United States General Accounting Office

GAO

Report to the Honorable
John D. Dingell, House of Representatives

August 1988

WATER POLLUTION

Efforts to Clean Up Michigan's Rouge River

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GAO

United States
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Resources, Community, and
Economic Development Division

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The Honorable John D. Dingell
House of Representatives

Dear Mr. Dingell:

In response to your request, we reviewed efforts undertaken by federal, state, and local entities to clean up the pollution problems of Michigan's Rouge River. This 126-mile waterway in southeastern Michigan flows into the Detroit River, which, in turn, flows into Lake Erie. We focused on issues relating to, among other things, the overall quality of Rouge River waters, sources of pollutants, status of planning efforts to clean up these pollutants, and costs of remedial measures needed to clean up the river.

Results in Brief

The Rouge River has serious and widespread pollution problems. These problems are primarily caused by discharges into the river of pollutants from combined sewers that overflow during heavy rains and stormwater runoff from streets and other land areas. (Combined sewers are interconnecting sanitary and storm sewers that normally carry water to treatment plants.) Consequently, much of the Rouge River is unfit to be used for the purposes Michigan has designated, such as swimming and fishing.

Since 1986, planning for cleanup of the Rouge has intensified because Michigan made the river's cleanup a priority and because the Environmental Protection Agency (EPA), the state, and local communities joined in efforts to develop a remedial action plan for the river. A draft of this plan, published in June 1988, defines a program of actions needed to protect public health and make progress toward full cleanup of the Rouge over the next 20 years. Implementation of the draft plan, however, will not result in full restoration of the Rouge to its designated uses. Full restoration is a goal to be achieved beyond the year 2005.

The cost to fully restore the Rouge River is unknown because decisions on pollution control measures needed for full restoration have not been made. However, the cost will be substantial. The draft remedial action plan estimated $1.8 billion would be needed to complete just part of the plan. State and local officials are concerned about the availability of federal and state funds and affordability to local communities of the cost to fully restore the river.

One important tool in maintaining water quality is EPA's permit program, which requires that point sources discharging into a waterway have a permit that, among other things, can limit the types and amounts of pollutants discharged. However, the permit program for the Rouge River has not been as effective as it could be. For example, some sources of pollutants are not covered by permits; permittees have not always complied with permit requirements; and enforcement actions on permit reporting violations have not always been taken.

Although Michigan is acting to resolve these problems, we believe EPA needs to establish controls designed especially to oversee Michigan's implementation of corrective actions under permits for the Rouge River.

Background

The Rouge River winds through a 467-square-mile area known as the Rouge River Basin. Of all the rivers in Michigan, the Rouge has the greatest potential for public contact and use. The Basin includes a portion of the city of Detroit and its adjacent metropolitan area. In all, more than 1.5 million people, representing all or part of 48 communities in 3 counties, reside in the Rouge River Basin. A map of the Rouge River Basin is provided in appendix I.

The Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251, et seq.), known as the Clean Water Act, is the major legislation driving the restoration and maintenance of Rouge River water quality. However, because the Rouge River empties into Great Lakes waters, the river is also subject to the provisions of the Great Lakes Water Quality Agreement. This agreement is monitored by the International Joint Commission, an advisory body to the Canadian and U.S. governments on matters affecting the Great Lakes.

In Michigan, the responsibility for cleaning up polluted waterways, such as the Rouge River, rests with the Michigan Department of Natural Resources (MDNR). The local agency most involved in assisting MDNR is the Southeast Michigan Council of Governments (SEMCOG). As the Clean Water Act requires, Michigan has set specific uses for the Rouge. Those uses, which require the maintenance of a suitable water quality level, are swimming, fishing, maintaining aquatic life and wildlife, industrial and agricultural water supply, navigation, and aesthetics. While Michigan is responsible for managing Rouge cleanup activities, EPA is responsible for ensuring that the requirements of the Clean Water Act and the Great Lakes Water Quality Agreement are met.

Pollution Is Serious and Widespread

MDNR conducted comprehensive tests of Rouge River water quality in 1973 and 1986. These tests showed that some water quality standards were not met, biological life was degraded, and sediment was polluted. For example, the 1986 test showed the water quality of the Rouge River was fair to very poor; 41 percent of the fish collected had external parasites, primarily black spot disease; and sediment was moderately to heavily polluted. In addition, MDNR and SEMCOG reported in June 1988 that the Rouge's designated water uses were impaired to some degree in its 11 subbasins. For most of the river, the impairment was frequent or severe.

Significant Sources of Pollution

MDNR is responsible for identifying pollutant loadings entering the Rouge River. Such information describes the amount of pollutants entering the river, the types of pollutants, and the sources that emit the pollutants.

Until 1986, MDNR had not determined comprehensive pollutant loadings from all sources discharging into the Rouge River because EPA's and the state's priority was to identify and control pollutants from industrial and municipal discharges through the national permit program. In 1986, after Michigan made Rouge River cleanup a priority, MDNR entered into a contract with SEMCOG to develop estimates of pollutant loadings.

The estimates showed that about 473 million pounds of pollutants were discharged into the Rouge River annually. According to EPA, MDNR, and SEMCOG, the two most significant sources of pollution problems are overflows of combined sewers and stormwater runoff.

Combined sanitary and storm sewage at times bypasses treatment plants and is discharged into the Rouge River at one or more of 168 locations. The resulting bacterial contamination is a threat to public health because discharges from combined sewers are believed to contribute virtually all of the toxins—arsenic, chromium, mercury, and polychlorinated biphenyls—entering the Rouge River, according to the draft remedial action plan. Discharges of stormwater contain pollutants from streets, buildings, and soil erosion. They account for two-thirds of the lead entering the river and about 78 percent of the known conventional pollutants, such as suspended solids, according to the loadings estimates.

SEMCOG used this information, in conjunction with the water quality test results, to identify pollution problems and their sources and to develop

the pollution control strategies ultimately contained in the draft Rouge River remedial action plan.

Sources of Pollution Not Effectively Regulated

The Clean Water Act's National Pollutant Discharge Elimination System (NPDES) permit program has since 1972 regulated point sources of pollution—sources that can be readily identified, such as combined sewer overflows and municipal and industrial dischargers. More recently, the Water Quality Act of 1987 required EPA to establish a stormwater control program, including permits to reduce the discharge of pollutants through stormwater.

The Rouge River has 474 known point source dischargers of pollution—168 combined sewer overflows, 273 storm drains, 30 industrial facilities, and 3 municipal facilities—that must be regulated under a NPDES permit. Although the NPDES program has reduced the amount of pollutants discharged by Rouge River point sources, it has not been as effective as it could be.

Problems experienced with combined sewer overflow permits include (1) 29 combined sewers that have not received permits to discharge into the Rouge; (2) 9 outfalls (specific points of pollutant discharge such as pipes) that have permits as combined sewers but appear to be separate sanitary sewers discharging sewage directly into the Rouge; and (3) 3 permittees, covering at least 10 communities and controlling 69 combined sewers, that do not have or have not implemented the required community-developed plans to control overflows.

With regard to municipal and industrial permits, problems include (1) permittees that often have not met NPDES permit reporting requirements and (2) the city of Detroit's and Oakland County's incomplete implementation of industrial pretreatment programs required by their permits. Industrial pretreatment is a key program for controlling untreated industrial waste (particularly toxins) from entering public sewer systems.

State Actions

MDNR has not always taken enforcement actions to bring about compliance by these sources of pollution, and, when taken, the actions were not always timely or effective in bringing about quick compliance. For example:

- MDNR has not taken any action to enforce the provisions in existing combined sewer permits because of the absence of specificity in the permit language.
- MDNR has frequently not taken enforcement actions for reporting violations, or taken them long after the violations occurred. Also, when it acted, its actions were not always successful in bringing permittees into compliance.

Michigan is taking steps to control combined sewers through the NPDES program and the Rouge River remedial action plan. MDNR plans include (1) revising permit language so that provisions are more specific and enforceable; (2) developing draft permits for all outfalls during the summer of 1988; (3) requiring municipalities to develop and implement plans to eliminate separate sanitary sewer discharges; and (4) requiring communities to prepare specific plans with time frames that, when implemented, will achieve the level of control required to protect public health.

Regarding municipal and industrial dischargers, MDNR has, among other things, established a schedule for reissuing expired permits, increased staff resources to allow greater monitoring and enforcement of all permits, and taken steps to monitor Oakland County's and Detroit's pretreatment programs.

Stormwater runoff has not been effectively controlled, according to EPA and MDNR officials. The Water Quality Act of 1987 requires that industrial and large municipal stormwater dischargers have a permit. At the present time, MDNR is attempting to identify storm drains that are subject to the act's requirements. Also, MDNR is waiting for EPA regulations and guidance on control measures to be included in stormwater permits. EPA plans to issue such regulations in 1989, and MDNR plans to issue stormwater permits based on the regulations and guidance received.

Federal Actions

While Michigan is responsible for managing the NPDES permit program, EPA is responsible for ensuring that the requirements of the Clean Water Act, including NPDES, are met. EPA oversight of Michigan's NPDES program focuses on program performance statewide rather than on specific rivers.

In this regard, although it did not specifically identify any Rouge problems, EPA has identified statewide NPDES permit problems similar in many ways to those experienced on the Rouge. For example, in July

1988, EPA's Region V Water Division Director told us that, while MDNR has demonstrated that it is adequately managing the permit compliance program, EPA is very concerned about the operation of MDNR's computerized permit compliance system. He said that since the system has not been fully implemented, and MDNR uses less efficient manual compliance tracking procedures, Michigan's ability to take timely enforcement actions, and EPA's ability to oversee Michigan's program, are impeded. According to this official, agreement has been reached with MDNR on a plan to resolve the problem that should provide Michigan with the ability to effectively monitor permit compliance.

Planning for Rouge River Cleanup

One of the recommendations of the Great Lakes Water Quality Agreement is that Canada and the United States develop coordinated planning processes to ensure adequate control of all pollution sources. In 1977, the International Joint Commission—for the first time—singled out the Rouge River as one of several major areas of concern with significant environmental degradation in the Great Lakes Basin. In 1985 it recommended that remedial action plans be developed for all areas of concern.

The development of such remedial action plans represented a change from historical pollution control efforts. According to the Commission, before 1985, separate programs to regulate municipal and industrial discharges, urban runoff, and agricultural runoff, had been implemented without considering the need to integrate the responsibilities of different agencies, organizations, and programs. Also, such efforts did not always consider whether programs would result in restoring all state-designated water quality uses.

Since 1986 MDNR and SEMCOG have been preparing a remedial action plan for the Rouge. A draft plan dated June 1988 is being distributed to state and local officials for comment. This plan outlines a 20-year program to begin to solve the river's worst pollution problems and protect public health. The plan's developers recognize that Michigan's water quality standards will have to be achieved over a longer period of time. However, by the year 2005, the plan proposes to eliminate untreated discharges of raw sewage caused by overflows from separate sanitary and combined sewers and to control the discharge of toxic pollutants to the river.

To control discharges of untreated sewage, the draft plan recommends that facilities be built to ensure that discharges from combined sewers receive at least a minimum level of treatment, and it identifies projects

that must be constructed to eliminate overflows from separate sanitary sewers. The plan also recommends that toxics be controlled at their sources by such mechanisms as adequate pretreatment programs. The plan includes an estimate of the costs for implementing some of the projects recommended and outlines a strategy for distributing and financing this cost.

Concern Over Availability of Cleanup Funds

Costs to fully restore the Rouge River have not been determined because control measures for full restoration await further study and analysis. However, these costs will be substantial since the June 1988 draft plan estimated $1.8 billion will be required to complete just part of the draft plan.

Future federal funding to help pay these costs will be limited. The Water Quality Act of 1987 provides for the phaseout of EPA's construction grants program for sewage treatment construction and the establishment of a state revolving loan program. States would make low interest loans from these programs to local communities to construct treatment systems. Federal funds for state revolving loan programs will be terminated at the end of fiscal year 1994. With the end of the federal grant program, which has provided $48 billion nationally since 1972, states and local governments will be financially responsible for publicly owned sewage treatment systems.

Michigan is developing a revolving loan program that is expected to provide up to $1.1 billion for eligible projects statewide. Concerns have been raised, however, that this program will not generate enough money to fund all Rouge River projects. Rouge River projects are expected to face stiff competition statewide for limited loan program funds, other cleanup projects are mandated by court orders, and individual project funding will be limited to no more than 30 percent of the funds available to the state in any given year. Rouge River projects that are not funded by the loan program will result in an additional funding burden for local communities.

Conclusions

The Rouge River has a history of serious and widespread pollution problems. It is considered a threat to the health and safety of Michigan citizens who live in its proximity, as well as a threat to the environmental integrity of Lake Erie.

The June 1988 draft remedial action plan for the Rouge provides a basis for beginning to address the river's pollution problems by proposing actions Michigan considers necessary to protect public health. While implementation of the draft plan and other actions planned by Michigan are steps forward, full restoration of Rouge River water quality is not expected to be achieved until well into the next century.

Michigan needs to overcome many formidable obstacles to restore the Rouge River. One major obstacle is that the NPDES permit program is not as effective as it could be in controlling pollution. MDNR has taken or intends to take action to correct NPDES permit problems. However, it is too early to know the extent to which these actions will resolve permit problems on the Rouge River. While EPA is aware of statewide NPDES permit problems that in many ways are similar to the problems experienced on the Rouge, its oversight of Michigan's permit program is not directed specifically to the Rouge. If the Rouge River is to be cleaned up, EPA needs to augment its statewide oversight by focusing on the Rouge River to help ensure MDNR's corrective actions to the permit program are successful.

Recommendation

Because of the Rouge's long history of pollution problems, its potential for public contact and use, which is the greatest of all the rivers in Michigan, the recent priority assigned to cleanup by Michigan, and the effect of the river's water quality on international waters, we recommend that the Administrator, EPA, require its Chicago Regional Office to establish controls designed specifically to oversee MDNR's implementation of corrective actions on Rouge River discharge permits. As part of these controls, EPA should perform periodic reviews of MDNR's progress to correct combined sewer, stormwater, municipal, industrial, and pretreatment permit program problems, and provide feedback to MDNR on its assessment of the progress made to resolve these problems. If MDNR does not make satisfactory progress, the Administrator should develop options in consultation with MDNR to address the obstacles encountered.

Scope and Methodology

We performed our work between September 1986 and February 1988 and updated the results through June 1988. We interviewed officials and collected information at, among other places, the following locations: EPA headquarters; EPA's Chicago Regional Office; EPA's Great Lakes National Program Office in Chicago; MDNR in Lansing, Michigan; SEMCOG in Detroit; the Great Lakes International Joint Commission's regional

office in Windsor, Ontario, Canada; and various Rouge River Basin communities. We obtained information on your questions relating to the pollution problems of the Rouge River and agency efforts to address the problems. See appendix I for a discussion of our objectives, scope, and methodology. See appendixes II through VIII for a detailed discussion of the issues addressed in this letter, as well as other information we obtained in response to your questions.

We discussed the information contained in this report with EPA, International Joint Commission, MDNR, and SEMCOG officials. As agreed with your office, however, we did not request agency comments on the report. Our review was performed in accordance with generally accepted auditing standards.

As arranged with your office, unless you publicly release its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time we will send copies to the Administrator, EPA; the Director, MDNR; the Director, SEMCOG; the Chairman, International Joint Commission; and other interested parties; and, we will make copies available to others upon request.

This work was performed under the direction of Walter C. Herrmann, Jr., former Manager, Detroit Regional Office. Other major contributors are listed in appendix IX.

Sincerely yours,

J. Dexter Peach

J. Dexter Peach
Assistant Comptroller General

Contents

Abbreviations

CSO	combined sewer overflow
DMR	discharge monitoring report
EPA	Environmental Protection Agency
GLNPO	Great Lakes National Program Office
IJC	International Joint Commission
MDNR	Michigan Department of Natural Resources
NPDES	National Pollutant Discharge Elimination System
QNCR	quarterly noncompliance report
SEMCOG	Southeast Michigan Council of Governments

Introduction

The Rouge River, located in southeastern Michigan, is a 126-mile waterway that winds through a 467-square-mile area known as the Rouge River Basin. Seriously polluted, the Rouge River threatens the health and safety of Michigan citizens who live near it, and the environmental integrity of Lake Erie, into which it ultimately flows.

