest the confluence (Sites 2 and 3), with the highly polluted material found in the Lake (Site 1). The results are contrary to what would be expected. It is expected that a lower concentration of inorganic material would be found in an open-lake site.*
>
> *"Since the overall quality of the tested sediment is non-to-moderately polluted, the suggestion of the Corps would be to place the dredgings in an open-lake disposal site or an upland site. It is recommended that the more polluted sediments between Sites 3 and 1 be placed in the disposal area first and overlain by the non-polluted sediments between Sites 2 and 3."*

There have been restrictions on dredging the mouth of the Toussaint, but not from contaminated sediments in the usual sense. Dredging work was not completed because of unexploded ordnance fired from Camp Perry.

viii) Eutrophication or undesirable algae

The Maumee River basin is the largest single source of phosphorus to Lake Erie, comprising over 40% of the total annual load. The Lake Erie Direct tributaries are a special concern because they offer sediment and phosphorus a quick and direct route from the field to the lake.

ix) Restriction on drinking water consumption, or taste and odor problems

No drinking water restrictions have been reported in these watersheds or along the lake shore. Surface drinking water supplies in the area use the lake, rather than the streams as a source. The lake is much less susceptible to seasonal concentrations of nitrates, pesticides, and trihalomethanes than the streams. The Ottawa County Health Department receives nearshore lake water sample bacterial and nitrate results regularly during summer months. Samples have not shown concentrations over the advisory levels. Trihalomethanes are not monitored for water

supplies in the area.

x) Beach closings

Most of the streams in the Packer/Turtle/Toussaint watersheds are too small for swimming; most swimming areas are on the lake shore. Sections of the streams are too polluted for primary contact in general (wading) in and below areas with many septic systems, such as Turtle Creek below Genoa. Refer to the section on Home Sewage Disposal for details.

There are public swimming areas at Crane Creek State Park and Wild Wings (near Green Cove in Carroll Township); most of the rest of the shoreline is in private ownership. There have not been beach closings in this area. The nearest closings are further east, at Port Clinton, due to bacteria. The primary sources are believed to be combined sewers and discharges into the Portage River. If Turtle Creek, Packer Creek, and the Toussaint River have any effect on the beaches in Port Clinton, they are overshadowed by the Portage River.

xi) Degradation of aesthetics

Debris and highly turbid water after rainstorms.

xii) Added costs to agriculture or industry

The Davis Besse Nuclear Power Station is by far the largest water user in the area. The station has its own water system, taking raw water from Lake Erie. The largest volume of water is used for cooling, which receives primary clarification. Drinking water serves between 1,000 and 1,100 employees. Davis Besse also uses water for steam generation. This water must be cleaner than drinking water. Treatment for this process water includes removal of metals and minerals. Sediment and algae in raw water increases the treatment costs of all water users.

xiii) Degradation of phytoplankton and zooplankton populations

Unknown.

xiv) Loss of fish and wildlife habitat

Fish communities are influenced by habitat modifications such as the addition of riprap, channel straightening, and loss of woody buffer areas along stream banks.

xv) Loss of jobs or inhibition of economic development due to pollution

Contaminated soils, particularly at old industrial sites, are a problem in many midwestern cities. Old chemical spills make sites hazardous for employees of the business now occupying the site. If the company wishes to expand, the chemicals may also be dangerous to construction workers. This issue was not addressed specifically as an "impairment of beneficial uses" in the *Maumee RAP Stage I Report,* but it applies to the Toledo area. The Millard Avenue overpass road project, which would allow traffic through Oregon and East Toledo without constant train crossing blockages, has been held up for years because of soil contaminants. Large industrial sites in Oregon and East Toledo remain vacant because of contaminants left behind by previous owners.

The Ohio EPA *Master Sites List* [of contaminated sites] has two entries in the Packer / Turtle / Toussaint watersheds: Cooper Industrial Products in Bowling Green, near the headwaters of the Toussaint; and Motor Wheel, just north of Luckey, also on the Toussaint. Both inherited site contamination problems left by earlier owners. Cooper has been unable to expand and add jobs because of this problem.

7.1. Publicly-Operated Treatment Works

7.1.1. Village of Genoa

The Village of Genoa's wastewater treatment plant (WWTP) has a design flow of 0.28 million gallons per day (mgd) and presently treats an average of about 0.33 mgd. Its effluent is discharged to Toussaint Creek. The Genoa WWTP has failed to meet its discharge permit conditions on numerous occasions in the past several years. The Village is under Findings and Orders from Ohio EPA to upgrade its treatment plant and comply with its permit.

In the 1970s and early 1980s when US EPA grants were available for sewerage systems, most municipalities prepared *Facility Plans* to apply for the funding. Genoa was one community that did not prepare a Plan, so there are no past studies of the Village's needs on record. The Village of Genoa is preparing a *General Plan,* which will state what improvements the Village will make to its sewerage system in order to meet its permit.

In the longer term, several areas around Genoa will need sanitary sewer service. Clay Township is unsewered except for Woodland Estates, and has been recognized as a Critical Home Sewage Disposal Area, and, as will be discussed later, Turtle Creek is polluted by failed septic systems. The Village of Clay Center is also unsewered. The Woodland Estates Subdivision is served by an aging package plant which eventually will need to be replaced or upgraded.

The *Areawide Water Quality Management Plan* calls for Genoa ultimately to serve Clay Center and the surrounding parts of Clay and Allen Townships.[9] A regional sewerage system operated by Genoa would eliminate the Woodland Estates plant and many septic systems. The Village of Genoa would have to increase its treatment capacity substantially in order to serve these areas.

Ottawa County is developing a proposed sewer system that would serve several parts of Clay Township northwest of Genoa, the Genoa Area High School just south of Clay Center, and the Village of Clay Center itself. The County portion of this project was estimated at $6.7 million in October, 1991, including sewer laterals in Clay Center. The project would provide sewer service along SR 51 from Genoa to the north side of Martin-Moline Road, plus developed areas Clay Township sections 20, 21, 27, 28, and 29.

In addition to the County's costs for building sewers, the Village of Genoa would have to expand its wastewater treatment plant, at an estimated cost of $750,000. The Genoa Area sewerage projects would substantially improve water quality in Turtle Creek.

7.1.2. Village of Luckey

The Village of Luckey installed a sanitary sewerage system with a design capacity of 120,000 gallons per day (gpd) in 1988. The treatment plant is a lagoon, discharging to Toussaint Creek. Since Luckey did not qualify for financial assistance, the Village decided to use a combined sewer system. Dry-weather flow from the existing storm sewers was collected and pumped to the treatment plant. During wet weather, the excess combined stormwater and sewage bypasses to Toussaint Creek via one of several ditches.

Luckey has shallow bedrock, and a conventional sewer system would have been expensive to install. The *Luckey Facilities Plan* (1981) considered several different sewer designs; the construction cost was approximately $2.2 million. The combined system was chosen to reduce construction costs.

Both Luckey and Genoa discharge to Toussaint Creek. The Woodland Estates (physically a package plant; administratively a POTW) discharges to Turtle Creek.

7.2. Combined Sewer Overflows

7.2.1. Village of Genoa

Genoa's sewers are partly a combined system, which bypass to Packer Creek. CSO abatement could be done by storing combined sewage for treatment after a storm, or by separating the storm and sanitary sewer systems. Either alternative increase the amount of wastewater to treat. Additional capacity is needed to treat sewage which formerly would have been bypassed.

Genoa is addressing its combined sewer problem by separating the storm and sanitary sewers over the entire village. The first of thirteen annual phases was submitted to Ohio EPA in 1988, and has remained on schedule. To date, four of the sewer separation phases have been built. Phases V through VII were estimated (1/93) at a total of $930,000.

7.2.2. Village of Luckey

Luckey's storm sewers double as a sanitary sewer system. Pump stations at strategic points capture the sewage and pump it to the treatment plant. This system was relatively inexpensive to build, but it does allow untreated sewage to bypass during wet weather. Ohio EPA approved Luckey's combined sewer system with the proviso that the village would separate the sewers over a period of years. There are four combined sewage outfalls.

7.3. Industrial Dischargers

The watersheds are predominately agricultural, but there are some industries in the area. A list of all NPDES permits is given below. This list includes both public and private facilities. Industrial facilities are assigned NPDES numbers beginning with "2I." Publicly-owner, or "semi-public" (i.e., package plants) have NPDES numbers beginning with "2P." A more detailed list is presented in Appendix B.

TABLE 2
NPDES Permits in the Area of Concern
Packer Creek, Turtle Creek, and Toussaint River Watersheds

Ottawa County

NPDES PERMIT	FACILITY NAME AND LOCATION	
NPDES #2IJ00063	Gemline, Genoa Quarry	Genoa
NPDES #2PB00008	Genoa WWTP	Genoa
NPDES #2PS00007	Green Cove Condominiums PO Box 278	Pkg Plant #O-117 Port Clinton
NPDES #2IJ00036	Stoneco - Rocky Ridge Quarry	Graytown
NPDES #2IB00011	Toledo Edison, Davis-Besse Station 300 Madison Ave.	Pkg Plant #O-10 Toledo
NPDES #2IF00006	USCO Services Erie Industrial Park, Bldg. 2	Pkg Plant #O-122 Port Clinton
NPDES #2IJ00037	White Rock Quarry	Clay Center

NPDES #2PG00037	Woodland Estates Ottawa Co. Courthouse, 315 Madison St.	Pkg Plant #O-50 Port Clinton

Sandusky County

NPDES PERMIT	FACILITY NAME AND LOCATION	
NPDES #2PQ00000	Blue Heron-Wyandot Service Plazas 682 Prospect	Pkg Plant #S-53 Berea
NPDES #2IJ00040	Martin Marietta, Refractories Div (Lime) POB 187	Pkg Plant #S-57 Woodville

Wood County

NPDES PERMIT	FACILITY NAME AND LOCATION	
NPDES #2IS00021	Latrobe Steel, Castmasters Div.	Bowling Green
NPDES #2PA00080	Luckey WWTP	Luckey
NPDES #2PY00005	Maurer Trailer Park 18487 North Dixie Highway	Pkg Plant #W-64 Bowling Green
NPDES #2IR00008	Motor Wheel	Pkg Plant #W-75 Luckey
NPDES #2PS00005	Otterbein-Portage Valley Village 20311 Pemberville Rd	Pkg Plant #W-77 Pemberville
NPDES #2PY00008	Village Green MHP 7630 Reitz Road	Pkg Plant #W-62 Perrysburg

Each NPDES Discharger is required to sample its effluent and submit the test results to Ohio EPA. The NPDES permit sets limits on concentrations and/or quantities of pollutants that may be discharged. Exceeding those limits constitutes an Effluent Violation.

The following table lists administrative water quality actions taken by Ohio EPA relative to NPDES dischargers in these watersheds. This list of water quality actions includes any approvals, denials, complaints, orders, and violations cited by Ohio EPA. The NPDES dischargers below includes all public, semi-public, and industrial facilities. An "MHP" is a Mobile Home Park; POTW stands for "Publicly-Operated Treatment Works" (i.e., a sewage treatment plant); and "WWTP" stands for "Wastewater Treatment Plant" (usually meaning public sewage treatment plant, but can mean industrial wastewater).

The source of these listing is the Ohio EPA publication *Weekly Review.* It is a log of administrative and regulatory actions Ohio EPA takes regarding discharge permits, review of plans and specifications, or Permits To Install. Until late 1992, the *Weekly Review* log included warning letters for NPDES permit violations. In a budgetary cutback, Ohio EPA has eliminated that information from *Weekly Review.*

TABLE 3
Ohio EPA Water Quality Actions
for Packer/Turtle/Toussaint NPDES Dischargers

OTTAWA County

E. Kramer & Sons — NPDES #2IJ00037*
Date: 10/03/89
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008*
Date: 0890
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008001*
Date: 06/26/91
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008*
Date: 01/23/91
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008*
Date: 01/23/91
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 08/21/92
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 10/29/91
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 07/02/92
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 06/18/92
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 08/06/91
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008*
Date: 11/19/90
Action: Warning Letter for Effluent Violation

Genoa — NPDES #2PB00008000*
Date: 04/14/92
Action: Warning Letter for Effluent Violation

Genoa POTW — NPDES #2PB00008*
Date: 07/19/89
Action: Warning Letter for Effluent Violation

Genoa WWTP — NPDES #2PB00008*
Date: 09/18/89
Action: Warning Letter for Effluent Violation

Genoa WWTP — NPDES #2PB00008*
Date: 03/20/90
Action: Warning Letter for Effluent Violation

Genoa WWTP — NPDES #2PB00008*
Date: 09/24/90
Action: Warning Letter for Effluent Violation

Genoa WWTP NPDES #2PB00008*
Date: 09/01/89
Action: Warning Letter for Effluent Violation

Genoa WWTP NPDES #2PB00008*
Date: 10/11/89
Action: Warning Letter for Effluent Violation

Genoa WWTP NPDES #2PB00008*
Date: 02/20/90
Action: Warning Letter for Effluent Violation

Stoneco-Rocky Ridge NPDES #2IJ00036000*
Date: 07/02/92
Action: Warning Letter for Effluent Violation

Toledo Edison-Davis Besse NPDES #2IB00011*
Date: 01/31/91
Action: Warning Letter for Effluent Violation

White Rock Quarry NPDES #2IJ00037*
Date: 07/21/89
Action: Warning Letter for Effluent Violation

Woodland Estates NPDES #2PG00037000*
Date: 08/21/92
Action: Warning Letter for Effluent Violation

Woodland Estates NPDES #2PG00037000*
Date: 07/02/92
Action: Warning Letter for Effluent Violation

SANDUSKY County

Martin Marietta Basic Products NPDES #2IJ00040*
Date: 09/15/89
Action: Warning Letter for Effluent Violation

Martin Marietta Corp NPDES #2IJ00040001*
Date: 05/06/91
Action: Warning Letter for Effluent Violation

Martin Marietta Corp. NPDES #2IJ00040*
Date: 01/23/90
Action: Warning Letter for Effluent Violation

Martin Marietta Corp. NPDES #2IJ00040*
Date: 02/22/91
Action: Warning Letter for Effluent Violation

Martin Marietta Corp. NPDES #2IJ00040000*
Date: 03/04/92
Action: Warning Letter for Effluent Violation

WOOD County

Luckey NPDES #2PA00080000*
Date: 05/21/92
Action: Warning Letter for Schedule Violation

Luckey POTW NPDES #2PA00080*
Date: 07/30/89
Action: Warning Letter for Effluent Violation

Maurer MHP NPDES #2PY00005000*
Date: 07/02/92
Action: Warning Letter for Effluent Violation

Maurer MHP NPDES #2PY00005000*
Date: 06/08/92
Action: Warning Letter for Effluent Violation

Motor Wheel Corp NPDES #2IR00008000*
Date: 06/18/92
Action: Warning Letter for Effluent Violation

Motor Wheel Corp NPDES #2IR00008000*
Date: 05/06/92
Action: Warning Letter for Effluent Violation

Motor Wheel Corp. NPDES #2IR00008*
Date: 07/14/89
Action: Warning Letter for Effluent Violation

Motor Wheel Corp. NPDES #2IR00008*
Date: 12/04/89
Action: Warning Letter for Effluent Violation

Motor Wheel Corp. NPDES #2IR00008*
Date: 09/25/89
Action: Warning Letter for Effluent Violation

Portage Valley Nursing NPDES #2PS00005000*
Date: 06/08/92
Action: Warning Letter for Effluent Violation

Portage Valley STP NPDES #2PS00005*
Date: 03/01/90
Action: Warning Letter for Effluent Violation

Village Green NPDES #2PY00008000*
Date: 01/07/92
Action: Warning Letter for Effluent Violation

Village Green MHP NPDES #2PY00008000*
Date: 12/10/91
Action: Warning Letter for Effluent Violation

By far, the majority of the effluent violations are related to sewage treatment. That applies to the Village of Genoa, Woodland Estates, the Village of Luckey, Maurer MHP, the Portage Valley Nursing Home, and the Village Green MHP. Genoa shows the most permit violations, generally suspended solids effluent exceedences due to algae in their lagoon effluent during the summer. There were also some dissolved oxygen violations.

