



**Combined Sewer Overflow (CSO) &
Sanitary Sewer Overflow (SSO)**



Annual Report

(July 2000 - December 2001)

The Michigan Department of Environmental Quality (DEQ), has produced the attached Combined Sewer Overflow (CSO) & Sanitary Sewer Overflow (SSO) Report as a means of providing the public with information regarding known discharge of untreated and partially treated sewage to land and waters of the state. An ongoing annual reporting requirement was part of a revision to the Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, specifically Section 324.3112(c) which took effect on July 10, 2000.

Since the changes to the law were enacted on July 10, 2000, this first report includes event information for the partial year 2000 (July 10, 2000 through December 31, 2000) along with reported information for calendar year 2001. Future reports will be made available on a calendar year basis.



<p>The Michigan Department of Environmental Quality (DEQ) will not discriminate against any individual or group on the basis of race, sex, religion, age, national origin, color, marital status, disability, or political beliefs. Questions or concerns should be directed to the MDEQ Office of Personnel Services, PO Box 30473, Lansing, MI 48909</p>	<p>Authority: PA 451 of 1994 Total Cost: \$2,365.24 Total Copies: 120 Cost Per Copy: \$19.71</p> <p>Michigan Department of Environmental Quality</p>	 <p>Printed on Recycled Paper</p> 
<p align="center">Act 451 Legislative Report Requirement</p> <p>The Natural Resources and Environmental Protection Act, 1994 P.A. 451, as amended, Section 324.3112(c) identifies activities to be undertaken by DEQ to make information related to known discharges of untreated or partially treated sewage from sewer systems to land or waters of the state available to the general public. This report provides a summary of releases reported to the DEQ, Surface Water Quality Division to meet these requirements.</p>		

Annual Report Contents

	Page #
INTRODUCTION.....	1
What Is the Difference between a Sanitary Sewer System and a Combined Sewer System?.....	1
In General, What are CSOs and SSOs?.....	1
Who Will Let Me Know Whether the Water Is Safe for Swimming, Fishing or Canoeing?	2
Who Do I Contact for More Information?	2
DISTRICT CONTACTS BY COUNTY.....	4
REPORT TERMS AND ACRONYMS	5 & 6
COMBINED SEWER OVERFLOWS.....	7
What are Combined Sewer Overflows and What Causes Them?.....	7
How are CSO's Addressed?	7
What is the Main Challenge for Communities to Address in Controlling CSOs?.....	8
What Data Does the CSO Report Contain?.....	8
CSO REPORT.....	CSO-1 thru CSO-109
SANITARY SEWER OVERFLOWS.....	9
What are Sanitary Sewer Overflows?.....	9
What causes an SSO?.....	9
How Does the Sewage end up in the Environment?	9
How are SSO's Addressed?.....	10
What Factors Justify Long-term Plans for Eliminating SSOs?.....	10
What Data does the SSO Report Contain?	11
SSO REPORT	SSO-1 thru SSO-215

Introduction

The DEQ is concerned about releases of raw and partially treated sewage from municipal sewer systems, an environmental and public health problem that has plagued Michigan for decades. The State of Michigan took a more aggressive approach to address these discharges in 1988 by initiating an aggressive Combined Sewer Overflow (CSO) control program and in the year 2000 by adopting a Sanitary Sewer Overflow (SSO) control strategy. In addition to the state's efforts, local units of government were called upon to step up to the plate to help protect Michigan's waters. This report is one step in addressing these types of discharges for the people of Michigan, specifically, it defines and publicizes the extent of this statewide problem and the actions being taken to control these discharges.

What Is the Difference between a Sanitary Sewer System and a Combined Sewer System?

In order to understand the difference between a CSO and an SSO, it is necessary to understand some basics of sewer system design. Separate sanitary sewers are designed to carry only sanitary sewage to a waste water treatment plant (WWTP) (See Figure 1), storm water is directed to a nearby river, lake or stream via storm sewers. Combined sewer systems are generally older sewer systems designed to convey both sewage and storm water (combined in one pipe) to a WWTP under dry conditions (See Figures 2). Many combined sewer systems have recently installed overflow basins (also called retention/treatment basins), which are designed to capture the combined sewage and rain water, that would otherwise flow to surface waters, long enough to provide initial treatment and disinfection before the discharge is released into waters of the state during periods of intense precipitation (See Figure 3).