Of all the rivers in Michigan, the Rouge has the greatest potential for public contact and use. The Rouge River Basin encompasses many jurisdictions—all or part of 48 communities, a portion of Detroit, and 3 counties. More than 1.5 million people live near the river. About 40 percent (50 miles) of the river flows through public parklands, and 404 lakes, ponds, and impoundments comprise the Rouge River water system. The lower portion of the river serves as a shipping channel for the heavy industry located near the river's mouth. (See fig. I.1.)

Given the river's potential impact on the people and communities located near it, Michigan has determined that Rouge River water should be used

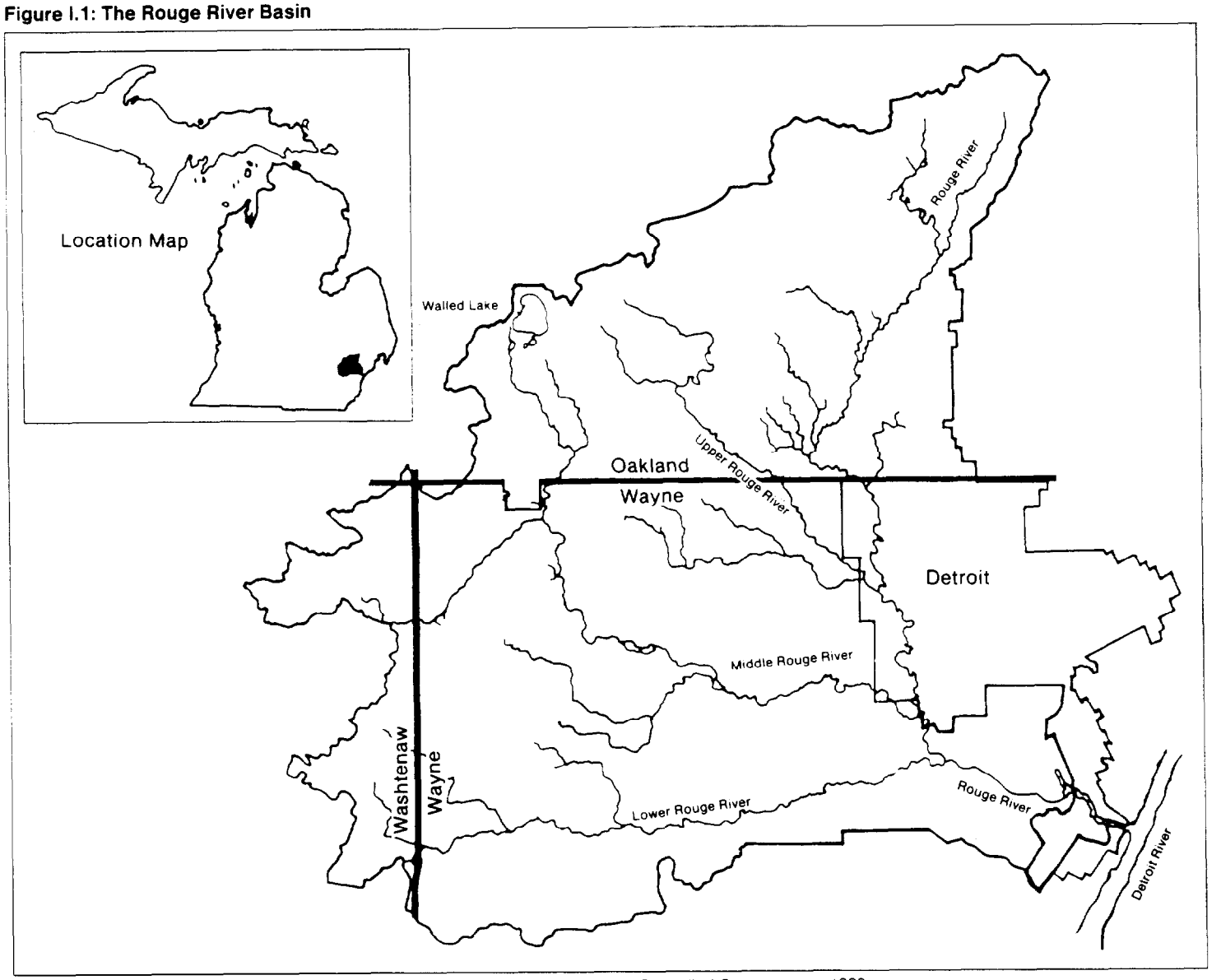
- as an industrial and agricultural water supply;
- for water contact recreation (swimming);
- as a warm-water fishery;
- to support aquatic life and wildlife;
- for navigation (recreational and/or commercial); and
- for aesthetics (free from litter and odor).

Currently, the pollution problems of the Rouge River are so severe that the water quality in each of its 11 subbasins does not meet Michigan's standards for water use in at least 3 of the designated use categories. As a consequence of these problems, federal, state, and local levels of government have begun to address the difficult task of restoring this potentially valuable resource to designated uses.

Pollution Control Laws, Programs, and Organizations

A number of federal and state laws, and an international water quality agreement govern the water pollution control activities and programs of the Rouge River. In addition, five key entities at the federal, state, and international levels are involved in administering the laws and the agreement as they affect the Rouge River Basin.

Figure I.1: The Rouge River Basin



Source: Southeast Michigan Council of Governments, 1988.

Federal Laws

The Federal Water Pollution Control Act, as amended, commonly referred to as the Clean Water Act, is the principal federal legislation for water pollution control efforts. Under the act states are primarily responsible for preventing, reducing, and eliminating pollution. The Environmental Protection Agency (EPA) is responsible for overseeing the

states' activities to ensure that the intent and objectives of the act are met. That is, EPA establishes environmental standards, develops and issues regulations and guidelines, provides research and technical support, awards and administers grants, and enforces various environmental laws.

The act also established the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES program is the basic enforcement mechanism for regulating and reducing point source pollution from industries and municipalities.[1] Although the NPDES program can be delegated to the states, EPA remains responsible for overseeing a state's implementation of the NPDES program requirements.

As amended in 1987 (P.L. 100-4), the Clean Water Act contains, among other things, the following provisions that affect the Rouge River:

- The need to achieve the water quality goals embodied in the Great Lakes Water Quality Agreement of 1978 between the United States and Canada is emphasized.
- The existing federal construction grants program will be phased out and replaced by a state revolving loan fund to finance future sewage treatment projects. Federal funds to help the states start revolving loan programs will not be available after September 30, 1995.
- States are required to develop lists of impaired waters, identify point sources and whether the amounts of pollutants they discharge cause toxic effects, and develop individual control strategies for each such point source that will ensure applicable water quality standards are achieved no later than June 1992.
- States are required to develop and implement programs to control nonpoint sources of pollution.

State Laws

The state of Michigan has enacted several laws since 1921 to guide state pollution control efforts and implement federal requirements. In particular, the Executive Organization Act of 1965 created the Department of Natural Resources (MDNR) as the primary state agency responsible for carrying out water pollution control. The act also created the Natural Resources Commission to oversee MDNR's efforts, with the exception of certain quasi-judicial functions.

[1]Point sources emit pollutants from specific points (outfalls), such as pipes and ditches, and include industries, municipal wastewater treatment plants, and combined sewer overflow (CSO) discharges. Nonpoint sources of pollution generally include contamination from diffuse rather than specific point sources, such as stormwater runoff from urban streets and soil erosion from farmland.

These functions are carried out by the Water Resources Commission, which the state established in a separate act. This Commission is responsible for all quasi-judicial functions for water pollution control—rule-making, and issuance of permits and orders.

Local Organizations

The Southeast Michigan Council of Governments (SEMCOG) has a major role in Rouge River matters. Created by local governments in southeastern Michigan, the Council is a regional planning and intergovernmental coordination agency associated with more than 130 local governments. Represented on the Council are counties, cities, villages, townships, school districts, and community colleges. The Council is supported by federal grants (65 percent) and member fees (25 percent), with the remaining support coming from various sources, including service fees and grants and contracts.

International Agreement

The Rouge River and its basin are considered part of the Great Lakes water system because the river flows into the Detroit River, which ultimately empties into Lake Erie. In November 1978 the United States and Canada entered into the latest Great Lakes Water Quality Agreement. Michigan is one of eight Great Lakes states that participate. Under this agreement each government agreed to develop and implement programs and other measures to control, abate, and prevent pollution from seven specific sources, including municipalities, industries, agriculture, and forestry. The governments also agreed to develop and implement programs and measures to (1) reduce and control inputs of phosphorus to the lakes, (2) minimize or eliminate the release of hazardous substances, and (3) eliminate all discharges of persistent toxic substances.

The agreement is monitored by the International Joint Commission (IJC), a permanent body made up of three members from each country. The IJC is responsible for, among other things, approving or disapproving applications from governments, companies, or individuals for the use, obstruction, or diversion of boundary waters; monitoring compliance with the terms and conditions set forth in its approval of applications; and monitoring and coordinating actions or programs it has recommended, when requested by the governments. The IJC is an advisory body and has no enforcement powers.

Objectives, Scope, and Methodology

In his letter of August 15, 1986, Congressman John D. Dingell asked us to examine several issues concerning the pollution of and cleanup efforts for the Rouge River. In subsequent discussions with his office, we agreed to address the following issues:

- the agencies responsible for overseeing Rouge River cleanup efforts (see app. II);
- the offices having a role in testing Rouge River water quality, the extent of coordination between these offices, and the results of water quality testing (see app. III);
- the status of efforts to identify the types of pollutants discharged to the Rouge River (see app. IV);
- the identification of municipal and industrial dischargers not meeting Rouge River permit limits, and the current status of such violations (see app. V);
- the type of enforcement actions taken against dischargers who have violated their permits, and whether these dischargers are now in compliance with their permits (see app. V);
- the status of Rouge River planning efforts to meet the requirements of the Great Lakes Water Quality Agreement between the United States and Canada (see app. VI);
- the extent of coordination of agency efforts to address Rouge River pollution problems (see app. VII); and
- the status of efforts to determine the costs of cleaning up the Rouge River (see app. VIII).

We performed our review between September 1986 and February 1988 and updated the results through June 1988. Our review of EPA actions took place at the following offices: headquarters, Washington, D.C.; and Region V and the Great Lakes National Program Office, Chicago, Illinois. In Michigan, we conducted work at the Office of the Great Lakes, Lansing; the Water Resources Commission, Ann Arbor; MDNR, Lansing, and the MDNR district office, Northville; the Southeast Michigan Council of Governments, Detroit; and the Departments of Public Works in Oakland and Wayne counties. We also worked at the U.S. Army Corps of Engineers' district office in Detroit, Michigan, and the Great Lakes IJC regional office in Windsor, Ontario, Canada. We also obtained information from the Natural Resources Commission in Lansing and officials in various Rouge River Basin communities, including Canton Township, Dearborn Heights, Detroit, Farmington Hills, and Southfield.

To identify the agencies responsible for overseeing the cleanup of the Rouge River, we reviewed international agreements and federal and

state legislation governing water pollution control. We interviewed key officials to learn about the procedures and practices used to directly oversee Rouge River activities. In addition, we obtained and analyzed agency guidance documents, the EPA delegation agreement with the state of Michigan, and documents on oversight duties and responsibilities.

To assess the efforts undertaken to identify pollutants entering the Rouge River, we interviewed officials from EPA Region V, MDNR, and SEMCOG who have some responsibility for controlling pollution on the Rouge River. As agreed with your office, to determine pollutant loading estimates for the Rouge River, we relied on data developed by responsible agencies.[2] We analyzed the pollutant loading estimates for the Rouge River prepared in 1984 by an EPA contractor. We also obtained preliminary estimates developed by SEMCOG in 1987 as part of the ongoing process of preparing a remedial action plan for the Rouge River. We analyzed SEMCOG's preliminary estimates to determine the total amounts and types of pollutants discharged by point and nonpoint sources to the river. Finally, to determine the relative significance of the loading estimates by source on the pollution problems of the river, we obtained EPA Region V's interpretation of the loadings data.

To determine the offices involved in testing the water quality of the Rouge River and whether testing efforts were being coordinated, we reviewed federal and state legislation addressing water quality testing duties and responsibilities. We then interviewed various officials from the organizational units within EPA and the state of Michigan responsible for carrying out water quality tests. Included in our interviews were EPA's Office of Research and Development and Region V Water Division and Michigan's Natural Resources Commission and Department of Natural Resources.

We determined the extent of water quality testing for the Rouge River by reviewing agency reports of tests conducted. This review included the results of the biological and chemical testing that MDNR conducted in 1973 and 1986. We compared the 1986 test results with the state's water quality standards and the objectives of the Great Lakes Water Quality Agreement to determine whether the water quality results met the state standards and the agreement objectives.

[2]Pollutant loadings are estimates of the amount (gallons or pounds per year) of pollutants entering the river, the types of pollutants (toxic or non-toxic), and the point and nonpoint sources of the pollutants identified.

To determine the extent of municipalities' and industries' compliance with permit requirements for January 1985 through December 1987, we compared self-monitoring reports that all dischargers are required to complete with the reporting and most stringent discharge requirements of individual permits.[3] These reports show the type and volume of each pollutant being discharged. We also reviewed the status of other permit requirements, such as the requirement to develop a CSO control plan. We therefore were able to determine the extent to which permit requirements were met as well as the frequency of any noncompliance. We also reviewed the quarterly noncompliance reports submitted by MDNR to EPA to ascertain those permit violations that were considered significant by EPA's standards.

To evaluate the type and extent of enforcement actions taken against permittees in noncompliance with permit requirements, we reviewed EPA and MDNR criteria for monitoring and enforcing NPDES permits. We also interviewed permit compliance officials and staff of MDNR's Surface Water Quality Division. Where necessary, we also interviewed individual permittees to discuss violations and enforcement actions so we could determine if enforcement actions taken had corrected the problems identified. We also reviewed EPA inspection reports, correspondence between EPA and MDNR as well as with the permittees, and MDNR enforcement actions. We also reviewed MDNR files for letters notifying the permittees of permit violations. By analyzing the data contained in the monthly self-monitoring reports submitted by permittees, we determined the length of time that noncompliance continued before enforcement action was taken and the effect of the enforcement action in bringing about compliance.

To determine the status of efforts to meet the requirements of the U.S.-Canadian water quality agreement, we compared key agreement provisions with the proposals in the draft remedial action plan for the Rouge River. We interviewed the IJC official responsible for coordinating the remedial action plan, and we reviewed IJC reports that discussed the types and sources of water quality problems and the status of cleanup efforts. To obtain federal and state assessments of the IJC reports and conclusions, we interviewed the director and assistant director of EPA's Great Lakes National Program Office, as well as officials in EPA's Region V. We also interviewed MDNR officials responsible for developing and

[3]In most cases we used daily discharge limits because they were the most stringent, according to MDNR. In some cases we used monthly discharge limits because no daily limits were set.

implementing the specific programs needed to meet agreement objectives applicable to the Rouge River. Our interviews and review of documentation included SEMCOG, which is under contract to MDNR to develop a remedial action plan for the Rouge River.

In determining the extent of coordination for Rouge River activities, we focused our efforts primarily on cleanup planning, which has been the major effort on the Rouge River in recent years. Criteria for a coordinated planning effort included the Clean Water Act, the Great Lakes Water Quality Agreement, and planning guidance issued by EPA, the IJC, and the state of Michigan. We interviewed planning officials from the three key agencies involved with developing a plan for the Rouge River—EPA Region V, MDNR, and SEMCOG. We also reviewed the operations of the various Rouge River planning committees established since 1985, primarily to ensure that a coordinated planning effort was accomplished. We analyzed the agendas of committee meetings, meeting minutes, and other committee correspondence, and from these documents we determined who attended committee meetings. We also spoke to the chairpersons of the two major committees and interviewed other committee members as appropriate to obtain their views on how well the committee process was working to promote a coordinated effort. As agreed with the requester's office, we did not assess the effectiveness of coordination between the agencies included in our review.

In order to identify the cost of cleaning up the Rouge River, we interviewed agency officials responsible for overseeing the cleanup of the Rouge River. We reviewed various agency studies and reports, including consultant reports, that contained applicable cost estimates. We did not develop any original cost data but, as agreed with the requester, we did review the support for any estimates made by responsible agencies to determine whether the estimates were complete and reliable.

We also reviewed the work of the Rouge River Infrastructure Financing Committee, established to develop a strategy for financing any cleanup costs that had been identified. In addition, we interviewed selected officials from the local sector to obtain their views about cleanup costs, including the adequacy of the financial resources available to fund cleanup actions. The local officials interviewed represented communities or units of government having a large stake in the effort to correct the pollution problems of the Rouge River.

