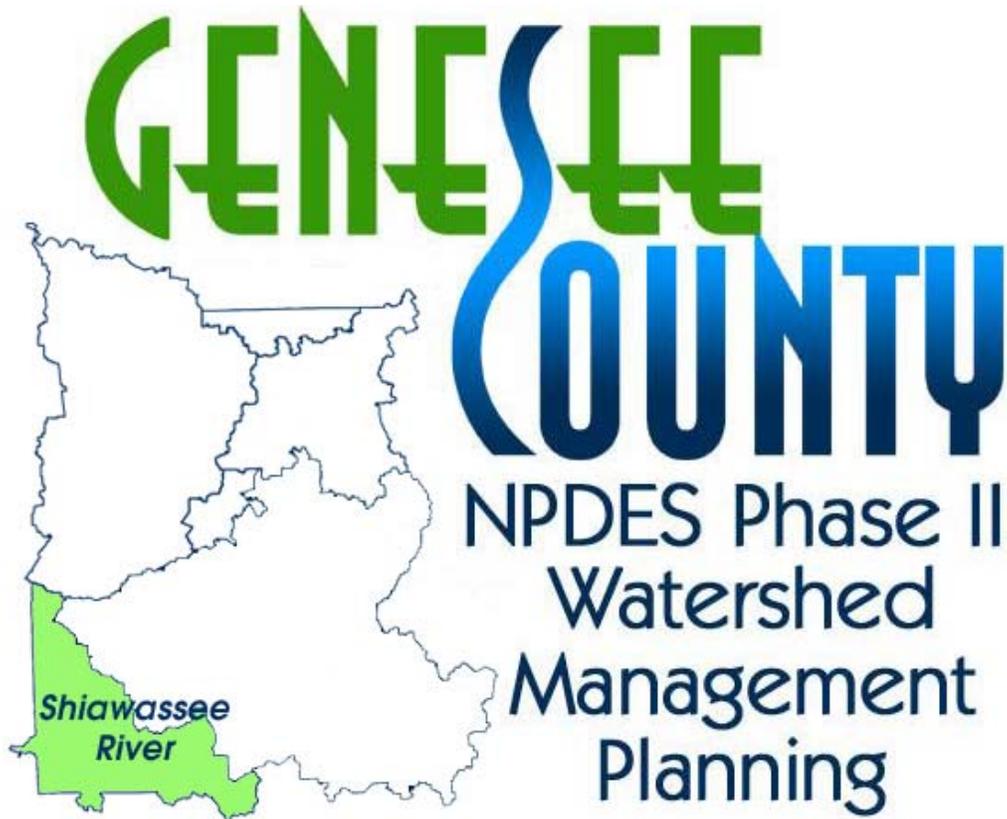


Shiawassee River
Watershed

Stormwater Management Plan



February 27, 2008



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ACRONYMNS

The following is a list of acronyms and definitions that are useful for understanding the contents of this report:

AOC	Area of Concern
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CAER	Center for Applied Environmental Research
CAFOs	Concentrated Animal Feeding Operations
CMI	Clean Michigan Initiative
COC	Certificate of Coverage
CREP	Conservation Reserve Enhancement Program
CVT	City, Village or Township
CWA	Clean Water Act
CWP	Center for Watershed Protection
EPA	Environmental Protection Agency
ERP	Evaluation and Revision Plan
FCAs	Fish Contaminant Advisories
FRWC	Flint River Watershed Coalition
GCDC	Genesee County Drain Commissioner's Office
GIS	Geographic Informational System
GLNPO	Great Lakes National Program Office
GPS	Global Positioning System
GREEN	Global Rivers Environmental Education Network
IDEP	Illicit Discharge Elimination Plan
JPA	Joint Permit Application
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MS4s	Municipal Separate Storm Sewer Systems
NRCS	Natural Resources Conservation Service
NPDES	National Pollutant Discharge Elimination System
OCDC	Oakland County Drain Commission
PEP	Public Education Plan
POTWs	Publicly Owned Treatment Works
PPP	Public Participation Plan
RAP	Remedial Action Plan
SESC	Soil Erosion Sedimentation Control
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
SWPPI	Storm Water Pollution Prevention Initiative
SWAG	Subwatershed Advisory Group
SWM	Surface Water Management
TMDL	Total Maximum Daily Load
UAW	United Auto Workers
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation
WAG	Watershed Advisory Group
WIMS	Watershed Information Management System
WMP	Watershed Management Plan
WQS	Water Quality Standards