In General, What are CSOs and SSOs?

CSOs are overflows from older combined sewer systems designed to carry both sanitary sewage and storm water. SSOs are discharges of raw or inadequately treated sewage from municipal separate sanitary sewer systems, which are designed to carry sanitary sewage but not storm water. These overflows both discharge untreated human and industrial waste, toxic materials, debris and disease causing organisms into our rivers, lakes and streams after an untreated overflow event.

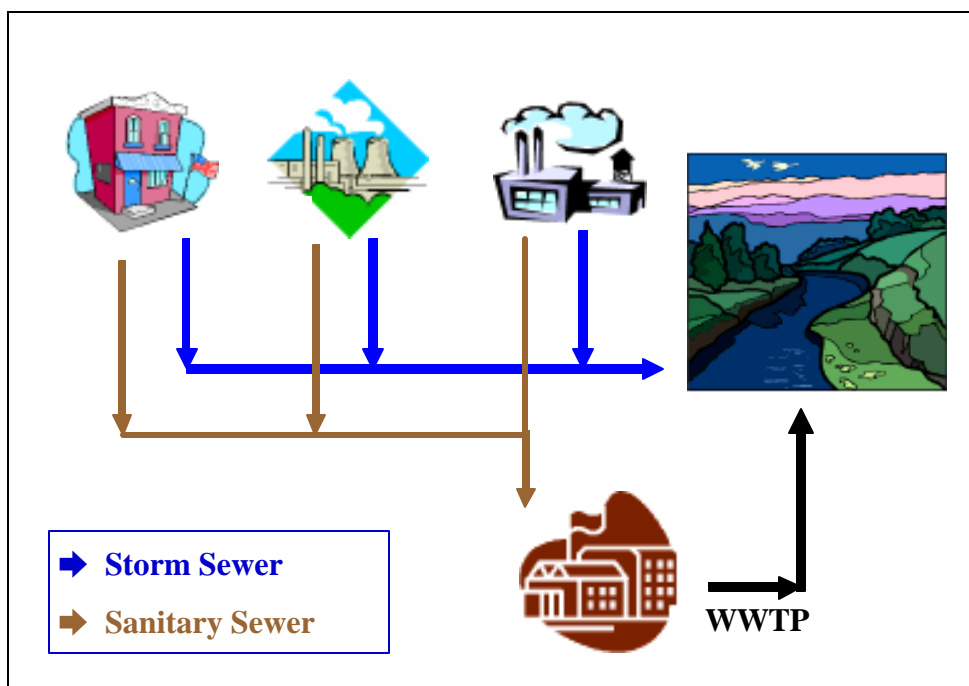


Figure 1: Separate Sewer System

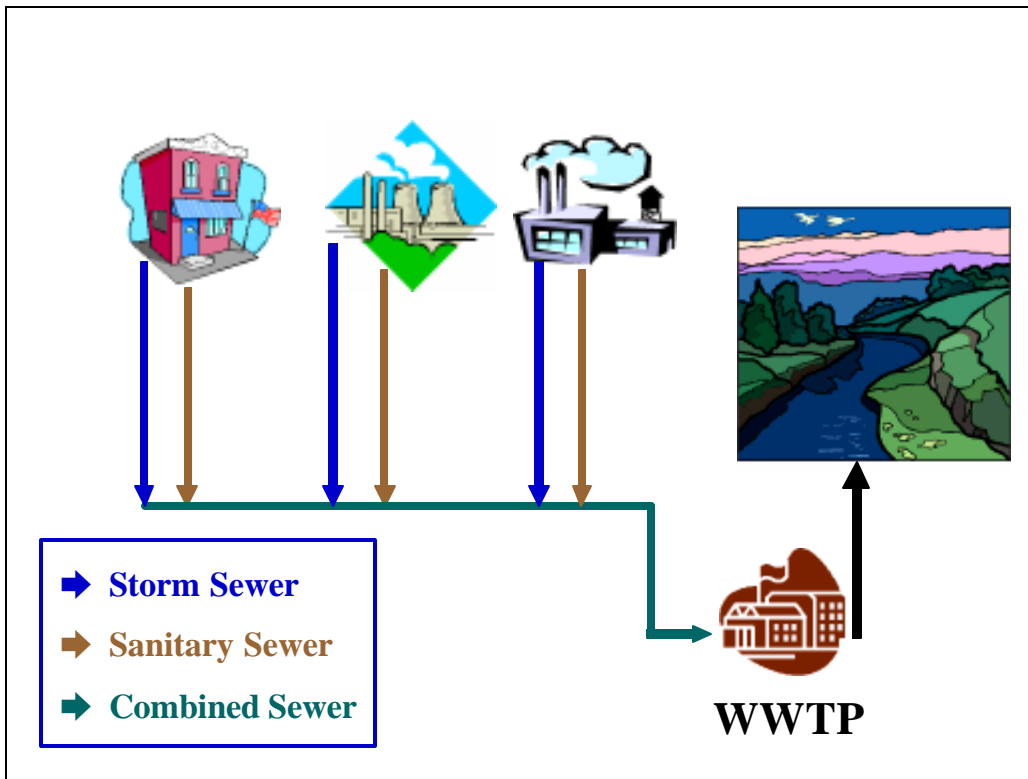


Figure 2: Combined Sewer System—Dry Weather Conditions