The Ohio EPA Northwest District Office notes that there were many more permit violations for several Wood County dischargers than listed above.

From 1989 through March, 1993, Luckey had effluent violations due to high pH during two additional months not listed above.

The Maurer MHP experienced permit violations during thirteen additional months between 9.91 and 3/93, due to continuing operation and maintenance problems with the package plant. Violations included SS, CBOD, DO, SS, Fecal Coliform, and chlorine residual.

The Portage Valley (Otterbein) Nursing Home package plant had violations in three additional months, all for CBOD; plus one each for SS and NH3.

Motor Wheel's NPDES Permit applies to a package plant that treats process water and sewage. The products produced here are polyurethane-coated steel-rim automotive wheels. The Motor Wheel permit also includes site runoff, which is a concern in part because of hazardous materials left behind on the site—notably Beryllium (Be)—by previous owners. The NPDES permit requires monitoring of runoff water for Be, but there are no effluent limits. Ohio EPA notes that Be concentrations found in the runoff exceed human health criteria. There are requirements for neither monitoring nor effluent limits on Cu. From 11/91 through 10/92 there were seven additional months with permit violations. In six of those months, there were DO violations; other parameters included Oil and Grease, SS, CBOD, and chlorine residual.

The package plant at the Village Green MHP had effluent violations during seven additional

months between 8/90 and 3/93. Parameters included Ammonia, DO, Fecal Coliform, and SS. All this juicy stuff about Wood County from Leona Hohman//June 3, 1993

E. Kramer and Sons and White Rock Quarry in Ottawa County are the same facility. White Rock, Stoneco, and Martin Marietta are all quarry operations, and their permit violations were for suspended solids in dewatering pond effluent.

The Ohio EPA violation letter for Davis Besse in 1991 did not provide details. It was related to Outfall #001, discharge to Lake Erie, whose parameters are temperature, pH, and free available chlorine. There was also a chlorine spill on the site in 1992 that did not result in a discharge permit violation.

7.4. Urban Runoff

Urban stormwater runoff constitutes a largely unquantified but potentially major source. Because pollutants in urban stormwater runoff come from diverse nonpoint sources, control is very difficult. While US EPA has recognized the need to control pollution from urban stormwater, little guidance has been offered regarding how to do so, or what standards need to be met.

Conventional pollutants such as suspended solids and phosphorous are typically found in elevated concentrations in urban stormwater. Given the agricultural nature of the watershed, the mass load of these pollutants from urban sources is dwarfed from the contribution from agricultural drainages. However, localized problems result from uncontrolled urban stormwater drainages, such as during active construction activities where erosion can result in large discharges of solids.

The introduction of toxins from urban drainages probably presents a greater threat than conventional pollutants in terms of degrading the Maumee River basin. Unfortunately, research on the introduction and fate of toxins from urban drainages into the watershed is very sparse. High concentrations of heavy metals have been found in some urban storm sewer sediments, elevated concentrations of oil and grease are commonly found in urban runoff, and other organic contaminants may be introduced from a number of industrial sources. Thus, while the potential for system damage from toxins is great, the understanding of how much of that potential has been realized is small.

US EPA regulations require NPDES Permits for three categories of urban runoff.

1. *Municipal Separate Storm Sewers.* Systems serving a population of 100,000 or greater are required to characterize stormwater discharges and develop a comprehensive management plant to reduce pollution. This regulation has no effect on the Packer, Turtle, or Toussaint watersheds.

2. *Industrial Facilities.* Discharges from industrial sites (e.g, manufacturing, transportation, power plants, waste treatment, landfills, etc.) are required to describe drainage areas, material and waste handling practices; submit stormwater data; and test for dry weather discharges. The Permit may set pollution effluent limits. Municipal sites are included in this category. Ohio EPA already covered some industrial sites where runoff was a concern. Quarries are a good example in this area; rail yards are another example.

3. *Construction Sites.* Development that disturbs five or more acres of land require a Permit. The developer is required to use construction methods to minimize the amount of erosion from the site.

Refer to Chapter 3 of *The Maumee RAP Recommendations Report* for recommended actions. Because the Packer, Turtle, and Toussaint watersheds are primarily rural, the municipal storm sewer permit discussions and recommendations are inapplicable. The discussions related to industrial and construction sites do apply, however.

7.5. Agricultural Runoff

Agricultural runoff is a primary issue in the Turtle, Packer, and Toussaint watersheds because these streams offer sediment and nutrients a short, direct route to the lake. Further detail is given in the earlier section, "Discussion of Water Quality Data." The effects of agricultural runoff on Lake Erie water quality are discussed below, but see the *Maumee RAP Stage I Report* and the *RAP Recommendations Report* chapter on the Maumee River Basin for more detail. By and large, the information in those documents pertains equally here.

A USGS gauging station on the Maumee at Waterville coupled with a Heidelberg College sampling station provides export data for sediment, nutrients, and pesticides to Lake Erie. A similar station on the Sandusky River above Fremont provides the same information for that river. There is no equivalent station on the Toussaint, since it is a much smaller river. The soil loss and export rates per acre may be taken as typical for the Toussaint, however, since it has the same types of Lake Plains soils as neighboring watersheds, and agricultural practices are essentially the same.

Croplands are major sources of sediment, phosphorus, nitrate and pesticides. The first three of these pollutants may come from many different sources, but agriculture is by far the largest. Pesticides such as Atrazine and Alachlor are unique to agriculture. Sediment is a pollutant that impacts water bodies of all sizes, from the smallest ditch to lake Erie itself by filling in channels and inhibiting drainage. Nitrates and pesticides are primarily a concern for drinking water supplies, and are more likely to be found in significant concentrations in streams than in the Lake. Phosphorus is primarily a concern for its impact on Lake Erie, and is conventionally viewed as the limiting nutrient in causing nuisance algal blooms and accelerated eutrophication.

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." 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 northwest Ohio are generally low, but because of the amount of land in agriculture, erosion from cropland poses a major pollution problem. The fine textured Lake Plains soils are easily displaced and washed away by the rain, and are slow to settle out again.

There are numerous problems created by suspended and deposited sediment. Some impact the streams themselves; others are serious concerns for Lake Erie.

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 *State of Ohio Phosphorus Reduction Strategy for Lake Erie* divided the Lake Erie drainage area (Ohio portion only) into hydrologic groups and watersheds.[10] It also prioritized the watersheds by their probable phosphorus loadings. In the Ohio portion of the Maumee River Basin the estimated sediment yield was 6,384,071 tons at the edge of the field or 1.9 tons/acre/year. Table 4 shows the agricultural acreages and phosphorus priorities of the watersheds.

TABLE 4
Packer, Turtle & Toussaint Watersheds:
Agricultural Acreages and Phosphorus Priorities

Basin Name	Basin PEMSO Number	Total* Acres	Agricultural Acres	Phosphorus Priority Class
Packer Creek	1610202	22,044 (23,762)	14,118	2
Toussaint at Mouth	1610231	19,516 (24,263)	14,415	2
Turtle Creek	1610301	20,836 (19,251)	11,438	2
Lake Erie Direct #4	1610362	2,905 2,753	1,636	2
Lake Erie Direct #5	1610361	1,919 (1,949)	1,158	2
Toussaint above Graytown	1610201	43,561 (45,257)	26,889	1
Subtotal, Priority Class 1	**43,561**	**39.3%**		
Subtotal, Priority Class 2	**67,221**	**60.7%**		
TOTAL		**110,782**	**69,654**	

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.

Eutrophication is a natural aging process generally describing the fertility (mainly aquatic plant

* The total acreages shown are from the *Land Resources Information System* (LRIS) land use database system; the numbers below in parentheses are total acreages from the *Planning and Engineering Data Management System for Ohio* (PEMSO) system. The acreages do not agree exactly due to small differences in watershed and drainage basin delineations. The agricultural acreage figures are from the PEMSO system, since these figures are more recent than LRIS data.

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 *Great Lakes Water Quality Agreement* established phosphorus loading targets for Lake Erie of 11,000 metric tons per year. It called on both 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* established a total Lake Erie reduction of 1,700 metric tons of which Ohio is responsible for 1,390 metric tons.

The *Phosphorus Reduction Strategy for Lake Erie* set out Ohio's plan to reduce phosphorus export by 1,390 metric tons per year. 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 Priority 1 watersheds in the Lake Erie Basin to receive priority treatment with Best Management Practices.

The phosphorus contribution of the Maumee Basin in Ohio was estimated at 1,197 metric tons per year. The strategy proposed that this contribution would be reduced by 447 metric tons, or about half of Ohio's agricultural reduction target. The Maumee Basin has therefore received a very high priority for Best Management Practices to reduce sediment and phosphorus loadings.

The Packer, Turtle, and Toussaint watersheds have similar soils and cropping practices, and the same BMPs are applicable here. Table 5 gives the cropland acreages, base year phosphorus loadings, and reduction targets for these watersheds. Achieving these reductions will improve water quality in Lake Erie and its tributaries.

TABLE 5
Phosphorus Reduction Targets for the Packer, Turtle, and Toussaint Watersheds

Watershed PEMSO #	Cropland Acres	Agricultural Phosphorus M Tons	Phosphorus Reduction M Tons
Lake Erie #4			
1610362	1,636	0.63	0.56
Lake Erie #5			
1610361	1,158	0.76	0.35
Packer Creek			
1610202	14,118	13.71	4.67
Toussaint Creek			
1610201	26,889	29.20	9.68
1610231	14,415	12.36	4.41
Turtle Creek			
1610301	11,438	10.46	3.50
TOTAL	**69,654**	**67.12**	**23.17**

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 reported that the nitrogen export rate for the Maumee River Basin was 19 kg/hectare/year (17.1 lb/acre/year), 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.

Nitrate nitrogen levels in the Great Lakes, and in both the Maumee and Sandusky Rivers have been increasing. Time-weighted and flow-weighted mean concentrations of Total Phosphorus have been falling at about 2% per year in both the Maumee and the Sandusky Rivers. For Soluble Reactive Phosphorus, the rate of decline has been about 5%. For nitrates, however, the rates of *increase* have ranged between 3%-5%, depending on which river, and whether one is dealing with time-weighted or flow-weighted means.[11] 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.

Pesticides

During spring and early summer, the concentrations of many currently used pesticides increase in Lake Erie Tributaries.[12] 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 suggested interim health guidance levels for some compounds in 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 6 contains information about the concentrations of pesticides in the Maumee River at Waterville and the Sandusky River above Fremont. Again, there has been no sampling on the Toussaint, but there is every reason to believe that the Maumee and Sandusky figures are applicable.

TABLE 6
Pesticide Concentrations and Exposure Levels[13]

Pesticide	Trade Name	Concentrations (µg/l) 1983 through 1989		Percent of Time over Lifetime Exposure		US EPA Health Advisory (µg/l)		
		Maumee	Sandusky	Maumee	Sandusky	1 day	10 day	Lifetime
Alachlor	Lasso	0.46	0.63	7%	8%	100	100	2
Atrazine	Aatrex	1.50	1.73	13%	12%	100	100	3
Metolachlor	Dual	0.90	1.43	0%	0%	2000	2000	100
Cyanazine	Bladex	0.34	0.36	0.1%	0.8%	100	100	10
Metribuzin	Sencor, Lexone	0.27	0.30	0%	0%	5000	5000	200
Butylate	Sutan	--	--	--	--	2000	2000	350
Simazine	Princep	0.12	0.10	1.8%	1.8%	500	500	1
Terbufos	Counter	<0.01	<0.01	<0.9%	<0.5%	5	5	0.9
Chlorpyrifos	Lorsban	trace	trace	0%	0%	30	30	20

7.5.1. The Paired Watershed Study

In 1988, the Ottawa Soil and Water Conservation District, Heidelberg College Water Quality Laboratory (WQL), TMACOG, and the University of Toledo began a study to compare the export of sediment, nutrient, and pesticides on conventional tillage fields versus conservation tillage fields. The study was set in two small, predominantly agricultural, watersheds in western Ottawa County, between Rocky Ridge and Oak Harbor. The streams selected were the Oak Harbor Cutoff Branch of Lacarpe Creek and its tributary, Bayou Ditch. This cutoff of Lacarpe Creek joins the Portage River at the west edge of Oak Harbor, and therefore is not in the Packer, Turtle, or Toussaint watersheds. However, the next stream to the north of Lacarpe Creek is Rusha Creek (a tributary of the Toussaint); and to the northwest, the Toussaint. The soils and land use in the Lacarpe and Bayou watersheds are very similar to their neighbors, the Packer, Turtle, and the Toussaint. The Paired Watershed Study data are therefore directly

applicable.

Field data, which includes tillage practices, crops grown, and applications of fertilizers and pesticides, have been collected by SWCD staff. The goal of this project is to show what can be accomplished in terms of reduced nutrient loading to streams through improved conservation practices. Table 7 shows the total export of nutrients and pesticides, and compare those figures with inputs; and the export rates in terms of pounds per year per productive acre.