We discussed the facts contained in this report with EPA, IJC, MDNR, and SEMCOG officials, and their comments have been incorporated where

appropriate. However, as requested, we did not provide a copy of the draft report to the agencies for official review and comment. Our review was performed in accordance with generally accepted auditing standards.

Agency Oversight of Rouge River Cleanup

This appendix discusses state, federal, and international agencies' oversight of the cleanup efforts for the Rouge River.[1] MDNR is primarily responsible for the Rouge River cleanup efforts. However, both EPA and the IJC play oversight roles in the cleanup process.

State Oversight

To carry out its water pollution control responsibilities, Michigan has to take a series of actions. First, Michigan had to establish the water quality standards for state waterways to protect the environment and public health. Second, MDNR must determine the severity, location, and sources of pollution problems by evaluating, among other things, the results of water quality tests and estimated pollutant loadings. Third, MDNR must develop a cleanup strategy that identifies the control programs required to remedy any pollution problems identified. Finally, MDNR, in conjunction with other agencies, must implement the cleanup strategy.

Two state environmental commissions—the Natural Resources Commission and the Water Resources Commission—oversee MNDR's efforts. Because both these commissions have specific responsibility for oversight of MDNR's pollution control activities for the Rouge River, their roles are overlapping, and the commissions must coordinate their oversight activities.

The Natural Resources Commission sets priorities and establishes policies regarding pollution control activities such as water quality testing, the monitoring and enforcement of NPDES permit requirements, and the control of specific sources of pollution such as CSOs (see app. III). This Commission, which has primary responsibility for MDNR, also appoints the Director of MDNR. The Natural Resources Commission also oversees MDNR's activities to carry out the priorities and policies that it has established.

The Water Resources Commission is responsible for promulgating rules, issuing all NPDES permits, and establishing the state's water quality standards to protect the environment and public health. The Commission is also responsible for overseeing MDNR's water pollution control activities to ensure that the Rouge River meets state water quality standards.

Concerned about clear management direction for Michigan's environmental programs, the governor, in his 1988 State of the State Message,

[1] Local agencies are not included in this discussion because, according to EPA and MDNR, they have no specific oversight responsibility for cleanup efforts.

said that he would act on a recent MDNR proposal to abolish the Water Resources Commission and transfer its responsibilities to the Natural Resources Commission and MDNR. Currently, MDNR is drafting legislation to implement these changes.

Both the Natural and Water Resources Commissions have performed certain activities to carry out their oversight responsibilities. The Natural Resources Commission reviews, on a statewide basis, MDNR's cleanup plans and strategies as well as periodic progress reports. According to the chairperson, plans and periodic progress reports have not been required specifically for Rouge River cleanup efforts. However, the Commission discussed cleanup efforts at various meetings. Additionally, a commission member serves as chair of the Rouge River Executive Steering Committee. Participation on this Committee provides information to the Commission on progress toward developing a Rouge River remedial action plan.

The chairperson of the Water Resources Commission also served as a member of the Rouge River Executive Steering Committee and has regularly attended and actively participated in Committee meetings discussing the development of the remedial action plan. Additionally, the Water Resources Commission has frequently monitored MDNR's cleanup efforts by discussing plans and strategies at monthly commission meetings.

Officials of both commissions advised us that they are responsible for reviewing the remedial action plan being developed for the Rouge River. The chairperson of the Natural Resources Commission said the Commission will review the plan primarily to determine (1) implementation requirements for meeting water quality standards and water pollution legislation and (2) needed resources to implement the plan. As part of the review, this Commission will consider comments made by other entities, such as the Water Resources Commission. The chairperson of the Water Resources Commission said that the Commission will review the remedial action plan to determine, among other things, whether the plan will (1) adequately address all sources of discharges so that the river can meet the goals of the Clean Water Act and state water quality standards and (2) meet applicable remedial action planning guidelines issued by entities such as the IJC.

According to the chairperson of the Natural Resources Commission, the review process of both commissions will be coordinated and any problems reconciled to the satisfaction of both. According to this chairperson, if the commissions are unable to reach agreement on a plan, then

the matter would have to be referred to the state attorney general's office for resolution. The chairperson of the Water Resources Commission agreed that review processes will be coordinated, but he believes that, because Michigan's law makes the Water Resources Commission advisory to the Natural Resources Commission for some functions, the Natural Resources Commission would have the authority for the final review of the remedial action plan.

Federal Oversight

While MDNR is responsible for managing Rouge River cleanup activities, EPA is responsible for ensuring that the requirements of the Clean Water Act and the Great Lakes Water Quality Agreement are met. Within EPA, two offices are responsible for overseeing pollution control activities for the Rouge River—Region V's Water Division and the Great Lakes National Program Office (GLNPO). The first office primarily oversees Clean Water Act requirements, the second monitors, among other things, the U.S.-Canadian agreement.

From 1972 to 1985, Region V's oversight of MDNR cleanup activities was generally limited to determining how well pollution control programs were implemented on a statewide basis; it was not focused on the pollution problems of a specific river basin, such as the Rouge River. EPA has recently taken steps to focus some of its oversight activities specifically on the Rouge River.

For example, when the Rouge River Executive Steering Committee was formed in October 1985, the Director of the Region V Water Division became a member. This key decision-making body provides input to the development of a remedial action plan for the river. Since the remedial action plan for the Rouge River must be incorporated into the state's Water Quality Management Plan, EPA will review and approve the plan as part of its responsibility to oversee the state's planning activities. EPA will also review the remedial action plan as part of its ongoing efforts to support the work of the IJC.

GLNPO has in the past also focused on statewide cleanup efforts as they affect the Great Lakes. Starting in 1985, however, GLNPO designated one individual to oversee cleanup efforts for the Rouge River and to provide any needed technical assistance to state or local officials. According to GLNPO's Assistant Director, this individual's oversight activities have included discussions with EPA Region V officials and review of Executive Steering Committee meeting agendas and minutes. He advised us that

GLNPO will review the Rouge River's remedial action plan to determine if it meets the objectives of the Great Lakes Water Quality Agreement.

International Oversight

The IJC is responsible for seeing that Rouge River cleanup efforts meet the objectives of the Great Lakes Water Quality Agreement. The IJC is an advisory body with no enforcement powers. It has designated a staff member as a remedial action plan coordinator for all plans, including the plan for the Rouge River, to be submitted to the IJC. This coordinator serves as a member of the Rouge River Basin Committee and has participated in the development of the remedial action plan for the Rouge River. Like other entities responsible for overseeing cleanup efforts, the IJC will review the Rouge River remedial action plan.

Water Quality Testing

This appendix discusses two issues related to the testing of the Rouge River's water quality: (1) the efforts of responsible offices to test Rouge River water quality and the results of these efforts and (2) the status of coordination between the offices involved in testing.

Comprehensive water quality testing involves an intensive evaluation of the biological and chemical condition of a waterway, including the extent and severity of pollution. Biological evaluations analyze the nature of the plant and animal communities in the water. The composition of the plant and animal life and their rate of growth are basic parameters in evaluating water quality. Chemical evaluations are based on samples from selected locations. These samples are analyzed to determine the types and levels of pollutants in the water and in sediments. Both evaluations include an assessment of the natural condition of the river, such as water flow.

MDNR's Efforts to Test Water Quality

In Michigan, MDNR is responsible for water quality testing. In the past 15 years, it has made two comprehensive tests of the water quality of the Rouge River in addition to periodic, limited tests. The first comprehensive test was performed in 1973, the second began in 1986.

Water Quality Testing Before 1986

In 1973, MDNR comprehensively evaluated the Rouge River's water quality. The biological evaluation included collecting samples from approximately 80 locations throughout the river from May to October. The sample test results showed low diversity of fish life and other organisms. On the basis of these results, MDNR concluded that the water quality throughout the Rouge River was fair to very poor, at best. MDNR further concluded that the primary cause of this condition was discharges from CSOs. Combined sewers are a network of pipes that interconnect sanitary and storm sewers to carry domestic and industrial wastewater and stormwater to treatment plants for processing. During heavy rains, these sewers overflow, taking untreated sewage directly into the river.

The chemical evaluation of the water samples involved testing for 20 pollutants and 5 water quality characteristics at 35 selected sampling locations.[1] The evaluation also included taking sediment samples from 21 locations and testing them for the presence of 21 pollutants.

[1] Water quality characteristics include such things as water temperature and dissolved oxygen; the latter is a measure of the oxygen level of the river.

In a March 1974 report of its 1973 testing of water samples, MDNR reported that four pollutants and two water quality characteristics were sufficient to show the extent and severity of the Rouge River's water quality problems. In the report, MDNR presented test data showing that water quality standards were not always met for two pollutants and one water quality characteristic. For example, fecal coliform—a pollutant commonly associated with discharges from CSOs—was one of the pollutants highlighted in the 1974 report. The fecal coliform test results showed that the river would not meet the state's standard, and that some fecal coliform samples contained bacteria levels as much as 10 times higher than the state standard allowed. Subsequently, in an October 1975 report on the sediment samples taken in 1973, MDNR stated that the levels of various pollutants in Rouge River sediment exceeded levels found in other Michigan waterways.

Further comprehensive tests of Rouge River water quality were not made from 1974 to 1985. During these years, MDNR obtained limited information on the water quality conditions of the river as part of its routine testing program. The routine tests included periodic sampling from various locations on the Rouge River, but the tests were not sufficient to assess the water quality of the entire river. According to MDNR officials, limited resources prevented the degree of testing from being done that would have been necessary to determine the Rouge River's water quality during this period.

1986 Test Results

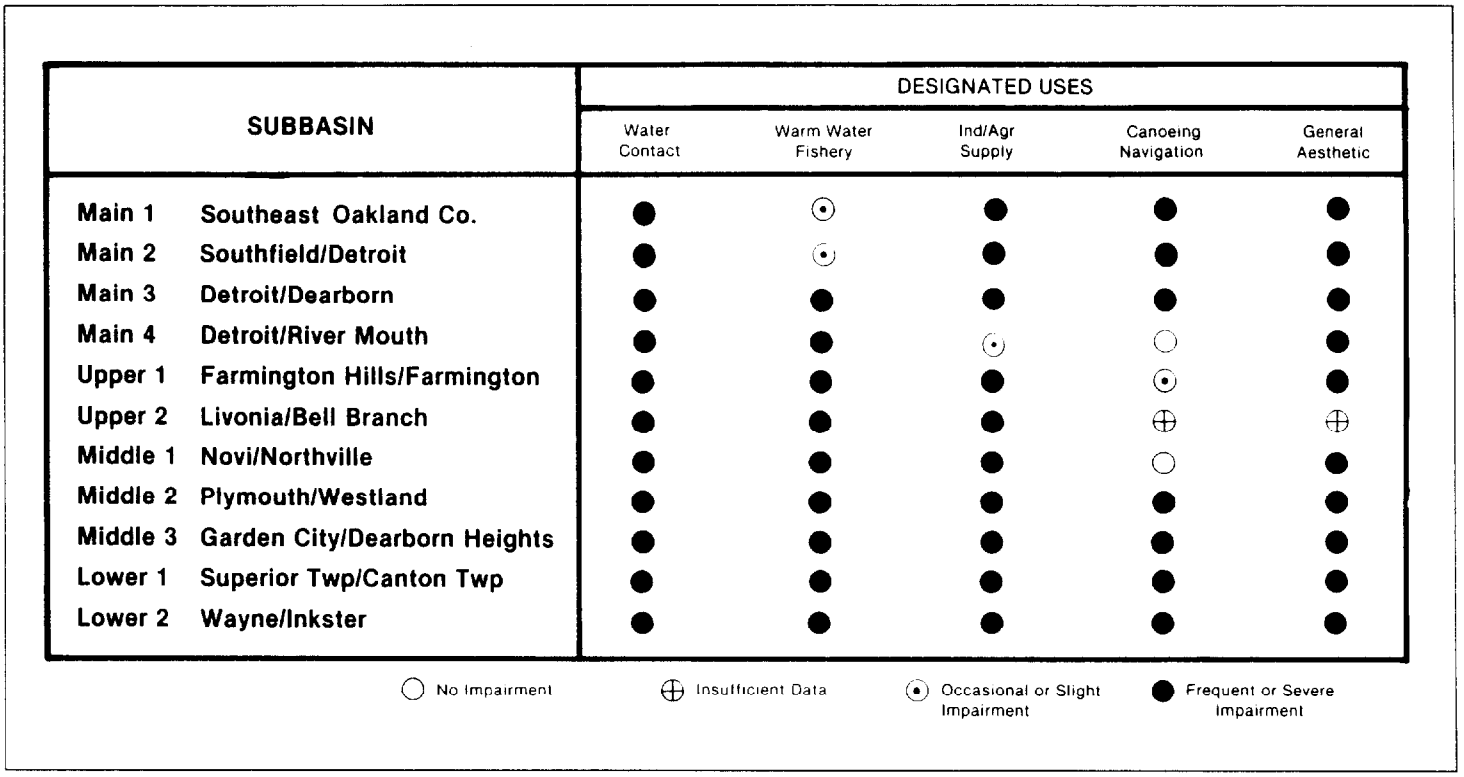
In 1986, MDNR began its second comprehensive test of water quality of the Rouge River. The test was undertaken so that appropriate remedial actions could be developed consistent with the state's intention at that time of cleaning up the river by 2005.

The results available to date of the 1986 test showed that water quality throughout the Rouge River Basin ranges from fair to very poor since biological life is degraded, some water quality standards are not met, and sediment is moderately to heavily polluted.

MDNR and SEMCOG evaluated the available test results in conjunction with other data, such as estimated pollutant loadings (see app. IV), to determine the water quality condition of the Rouge River. The results, which have been incorporated into the draft June 1988 remedial action plan for the Rouge River Basin, show that the designated water uses of all 11 subbasins are impaired to some degree. In the majority of cases, the

impairment is frequent or severe for various reasons, such as (1) pollutant levels not meeting state water quality standards; (2) trash, odor and log jams; and (3) low river flow and shallow stream conditions. This assessment is shown in figure III.1.

Figure III.1: Summary of Impaired Uses for the Rouge River



Source: SEMCOG, 1988; adapted from Limno-Tech, Inc., 1987.

Biological Evaluation Shows Fair to Very Poor Water Quality

The biological evaluation involved an analysis of selected fish and aquatic organisms to determine the present biological condition of the Rouge River and compare the results with those found in 1973. In September 1987, MDNR reported that, although biological activity was slightly better in 1986 than in 1973, the Rouge River remained degraded. MDNR characterized the water quality throughout the Rouge River as fair to very poor. It reported the following:

- Forty-one percent of the 3,178 fish collected for the biological evaluation had external parasites, primarily black spot disease.

- Over 4 percent of the fish collected had growths and fin abnormalities.
- The poor water quality was primarily due to pollutants discharged from CSOs and stormwater runoff, and because the river is flat and slow-moving, unable to easily cleanse itself of pollutants.

Figure III.2 shows results of the biological water quality evaluations for the sampled locations.

Chemical Evaluation Shows Some Water Quality Standards Are Not Met and That Sediment Is Polluted

The 1986 chemical evaluation included testing to determine the extent of pollution in both water and sediment samples.

