MANAGING THE COST OF CLEAN WATER: AN ASSESSMENT OF MICHIGAN'S SEWER INFRASTRUCTURE NEEDS

This study was conducted as a joint project by Public Sector Consultants, Inc.,
and Environmental Consulting and Technology, Inc.,
for CLEAN WATER MICHIGAN

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EXECUTIVE SUMMARY

Michigan has made substantial progress in controlling water pollution over the last 35 years. Beginning in the late 1960s, state and federal grants provided generous financial assistance to local agencies to construct sanitary sewers and treatment plants. Little thought was given at the time to the dollars needed to upgrade and replace these facilities as they reached the end of their useful life. Since 1988, state and federal assistance for capital improvements to wastewater systems, with some exceptions, has been limited to subsidized loans from the state revolving fund (SRF). Local capital investments in and operating costs for sanitary waste systems have increased steadily since 1970. The federal and state government share of these costs has continued to diminish since the early 1980s.

Many of the facilities constructed to correct the pollution problems evident in the 1960s are reaching the end of their serviceable life. Faced with limited financial resources, many communities are deferring the investments needed to maintain, rehabilitate and/or replace older wastewater infrastructure in order to afford the cost of correcting combined sewer overflow (CSO) and separate sanitary sewer overflow (SSO) problems. Deferred expenditure on existing infrastructure, however, increases the risk of major system failures. National studies predict an unprecedented demand for sewer infrastructure upgrading and replacement over the next 20 years. This study confirms that a majority of Michigan sanitary sewers and many waste treatment facilities, like those in the rest of the nation, will soon be more than 50 years old. Without a major investment, sewer maintenance costs will continue to rise, and frequent system failures are inevitable.

In the last decade statewide expenditures for CSO controls alone have been approximately $1 billion. An estimated $1.7 billion will be required to address remaining CSO problems over the next 12 years. New reporting and compliance initiatives at the state and federal level for SSOs in the state will substantially increase local costs. The full magnitude of the SSO problems in Michigan is unknown, but preliminary information indicates that several hundred million dollars will be needed to address known problems over the next decade. Federal storm water regulations will require most urban areas in Michigan to meet additional water pollution control requirements within the next three years, including identification and remediation of failing on-site disposal systems (septic tank/tile fields).

The burden for capital improvements to sanitary sewer infrastructure has fallen disproportionately on older urban areas in the state, which can least afford them. In many of these, the population and tax base are shrinking, and average household income is below the state average. For the residents who remain, the cost of pollution control is becoming unaffordable. In some communities, the costs of sanitary sewer service or special assessments for wastewater capital improvements are already so significant that residents are moving to the suburbs, where such costs are, at least for now, lower. Urban sprawl increases the need for sanitary sewer infrastructure and ultimately raises the cost per household for maintenance of systems that serve less dense populations in the suburbs. Many communities are also facing new costs associated with the new storm water regulations.

Phase II of the new federal storm water regulations will require most communities in urbanized areas of Michigan to obtain a storm water discharge permit by March of 2003. Under Michigan's unique watershed alternative, local agencies can use a cooperative approach to meet the federal requirements. Under the state watershed approach, local governments have more flexibility in establishing priorities and timetables for implementing storm water pollution control programs.

Adequately designed, sited, and maintained on-site disposal systems (OSDSs) can provide a safe and effective alternative for disposal of human waste. There is mounting evidence throughout Michigan, however, that many of the 1.2 million homes served by OSDSs are causing surface and groundwater contamination that threatens public health. A comprehensive program is needed to ensure proper design, siting, operation and maintenance of OSDSs, which are increasing at an annual rate of more than 10,000 new systems in Michigan. In places where sanitary sewers are impracticable, local health agencies are being pressed to permit alternative OSDSs, even though natural soil and water table conditions do not meet standards. Some of these alternative systems have failed within the first few years of operation. State standards for the design, siting, and maintenance of OSDSs must be upgraded to prevent future problems.

Without a renewed commitment at the national level and concurrent support at the state level to increase appropriations for wastewater infrastructure, Michigan and many other states will face a severe funding crisis within the next decade. Local governments simply cannot afford to meet the projected needs without more financial assistance and an improved, cooperative management of infrastructure costs.

The SRF loan program has been very successful, but the capitalization of this fund must be substantially increased in order to assist local governments with wastewater infrastructure projects. This report calls for at least a doubling of annual federal and state appropriations to capitalize the Michigan SRF over the next five years and a realistic assessment of SRF needs beyond 2005.

Without a secure funding source at the federal level, appropriations for wastewater infrastructure will become an annual battle in Congress, and the outcome will be uncertain, particularly in lean economic times. This report challenges Michigan to become the advocate for a national trust account to fund wastewater infrastructure projects, similar to that in place for transportation infrastructure.

Local governments are faced with the difficult task of funding both new water pollution control priorities and maintenance of existing wastewater infrastructure. Without cooperation among state, federal, and local agencies on the appropriate schedules, opportunities to maximize federal and state financial assistance for required capital improvements can be lost. This report recommends that Michigan adopt a new strategic approach to the management of wastewater infrastructure assets that will maximize the combination of funding sources to meet water pollution control objectives. It also recommends that the SRF funding criteria be altered to reflect priorities established through this new strategic management approach.

As this report points out, there are alternatives available that can help prevent future water pollution problems from the state's 1.2 million OSDSs. It is recommended that a comprehensive program for design, siting, operation, and maintenance of OSDSs be implemented in stages in Michigan. The first steps are a new education initiative targeted at OSDS households and a statewide requirement for inspection and certification of OSDSs at the time property is sold.

Finally, this report concludes that the local governments should not be subject to a strict liability standard for basements that flood with sewage from overloaded systems when steps are underway to correct the problems. Action is urged to limit liability to actual damages when local governmental units are in compliance with corrective action schedules mandated under state law. This change in the liability standard will allow local agencies that are working on solutions to SSO problems to invest local resources in correction, rather than in the payment of punitive damages.

INTRODUCTION

Background

As the only state entirely within the Great Lakes basin, Michigan has a key role in determining the quality of the world's largest body of freshwater. The Great Lakes and the state's bountiful inland lakes and streams are a major factor in the economic wellbeing and quality of life for Michigan residents. More than 4.5 million people depend upon these sources for their drinking water. In addition, fishing, swimming, boating, and related recreation activities are a crucial component of the state's $15 billion annual tourist industry.

Past investments by the people of Michigan in water pollution control have significantly improved the quality of both the Great Lakes and inland waters. Yet, major sources of water pollution remain in many areas of the state and continue to limit recreation uses, pose public health risks, and threaten future economic prosperity. Despite state and local efforts to collect and treat sewage and control major sources of industrial pollution over the last century, measurable progress did not occur until after adoption of the federal Clean Water Act in 1972.

The Clean Water Act established uniform water quality standards, provided federal assistance to local governments for construction of desperately needed wastewater treatment facilities and collection systems, and imposed a permit requirement for all commercial, industrial, and municipal wastewater discharges. Complementary Michigan laws passed in the 1970s supplemented federal funds with state dollars for local government water pollution control efforts and targeted pollution sources not covered by federal law.

By the 1980s, expanded regulation and the resulting enhanced treatment of municipal and industrial wastewater discharges (point source controls) had led to significant improvements in water quality in the Great Lakes, particularly Lake Erie and many of Michigan's inland lakes and streams. The permit requirements universally imposed on all wastewater discharges in the 1970s were effective. It soon became evident, however, that the mandate under the Clean Water Act to achieve "fishable and swimmable" conditions in all the waters of the United States could not be met without further efforts. Attention in the 1980s focused on the elimination of toxic and persistent chemicals through source controls (industrial pretreatment programs) and on the prevention of CSOs in older urban areas. In the 1990s, the scope was expanded to discharges from separate storm sewer systems (storm water regulations) in urban areas and to polluted, direct surface runoff from agricultural and urban landscapes (nonpoint source controls).

Under federal law, Michigan is required to generate and maintain a list of all bodies of water that do not meet water quality standards and develop Total Maximum Daily Load (TMDL) requirements for sources of pollution contributing to these violations. Twenty-eight of the TMDLs scheduled for development in Michigan address pollution concerns related to untreated or inadequately treated human sanitary waste. There is a growing statewide concern over untreated human waste affecting the recreational uses of the state waterways: This concern has been highlighted in recent summers, as local health officials have closed public beaches and issued health advisories for boaters, anglers, and swimmers in Lake St. Clair, a recreation resource serving hundreds of thousands of residents in southeast Michigan.

Purpose of the Study

This research assesses the financial obligations of local government for sanitary sewer infrastructure repairs and improvements. It also examines (1) the resources available for capital expenditures and (2) the legal and policy issues local governments must address if they are to meet existing and new mandates related to water pollution control.

In most cases, treatment of sanitary waste is the legal and financial responsibility of local government. State and federal grant programs designed to help finance capital improvements in local wastewater systems were largely eliminated in the mid-1980s. These grants were replaced with a revolving loan program that uses state and federal dollars to subsidize low-rate loans for local projects. This report suggests ways in which local governments, state and federal regulatory agencies, and elected officials can help achieve cost-effective, long-term protection and enhancement of the quality of Michigan's inland and Great Lakes waters.

Limitations of the Study

This assessment focuses on the public sanitary sewer infrastructure that discharges into municipal wastewater treatment facilities. The future cost of expansion or replacement of those treatment facilities was not evaluated in our surveys, but information from other studies related to that cost is included in the summary. The cost of compliance with the federal storm water regulations as estimated by the EPA is also included in the summary.

Information related to on-site sanitary waste disposal systems (septic tank/tile fields) was primarily obtained from 1990 Census information and verified by data from the Michigan Department of Environmental Quality (MDEQ). Data on past and projected expenditures for CSO controls were obtained directly from the communities involved and/or the State Revolving Loan Program managed by the MDEQ.

Unless otherwise noted, the assessment is drawn from surveys sent to Michigan Municipal League (MML) members or conducted by the Southeast Michigan Council of Governments (SEMCOG). Since not all MML surveys were returned, and since SEMCOG only surveyed within its area, the costs and other information compiled represent minimum statewide estimates. When projections are made for the entire state based upon the survey data, the report identifies the methods used to make these estimates.

POLLUTION SOURCES

Pollutants enter water from a variety of sources. The following discussion focuses on the major sources of pollution addressed by the Clean Water Act and on the requirements of this federal regulatory framework. Although particular attention is given to sources that are the direct responsibility of local government, all major sources are discussed in order to establish their relationships and their contributions to pollution problems.

Under Michigan law, local units are responsible for controlling any pollution caused by waste discharged into their publicly owned or operated sanitary and storm sewer conveyance/treatment systems. Industrial or commercial wastewater that is treated and directly discharged into waters without entering a publicly owned sewer system is not the responsibility of local government. Even nonpoint water pollution (direct runoff from the land and atmospheric deposition) becomes the legal responsibility of local units if it reaches a publicly owned drain or sewer system. Individually owned and operated on-site waste disposal systems can become the responsibility of local government if the failure of such systems results in unlawful discharges.

Industrial and Municipal Wastewater Treatment Facilities

The focus of state and federal regulatory effort in the 1970s was large point sources of pollution, that is, direct discharges from, usually, an industrial or municipal wastewater treatment facility. Since 1972, federal and state laws require that all point source discharges to surface water must have a National Pollutant Discharge Elimination System (NPDES) permit, which prescribes treatment based upon water quality standards. Michigan was one of the first states to obtain delegated authority under the Clean Water Act to issue federal NPDES permits. Large point sources represent the highest volume of wastewater discharges. NPDES treatment requirements have progressively increased since the early 1970s. While some significant problems remain at municipal owned facilities, the contribution of pollutants from large, industrial waste treatment systems has declined significantly over the past 30 years.

Combined Sewer Overflows

Unfortunately, industrial and sanitary waste discharged into a combined municipal sanitary and storm sewer system does not always reach the treatment facility. During heavy rains or substantial snowmelt, combined sewers may not have the capacity to transport the aggregate flows of sanitary wastewater and storm water. Many combined systems discharge untreated waste directly into a nearby waterway to avoid basement flooding when the sewer capacity is exceeded. These CSOs were the largest source of untreated waste entering Michigan waters in the 1980s. In 1989, the state reported that 70 communities were discharging up to 20 billion gallons of untreated sewage and industrial wastewater at nearly 600 locations each year. More than $1 billion has been expended over the last decade to remedy this situation, but many CSO problems remain.