TABLE 7
Ottawa County Paired Watershed Study
Nutrient and Pesticide Application Summary for 1988-1989

	BAYOU DITCH, 1988 The Conservation Watershed 1,263.2 Productive Acres Conservation Tillage: 40.8%				LACARPE CREEK, 1988 The Control Watershed 1,669.5 Productive Acres Conservation Tillage: 27.5%			
	Input	Output[14]	% Out	Lb Out/Acre	Input	Output	% Out	Lb Out/Acre
Sediment		20,805		16.47		12,424		7.44
Phosphorus	38,215.0	63.0	0.2%	0.050	47,933.0	67.6	0.1%	0.040
Nitrogen	17,559.0	3,463.1	19.7%	2.74	14,370.0	6,366.9	44.3%	3.81
Atrazine	113.5	0.1	0.1%	0.00008	192.2	0.0	0.0%	0
Alachlor	224.4	0.0	0.0%	0	188.7	0.0	0.0%	0
Cyanazine	93.9	0.0	0.0%	0	500.6	0.0	0.0%	0
Metolachlor	222.0	0.1	0.0%	0.00008	542.4	0.2	0.0%	0.00012

	BAYOU DITCH, 1989 The Conservation Watershed 1,333.4 Productive Acres Conservation Tillage: 24.9%				LACARPE CREEK, 1989 The Control Watershed 1,672.5 Productive Acres Conservation Tillage: 29.8%			
	Input	Output[15]	% Out	Lb Out/Acre	Input	Output	% Out	Lb Out/Acre
Sediment		299,452		224.6		403,384		241.2
Phosphorus	40,370.0	1,137.8	2.8%	0.853	43,438.0	2,254.8	5.2%	1.35
Nitrogen	29,352.0	23,452.6	79.9%	17.59	15,674.0	40,498.8	258.4%	24.2
Atrazine	194.4	11.6	5.9%	0.0087	97.9	17.7	18.1%	0.0106
Alachlor	160.2	2.2	1.3%	0.0016	346.5	0.0	0.0	0
Cyanazine	329.8	2.4	0.7%	1.0018	495.4	12.1	2.4%	0.0072
Metolachlor	256.0	7.7	3.0%	0.0058	588.4	4.8	0.8%	0.0029

During the first year of the Paired Watershed Study, there was a drought. Both streams were dry for most of the summer. Since there was no water, the very low exports of all six parameters come as no surprise. In 1989, rains returned, and more than twice as much nitrate came out of the Lacarpe watershed as was applied to the fields. This may be the result of carry-over from the previous dry year.

In 1988 and 1989, the flow characteristics of the two streams were very different. Bayou Ditch responded much more quickly to storm events than Lacarpe Creek. The Bayou Ditch watershed is better tiled, and the stream was cleaned out in 1988, while Lacarpe had not been cleaned out since 1966; it was to be cleaned out again during the winter of 1990. Further discussion of these two watersheds, tillage practices, nutrient and pesticide uses, their flow characteristics, and sediment, nutrient, and pesticide output is presented in the *Paired Watershed Project Report: 1990-1992 Field Years Input/Output Report.*[16]

During the summer of 1991, the US Fish and Wildlife Service analyzed water samples from ten sites in the existing and proposed expanded Area of Concern for two herbicide groups: Alachlor and Triazines. The Alachlor test used shows higher results than the test Heidelberg College uses, because it includes other chemicals, such as Metolachlor, Matalaxyl, and Alachlor breakdown products. Triazine refers to a *family* of herbicides that includes Atrazine, Simazine, and Propazine. The first nine sites are within the boundaries of the original Area of Concern. They are shown here because the data is recent, and has not been included in one of the earlier

RAP reports; and because nearby coastal water quality affects environmental quality at the mouths of Turtle Creek and the Toussaint River.

The river sites (Maumee, Portage, Muddy, Sandusky) indicate concentrations coming downstream. The other sites are in one of the Ottawa National Wildlife Refuge areas. The Cedar Point Area is in Jerusalem Township (Lucas County) east of Maumee Bay State Park. The central area is partly in Lucas County, and partly in Benton, and Carroll Townships of Ottawa County. Crane Creek goes through this area. The Darby Area is between Camp Perry and Port Clinton in Erie Township. Part of Lacarpe Creek drains into this area; Lacarpe has three upstream cutoffs that all drain into the Portage.

The results are shown in Table 8. All concentrations are shown in parts per billion.

TABLE 8
Alachlor and Triazine Concentrations, 1991
Maumee River, Toussaint River, and Lake Erie[17]

Site	5/22/91		6/17/91		7/24/91		8/29/91		10/23/91	
	Alachlor	Triazine	Alachlor	Triazine	Alachlor	Triazine	Alachlor	Triazine	Alachlor	Triazine
Site in the Original Maumee AOC										
Maumee @ Waterville	12.72	2.00	36.17	4.38	8.26	3.57	4.83	1.78	4.11	1.36
Cedar Point Refuge Area, East of Maumee Bay State Park										
Lake Erie/Cedar Pt. E.	2.65	0.37	27.98	3.84	6.19	4.07	0.74	1.34	1.40	0.57
Lake Erie/Cedar Pt. W.	1.77	0.43	32.07	4.14	5.88	3.69	1.13	1.23	2.33	0.56
Cedar Pt. E.	3.89	0.11	--	--	--	--	--	--	--	--
Cedar Pt. W.	10.30	0.70	31.56	4.38	--	--	--	--	--	--
Central Refuge Area, West of Magee Marsh										
MSU-8B	3.75	0.23	4.28	0.71	--	--	--	--	--	--
Crane @ Stanger Rd.	5.76	1.07	16.34	4.54	3.54	1.05	7.09	1.37	1.68	0.31
MSU-5	8.28	0.44	8.00	0.54	2.29	0.16	0.24	0.27	3.01	0.72
Pool-3	3.29	0.71	3.18	0.34	1.11	0.08	0.39	0.25	1.14	0.17
Turtle/Packer/Toussaint Watershed Site										
Toussaint @ SR 2	6.19	0.66	33.38	3.97	9.98	3.12	10.20	1.70	2.27	0.60
Darby Refuge Area; Lacarpe Creek North of SR 2; East of Camp Perry										
Darby/Pool	9.30	0.68	--	--	--	--	--	--	--	--
Darby/Lake Erie	2.39	0.34	4.82	0.89	3.01	0.62	0.47	0.98	0.34	0.38
Darby/Canal	--	--	--	--	1.67	0.59	0.44	0.53	1.31	0.58
Portage River/Muddy Creek Bay/Sandusky River Watershed Sites										
Portage @ SR 2	2.11	0.38	--	--	--	--	--	--	--	--
Muddy Creek @ SR 53	--	--	36.46	4.67	9.66	4.55	13.62	2.99	11.59	2.08
Sandusky @ Wolf Cr. Park	--	--	27.75	4.57	3.75	2.82	3.66	1.85	4.76	1.32

William Kurey of the US Fish and Wildlife Service, in discussing his findings, notes:

> *"The levels of Alachlor in all waters was generally much higher than the Triazines throughout the sampling period except for several data points in the October 23 sampling. Both herbicides show a marked peak concentration in June with subsequent declines. The high levels of Alachlor may have been the result of the test kit detecting both Alachlor and Metolachlor.*
>
> *"Baker and Richards (1989) summary of Atrazine, Metolachlor, and Alachlor concentrations for waters of the Maumee River and Sandusky River between 1983 and 1988, which were the result of gas chromatography analysis, show Atrazine levels to be much higher than Alachlor. The concentration of Metolachlor was also about twice that of Alachlor. The high concentrations of Alachlor relative to Triazines in our 1991 study is probably the result of the test kit for Alachlor detecting both Alachlor and Metolachlor. With this understanding the 1991 data is in much better agreement with those of Baker and Richards (1989)...."*

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* All concentrations are in parts per billion.

Using the Alachlor health advisory concentrations, the 1 and 10 day levels are both 100 µg/l; none of the samples exceeded that level. The lifetime health advisory concentration for Alachlor is 2 µg/l; 44 of 58 samples, or 75.9%, were over that level. If the Metolachlor criteria are applied to the data (2,000 µg/l for 1 and 10 day exposure; 100 µg/l for lifetime), none of the samples would be over the advisory levels. If the chemicals detected by this Alachlor test are a third Alachlor and two-thirds Metolachlor, a composite lifetime criterion of 67 µg/l may be appropriate, which none of the samples exceeded.

None of the Triazine concentrations found were over the Atrazine 1 or 10 year exposure levels of 100 µg/l; 13 of 58 samples (22.4%) were over the Atrazine lifetime exposure level of 3 µg/l. This exceedence rate is also higher than Baker and Richards' results; but the Triazine test includes Cyanazine as well as Atrazine. The lifetime exposure criterion for Cyanazine is 10 µg/l.

The RAP Recommendations presented in that document apply to the Packer, Turtle, and Toussaint watersheds. The recommendations focus on ways to improve soil conservation, and so keep sediment and nutrients on the fields. Please refer to Chapter 3 of the *RAP Recommendations Report* for details about recommended Best Management Practices.

7.6. Contaminated Sediments

There are no sediment quality samples on record for Packer or Turtle Creeks. CLEAR included sediment samples from the mouth of the Toussaint as part of its Lake Erie Nearshore monitoring in 1978 and 1979.

Streams downstream of possible sources of chemical pollution could have contaminated sediments. Potential sources include:

1. Industrial sites where chemicals are used, or were used in the past
2. Municipal storm sewers; residents may dump garden pesticides, automotive fluids, or paints, etc., down the nearest catch basin
3. Landfills and dumps

7.7. Dredged Disposal

The Toussaint River was dredged in 1991. The work was the original Corps of Engineers channel deepening project, and is intended to be maintained as needed; no maintenance schedule has been established. Ordnance (old unexploded shells) from Camp Perry on the bottom of the river and bay, prevented completion of the dredging work. Some sediment was disposed of onshore; the remainder was unconfined offshore disposal. The Corps of Engineers published an environmental study on the effects of dredging the Toussaint in 1984. It included the sediment sampling results shown in Table 9.

TABLE 9
Sediment Quality Data at the Mouth of the Toussaint River
US Army Corps of Engineers, 1984[18]

PARAMETER	SITE* 1A	1B	2A	2B	3A	3B
Total Solids, %	75.3	78.4	84.5	89.5	81.3	79.5
Total Volatile Solids, %	2.18	2.30	1.08	0.72	1.06	1.92
Arsenic	2.7	5.7	6.9	4.1	2.7	4.2
Barium	147	156	27	29	73	31
Cadmium	<0.3	<0.3	<0.1	0.1	<0.1	0.2
Chromium	17	19	5	5	4	5
Copper	147	36	12	8	4	6
Lead	150	19	14	8	5	5
Mercury	150	19	14	<0.12	<0.12	<0.12
Nickel	36	39	12	11	9	11
Zinc	60	64	16	11	14	17
Iron	24,000	25,100	7,700	5,300	5,300	7,200
Manganese	170	199	240	240	140	170
Ammonia-N	13.1	7.3	1.6	2.5	3.8	11.9
TKN	224	121	76.2	20.7	97.2	150
Total P	470	550	310	280	360	340
Oil and Grease	82	48	97	53	28	54

As noted earlier, contrary to usual patterns, the site furthest out in the Lake (Site #1) was the most contaminated. That site was rated as "highly polluted" in Barium, Copper, Iron, and Lead.

Sediments were also tested for pesticides (β-Endosulfan, α-Endosulfan, Endosulfan Sulfate, α-BHC, β-BHC, γ-BHC [Lindane], δ-BHC, Aldrin, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, Chlordane, Toxaphene, Methoxychlor, and Mirex); and PCBs (Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260). No detectable levels of any of these chemicals were found.

7.8. Package Plants

Package plants are discussed in detail in the *RAP Recommendations Report,* and an inventory is included as Appendix C of this report. Improved inspection and operator training programs are needed. Since 1985, package plant inspection has improved in Northwest Ohio. Wood County has established a "House Bill 110" inspection program. Ohio currently has about 30% of the package plants in the TMACOG planning area on NPDES permits, as opposed to 10% in 1985. There is still no regular or required operator training program, however; and manufactured home parks, recreation vehicle parks, recreation camps, and combined park-camps are exempted from "House Bill 110" inspection.[19]

7.9. Home Sewage Disposal

Two TMACOG reports have documented Home Sewage Disposal problems in these watersheds. *Home Sewage Disposal Priorities* identified Critical Home Sewage Disposal Problem Areas throughout the TMACOG planning area.[20]

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* Site #1 was 1700 feet out into Lake Erie from the Mouth of the Toussaint. Site #2 was at the Mouth of the Toussaint River, at its confluence with Rusha Creek. Site #3 was 650 feet out into the Lake. At all locations, the "A" site refers to samples taken from the top two feet of sediment, and the "B" site was a composite of sediment from two to eight feet deep.

All results reported in mg/kg (dry weight basis) unless otherwise noted.

OTTAWA COUNTY

In Ottawa County, six areas were identified as Critical Home Sewage Disposal Areas. These were:

1. The Village of Clay Center, unsewered. While there is no stream or storm tile sampling for Clay Center on record, the soil types, number of houses, and small lot sizes indicate sewage disposal problems. Many of the existing on-lot systems are home aerator or sub-surface sand filter units, which are especially prone to failure. According to 1990 Census data, there are 102 households in Clay Center, with a population of 289. A local house count puts the village at 110 houses and 9 businesses.
2. Clay Township northwest of Genoa, along SR 51; in Section 20. The Ottawa County Health Department has issued a building ban in this area due to septic system failures and poor soil conditions. See the discussion below.
3. Clay Township north of Genoa, along Genoa-Clay Center Road; in Sections 27 and 28. See the discussion below.
4. The Locust Point area in Carroll Township. This area along the lake front has many cottages, mobile home parks, marinas, etc. Sewage disposal is handled by septic systems, package plants, and holding tanks.
5. The mouth of the Toussaint, east of SR 2 is designated as a Critical Home Sewage Disposal Area. There is lake front development in this area, and the Davis Besse Nuclear Power Station. Since the report was written in 1983, there has been additional lake front development, and the Locust Point and Mouth of the Toussaint may be considered all one Critical Area.
6. The Village of Rocky Ridge, unsewered. Rocky Ridge had a population of 433 in 1990. A sanitary survey of the village has documented the septic storm tile outfalls.[21] The north half of the village drains to Toussaint Creek via Krehmke Ditch and Lickert-Harder Ditch.

TMACOG worked with Ottawa County to prepare a study addressing the specific on-site sewage disposal problems in part of Clay Township[5]. Sections 20, 21, 23, 27, 28, 32, 34, and 36 of Clay Township were identified as problem areas due to failed residential septic systems. Samples were collected at seven locations in Turtle Creek in July, 1978 and May, 1986. On both occasions, fecal coliform counts at all but two sites violated water quality standards. The data is presented in Table 10.