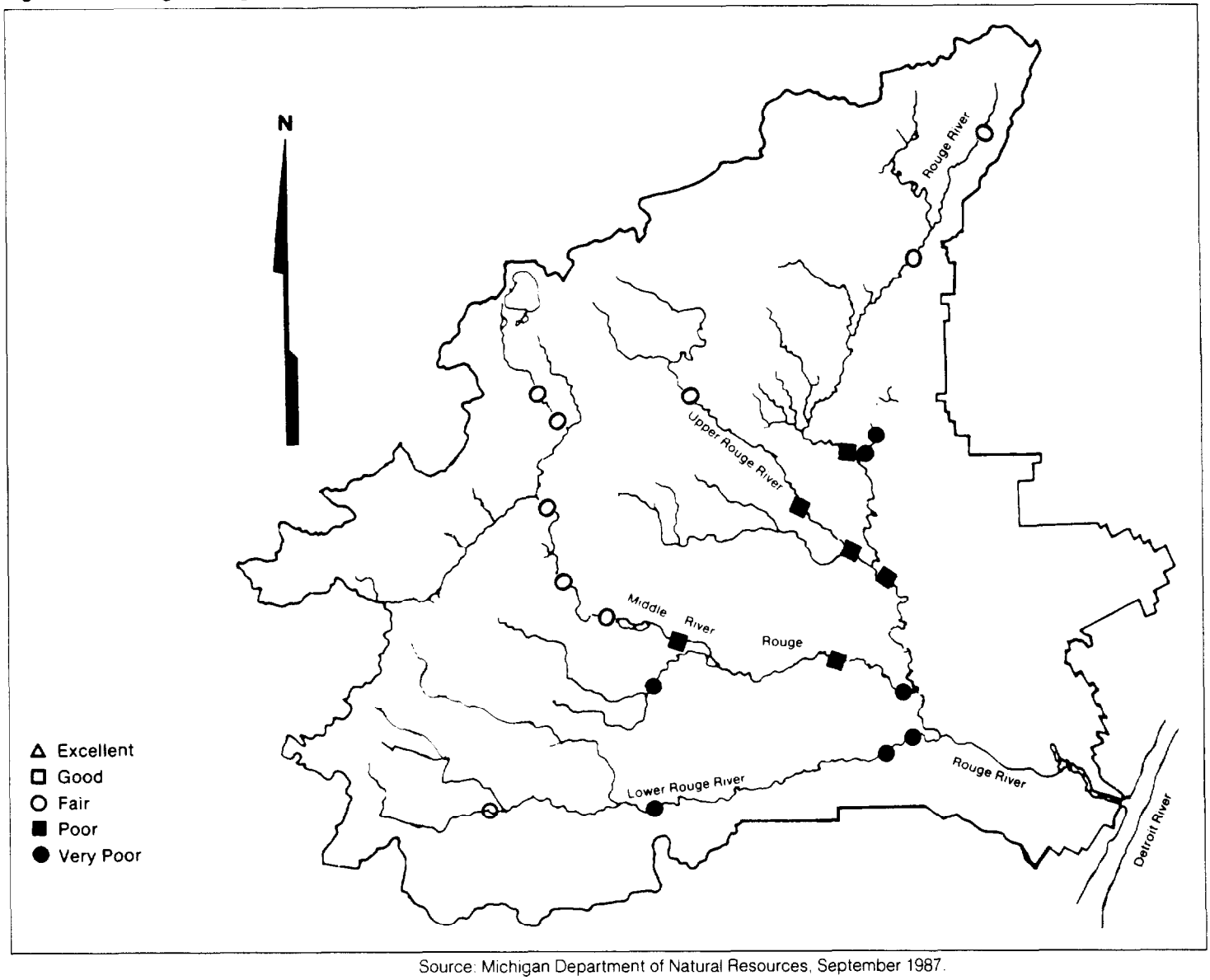
To test the water samples, MDNR initially planned to test for 1 water quality characteristic, dissolved oxygen, and for 16 of the 54 pollutants estimated to enter the Rouge River. The MDNR official overseeing the chemical evaluation believed that the testing scope was sufficient to assess the overall water quality condition of the river since the testing included key characteristics/pollutants, and water samples would be taken from locations throughout the Basin.

Because of state funding limitations, MDNR requested assistance from the city of Detroit and Oakland and Wayne Counties in carrying out its planned testing program. However, local funding and staff resource problems prevented the assisting units from completing the testing as planned. For example, 2 of the 16 pollutants originally to be tested for were not tested at all. Because of the problems, the 1986 chemical tests performed were not sufficient to determine the overall extent and severity of the Rouge River's pollution problems. Consequently, MDNR continued its comprehensive testing into 1987 to complete the tests started in 1986. This testing was conducted from April 1987 through March 1988 for all 16 pollutants and dissolved oxygen.

The testing was completed as planned, and the results were used to analyze impairments to water quality as discussed previously.

MDNR has been assessing the possibility of obtaining water quality test data on the remaining 38 of the 54 pollutants estimated to enter the Rouge River. In May 1987, Detroit Edison Company (a public utility company) volunteered to assist MDNR in this effort. Detroit Edison has performed some preliminary tests, and MDNR will include the company in its 1988 testing effort if Detroit Edison's testing procedures meet federal and state criteria.

Figure III.2: Rating of Rouge River Water Quality Based on MDNR's 1986 Comprehensive Biological Evaluation



Source: Michigan Department of Natural Resources, September 1987.

MDNR analyzed some of the 1986 test results to determine whether Rouge River water quality met the state's water quality standards. MDNR is also evaluating its 1987 test results; however, as of June 1988, the evaluation was not yet completed. The available MDNR analysis of the 1986 test results compared those results with state water quality standards for

dissolved oxygen and 2 of the 12 pollutants tested. As shown in table III.1, this comparison showed that the state's standards for dissolved oxygen and two pollutants—fecal coliform and dissolved solids—were not met.

Table III.1: Rouge River Characteristics/ Pollutants Not Meeting State Water Quality Standards, 1986 Test Results

Characteristic/pollutant	State standard	Percent of samples violating standards
Dissolved oxygen	Minimum of 5 milligrams per liter	14[a]
Fecal coliform	Not more than 200 organisms per 100 milliliters	97[b]
Dissolved solids	Not more than 750 milligrams per liter	11[c]

[a]33 of 238 samples

[b]230 of 238 samples

[c]25 of 238 samples

As the table indicates, the standard most frequently not met was for fecal coliform. The presence of fecal coliform is important because, according to EPA, high amounts of fecal coliform could stimulate the production of bacteria that cause disease in humans and in aquatic life. In addition, levels of bacteria above state standards caused impairments to the designated use of water contact. Similarly, since the standards set for dissolved oxygen and dissolved solids were not met, the designated uses of warm-water fishery and agricultural and industrial water supply were impaired.

MDNR did not conduct a similar comparison for the remaining 10 pollutants tested. For two of these pollutants (carbonaceous biochemical oxygen demand and ammonia nitrogen), the state does not have a water quality standard. For the remaining eight, six of which are toxins, the state must establish numerical standards on a location by location basis, since there is no specific standard for the entire river. MDNR officials stated that MDNR will make such a determination once it has finished interpreting the test data obtained during 1988.

In a January 1988 report summarizing the results of sediment samples taken in 1986 and 1987, MDNR said that 10 of the 11 Rouge River subbasins have polluted sediment—7 subbasins were moderately polluted, and 3 were heavily polluted. The report cited examples of the types and amounts of pollutants found in the river's sediments. For instance, one

subbasin was found to be heavily polluted with iron, lead, and manganese.

In addition, Rouge River water quality does not meet certain water quality objectives set forth in the Great Lakes Water Quality Agreement. To determine whether agreement objectives were met, we compared the available 1986 test data with water quality objectives set forth in the agreement. We found that two pollutants (dissolved solids and copper) and dissolved oxygen did not meet water quality objectives.

For dissolved solids and dissolved oxygen, the water quality objectives in the agreement are the same as the state's water quality standards; therefore, they were also not met. For copper, the agreement specifies a water quality objective that differs from the state standard. The state has a narrative standard that must be interpreted on a location-by-location basis, while the agreement establishes a numerical limit for the entire river. Our analysis of the 42 samples tested for copper in 1986 showed that 16 did not meet the objective established in the agreement.

We could not determine whether the other pollutants tested met the water quality objectives set forth in the agreement because the agreement did not have numerical objectives for these pollutants and because MDNR has not yet fully interpreted its test data.

Coordination of Water Quality Testing

To coordinate its activities internally, MDNR holds regular meetings and informal discussions among its staff. For instance, all the MDNR offices involved in water quality testing report to the Surface Water Quality Division, and the Division Director meets weekly with the heads of these offices to discuss water pollution control activities, including water quality testing. The Director told us that these meetings and other communications within MDNR help ensure coordination and avoid duplication of efforts.

In addition, to further ensure coordination of testing activities specific to the Rouge River, MDNR developed, in 1986, a monitoring strategy that outlined its proposed 1986 water quality testing for the river. This plan was distributed to MDNR offices involved in testing. Further, the Surface Water Quality Division Director monitored the progress of the plan's implementation, and any problems were discussed at the regular weekly meetings.

In another action, MDNR assigned its staff to the Rouge River Executive Steering Committee, which reviews and approves staff planning activities and provides input to the development and implementation of a remedial action plan for the river. Membership on the committee enabled MDNR staff to participate in discussions of the testing strategy.

Both EPA Region V and the Michigan Natural Resources Commission are responsible for overseeing MDNR's efforts to test water quality. Prior to 1986, most of their oversight activities were focused on MDNR's statewide testing efforts, rather than on testing done on specific waterways such as the Rouge River.

Beginning in 1986, EPA and the Natural Resources Commission became more involved in overseeing specific Rouge River testing activities. For example, both have placed a member on the Executive Steering Committee. As with the MDNR membership, these memberships provide a more informed and influential role.

Identification of Pollutants

This appendix discusses which agencies are responsible for identifying the types of pollutants discharged to the Rouge River, and whether any agency is gathering actual or estimated pollutant loadings from both point and nonpoint pollution sources to the Rouge River. The comprehensive identification of pollutant loadings entering the Rouge River is important because, in conjunction with other water quality data, such as test results (see app. III), pollution problems, and their sources, can be identified and control strategies can be developed.

MDNR Responsible for Identifying Pollutant Loadings

In Michigan, MDNR is the agency responsible for identifying pollutant loadings into the Rouge River. According to EPA and MDNR, neither EPA nor local communities are responsible for identifying all pollutants entering the Rouge River. However, local communities must control some pollution sources in their jurisdictions and may identify pollutants to develop appropriate corrective actions.

Efforts to Estimate Pollutant Loadings

From 1972 to 1986, MDNR did not develop comprehensive pollutant loadings for the Rouge River. According to MDNR officials, the national priority during this time was primarily to control pollutants from industrial and municipal dischargers. Consequently, comprehensive loadings data generally were not developed specifically for rivers.

In 1984, EPA learned that the Great Lakes Water Quality Board, the principal advisor to the IJC, was going to recommend that states develop remedial action plans for "areas of concern"— i.e., bodies of water where agreement objectives established to protect water uses have been exceeded and remedial measures are necessary to restore these uses. The Rouge River is one such area. Consequently, EPA undertook the first attempt to develop a comprehensive estimate of the loadings by all sources to the Rouge River. It contracted with ESEI/EcolSciences Inc., of South Bend, Indiana, to, among other things, develop a prototype remedial action plan for all areas of concern, using the Rouge River as a test case. EPA selected the Rouge River for the ESEI study because (1) the river typified many pollution problems, such as CSOs, found in other areas of concern and (2) the remedial projects already scheduled for the Rouge River were not, according to EPA, adequate to restore it to beneficial water uses.

The ESEI contract called for an estimate of all pollutant loadings going into the Rouge River, based on a compilation of all available information

on the Rouge River. However, because limited historical data were available and because ESEI did not assess all available data, ESEI developed loading estimates for 15 pollutants. According to EPA, one shortcoming of the estimates was that they did not include many toxic pollutants believed to be entering the Rouge River.[1]

Responding to an October 1985 decision by Michigan's Water Resources Commission to make Rouge River cleanup a priority, MDNR began a second attempt to estimate pollutant loadings in January 1986 by entering into a 2-year contract with SEMCOG. Under the provisions of the contract, SEMCOG was to, among other things, estimate the pollutant loadings to the Rouge River.

In compiling loadings data for 1987, SEMCOG estimated the amounts and types of pollutants from the following sources—CSOs, stormwater runoff, industrial dischargers,[2] and municipal wastewater dischargers, including treatment plants. According to MDNR and SEMCOG, these loadings estimates represent the best data available for the Rouge River, and they are being used, in conjunction with water quality test data (see app. III), to develop strategies for controlling and eliminating the sources of Rouge River pollution.

These data show that the total annual discharge to the Rouge River from point and nonpoint sources is about 473 million pounds of pollutants. According to EPA, MDNR, and SEMCOG officials, even though CSOs and stormwater runoff represent less than one-half of the total estimated pollutant loadings entering the Rouge River, they contribute the types of pollutants most likely to impair water quality. Consequently, these officials consider these two sources to be the Rouge River's most significant pollution problems.

Combined Sewer Overflows

Combined sewers are designed to overflow during periods of heavy rains when wastewater exceeds pipe capacity. Although these sewers are designed for intermittent overflow, larger and more frequent discharges have occurred. The sewers were not adequately enlarged to

[1]A toxic pollutant is a chemical or mixture that may present a risk of injury to health or the environment. As used in this report, toxic pollutants include the 126 chemicals listed by EPA regulations under section 307(a)(1) of the Clean Water Act (33 U.S.C. 1317 (a)(1)).

[2]These sources produce liquid waste from industrial processes, as distinguished from domestic or sanitary sewage.

accommodate the increased wastewater that has resulted from population growth. In addition, urban construction covering previously open ground caused an increase in unabsorbed rainwater.

SEMCOG's study of pollutant loadings shows that virtually all of the following toxins—arsenic, chromium, mercury, and polychlorinated biphenyls—and 71 percent of the nickel and 67 percent of the cadmium entering the Rouge River originate from CSOs. Depending on the quantity discharged, toxins may injure human health or the environment by causing death, disease, behavioral abnormalities, and/or genetic mutations. In addition to toxins, CSOs also accounted for about 5 million pounds—40 percent—of the biological oxygen demand in the river.[3] Biological oxygen demand is a primary indicator of water pollution problems because high pollution levels can adversely affect water quality by depleting oxygen needed to sustain many preferred forms of aquatic life.

Stormwater Runoff

Stormwater runoff results in the discharge of pollutants to the Rouge River in a diffused manner from either storm drains or soil erosion. Stormwater runoff contains pollutants from streets and buildings and from erosion from various land types, including cropland, grassland, and woodland.

SEMCOG's estimated loadings data showed that stormwater runoff accounts for two-thirds of lead, a toxin, discharged into the Rouge River. Stormwater runoff also contains almost 78 percent of all the conventional pollutants going into the river.[4] For example, an estimated 88 percent (151 million pounds) of all suspended solids[5] as well as 46 percent (6 million pounds) of all the biological oxygen demand entering the Rouge River come from stormwater runoff. In addition, stormwater runoff contributes some of the more significant nonconventional pollutants discharged into the river.[6] These discharges include 66 percent of all

[3]Biological oxygen demand is a measure of oxygen consumed in the biological processes that break down organic matter.

[4]As defined under the Clean Water Act, conventional pollutants include biological oxygen demand, suspended solids, fecal coliform bacteria, acidity, oil, and grease.

[5]Suspended solids are small particles of solid pollutants in sewage that resist separation by conventional means.

[6]Nonconventional pollutants are those pollutants that do not fit the conventional or toxic categories, such as ammonia, nitrogen, and phosphorus.

nitrogen and 49 percent of all phosphorus entering the river. These pollutants can deplete oxygen levels, have toxic effects, or cause water cloudiness. The Great Lakes Water Quality Agreement specifically identifies phosphorus as a major problem of Great Lakes pollution and requires that it be controlled.

Industrial and Municipal Point Sources

Industrial and municipal point source loadings are the estimated pollutants discharged directly to the Rouge River from 30 companies and 3 municipal dischargers, 2 of which are wastewater treatment plants. The 30 industrial dischargers, which include steel, paper, and automotive-related manufacturers, contribute a wide range of pollutants to the Rouge River, including suspended solids and toxins such as lead and zinc. The three municipal sources discharge treated or untreated wastewater, which may contain, among other things, ammonia nitrogen and phosphorus.

Effectiveness of the Permit Program in Controlling Point Sources of Pollution

The NPDES program, established under the Clean Water Act, is the principal tool used by EPA and the states to control water pollution from point sources. By issuing permits that can specify the type and volume of pollutants that can be discharged, EPA and the states attempt to control the amount of pollution entering a waterway. This appendix discusses municipal and industrial compliance with permit limits between January 1985 and December 1987, and enforcement actions taken against those found in noncompliance. It also discusses the progress being made to permit certain CSO outfalls and storm drains that are required to be permitted.

NPDES Requirements

To discharge pollutants into a waterway such as the Rouge River, dischargers (point sources) must have a permit. Permits issued to municipal and industrial dischargers generally specify

- who is allowed to discharge pollutants;
- the types and amounts of pollutants to be discharged;
- the conditions under which the discharge is to occur; and
- the discharge location, called an outfall.

Permits for CSOs also specify all of the above, except for the types and amounts of pollutants to be discharged. According to EPA and MDNR, the establishment of numeric effluent limitations is not feasible for CSOs because their intermittent discharges are unpredictable in terms of frequency and volume of the discharge. Consequently, in cases where numeric effluent limitations cannot be used, NPDES permits are required to include best management practices to control or abate the discharge of pollutants.

A permit can be issued for up to 5 years. Once issued, the permit is a legal commitment on the part of the discharger to meet all permit requirements.