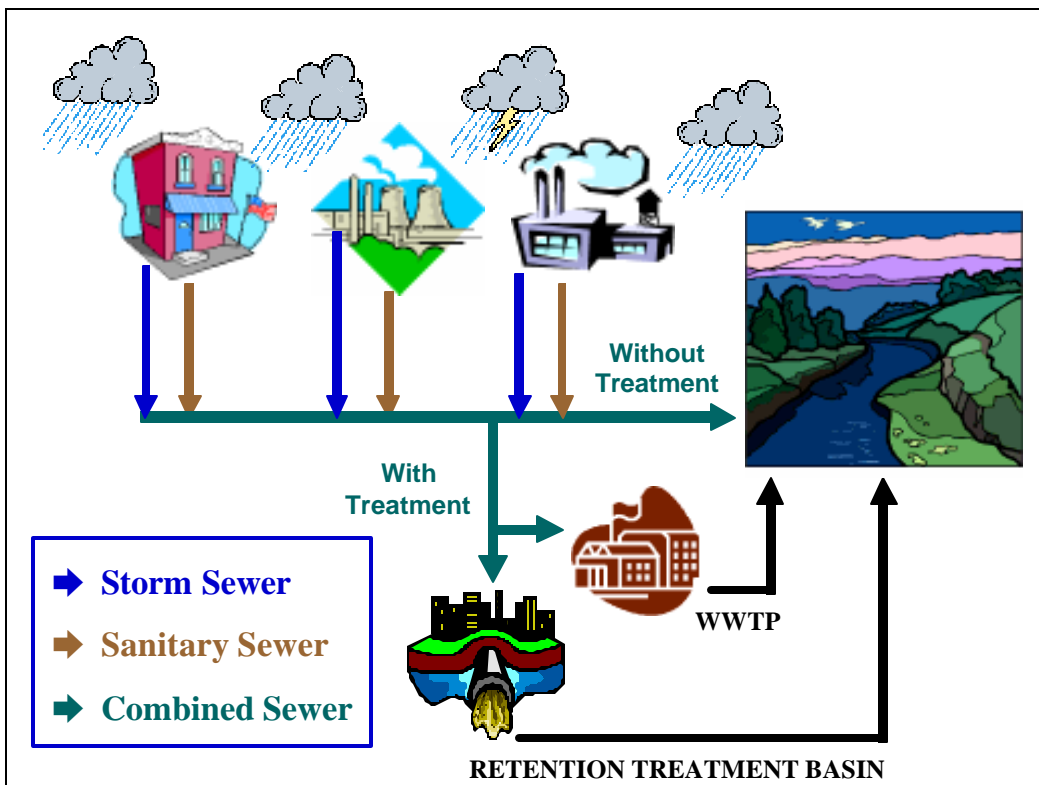


Figure 3: Combined Sewer System—Wet Weather Conditions

Who Will Let Me Know Whether the Water Is Safe for Swimming, Fishing or Canoeing?

When raw or partially treated sewage is released into a river, lake or stream the responsible municipality is required to notify the local health department. The local health department may sample, or require the responsible municipality to sample, the water-body that received the sewage discharge. If the discharge poses a public health threat, then the health department will issue a public health advisory to notify people of the dangers associated with river or lake water contact.