Combined sewers are the result of historical development patterns in older cities. In the early 1800s, storm water was drained through creeks and riverlets that intersected crowded city streets. Eventually, as on-site sewage disposal became a larger problem, household waste was diverted to nearby creeks along with storm water. As more households connected to these early open sewers, local governments enclosed the system to transport the unhealthy and offensive sewage to discharge points. As communities grew, large pipes (interceptor sewers) were used to transport wastewater for discharge farther downstream. Eventually, these locations became the sites for treatment facilities.

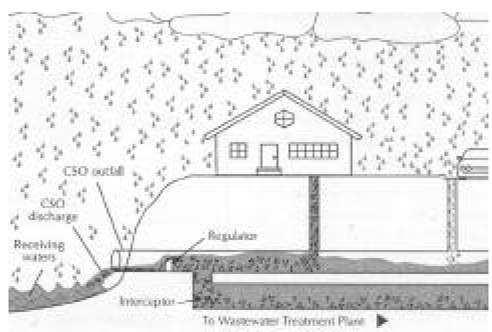
Cities continued to expand and the amount of sewage continued to grow, even though the system's ability to transport and treat remained constant. Wet weather caused sewage to back up into homes, which created health hazards and aesthetic problems. Two solutions were implemented in the early 1900s. One was the regulator, an invention that allowed discharge of waste to the nearest waterway when the sewer interceptor reached capacity. The other solution was the installation of separate sewers for sanitary waste and storm water, which solved many of the backup problems. Nevertheless, many communities chose to expand combined sewers, which were less expensive and required less space than separated systems.

A combined sewer allows limited control of overflows. At normal volumes, the wastewater enters an interceptor sewer, which leads to the treatment plant. During small rain/snowmelt events, the flow can be handled, but sometimes the interceptor is overwhelmed by the excessive storm water entering the system. A regulator holds the excess and acts as a dam until the water level within the pipe spills over, as shown in Exhibit 1. The overflow is discharged, untreated, into the nearest watercourse.

Discharges from CSOs significantly degrade water quality. In addition to sanitary and industrial waste, the CSO discharge contains contaminated storm water. Typical pollutants found in a CSO discharge include suspended solid sanitary waste, oxygen-consuming chemicals and organic waste, metals, phosphorus, ammonia, bacteria, oil, grease, soil sediments, and other waste and debris carried by storm water from streets, roofs, lawns, and parking lots.

EXHIBIT 1

Combined Sewer Overflows (CSOs)



SOURCE: "Demo Bulletin: Combined Sewer Overflows, No. 2," Rouge River National Wet Weather Demonstration Project, Nov. 1995.

The pollution from CSOs negatively affects the environment, human health, and aesthetics. During large wet weather events and in the weeks that follow, the solids in the overflow settle to the bottom of the river and consume oxygen as they decompose. Lower oxygen levels and the degraded water quality are harmful to fish, aquatic organisms, and wildlife. High bacteria levels from human waste contained in CSOs create human health risks. Odors and debris degrade the aesthetic quality of the receiving water.

Sanitary Sewer Overflows

Separate sanitary systems for transporting sewage to treatment plants have been legally required in Michigan since the mid-1960s. Theoretically, if the sewer is designed properly, any sewage that enters the system is transported directly to treatment with no opportunity to reenter the environment. Overloads occur, however, due to growth in excess of the original design capacity, unanticipated large volumes of storm water, and/or groundwater that infiltrates the system during wet weather. In some cases, SSOs may occur because of poor design, construction techniques, or the materials employed.

Overloaded sewers can result in the backup of sanitary waste into homes and businesses unless the excess is discharged directly into a nearby watercourse. SSOs are a major concern in large geographic areas served by a single wastewater treatment plant. A complex network of interceptors, pump stations, and equalization basins has been built in some jurisdictions to prevent or minimize overflows. Many others have yet to address the problem.

Excessive volumes within a separate sanitary sewer system can be caused by infiltration of groundwater into an aging system or when storm water enters through improper direct connections with storm sewers (cross-connections) and/or poorly maintained manholes. Peak (and sometimes excessive) demands on the system become more frequent as a community grows. Businesses also may contribute to higher volumes through large releases of industrial wastewater.

To avoid backups, many communities either pump out the excess during wet weather (discharging untreated sewage directly into rivers) or install regulators similar to those used for CSOs. SSOs contribute the same broad spectrum of pollutants found in CSO discharges, although they are usually less frequent and voluminous.

Unlike CSOs, SSOs cannot be authorized by permit under state and federal law, but they occur with some regularity in a number of Michigan communities. Recent lawsuits by homeowners to collect actual and punitive damages from local governments because of basements flooded with sanitary waste have created a difficult situation for local governments, which will be discussed in detail later in this report.

Urban Storm Water

After considerable debate and a federal court consent judgment, the EPA agreed to establish a phased approach for regulating point source discharges from separated storm water systems in urban areas. In Michigan and elsewhere, intensive studies have revealed that urban storm water is a significant contributor of pollutants that violate water quality standards.[1] Oil, grease, sediments from soil erosion, heavy metals, toxic chemicals from air deposition, waste paper and plastic, fertilizers and other lawn chemicals, organic plant debris, and bacteria from animal waste are common contaminants in storm water. In some cases, illicit connections (inadvertent or illegal connections that transport sanitary, commercial, or industrial waste into storm sewers) allow untreated waste to be discharged directly into waterways.

On-Site Sewage Disposal Systems

On-site sewage disposal systems typically use septic tanks and drain fields to treat and dispose of sewage, as shown in Exhibit 2. Waste material from the house enters the septic tank, where

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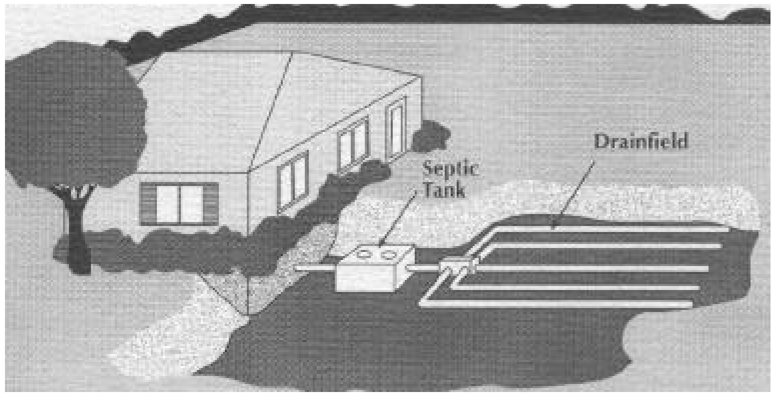
[1]EPA, *National Urban Runoff Program (NURP)*, 1983.

EXHIBIT 2

On-Site Sewage Disposal (OSDS)



SOURCE: "DemoInfo: Septic Systems," Rouge River National Wet Weather Demonstration Project.

heavier solids settle to the bottom and form a sludge layer, and lighter wastes, such as oil and grease, rise to the top and form a scum layer. Between these two is liquid wastewater. Perforated pipes allow the liquid to be equally distributed in a gravel-filled drain field. OSDSs are designed for rural or large lot settings, where a sanitary sewer is not available.

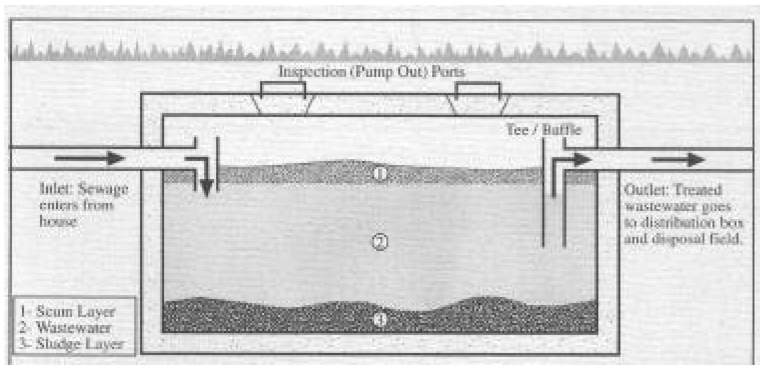
During the rapid housing growth in Michigan and throughout the country following World War II, the demand for sanitary sewers often could not be met by local jurisdictions. OSDSs were built to serve many of the homes constructed in the late 1940s and 1950s as an interim measure until municipal sanitary sewer service could be provided. A number of these are still in use, and the failure rate for septic systems more than 30 years old is very high. Furthermore, the relatively recent housing boom in certain high-growth counties in Michigan is creating new demand for OSDSs where public sewers are not available.

When an OSDS is correctly located, adequately designed, carefully installed, and properly managed, it can be a simple, economical, effective, safe, and environmentally acceptable waste disposal system. In a typical OSDS, illustrated in Exhibit 3, the septic tank is made of reinforced concrete, is buried, and is watertight. The waste is biologically, chemically, and physically decomposed by the action of bacteria that thrive in the low-oxygen (anaerobic) conditions. The central liquid layer flows through a pipe into the drainage field, where a series of perforated pipes distribute it into the surrounding soil. The soil acts as a final filter, and the waste is further degraded by oxygen-consuming (aerobic) bacteria.

The decomposition that occurs in the septic tank reduces solids but leaves a residue. As time passes, this accumulates and must be pumped out every two or three years, or it will enter the drain field and clog the system. Excessive water in the drain field can affect performance. If the soil is saturated, the oxygen needed by the aerobic bacteria that complete the decomposition is not available, and the system will fail.

EXHIBIT 3

Septic Tank



SOURCE: "DemoInfo: Septic Systems," Rouge River National Wet Weather Demonstration Project.

Even the best designed and installed system will not last forever. Although proper maintenance can extend its life, such modern conveniences as washing machines, garbage disposals, and automatic dishwashers tax the system. OSDS failures can cause serious problems. When inadequately treated sewage backs up into buildings or on the surface of the drain field, animals and people may become sick upon contact. The pollution can also enter surface water and drinking water sources. In many locations in Michigan, homes served by OSDSs depend upon groundwater wells for potable water, and bacteria, viruses, and nitrate contamination from a failing OSDS can be a significant health threat. The problems many communities face because of OSDSs are discussed in detail later.

Nonpoint Pollution Sources

Under the Clean Water Act, discharges from wastewater treatment facilities, CSOs, storm sewers, and other direct discharges to surface waters (usually by means of a pipe) are regulated as point sources. All others are collectively identified as nonpoint pollution sources, including runoff from farm fields, roadways, and residential/commercial areas not served by storm sewers as well as the deposition of air pollutants, such as mercury and polychlorinated biphenyls (PCBs), onto the land and directly into surface waters. In agricultural areas, fertilizers, pesticides, and animal waste can be significant sources of nonpoint pollution. In urban areas without public storm water sewers or storm drains, runoff that eventually reaches a watercourse contains the same type of pollutants found in enclosed storm drains. Construction activity and related soil erosion near a body of water also can be a nonpoint source of pollution.

SURVEY METHODS AND DATA SOURCES

As a partner in this project, in October 1999 the MML surveyed member cities and villages outside the seven-county area in southeastern Michigan, as shown in Exhibit 4. The questionnaire was developed and reviewed with the assistance of the Stakeholder Technical Advisory Committee, which was formed as part of this assessment. The survey instrument (see Appendix) asked for information on the age and status of sewer infrastructure, maintenance costs, recent and projected expenditures to control CSOs, and the number of residences still served by OSDSs. The survey was distributed to 380 members, and 149 completed questionnaires were initially returned. Follow-up contacts raised the total number returned to 175, which represents approximately 70 percent of the population in the survey area. Many smaller communities do not provide sanitary sewer service, and residents either maintain their own OSDSs or purchase sewer service from a municipal system nearby.

EXHIBIT 4

SEMCOG and MML Survey Area

SOURCE: Public Sector Consultants, Inc.

The MML questionnaire was modeled after a similar but more detailed infrastructure survey prepared and sent by SEMCOG in summer 1999 to selected counties, cities, townships, and villages in its service area (Wayne, Oakland, Macomb, Monroe, St. Clair, Washtenaw, and Livingston counties). Of the 164 SEMCOG questionnaires distributed, 82 were returned.

The results of both surveys were used to assess the cost associated with maintenance and improvement of the sanitary sewer infrastructure. The operation, maintenance, and capital costs associated with wastewater treatment facilities were not within the scope of either survey. Information about past and future local investments in municipal wastewater treatment plants was drawn from other studies and is cited in the summary section of this report.