EPA has delegated NPDES permitting authority to the state of Michigan. Administratively, Michigan's Water Resources Commission authorizes the issuance of permits prepared by MDNR and establishes the conditions and limits of the permits. EPA reviews the permits and can reject a permit and reissue it with conditions that the agency believes are appropriate.

EPA classifies facilities as either major or minor. A major municipal treatment facility is one that serves a population of 10,000 or more, or

discharges 1 million gallons or more of wastewater per day. Municipal facilities not meeting these criteria are considered minor. To help classify a wide range of industrial permittees (from computer chip manufacturers to large manufacturing complexes such as steel mills) as either minor or major, EPA uses a numerical rating system. The rating considers factors such as the facility's potential for discharging toxic pollutants, the volume and type of wastewater discharged, and the amount of conventional pollutants in the discharge wastewater. Facilities receiving a rating of 80 or higher are classified as major, while those receiving a lesser score are considered minor.

For the most part, permittees monitor their compliance with the conditions and limits of their permit. Under EPA regulations, permittees must monitor their discharges, analyze what is being discharged, and report at a prescribed frequency to the permitting authority the amount and types of discharges that have taken place. To meet this self-monitoring requirement, Rouge River permittees must submit discharge monitoring reports (DMR) to MDNR. The DMR is a routine compliance report showing, for example, the quantity and discharge rates of the pollutants discharged; it is usually submitted to MDNR monthly.

MDNR is responsible for ensuring that DMRs are submitted on time from each permittee and that they are complete. MDNR compares these reports with permit requirements. If the permittee has violated the permit, EPA expects some enforcement action to be taken. Failure to submit DMRs is also a violation of the permit. MDNR may take an enforcement action against those permittees that either do not submit DMRs or submit them late.

Enforcement actions depend upon the seriousness of the violation, the compliance history of the permittee, and other relevant facts in the case. They range from telephone inquiries to determine the reason for the violation to a federal lawsuit against the violator. In Michigan, MDNR considers telephone calls or letters of violation issued at the district office level as informal enforcement actions. District office staff can also issue a notice of noncompliance; however, this is the only formal enforcement action issuable at the district level. Any higher level of action, such as issuing a notice of violation or referring the matter for judicial action, requires involvement by MDNR headquarters.

EPA expects compliance with all permit conditions to be enforced but recognizes the need to concentrate available resources on the most significant instances of noncompliance. Significant noncompliance is an EPA

term that applies only to major dischargers. EPA criteria provide that a DMR submitted 30 or more days past the due date is to be considered in significant violation of a permit's reporting requirements. As for determining significance of violations of permit effluent limits, EPA's significance criteria are defined, in part, as an average monthly discharge of 40 percent or more than allowed by permit limits for 2 out of 6 months for conventional pollutants. Also, chronic violations are considered significant if the monthly average permit limit is exceeded for any 4 months in a 6-month period.

EPA requires that significant noncompliance by major permittees be monitored through a quarterly reporting system. To meet this EPA requirement, MDNR includes all significant violations in a quarterly noncompliance report (QNCR), which is sent to the EPA regional office in Chicago. For these violations, EPA expects MDNR to take formal enforcement action before the violations reappear on the next quarterly report.

Michigan guidelines provide that MDNR act against major dischargers within 45 days of becoming aware that a violation has occurred. Although the guidelines do not specifically address minor dischargers, an MDNR official told us that Rouge River minor permittees fall under this guidance.

Reviewing the records provided by MDNR and SEMCOG, we determined that the Rouge River has 474 known point source dischargers that are subject to the requirements and regulation of the NPDES program. Of this total, 168 are CSO outfalls, 273 are storm drains, 30 are industrial facilities, and 3 are municipal dischargers.

Combined Sewer Overflows

Local municipalities or county governments are responsible for the CSOs located within their jurisdictions. Because of this, permits are issued to the responsible parties where the CSO outfalls are located.

The 168 CSO outfalls discharging to the Rouge River represent about one-fourth of all CSOs believed to exist throughout Michigan as of December 1987. It is uncertain if there are additional CSOs discharging to the Rouge River. According to the Chief of MDNR's Municipal Permit Section, CSO identification is complicated because some communities have inadequate sewer maps, and because EPA's current definition of a CSO does not easily describe or fit some of the unique sewer connections that exist on the combined sewer systems serving the Rouge River. Currently, MDNR is

attempting to identify all CSO outfalls by working with EPA and local officials.

CSO Permit Problems

Of the 168 known CSOs, 139 have permits to discharge into the Rouge River Basin. For these 139 permitted CSOs, a total of 9 NPDES permits were issued to individual municipalities or county governments. These nine permits are classified as minor. The remaining 29 outfalls do not have permits because, according to the Chief of MDNR's Municipal Permits Section, the parties responsible for these CSOs had not yet applied for them. Until permits are applied for, these 29 outfalls are discharging illegally into the Rouge River.

There are several problems with permit monitoring and enforcement. First, some outfalls are listed under more than one permit. For example, in addition to the nine CSO permits mentioned above, we found that MDNR had six other permits in force at the time of our review. Most outfalls listed under these permits were duplicated in one of the nine permits. According to MDNR officials, this duplication was an error.

Second, we found that 13 outfalls, in addition to the 168 known CSOs, were also included under these 9 NPDES permits. However, these 13 outfalls may not be operative or may not be CSOs. By cross-matching the outfall descriptions contained in the permits with the results of an outfall survey completed in 1987 by SEMCOG as part of the remedial action planning process, we determined that nine outfalls permitted as CSOs appear to be separate sanitary sewers; three outfalls permitted as CSOs appear to be storm drains; and one outfall permitted as a CSO appears to no longer be operating. According to the Chief of MDNR's Municipal Permit Section, these 13 outfalls were permitted as CSOs because the local governmental units identified them as such when they applied for a permit in the late 1970s. Because of limited resources, MDNR did not perform an independent verification for minor permits.

Third, the permit provisions for these permits are often vague and open to interpretation. For example, all nine permits contained nonspecific provisions, such as a requirement that permittees operate their facilities as efficiently as possible. Because of such lack of specificity, the Chief of MDNR's Municipal Permits Section told us that it is not possible to determine the extent of noncompliance. As a result of this problem, MDNR has not taken any enforcement action.

Fourth, there are still problems even with more specific permits. Three permittees, covering at least 10 communities, were required to develop a plan to control 69 CSOs and to implement the plan by March 31, 1982. Although two permittees have developed plans, they have not implemented them. For example, Wayne County was required to develop a plan for 8 communities in which 44 of the 69 CSO outfalls are located and to implement the plan by March 31, 1982. Although the county completed a plan that addressed CSOs, it had not implemented it as of June 1988 for various reasons, including lack of funds and lack of approval from participating local governmental units.

Specific requirements were also not enforced. For example, from March 31, 1982, to December 31, 1987, MDNR did not take enforcement action against the one permittee that had not developed a CSO control plan, Wayne County, or the other permittee that had not implemented the required CSO control plan. According to MDNR officials, enforcement actions were not taken primarily because MDNR was concentrating its statewide efforts on monitoring and enforcing permit requirements for major municipal and industrial point source dischargers, and because MDNR recognized that local governmental units did not have the funds needed to develop or implement control plans and were in the process of applying for federal monies.

And, fifth, NPDES permits for CSO outfalls have not been reissued at least every 5 years as required under the NPDES program. For example, eight of the nine permits were issued during the mid- to late 1970s and were to expire in the late 1970s to the early 1980s. They are still in effect because permittees submitted applications for permit reissuance. NPDES requirements provide that, once an application has been filed for permit reissuance, the existing requirements are to continue in force if the permitting authority does not reissue the permit.

Reasons for CSO Permit Problems

CSOs have not been effectively regulated for several reasons. According to EPA and MDNR officials, the primary reason is that EPA and MDNR gave low priority to controlling CSOs since officials decided to concentrate agency efforts on controlling other point sources, including industrial and municipal dischargers. In addition, MDNR gave low priority to overseeing minor permits because it lacked staff and resources. Furthermore, some permit requirements were not clearly written because EPA and MDNR were not sure of the type of CSO control to require. Michigan's water quality standards do not clearly state the acceptable concentrations of pollutants that can be discharged by CSOs. Finally, the local

municipalities did not implement their proposed corrective projects, as required by their permits, because of limited funds and inadequate institutional arrangements.

Steps Taken to Correct CSO Permit Problems

The June 1988 draft remedial action plan for the Rouge River Basin recommends that the NPDES permit program be used to control the discharges from each of the 168 CSOs in the Rouge River Basin. The plan specifically recommends that permits for all CSO outfalls be issued during 1988, and that these permits initially contain short-term control projects followed later by controls that may be needed over the longer term.

Short-term controls include the monitoring of overflows to better understand the nature of the CSO problem, and the making of physical improvements that will result in more efficient operation of existing sewer systems. The remedial action plan recommends that short-term controls be planned and implemented from 1989 through 1993. The longer term solution requires communities to prepare control plans within specified time frames that, when implemented, will achieve the level of CSO control required to protect public health. The plan recommends that this long-term control be implemented between 1994 and 2005. The plan also recommends that, after 2005, additional long-term controls may be needed if the Rouge River's water is to meet water quality standards.

MDNR plans to develop revised permits for all CSO outfalls consistent with the recommendations of the remedial action plan. In these permits, MDNR plans to make the language clearer, more specific, and more enforceable than has been the case in the past. Although CSOs are classified as minor dischargers, MDNR plans to allocate staff to monitor and enforce the new permits. MDNR also plans to make all permit requirements issued to individual municipalities or county governments consistent with each other as well as with a basinwide cleanup plan. According to SEMCOG, individual CSO control plans cannot be effective from a basinwide approach without also taking into account what other communities upstream and downstream are planning.

MDNR plans to submit revised permits to the Water Resources Commission during the fall of 1988. It expects the Commission to issue the permits shortly thereafter. According to an MDNR official, once these permits are issued, MDNR plans to closely monitor and enforce the requirements.

Before they can begin to plan for long-term solutions, communities will need guidance from MDNR regarding how to interpret state water quality standards as they apply to CSO control. Because Michigan's standards do not clearly state the acceptable concentrations of pollutants discharged by CSOs, the standards must either be rewritten or interpreted by designated officials. A state committee formed to develop a CSO policy evaluated this problem, and in March 1987, MDNR, with committee approval, proposed changing the state water quality standards to specifically address CSOs. However, the Water Resources Commission was concerned about the length of time required to rewrite the standards. Because of this concern, MDNR proposed that the existing standards be interpreted on a case-by-case basis, and the Commission agreed. To ensure consistent interpretation, MDNR currently plans to issue guidance to help develop permit requirements.

Stormwater Discharges

EPA and MDNR consider stormwater runoff a major source of pollution for the Rouge River. Although stormwater runoff is a nonpoint pollution problem, runoff also enters the Rouge River by way of municipal or industrial storm drains. To the extent that such discharges occur, EPA considers them a point source problem subject to regulation under the NPDES program because the discharge originates from a specific point. According to EPA and MDNR officials, stormwater discharges from storm drains have not been brought under effective regulatory control.

Currently, MDNR is attempting to identify all industrial and municipal storm drains that discharge pollutants to the Rouge River and are thus subject to the requirements of the NPDES program. Although the draft remedial action plan for the Rouge River Basin identified 273 storm drains that require permits, MDNR and SEMCOG officials believe there are numerous others.

According to EPA, Rouge River storm drains generally have not had permits because of an ongoing debate regarding specific statutory requirements governing such discharges. Furthermore, both EPA and MDNR made the control of pollution from industrial and municipal dischargers a priority.

The Water Quality Act of 1987 requires that industrial and large municipal stormwater dischargers have permits. Storm drain discharges associated with industrial activities must be treated with the best available technology economically achievable or best conventional pollution control technology, while discharges from municipal storm drains, serving a

population of 250,000 people or more, must be decreased to the maximum extent practicable.

EPA is currently drafting regulations to issue stormwater permits as required by this act. According to an EPA headquarters official, the regulations are expected to be made final during 1989.

EPA expects industrial stormwater dischargers seeking permits to submit with their application (1) maps showing on-site drainage; (2) descriptions of management practices and control measures; and (3) test data on various pollutants and other types of discharges. Once this information is assessed, the permit authority must determine potential pollution problems and issue permit requirements that include best management practices and control measures to begin addressing the pollution problems identified.

Large municipal stormwater dischargers seeking permits will be required to provide, among other things, information identifying (1) responsible parties for the discharge; (2) sources of discharge, including known outfalls; and (3) types and amounts of pollutants discharged. Permittees will also be required to submit management plans that basically assess the potential pollution problems and identify controls needed to address the problems. According to an EPA official, the proposed permit requirements for these municipal dischargers will include the management plan submitted and a schedule for its implementation.

The June 1988 draft remedial action plan for the Rouge River Basin recommends a series of actions to address the pollution problems associated with discharges from storm drains. The plan recommends that all illegal connections to storm drains be identified and eliminated. Also, the plan recommends that stormwater discharge permits be issued in 1990, stormwater management programs previously developed by local communities be reviewed and updated, and retention basins be built to reduce the volume of discharges to the river.

Industrial and Municipal Point Sources

Thirty industrial and 3 municipal facilities function as point source dischargers directly to the Rouge River.[1] Of these 33 sources, 4 meet the definition of a major discharger, while the remaining 29 are minor dischargers. The four major dischargers include two industrial facilities—the Rouge Steel Company and the Double Eagle Steel Coating Company—and two municipal wastewater treatment plants—the Walled Lake/Novi's and the city of Detroit's.

By far the largest single discharger into the river, with 13 outfalls regulated by a permit, is the Rouge Steel Company. According to SEMCOG data compiled as part of the remedial action planning process, Rouge Steel accounts for about 91 percent of all municipal and industrial direct discharges into the Rouge River. The Rouge Steel facility is permitted for about 800 million gallons of flow daily.

The Detroit wastewater treatment plant is the largest single-site treatment facility in the world. It services about 3 million people in 76 communities, and it has a capacity for primary treatment of 1.1 billion gallons daily. Approximately 40 percent of this average daily flow originates within the Rouge River Basin. Three of the plant's four outfalls discharge directly into the Detroit River; the fourth outfall discharges into the Rouge River. The outfall to the Rouge is for emergency purposes only, generally in cases of plant overload conditions caused by heavier rains, or structural reasons, such as equipment repairs that require a partial or total plant shutdown. To determine loadings data, SEMCOG estimated an annual flow of 510 million gallons through the Detroit plant's one Rouge River outfall. Because the vast majority of the plant's total discharge goes into the Detroit River, MDNR considers the Detroit plant a major discharger into the Detroit River. For purposes of this review, we have included Detroit's outfall into the Rouge River as a major discharger.

According to MDNR, each of the 29 minor dischargers to the Rouge River has a minimal impact on the water quality of the river because of the low volume of discharge and the types of discharge. For example, about one-third of the minor permittees discharge only noncontact cooling water, which is used for cooling machinery and does not come into direct contact with, for example, any raw material or waste product. Only one minor industrial permittee discharges toxic pollutants to the river.

[1] These 33 facilities represent those operating under NPDES permits as of November 1986 when we began our review of NPDES compliance.

NPDES Permit Reissuance

In the past, MDNR has not always quickly reissued NPDES permits to Rouge River permittees once the existing permits have expired. The NPDES permit to the Walled Lake/Novi wastewater treatment plant, issued in 1982, expired in December 1986. Although this discharger promptly reapplied for another permit, the permit was not reissued until September 1987 because MDNR and Oakland County disagreed on the levels of control to be provided for lead and silver. In addition, we found that it took MDNR an average of about 3 years to reissue expired permits for 23 Rouge River minor permittees. In one instance, almost 8-1/2 years passed before an expired permit was reissued.

Timely reissuance of permit requirements is important because permit parameters and discharge limits may be revised. For example, the NPDES permit issued to the Walled Lake/Novi plant in September 1987 contains parameters for the toxic metals lead and silver that were not in the 1982 permit.

EPA Region V expressed concern with MDNR's operation of the NPDES program statewide, including permit reissuance. In response to this concern, MDNR developed a permit reissuance schedule and included it in the fiscal year 1984 program plan submitted to EPA. The schedule set up a continuous 5-year cycle, beginning with 1984, for reissuing all permits. The schedule was set by individual water basins, with the Rouge River included in the fourth year of the cycle—1987, 1992, 1997, etc. As of April 1988, MDNR had issued all permits except one for dischargers to the Rouge River. This last one is expected to be issued sometime in 1988.