The local health department (usually county or “district” level) gathers information related to health aspects of water pollution for public and semi-public beaches. They issue swimming advisories and track reported illnesses related to water borne organisms. Some county health departments provide citizens with information and resources to do their own beach monitoring.

More information about water quality monitoring related to health aspects of water pollution, including a list of local health departments with phone numbers can be found online through the state of Michigan Beach Monitoring Website found at: **www.deq.state.mi.us/beach**. Phone books also contain local health department contact information.

Who Do I Contact for More Information?

While compiling the information in this report, the DEQ identified some data integrity issues and other related problems. These problems and issues were eliminated whenever possible. The DEQ has made sincere efforts to assure the accuracy of this report, which is intended for informational purposes only. If you believe the information is inaccurate, or if you have any questions or concerns regarding the information contained in the report, then please contact the appropriate district office for your area.

For additional information regarding the Water Division’s overall CSO/SSO control strategies and policies, or questions regarding specific events, please contact the appropriate district office for your area. More information, including a continually-updated database of reported events can be found online at: **www.deq.state.mi.us/csosso**.

District Contacts by County



Cadillac District: Alcona, Alpena, Antrim, Benzie, Charlevoix, Cheboygan, Crawford, Emmet, Grand Traverse, Kalkaska, Lake, Leelenau, Manistee, Mason, Missaukee, Montmorency, Osceola, Oscoda, Otsego, Presque Isle, Roscommon and Wexford.

Brian Jankowski, Phone: 231-775-3960 (6268), jankowsb@michigan.

Grand Rapids District: Barry, Ionia, Kent, Mecosta, Montcalm, Muskegon, Newaygo, Oceana and Ottawa.

Christine Veldkamp, Phone: 616-356-0263, veldkamc@michigan.gov



Jackson District: Hillsdale, Jackson, Lenawee, Monroe and Washtenaw.

Tiffany Myers, Phone: 517-780-7480, myerstj@michigan.gov

Kalamazoo District: Allegan, Berrien, Branch, Calhoun, Cass, Kalamazoo, St. Joseph and Van Buren.

Steve Norton, Phone: 616-692-6962, nortonsc@michigan.gov



Saginaw Bay District: Arenac, Bay, Clare, Gladwin, Huron, Iosco, Isabella, Midland, Ogemaw, Saginaw, Sanilac and Tuscola.

David Walters, Phone: 989-686-8025 (8265), waltersd@michigan.gov

Shaiwasee District: Clinton, Eaton, Genesee, Gratiot, Ingham, Lapeer, Livingston, and Shiawassee.

Charles Bennett, Phone: 517-625-4648, bennetc1@michigan.gov



Southeast Michigan District: Macomb, Oakland, St. Clair and Wayne.

Phil Argiroff, Phone: 734-953-1443, arigrofp@michigan.gov

Upper Peninsula District: Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Luce, Keweenaw, Mackinac, Marquette, Menominee, Ontonagon and Schoolcraft.

Kristen Mariuzza, Phone: 906-346-8417, mariuzzk@michigan.gov



Report Terms and Acronyms

Explanation of Report Headings:

EventID – A unique internal DEQ tracking number assigned to an event. If you have questions about a specific event, or need additional information, providing this number to the DEQ district office staff in your area will assist them in finding the correct information*.

Start Date/Time – The date and time the CSO/SSO discharge event began. If there were multiple discharge locations associated with a single event, all discharging at different dates/times, then this is the date/time of the earliest discharge.

End Date/Time - The date and time the CSO/SSO discharge event ended. If there were multiple discharge locations associated with a single event, all discharging at different dates/times, then this is the date/time of the latest discharge.

Event Volume – Total CSO/SSO discharge volume for the event (in millions of gallons) reported by the municipality. This value **can** be an estimated value as is often the case with SSO's. When the report lists 'Not Specified', no volume information was reported to the MDEQ.

Discharge Quality – Description of the quality of the wastewater discharged. See *Acronym/Definitions* section for detailed explanations.

Point(s) of Discharge – Narrative description of wastewater discharge location(s) (separated by ***) where multiple points of discharge occurred during a single event. Where appropriate, provides information about receiving waters and/or land areas impacted by the discharge. A three digit number preceding a receiving water name is the permittee's outfall discharge location as listed in their NPDES permit. When the report lists 'Not Specified', discharge information was not reported to the DEQ for the land area or waterbody impacted.