SECTION 1 - EXECUTIVE SUMMARY

The goal of the Shiawassee River Watershed Management Plan is to recognize and catalog the current conditions impacting the water quality of the Shiawassee River, its tributaries and lakes, address actions that can be taken to resolve existing problems and prevent future degradation. Over the last two years, representatives from both county and local communities have worked together to develop this plan by:

- Developing a Public Participation Plan
- Identifying stakeholders
- Gathering available information on: water quality, stormwater flow, habitat
- Identifying known impairments to the river and its tributaries
- Identifying and prioritizing the sources of the pollutants
- Obtaining input from community officials, stakeholders and the general public
- Establishing and prioritizing goals for the watershed
- Identifying the actions for which the communities would take responsibility
- Highlighting areas where gaps existed between the goals and the actions
- Developing a list of recommended activities to be implemented by the local governmental agencies
- Presenting this information to stakeholders and the general public

This planning process resulted in a Stormwater Management Plan that fulfills Genesee, Livingston & Oakland Counties' and those Phase II community's requirements under the Michigan Department of Environmental Quality (MDEQ) Phase II Watershed-based Stormwater Permit. Shiawassee County is not a Phase 2 Community and their participation in the watershed planning process is completely voluntary.

Livingston County through the Livingston County Drain Commissioner's Office has produced a Stormwater Management Plan for the South Branch of the Shiawassee River. That plan is referred to as "Upper-2 Shiawassee River Watershed Management Plan". Since much of the watershed originally part of this plan has been included under the Upper-2 Watershed plan the watershed boundary line was moved, with a few exceptions to the jurisdiction boundary to minimize duplication. This reduced this 149 mi² watershed to 92 mi².

BACKGROUND

The initial emphasis of the National Pollutant Discharge Elimination System (NPDES) under the Federal Clean Water Act of 1972 was to control discharges from industrial and large municipal wastewater treatment plants. Once these discharges were substantially under control, it became apparent that the combined impact of various smaller widespread (non-point) pollution sources was preventing many streams and receiving waters from meeting state water quality standards. These diffuse sources include failing septic systems, stormwater runoff from residential lawns, agricultural fields, parking lots, roadways and construction sites, illegal dumping, and airborne deposition. Adequate

control of all these point and non-point sources is necessary to restore and maintain the use of the nation's water resources.

Instead of imposing discharge limitations and stormwater control programs, the Michigan Department of Environmental Quality is allowing local units of government to establish goals to improve water quality through development and implementation of a watershed management plan. In 2001, Genesee County designated the Drain Commissioner's Office as the county agency responsible to engage in watershed management activities and establish a system of stormwater management services under Act 342, Public Acts of Michigan, 1939, as amended ("Act 342"). Although not all of the communities located within Genesee County are regulated under the NPDES Phase II program, all the communities have signed a contract under Act 342 with the Genesee County Drain Commissioner's Office to provide stormwater management services which includes:

- Applying for Certificate of Coverage for the communities and Genesee County under Michigan's Phase II Watershed-based Stormwater Permit.
- Organize and direct the development of a Public Participation Plan
- Organize and oversee the Public Education and Participation Sub Committee
- Organize and oversee the New Construction Standards and Post Construction Practices Sub Committee
- Organize and oversee the Monitoring and Mapping Sub Committee
- Organize and direct the watershed workgroup in developing the Stormwater Management Plan.
- Organize and oversee planning and implementation of the above programs
- Assist the contract communities in preparing individual SWPPs
- Coordinating between the communities and the school districts that have signed contracts as nested jurisdictions.

The Oakland County Drain Commissioner's Office (OCDC) is the agency for the Oakland County Phase II Stormwater Permit. The OCDC coordinates communication between Oakland County departments, as well as acting as a resource for watershed and sub watershed groups. Phase II communities within Oakland County are either implementing the watershed plan(s) on their own or are contracting to partner with watershed groups within adjoining watersheds to meet their requirements.

The Livingston County Drain Commission (LCDC) has taken the lead on the upstream areas through their separate "Upper-2 Shiawassee River Watershed Management Plan". This plan has been completed and submitted to the Michigan Department of Environmental Quality (MDEQ) for review. The Phase 2 communities within Livingston are implementing the watershed plans on their own with the Livingston County Drain Commissioner's Office (LCDC) providing assistance by coordinating implementation efforts. The Phase 2 Communities can also contract with the LCDC for IDEP work.