TABLE 10
Turtle Creek Water Quality in Clay Township

Sampling Station	Fecal Coliform 7/19/78	BOD (ppm) 5/86	SS (ppm) 5/86	Fecal Coliform 5/86
A - S. Branch @ Edgefield	TNTC	31.4	14	200
B - S. Branch @ Reiman/Watson	TNTC	(not enough water to collect a sample)		
C - Turtle Cr. @ SR 51	TNTC	3	10	3,960
D - Turtle Cr. @ Hellwig	4,600	2.6	3	4,500
E - S. Branch @ Genoa-Clay Center Rd	730	5.9	9	5,400
F - S. Branch @ Hellwig	TNTC	2.8	6	380
G - S. Branch @ Reiman Rd.	TNTC	2.9	4	2,660

The fecal coliform standard for Primary Contact is 400 (maximum) colonies per 100 ml sample, or 200 on the average. "TNTC" stands for "Too Numerous To Count." It indicates a very high fecal coliform count, and a water quality violation. A summary of home sewage disposal systems in 1980, and 1980/1990 populations in Ottawa County follows.

TABLE 11
Home Sewage Disposal Systems in the Packer/Turtle/Toussaint Watersheds

	Septic[22] Systems	Other	1980 Population	1990	% Change	Status
Allen Township						
Clay Center Village	91	6	327	289	-11.6%	
Township	878	23	3,322	3,177	-4.36%	
Benton Township						
Rocky Ridge Village	130	3	457	438	-4.16%	
Township	667	28	2,446	2,546	+4.09%	
Clay Township						
Genoa Village	10	0	2,213	2,262	+2.21%	
Township	884	20	5,359	5,267	-1.72%	
Carroll Township	997	64	1,706	1,671	-1.99%	
Harris Township						
Elmore Village	10	0	1,271	1,334	+4.96%	
Township	457	24	2,688	2,699	+0.41%	

SANDUSKY COUNTY

There were no Critical Home Sewage Disposal Areas identified in the Sandusky County portion of the Toussaint Creek watershed. A summary of home sewage disposal systems in 1980, and 1980/1990 populations in Ottawa County follows.

	Septic Systems	Other	1980 Population	1990	% Change	Status
Woodville Township	373	6	3,234	3,032	-6.25%	

WOOD COUNTY

There were two Critical Home Sewage Disposal Areas in Wood County. The largest was the Village of Luckey, which was unsewered in 1983. Since then, Luckey has constructed a village sewer system and treatment plant. The Village of Luckey is discussed in more detail under Publicly Operated Treatment Works and Combined Sewer Overflows.

The other Critical Area in Wood County was on the north side of Devil's Hole Road at Anderson Road in Webster Township.

A summary of home sewage disposal systems in 1980, and 1980/1990 populations in Wood County follows.

	Septic Systems	Other Population	1980	1990	% Change	Status
Center Township	332	15	1,334	1,148	-13.94%	
Plain Township	564	12	2,460	1,983	-19.39%	
Webster Township	361	12	1,082	1,081	-0.09%	

7.10. Landfills and Dumps

There are two sources of information about landfills and dumps in these watersheds. One is the TMACOG *Inventory of Dumps, Landfills, & Hazardous Waste Sites* (1984).[23] The other is the *Ohio EPA Master Sites List.*[24]

Two major, active landfills are not included below because they are outside the watershed boundaries; but are worth noting, because they are close by. The BFI Landfill in Ottawa County, on SR 358 south of Lacarpe Creek in Erie Township serves Ottawa, Seneca, and Sandusky Counties. The Wood County Landfill is at Tontogany Road and US 6 in Plain Township.

7.10.1. Closed Dumpsites

Figure 2 shows the known closed dumpsites, active landfills, and sites from the Ohio EPA Master Sites List for Ottawa County, and the corner of Sandusky County in the Packer Creek watershed. Figure 3 shows the same information for Wood County. The maps and the site numbers in the figures and below are from the 1993 *TMACOG Inventory of Landfills, Dumps, and Hazardous Waste Sites.*[25] Site numbers that start with "MSL-#" are those included in the *Master Sites List.*

Wood #23	Troy-Luckey Dump
Ottawa #8	Allen Township Dump
Ottawa #9	Huston Landfill
Ottawa #10	Clay Township Dump
Ottawa #13	Benton Township Dump
Ottawa #14	Allen Township Dump
Ottawa #23	Kilmer Landfill

7.10.2. Active Landfills

There are no active dumpsites in the Toussaint, Packer, or Turtle Creek watersheds.

FIGURE 2

OTTAWA/SANDUSKY COUNTY

REMEDIAL ACTION PLAN:
Turtle Creek, Packer Creek, Toussaint River
DUMPS AND LANDFILLS

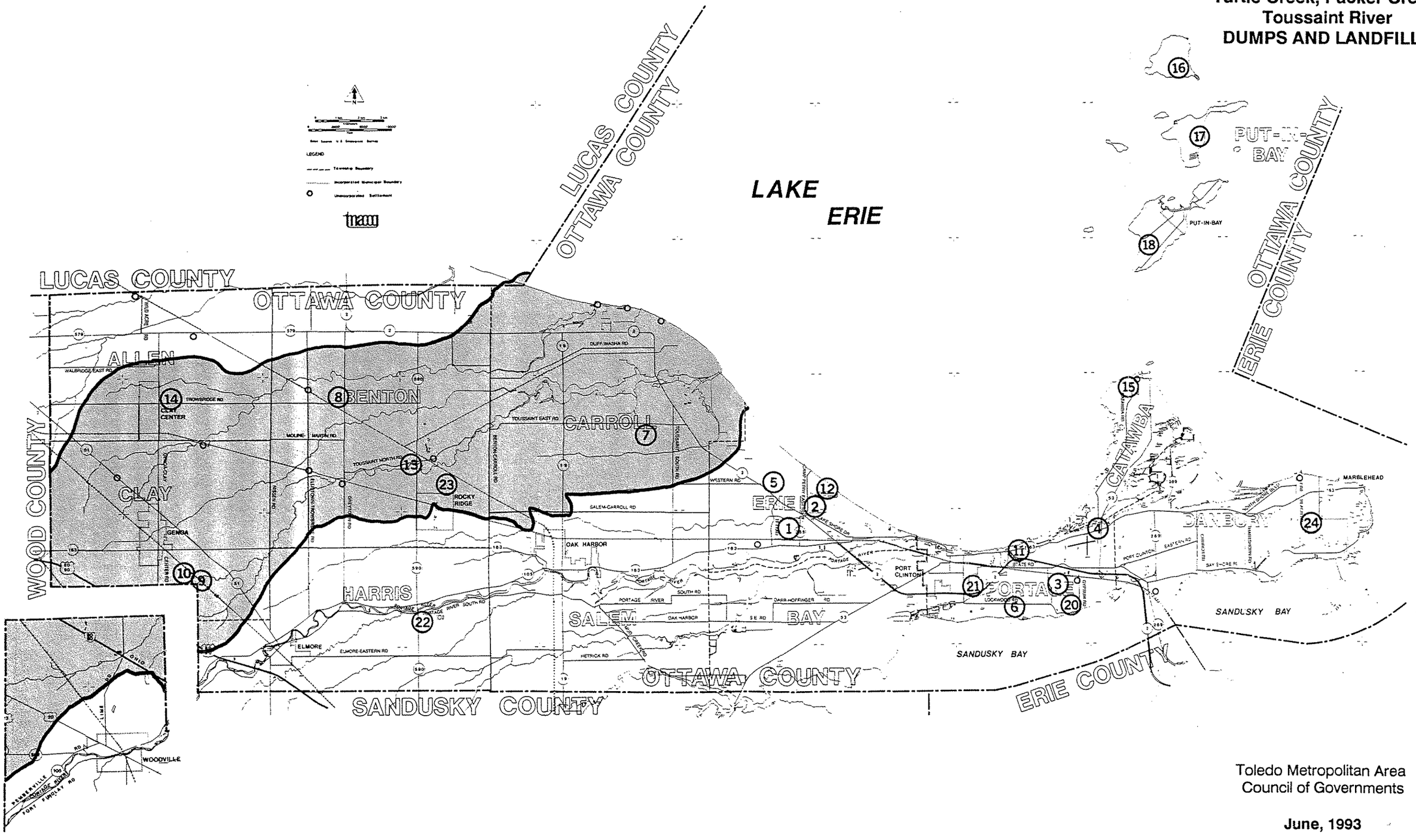

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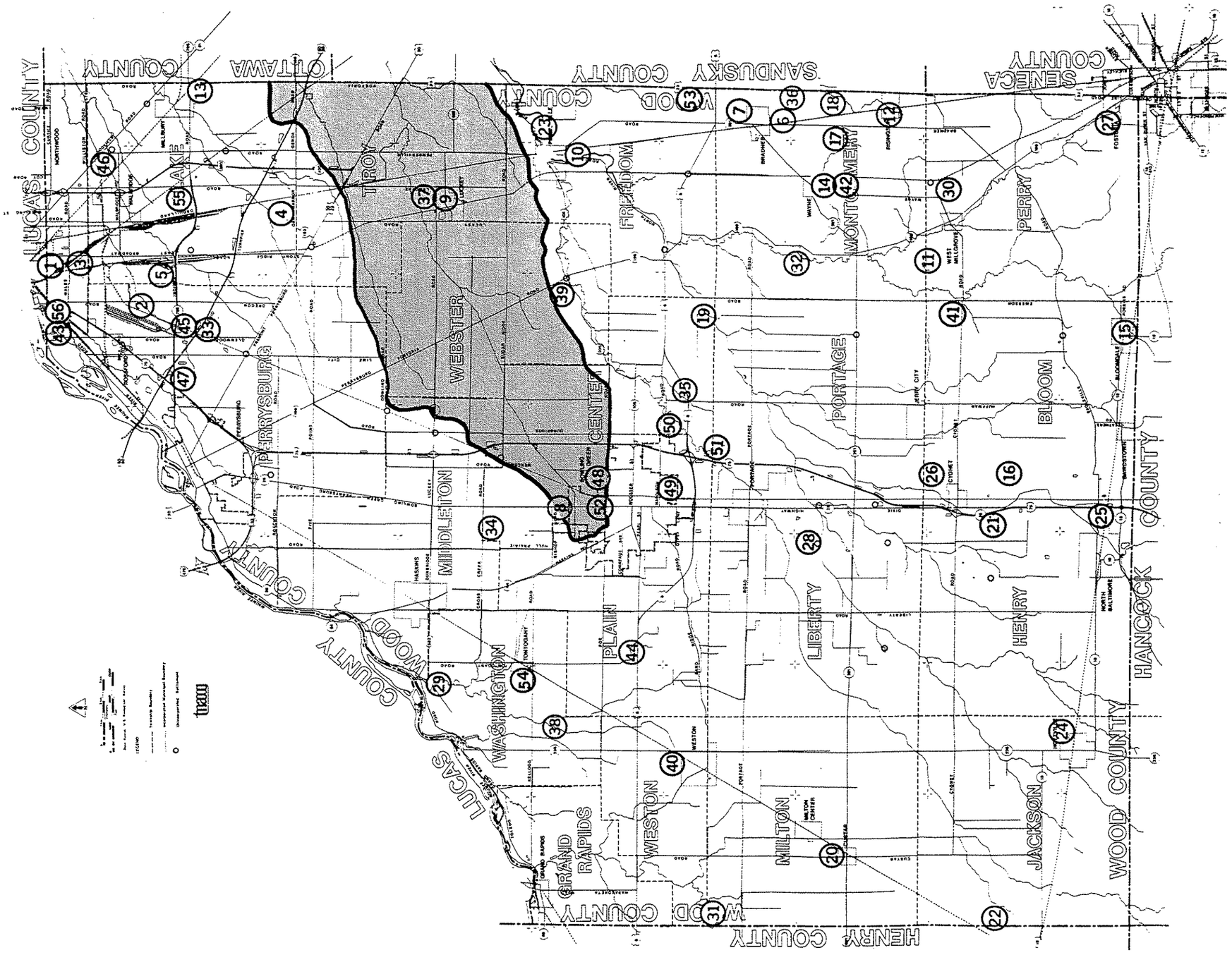
FIGURE 3

WOOD COUNTY

REMEDIAL ACTION PLAN:
Turtle Creek, Packer Creek, Toussaint River
DUMPS AND LANDFILLS



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7.10.3.RCRA Sites

Ottawa County RCRA Sites

Amoco Fertilizer Plant; 3014 Martin-Williston Road
Ares Inc., 818 Front St., Erie Industrial Park
Blatt's Trucking Inc., 1271 N Main St., Rocky Ridge
Crane Creek Wildlife Experimental Station, 13229 W SR 2
Dick's Body Shop, 1191 N. Benton-Carroll Road
Environmental Management Corp., 1141 CR 51, Genoa
Genline Group LP, 21880 W. SR 163, Genoa
Genoa Motors, SR 51, Genoa
Interstate Mfg. Co., Bldg 248 Erie Industrial Park
Kruse Cleaners, 22054 W SR 51, Genoa
Miller Chevrolet, 2080 SR 19, Oak Harbor
Ohio Air National Guard, Camp Perry
Ohio National Guard, Camp Perry
Scandura Ohio Inc., Erie Industrial Park, Bldg #320
Silgan Plastics Corp., Erie Industrial Park, Bldg 460
Stoneco, Rocky Ridge Plant, 3017 N SR 590, Rocky Ridge
Sunoco Service Station, 501 Main St., Genoa
Superior Mfg., Erie Industrial Park Bldg 460
Superior Push Rod, Erie Industrial Park, Bldg 484
Toledo Edison, Davis Besse Nuclear Power Station (SR 2)
Uniroyal Chemical Co., Erie Industrial Park, Bldgs #2, #146, #320
White Rock Quarry, Bolander Road, Clay Center
US Army Corps of Engineers, Erie Industrial Park, Bldg #2

Sandusky County RCRA Sites

Martin Marietta Chemicals, 755 Lime Road, Woodville
Ohio Turnpike Commission 6164 and 6410 CR 165*
Stoneco, Woodville Asphalt Plant #37, 812 Lime Road, Woodville
Woodville Lime and Chemical, 643 Lime Road, Woodville

Wood County RCRA Sites

Bowling Green Lincoln-Mercury, 1079 N. Main St., Bowling Green
Capitol Plastics, 333 Van Camp Road., Bowling Green
Cooper Tire, 1175 N. Main St., Bowling Green
DC Collisions, 5182 Sugar Ridge Road, Pemberville
Henry Filters, 1350 Van Camp Road, Bowling Green
Marathon Special Products, 13300 Van Camp Road, Bowling Green
McCord Products, 1135 N. Dixie Highway, Bowling Green
Motor Wheel, 21200 Luckey Road, Luckey
Thayer, Ralph Chevrolet, 1225 N. Main St., Bowling Green
University Honda, 1019 N. Main St., Bowling Green

7.10.4.Ohio EPA Master Sites List

MSL-#1	Motor Wheel: AKA Goodyear, AKA Brush Beryllium, AKA National Lead Magnesium Plant; Gilbert Road north of Luckey
MSL-#2	Cooper Industrial Products: 1175 North Main Street, Bowling Green

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* Listed in Ohio RCRA database as Ottawa County

7.11. Leaking Underground Storage Tanks

In the November 1984 reauthorization of the federal Resource Conservation and Recovery Act of 1976, Subtitle I was added to the Act to regulate Underground Storage Tanks (USTs) for petroleum products and hazardous substances.