Compliance With Reporting and Monitoring Requirements

For the 3-year period ending December 31, 1987, the 33 permittees on the Rouge River did not submit all the DMRs required by their permits. Further, DMRs submitted were often late or incomplete. Table V.1 shows the extent of the reporting noncompliance disclosed through our analysis for each category of discharger. As indicated in the table, almost one-half of the required DMRs did not meet the permit reporting requirements.

Table V.1: Extent of DMR Reporting Noncompliance by Type of Discharger

Permitted dischargers	January 1985 Through December 1987		
	Number of reports required	Number of reporting violations	Number of significant violations[a]
Major (4)			
Detroit[b]	18	15	[c]
Double Eagle	21	16	3
Rouge Steel	36	13	0
Walled Lake/Novi	36	23	2
Total	**111**	**67**	**5**
Minor (29)	**802**	**381**	[d]
Total	**913**	**448**	

[a]DMRs either not submitted or submitted 30 days or more late constitute significant noncompliance for major dischargers. We were unable to determine the full extent of significant noncompliance because the DMRs at the MDNR district office were frequently not stamped to indicate the date of receipt from the permittee.

[b]These data pertain only to Detroit's one outfall into the Rouge River. DMRs are required only in the months in which flow occurs.

[c]Significance could not be determined because of the lack of information in MDNR files.

[d]According to the Chief of the Compliance and Enforcement Section, MDNR, the lack of resources prohibited the application of enforcement of EPA's significance criteria against minor permittees.

We analyzed the reporting statistics for the 3 years to determine if there were any significant trends not revealed by the cumulative information. We found that, for the major permittees, the number of incomplete or deficient DMRs submitted has been increasing. For example, in 1985 about 58 percent of the DMRs were incomplete or deficient compared with almost 63 percent in 1987. For the minor permittees, the percent of noncompliance had substantially improved from 1985 to 1986; however, in 1987, the noncompliance rate returned to the 1985 level. Further, we found one minor permittee had not submitted a single DMR over the 3-year period, and two others had submitted 10 percent or less of the required DMRs.

Table V.1 shows a high incidence of reporting noncompliance for Rouge River permittees. The most frequent problem found was incomplete or deficient reporting on the DMRs. A DMR was considered to be incomplete or deficient by us if it was missing required data on the outfalls listed under the permit or if it did not report pollutant measurements at the frequency required. Because only two major and five minor dischargers were permitted for multiple outfalls, the most common problem was information not being reported as frequently as the permit required.

For example, the permit for the Walled Lake/Novi plant requires it to monitor fecal coliform bacteria daily during the 5 months between May 15 and October 15 of every year, and include the results of its daily monitoring in its monthly DMRs. According to EPA, fecal coliform bacteria must be monitored since it can cause disease in humans and aquatic life. We found the monthly DMRs did not contain information on fecal coliform bacteria for 48 of the 462 days required over the 3-year period, a 10.4-percent noncompliance rate. The rate of noncompliance varied among DMRs, with June 1986 showing fecal coliform not reported on 11 of the 30 days.

The Detroit wastewater treatment plant provides another example of incomplete reporting. Its DMRs showed that in 15 of 18 instances the reports did not include complete information on one or more of the four parameters—chlorine, dissolved oxygen, oil and grease, and pH[2] —covered under the permit.

In addition to these problems, two major dischargers did not submit other documents to MDNR within the time frames prescribed in the permits. Table V.2 shows the types of additional reporting requirements and the dates that these requirements were met.

Table V.2: Other Instances of Reporting Noncompliance by Major Permittees

Permitted discharger	Document due	Date due	Date submitted
Walled Lake/Novi	Toxic substances monitoring report	6/15/82	7/9/86
	Report on proposed phosphorus removal	7/1/83	8/14/85
Double Eagle	Primary power provision report	6/30/86	3/13/87
	Short-term waste characterization study	7/2/86	1/13/87

MDNR needs the information in these reports to adequately determine if and how permits should be revised. For example, the toxic substances monitoring report submitted by the Walled Lake/Novi plant, which was over 3-1/2 years late, resulted in an MDNR district compliance officer recommending that the toxic pollutants lead and silver be included in the permit. Monitoring of these metals did not begin until September 1987 when MDNR issued a revised permit to Walled Lake/Novi. The facility is now required to monitor these metals and to meet new discharge limits effective January 1989.

[2]A value used to express acidity and alkalinity.

Although MDNR took enforcement action against the four major permittees that did not meet permit reporting requirements, these actions were not always timely, nor did they bring about compliance quickly. For example, from January through June 1985 the Walled Lake/Novi's DMRs were incomplete each month for ammonia nitrogen, dissolved oxygen, and pH, and were incomplete for two months for biological oxygen demand. It was not until July 1985 that MDNR issued a notice of noncompliance. In 1986, the plant was listed on the QNCR once for untimely reporting. In July 1986, MDNR sent plant personnel a letter stating that the DMR for May 1986 had not been received. This DMR was submitted in July 1986, following MDNR's letter.

The Walled Lake/Novi plant submitted its toxic substances monitoring report, originally due June 1982, in July 1986. MDNR issued a notice of noncompliance in December 1984, a letter in January 1986,[3] and another notice of noncompliance in June 1986. The first two actions extended the due date for the report, first to April 1985 and then to March 1986.

Regarding compliance by Double Eagle, we found that the company did not submit timely DMRs for either of its two outfalls for April through June 1986. However MDNR did not issue a notice of violation until August 1986. An MDNR district compliance officer said he was unable to monitor Double Eagle in its first few months of operations because he was working on a top priority project. Also, the officer explained that he had not expected the start-up problems encountered in the Double Eagle operations. The company began submitting its required DMRs in August 1986; however, DMRs were incomplete for the first 9 months of 1987, primarily because the results of outfall observations required under the NPDES permit were not reported. In September 1987, MDNR telephoned Double Eagle instructing the company to comply with this requirement, and the company has been submitting complete DMRs since.

Rouge Steel has one permit that sets requirements for each of its 13 outfalls. The violations shown in table V.1 include DMRs submitted that did not cover all 13 outfalls, as well as those that did not report on individual pollutants at the frequency specified in the permit. MDNR did not take any enforcement action against these violations for a number of reasons, such as its belief that Rouge Steel generally does a good job of testing and reporting, especially considering the size of the operations, and the violations were not significant.

[3]A letter constitutes a lower level of enforcement than a formal notice of noncompliance.

In 1985, MDNR did not take any enforcement action against reporting violations by the minor permittees and took only seven in 1986. An MDNR official explained that staffing constraints generally allowed for monitoring only the major permittees in 1985, but staff has attempted to increase monitoring of the minor dischargers beginning in 1986. In 1987, MDNR issued three enforcement letters and two notices of noncompliance against a total of four minor permittees. However, 18 other minor permittees that also did not comply with reporting requirements had no enforcement action taken against them. Violations unaddressed included, for example, a minor permittee that did not file any DMRs for 9 required months. In this instance, the MDNR district compliance official explained that enforcement action was not taken because he knew the permit to be revised in 1987 for this permittee would change the reporting requirement from monthly to annually.

However, our review showed that submission of these annual reports is a problem. In a March 1988 review of MDNR district files, we found that MDNR had not yet received 8 of the 11 annual reports by minor permittees that were due on January 10. MDNR had not taken any enforcement action against these permittees as of June 1988.

EPA has also noted enforcement and reporting problems. For example, in July 1986 EPA reviewed the NPDES files and the compliance program of the MDNR district office responsible for southeastern Michigan, including the Rouge River Basin. EPA reported that MDNR occasionally took more informal enforcement action against permittees than it would have taken. EPA recommended that, at least in cases of significant violations, MDNR comply with EPA guidance and use formal notices of noncompliance in lieu of informal actions such as warning letters. EPA acknowledged that MDNR has a major problem: too much work to do and too few resources to get it done.

Regarding reporting, one measure EPA has advocated over the past several years to help manage the compliance program and track individual permittees is that MDNR make increased use of EPA's automated permit compliance system. According to EPA, this system is the cornerstone of an effective compliance and enforcement program. By using it, MDNR could reduce the burden of manually preparing compliance reports, provide for more accurate and consistent determinations of violations, and monitor the timely submission and quality of DMRs.

According to the MDNR district supervisor, approximately one-half of a full-time equivalent position was allocated to monitoring Rouge River

permits in 1985 and 1986. In October 1987 staff time was increased to the equivalent of one full-time staff person, and again in February 1988 to the equivalent of about 1.8 staff persons. The district supervisor stated that the increased staff will allow for greater monitoring and enforcement of Rouge River permits, both major and minor.

According to EPA, Michigan is behind all other Region V states in using the automated permit compliance system. Various setbacks have been experienced, including data entry problems and the lack of timely DMR reporting by permittees.

In its fiscal year 1988 midyear evaluation of the performance of MDNR's Surface Water Quality Division, EPA used data from Michigan's automated permit compliance system. It found that a problem statewide was that permittees were not reporting about 30 percent of the compliance data. Because of the substantial reporting problem, EPA reported the following:

- A large number of permittees may be in significant noncompliance for nonreporting and are not being documented on MDNR's manually generated QNCR.
- MDNR does not have a management system in place to ensure that permittees comply with their reporting requirements.
- The state's compliance rates regarding effluent limits are questionable and could be inflated as much as 10 to 15 percent.
- MDNR must enforce reporting requirements in NPDES permits and enter this type of significant noncompliance on its QNCR.

EPA concluded that Michigan's inability to implement the automated permit compliance system raises questions about the state's capacity to effectively manage the NPDES compliance program.

Subsequent to the midyear evaluation, MDNR and EPA met to discuss the problems raised by the report. In July 1988, EPA's Region V Water Division Director told us that MDNR's automated permit compliance system has extensive data entry problems. He said that supplemental information provided by MDNR from its manual system showed that the automated data used by EPA were inaccurate. According to this official, EPA has reached agreement with MDNR on a plan to resolve the problem. On the basis of the supplemental information provided by MDNR and the agreed-upon plan, MDNR has demonstrated that it is adequately managing the compliance program, according to this official. However, this official added, EPA is very concerned that Michigan's ability to take

timely enforcement actions and EPA's oversight are impeded because the automated system has not been fully implemented and MDNR uses less efficient manual compliance procedures.

Compliance With Permit Effluent Limits

The DMRs received from the four major permittees indicated that these permittees were in noncompliance with their permit effluent limits a total of 472 times between January 1985 through December 1987. Table V.3 summarizes, by year and by permittee, the type and frequency of the noncompliance reported. However, the number and significance of these violations decreased markedly in 1987.

Table V.3: Discharge Violations by Major Permittees, January 1985 Through December 1987

		Violation frequency			
Permitted dischargers	**Type of violation**	**1985**	**1986**	**1987**	**Total**
Detroit[a]	no violation reported	0	0	0	**0**
Total					**0**
Double Eagle	pH	[b]	47	1	**48**
	suspended solids	[b]	14	0	**14**
	zinc	[b]	120	0	**120**
Total					**182**
Rouge Steel	ammonia	2	0	3	**5**
	oil and grease	11	5	1	**17**
	pH	3	1	1	**5**
	phenol	0	3	0	**3**
	residual chlorine	11	9	5	**25**
	suspended solids	1	11	5	**17**
	zinc	0	0	3	**3**
Total					**75**
Walled Lake/Novi	ammonia nitrogen	20	49	15	**84**
	dissolved oxygen	121	0	7	**128**
	fecal coliform	0	0	1	**1**
	pH	0	2	0	**2**
Total					**215**
Total		**169**	**261**	**42**	**472**

[a]Detroit's outfall to the Rouge River.

[b]Double Eagle did not begin operations until April 1986.

As table V.3 shows, the reports submitted by major permittees indicated they were, for the most part, in compliance with their permit limits in 1987. While there were instances of significant noncompliance in 1985 and 1986, none of the violations occurring in 1987 met EPA's criteria for

significance. However, EPA has questioned permit compliance rates in Michigan because of the significant reporting problems that exist.

For the minor permittees that reported, noncompliance with effluent limits has not been a serious problem. Over the 3-year period, the minor permittees were in noncompliance a total of 116 times—34 in 1985, 60 in 1986, and 22 in 1987. MDNR does not consider any of the minor violations to have a significant impact on Rouge River water quality because minor permittees, by their nature, are not expected to emit a large volume of waste on a frequent basis.

In the past, when permittees were in significant noncompliance, MDNR took enforcement action. For instance, 119 of the 120 zinc violations by Double Eagle in 1986 were significant. MDNR water samples taken in August 1986, 5 months after the company began operations, showed that the company's zinc discharge was acutely toxic to two forms of aquatic life that were the subject of tests by MDNR. The MDNR composite sample found zinc concentrations of 322 milligrams per liter in the discharge, compared with the allowed daily maximum concentration of 2.5 milligrams per liter. Because of the severity of the violations, MDNR referred the case to the attorney general and a consent decree and fine of about $875,000 was levied against Double Eagle. The consent decree established, among other things, a dredging program to remove the zinc deposits. MDNR conducted four inspections between July 1986 and July 1987 and found that the problems causing the noncompliance had been rectified and that further enforcement actions were not necessary.

In the case of significant Walled Lake/Novi effluent violations, MDNR took enforcement actions, but these actions did not always result in timely compliance. Because the facility failed to meet limits set for, among other things, ammonia nitrogen, MDNR informed Oakland County in August 1986, that generally it could no longer issue certain sewer construction permits for the Walled Lake/Novi service area until the problems were corrected. This action resulted after MDNR, plant, and county officials had exchanged letters over an 11-month period. In a March 1987 letter to Oakland County, MDNR noted further violations of ammonia nitrogen and stated that the restrictions would not be relaxed until the plant could demonstrate that it could consistently meet the ammonia limitations during the critical summer months. In June 1988, MDNR lifted the sewer ban because Walled Lake/Novi consistently met its ammonia nitrogen limits.

An MDNR district compliance officer said that MDNR did not take any enforcement action against Rouge Steel for discharge violations because the violations were not significant and because the company has had difficulty finding equipment to control pollutants in their effluent. Furthermore, the officer said that Rouge Steel is constantly working to correct any discharge problems, notifies MDNR when permit violations occur, and reports on its plans to correct them.

Because effluent violations over the 3-year period were not considered serious for minor dischargers and because limited enforcement staff were busy doing other work, including monitoring the major permittees, enforcement actions generally have not been taken. In 1985, no enforcement actions were taken against the 34 violations by minor dischargers that occurred in that year. In 1986, after MDNR gave priority attention to enforcing minor permittee violations to coincide with the priority assigned to Rouge River cleanup, MDNR only issued one enforcement action, which covered 33 of the 60 violations that occurred that year. In addition, this single action was not taken until more than 8 months after the violations had been first reported. Further, MDNR staff took another 5 months to follow up and determine that the permittee had taken corrective action. MDNR did not take any enforcement action against the 22 discharge violations that occurred in 1987.

Industrial Pretreatment

The national pretreatment program is a key strategy to help meet the objectives of the Clean Water Act, as amended. It requires industries that discharge into public sewer systems (as opposed to those that discharge directly into a river or stream) to pretreat their wastes prior to discharge. This pretreatment is designed to remove pollutants—primarily toxins—that would otherwise (1) pass untreated through the municipal treatment facility into the receiving water; (2) interfere with the treatment process or damage the facility; (3) contaminate the sewage sludge produced by the treatment plant; or (4) pose health or safety problems to workers at the plant. Upon MDNR approval of a municipal treatment facility's pretreatment program, the task of determining industrial compliance with pretreatment standards rests with the control authority (the local government regulator), with the state providing program overview. Implementation of pretreatment program requirements generally is carried out through the NPDES permit program.

The Detroit and the Walled Lake/Novi municipal treatment plants both operate sewer systems in the Rouge River Basin. Each plant has a NPDES permit requiring implementation of an approved pretreatment program

for the sewer system's industrial users. The Walled Lake/Novi plant operates under the control authority of the Oakland County Department of Public Works, while the Detroit plant is under the authority of the Water and Sewerage Department under the city's Department of Public Works. The Detroit plant is the most significant concern because of the large number of industrial users that discharge into the sewer system and because 167 of the 168 CSOs discharge into the Rouge River Basin.

Industrial users discharging to these two treatment plants are classified as either categorical or non-categorical. EPA has grouped different industries into 26 categories according to common processes and wastewater characteristics. They are referred to as categorical industries. All categorical users are considered significant. Non-categorical users are required to meet standards or limits developed either by the control authority for the treatment plant or by the community in which the industrial user is located. In either case, the standards or limits are based on MDNR guidelines and must receive MDNR approval. The decision as to which non-categorical users are significant is based on such things as whether the discharge is a harmful substance or interferes with the operation of the treatment plant, or the amount of flow going from the user into the wastewater treatment system.