Shiawassee County and its communities are not regulated under the NPDES Phase II program, but are invited to participate in the development of the Stormwater Management Plan.

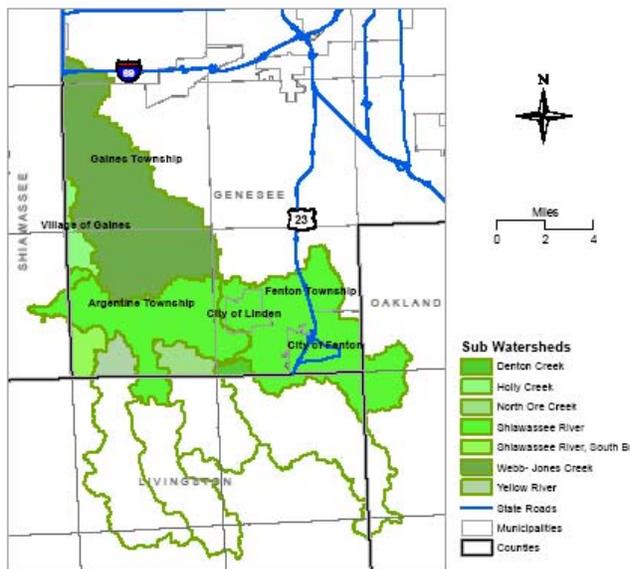
By working together, these public agencies designed a watershed management plan that is built on the strengths of existing programs, resources, and addresses local water quality concerns.

SECTION 2 - INTRODUCTION

SHIAWASSEE RIVER WATERSHED



The Upper I Shiawassee River has several tributaries that have headwaters located in northern Livingston County and the northwest corner of Oakland County flowing north through the southwest corner of Fenton Township into the main Shiawassee River. Then continues west across Genesee County into Shiawassee County in Michigan's lower peninsula. The tributaries that flow thru the 92.12 square-mile (58,956 acres) watershed studied here are comprised of 7 smaller watersheds. From north to south the watersheds are the Webb-Jones Creek, Holly Creek (head waters), Shiawassee River, South Branch of the Shiawassee, Yellow River, North Ore Creek & Denton Creek. The Upper I Shiawassee River Watershed contains over 5.5 square miles of lakes, and more than 234 miles of rivers, creeks and drains, providing many values, including water quality, habitat for indigenous species and recreation opportunities where access is available to the public.



Everything in this watershed is connected from the rain that falls on the ground and either soaks in or flows to the swales that drain to the ditches into the creeks and lakes to finally drain to the Shiawassee River. From there it flows west out of Genesee County and through Shiawassee County where it joins the Flint River in Saginaw County. The Shiawassee, Tittabawassee, and the Cass Rivers merge to form the Saginaw River near Saginaw. The Saginaw River flows into Saginaw Bay and Lake Huron.

Figure 2-1 Location Map (not to scale)

Land use in the Shiawassee River watershed varies from commercial and residential concentrated in the center of the watershed, to rural residential clustered around the lakes and agricultural throughout much of the headwaters in the southeast and Argentine. Over time, the agricultural/ undeveloped land uses are being converted to urban and suburban uses by increased development. The change in land use this basin is facing has had, and will have profound effects on the Shiawassee River and Lakes for many decades to come. Through watershed planning, there is the opportunity for consideration of alternative strategies for protection, rehabilitation, and enhancement of the health of the Shiawassee River and its tributaries with the hope of also raising its recreational and aesthetic aspects. Much like the watershed planning process, which is developed through many sources from political entities, to stakeholders and the general public's input, the health of the Shiawassee River and Lakes are determined by many sources from hydrologic, geomorphic, and biologic realities to ordinances, land changes and the release of pollutants into the watershed. What the Shiawassee River and lakes become in the future will depend not only on our actions and desires, but also on the nature of its catchments and its connections to larger, regional systems.

The Shiawassee River Watershed has gone through many changes throughout the years, most recently a significant portion of this watershed has been changed from agricultural to developed residential and commercial land around US-23 and the Fenton area.