The MDEQ provided additional data for this assessment. The Environmental Assistance Division supplied information on the loan commitments made under the SRF for sewer infrastructure. The Surface Water Quality Division provided information on the status of CSO compliance regulated by NPDES permits. The Drinking Water and Radiological Protection Division shared summaries of annual reports from health agencies on the number of existing and new OSDSs permitted at the local level.

Other sources included U.S. Census data from 1990, which were used to estimate the number of households served by sanitary sewers versus OSDSs. The Wayne County Rouge River National Wet Weather Demonstration Project reports provided detailed information on CSO costs for communities within the Rouge River watershed. Local governments, regional authorities, and county agencies supplemented the data obtained from the two surveys. Finally, specific documents are cited throughout this report as sources of information.

AN UPDATE ON COMBINED SEWER OVERFLOWS

The statewide assessment entitled "Michigan's Sewer Crisis: The Problem and Solution," prepared for the Clean Water Michigan coalition by Public Sector Consultants, Inc. in 1989, reported that CSOs in more than 70 communities annually discharged up to 20 billion gallons of untreated wastewater into Michigan's waterways. At that time the state reported discharges at nearly 600 locations. The 1989 study estimated that it would cost between $3 billion and $5 billion to construct separated sewers to correct the problem. The report noted the severe financial constraints facing many communities with CSO problems and urged an expanded state and federal capitalization of the SRF loan program. Although most smaller and mid-sized communities have constructed separate sanitary and storm sewers to deal with CSOs, many larger communities have used a combination of sewer separation and storage/treatment basins or tunnels (in-line storage).

CSO Expenditures and Projected Costs

Based on survey information, statewide capital expenditures for CSO controls in Michigan in the last ten years were approximately $1 billion in 63 communities. In a few areas, sewer separation and retention basin construction to control CSOs were completed before 1989. No information was obtained from seven smaller communities that are known to have finished or planned sewer separation projects during the last decade.

Nearly $1 billion has been expended by local government in the last decade to address CSOs; an additional $1.7 billion is needed.

The estimated capital costs for remediating remaining CSO problems is approximately $1.7 billion. When that is combined with the money already spent, the total cost for CSO controls through 2012 will exceed $2.7 billion. The 1989 PSC study gave a somewhat higher minimum figure, which was based on separating storm and sanitary sewers in all areas where CSOs occurred. Instead, retention basins have been constructed or are planned by some communities as a less expensive alternative.

The estimate does not include new expenditures for annual operation and maintenance of CSO retention and treatment facilities. Over the next ten years, these are projected to be 10 percent of the capital cost of such facilities. Exhibit 5 shows the location of communities with CSOs, reported expenditures by region, and remaining capital costs.

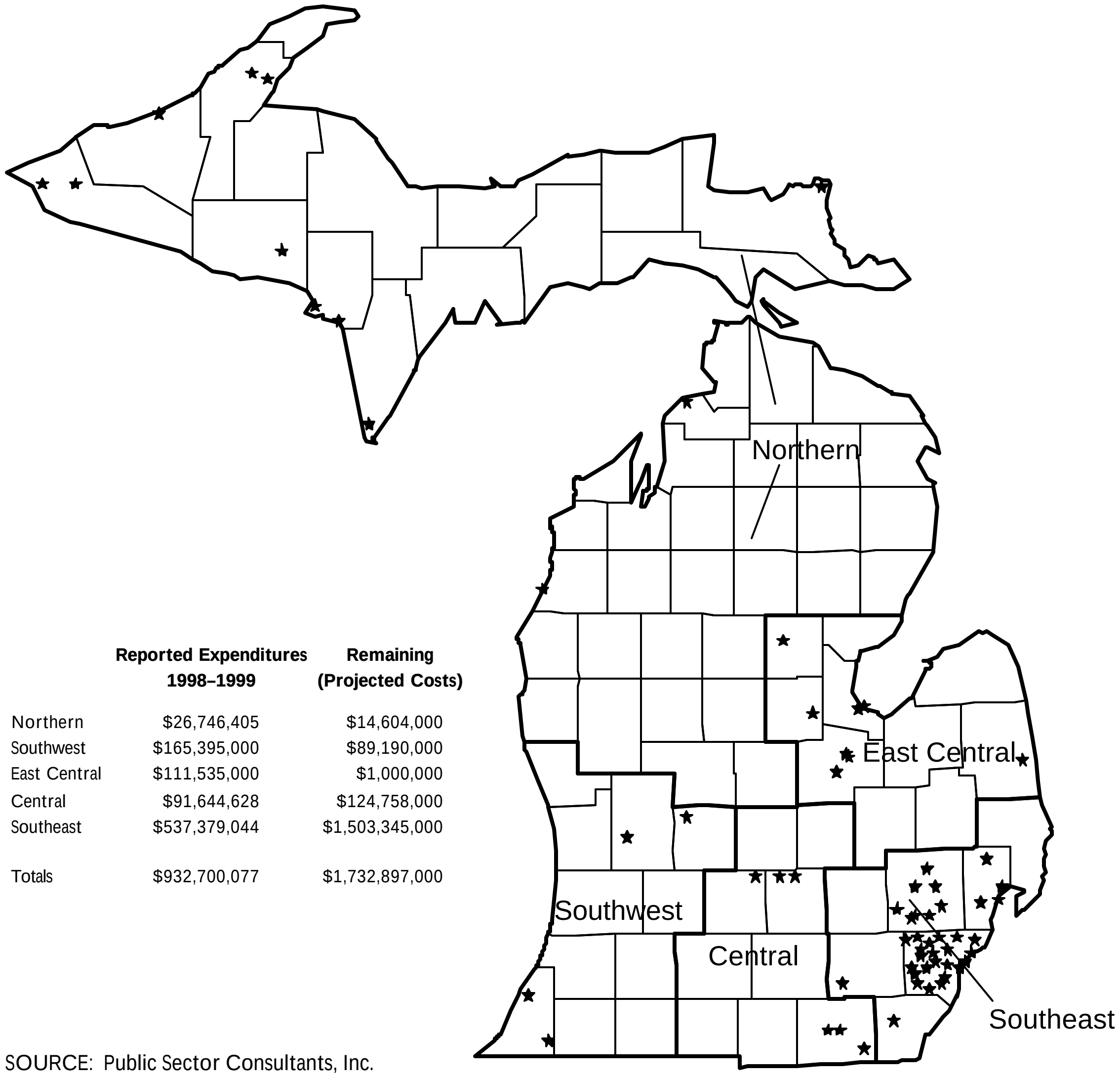
State Revolving Fund Loan Program

Michigan's environmental bond program was approved by the voters in 1988 and provides state funds to match the federal appropriation. Since 1988, the SRF has made binding commitments to local authorities for about $1 billion in low-interest loans with a 20-year amortization. Approximately half the loan funding ($491,795,082) has been for CSO projects.[2] The availability of SRF money for future sewer infrastructure improvements will be discussed later.

[2] Municipal Facilities Section, Environmental Assistance Division, MEDQ, *State Revolving Fund Category Cost*, 2000.

EXHIBIT 5

Location of CSO Communities and Expenditures
(Reported Expenditures and Projected Costs)



	Reported Expenditures 1998–1999	Remaining (Projected Costs)
Northern	$26,746,405	$14,604,000
Southwest	$165,395,000	$89,190,000
East Central	$111,535,000	$1,000,000
Central	$91,644,628	$124,758,000
Southeast	$537,379,044	$1,503,345,000
Totals	$932,700,077	$1,732,897,000

SOURCE: Public Sector Consultants, Inc.

Remaining CSOs

According to the MDEQ's, Surface Water Quality Division, 30 CSO discharge authorizations originally issued in 1990 have been terminated due to completion of long-term control programs and/or the elimination of the discharge.[3] The majority of terminated permits were related to the construction of separated sewers. The 1998 status report also indicates that 75 CSO authorizations remain, several for multiple discharge points.

[3]Surface Water Quality Division, MDEQ, *Status Report of the Combined Sewer Overflow Control Program*, January 1998.

Of the 45 communities currently implementing an approved program, 26 have chosen to separate sewers. The other 19 are constructing either retention/treatment facilities, in-line storage for wastewater before transport to treatment, or a combination of these.

CSO permits for communities within the Rouge River watershed in southeastern Michigan, which is served by the Detroit wastewater treatment facility, have a unique status. Remediation efforts are covered in a state administrative consent agreement overseen by the U.S. District Court. The communities have received matching federal grants to help address CSO problems as part of the EPA-funded Rouge River National Wet Weather Demonstration Project (Rouge Project). Several local units have completed sewer separation or have constructed retention basins under the first phase of the consent agreement, but only about one-third of the CSO discharges to the Rouge River have been addressed to date. The project focuses on retention basin design construction, and evaluation to determine the effectiveness of remediation alternatives. The state will use the outcomes of the project to establish design criteria for addressing remaining CSO problems.

SANITARY SEWER OVERFLOWS

Source of the Problem

Separated systems are generally designed to handle expected sanitary waste flows generated from residences and businesses during peak usage. When heavy downpours or snowmelt enter the system, hydraulic overload can result in the backup of sewage into basements and/or overflows of untreated wastewater into nearby watercourses. This occurs because many sanitary sewers are “wet systems” that incorporate a direct connection to basement wall footing drains and in some cases to roof downspouts as well. In poorly designed or maintained systems groundwater can enter into sanitary sewers. Broken pipes, inadvertent storm sewer connections, and failing pump stations can also cause SSOs. SSOs can occur even in dry weather if the system has undersized sanitary sewers.

Sorting out the cause of SSOs, let alone the remedy, can be a difficult and expensive task. Many problems surfaced when communities began to address CSOs. Once sanitary sewers are separated or combined sewer retention basins are constructed, any direct discharge points are eliminated, and hydraulic capacity problems then may become evident.

Local Government’s Dilemma

When citizens complain about a basement flooded with sewage, local authorities may provide immediate relief by pumping the system and temporarily discharging untreated sanitary waste into a nearby watercourse. This is illegal under state and federal law and exposes the local agency to substantial fines and penalties for each day the discharge occurs. But the agency also may face financial consequences if property owners sue.

One circuit court held a local government to a strict liability standard and awarded actual plus punitive damages. Several communities joined in an appeal, but in May 2000 the Michigan Supreme Court declined to review the decision. Local governments are understandably alarmed: They face state fines and penalties if they illegally discharge to prevent backups or court-awarded damages if they do not. They are seeking state legislation to limit their liability while they take steps to address capacity problems.

Scope of the Problem

Many communities are under corrective orders from the MDEQ or are subject to state NPDES permit requirements to remediate SSOs. In May 1999, the MDEQ reported to the U.S. District Court that is overseeing the actions to address water pollution in the Rouge River. The report documented the status of 42 known SSO problems in the watershed involving 12 communities as well as two large interceptor sewers operated by county agencies on behalf of several local units. At some of the sites, corrective programs are underway or complete, such as elimination of cross-connections to storm sewers. A significant number of sites are still being investigated, however, and the cost of remediation throughout the watershed has not been deter-

> New state and federal enforcement policies on SSOs and lawsuits over flooded basements are creating unanticipated costs for many communities.

mined. A preliminary estimate to correct SSO discharges for the Evergreen/Farmington collection area in Oakland County is approximately $182 million.

Similar problems exist in urbanized areas throughout the state. In 1999, the MDEQ notified all public sanitary sewer systems within the Rouge River watershed that they must report all SSOs. Legislation passed in June 2000 (Senate Bill 1201) requires all municipalities in Michigan to report such discharges to the state, local health agencies, and daily newspapers, as they are now required to report CSOs. Companion legislation (Senate Bill 1216) requires the MDEQ to maintain a list of the SSO discharges on its Web site and publish an annual report identifying the agency responsible, the corrective action scheduled, and other information.

The total number of SSOs in the state is unknown. The MML survey revealed that at least 25 percent of the respondents have sewer capacity problems that can result in SSOs. That information and data from the Rouge Project suggest that several hundred SSOs exist statewide. In some cases, the cost of correction is relatively small (replacement of a failed pump), but hydraulic limitations inherent to an entire system may be prohibitively expensive to remedy.

On the national level, the EPA reports that a majority of the nearly 20,000 separated systems operated by municipalities have SSO discharges with varying degrees of frequency.[4] In response to concerns about the EPA policy on SSOs expressed in U.S. District Court before Judge John Feikens in July 1999, the MDEQ sent a letter to congressmen John D. Dingell and Joseph Knollenberg. The letter acknowledged that during heavy storms even well designed sanitary systems can be overloaded, and sewage backup into basements can occur unless SSOs are allowed. The MDEQ suggested there may be a need for state and federal regulations to permit very infrequent SSOs under extreme conditions.