Program Requirements

A pretreatment program must meet three basic requirements: (1) the establishment of enforceable legal authority to authorize or enable the publicly owned treatment plant to enforce pretreatment program requirements; (2) the development and implementation of procedures to ensure compliance with program requirements; and (3) the determination that the publicly owned treatment plant has sufficient resources and qualified personnel to administer the program.

In order to fully implement an approved industrial pretreatment program, the control authority (the city of Detroit and the county of Oakland) is responsible for issuing control mechanisms to significant industrial users in a timely fashion. The control authority can use contracts, industrial user permits, or sewer use ordinances as control mechanisms. Control mechanisms establish enforceable limits, conditions for monitoring compliance with the limits, and reporting requirements for industrial users. Generally, the control authority is required to conduct an industrial user survey to identify the categories of users and the types of pollutants to be controlled, draft a sewer use ordinance that provides legal authority for the program, issue industrial user permits, and monitor and enforce these permits.

Implementation and Enforcement of Program Requirements

MDNR has reported serious problems with the timely and effective implementation of the industrial pretreatment programs for both Detroit and Oakland County. It approved their programs in September 1985.

Oakland County did not begin to implement an industrial pretreatment program until October 1987—2 years after program approval. For that 2-year period, none of the 19 industrial users identified by Oakland County, including the 3 significant industrial users in the sewer system, had been issued discharge permits as required under the approved program. In addition, county officials had not conducted the required samplings and inspections needed to verify the types and amounts of discharges from the industrial users. As of October 1987, monitoring and enforcement of national and local pretreatment standards had not begun, and uncontrolled polluted wastewater continued to be discharged into the sewer system.

Oakland County officials explained that implementation was slow to begin because of budgeting and staffing constraints. They stated that approval of the Walled Lake/Novi industrial pretreatment program in September 1985 did not provide enough time to budget funds for that fiscal year. Consequently, budget allocations for staff could not be made until the following fiscal year. Subsequent to budget approval, standard personnel hiring practices needed to be followed, which further delayed hiring staff until June 1987.

In the case of the Walled Lake/Novi plant, the approved program required Oakland County to issue user permits by June 1986. However, MDNR cited this plant on the July-September 1986 QNCR for failure to implement the industrial pretreatment program and failure to issue permits, and MDNR district officials issued a notice of noncompliance in September 1986. The notice cited Oakland County for failing to supply funding and staffing to the program and failing to provide guidance to the industrial users—implementation efforts that were to begin immediately following program approval. The noncompliance problem was not resolved—MDNR issued a second notice of noncompliance in March 1987, citing the same problems as in the past.

In a compliance inspection performed in July 1987, MDNR found that county officials had hired a program administrator. However, this administrator had no previous experience with the pretreatment program. Following a training program, the new program administrator began implementing the program in October. Full program implementation was completed in July 1988.

With respect to the Detroit program, MDNR's September 1985 approval letter required that all significant industrial users be issued permits by October 31, 1986. In its first inspection of the Detroit pretreatment program in September 1986, MDNR found that no permits had been issued. In a July 1987 pretreatment compliance inspection report, MDNR stated that, as of July 1987, Detroit had issued permits to about 500 of the approximately 540 significant industrial users. However, on the basis of a review of 18 permits, MDNR concluded that in 9 cases either the categorical limits in the permits issued by Detroit had been incorrectly applied or, if applied correctly, the files lacked the necessary information to adequately support selection of the chosen category.

In addition, MDNR noted that most of the 40 unpermitted industrial users were in significant noncompliance with federal pretreatment regulations. According to MDNR, enforcement action is pending for noncompliance with federal regulations.

MDNR also noted that Detroit was not performing comprehensive inspections of significant users that were sufficiently adequate to determine compliance with pretreatment requirements. Further, MDNR stated that Detroit questioned whether existing agreements with users located outside the city limits constituted sufficient legal authority that would enable Detroit to adequately enforce pretreatment program requirements.

MDNR's July 1987 report concluded that, despite marked progress, Detroit was in violation of national pretreatment program regulations that required control authorities to demonstrate sufficient resources and personnel to adequately implement the industrial pretreatment program. The report also noted that Detroit had not yet established clear priorities for implementation or a work plan with requisite staff resources to accomplish these priorities. The July 1987 report contained seven recommendations addressing the deficiencies identified through the compliance inspection.

The Director of Detroit's Office of Program Management in the Water and Sewerage Department explained that the city was not avoiding implementation, but rather was trying to determine how to implement a program of its size and diversity. This official believes that regulating industrial users throughout 76 communities is a difficult task, and one for which the city received no helpful guidance from either EPA or MDNR. Rather, city officials had to slowly develop the expertise themselves to effectively implement the program. In an April 1988 memorandum to

MDNR on the handling of pretreatment programs statewide, EPA notified MDNR that, as delegated authority for such programs, it needed to increase its level of technical assistance to local programs.

EPA guidance to the state on reporting and evaluating noncompliance with pretreatment implementation requirements provides that noncompliance may be resolved initially through informal measures such as conferences or on-site reviews. The guidance also provides that the enforcement response taken by the state should be timely and should escalate to a formal enforcement action if the control authority has substantially failed to implement its approved program or demonstrated inadequate commitment to corrective action on a timely basis.

Following its September 1986 inspection of the Detroit program, MDNR drafted but did not issue a notice of noncompliance for the deficiencies found. Because of time and staff constraints, MDNR did not complete its inspection report and notice until December. MDNR decided the notice was no longer appropriate because too much time had elapsed between the inspection and the date of the violation, and because Detroit had begun to take steps to correct the problems noted in the inspection report. MDNR reported the Detroit plant in noncompliance with the pretreatment program on the October-December 1986 QNCR. MDNR continued to show the plant in noncompliance on the QNCRs through December 1987, noting that implementation and enforcement agreements had not been agreed to between the communities involved and Detroit.

The Regional Pretreatment Coordinator in EPA Region V told us that EPA is in the process of taking formal enforcement action against the city of Detroit for failure to adequately implement its industrial pretreatment program. The enforcement action is based on the results of EPA's on-site audit of the program conducted in May 1988.

The Regional Pretreatment Coordinator explained that, although MDNR had conducted two pretreatment compliance inspections in each of the 2 years since approval of the Detroit program, these inspections had been low-level reviews and had not resulted in any enforcement actions against Detroit. He said that a compliance inspection examines the level of activity in implementing a program, whereas the higher compliance audit conducted by EPA looks at both level and quality of activity. EPA concluded that, although Detroit's level of activity had increased and some efforts had been made, the program was not where it should be more than 2 years after approval. For example, Detroit has only taken

one formal enforcement action against an industrial user, and EPA sees this as a problem.

EPA's Regional Pretreatment Coordinator believes that, because the CSO situation on the Rouge River is not going to be resolved in the near future, it is very important that Detroit give priority to controlling industries discharging pollutants, especially toxins, to the sewer system. SEMCOG officials working on the Rouge River remedial action plan have identified the areas where industries discharge into the sewer system and the potential impact of these discharges on the Rouge River during CSO events. The EPA official explained that this industrial waste often does not receive any treatment because of Detroit's failure to implement the industrial pretreatment program.

Planning for the Rouge River Cleanup

This appendix discusses the efforts undertaken to prepare a cleanup plan for the Rouge River that will meet the requirements of the Great Lakes Water Quality Agreement.

Planning Requirements of the Agreement

One of the recommendations of the Great Lakes Water Quality Agreement is that Canada and the United States develop coordinated planning processes to ensure adequate control of all pollution sources. Under the terms of the 1972 agreement, the entire Great Lakes Basin water system, including the Rouge River, is covered.

Although the IJC has recognized the Rouge River as a major area of concern since 1977, it did not formally recommend the development of a remedial action plan until 1985.[1] A remedial action plan is a systematic and comprehensive approach to restoring all beneficial uses of the waters located in the area of concern. According to the IJC, a remedial action plan is a new approach. It calls for all agencies, communities, and programs affecting an area of concern to work together on common goals and objectives to ensure successful implementation of all pollution control efforts. Although the IJC has no authority to require such plans or enforce them once developed, it recommended them because little had been done up to then to treat the Rouge River and other areas of concern.

Historically, according to the IJC, separate programs to regulate municipal and industrial discharges, urban runoff, and agricultural runoff had been implemented without considering the need to integrate the responsibilities of different agencies, organizations and programs. Also, these independent efforts did not always consider whether programs would result in restoring all designated uses.

The IJC believes that a remedial action plan will provide a basis for assessing how effectively programs will meet agreement objectives of restoring and enhancing water quality throughout the Great Lakes Basin system.

[1]Subsequently, in 1987, the IJC identified the Rouge River as 1 of 42 areas of concern in the Great Lakes system, and 1 of 14 located in Michigan. It said the Rouge River had the following problems: toxics in water and sediment, health advisories on fish and fish with tumors, deteriorated quality of aquatic life, elevated bacteria and phosphorus levels, and dissolved oxygen depletion.

EPA Acts to Develop a Cleanup Plan

As discussed in appendix IV, EPA began to work on the development of a prototype remedial action plan in 1984, when it learned that the IJC would recommend such an approach. ESEI/Ecol Sciences agreed to do the work.

In its March 1985 report, ESEI concluded that the available data showed that the water quality problems in the Rouge River Basin were largely the result of CSOs, stormwater discharges, and the release of pollutants from large accumulations of grossly contaminated sediments in the river. The report also concluded that the necessary data and evaluation models did not exist, and that there was no basinwide planning entity that could address the pollution problems of the Rouge River Basin.

Soon thereafter, EPA decided that remedial action plans would be more likely to be implemented if the Great Lakes states and affected local communities played the major role developing the final remedial action plans. It made Michigan and other states responsible for developing plans for areas of concern. Michigan's responsibility includes the Rouge River. Using the IJC's outline, the results of the ESEI study, and other information, EPA developed guidelines to help states prepare their remedial action plans. These guidelines were issued in July 1985.

Michigan Is Developing a Remedial Action Plan

Even before Michigan was assigned this responsibility by EPA, MDNR officials had begun to consider the need for a comprehensive planning document. In late 1984 and early 1985, MDNR considered three projects to address some of the CSO problems on the Rouge River. It planned to request funding for these projects under EPA's construction grants program. However, EPA stated that no one project would be reviewed and approved independently of an overall Rouge River Basin plan to reduce CSOs and improve water quality. EPA adopted this review and approval process to maximize the use of limited funds and to help ensure that any individual projects funded to control combined sewer problems would also address the problem of combined sewers basinwide. Before agreeing to fund these CSO projects, EPA required MDNR to prepare a strategy that would ensure that all remedial projects for the Rouge River would be consistent with each other in terms of basinwide cleanup of the river.

In April 1985, MDNR began developing a basinwide strategy so that problems and corrective actions could be accurately identified and an assessment could be made of whether all proposed projects, including CSOs, met Rouge River cleanup needs. In July 1985, MDNR submitted a draft of

a Rouge River Basin strategy to the Michigan Water Resources Commission for approval. In that same month, the Water Resources Commission resolved that the Rouge River was an extremely valuable resource and should be restored to its beneficial uses. Further, the Commission directed MDNR to complete a strategy for the Rouge River and to resubmit it by September 1985 for further consideration. The Commission asked MDNR to consider including in the final plan a local participation process involving local municipalities in both the development and implementation of an overall cleanup plan for the Rouge River.

MDNR submitted a final strategy, which the Water Resources Commission approved in October 1985. The Commission established the year 2005 as the goal for restoring designated uses to the Rouge River, to the maximum extent practicable. The approved strategy provided that MDNR would take the lead role in developing a remedial action plan and established within MDNR the position of Rouge River Coordinator. This coordinator is, among other things, to (1) coordinate and oversee all activities related to the Rouge River Basin and (2) ensure that community efforts are focused to effectively resolve the problems identified. In addition, the strategy established a committee structure to involve local governments and to serve as a coordination mechanism.

To fulfill its obligations, MDNR in January 1986 awarded SEMCOG a contract to prepare an initial remedial action plan for the Rouge River, with MDNR providing assistance and support as needed. MDNR anticipated that the development of a comprehensive plan would take several years. According to MDNR officials, it will gradually phase out SEMCOG's special role for the Rouge River over the next 4 years as the remedial action plan moves from planning into implementation. However, SEMCOG will continue to be involved in Rouge River cleanup activities in its usual role as the local planning agency for southeast Michigan. As of December 31, 1987, $210,000 had been spent on the plan's development.

As required by its contract, in January 1987, SEMCOG issued a draft remedial action plan that served as a status report on the first year's work and described the next steps in addressing the significant problems of the Rouge River. A subsequent contract required SEMCOG to present an updated remedial action plan to the Water Resources Commission by January 1988. This plan was not presented to the Water Resources Commission until May 1988 because all planned studies were not completed on schedule. The Commission is expected to adopt the plan—dated June 1988—sometime during the summer of 1988. During

a public review and comment period, the 48 communities located in the Rouge River Basin will have an opportunity to comment on the plan.

The June 1988 draft remedial action plan for the Rouge River Basin outlines a 20-year program to begin to solve the river's worst pollution problems and to protect public health. Although the plan's implementation will not achieve state water quality standards, it recognizes the need to meet this goal, but on a longer term basis. Over the short-term, by the year 2005, the plan proposes to eliminate untreated discharges of raw sewage caused by overflows from separate sanitary and combined sewers, and to control the discharge of toxic pollutants to the river. To control discharges of untreated sewage, the plan recommends that facilities be built to ensure that discharges receive at least a minimum level of treatment, and it identifies projects that must be constructed to eliminate overflows from separate sanitary sewers. The plan recommends that toxics be controlled at their sources by such mechanisms as adequate pretreatment programs. The plan also (1) defines the water quality condition of the Rouge River; (2) identifies the types, origin, and amount of pollutants entering the river; (3) outlines actions to address each pollutant source; and (4) estimates the costs for the projects recommended, and outlines a strategy for allocating and financing this cost.

MDNR is currently negotiating an approximately $150,000 contract with SEMCOG to resolve open issues and update the information in the 1988 remedial action plan. MDNR intends to update the remedial action plan annually through the year 2005.

Coordination of Cleanup Efforts

This appendix discusses coordination between the federal, state, and local agencies involved in addressing Rouge River pollution problems. It also discusses whether these agencies are cooperating and sharing information.

Effective Cleanup Efforts Require Coordination

Coordinated planning of cleanup actions among all affected government units is required under the Clean Water Act, Michigan law, and the Great Lakes Water Quality Agreement. According to federal, state, and local pollution control officials, coordinated planning efforts will be needed to ensure that Rouge River pollution problems are addressed consistently. Consistency among plans is important because the Rouge River Basin is divided into numerous political boundaries.

From the late 1970s to the mid-1980s, many plans were developed to identify and correct the CSO problems on the Rouge River. According to EPA and MDNR officials, however, the communities developing these plans generally did not coordinate their efforts. The plans identified pollution problems and corrective actions only within the specific boundaries of each local community and were not designed to be integrated with the plans being developed by neighboring communities. Since the plans were developed separately, they ultimately could not be used to establish the basinwide program needed to control or eliminate the Basin's CSO pollution problems.

In March 1984, EPA contracted with ESEI/Ecol Sciences to develop a prototype remedial action plan for the Rouge River (see app. VI), which required, in part, that the consultant evaluate past planning efforts. ESEI identified two reasons for past planning inadequacies: (1) the legal framework needed to coordinate, direct, and implement proper basinwide planning did not exist and (2) there was insufficient coordination among the responsible jurisdictions and agencies.

Efforts Taken to Improve Coordination

In October 1985, the Water Resources Commission approved MDNR's proposed strategy for enhancing a coordinated basinwide planning approach to address the pollution problems of the Rouge River. The strategy, among other things, recognized the need to establish (1) a committee structure to involve and coordinate all governmental levels in the development and implementation of a remedial action plan and (2) a new position of Rouge River Coordinator to ensure that the agencies and municipalities involved in cleanup efforts cooperated and shared information.

Coordination Committees

After the Water Resources Commission approved the strategy, MDNR contracted with SEMCOG to develop a remedial action plan for the Rouge River and to establish a local participation process to assist in this effort. The objectives of this process were to (1) establish a committee structure to participate in the development and implementation of a remedial action plan; (2) inform and obtain input from affected units of government, the public, and other interested parties about Basin problems and possible solutions; (3) set goals and policies for Rouge River Basin improvements; (4) identify and select easily implemented improvement projects; and (5) review and recommend local government roles and responsibilities to accomplish long-term basin improvements.