According to the State Fire Marshal registry, there are 2834 USTs for Lucas County, 879 for Wood County and 284 for Ottawa County. Because USTs are associated with business and industry, it appears that they are found in higher concentrations in areas of greater population. The Ohio EPA Office of Emergency Response reports that since 1978 there have been 50 reported leaks for Lucas County, 22 for Wood County and 12 for Ottawa County and that about 75% of these leaks have come from tanks at gas stations.

The RAP Advisory Committee in its deliberations of the water quality impact on the originally established Area of Concern from USTs stated that watersheds in the core area of the City of Toledo should be rated suspected high impact, with the ring adjacent being suspected medium impact, and the outer ring in the more rural areas being suspected low impact.

Sub. H.B. 421 was enacted in August of 1989 which created among other measures the Petroleum Underground Storage Tank Linked Deposit Program to help provide low interest loans to owners of six or fewer petroleum USTs for the purpose of replacing or improving the tanks; requires the Fire Marshal to establish, by rule, requirements for financial responsibility of owners and operators of petroleum USTs for corrective action costs and compensation of bodily injury and property damage to third parties caused by releases of petroleum from UST systems; stipulates that the Fire Marshal's authority to require corrective action applies to both suspected and confirmed releases of petroleum from UST systems; requires the Fire Marshal to adopt alternative release detection and release containment methods for areas of the state designated as being sensitive for the protection of human health and the environment; and authorizes the Fire Marshal to delegate, by rule, the authority to conduct inspections of USTs to certified fire safety inspectors of municipal corporations and townships.

For further details and recommendations, please refer to the *RAP Recommendations Report* section on the Maumee River.

7.12. Atmospheric Deposition

No specific information exists for the effects of atmospheric deposition of pollutants in the AOC. Air quality data, noted in the *Investigation Report*, give reason to suspect potential problems from deposition. All watersheds are rated "Unknown, but suspected problem" as shown in the *Water Quality Problem Matrix*.

From 1981 through 1985 the Great Lakes National Program Office of US EPA sampled precipitation near Maumee Bay in Oregon, Ohio. The results for pH on a quarterly average showed a low of 3.6 for early 1984, with 9 quarterly averages being about 4.1. The Great Lakes Water Quality Board to the IJC states that even though the magnitude of the input has not been fully defined, the available evidence indicates that atmospheric deposition is a major pathway for contamination of the Great Lakes ecosystem. No air quality sampling is conducted within the Toussaint, Packer, or Turtle Creek watersheds.

A summary of the latest 1988 Toxic Chemical Inventory prepared by Toxic Action of Columbus, Ohio shows Lucas County to be sixth of ten of the hardest hit counties in Ohio related to the release of untreated toxic air pollutants. The source of this information is based on Toxic Chemical Release (TRI) inventory forms that many manufacturers are required to submit annually to OEPA under the federal Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986). The raw data in the report was provided by industries themselves and entered into a computer database by Toxic Action.

Data for three years (1987-1989) is presented in Appendix E. This appendix includes two summary reports of toxics released in the Packer, Turtle, and Toussaint watersheds. The first is a listing of the chemicals. It tells how much was released to each type of destination during each year, and the three year total. The second list is in order by the amount of chemical released. It says what industries released how much of each chemical each year. They are in order from smallest discharger to largest.

A similar list was presented as Appendix A to the *RAP Investigation Report.* That appendix included a discussion of the source, meaning, limitations, and use of the data. For full detail, please refer to that report.

To summarize, however, the Toxic Release Inventory is a collection of data reported by industries to US EPA. The TRI data is included here because, with all its shortcomings, it is the best sources of toxics data available. It includes only industries, and excludes many other potential sources of toxic chemicals. The TRI makes no attempt to prioritize chemicals according to their relative danger; and some are much more toxic or carcinogenic than others. Finally, data entry errors, or reporting errors due to misunderstanding US EPA reporting forms may occur (the *RAP Recommendation Report* cites one such instance in Lucas County). *Numbers from this database should be confirmed before taking further action.*

7.13. Water Treatment Plant Sludge

Water treatment plant sludge is not known to be an issue in these watersheds. The City of Oregon supplies Genoa with water. Luckey, Clay Center, and Rocky Ridge are all on private wells. The Davis Besse Nuclear Power Station, as has already been discussed, has its own water treatment facility. Davis Besse's water treatment sludge is stored in two 1 million gallon lagoons; discharge of water from these backwash lagoons is included in the NPDES Permit.

A public water system for Carroll Township, possibly also serving Rocky Ridge, is in the planning stages.

7.14. Natural Resources

Use this section to detail the "Ecosystem Approach" discussed in Chapter 2 of the *RAP Recommendations Report.*

This area is important for its wetlands and coastal marshes. It includes the Ottawa National Wildlife Refuge (Benton Township), Magee Marsh Reserve (Carroll Township), and the Toussaint Creek Wildlife Area (Carroll Township). The lake shore and the Toussaint River in Carroll Township seem to be increasingly popular recreation areas (see package plants).

7.15. Ecosystem Approach and Long-Term Management, Monitoring, and Institutional Needs

The *RAP Recommendations Report* discusses the Ecosystem Approach; Water Quality and Habitat; Wetlands and Open Space; Control of Introduced Species; Mosquito Control; Long Term Monitoring Needs; Institutional Framework; and Public Participation. These discussions are also applicable to the Packer, Turtle, and Toussaint watersheds. Please refer to Chapter 2 of the *RAP Recommendations Report* for more information.

7.15.1.Long-Term Monitoring of the Area of Concern

The *RAP Recommendations Report,* §2.3.8, discusses water quality monitoring needs to track whether or not environmental quality is improving. *The RAP Monitoring Strategy* provides an exhaustive list and detailed recommendations for monitoring needs.[26] Unfortunately, due to budget cutbacks, monitoring efforts have gradually but steadily declined since the late 1970s. In many areas, especially small streams, the only sampling on record is monitoring done in the early days of the Clean Water Act in the mid to late 70s. That is one reason why hard data is scarce for Packer, Turtle, and Toussaint Creeks, all small streams.

The RAP Monitoring Strategy does not include the Packer, Turtle, and Toussaint watersheds; it should be updated to include them.

References

(1) *Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987.* International Joint Commission, September, 1989.

(2) *Maumee River Basin Area of Concern Remedial Action Plan: Volume 1, Investigation Report.* Toledo Metropolitan Area Council of Governments, October, 1988. Also see *Maumee River Remedial Action Plan: Stage I, Investigation Report.* Ohio EPA/Maumee River Remedial Action Plan Advisory Committee, October, 1990. The later report was an updated and finalized version of substantially the same material.

(3) *Water Quality Sampling Site Inventory,* Toledo Metropolitan Area Council of Governments, 1993.

(4) *Facilities Plan for the Village of Luckey: Wastewater Collection and Treatment Improvements;* Lester H. Poggemeyer, P.E., Inc., 1981

(5) *Demonstration Project for Clay Township, Ottawa County, Ohio* TMACOG; Draft, August, 1987

(6) The resulting non-point source grant proposal resulted in $641,000 becoming available in the Maumee Basin to buy-down the cost of conservation tillage equipment. The group did not prepare a formal report or study; TMACOG prepared a brochure to explain the program, however: *Reduce Phosphorus and Sediment in the Maumee River Basin, Ohio.*

(7) Correspondence from US Department of the Interior, Fish and Wildlife Service, December 10, 1992; Reynoldsburg, Ohio Field Office; Bill Kurey, Biologist.

(8) US Army Corps of Engineers, Buffalo District Disposition Form from S. Baj and R. Leonard dated December 31, 1984

(9) *Areawide Water Quality Management Plan, Chapter II: Public Wastewater Treatment Services* Toledo Metropolitan Area Council of Governments; May, 1991.

(10) *State of Ohio Phosphorus Reduction Strategy for Lake Erie,* Ohio EPA, 1985.

(11) *Journal of Great Lakes Research,* Vol. 19, #2, Summer, 1993; "Trends in Nutrient and Suspended Sediment Concentrations in Lake Erie Tributaries, 1975-1990." R. Heidelberg College Water Quality Laboratory

(12) *Lake Erie Agro-Ecosystem Program: Sediment, Nutrient, and Pesticide Export Studies* (prepared for the Great Lakes National Program Office) Heidelberg College Water Quality Laboratory

(13) Richards and Baker, Heidelberg College Water Quality Laboratory; Tiffin, Ohio; 1989.

(14) *Paired Watershed Demonstration Project: Third Year Annual Report.* Toledo Metropolitan Area Council of Governments, July, 1990. All quantities are in pounds. In 1988, nutrient outputs are from the first sample (4/11) to the end of the calendar year. Herbicide exports are extrapolated for the *entire* year. See the herbicide export tables in Appendix A of that report for further details.

(15) *Ibid.* All quantities are in pounds. In 1989, nutrient outputs are from the January 1 through the end of the Water Year, September 30. Herbicide exports are extrapolated for the *entire* year. See the herbicide export tables in Appendix A of the *Paired Watershed Demonstration Project: Third Year Annual Report* for further details.

(16) *Paired Watershed Project Report: 1990-1992 Field Years Input/Output Report.* Toledo Metropolitan Area Council of Governments; available only in draft form, pending completion of analyses of 1992 input/output data.

(17) *Herbicide Concentrations in Waters of Northwestern Ohio,* US Fish and Wildlife Service, August, 1992; William J. Kurey, Biologist. The sampling data included sixteen sites from the Maumee to the Portage, and along the Lake Erie shoreline between.

(18) *Analysis of Sediment from Toussaint River, Ottawa County, Ohio* Prepared for US Army Corps of Engineers, Buffalo District, November, 1984; Aqua Tech Environmental Consultants, Inc., Melmore, Ohio.

(19) Ohio Revised Code, 3709.085.

(20) *Home Sewage Disposal Priorities,* TMACOG, December, 1983

(21) *Village of Rocky Ridge, Ohio Appropriate Technology Wastewater Collection and Treatment Facilities Study;* TMACOG, July, 1985

(22) 1980 Census, STF 3A Tape 108; 1990 Census, STF 3A. Populations for Townships include the villages within them. The septic tank figures are from 1980.

(23) *1984 TMACOG Inventory of Dumpsites, Landfills, Hazardous Waste Sites, and Combined Sewer Overflows;* Toledo Metropolitan Area Council of Governments; December, 1984. Sources of information used to compile this inventory were Ohio EPA files and County Health Department records.

(24) *1992 Master Sites List;* Ohio Environmental Protection Agency Division of Emergency and Remedial Response.

(25) *TMACOG Environmental Resources Inventory: Landfills, Dumps, and Hazardous Waste Sites,* April, 1993.

(26) *Maumee River Remedial Action Plan Water Quality Monitoring Strategy;* Toledo Metropolitan Area Council of Governments; December, 1991

Glossary

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.
µg/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*).
Bypass	A point in a sanitary sewer system where untreated sewage can overflow directly to a stream instead of continuing to the treatment plant. See also Combined Sewage.
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 sites 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.
$CaCO_3$	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"
CSO	*Combined Sewer Overflow.* See *Combined Sewage.*
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.
FWS	US Fish and Wildlife Service; the Federal agency charged with protecting wildlife and its habitat. In Ohio, FWS has a field office in Reynoldsburg (southeast Columbus metropolitan area).
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 suspected carcinogens. 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). 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 (=µg/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
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
TPCD	Toledo Pollution Control Division: a division of the City of Toledo which is responsible for performing air and water quality monitoring in Toledo. Formerly TESA, (*Toledo Environmental Services Agency*); TESD (*Division*).
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"

APPENDIX A
WATER QUALITY MONITORING IN THE MAUMEE RAP AREA OF CONCERN PACKER CREEK, TURTLE CREEK, AND TOUSSAINT RIVER WATERSHEDS

WATER QUALITY MONITORING
In the Maumee River Area of Concern

Clay Center, Rocky Ridge, Genoa, Elmore, Oak Harbor, and Port Clinton
Ottawa County Milepoint: 0.0 ODNR ** ** 1970 TMACOG Ref. No. 196
Parameters: SiO2, Fe, Mn, Ca, Mg, Na, K, SO4, Cl, F, NO3, TDS, Tot Hard, Noncarb, Hard, Bicarb, H2S, pH.

Lacarpe Creek at Darby Refuge Area, E of Camp Perry: Darby/Pool Site
Ottawa County Milepoint: 0.0 FWS ** 5 between 5/91-10/91 Sample(s) ** 1991 TMACOG Ref. No. 273
Parameters: Alachlor, Triazines

Lacarpe Creek at Darby Refuge Area, E of Camp Perry: Darby/Canal Site
Ottawa County Milepoint: 0.0 FWS ** 5 between 5/91-10/91 Sample(s) ** 1991 TMACOG Ref. No. 273
Parameters: Alachlor, Triazines

Lake Erie Shoreline between Toussaint River and Turtle Creek
Ottawa County Milepoint: 0.0 OEPA 305b ** ** 1988 TMACOG Ref. No. 255
Parameters: "Lake Erie shoreline segment that has toxic impacts substantially due to "non-conventional" toxics (priority pollutants) and fish tissue contamination. OEPA stream code #24-001.

Lake Erie Shoreline between Turtle Creek and Crane Creek
Ottawa County Milepoint: 0.0 OEPA 305b ** ** 1988 TMACOG Ref. No. 255
Parameters: "Lake Erie shoreline segment that has toxic impacts substantially due to "non-conventional" toxics (priority pollutants) and fish tissue contamination. OEPA stream code #24-001.

Lake Erie Shoreline between Toussaint River and Portage River
Ottawa County Milepoint: 0.0 OEPA 305b ** ** 1988 TMACOG Ref. No. 255
Parameters: "Lake Erie shoreline segment that has toxic impacts substantially due to "non-conventional" toxics (priority pollutants) and fish tissue contamination. OEPA stream code #24-001.

Lake Erie at Darby Refuge Area, E of Camp Perry
Ottawa County Milepoint: 0.0 FWS ** 5 between 5/91-10/91 Sample(s) ** 1991 TMACOG Ref. No. 273
Parameters: Alachlor, Triazines

Lake Erie at Toledo Edison Davis Besse Plant Intake
Ottawa County Milepoint: 0.0 LEAPS/NPDES ** ** TMACOG Ref. No. 292
Parameters: Temp.