Both the EPA and the MDEQ are evaluating current policies to determine what conditions should guide the enforcement of penalties for illegal SSO discharges. Under proposed EPA rules, planned for adoption in 2000, the agency is expected to set capacity, management, operation, and maintenance (CMOM) standards. The regulations are not expected to authorize SSOs even in extremely wet weather, but they are likely to provide an affirmative defense for local agencies that can demonstrate they have met the CMOM standards.

Whatever the outcome of the enforcement debate, many localities in Michigan face substantial costs to reduce SSOs. In the MDEQ's 1994 Rouge River Remedial Action Plan Update, it was reported that communities in the watershed have spent more than $500 million on the problem already, and at least $300 million more will be needed by the communities within the Rouge River watershed alone.

[4]Office of Wastewater Management, EPA, *Sanitary Sewer Overflow (SSO) Cost/Benefit Analysis*, 1997.

SANITARY SEWER MAINTENANCE AND EXPANSION

In addition to the expense of treating waste, the repair and replacement of combined or separated systems represent a substantial ongoing cost. Routine inspections and maintenance reduce the potential for major failures. Sanitary sewers are constructed to last for decades before significant rehabilitation is required, but as systems age, maintenance and repair costs increase significantly.

> Within 20 years, a majority of the sanitary sewer infrastructure in Michigan will be more than 50 years old, and many communities are not prepared for the increased cost of maintenance, repair, and replacement of these systems.

Aging Infrastructure and Population Shifts

Sanitary sewers in some Michigan communities are more than 75 years old. Maintenance can become so expensive that the replacement of failing sections is more economical. Many of these older communities also have incurred the cost of correcting CSOs.

Most older urban areas in Michigan have experienced significant population decline over the last few decades. In Detroit, the combined sewer system within the city limits once served more than 1.8 million people compared to approximately 1 million today. A large portion of the population lost shifted to nearby suburbs, which send sanitary waste to Detroit's treatment plant through large, regional interceptor sewers. The reduction in the tax base has been less dramatic in most Michigan cities, but in virtually all, the cost per household to maintain sewer infrastructure has risen considerably.

In general, the cost per household is a function of the age of the sewer system and the density of the population served. Most of the urbanization in Michigan after the early 1950s was less dense than in the first half of the century. The maintenance cost for these relatively new systems is still low due to their age and the use of improved construction methods and materials, but the future costs per household will be high because of low population density.

Maintenance Cost

The 1999 MML and SEMCOG surveys asked for information on the miles and age of sanitary sewers as well as the overall cost of maintaining the system. That cost was divided by total miles to obtain the average annual cost, which was $7,699/mile in the MML survey and ranged in the SEMCOG survey between a low of $6,298/mile and a high of $9,310/mile. The annual maintenance expense varied widely among communities due to differences in size and age of the sanitary sewer system. A comparative analysis of the MML survey indicated that if a majority of the system was constructed before 1950, the maintenance cost per mile was nearly three times that for systems largely constructed after 1970.

Age is a major factor, but other variables are also important. Construction materials and design standards adopted over the last 30 years have substantially increased the expected life of sanitary sewers and reduced maintenance cost. New pretreatment requirements reduce the likelihood that highly corrosive industrial waste will cause pipe deterioration. Nevertheless, maintenance, repair, and replacement are expensive. Some communities build these costs into annual operations, and others use their bonding authority to generate the funds needed to replace or upgrade sanitary sewers.

Cost of Major Repair and Replacement

Based upon the MML survey, a minimum of $150 million in capital expenditures are planned for the next 20 years to replace, rehabilitate, and upgrade sanitary sewers. The SEMCOG data add $538 million for similar work in the 82 communities responding to that survey. Therefore, the statewide projected total over the next two decades is at least $688 million. As discussed later, this estimate is probably far lower than what is needed. In the MML survey, 24 percent of the communities responding to this question (37 out of 151) indicated that their sanitary sewer system was inadequate to handle projected flows in 2010.

Extension of Sanitary Sewer Systems

The southeastern Michigan survey specifically asked about expansion of the sanitary sewerage infrastructure. Based upon projections developed by SEMCOG, expansions in the seven-county area will cost an estimated $187 million over the next 20 years for large interceptor sewers alone. A major portion of the capital cost to provide smaller lateral sewer lines to new housing developments is usually paid by the developer. The MML survey only asked about service expansion within the next 20 years to households currently using OSDSs, and nearly 80 percent of the responding communities indicated that some of these residences eventually will be connected to sanitary sewers. No survey information was obtained to allow projections for townships outside the SEMCOG area, although most of the statewide expansion of sanitary sewers is expected to occur at that governmental level.

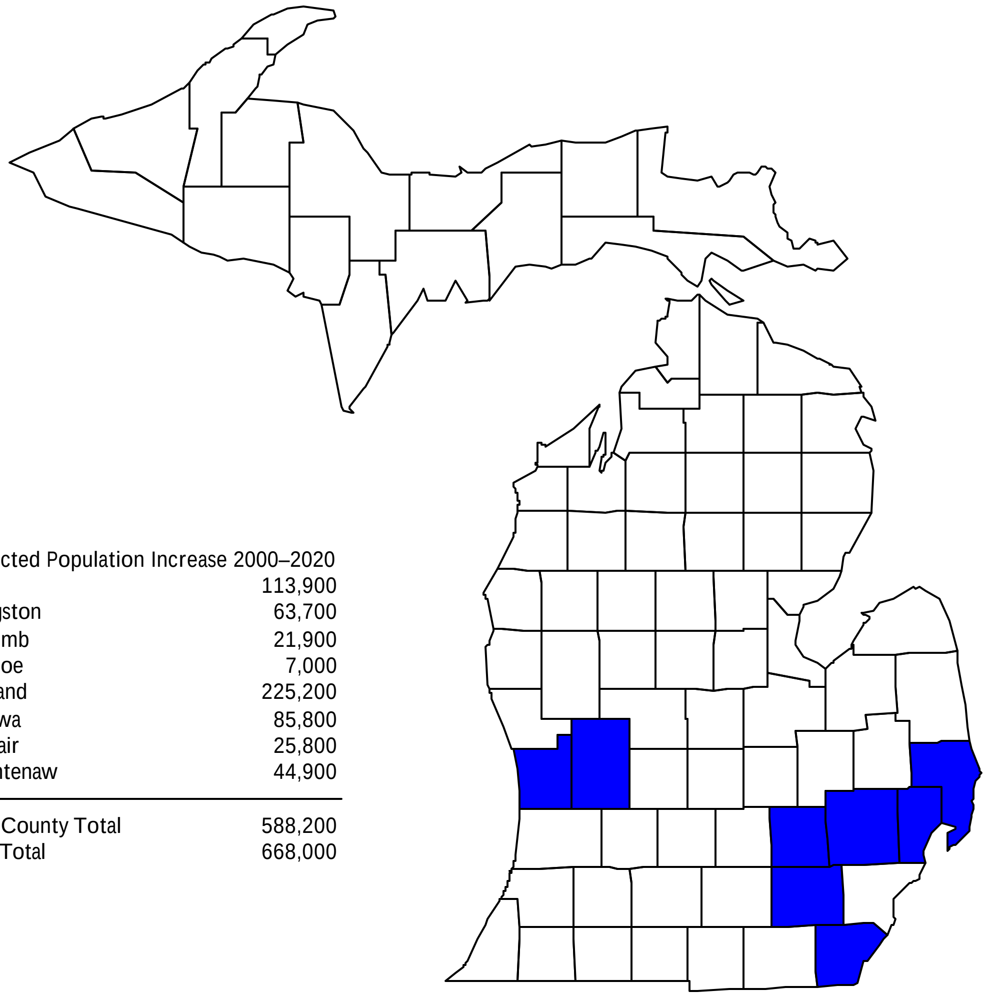
A majority of Michiganians now reside in townships, and population growth is expected to occur largely in those local units rather than in cities and villages. The largest increase between 1990 and 2020 is anticipated in Oakland, Kent, Ottawa, Livingston, and Washtenaw counties, which are likely to account for 75 percent of the state gain (668,000) during this period.[5] Three of these five counties are within the SEMCOG survey area, and their cost of expanded sewer service is included in the estimate cited above for southeastern Michigan. All seven SEMCOG counties are expected to gain population over the next two decades with the exception of Wayne. According to state estimates, the SEMCOG region plus Ottawa and Kent counties will account for approximately 88 percent of projected population growth in Michigan between 2000 and 2020, as shown in Exhibit 6. Sewer expansion and attendant costs will be concentrated in those areas.

> A majority of Michigan citizens now reside in townships, and most expanded sewer service will occur in these areas.

[5]Preliminary population projections of the Michigan Department of Management and Budget, as reported in Michigan Society of Planning Officials, *Michigan's Trend Future Project Report*, 1998.

EXHIBIT 6

The Eight Michigan Counties Representing 88 Percent of the Projected State Population Growth, 2000–2020



Projected Population Increase 2000–2020	
Kent	113,900
Livingston	63,700
Macomb	21,900
Monroe	7,000
Oakland	225,200
Ottawa	85,800
St. Clair	25,800
Washtenaw	44,900
Eight County Total	588,200
State Total	668,000

SOURCE: Office of State Demographer, Michigan Department of Management and Budget, January 1996.

ON-SITE SANITARY DISPOSAL SYSTEMS

A conservative estimate is that more than 1.2 million households (approximately 3.7 million people) in Michigan are now served by OSDSs. That is roughly 29 percent of all households in the state, based upon Census data and estimated growth since 1990. Most OSDSs are located in townships, where the majority of new development is occurring, or in small rural communities. These systems increased at a rate of more than 10,000 each year between 1980 and 1990 according to Census data for Michigan. Local health agencies in the state that responded to a national survey issued more than 22,000 OSDS permits in 1993.[6] The MDEQ reports that nearly 40,000 OSDS residential and commercial permits were issued in 1997. There is increasing demand for OSDSs in new subdivisions planned for rural areas, where local governments are reluctant to extend sewer service for fear of the further growth that it will bring.

In southeastern Michigan alone, county health agencies estimate that more than 200,000 homes are served by septic systems and that more than 20 percent of these are leaking inadequately treated waste into surface streams or groundwater.[7] Failure can occur long before sewer backups force a homeowner to correct the problem. Communities that fall under the new federal storm water regulations will be required to address this issue systematically. In some urban areas in Michigan, particularly those developed more than 25 years ago, failing septic systems are a significant source of pollution of both ground and surface waters.

The Groundwater Education in Michigan (GEM) program was initiated by the W.K. Kellogg Foundation in 1988, and numerous local projects have demonstrated the potential for contamination when OSDSs are improperly installed or inadequately maintained. According to research funded through GEM at MSU's Institute for Water Research, 530 million gallons of groundwater are withdrawn in Michigan each day. Nearly 70 percent is used for domestic purposes, and 30 percent is withdrawn through individual wells for drinking water. Bacteria, viruses, and other disease-causing microorganisms found in improperly treated human waste can move through the soil and contaminate water sources tapped by domestic wells.

A GEM project at Grand Valley State University's Institute for Water Research revealed that the volume of daily septic system discharges to the groundwater in Kent County is over one-third of the daily discharge released from the wastewater treatment plant for the entire City of Grand Rapids. The county's daily septic discharge alone equals the daily total wastewater treatment plant discharge from the City of Wyoming, the second largest city in the county, and far exceeds other local municipality discharges.[8] Although failing systems pose the greatest risk in densely populated areas, another GEM project in rural Chippewa County determined that the water-borne illnesses afflicting Drummond Island residents in the mid-1990s were due to bacteriological contamination of groundwater from failing OSDSs. The study led to performance-based revisions of the local health code to allow for the installation of OSDSs better suited to protecting public health in isolated lakeshore developments.

[6]National Small Flows Clearinghouse, *Summary of Onsite Systems in the United States*, 1993, 1994.

[7]"Septic tanks secretly leaking—River pollution tied to faulty systems," *Detroit Free Press*, June 7, 1999.

[8]Grand Valley State University's Institute for Water Research (with assistance from Prein & Newhof and Langsworthy LaBlanc, Inc.), slide show presentation, "Protecting our Rural Ground Water Resources," December 1997.