Control Program – For CSOs, this area of the report provides information and status of the permittee's long term control program corrective actions as contained in their NPDES permit.

Outfall Corrective Actions- For SSOs this area of the report provides information regarding corrective actions taken to reduce/eliminate future discharges from a particular SSO outfall discharge location (Note: these corrective actions do not pertain to a specific discharge event or to the municipality as a whole). The specific locations where these corrective actions have taken place are listed under "Associated Outfall(s).

Acronyms/Definitions:

Collection System – System of subsurface sewer pipes designed and used to convey either sanitary sewage or both sanitary sewage and storm water to a wastewater treatment plant.

Combined Sewer – Sanitary sewage and storm water are conveyed to the wastewater treatment plant in the same (combined) sewer pipe.

CSO – Combined Sewer Overflow

DEQ – The State of Michigan's Department of Environmental Quality

Diluted Sanitary Sewage – Sanitary sewage diluted with rain water, snow melt, or ground water.

I/I (Removal) – Inflow/Infiltration, e.g., rain water, snow melt, or ground water flowing into separate sanitary sewers via connected roof downspouts and/or building footing drains or infiltrating into the pipe through cracks in the pipe walls or joints.

MG – Million Gallons, e.g., 24,000 gallons = 0.024 MG

MH – Manhole

NPDES Permit – National Pollutant Discharge Elimination System Permit. A permit issued by the MDEQ, authorized under the federal Clean Water Act, to discharge treated wastewater to waters of the United States. Administration of this program is delegated to the State of Michigan.

mg/l – Milligrams per liter, concentration unit equivalent to parts per million.

Outfall – Point of discharge of treated, partially treated or untreated wastewaters to surface waters of the state.

Partially Treated Sewage – Any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is not treated to national secondary treatment standards for wastewater or that is treated to a level less than that required by a National Pollutant Discharge Elimination System permit. This wastewater typically receives some amount of treatment which may involve any combination of screening, settling, skimming and/or disinfection.

PS – Pump station

Raw Sewage – Untreated sanitary sewage, which has not been disinfected.

RTB – Retention Treatment Basin used for treatment of combined sewage.

Separate Sanitary Sewer – Separate sanitary sewer pipe, designed to convey only sanitary sewage and minor amounts of infiltration and inflow to a wastewater treatment facility. These types of collection systems usually have another separate pipe for conveying storm water.

SSO – Sanitary Sewer Overflow

Surface Waters of the State – e.g., rivers, streams, creeks, lakes, some open ditches, and wetlands. As opposed to ground waters (i.e., aquifers).

TSS – Total Suspended Solids

Twp – Township

WWTP – Wastewater Treatment Plant or other treatment facility such as a treatment lagoon.

Combined Sewer Overflows

What are Combined Sewer Overflows and What Causes Them?

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems were designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. Historically, CSOs are among the major sources for beach closings and other water quality impairments.

Many combined sewer systems have recently installed treatment facilities (called retention/treatment basins), which are designed to capture the combined sewage and rain water long enough to provide initial treatment and disinfection. This initial treatment often involves allowing solids to settle, the skimming of floatable materials such as oils; and disinfection of disease causing organisms, often accomplished through the addition of chlorine. This combined rainwater and sewage wastewater, with chlorine disinfection is the typical treated CSO discharge in the state of Michigan; therefore, many CSO releases are considered partially treated sewage. The treatment provided significantly reduces the amount of pollutants discharged and the associated public health risk.

How are CSOs Addressed?

CSOs are a problem nationwide. Michigan initiated a CSO control program in 1988, and in 1994 the federal government developed a nationwide CSO Control Policy. This policy suggested that states use an enforceable mechanism, preferably the permit program that was initiated by the federal Clean Water Act (called the National Pollutant Discharge Elimination System) to require CSO communities to implement interim measures referred to as “nine minimum controls” by January 1, 1997, and to develop CSO Long-Term Control Plans (LTCPs). The “nine minimum controls” basically included interim measures that could be undertaken to improve the quality of the combined wastewater before major sewer system construction activities would be undertaken as part of the LTCP. Once the state and the community reached agreement on the LTCP, the community would then implement the CSO controls as soon as practicable. In Michigan, these LTCPs are contained in various legal documents including state issued NPDES permits, Administrative Consent Orders, Abatement Orders, and other types of court orders. In Michigan, all municipalities with CSOs have completed the necessary interim control measures.