Problems within the watershed include development around lakes, bank erosion, increased sediment carried into the watercourses from both new development and agricultural runoff. As areas are urbanized there is a change or loss of wetlands and low areas that hold or detain water.

PURPOSE OF THE WATERSHED MANAGEMENT PLAN

The goal of the Shiawassee River Watershed Management Plan is to recognize and catalog the current conditions impacting the water quality of the Shiawassee River and lakes, address actions that can be taken to resolve existing problems and prevent future degradation.

Watershed planning is an innovative way to address Phase II NPDES permit requirements. Michigan is one of the few states to offer this permitting option. With over 300 communities in Michigan needing to apply for Phase II Permit coverage, over 250 have decided to use the watershed planning option, due to its many benefits over a traditional permitting program.

Some benefits of the watershed approach include access to grant funding, including the State Bond Fund known as Clean Michigan Initiative (CMI), expanded schedules for watershed management planning and choices on how and when implementation will occur. A watershed approach involves coordination with both public and private sectors, focusing efforts to address the highest priority problems.

WHAT IS A WATERSHED

A watershed is any area of land that drains to a common point. That common point may be a lake, the outlet of a river, or any point within a river system. Throughout this Watershed Management Plan, the terms basin, sub-basin, watershed, sub-watershed, and catchment are used to describe the drainages of the river.

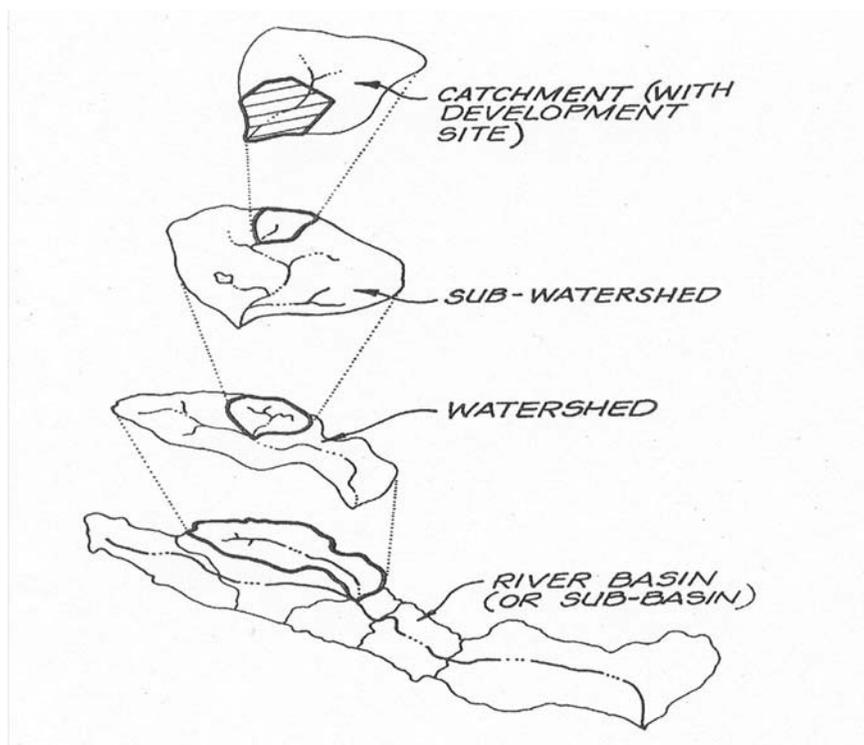
The largest watershed management unit is the basin. A basin drains to a major receiving water, such as a large river, estuary or lake. Within each basin are a group of sub-basins, that are a mosaic of many diverse land uses, including forest, agriculture, range and urban areas. Sub-basins are composed of a group of watersheds, which, in turn, are composed of a group of sub-watersheds. Within sub-watersheds are catchments, which are the smallest units in a watershed, defined as the area that drains an individual development site to its first intersection with a stream (Center for Watershed Protection)

Table 2-1 Description of the Various Watershed Management Units

Watershed Management Unit	Typical Area (square miles)	Influence of Impervious Cover	Sample Management Measures
Catchment	0.05 to 0.50	Very strong	BMP and site design
Subwatershed	1 to 10	Strong	Stream Classification and management
Watershed	10 to 100	Moderate	Watershed-based zoning
Subbasin	100 to 1,000	Weak	Basin planning
Basin	1,000 to 10,000	Very weak	Basin planning