National statistics compiled by the EPA indicate that 25 percent of the roughly 109 million households in the United States use OSDSs.[9] The EPA estimates that approximately 37 percent of new developments in the country rely upon decentralized sewage treatment systems (i.e., small treatment plants serving a minor portion of a total community and individual/multiple family OSDSs). According to the EPA, the U.S. Bureau of the Census conservatively estimates that 2.5 million of the OSDSs in the nation malfunctioned in 1995.[10] This estimated national failure rate for OSDSs is an order of magnitude lower than the recent findings of Wayne and Washtenaw counties. Time of sale inspections in these two counties indicate that the rate of problems with OSDSs approaches 20 percent.

Regulation of OSDSs

Under Michigan law, the discharge of sanitary waste from any source into the waters of the state, including groundwater, requires a permit. OSDS discharges are regulated by state water pollution control laws. Under MDEQ rules, local county, city, or district health departments are authorized to approve subsurface (in-ground) sewage disposal for discharges of less than 1,000 gallons/day. In general, this means that OSDSs designed to serve up to two residences require only local approval, not a state permit. Local departments also can approve discharges of up to 10,000 gallons/day provided these meet the Michigan Criteria for Subsurface Sewage Disposal, last revised in 1994 by the Michigan Department of Public Health and currently under review by the MDEQ, which now oversees this program.

Under state law the ultimate responsibility for addressing failed septic systems falls to local government (city, village, or township). If it is determined that untreated human waste is entering surface water or groundwater, the state requires the local unit to provide sanitary sewers or take other steps to stop the unlawful discharges.

Problems with OSDSs

If designed and installed properly in appropriate soils, and if sited an adequate distance from domestic wells, groundwater, and surface water, a properly operated/maintained OSDS can provide cost-effective and environmentally safe waste disposal for up to 30 years. If any one of these essential factors is ignored, however, the system can release contaminants harmful to public health and the environment. The criteria for the design and construction of OSDSs have improved over time, but the current standards do not address some of the major causes of OSDS failure.

> Septic system failures have occurred throughout the state. A comprehensive approach is needed to address concerns and prevent future problems.

First, state law does not require that OSDSs be maintained. In 1984, Ottawa County was the first jurisdiction in Michigan to adopt an ordinance that requires on-site inspection of OSDSs at the time of property transfer. As shown in Exhibit 7, at least five counties now have such a requirement: Benzie, Grand Traverse, Ottawa, Washtenaw, and Wayne.

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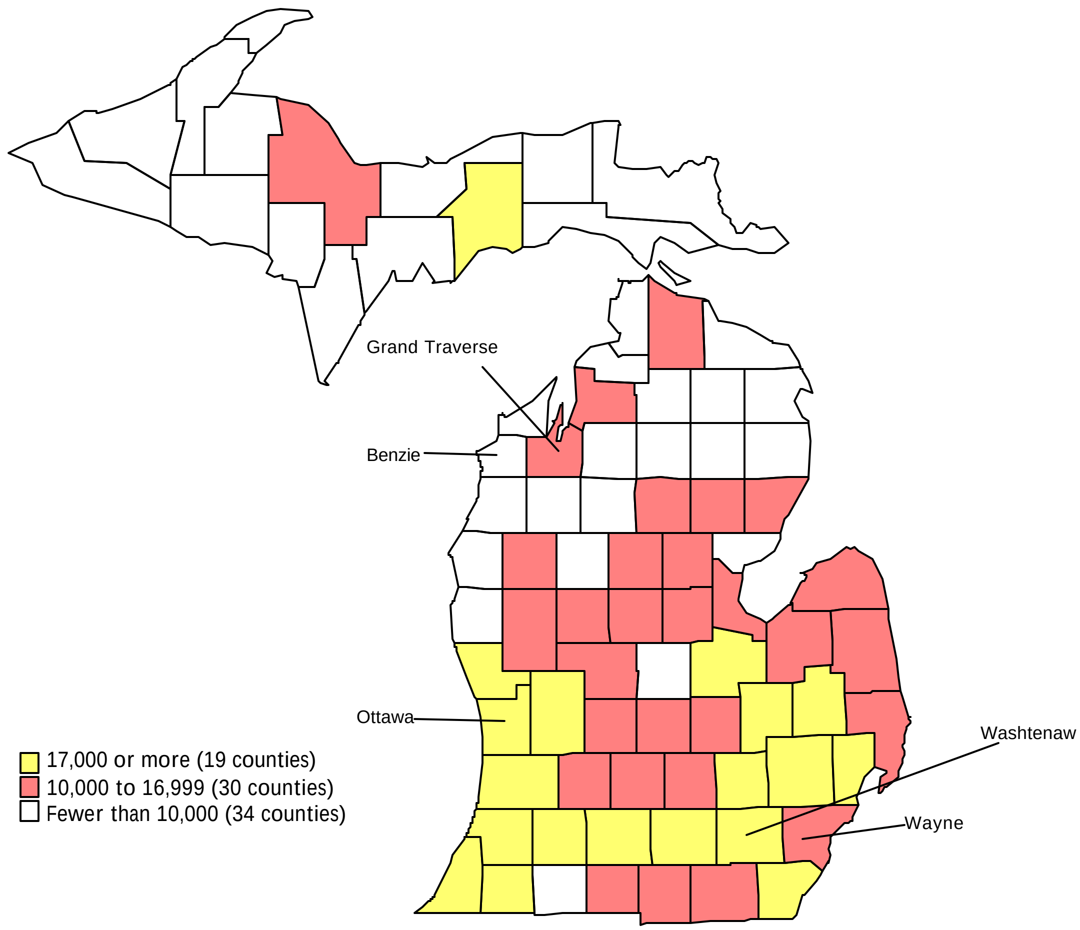
[9]Environmental Protection Agency, *Draft Voluntary National Standards for Management of Onsite/Decentralized Wastewater Systems*, October 1999.
[10]Environmental Protection Agency, *Funding of Decentralized Wastewater Systems Using the Clean Water State Revolving Fund*, 832-F-99-001, June 1999.

EXHIBIT 7

Number and Distribution of OSDSs in Michigan
(The Five Counties with Inspection Requirements Are Identified)



SOURCE: U.S. Bureau of the Census, 1990.

Where natural conditions (i.e., inadequate soil permeability or close proximity to groundwater) are not suitable for the construction of a conventional septic drain field, regulations may allow for the design and construction of alternative systems. Where soil conditions are a problem, an increasing array of technical alternatives, including elevated mounds, sand filters, aerobic treatment units, etc., are being approved to overcome these limitations. As development has increased in some areas, local health agencies are under increasing pressure from developers to authorize alternative OSDSs when natural conditions do not support conventionally designed systems.

Recent information indicates that these alternatives, particularly those involving pre-treatment and those discharging to minimally permeable soils, have an extremely high rate of failure when adequate attention is not paid to proper siting, construction, operation and maintenance. Despite mounting evidence of problems with current requirements and widespread support for higher standards among local health agencies, efforts to strengthen state standards for alternative sites have met with strong resistance from those interested in developing properties not served by sanitary sewers.

Third, many homeowners do not understand the limitations of the system and the maintenance requirements. Large volumes of waste and water from garbage disposals, automatic dishwashers, and washing machines shorten the expected life of an OSDS. Although long-term rural residents usually are very knowledgeable about these issues, newer residents from urban backgrounds are accustomed to disposing of all sorts of household waste into the sewer system. Flushing certain chemicals into an OSDS can cause immediate failure by destroying the bacteria that digest the waste. Even cleaning a few paintbrushes with an organic solvent that then enters the home sewer can significantly degrade the effectiveness of an OSDS.

Finally, in some rapidly growing areas of the state the disposal of the solids and liquids (septage) pumped from septic tanks as part of routine maintenance is a problem. Less agricultural land is available in such areas for approved on-ground disposal, and as nearby municipalities restrict the locations at which septage can be unloaded into their sanitary sewer system, illegal dumping has increased, which creates potentially serious public health and environmental hazards.

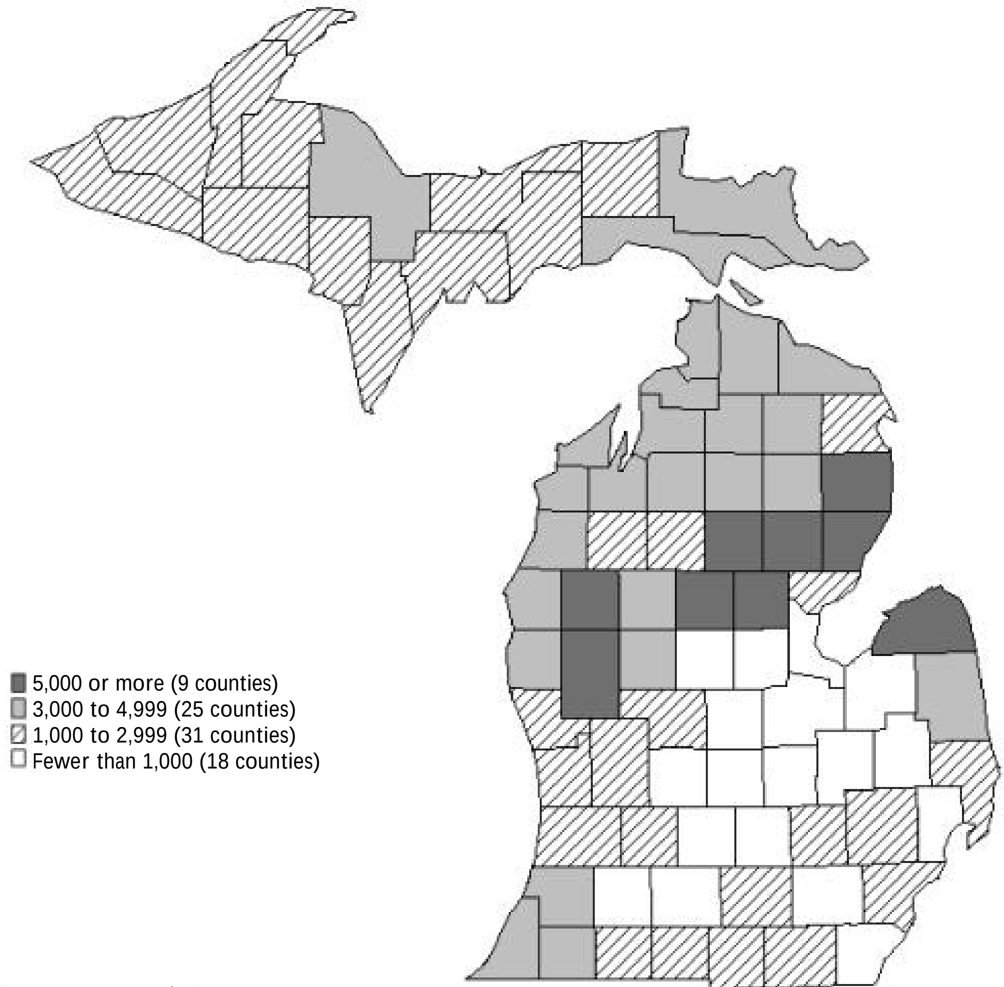
Second Home Development

Seasonal or recreational homes are common in Michigan, particularly adjacent to lakes, rivers, streams, and the Great Lakes shoreline. Many were built with septic tanks/tile fields that were adequate for limited summer use but not year-round residence. Small waterfront lots with a high water table and/or poor soil conditions are not well suited to OSDSs in any case. When a cottage becomes a permanent home, the addition or increased use of automatic dishwashers, garbage disposals, and washing machines can overload the system.

Over the last 30 years, sanitary sewer service has been provided on many heavily developed lakes in Michigan where water pollution was a concern. As the conversion to permanent homes continues, however, the potential for water pollution grows if sanitary sewer service is not available. Exhibit 8 shows the distribution of second homes in Michigan. The cost of providing conventional sanitary service to these homes can be very high compared to the value of the property. Pressure systems, cluster systems, and other innovative approaches are often the most cost-effective solution for waterfront homes with failing OSDSs.

EXHIBIT 8

Number and Distribution of Second Homes in Michigan



SOURCE: U.S. Bureau 7th Census, 1990.

STORM WATER MANAGEMENT

In 1987, Congress amended the Clean Water Act to establish comprehensive control of pollution from storm water discharges. Phase I of the regulations promulgated by the EPA in November 1990 focused primarily on runoff from industrial activity, including construction projects that disturb more than five acres, and the discharge of storm water by municipally owned separated systems that serve at least 100,000 people. Phase II regulations were published in final form in the *Federal Register* on October 29, 1999. These will take effect within the next three years and apply to the discharge of storm water by municipalities with fewer than 100,000 people that are within urbanized areas defined by the U.S. Bureau of the Census. In addition, Phase II requires permits for storm water discharges from municipal construction projects that disturb one acre or more as well as from certain municipal activities, such as the operation of sewage treatment plants and vehicle maintenance facilities.