The LTCP must assess a range of control options, including costs and benefits, and lead to selection of an alternative that would achieve appropriate water quality objectives and compliance with the federal Clean Water Act and state laws. Since the cause of CSOs is the overabundance of rain water entering the sewer system, many municipalities decide to separate their combined sewers, thereby re-directing rain water to lakes, rivers and streams. Sewer separation projects are expensive and time consuming because they involve extensive utility and road reconstruction. Sewers run under roads, therefore roads need to be torn up and re-paved in order to gain access to and re-direct the sewers. While separating the sewer system is a common practice to eliminate CSOs, other communities may build additional treatment or storage basins to contain and control CSOs.

What is the Main Challenge for Communities to Address in Controlling CSOs?

Several challenges exist in controlling CSOs, but the main challenges are the costs associated with mounting water and wastewater infrastructure improvements and the financial resource-intensive nature of CSO controls. CSO LTCPs typically involve major infrastructure investments that must compete with other community needs. For example, prior to CSO control, Saginaw Michigan's 36 CSOs discharged nearly 3 billion gallons of combined sewage each year to the Saginaw River. As of 2001, Saginaw has spent nearly \$100 million on capital improvements in the combined sewer system. These expenditures have resulted in the elimination of 20 out of the 36 CSO locations, and a 75% reduction in the amount of combined sewage discharged from the combined sewer system each year. The Saginaw River is now characterized as one of the top walleye fisheries in the country. Saginaw is only one example of a community addressing CSO discharges through investment in infrastructure; it is an especially good example due to the associated environmental improvement. This example demonstrates that Michigan is making progress in addressing these discharges; however, the following report confirms that as a state we still have a long way to go.

What Data Does the CSO Report Contain?

The data contained in the following CSO Report was reported (as required by law) to the DEQ by the responsible municipalities. During the report period from July 10, 2000 through December 31, 2001 there were 669 reports of CSO, of which 639 reports included discharge volume information. The total CSO volume reported was 40,302.81 million gallons (i.e., approximately 40 billion, 303 million gallons). For the partial year 2000, there were 168 reports of CSO, of which 163 reports included discharge volume information. The total CSO volume reported for the partial year 2000 was 8,576.89 million gallons. For the year 2001, there were 501 reports of CSO, of which 476 reports included discharge volume information. The total CSO volume reported for the year 2001 was 31,725.93 million gallons.

Click to view CSO report

Sanitary Sewer Overflows

What are Sanitary Sewer Overflows?

Sanitary sewer overflows, or SSOs, are discharges of raw or inadequately treated sewage from municipal separate sanitary sewer systems. These systems are designed to carry sanitary sewage but not storm water. When an SSO occurs, sewage is released into areas such as city streets and streams rather than being transported to a treatment facility. They are illegal and often constitute a serious environmental and public health threat. Sewage discharges into basements may also occur, but these events are not required to be reported to DEQ for entry in this report under Section 324.3112(a) of NREPA.

What causes an SSO?

For the purposes of this report, SSOs can be categorized in three general categories, those being chronic SSOs, site specific SSOs, and SSOs due to mechanical/electrical failure or emergency.

Chronic SSOs can occur when too much water enters into a sanitary sewer system. Other sources of water besides that contained in sewage, (termed “clear water”) enters the sanitary sewer system when:

- Ground water seeps in through cracks in the sewer pipes;
- Rain water or snow-melt flows into the sanitary system through improperly connected roof drains;
- Groundwater enters from footing drains and sump pumps; and
- Storm sewers are inadvertently connected to the sanitary sewer.

Chronic SSOs can also occur when sanitary systems are too small to contain all the sanitary wastewater that is in the sewer system. Therefore, SSOs can occur when too much sewage is introduced into the system to the point where sewers and pumps that normally pump the sewage through the system are undersized to carry the excess sewage. Factors that can lead to chronic SSOs include: increased development in a community to the point where the area does not have enough sewer system capacity to handle the population; or system deterioration due to the age of the sewer system.

Site specific SSOs occur when blockages in the sewer cause sewage to back up in the sewer system. Blockages can happen when tree roots grow into the sewer or when sediments build up in the sewers.