(CWP, 1998)

Figure 2-2 Watershed Management Units



PLAN REQUIREMENTS

According to the MDEQ NPDES Permit for Storm Water Discharges from municipal separate storm sewer systems, subject to watershed plan requirements, the WMP shall contain the following, at a minimum:

- *an assessment of the nature and status of the watershed ecosystem to the extent necessary to achieve the purpose of the WMP;*
- *short-term measurable objectives for the watershed;*
- *long-term goals for the watershed (which shall include both the protection of designated uses of the receiving waters as defined in Michigan's Water Quality Standards, and attaining compliance with any TMDL established for a parameter within the watershed);*
- *determination of the actions needed to achieve the short-term measurable objectives for the watershed;*
- *determination of the actions needed to achieve the long-term goals for the watershed;*
- *assessment of both the benefits and costs of the actions identified above (a "cost/benefit analysis" is not required);*
- *commitments, identified by specific permittee or others, as appropriate, to implement actions by specified dates necessary to achieve the short-term measurable objectives;*
- *commitments, identified by specific permittee or others as appropriate, to implement actions by specified dates necessary to initiate achievement of the long-term goals; and*
- *methods for evaluation of progress, which may include chemical or biological indicators, flow measurements, erosion indices, and public surveys.*

RELEVANT FEDERAL, STATE AND REGIONAL PROGRAMS

Clean Water Act

Growing public awareness and concern for controlling water pollution led to enactment of the Clean Water Act (CWA). The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA also continued requirements to set water quality standards for all contaminants in surface waters. The Act made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. It also funded the construction of sewage treatment plants under the construction grants program and recognized the need for planning to address the critical problems posed by nonpoint source pollution.

Subsequent enactments modified some of the earlier CWA provisions. Revisions in 1981 streamlined the municipal construction grants process, improving the capabilities of treatment plants built under the program. Changes in 1987 phased out the construction grants program, replacing it with the State Water Pollution Control Revolving Fund, more commonly known as the Clean Water State Revolving Fund. This new funding strategy addressed water quality needs by building on EPA-State partnerships.

NPDES Municipal Storm Water Phase II

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating discharges of pollutants into waters of the United States. Phase I of the NPDES storm water program required permit coverage for large or medium municipalities that had populations of 100,000 or more. Phase II of the NPDES Storm Water program builds upon the existing Phase I program by requiring smaller communities, also known as small municipal separate storm sewer systems (MS4s), to be permitted.

Once a permit application is submitted by the operator of a regulated small MS4 and a permit is obtained, the conditions of the permit must be satisfied and periodic reports must be submitted on the status and effectiveness of the program. The Final Phase II Rule requires small MS4 operators to design programs for permit compliance to:

- reduce the discharge of pollutants to the “maximum extent practicable” (MEP);
- protect water quality; and
- satisfy the appropriate water quality requirements of the Clean Water Act.

Michigan’s Department of Environmental Quality (MDEQ) has developed a strong permitting process for Phase II and is the responsible permitting agency for the State of Michigan. Michigan developed two permitting options including a jurisdictional based permit and a watershed based general permit. PA 451 of 1994 sections 3103 and 3106 Part 21 R 323.2161a of Michigan Law regulate municipal storm water discharge requirements and the minimum permit requirements for the State of Michigan.

Michigan is unique nationally as one of the few states that have formalized their NPDES Storm Water Phase II compliance through the use of a general permit based on watershed management planning. This special permitting approach has resulted in a large majority of Michigan’s regulated Phase II communities using watershed management planning as a tool to implement their Phase II Program.

Total Maximum Daily Load Program (TMDLs)

A TMDL is an acronym used to describe a scientific study conducted on how much pollutant load a lake or stream can assimilate. TMDLs are conducted when a lake or stream does not meet water quality standards (WQS). The TMDL takes into account point source discharges, such as discharge from a wastewater treatment plan, and nonpoint source discharges, such as stormwater runoff.

The Clean Water Act, section 303, establishes the water quality standards and TMDL programs. Water quality standards are set by States, Territories, and Tribes. They identify the uses for each waterbody, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use.