Despite considerable opposition from the regulated community, the EPA proceeded with the implementation of the phased storm water regulations. The agency has followed the terms contained in a judicial consent decree (*NRDC* v. *Browner*, D.D.C., Civ. No. 95-634 PLF), which resulted from a suit brought by the Natural Resources Defense Council to force the control of storm water pollution based upon the 1987 Clean Water Act amendments.

In Michigan, permits under Phase I, and presumably under Phase II, are issued by the MDEQ through its delegated authority from EPA to operate the NPDES permit program. The Michigan Phase I regulations affecting industrial dischargers and municipal governments are in the form of a general permit. Construction sites are covered under a permit-by-rule that references Michigan's own Soil Erosion and Sedimentation Control statute, and procedures are administered at the local level.

Phase I Costs

Five Michigan communities (Ann Arbor, Flint, Grand Rapids, Sterling Heights, and Warren) were required to apply for permits under Phase I. The Michigan Department of Transportation (MDOT) and the University of Michigan also were required to have permits, since they operate separate storm water systems within one or more of the five communities. Although the total cost for implementing the permit requirements eventually mandated is not yet known, merely gathering the information to obtain the permit was expensive. It is estimated that identifying and sampling storm water discharges cost an average $750,000 in each case, according to the MML. The national average cost for implementing Phase I regulations as reported by the EPA was $8.85/household/year.[11] For a city of 100,000, assuming the national average of 2.62 people per household, the average cost for Phase I implementation is $337,786/year.

> New federal regulations will require urban communities to address storm water problems. Michigan offers an innovative watershed approach to meet these new requirements.

[11] Office of Water, Environmental Protection Agency, *Report to Congress on the Phase II Storm Water Regulations*, October 1999.

Phase II Costs

Although Phase II requirements are similar to those for Phase I, the application cost should be somewhat lower because the communities have a smaller population and presumably fewer storm water outfalls to inventory and test. In the same study cited for Phase I, the EPA estimated the annual compliance cost for Phase II at approximately $9/household, based on Phase I data and information obtained from Phase II communities by the National Association of Flood and Storm Water Management Agencies (NAFSMA). For a city of 50,000, the EPA estimates the cost of Phase II implementation at about $172,000/year.

Michigan has developed an innovative approach that the EPA has approved as an acceptable alternative for meeting the Phase II requirements. It involves fewer requirements in exchange for a comprehensive, locally driven, watershed approach to the management of storm water and nonpoint sources of pollution. This general permit alternative is voluntary and will remain an option after Phase II takes effect in March of 2003. Within the Rouge River watershed, 43 public entities (cities, townships, county agencies, and the MDOT) have been approved for this option. An application also has been received by the MDEQ from a watershed that encompasses the City of Battle Creek. Macomb and St. Clair counties have prepared applications for the watershed-based general storm water permit and are seeking concurrence from their respective boards of commissioners.

Many communities in southeastern Michigan participated in the development of this unique approach to storm water management as part of the EPA-funded Rouge River National Wet Weather Demonstration Project, managed by Wayne County. Although the application costs for this approach are substantially lower than for the standard Phase I process, implementation requirements and costs are expected to be similar. The attractiveness of the general permit is that a group of communities can collectively determine priorities and schedules consistent with local conditions within a broad regulatory framework that encourages innovative, cost-effective pollution control activities.

The minimum requirements under Phase I, Phase II, or the Michigan watershed option are similar. Communities must seek out and remove illicit connections to storm sewers that allow domestic, commercial, and industrial waste to be discharged untreated into lakes and streams. They also must conduct extensive public education to reduce the amount of waste and chemicals entering storm sewers and implement best management practices to reduce pollutants carried by runoff from the land, parking lots, and streets. Furthermore, in Michigan, communities are required to investigate the contribution of failing septic tanks to storm water pollution.

Most urban areas in southern Michigan and some in other parts of the state will be required to have storm water permits under Phase II regulations within three years. Perhaps 70 percent or more of the Michigan population will be affected by Phase I and Phase II. The cost of both phases will be approximately $20 million each year. This assumes that 60 percent of Michigan households, estimated at 3,688,200 in 2003, will fall under Phase II, and that the EPA figure of $9/household/year is accurate. The EPA projects a cost of $297 million/year for implementing Phase II nationwide.

SUMMARY OF LOCAL COSTS AND FINANCING OPTIONS

Local Costs to Meet Water Quality Requirements

Exhibit 9 summarizes the capital costs to local governments in Michigan for various types of water pollution control activities to meet current state and federal requirements. The cost of the new federal storm water regulations is estimated as well. Since the surveys conducted for this study were limited in scope, the sources of information are as follows.

Under the column heading "Capital Expenditures 1989–1999," most of the data are from SRF loan information compiled by the MDEQ's Environmental Assistance Division. MML survey information and contacts with individual communities also were used. One-time Phase I application costs incurred by five Michigan communities during 1996–1998 were calculated from information supplied by these communities to the MML.

Under the column heading "Needs Survey Estimated Cost 1996–2016," data are from the *1996 Clean Water Needs Survey (CWNS)—Report to Congress* prepared by the EPA in cooperation with state agencies. That is the twelfth such report since the Clean Water Act was passed in 1972; the thirteenth will be completed in 2001. CWNS figures are calculated from information supplied by states and incorporated into an EPA model of technical and cost factors for approximately 16,000 publicly owned treatment facilities. The primary objective of the 1996 CWNS was to estimate the needs for SRF funding by program category. The EPA recognizes 11 project types as eligible under seven categories.

The EPA information is distributed in Exhibit 9 as follows. EPA categories I and II (Secondary and Advanced Treatment) are combined under the heading "Capital Improvements to Wastewater Treatment Plants"; IIA and IIB (Infiltration/Inflow Correction and Sewer Replacement/Rehabilitation) are incorporated into "Repair and Replacement of Sanitary Sewers"; and IVA and IVB (New Collector Sewers and New Interceptor Sewers) are merged into "Expansion of Sanitary Sewer Service." EPA categories V (Combined Sewer Overflows), VI (Storm Water), and VII (Other, including nonpoint) appear in Exhibit 9 under the CSO, storm water, and nonpoint headings.

Under the column heading "Projections of This Study to About 2020," data were derived from the MML and/or the SEMCOG survey, although CSO projections are from contacts with individual communities.

Range of Capital Costs

Exhibit 10 summarizes the projected range of local government capital costs for water pollution controls over the next two decades and cites the basis for estimates. No operational costs are included because the focus is on whether SRF resources will be available to help local entities fund the expected capital outlays. Between $2.7 billion and $5.8 billion will be needed to maintain and improve sanitary sewers, meet storm water permit requirements, and address nonpoint source pollution. The majority of these expenditures will occur in the next 12 years, since current permits require nearly all communities to complete CSO improvements by 2012.

EXHIBIT 9

Summary of Cost Estimates for Local Government Water Pollution Controls (millions of dollars)

	Capital Expenditures 1989–1999	Needs Survey Est. Cost 1996–2016	Projections of This Study to About 2020
CSO Capital Costs			
State Revolving Fund Loans	$492		
Additional Local CSO Capital Expenditures	246		
Federal Grants	195		
Estimate for CSO Communities Not Reporting Expenditures	50		
Subtotal	**983**		
EPA/MDEQ Needs Survey		$3,723	
Projection of This Study			**$1,733**
Repair and Replacement of Sanitary Sewers			
State Revolving Fund Loans	55		
Other Local Capital Expenditures	No data collected		
Subtotal	**55**		
EPA/MDEQ Needs Survey		92	
MML Survey Area (outstate cities and villages)			150
SEMCOG Survey (cities, villages, and townships)			538
Projection of This Study			**688**
Expansion of Sanitary Sewer Service			
State Revolving Fund Loans	270		
Other Local Costs	No data collected		
Subtotal	**270**		
EPA/MDEQ Needs Survey		478	
SEMCOG Survey			187
Projection of This Study			**187**
Capital Improvements to Wastewater Treatment Plants			
State Revolving Fund Loans	259		
Other Local Costs	No data collected		
Subtotal	**259**		
EPA/MDEQ Needs Survey		643	
Projections of This Study			Insufficient data
Operating and Capital Cost to Meet Storm Water Permit Requirements			
State Revolving Fund Loans	—		
Phase I (one-time application cost 1996–98)	4		
Subtotal	**4**		
EPA/MDEQ Needs Survey		34	
Projection of This Study (Phase I and II)			**339**
Operating and Capital Cost of Non-Point Source Controls			
State and Local Expenditures	No data collected		
Subtotal			
EPA/MDEQ Needs Survey		173	
Projection of This Study (Phase I and II)			Insufficient data
Totals	**$1,571**	**$5,143**	**$2,946**

SOURCES: MEDQ's Environmental Assistance Divison, SRF loan information; the EPA's *1996 Clean Water Needs Survey—Report to Congress*; and MML Survey information.

The MML and SEMCOG surveys reveal that many communities have not yet planned for the major sewer replacement and rehabilitation costs that will be required for the aging infrastructure. As discussed later, most sanitary sewers and many waste treatment facilities will need substantial upgrading within the next 20 years. The figures in Exhibit 10 are minimum estimates for replacement of existing infrastructure and anticipated expansion.

State Revolving Fund Loans

Michigan adopted the State Revolving Fund Act in 1988 in order to participate in the federal program established by the 1987 amendments to the Clean Water Act. The SRF makes loans to local government at lower than market rates for a wide variety of capital projects to improve water quality. Michigan issued the first loan in late 1989. In 1999 the total value of loan commitments during the previous ten years exceeded $1 billion. Approximately 46 percent was for CSOs, 24 percent for waste treatment facilities, 6 percent for sewer rehabilitation (repair and replacement), and 24 percent for new interceptor and collecting sewers. For the fiscal year 2000, 34 communities have submitted applications to the SRF totaling $350 million, but only about $220 million is available.

Since its inception, the Michigan SRF has been capitalized with $749 million in federal funds and $149 million in state match, to which is added periodic repayment of loans. The amount available is approximately $165 million/year. Over the last several years, federal appropriations have added $57 million annually to capitalize the Michigan SRF, and the state has appropriated the required 20 percent match of approximately $11.5 million. There is no assurance that either appropriation will continue at these levels, but state administrators are assuming that around $220 million a year will be available for SRF loans at least through 2001.

Exhibit 10 shows the range of capital costs. Exhibit 11 shows the projected annual demand on the Michigan SRF through 2011, based upon the low estimate of total capital fund needs in Exhibit 10, assuming a 4 percent cost increase (construction inflation) per year. The CSO costs are spread through the first 12 years since nearly all current state permits require these controls to be completed by 2012. The low estimate in Exhibit 11 indicates that about $200 million will be needed to meet expected requests from local communities in 2000, and the figure increases to $350 million by 2012.

Exhibit 11 also shows a demand projection based upon the high estimate in Exhibit 10. In 2000 that demand is just over $400 million, and by 2012 it increases to almost $700 million. As noted above, requests received by the MDEQ for fiscal year 2000 totaled approximately $350 million, which is within the $200–400 million range indicated for that year in Exhibit 11.

SRF demand beyond the next decade is difficult to project. Information requested in the MML and SEMCOG surveys did not cover several key issues that will influence capital expenditures for wastewater infrastructure over the next 25 years.