Finally, SSOs occur due to power outages, emergency conditions, and equipment or mechanical failures. Examples include: faulty valves within the sewer pipes, lightning strikes to pump stations; the breaking of a sewer pipe; power failures that shut down pumps (which are installed to force sewage through the system), and even car accidents that damage sewer system pump stations.

How Does the Sewage end up in the Environment?

Sewage may escape from a sewer system in many different ways. For example, SSO events include direct releases of sewage from a broken sewer pipe and releases of sewage through a manhole in the lowest area of the sewer system. Sometimes sewage has been intentionally released from a sewer system into the environment to prevent basements within the system from flooding. Additionally, some sewer systems have emergency storage basins (often called equalization basins) that hold excess sewage in an overflow scenario. These basins can provide some treatment of the sewage, and in extreme rain events, unauthorized overflow releases of this partially treated sewage may occur.

How are SSO's Addressed?

Since SSOs have different causes, there are various ways that SSOs can be addressed. When SSOs are a chronic problem in a community, DEQ will require the municipality to implement corrective actions within a defined schedule ("schedule of compliance"). The schedule of compliance will outline how the community will eliminate all SSOs, and the schedule will be embodied in a legal document. Frequently, DEQ works with communities to achieve a voluntary settlement (settlements between DEQ and a community are called "administrative settlements"). These settlements are often embodied in legal documents called District Compliance Agreements, permits, or Administrative Consent Orders. If an administrative settlement is not achieved, then a schedule of compliance will often be sought through litigation resulting in a court order or court judgment.

For site specific SSOs caused by sewer blockages, the response is undertaken by the responsible municipality. The response activity will usually include the removal of the sewer blockage to restore the proper function of the sewer system, along with cleanup and/or disinfection of the areas where sewage was spilled to limit public exposure. The emergency response for SSOs due to equipment failures are handled by the municipalities in a similar way. The power is restored or the mechanical problem is fixed (i. e. the cracked sewer is repaired, or the faulty pump is replaced); and the area is similarly cleaned up or disinfected.

What Factors Might Justify Longer-term Plans for Stopping Chronic SSOs?

Sewer systems are frequently complex and expensive to fix. Consider that sewer pipes are buried with other utility lines, oftentimes under roads, making access to them difficult. This limited access not only makes repair difficult, but it also makes the identification of extra sources of water to the sewer system a challenge. In addition, many sewer systems were built over 30 years ago, are reaching the end of their design-life and are in need of rehabilitation or replacement. Additional costs to the municipality could include: engineering to design system improvements, upgrades to the community wastewater treatment plant to handle additional flow, and replacement of pumps and other equipment that make up the sewage system. Monies may or may not be available via grants, low rate loans or rate increases; therefore, many communities need time to secure funding. In sum, communities usually need time to find the cause of large systemic problems such as identifying the sources of "clean water" to their system or finding the components in the system that are undersized. In addition the community will need time to review financing alternatives, design construction improvements, and to implement the project.

What Data Does the SSO Report Contain?

The data contained in the following SSO Report was reported (as required by law) to the DEQ by the responsible municipalities. During the report period from July 10, 2000 through December 31, 2001 there were 565 reports of SSO, of which 477 reports included discharge volume information. The total SSO volume reported was 414.28 million gallons. For the partial year 2000, there were 168 reports of SSO, of which 143 reports included discharge volume information. The total SSO volume reported for the partial year 2000 was 132.50 million gallons. For the year 2001, there were 397 reports of SSO, of which 334 reports included discharge volume information. The total SSO volume reported for the year 2001 was 281.79 million gallons.

Key to the Reported Volume Codes:

a = reported as an approximate value

c = reported volume unit (e.g., cubic feet) converted to standard units (million gallons)

g = reported volume greater than or equal to listed value

l = reported volume less than or equal to listed value

Note 1: When a volume range was reported, the greatest value was used for the purposes of this report.

Note 2: When applicable, volume totals were rounded off to a maximum of three decimal places.

Click to view SSO report

This Report was prepared by:



**Michigan Department of Environmental Quality
Water Division, in cooperation with the
Environmental Science and Services Division**

**Internet Address:
www.michigan.gov/deq**

Report Internet Address:

<http://www.deq.state.mi.us/documents/deq-swq-csossoreport01.pdf>

**John Engler, Governor
Russell J. Harding, Director**