The State of Michigan administers the TMDL Program in Michigan. These rules define the water quality goals for a lake or stream. MDEQ defines water quality standards as “state rules established to protect the Great Lakes, the connecting waters, and all other surface waters of the state”. The goals are in three areas, including the uses of the lake or stream, such as swimming and fishing; safe levels to protect the uses, such as the

minimum oxygen level needed for fish to live; and procedures to protect high quality waters.” (MDEQ website summary)

Public Act 451 of 1994 – Natural Resources and Environmental Protection Act

Michigan Act 451 of 1994 is an act to protect the environment and natural resources of the state; to codify, revise, consolidate, and classify laws relating to the environment and natural resources of the state; to regulate the discharge of certain substances into the environment; to regulate the use of certain lands, waters, and other natural resources of the state; to prescribe the powers and duties of certain state and local agencies and officials; to provide for certain charges, fees, and assessments; to provide certain appropriations; to prescribe penalties and provide remedies; to repeal certain parts of this act on a specific date; and to repeal certain acts and parts of acts.

Notable parts of the act relating to storm water include: Part 41 – Sewerage Systems; Part 31 – Water Resources Protection; Part 91 – Soil Erosion & Sedimentation Control; Part 87 – Groundwater and Freshwater Protection; Part 301 – Inland Lakes and Streams; Part 303 – Wetland Protection; and Part 305 – Natural Rivers Act.

Public Act 40 of 1956 – The Drain Code

Michigan Act 40 of 1956 in an act to codify the laws relating to the laying out of drainage districts, the consolidation of drainage districts, the construction and maintenance of drains, sewers, pumping equipment, bridges, culverts, fords, and the structures and mechanical devices to properly purify the flow of drains; to provide for flood control projects; to provide for water management, water management districts, and subdistricts, and for flood control and drainage projects within drainage districts; to provide for the assessment and collection of taxes; to provide for the investment of funds; to provide for the deposit of funds for future maintenance of drains; to authorize public corporations to impose taxes for the payment of assessments in anticipation of which bonds are issued; to provide for the issuance of bonds by drainage districts and for the pledge of the full faith and credit of counties for payment of the bonds; to authorize counties to impose taxes when necessary to pay principal and interest on bonds for which full faith and credit is pledged; to validate certain acts and bonds; and to prescribe penalties.

State Programs and Permits

State programs that directly enforce and assist in compliance with federal and state storm water regulations include the following MDEQ Water Division groups: Storm Water, Soil Erosion and Sedimentation Control, NPDES Permits, and Nonpoint Source Pollution. State-level funding programs that support storm water related projects include: the Water Pollution Control Revolving Fund, the Strategic Water Quality Initiative Fund, and the Clean Michigan Initiative.

Despite the NPDES permitting process that covers storm water-specific issues, other permits may apply for a specific case. Many state and federal permits are covered under the MDEQ/U.S. Army Corps of Engineers Joint Permit Application (JPA) package. The JPA covers activities relating to: wetlands, floodplains, marinas, dams, inland lakes and streams, great lakes bottomlands, critical dunes, and high-risk erosion areas. Other permits not included in the JPA include: the Sewerage System Construction Permit and the Groundwater Discharge Permit.

Additional Programs

The MDEQ maintains a number of programs that may relate to storm water issues, including: Dam Safety, National Flood Insurance, Wetlands Protection, Watersheds, Surface Water Enforcement, Source Water Assessment, Septage, Sanitary and Combined Sewer Overflow, Land Development, Inland Lakes, and Groundwater Discharge. Other MDEQ, Michigan Department of Natural Resources, regional, or local programs may also relate to storm water issues.

Specific situations may invoke numerous other federal, state, and local programs that directly or indirectly relate to storm water issues. The following list presents some of these:

- The federal Safe Drinking Water Act establishes wellhead protection provisions that are implemented at the state (MDEQ Water Wellhead Protection program) or local level. Wellhead protection may involve managing and treating storm water to prevent aquifer pollution.
- Coastal and shoreline areas invoke numerous federal laws such as the Shoreline Erosion Protection Act and the Coastal Zone Act, state laws, and state programs such as Coastal Management, Sand Dune Protection, and Shoreland Management.
- Commercial/industrial facilities (mines, landfills, agriculture facilities, etc.) have numerous laws and regulations controlling on-site materials use and site-related runoff control requirements that are designed to minimize environmental impacts. Example laws include: the Surface Mining Control & Reclamation Act, the Resource Conservation and Recovery Act, and the Federal Insecticide, Fungicide, and Rodenticide Act.