Luckey ditches
Wood County Milepoint: 0.0 FP ** 27 sites Sample(s) ** 1981 TMACOG Ref. No. 39
Parameters: BOD; FC; DO

Luckey ditches
Wood County Milepoint: 0.0 FP ** 27 sites Sample(s) ** 1981 TMACOG Ref. No. 39
Parameters: BOD; FC; DO

Ottawa County Private Wells
Ottawa County Milepoint: 0.0 HWQL ** 184 Sample(s) ** 1987 TMACOG Ref. No. 250
Parameters: 184 private wells were tested for nitrate levels. Of those, 7 were between 3 and 10 ppm; 0 were over 10 ppm. Individual well locations not reported.

Packer Creek
Ottawa County Milepoint: 0.0 ODNR ** ** 5/8/86 TMACOG Ref. No. 173
Parameters: No-kill: vegetable oil; 'fuel & kindred'

S-190-W07 Edward Minke, Woodville 7556 CR 165
Sandusky County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C

Dichlorobromomethane; Carbon tetrachloride; 1,2-Dichloroethane; Bromoform; Chloro-dibromo-methane; Chloroform; Toluene; Benzene; Chlorobenzene; Chloroethane; Ethyl-benzene; Methyl-bromide; Methyl-chloride; Methylene-chloride; Tetrachloro-ethylene; Trichloro-fluoro-methane; 1,1-Dichloroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,2-Dichlorobenzene; 1,2-Dichloropropane; 1,2-Transdichloroethane; 1,3-Dichloropropene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 2-Chloro-ethyly-vinyl-ether; Dichloro-Difluoromethane; Trans-1,3-Dichloropropene; Cis-1,3-Dichloropropene; 1,2-Dibromoethylene; Vinyl Chloride; Trichloroethylene; Stryrene; Xylene

See also Reference #272

S-33 Martin Marietta Inc., Woodville 755 Lime Rd.
Sandusky County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C Gross alpha, gross a as Sr/Yt-90, gross a as Cs-137, U

Dichlorobromomethane; Carbon tetrachloride; 1,2-Dichloroethane; Bromoform; Chloro-dibromo-methane; Chloroform; Toluene; Benzene; Chlorobenzene; Chloroethane; Ethyl-benzene; Methyl-bromide; Methyl-chloride; Methylene-chloride; Tetrachloro-ethylene; Trichloro-fluoro-methane; 1,1-Dichloroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,2-Dichlorobenzene; 1,2-Dichloropropane; 1,2-Transdichloroethane; 1,3-Dichloropropene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 2-Chloro-ethyly-vinyl-ether; Dichloro-Difluoromethane; Trans-1,3-Dichloropropene; Cis-1,3-Dichloropropene; 1,2-Dibromoethylene; Vinyl Chloride; Trichloroethylene; Stryrene; Xylene

See also Reference #272

Toussaint Basin groundwater
Lucas, Wood, Ottawa Count Milepoint: 0.0 ODNR/OWPI ** ** 1962 TMACOG Ref. No. 201
Parameters: Fe; Cl; TDS; pH

Toussaint Creek above Luckey Road
Wood County Milepoint: 30.0 TMACOG/208/BLR ** ** 1973 TMACOG Ref. No. 177
Parameters: Ortho P; Tot P; SS; NO3+NO2; NH3; Cl; DO

Toussaint Creek at Genoa WWTP Outfall
Ottawa County Milepoint: 0.0 LEAPS/NPDES ** ** TMACOG Ref. No. 292
Parameters: DO, pH, Nonfilt. Residue, CBOD5

Toussaint Creek at Luckey WWTP Outfall
Wood County Milepoint: 0.0 LEAPS/NPDES ** ** TMACOG Ref. No. 292
Parameters: Q, upstream only

Toussaint River at Lake Erie
Ottawa County Milepoint: 0.0 CLEAR ** ** 1978-9 TMACOG Ref. No. 210
Parameters: Temp; Secchi; Turb; DO; pH; Cond; TP; TDP, SRP; TKN; NH3; NO2+NO3; SiO2; Cl; SO4; Ca, Mg; Na; K; Al; Cd; Cr; Cu; Fe; Pb; Mn; Ni, V; Zn; Ag; As; Hg; Se; CN; Phenol; TSS; VS, TOC; C; Aerobic Heterotrophs; FC; Phytoplankton; Zooplankton; Chlorophyll; Pheophytin. Sediments: % Solids; % VS; COD; TOC; TP, TKN; As; Se; Cd; Cr; Cu; Fe; Pb; Ni; Ag, Zn; Hg; CN; PCBs; Hexachlorobenzene; Beta Benzenehexachloride; Lindane; Treflan, Aldrin; Isodrin; Heptachlor epoxide, Chlordane; DDT; Methoxychlor; Mirex, Isopropyl ester of 2,4-D; Endosulfan, Dieldrin; Endrin; Tetradinfon; Macroinvertebrates

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Toussaint River at Mouth
Ottawa County Milepoint: 0.0 CLEAR ** Western Basin Nearshore Study ** 1978-1979 TMACOG Ref. No. 210
Parameters: Temperature, wind speed and direction, Transparency (Secchi), Wave height, Turbidity, DO, pH, Conductivity, Alkalinity, Total P, Total Dissolved P, Soluble Reactive P, TKN, Total NH3, NO2 + NO3, Dissolved Reactive SiO2, Cl, SO4, Ca, Mg, Na, K, Al (total), Al (dissolved), Cd (t&d), Cr (t&d), Cu (t&d), Fe (t&d), Pb (t&d), Mn (t&d), Ni (t&d), V (t&d), Zn (t&d), Ag (t&d), As (t), Hg (t), Se (t), CN, Phenol, TSS, VS, TOC, Dissolved organic Carbon, Particulate organic Carbon, total Aerobic Heterotrophs, FC, Phytoplankton, Zooplankton, Chlorophyll a (corrected), Chlorophyll a SCOR/UNESCO, Pheophytin. SEDIMENTS % Solids, % Solids (volatile), COD, TOC, Total P, TKN, As, Se, Cd, Cr, Cu, Fe, Pb, Ni, Ag, Zn, Hg, CN, Size Analysis, Total PCBs, Hexachlorobenzene, Beta Benzenehexachloride, Lindane, Treflan, Aldrin, Isodrin, Heptachlor epoxide, Chlordane, DDT and isomers, Methoxychlor, Mirex, Isopropyl ester of 2,4-D, Endosulfan I, Endosulfan II, Dieldrin, Endrin, Tetradinfon, Macroinvertebrate Analysis.

Toussaint River at SR 2
Ottawa County Milepoint: 0.0 FWS ** 5 between 5/91-10/91 Sample(s) ** 1991 TMACOG Ref. No. 273
Parameters: Alachlor, Triazines

Turtle Creek
Ottawa County Milepoint: 0.0 ODNR ** ** 7/3/84 TMACOG Ref. No. 173
Parameters: Fish kill; unknown pollutant & source

Turtle Creek
Ottawa County Milepoint: 0.0 ODNR ** ** 6/6/85 TMACOG Ref. No. 173
Parameters: Fish kill; hog manure

Turtle Creek South Branch at Genoa-Clay Center Road | Station "E"
Ottawa County Milepoint: 3.8 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek South Branch at Genoa-Clay Center Road | Station "E"
Ottawa County Milepoint: 3.8 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

Turtle Creek South Branch at Reiman Rd| Station "G" |sample from N side of bridge
Ottawa County Milepoint: 5.0 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek South Branch at Reiman Rd| Station "G" |sample from N side of bridge
Ottawa County Milepoint: 5.0 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

Turtle Creek South Branch at Edgefield Road | Station "A"
Ottawa County Milepoint: 5.8 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek South Branch at Edgefield Road | Station "A"
Ottawa County Milepoint: 5.8 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

Turtle Creek South Branch: Reiman Rd./Watson Dr. |Station "B" |(catch basin?)
Ottawa County Milepoint: 5.8 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform -- but not enough water to get a sample.

Turtle Creek South Branch: Reiman Rd./Watson Dr. |Station "B" |(catch basin?)
Ottawa County Milepoint: 5.8 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek South Branch at Hellwig Rd W of Reiman| Station "F" |sample of tile sample from N side of bridge
Ottawa County Milepoint: 6.4 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

Turtle Creek South Branch at Hellwig Rd W of Reiman| Station "F" |sample of tile sample from N side of bridge
Ottawa County Milepoint: 6.4 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek Tributary at Hellwig Road west of Genoa-Clay Center Road | Station "D"
Ottawa County Milepoint: 1.9 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

Turtle Creek Tributary at Hellwig Road west of Genoa-Clay Center Road | Station "D"
Ottawa County Milepoint: 1.9 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek Tributary at SR 51 NW of Genoa-Clay Center Road | Site "C"
Ottawa County Milepoint: 2.5 OEPA ** 1 Sample(s) ** 1978 TMACOG Ref. No. 251
Parameters: Fecal Coliform

Turtle Creek Tributary at SR 51 NW of Genoa-Clay Center Road | Site "C"
Ottawa County Milepoint: 2.5 Ottawa County ** 1 Sample(s) ** 1986 TMACOG Ref. No. 251
Parameters: Temp., pH, DO, BOD, SS, Fecal Coliform

WO-272-WB36 Webster Meth. Church, Bowling Green near 7950 Scotch Ridge
Wood County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C

Dichlorobromomethane; Carbon tetrachloride; 1,2-Dichloroethane; Bromoform; Chloro-dibromo-methane; Chloroform; Toluene; Benzene; Chlorobenzene; Chloroethane; Ethyl-benzene; Methyl-bromide; Methyl-chloride; Methylene-chloride; Tetrachloro-ethylene; Trichloro-fluoro-methane; 1,1-Dichloroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,2-Dichlorobenzene; 1,2-Dichloropropane; 1,2-Transdichloroethane; 1,3-Dichloropropene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 2-Chloro-ethyly-vinyl-ether; Dichloro-Difluoromethane; Trans-1,3-Dichloropropene; Cis-1,3-Dichloropropene; 1,2-Dibromoethylene; Vinyl Chloride; Trichloroethylene; Stryrene; Xylene

See also Reference #272

WO-274-MD28 John Schaller, Bowling Green 10920 Devils Hole Rd. at Dunbridge
Wood County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C

Dichlorobromomethane; Carbon tetrachloride; 1,2-Dichloroethane; Bromoform; Chloro-dibromo-methane; Chloroform; Toluene; Benzene; Chlorobenzene; Chloroethane; Ethyl-benzene; Methyl-bromide; Methyl-chloride; Methylene-chloride; Tetrachloro-ethylene; Trichloro-fluoro-methane; 1,1-Dichloroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,2-Dichlorobenzene; 1,2-Dichloropropane; 1,2-Transdichloroethane; 1,3-Dichloropropene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 2-Chloro-ethyly-vinyl-ether; Dichloro-Difluoromethane; Trans-1,3-Dichloropropene; Cis-1,3-Dichloropropene; 1,2-Dibromoethylene; Vinyl Chloride; Trichloroethylene; Stryrene; Xylene

See also Reference #272

WO-307-WB15 Jim Roth, Perrysburg 9921 Dowling Rd. at Dowling
Wood County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C Dichlorobromomethane, Carbon tetrachloride, 1,2-Di-chloroethane, Bromoform, Chloro-dibromomethane, chloroform, Toluene, Chlorobenzene, Chloroethane, Ethylbenzene, Methylbromide, Methylchloride, Methylene chloride, Tetrachloro ethylene, Trichlorofluoro methane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2,2-tetrachloro ethane, 1,2-dichloro benzene, 1,2-dichloro propane, 1,2-trans-dichloroethene, 1,3-dichloro propene, 1,3-dichloro benzene, 1,4-dichloro benzene, 2-chloroethylvinyl ether, dichloro-difluoro methane, trans 1,3-dichloro propene, cis 1,3-dichloro propene, 1,2-dibromo ethylene, Vinyl chloride, trichloro ethylene, Styrene, Xylene Gross alpha, gross a as Sr/Yt-90, gross a as Cs-137, U Sb, As, Ba, Cd, Cr, Cu, Pb,Li, Hg, Ni, Se, Ag, Zn, CN

See also Reference #272

WO-341-LK36 Lowell Baker, Genoa 1716 Genoa Rd. near Forest Park
Wood County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C Dichlorobromomethane, Carbon tetrachloride, 1,2-Di-chloroethane, Bromoform, Chloro-dibromomethane, chloroform, Toluene, Chlorobenzene, Chloroethane, Ethylbenzene, Methylbromide, Methylchloride, Methylene chloride, Tetrachloro ethylene, Trichlorofluoro methane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2,2-tetrachloro ethane, 1,2-dichloro benzene, 1,2-dichloro propane, 1,2-trans-dichloroethene, 1,3-dichloro propene, 1,3-dichloro benzene, 1,4-dichloro benzene, 2-chloroethylvinyl ether, dichloro-difluoro methane, trans 1,3-dichloro propene, cis 1,3-dichloro propene, 1,2-dibromo ethylene, Vinyl chloride, trichloro ethylene, Styrene, Xylene Gross alpha, gross a as Sr/Yt-90, gross a as Cs-137, U Sb, As, Ba, Cd, Cr, Cu, Pb,Li, Hg, Ni, Se, Ag, Zn, CN

See also Reference #272

WO-342-T9 Luckey Farmers Exchg., Lemoyne 23615 Lemoyne Rd.
Wood County Milepoint: 0.0 USGS ** ** 1986-8 TMACOG Ref. No. 180
Parameters: Cond, pH,Temp, DO, Fec Col, Fec Strep, Hard, Ca, Mg, Na, K, HCO3, CO3, Alk, CO2, Sulfide, SO4, Cl, F, Br, SiO2, TSS, TDS,NO2, NO2+NO3, NH3+Org N, P, Al, B, Fe, Mn, Sr, Dis Org C Dichlorobromomethane, Carbon tetrachloride, 1,2-Di-chloroethane, Bromoform, Chloro-dibromomethane, chloroform, Toluene, Chlorobenzene, Chloroethane, Ethylbenzene, Methylbromide, Methylchloride, Methylene chloride, Tetrachloro ethylene, Trichlorofluoro methane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2,2-tetrachloro ethane, 1,2-dichloro benzene, 1,2-dichloro propane, 1,2-trans-dichloroethene, 1,3-dichloro propene, 1,3-dichloro benzene, 1,4-dichloro benzene, 2-chloroethylvinyl ether, dichloro-difluoro methane, trans 1,3-dichloro propene, cis 1,3-dichloro propene, 1,2-dibromo ethylene, Vinyl chloride, trichloro ethylene, Styrene, Xylene Gross alpha, gross a as Sr/Yt-90, gross a as Cs-137, U Sb, As, Ba, Cd, Cr, Cu, Pb,Li, Hg, Ni, Se, Ag, Zn, CN

See also Reference #272

Wood County Private Wells
Wood County Milepoint: 0.0 HWQL ** 81 Sample(s) ** 1987 TWACOG Ref. No. 250
Parameters: 81 private wells were tested for nitrate levels. Of those, 3 were between 3 and 10 ppm; 3 were over 10 ppm. Individual well locations not reported.