Emerging Capital Costs

Three major factors that will affect the demand for SRF funds were not effectively documented by the surveys conducted as part of this study. First, upgrading, major repair, and replacement of wastewater treatment plants built during the 1960s and 1970s will be a significant capital

EXHIBIT 10

Range of Local Capital Costs for SRF-Eligible Water Pollution Controle, 2000–2019 (millions of dollars)

	Basis for Estimates[a]	Range of Cost Estimates Low	High
Combined Sewer Overflows	1	$1,733	$3,448
Repair and Replacement of Sanitary Sewers	2	109	688
Expansion of Sanitary Sewer Service	3	187	569
Improvements to Wastewater Treatment Plants	4	471	765
Storm Water Permit Requirements	5	40	112
Nonpoint Source Controls	6	206	206
Total		$2,746	$5,788

[a]**THE BASIS FOR ESTIMATES IS AS FOLLOWS:**

1 LOW—Data collected from CSO communities with remaining uncontrolled discharges (assumes long-range plans acceptable)
HIGH—EPA Needs Survey, CSO Costs Adjusted to 2000 dollars (reduced by total expenditures to date for CSO control estimated in this study)

2 LOW—Mean annual SRF loans for repair/replacement since 1989 (assumes mean annual cost remains constant to 2019)
HIGH—EPA Needs Survey for repair/replacement adjusted to 2000 dollars (assumes mean annual cost remains constant to 2019)

3 LOW—Mean annual SRF loans for new sewers since 1989 (assumes mean annual cost remains constant to 2019)
HIGH—EPA Needs Survey for new sewers adjusted to 2000 dollars (assumes mean annual cost remains constant to 2019)

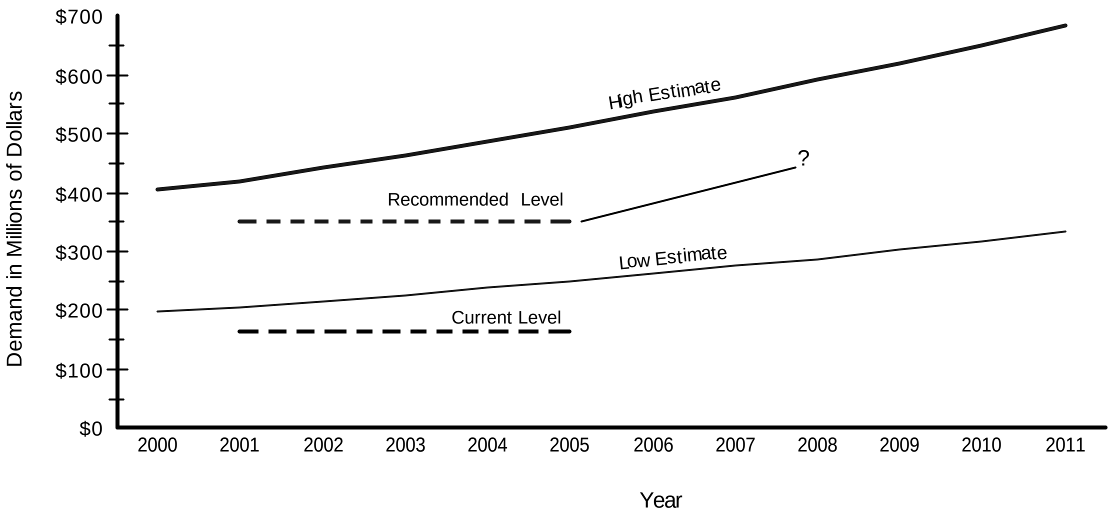
4 LOW—Mean annual SRF loans for waste treatment plants since 1989 (assumes mean annual cost remains constant to 2019)
HIGH—EPA Needs Survey for waste treatment plants adjusted to 2000 dollars (assumes mean annual cost remains constant to 2019)

5 LOW—EPA Needs Survey for storm water projects adjusted to 2000 dollars(assumes mean annual cost remains constant to 2019)
HIGH—EPA 1999 Report to Congress, Cost of Storm Water Regulations (assumes 33% of costs are SRF eligible)

6 LOW—EPA Needs Survey for nonpoint projects adjusted to 2000 dollars (assumes mean annual cost remains constant to 2019)
HIGH—EPA Needs Survey for nonpoint projects adjusted to 2000 dollars (assumes mean annual cost remains constant to 2019)

EXHIBIT 11

Range of Estimated SRF Demand Compared to Current and Recommended Levels



SOURCE: Public Sector Consultants, Inc.

cost for many municipalities within the next 20 years. Second, new state requirements regarding SSOs and recent federal initiatives directed at these technically illegal discharges will considerably increase local capital expenditures beginning within the next few years. Based upon the MML and SEMCOG surveys, there are more than 25,000 miles of sanitary sewers in Michigan, and more than half were built before 1970. Many of the older sewers will need substantial upgrading or replacement during the next 25 years. Many Michigan communities have deferred needed investment in existing infrastructure in order to pay for expensive CSO and SSO capital improvements. Eventually, it will be imperative to attend to deteriorating sanitary waste transport and treatment facilities.

National studies document similar trends throughout the country. *The Cost of Clean Water–Meeting Water Quality Challenges in the New Millennium*, prepared jointly by the Association of Metropolitan Sewage Agencies and the Water Environment Federation in 1999, reports on the growing cost of wastewater transport and treatment. The research indicates that in the first two decades following passage of the Clean Water Act, approximately $196 billion was expended for capital improvements to wastewater systems in the United States, and from 1996 to 2015 about $330 billion will be needed to meet current Clean Water Act requirements. The study further points out that since the mid-1980s, the local share of costs to construct, operate, and maintain wastewater infrastructure has increased, whereas the federal proportion has shrunk. In the late 1970s and early 1980s, the two shares were nearly equal. Today, federal support is now less than 10 percent of the $23 billion spent annually for wastewater transport and treatment in this country.

The EPA's Office of Wastewater has initiated a "gap analysis" that is scheduled for completion in late 2000. It is prompted by growing concern that the projected federal and state expenditures to meet Clean Water Act mandates and maintain infrastructure are far short of what is required. Preliminary results from this study question the affordability of financing needed investments from strictly local sewage fees, which already have been increased substantially over the last two decades. The early findings also focus on the growing need to fund replacement and upgrading of wastewater systems and on the shrinking federal participation in funding.

> The federal government contributes less than 10 percent of the $23 billion spent annually in the nation for sewage transport and treatment. Local governments are facing increasing costs to fill the gap.

Other Federal and State Funding

The Michigan SRF is the primary source of assistance for local governments. Large federal and state grant-in-aid programs for water pollution control ended in 1990, although some federal matching grants and loans are available for smaller projects in rural areas, administered by the U.S. Department of Agriculture (rural development grants and the Community Facility Loans and Grants program), and economically depressed urban areas. Some rural communities in Michigan have accessed these limited sources. The EPA-funded Rouge Project has provided a substantial federal match for CSO control and pilot storm water projects in several communities in Oakland and Wayne counties since 1993.

The Rouge Project and direct federal appropriations cannot be counted on as sources of future funding. Bills have been introduced in Congress to establish a new federal program to help local governments address CSO and SSO problems, but their fate is uncertain. State and federal water pollution control agencies are concerned that any new programs would simply reduce federal funding for SRF loans. Limited aid is available for nonpoint control projects under the new Michigan Clean Water Initiative grants, but no new state programs to assist local communities with large capital improvements for pollution control or sewer infrastructure are under consideration.

Local Funding

Even if an SRF loan is obtained, most of the money for water pollution controls must be generated locally. Local units have to fund the sewer infrastructure, CSO retention/treatment basins, and wastewater treatment facilities. Typically, operational costs are generated from user fees, usually water and sewage treatment charges. There are various options for capital improvements: (1) property taxes; (2) special assessments; (3) tax increment financing; (4) water and sewer hook-up fees; (5) water and sewer use charges; and (6) advanced sale charges for sewer capacity. However, statutory and constitutional constraints in Michigan limit the use of these financing option.

Property Tax Limitations

Two major changes in Michigan's constitution—the Headlee Amendment, passed in 1978, and Proposal A, passed in 1994—limit the ability of local governments to fund projects such as sewage infrastructure through property taxes.

The Headlee Amendment added several provisions (sections 25 through 33) to Article IX of the constitution. Section 31 affects local governments by requiring that voters approve any increase in local taxes. It also stipulates that if the definition of the base of an existing tax is broadened, the maximum authorized tax rate on the new base must be reduced to yield the same total tax. For example, a tax base of $1 million with a tax rate of 1 mill would yield a total revenue of $1,000; if the base increases to $1.5 million, the millage must be reduced to .667 so that the yield remains $1,000.

Another provision in Section 31 limits revenue from property assessment increases. If the assessed value of a local government's total taxable property (excluding new construction and improvements) increases by more than the inflation rate, then the property tax rate must be reduced to yield the same gross revenue, adjusted for inflation, as collected previously. In order to maintain the previous millage rate, the local government must obtain voter approval to override the "Headlee rollback." This provision's importance has been reduced by Proposal A, which imposes a more restrictive limit on assessment increases than the Headlee Amendment.

Proposal A, which radically changed Michigan's K–12 education funding system addressed longstanding frustration with high property taxes (35 percent above the national average) and sought to reduce disparities in per-pupil spending (which ranged from $3,277 to $10,356 in 1994) caused by differences in property values among districts. It replaced about 50 percent of school property taxes with a 2-cent sales tax increase and revenue from several smaller sources. Whereas general property tax rates ranged from 6 mills to 45 mills in 1993, Proposal A instituted a standard 6-mill state education tax. Local governments may assess up to 18 additional mills without voter approval, although homesteads and qualified agricultural property are exempt from this millage.

In contrast to the Headlee Amendment, which permits assessment increases but forces rate reductions, property tax assessments under Proposal A are capped at 5 percent per year or the rate of inflation, whichever is less, until a property is sold. Another difference between the two is that Headlee limits total assessment, whereas Proposal A applies to each parcel of property.

Local millage rates may be increased up to 50 mills with voter approval. Certain taxes are excluded from the 50-mill cap:

(1) debt service taxes for all full-faith and credit obligations of local units (after December 22, 1978, this exclusion applies only for obligations approved by voters);

(2) taxes imposed by units with separate tax limitations provided by charter or general law (cities, villages, charter townships, and charter counties);

(3) taxes imposed by certain districts or authorities that have separate limits (e.g., charter water authorities, port districts, metropolitan districts, and downtown development authorities); and

(4) certain taxes imposed by municipalities for special purposes (garbage services, library services, services to the aged, and police and fire pension funding).[12]

[12] Citizens Research Council, *Outline of the Michigan Tax System*, 20th Edition, 1999.

Local governments may be able to use one of these exclusions in order to fund sewer infrastructure needs, but they still need voter approval under the Headlee Amendment. Many communities use the institutional arrangement available under the Michigan Drain Code of 1956 to provide capital funds for sewers and wastewater treatment facilities. The code authorizes the establishment of drainage districts that can levy a mandatory special assessment exempt from the Headlee requirement for voter approval.

Special Assessments and Sewer Charges

Special assessments on property and sewer charges (use, hook-up, and advanced sale) are limited to fees that can be reasonably attributed to services provided. Without that direct link, the collection of revenue is considered a tax subject to the limitations outlined above. Fees for water and sanitary sewage treatment are well-established sources of both operating funds and debt service on capital improvement bonds. Many local communities use the Drain Code to establish property assessments to pay for capital improvements that directly benefit property owners. Other intergovernmental and local government bonding authorities are available under state law for individual communities or a combination of local units to assess the cost to individual property owners based on the proportional benefits received.

In many communities, particularly those faced with the high cost of correcting CSOs, replacing aging sanitary sewers, and a decreasing rate base, the cost per household for operation, maintenance, and debt retirement has become extremely high. Taxpayer resistance to further increases has become a serious political problem for elected officials in these communities.

A recent decision by the Michigan Supreme Court, *Bolt* v. *City of Lansing* (Case No. 108511, December 28, 1998), involves municipal fees to separate storm and sanitary sewers. The case has significant implications for Michigan communities as they seek to pay for storm water management to meet federal and state regulations. The decision affirmed that a city can implement a storm water or sewer charge without running afoul of the Headlee Amendment (can raise revenue without voter approval of the tax increase), but the court made a series of findings that appear to create severe limitations to its use. The problem, according to many, is that the court went beyond what was required in the specific case to find that the city had indeed imposed a tax disguised as a fee. At the very least, the decision will provide ample arguments for those who may wish to challenge utility-like services provided by local governments.

Part of the problem with the broad statements made by the court in *Bolt* may stem from a poor understanding of the complex nature of sewer systems in urban areas. Two of the most troubling findings in the case related to "voluntariness" of the fee and the fact that the city's project did not result in treatment of the separated storm sewer discharges. The findings implied that unless property owners had the ability to reduce, if not completely eliminate, the public health (and presumably environmental) problems being addressed by the fee ordinance, then the fee was a tax and subject to the Headlee limitations.

The decision appears to limit the imposition of sewer water fees in urban settings, where the construction of on-site storm water retention facilities is virtually impossible due to lack of open space. Yet, without an effective way to collect and transport storm water, urban areas would be routinely flooded and virtually uninhabitable.