SEMCOG formed two major local participation committees to accomplish these objectives in October 1985. An Executive Steering Committee represents key decisionmakers from various levels of government. This Committee was to meet at least quarterly and, among other things, direct and guide the planning effort, and review and approve basinwide goals and the projects needed to achieve these goals. According to SEMCOG, the Executive Steering Committee functions as the lead advisory committee in reviewing and approving planning activities and in expressing local government recommendations to SEMCOG for the development of the remedial action plan for the Rouge River. The Committee is comprised of 15 members—1 federal, 5 state government, and 9 local government agencies and various interest groups.

The other major committee, the Rouge River Basin Committee, serves as an advisor to the Executive Steering Committee and provides a broader base of representation. This Committee was to meet at least three times a year and both inform and obtain input from local communities and other parties having an interest in the Rouge River Basin.

The 80 members of this committee include 1 member from the IJC, 3 from the federal sector, 14 from state government, 9 from county government, 1 from SEMCOG, 6 from local interest groups and parties, 1 from private industry, and 45 from local communities in the Rouge River Basin.[1] Seven of the 48 local communities elected not to be represented on this Committee for various reasons, such as the limited land area of the community affected by the Rouge River.

[1]Several local communities have more than one representative serving on the committee.

SEMCOG also established a second tier of eight technical advisory committees to support its activities and those of the two major committees. Several committees, such as the Stream Enclosures and Soil Erosion Committee, met only once to make recommendations on a particular subject. Others, like the CSO Advisory Committee established in April 1987, met monthly to assess the possible control alternatives for correcting the CSO pollution problems.

Representation on all of the committees was determined in the following way. For the two major committees, MDNR and SEMCOG chose the federal and state members they believed should be on the committees. Local government members were chosen by the Oakland County and Wayne County executives, local boards of commissioners, or community officials such as mayors. For the eight advisory committees, MDNR and SEMCOG selected members known to have the technical expertise needed for each specific committee. Members attend meetings as part of their overall roles and responsibilities as public or elected officials, and receive no separate pay for their committee work.

Local Communities Have Not Fully Participated in Cleanup Planning Efforts

The primary objective in establishing the two major committees was to (1) ensure a coordinated planning and implementation effort and (2) involve local governments in decisions for the remedial action plan. However, the committees are not operating as fully as intended because attendance, particularly by committee members representing local governments, has been poor.

Both committee chairpersons stated that the lack of member attendance and participation at meetings affects the effective development and implementation of a Rouge River remedial action plan. For example, according to the chairperson of the Executive Steering Committee, it is important that members fulfill their roles and responsibilities at committee meetings, particularly considering the nature of the items on the agenda and the decisions needed to reach agreement on a remedial action plan.

A meeting of the Steering Committee held in August 1987 illustrates the importance of attending the meetings. Agenda items for discussion or decision-making included Rouge River pollution sources and loadings, financing of remedial action programs, possible control measures for CSOs, sewer system problems affecting the Basin, and the results of water quality testing. Although key issues were discussed, only 7 of the

15 members attended. Of the eight members missing, five represented the local sector.

Members of the Basin Committee also frequently do not attend meetings. Of the 80 members on the Committee, only 46 had attended 1 or more meetings; 34 members have yet to attend a committee meeting. Moreover, 24 (53 percent) of the 45 local members on the committee had not attended a meeting. Of the remaining 21 members, 13 had attended no more than 2 meetings. Only three members—representing Dearborn Heights, Melvindale, and Troy—attended all five meetings held.

According to the Rouge River Coordinator, attendance at Basin Committee meetings has steadily declined. Further, the members who have attended meetings have not always been in a position to provide informed input to the overall remedial action planning process. As a result, the coordinator said that the role initially envisioned for the Basin Committee has not materialized, and MDNR and SEMCOG have defined a new role for it. Since 1987, MDNR, SEMCOG, and the Committee chairperson, have used the Basin Committee meetings primarily to educate and inform local governments about the Rouge River's problems, and, more specifically, to obtain members' views on how they see certain activities and actions affecting their local jurisdictions. However, the Coordinator stated that, even with the change in committee direction, meeting attendance remains poor.

Because many members from the local sector have not attended meetings of the Steering and Basin Committees, MDNR is concerned that these members will not support the implementation of remedial programs decided on in their absence. To determine why some members do not regularly attend meetings, we spoke with 10 individuals—4 members of the Steering Committee and 6 of the Basin Committee. These 10 members had missed either all or most of the scheduled meetings. Four of the 10 members stated that they were not aware that they were members of a committee. The other six stated that they did not attend primarily because of time constraints.

In an effort to obtain the input and support of local communities, MDNR and SEMCOG will visit each of the 48 local government units during the summer of 1988. They will explain the draft remedial action plan, local government responsibilities for implementing the plan, the costs of implementation, and regulatory requirements. During the visits, SEMCOG will request that each community adopt a resolution to accept and implement the final remedial action plan.

The need for the two major committees to have a continuing role in Rouge River cleanup efforts is recognized in the June 1988 draft remedial action plan for the Rouge River Basin. The draft plan states that there is a need for continuing oversight and periodic evaluation of progress by a basinwide planning entity. Consequently, the draft plan recommends that the Executive Steering Committee should meet a least semiannually, and the Basin Committee should meet at least annually to review progress and approve updates to the remedial action plan.

MDNR Rouge River Coordinator

In addition to SEMCOG's establishing committees, MDNR appointed a Rouge River Coordinator from MDNR's Surface Water Quality Division in January 1986 to promote improved coordination in basinwide planning for remedial actions. In 1986, the coordinator split his time between fulfilling Rouge River responsibilities and developing an overall strategy for controlling pollution from nonpoint sources in Michigan. The coordinator said he has been working full time on Rouge River efforts since January 1987 and will continue to do so at least until January 1989.

The Rouge River Coordinator

- maintains day-to-day involvement with SEMCOG,
- keeps MDNR staff abreast of project status and developments,
- highlights emerging policy issues or controversial topics to assist the MDNR Rouge River Project Director in identifying problems to MDNR upper management,[2]
- ensures that technical support staff are available and involved in plan development as needed,
- serves as the public and accessible MDNR spokesperson with local governments and the media, and
- is the primary MDNR staff person for the Rouge River Basin Committee.

The Rouge River Coordinator has helped to promote coordination within the committees established by SEMCOG. The committees' attendance records showed that the Coordinator has attended virtually all the major committee meetings. At committee meetings we observed, and according to the chairpersons of the two major committees, the Coordinator frequently facilitates discussion of the agenda items, is responsive

[2]MDNR appointed the Chief of the Compliance and Enforcement Section of MDNR's Surface Water Quality Division as the Project Director for the Rouge River. The Project Director supervises the Rouge River Coordinator, makes MDNR policy decisions or obtains such decisions as necessary from the Chief of the Surface Water Quality Division, and assures that the Rouge River Coordinator is provided timely input from MDNR technical staff.

to concerns raised, and generally appears to command the respect and attention of other committee members and participants. Further, the Coordinator's position within MDNR's organizational structure enables him to win support and timely decisions from its upper level management.

Rouge River Cleanup Costs

This appendix discusses the costs necessary to clean up the Rouge River, as estimated by the agencies responsible for overseeing the cleanup effort. Because we were asked not to develop any original cost data, this appendix contains our evaluations of the support for cost estimates that have been made by others as well as our determination of whether they appear to be complete and reliable.

Costs for Full Restoration of the Rouge River Have Not Been Determined

Estimates of the cost of all significant remedial actions needed to clean up the Rouge River and restore its designated uses have not been made. EPA and MDNR officials explained that the planning process, which will identify all pollution problems and the specific remedial measures needed for the Rouge River, has not been completed (see app. VI). As a result, these officials told us that it is difficult and impractical to assign costs to projects that are still in the planning stage. These officials said that cost estimates for all significant remedial projects will be developed as individual project designs are completed.

The estimates of cost that have been made are concerned with those projects identified in the Rouge River remedial action plan as being needed to allow the Rouge River to meet one primary goal—compliance with public health standards by the year 2005. Protecting public health means eliminating the dumping of raw sewage and controlling the discharge of toxic pollutants into the river. The cost of meeting state water quality standards, the eventual long-term goal for the Rouge River, will require efforts beyond the year 2005, and the full extent of the costs needed to clean up the river will not be known until at least then.

According to the remedial action plan, the technology necessary to eliminate the public health problems caused by Rouge River pollution has been available for many years. The plan states that cleanup of the Rouge River has been postponed because of extremely high costs, limited state and federal assistance for CSO remedies, inadequate institutional arrangements, and the necessity for undertaking other pollution control projects that have competed for limited resources.

Cleanup Costs Will Be Significant

If the partial cost estimates that have been made are an indicator, the overall cost to clean up the Rouge River to meet state water quality standards will be significant. The June 1988 remedial action plan for the Rouge River Basin states that, even when stretched over a 20-year period, the cost of $1.8 billion needed to meet the 20-year public health

goal for the Rouge River is extraordinary. The $1.8 billion estimate covers primarily the capital and finance costs needed to make necessary improvements to existing separate sanitary sewers and to construct CSO control projects that will accomplish settling, skimming, and disinfection of combined sewage before it is discharged into the river.

This estimate does not include the costs that will be required to implement many of the other recommendations contained in the draft plan. Of the 28 Rouge River remedial projects recommended in the draft plan, 15 have cost estimates. Following are examples of projects for which no estimates have yet been made:

- Phase I of the plan's three-phased approach for addressing CSO problems extends from 1989 through 1993. It provides for Rouge River communities to develop detailed local plans for CSO controls in preparation for Phase II, optimize the performance of the existing combined sewer system, and inventory and monitor the existing system.
- At least 29 communities are expected to make improvements to local sewers as part of the solution to the problems caused by separate sanitary sewers. However, the remedial action plan provides a cost estimate for only 12 of the 29 communities.
- The construction of any necessary stormwater retention facilities as determined from planning efforts during 1989 to 2005 has not been included.
- The cost of nonpoint pollution controls needed to address problems such as chemical storage piles and soil erosion has not been included.

In addition, in certain areas, the estimates that have been made may be understated. For example, an estimated cost of $500 million in capital expenditures to implement the recommended CSO control program does not reflect (1) the cost of replacing aged facilities and (2) the estimated cost of operation and maintenance of new facilities needed to meet future flow needs. Further, the estimates have relied extensively on previously completed plans with cost estimates for CSO control that, in one case, dates back as far as 1973. Although these cost estimates were converted to 1987 dollars, the dated information may not be indicative of current CSO conditions and needs.

Sources of Cleanup Funds

Because cleanup costs will be substantial, state and local officials are concerned about funding sources.[1] The remedial action plan states that timely implementation of the plan's recommendations will require that the necessary funds be made available. According to the plan, local communities are expected to provide at least 60 percent of the total funds needed, while federal and state sources are expected to finance about 40 percent. Assuming a cost of $1.8 billion, local communities are being asked to provide about $1.08 billion, and federal and state sources a combined $720 million over a 20-year period.

EPA's construction grants program has been a primary source of funds for constructing sewage treatment plants, providing up to 75 percent of these costs at one time. MDNR statistics show that approximately 1,234 grants totaling $2.57 billion had been awarded to Michigan through May 1987. However, the Water Quality Act of 1987 provides for phasing out the construction grants program, which has provided $48 billion nationally since 1972, and replacing it with a state revolving loan fund to finance future sewage treatment projects. Federal funds provided to help states start revolving loan programs will terminate at the end of fiscal year 1994. At that time states will assume responsibility for financing all cleanup costs.

Before the construction grants program is phased out, some Rouge River projects will qualify for about $133 million in federal funding under the program, according to the remedial action plan. If Rouge River projects do qualify, about $587 million will remain to be obtained from federal and state sources to make up the $720 million estimated under the remedial action plan. A portion of this balance could come from the state's revolving loan program. Through fiscal year 1994, the life of the federal revolving loan fund, Michigan expects to receive approximately $365 million in federal funds for its revolving loan fund, although MDNR believes the actual amount received will be lower. To qualify for this money, Michigan will have to generate $73 million—which represents state matching funds of 20 percent. Over the next 10 years, assuming a best-case scenario, MDNR and SEMCOG expect that the Michigan loan program could provide up to $1.1 billion for eligible projects statewide.

[1]Historically, funding problems and cost concerns and/or institutional constraints have hindered the completion of Rouge River cleanup projects. For example, as early as 1970, two Rouge River communities protested their involvement in a regional sewer project because of high costs. In 1986, three other communities also criticized the same sewer project, which had been redesigned several times since 1970. The criticisms were, in part, because of alleged inequities in the allocation of development costs. The three communities finally withdrew from the project, which created the need to redesign it once again.

The Infrastructure Financing Committee is concerned that, as currently proposed, the loan program will not generate enough money to fund all needed Rouge River projects. The $1.1 billion will meet only Michigan's defined critical needs—projects required to comply with administrative or court orders and projects required to eliminate public health hazards. In addition, MDNR said that noncritical projects and CSO projects totaling another $5.6 billion, including Rouge River projects, are needed throughout the state.

The Chief of MDNR's Surface Water Quality Division stated that Rouge River projects, including CSO projects, would be eligible for funding of low-interest loans under the proposed loan program. However, according to the remedial action plan for the Rouge River, the competition statewide for the limited funds is expected to be very intense. Further, according to the MDNR chief, the loan program being proposed by MDNR would limit funding for any project in a given year to no more than 30 percent of the funds available to the state in that year. The chief stated that such a restriction would limit the amount of funds that could be directed to Rouge River projects. According to SEMCOG, such a restriction could put an additional funding burden on the local communities.

According to SEMCOG, under a best-case scenario, as much as $33 million annually, or about $330 million in total over a 10-year period, could be available for Rouge River projects through the revolving loan program. When added to the $133 million anticipated from the construction grants program, about $257 million would still remain to be financed. This amount either would have to be financed by the revolving fund, if one still exists after the initial 10-year period, or would have to be added to the local share. SEMCOG stated that the loans are not grant money and that local communities eventually will have to pay off the loans including interest. According to MDNR, the continuing viability of the state's revolving loan fund will depend on local communities paying the loans back at the specified interest rate and according to the payment schedules that have been determined.

Affordability of Costs to Fully Restore Uses

Although the cost of cleaning up the Rouge River to meet the long-term goal of state water quality standards is unknown, SEMCOG, local officials, and a consultant, have expressed concern about the affordability of cleanup projects, particularly if local communities must provide the bulk of the financing.

According to the June 1988 draft remedial action plan, additional federal funds will be needed if projects are going to be implemented to meet the Clean Water Act goal of having the Rouge River meet water quality standards. In addition, at a January 1988 meeting of the Rouge River Infrastructure Financing Committee, the planning director of SEMCOG and the project manager responsible for completing the CSO study conducted by Wade/Trim, a consulting firm, concluded that, without the federal government funding up to 75 percent of the cost of remedial projects, enforcement of the Clean Water Act requirements for the Rouge River essentially would bankrupt some southeastern Michigan communities. Further, several city and county officials told us that, with cutbacks in federal grants, local communities will be asked to bear an even heavier burden, and will have difficulty obtaining the funds required to pay for cleanup projects.

As part of the remedial action planning process for the Rouge River, SEMCOG established an Infrastructure Financing Committee to study all possible sources for financing cleanup of the river. To help the committee devise a financing strategy, SEMCOG contracted with Plante & Moran, a consulting firm, to (1) evaluate various sources of funding for implementing remedial measures; (2) assess each community's ability to pay; and (3) examine alternative funding sources, such as the use of special assessment districts.

Plante & Moran completed work in January 1988 and later revised some tables and figures in March 1988. The firm's statistics indicate that local funding sources will not be adequate to pay for cleanup costs because of the tremendous impact that the costs would have on such areas as property taxes or water and sewer usage rates.

In addition, the remedial action plan states that local communities within the Rouge River Basin are also part of other river basins and are being asked to support implementation of more than one remedial action plan. For example, according to MDNR, 11 Rouge River communities will be asked to support the remedial action plan for the Clinton River and two more communities will be affected by the remedial action plan for the Detroit River—both rivers are areas of concern just as the Rouge is. According to SEMCOG, the need for Rouge River communities to support other remedial action plans will affect their ability to generate revenue for cleaning up the Rouge River.

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