APPENDIX B
NPDES PREMITS IN THE MAUMEE RAP AREA OF CONCERN
PACKER CREEK, TURTLE CREEK, AND TOUSSAINT RIVER WATERSHEDS

NPDES PERMIT NUMBER	FACILITY NAME AND LOCATION	STREAM, WATERSHED, AND BASIN	WASTE STREAM DATA

NPDES DISCHARGE PERMITS
In the Maumee River Area of Concern

Ottawa County

	Gemline, Genoa Quarry	STREAM: Toussaint Creek via ditch	
NPDES #2IJ00063	21880 W SR 163	WATERSHED:	
PRETREATMENT? No	Genoa Clay Township	BASIN: Lake Erie	WASTE: Quarry Runofff
	Genoa WWTP	STREAM: Toussaint Creek	
NPDES #2PB00008		WATERSHED:221	
PRETREATMENT? No	Genoa Clay Township	BASIN: Lake Erie	WASTE: POTW
	S side SR 163, East of Village		
Pkg Plant #O-117	Green Cove Condominiums	STREAM: Lake Erie 77,000 gpd	
NPDES #2PS00007	PO Box 278	WATERSHED:	
PRETREATMENT? No	Oak Harbor Carroll Township	BASIN:	WASTE: Package Plant
	SR 2 just West of Davis Besse		
	Stoneco - Rocky Ridge Quarry	STREAM: Toussaint Creek via Ditch	
NPDES #2IJ00036	POB 29A	WATERSHED:221	
PRETREATMENT? No	Graytown Benton Township	BASIN: Lake Erie	WASTE: Quarry Runoff
	Graytown		
Pkg Plant #O-10	Toledo Edison, Davis-Besse Station	STREAM: Toussaint Creek	
NPDES #2IB00011	300 Madison Ave.	WATERSHED:060	
PRETREATMENT? No	Oak Harbor Carroll Township	BASIN: Lake Erie	WASTE: Package Plants, Cooling Water
	SR 2 on N bank Toussaint		
Pkg Plant #O-122	USCO Services	STREAM: Rusha Creek	
NPDES #2IF00006	Erie Industrial Park, Bldg. 2	WATERSHED:063	
PRETREATMENT? No	Port Clinton Erie Township	BASIN: Lake Erie	WASTE: Package Plant
	SR 2 at CR 15, Rusha Creek		
	White Rock Quarry	STREAM: Turtle Creek, North Branch	
NPDES #2IJ00037	Bolander Road	WATERSHED:048	
PRETREATMENT? No	Clay Center Allen Township	BASIN: Lake Erie	WASTE: Quarry Runoff
Pkg Plant #O-50	Woodland Estates	STREAM: Turtle Creek	
NPDES #2PG00037	Ottawa Co. Courthouse, 315 Madison St.	WATERSHED:049	
PRETREATMENT? No	Genoa Clay Township	BASIN: Lake Erie	WASTE: Package Plant
	SR 51 at Reiman Road		

** 8 NPDES Permits in Ottawa County **

NPDES PERMIT NUMBER	FACILITY NAME AND LOCATION	STREAM, WATERSHED, AND BASIN	WASTE STREAM DATA
Sandusky County			
Pkg Plant #S-53 NPDES #2PQ00000 PRETREATMENT? No	Blue Heron-Wyandot Service Plazas 682 Prospect Woodville Woodville Township Ohio Turnpike West of Lime Road	STREAM: Toussaint Creek WATERSHED:051 BASIN: Portage	WASTE: Package Plant
Pkg Plant #S-57 NPDES #2IJ00040 PRETREATMENT? No	Martin Marietta, Refractories Div (Lime) POB 187 Woodville Woodville Township 755 Lime Road	STREAM: Toussaint Creek WATERSHED: BASIN:	WASTE: Package Plant, Quarry Runoff
** 2 NPDES Permits in Sandusky County **			
Wood County			
NPDES #2IS00021 PRETREATMENT? No	Latrobe Steel, Castmasters Div. 1145 Fairview Ave Bowling Green	STREAM: Toussaint Creek WATERSHED:051 BASIN: Lake Erie	WASTE: Cooling Water
NPDES #2PA00080 PRETREATMENT? No	Luckey WWTP Luckey Troy Township Luckey Road (?) north of Village	STREAM: Toussaint Creek WATERSHED:051 BASIN: Lake Erie	WASTE: POTW
Pkg Plant #W-64 NPDES #2PY00005 PRETREATMENT? No	Maurer Trailer Park 18487 North Dixie Highway Bowling Green Plain Township	STREAM: Grassy Creek Diversion WATERSHED:045 BASIN: Maumee	WASTE: Package Plant
Pkg Plant #W-75 NPDES #2IR00008 PRETREATMENT? No	Motor Wheel 21200 Luckey Road Luckey Troy Township Luckey & Gilbert Roads, N of Luckey	STREAM: Toussaint Creek WATERSHED:051 BASIN: Lake Erie	WASTE: Package Plant
Pkg Plant #W-77 NPDES #2PS00005 PRETREATMENT? No	Otterbein-Portage Valley Village 20311 Pemberville Rd Luckey Troy Township	STREAM: Toussaint Creek via tributary WATERSHED:051 BASIN: Lake Erie	WASTE: POTW

NPDES PERMIT NUMBER	FACILITY NAME AND LOCATION		STREAM, WATERSHED, AND BASIN	WASTE STREAM DATA
Pkg Plant #W-62	Village Green MHP		STREAM: Two Root Creek via Reitz Road ditch	
NPDES #2PY00008	7630 Reitz Road		WATERSHED:	
PRETREATMENT? No	Perrysburg	Perrysburg Township	BASIN: Toussaint	WASTE: POTW

** 6 NPDES Permits in Wood County **

*** 16 NPDES Permits Total ***

APPENDIX C
PACKAGE SEWAGE TREATMENT PLANTS
IN THE MAUMEE RAP AREA OF CONCERN
PACKER CREEK, TURTLE CREEK, AND TOUSSAINT RIVER WATERSHEDS

PLANT AND NPDES NUMBER	LOCATION AND ADDRESS	RECEIVING STREAM, WATERSHED, AND BASIN	SIZE	CURRENT	MG/YEAR

PACKAGE SEWAGE TREATMENT PLANTS
In the Maumee River Area of Concern

Ottawa County
Allen Township

PLANT: O-1 BUILT: 1971	Allen Elementary School SE cor Genoa-Clay Cntr Rd. at Walbridge East Rd Ottawa County, Allen Twp.	WTRSHED NO: 048 BASIN: Lake Erie SUB-BASIN: Turtle Creek STREAM: North Branch Turtle Cr.	7,560	4,425	1.2
* Allen Township Totals *		1 Plants	7,560	4,425 gpd	1.2

Benton Township

PLANT: O-8 BUILT: 1984	Rocky Ridge School Second and West Streets Ottawa County, Benton Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Krehmke Ditch BASIN: Lake Erie	2,000	2,000	0.5
* Benton Township Totals *		1 Plants	2,000	2,000 gpd	0.5

Carroll Township

PLANT: O-132 BUILT: 1988	Beach Carte Tavern SW cor SR 2 & Humphrey Rd Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Lake Erie BASIN:	5,000	5,000	1.8
PLANT: O-9 BUILT: 1966	Camp Sabroske W side Tous.-North Rd., T-62, on N. bank Packer Cr Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Packer Cr. BASIN: Lake Erie	4,000	4,000	0.7
PLANT: O-127 BUILT: 1961	Carroll Elementary School NW cor SR 19 at E Toussaint Rd (CR 93) Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Toussaint River via SR 19 ditch BASIN: Lake Erie	10,000	10,000	2.7
PLANT: O-10B 2IB00011 BUILT: 1974	Davis Besse Nuclear Power Plant 5501 SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Lake Erie BASIN: Lake Erie	23,000	18,000	6.6

PLANT AND NPDES NUMBER	LOCATION AND ADDRESS	RECEIVING STREAM, WATERSHED, AND BASIN		SIZE	CURRENT	MG/YEAR
PLANT: O-10A 2IB00011 BUILT: 1974	Davis Besse Nuclear Power Plant 5501 SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: 059,060 SUB-BASIN: STREAM: Lake Erie	BASIN: Lake Erie	15,000	12,000	4.4
PLANT: O-117 2PS00007 BUILT: 1987	Green Cove Condominiums Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Lake Erie	BASIN:	77,000	77,000	14.1
PLANT: O-12B BUILT: 1967	Inland Mobile Home Park/Marina W. Side SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Portage STREAM: Lacarpe Cr	BASIN: Portage River	1,500	3,000	1.1
PLANT: O-12A BUILT: 1963	Inland Mobile Home Park/Marina W. Side SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Portage STREAM: Lacarpe Cr	BASIN: Portage River	3,000	6,000	2.2
PLANT: O-12C BUILT:	Inland Mobile Home Park/Marina W. Side SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Portage STREAM: Lacarpe Cr	BASIN: Portage River	8,000	8,000	2.9
PLANT: O-13 BUILT: 1971	Magee Marsh Nature Center At Crane Creek State Park, further down the road Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Lake Erie, via McGee Marsh	BASIN: Lake Erie	6,000	6,000	2.2
PLANT: O-14B BUILT: 1982	Paradise Acres Camp & Pool W side TR 224 (Rider Rd) N of TR 223 (Cover Rd) Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Beef Creek	BASIN: Lake Erie	3,000	3,000	1.1
PLANT: O-14A BUILT: 1970	Paradise Acres Camp & Pool W side TR 224 (Rider Rd) N of TR 223 (Cover Rd) Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Beef Creek	BASIN: Lake Erie	7,500	7,500	1.4
PLANT: O-114 BUILT: 1985	Toussaint River Marina E of T-104 (Toussaint S Rd), S bank Toussaint Riv. Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Toussaint River	BASIN: Lake Erie	6,000	6,000	2.2

PLANT AND NPDES NUMBER	LOCATION AND ADDRESS	RECEIVING STREAM, WATERSHED, AND BASIN	SIZE	CURRENT	MG/YEAR
PLANT: O-129 BUILT: 1988	Toussaint Tavern N Bank Toussaint, E side SR 2 Ottawa County, Carroll Twp.	WTRSHED NO: SUB-BASIN: STREAM: Toussaint	BASIN: Toussaint	9,000	9,000	3.3
* Carroll Township Totals *			14 Plants	178,000	174,500 gpd	46.7
Clay Township						
PLANT: O-133 BUILT: 1991	Blue Moon Motel SR 51 and SR 163 Ottawa County, Clay Twp.	WTRSHED NO: SUB-BASIN: STREAM: Toussaint	BASIN:	2,000	2,000	0.7
PLANT: O-47 BUILT: 1964	Ernesto's Restaurant Rts. 51 and 163 Ottawa County, Clay Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Packer Cr.	BASIN: Lake Erie	7,000	7,000	2.6
PLANT: O-111 BUILT: 1962	Genoa High School SW Cor Genoa-Clay Center Rd & Moline Rd Ottawa County, Clay Twp.	WTRSHED NO: 048 SUB-BASIN: Turtle STREAM: South Branch Turtle Creek	BASIN: Lake Erie	12,500	12,500	3.4
PLANT: O-48 BUILT: 1969	Greenwood Trailer Park 21022 W. SR 51 Ottawa County, Clay Twp.	WTRSHED NO: SUB-BASIN: Toussaint STREAM: Packer Creek	BASIN: Lake Erie	13,500	21,400	7.8
PLANT: O-49 BUILT: 1968	Whitehouse Truck Stop SR 51, 0.6 Mi. NW of Genoa-Clay Center Rd Ottawa County, Clay Twp.	WTRSHED NO: SUB-BASIN: Turtle River STREAM: South Branch Turtle Creek	BASIN: Lake Erie	6,000	0	0.0
PLANT: O-50 2PG00037 BUILT:	Woodland Estates SR 51 bet. Hellwig & Woodville rds. Ottawa County, Clay Twp.	WTRSHED NO: 049 SUB-BASIN: Turtle River STREAM: South Branch Turtle Creek	BASIN: Lake Erie	40,000	20,000	7.3
* Clay Township Totals *			6 Plants	81,000	62,900 gpd	21.8
** Ottawa County Totals **			22 Plants	268,560	243,825 gpd	70.3

PLANT AND NPDES NUMBER	LOCATION AND ADDRESS	RECEIVING STREAM, WATERSHED, AND BASIN	SIZE	CURRENT	MG/YEAR
Sandusky County **Woodville Township**					
PLANT: S-53 2PQ00000 BUILT: Before 1961	Blue Heron-Wyandot Service Plazas CR 30 @ Tpk Sandusky County, Woodville Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint Creek	150,000	150,000	54.8
PLANT: S-57N 2IJ00040 BUILT: 1975	Martin Marietta 755 Lime Road Sandusky County, Woodville Twp.	WTRSHED NO: BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint Creek	5,000	5,000	1.8
PLANT: S-57S 2IJ00040 BUILT: 1975	Martin Marietta 755 Lime Road Sandusky County, Woodville Twp.	WTRSHED NO: BASIN: Lake Erie SUB-BASIN: Toussaint STREAM: Gust Sandwich Ditch via quarry	2,000	2,000	0.7
* Woodville Township Totals *		3 Plants	157,000	157,000 gpd	57.3
** Sandusky County Totals **		3 Plants	157,000	157,000 gpd	57.3
Wood County **Perrysburg Township**					
PLANT: W-62 2PY00008 BUILT:	Village Green Mobile Home Park 7630 Reitz Rd W of Ault Rd Wood County, Perrysburg Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: Toussaint STREAM: Two Root Creek via ditch	36,000	36,000	13.1
* Perrysburg Township Totals *		1 Plants	36,000	36,000 gpd	13.1
Plain Township					
PLANT: W-64 2PY00005 BUILT: 1967, 1969	Maurer Trailer Park 18330 Brim Road Wood County, Plain Twp.	WTRSHED NO: 045 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint? via storm tile, US 25	30,000	30,000	11.0
* Plain Township Totals *		1 Plants	30,000	30,000 gpd	11.0