Following the court's logic, if combined sewers are used to transport sanitary and storm water, then the cost of constructing and maintaining the sewer system, CSO retention basins, and wastewater treatment plants can be charged as a fee to the users in the area serviced. In the case of separated sewers, however, only the sanitary waste handling and treatment services can be charged as a fee; according to the court, the storm water system has to be funded from general taxes. Furthermore, the court seems to be saying that if separated storm water does not require treatment before being discharged into surface waters, then no service is provided by the city. Thus, all the benefits accrue to the public at large, which makes the fee a disguised tax.

The court also ruled that the city did not set the "fee" at a level to defray the regulatory cost because it imposed the charge for a period less than the useful service life of the improvements. The court appears to say that any charge that collects fees faster than straight-line depreciation over the improvement's useful service life is a tax. This finding raises questions about many existing revenue bonds and severely restricts local financing through the SRF program, which, except in unusual cases, requires repayments within 20 years, a period far short of the expected useful life of most capital investments in water pollution controls.

Legal advisors to local government have provided guidelines for fee ordinances related to storm water regulation that offer the best chance of meeting the objections raised by the court in Bolt. Some are confident that through careful crafting and implementation such a fee system can meet the court's standards, but many caution local governments about the fee approach because of the uncertainties raised by the decision. Unfortunately, the ruling is not easily clarified. Since the court interpreted a constitutional provision, any future statute passed to define "tax" or "fees" would be subject to eventual judicial review for its conformance with constitutional mandate.

RECOMMENDATIONS

Funding Wastewater Infrastructure Needs

SRF loans are the primary source of financial support to local governments for needed capital investments in wastewater infrastructure. The current level of SRF funds available falls far short of expected needs over the next 12 years. The approximate $165 million/year cannot even meet minimum demand estimates in 2001 and will be less than half what is needed by 2012. Based upon the 1999 actual requests for SRF funding, the high-range projections provided in this study may most accurately estimate future demand. If those projections are on target, even if annual state and federal appropriations raise capitalization of the SRF by another $60 million/year, it will be nearly $200 million short of demand in 2001 and nearly $500 million short by 2012.

Based upon the findings of this research and similar national studies, the following actions are recommended.

- State and federal capitalization of the Michigan SRF needs to be increased above current levels by $125 million/year ($21 million state and $104 million federal) to support low-interest loans of at least $350 million/year for wastewater infrastructure over the next five years.
- Additional capitalization of the SRF should be phased in, beginning in 2006, in order to meet projected demand through 2020.
- Michigan should strongly advocate establishment of a national trust account that would set aside a secure source of federal funds to finance future wastewater infrastructure needs, similar to that for transportation infrastructure.

Scheduling of Mandated Improvements

Local communities find it very difficult to plan for future investments in wastewater infrastructure. New regulations and priorities at the federal and state level sometimes divert local resources from system maintenance. State and federal timetables for corrective action do not take into account how compliance schedules can affect the availability of SRF funds or construction costs, which can increase when all communities are bidding contracts at the same time.

A strategic approach to infrastructure asset management would assure that needed upgrading is not deferred and that newly mandated facilities can be built in a timely manner at reasonable cost. Affordability is becoming a major issue at the local level. Scheduling capital improvements to match available state and federal funding and to minimize construction costs can go a long way toward reducing the average household cost for wastewater infrastructure investment. The following are recommended to maximize the effectiveness of federal, state, and local investments.

- The state should help develop a strategic approach to the management of Michigan's wastewater infrastructure assets. The process should encourage local, state, and federal agencies and other stakeholders to reach consensus on realistic schedules for infrastructure investments that will protect water quality over the long term and minimize the financial burden on individual homeowners.

- SRF loan commitments should reflect priorities established by the strategic asset management process. State and federal criteria for awarding SRF funds should be modified as needed to reflect those priorities.

Addressing OSDS Problems

The large and growing number of OSDSs in Michigan (1.2 million, increasing by more than 10,000/year) and the potential for contamination of surface and groundwater due to high failure rates for older systems justify action now. OSDSs can provide effective and relatively less expensive treatment of household waste if properly designed, sited, operated, and maintained. A number of actions can be taken to reduce failure rates and associated remedial costs. The following recommendations closely parallel those published in 1999 by the EPA in *Voluntary National Standards for Management of Onsite/Decentralized Wastewater Treatment Systems*.

- Michigan should adopt a comprehensive management approach to OSDSs that covers design, siting, operation, and maintenance.
- Current design and siting requirements should be upgraded to ensure that OSDSs will protect ground and surface waters from contamination. Modifications to state standards for alternatives to conventional OSDSs need to reflect the results of recent studies that have shown high failure rates for many commonly used alternative systems.
- Systematic training of regulators, system designers, installers and inspectors is needed to assure statewide consistency in OSDS standards for installation, testing and reporting.
- A major education effort should be initiated at both the state and local level to inform owners of OSDSs about best management practices to ensure proper functioning and long-term effectiveness of the system.
- The state should adopt legislation that requires inspection and certification of OSDSs upon transfer of ownership, as is now required in at least five counties. This legislation should provide the option for local health agencies to adopt more stringent requirements as appropriate. Ultimately, the state should move toward requiring periodic inspection and maintenance of all OSDSs.
- State and local statutes, rules, and ordinances regulating businesses involved in the inspection and maintenance of OSDSs should be examined to make sure adequate authority exists to certify OSDS inspectors and control septage disposal locations.

When an OSDS fails and sewers are available, the requirement of connection to the system is relatively simple. In some rural areas or in isolated developments adjacent to inland lakes and streams, sanitary sewers may not be available, however, and installation of a traditional sanitary sewer system is cost prohibitive. In such cases, pressure or step systems are effective alternatives. Other innovative approaches may be available to resolve specific problems.

The state should encourage the development and use of innovative, alternative waste treatment systems that can effectively address disposal problems, along with OSDSs, when sanitary sewers are unavailable or system extension is not feasible.

Legislative Action on Local Liability for Flooded Basements

Local governments are now subject to a strict liability standard when basements flood with sanitary waste from overloaded sewer systems. They are subject to both actual and punitive damage claims. Without legislative action to limit liability, punitive judgments can drain local financial resources needed to address the source of the problem. The frustration of homeowners is understandable, and the recovery of actual damages is appropriate, but the strict liability standard does little to facilitate expeditious resolution of the problem. Determining what corrective steps are necessary is not always easy and may involve several local agencies that share sewer facilities. The following action is recommended to address the liability.

- Limit the liability that applies to local governments for flooded basements to actual damages if local units are in compliance with schedules contained in state permits or orders requiring correction of reported SSO problems.

Appendix
MML SURVEY INSTRUMENT
WITH SURVEY RESULTS

MICHIGAN MUNICIPAL LEAGUE

1999 SANITARY SEWER INFRASTRUCTURE SURVEY

Name of municipality ____

Completed by:

Name ____

Title ____

Department ____

Address ____

____

____

____

Phone/Fax ____________________________

E-mail ____________________________

Date ____________________________

PLEASE RETURN COMPLETED FORM IN THE POSTAGE PAID RETURN EVELOPE BY **FRIDAY, OCTOBER 29, 1999** TO:

Infrastructure Survey
Public Sector Consultants, Inc.
600 W. St. Joseph
Suite 10
Lansing, MI 48933-2265

If you have any questions regarding the survey, please contact Don Stypula, Environmental Affairs Advisor (phone: 517/485-1314 or 800/995-2674; e-mail: dstypula@mml.org), or Jack Bails, Senior Consultant for Natural Resources, Public Sector Consultants, Inc. (phone: 517/484-4954; e-mail jbails@pscinc.com).

I. General Description of Sewer Infrastructure

The purpose of this section is to collect general information concerning the existing sewer infrastructure maintained by your municipality. This information will be used to estimate statewide future replacement and infrastructure needs.

1. Separated/Combined Sanitary Construction
   Please indicate the approximate miles of sanitary sewers within your system and the decade of construction.

Decade of construction	**Estimated miles of pipe 24" or less**	**Estimated miles of pipe greater than 24"**
Pre 1950 TOTAL=2,932 (n=106)	2,612 (n=80)	320 (n=26)
1950s to 1960s TOTAL=1,741 (n=113)	1,549 (n=91)	192 (n=22)
1970s to 1990s TOTAL=2,427 (n=165)	2,249 (n=137)	178 (n=28)

2. Do you operate a wastewater treatment facility?

YES	69 percent	(n = 119)
NO	31 percent	(n = 54)
		TOTAL = 173

3. Does your sewage pass through a wastewater collection system or district that you do not own prior to reaching the wastewater treatment facility?

YES	17 percent	(n =29)
NO	83 percent	(n = 141)
		TOTAL = 170

4. Do you provide sanitary sewer service outside of your corporate boundaries?

YES	57 percent	(n = 96)
NO	43 percent	(n = 74)
		TOTAL = 170

5. Is the sanitary system you operate

Exclusively combined	3 percent	(n = 5)
Exclusively separated	79 percent	(n = 122)
A mix of combined and separated sanitary sewers	18 percent	(n =28)
		TOTAL = 155

6. Are the existing sewer systems adequately sized to handle the projected flow in 2010?

YES	76 percent	(n = 114)
NO	24 percent	(n = 37)
		TOTAL = 151

II. Estimated Cost to Maintain Existing Sewer Infrastructure

The purpose of this section is to collect information on the actual expenditures for maintenance of your sewer infrastructure and planned capital expenditures. The information will be used to project the long-term, statewide cost for the maintenance of existing sewer systems.

7. What is your approximate annual budget for operation, maintenance and repair of existing sanitary of combined sewerage systems including pump stations but excluding debt retirement and operating expense of any wastewater treatment facility?

$ Sum = $54,663,387 (Sum/n=139) = $393,262

8. Do you have any current or planned capital expenditures over and above those funded by your annual operating budget to replace/rehabilitate/upgrade existing sanitary/combined sewer infrastructure? See next section on CSO correction costs.

*Type of project**	*Anticipated total cost (excluding interest on bonds)*	*Actual or projected year of construction*
67	TOTAL = $149,660,774	Range = (1999–2017)

III. ESTIMATED COST OF REQUIRED IMPROVEMENTS TO CORRECT COMBINED SEWER OVERFLOWS

The purpose of this section is to identify what communities have already expended or are expecting to expend in order to address combined sewer overflows as required under state/federal permits.

9. Has your community been directed under the terms of state issued permit or order to address Combined Sewer Overflows during the last ten years?

YES	14 percent	(n = 22)
NO	86 percent	(n = 137)
		TOTAL = 159

If no, proceed to question number 11.

If yes, please provide the following information:

CSO Projects Already Completed, Underway and/or Funded

Number of CSO outfalls involved	Actual or Projected start date for project (year)	Actual or targeted completion date for full project (year)	Estimated total cost (excluding interest in bonds)
67	Range=(1989–2000)	Range=(1991–2006)	$322,094,483

CSO Project Required but not Underway or Funded

Number of CSO outfalls involved	Projected start date for project (year)	Actual or targeted completion date for full project (year)	Estimated total cost (excluding interest in bonds)
63	Range=(1991-2015)	Range=(2000-2029)	$231,712,000

10. Does your CSO control projects involve sewer separation, retention basins, or both?

Separation	62 percent	(n = 15)
Retention basins	21 percent	(n = 5)
Both	17 percent	(n = 4)

TOTAL = 24

IV. Estimated Number of On-Site Sanitary Disposal Systems

The purpose of this section is to determine the number of on-site sanitary disposal systems (septic systems) providing sanitary service in the state. This information will be combined with that from other sources to project the demands for expanded sanitary sewer service statewide.

11. Do you have homes within the corporate limits of your community served by septic systems?

YES	77 percent	(n = 131)
NO	23 percent	(n = 39)

TOTAL = 170

Is it likely that sanitary sewers will be made available to these households in the next twenty years?

YES	77 percent	(n = 98)
NO	23 percent	(n = 29)
	TOTAL = 127	

THANK YOU FOR YOUR COOPERATION.

PLEASE RETURN THE COMPLETED SURVEY IN THE POSTAGE PAID RETURN EVELOPE BY FRIDAY, OCTOBER 29, 1999.

GLOSSARY OF ACRONYMS

CMOM standards	Capacity, management, operation, and maintenance standards
CSO	Combined sewer overflow
GEM	Groundwater Education in Michigan
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MML	Michigan Municipal League
NAFSMA	National Association of Flood and Storm Water Management Agencies
NPDES	National Pollutant Discharge Elimination System
OSDS	On-site disposal systems
PCB	Poly-chlorinated biphenyl
SEMCOG	Southeast Michigan Council of Governments
SRF	State Revolving Fund
SSO	Separate sanitary sewer overflow
U.S. EPA	United States Environmental Protection Agency