PLANT AND NPDES NUMBER	LOCATION AND ADDRESS	RECEIVING STREAM, WATERSHED, AND BASIN	SIZE	CURRENT	MG/YEAR
Troy Township					
PLANT: W-73B BUILT: 1970	Eastwood High School Sugar Ridge & Luckey Rds Wood County, Troy Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint Creek via storm sewer	15,000	15,000	4.1
PLANT: W-73A BUILT: 1969	Eastwood Junior High School Sugar Ridge & Luckey Rds Wood County, Troy Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint Cr. via tributary	15,000	15,000	4.1
PLANT: W-75 2IR0000 BUILT: 1976	Motor Wheel NE cor SR 582/Gilbert Rd/Luckey Rd Wood County, Troy Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint	22,500	22,500	8.2
PLANT: W-77 2PS00005 BUILT: 1980	Otterbein-Portage Valley Retirement Village NW cor SR 582 @ Pemberville Rd Wood County, Troy Twp.	WTRSHED NO: 051 BASIN: Lake Erie SUB-BASIN: STREAM: Toussaint Creek via tributary	37,000	25,000	9.1
*** Troy Township Totals ***		4 Plants	89,500	77,500 gpd	25.6
**** Wood County Totals ****		6 Plants	155,500	143,500 gpd	49.7
***** Totals *****		31 Plants	581,060	544,325 gpd	177.3

APPENDIX D
OHIO EPA MASTER SITE LISTING
DUMPS, LANDFILLS AND CONTAMINATED SITES

OHIO EPA MASTER SITE LISTING
DUMPS, LANDFILLS AND CONTAMINATED SITES

OTTAWA COUNTY

(none)

SANDUSKY COUNTY

(none)

WOOD COUNTY

COOPER ENGINEERED PRODUCTS 1175 NORTH MAIN ST / BOWLING GREEN / 43472
EPAID: NOT ASSIGNED PRIORITY: H PADATE: 10/23/90 LAT: DUP_ID: FIT: PROBLEM: VOC CONTAM SITETYPE: A
OH_ID: 387-1213 NPL? No DATELISTED: 10/11/90 LONG: DUP? No FLAG: PRISORT: 5

MOTOR WHEEL CORP AKA LUCKEY AKA GOODYEAR 21200 LUCKEY RD / LUCKEY / 43443
EPAID: OHD043642958 PRIORITY: M PADATE: 09/16/85 LAT: 41 27 24 DUP_ID: FIT: 0 PROBLEM: BERYLLIUM SITETYPE:
OH_ID: 387-1033 NPL? No DATELISTED: 04/21/88 LONG: 83 29 18 DUP? No FLAG: PRISORT: 2

APPENDIX E
TOXIC RELEASE INVENTORY
OF INDUSTRIAL CHEMICALS RELEASED TO THE ENVIRONMENT
FOR 1987-1989

LOWER MAUMEE BASIN
AREA OF CONCERN

Total Industrial Releases of Toxic Chemicals, 1987-1989

1,1,1-Trichloroethane Releases

Cooper Industrial Products, Wood County — SIC Code: 3069
1175 North Main St., Bowling Green 43402

	1987 Releases	1988 Releases	1989 Releases
Report?	No	No	Yes
Fugative Air	0	0	4,000
Stack Air	0	0	10,000
Total Air	0	0	14,000
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	0	100
Total Releases	0	0	14,100

** Total Releases for 1,1,1-Trichloroethane

	1987	1988	1989	1987-1989
Fugative Air	0	0	4,000	4,000
Stack Air	0	0	10,000	10,000
Total Air	0	0	14,000	14,000
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	0	100	100
Total Releases	0	0	14,100	14,100

Total Industrial Releases of Toxic Chemicals, 1987-1989

Methyl Ethyl Ketone Releases

Cooper Industrial Products, Wood County — SIC Code: 3209
1175 North Main Street, Bowling Green 43402

	1987 Releases	1988 Releases	1989 Releases
Report?	No	Yes	No
Fugative Air	0	11,200	0
Stack Air	0	0	0
Total Air	0	11,200	0
Water	0	0	0
Injection	0	0	0
POTW	0	20	0
Land	0	0	0
Off Site	0	860	0
Total Releases	0	12,080	0

** Total Releases for Methyl Ethyl Ketone

	1987	1988	1989	1987-1989
Fugative Air	0	11,200	0	11,200
Stack Air	0	0	0	0
Total Air	0	11,200	0	11,200
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	20	0	20
Land	0	0	0	0
Off Site	0	860	0	860
Total Releases	0	12,080	0	12,080

Total Industrial Releases of Toxic Chemicals, 1987-1989

Toluene Releases

Cooper Industrial Products, Wood County — SIC Code: 3069
1175 North Main Street, Bowling Green 43402

	1987 Releases	1988 Releases	1989 Releases
Report?	No	Yes	Yes
Fugative Air	0	6,200	15,000
Stack Air	0	8,500	7,000
Total Air	0	14,700	22,000
Water	0	0	0
Injection	0	0	0
POTW	0	20	0
Land	0	0	0
Off Site	0	470	300
Total Releases	0	15,190	22,300

** Total Releases for Toluene

	1987	1988	1989	1987-1989
Fugative Air	0	6,200	15,000	21,200
Stack Air	0	8,500	7,000	15,500
Total Air	0	14,700	22,000	36,700
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	20	0	20
Land	0	0	0	0
Off Site	0	470	300	770
Total Releases	0	15,190	22,300	37,490

Total Industrial Releases of Toxic Chemicals, 1987-1989

Xylene (Mixed Isomers) Releases

Cooper Industrial Products, Wood County — SIC Code: 3069
1175 North Main Street, Bowling Green 43402

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	21,000	17,100	30,000
Stack Air	1,100	850	1,000
Total Air	22,100	17,950	31,000
Water	0	0	0
Injection	0	0	0
POTW	250	10	0
Land	0	0	0
Off Site	2,050	450	500
Total Releases	24,400	18,410	31,500

** Total Releases for Xylene (Mixed Isomers)

	1987	1988	1989	1987-1989
Fugative Air	21,000	17,100	30,000	68,100
Stack Air	1,100	850	1,000	2,950
Total Air	22,100	17,950	31,000	71,050
Water	0	0	0	0
Injection	0	0	0	0
POTW	250	10	0	260
Land	0	0	0	0
Off Site	2,050	450	500	3,000
Total Releases	24,400	18,410	31,500	74,310

Total Industrial Releases of Toxic Chemicals, 1987-1989

Zinc Compounds Releases

Cooper Industrial Products, Wood County — SIC Code: 3069
1175 North Main Street, Bowling Green 43402

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	0	0	0
Stack Air	0	0	0
Total Air	0	0	0
Water	0	0	0
Injection	0	0	0
POTW	20,000	690	3,000
Land	600	0	600
Off Site	120,000	47,510	62,010
Total Releases	140,600	48,200	65,610

** Total Releases for Zinc Compounds

	1987	1988	1989	1987-1989
Fugative Air	0	0	0	0
Stack Air	0	0	0	0
Total Air	0	0	0	0
Water	0	0	0	0
Injection	0	0	0	0
POTW	20,000	690	3,000	23,690
Land	600	0	600	1,200
Off Site	120,000	47,510	62,010	229,520
Total Releases	140,600	48,200	65,610	254,410

Total Industrial Releases of Toxic Chemicals, 1987-1989

Nitric Acid Releases

Martin Marietta Magnesia Spec, Sandusky County — SIC Code: 3274
755 Lime Road, Woodville 43469

	1987 Releases	1988 Releases	1989 Releases
Report?	No	Yes	Yes
Fugative Air	0	0	0
Stack Air	0	0	1
Total Air	0	0	1
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	880	0
Off Site	0	0	0
Total Releases	0	880	1

** Total Releases for Nitric Acid

	1987	1988	1989	1987-1989
Fugative Air	0	0	0	0
Stack Air	0	0	1	1
Total Air	0	0	1	1
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	880	0	880
Off Site	0	0	0	0
Total Releases	0	880	1	881

Total Industrial Releases of Toxic Chemicals, 1987-1989

Acetone Releases

Motor Wheel Corporation, Wood County — SIC Code: 3086
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	2,325	250	250
Stack Air	20,950	32,562	36,518
Total Air	23,275	32,812	36,768
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	3,667	5,152
Total Releases	23,275	36,479	41,920

** Total Releases for Acetone

	1987	1988	1989	1987-1989
Fugative Air	2,325	250	250	2,825
Stack Air	20,950	32,562	36,518	90,030
Total Air	23,275	32,812	36,768	92,855
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	3,667	5,152	8,819
Total Releases	23,275	36,479	41,920	101,674

Total Industrial Releases of Toxic Chemicals, 1987-1989

Dichloromethane Releases

Motor Wheel Corporation, Wood County — SIC Code: 3086
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	2,050	250	250
Stack Air	6,150	23,201	18,746
Total Air	8,200	23,451	18,996
Water	0	0	0
Injection	0	0	0
POTW	0	0	9,029
Land	0	0	0
Off Site	0	17,400	0
Total Releases	8,200	40,851	28,025

** Total Releases for Dichloromethane

	1987	1988	1989	1987-1989
Fugative Air	2,050	250	250	2,550
Stack Air	6,150	23,201	18,746	48,097
Total Air	8,200	23,451	18,996	50,647
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	9,029	9,029
Land	0	0	0	0
Off Site	0	17,400	0	17,400
Total Releases	8,200	40,851	28,025	77,076

Total Industrial Releases of Toxic Chemicals, 1987-1989

Methyl Ethyl Ketone Releases

Motor Wheel Corporation, Wood County — SIC Code: 3086
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	750	250	250
Stack Air	15,750	19,301	20,517
Total Air	16,500	19,551	20,767
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	1,909	1,112
Total Releases	16,500	21,460	21,879

** Total Releases for Methyl Ethyl Ketone

	1987	1988	1989	1987-1989
Fugative Air	750	250	250	1,250
Stack Air	15,750	19,301	20,517	55,568
Total Air	16,500	19,551	20,767	56,818
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	1,909	1,112	3,021
Total Releases	16,500	21,460	21,879	59,839

Total Industrial Releases of Toxic Chemicals, 1987-1989

Methyl Isobutyl Ketone Releases

Motor Wheel Corporation, Wood County — SIC Code: 3079
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	No
Fugative Air	250	250	0
Stack Air	9,175	15,591	0
Total Air	9,425	15,841	0
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	1,542	0
Total Releases	9,425	17,383	0

** Total Releases for Methyl Isobutyl Ketone

	1987	1988	1989	1987-1989
Fugative Air	250	250	0	500
Stack Air	9,175	15,591	0	24,766
Total Air	9,425	15,841	0	25,266
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	1,542	0	1,542
Total Releases	9,425	17,383	0	26,808

Total Industrial Releases of Toxic Chemicals, 1987-1989

N-Butyl Alcohol Releases

Motor Wheel Corporation, Wood County — SIC Code: 2821
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	No	Yes	No
Fugative Air	0	250	0
Stack Air	0	10,220	0
Total Air	0	10,470	0
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	1,011	0
Total Releases	0	11,481	0

** Total Releases for N-Butyl Alcohol

	1987	1988	1989	1987-1989
Fugative Air	0	250	0	250
Stack Air	0	10,220	0	10,220
Total Air	0	10,470	0	10,470
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	1,011	0	1,011
Total Releases	0	11,481	0	11,481

Total Industrial Releases of Toxic Chemicals, 1987-1989

Toluene Releases

Motor Wheel Corporation, Wood County — SIC Code: 3086
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	750	250	250
Stack Air	7,825	18,349	12,425
Total Air	8,575	18,599	12,675
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	0	3,985	3,847
Total Releases	8,575	22,584	16,522

** Total Releases for Toluene

	1987	1988	1989	1987-1989
Fugative Air	750	250	250	1,250
Stack Air	7,825	18,349	12,425	38,599
Total Air	8,575	18,599	12,675	39,849
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	0	3,985	3,847	7,832
Total Releases	8,575	22,584	16,522	47,681

Total Industrial Releases of Toxic Chemicals, 1987-1989

Toluene-2,4-Diisocyanate Releases

Motor Wheel Corporation, Wood County — SIC Code: 3086
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	Yes
Fugative Air	250	250	250
Stack Air	250	250	250
Total Air	500	500	500
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	9,600	2,860	0
Total Releases	10,100	3,360	500

** Total Releases for Toluene-2,4-Diisocyanate

	1987	1988	1989	1987-1989
Fugative Air	250	250	250	750
Stack Air	250	250	250	750
Total Air	500	500	500	1,500
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	9,600	2,860	0	12,460
Total Releases	10,100	3,360	500	13,960

Total Industrial Releases of Toxic Chemicals, 1987-1989

Toluene-2,6-Diisocyanate Releases

Motor Wheel Corporation, Wood County — SIC Code: 3079
21200 Luckey Rd, Luckey 43443

	1987 Releases	1988 Releases	1989 Releases
Report?	Yes	Yes	No
Fugative Air	250	250	0
Stack Air	250	250	0
Total Air	500	500	0
Water	0	0	0
Injection	0	0	0
POTW	0	0	0
Land	0	0	0
Off Site	2,400	750	0
Total Releases	2,900	1,250	0

** Total Releases for Toluene-2,6-Diisocyanate

	1987	1988	1989	1987-1989
Fugative Air	250	250	0	500
Stack Air	250	250	0	500
Total Air	500	500	0	1,000
Water	0	0	0	0
Injection	0	0	0	0
POTW	0	0	0	0
Land	0	0	0	0
Off Site	2,400	750	0	3,150
Total Releases	2,900	1,250	0	**4,150**

LOWER MAUMEE BASIN
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Toxic Chemicals Releases, 1987-1989
In Order by Three-Year Totals

Chemical Name	Total Releases to All Destinations, pounds 1987	1988	1989	1987-1989
1,1,1-Trichloroethane				
Cooper Industrial Products	0	0	14,100	**14,100**
Acetone				
Motor Wheel Corporation	23,275	36,479	41,920	**101,674**
Dichloromethane				
Motor Wheel Corporation	8,200	40,851	28,025	**77,076**
Methyl Ethyl Ketone				
Cooper Industrial Products	0	12,080	0	**12,080**
Motor Wheel Corporation	16,500	21,460	21,879	**59,839**
Methyl Isobutyl Ketone				
Motor Wheel Corporation	9,425	17,383	0	**26,808**
N-Butyl Alcohol				
Motor Wheel Corporation	0	11,481	0	**11,481**
Nitric Acid				
Martin Marietta Magnesia Spec	0	880	1	**881**
Toluene				
Cooper Industrial Products	0	15,190	22,300	**37,490**
Motor Wheel Corporation	8,575	22,584	16,522	**47,681**
Toluene-2,4-Diisocyanate				
Motor Wheel Corporation	10,100	3,360	500	**13,960**
Toluene-2,6-Diisocyanate				
Motor Wheel Corporation	2,900	1,250	0	**4,150**
Xylene (Mixed Isomers)				
Cooper Industrial Products	24,400	18,410	31,500	**74,310**
Zinc Compounds				
Cooper Industrial Products	140,600	48,200	65,610	**254,410**