

Watershed Approach to Restoring and Protecting Michigan's Waters

Purpose

The Environmental Advisory Council (EAC) recently recommended that the Department of Environmental Quality (DEQ) consider ways to improve the use of watershed management approaches to protecting Michigan's waters. The Water Bureau (WB) has long understood the environmental and logistical benefits of organizing efforts to monitor, restore and protect the waters of the state along watershed boundaries. Most of the WB's programs dealing with surface water quality are implemented on a watershed basis and the vast majority of the DEQ's watershed related programs are in the WB. The following is a summary of the Water Bureau's efforts to use a watershed approach to protecting waters of the state.

Background

Historically, two major factors drove the WB to organize surface water monitoring, restoration and protection programs along watershed boundaries. The first was recognition of the environmental benefits of a holistic approach to watershed management. The second was recognition of the logistical, cost and efficiency benefits of organizing work along watershed boundaries. For example, staff were able to develop more protective National Pollutant Discharge Elimination System (NPDES) permits when the cumulative impact of all of the discharges to a waterbody were considered at the same time. Dividing monitoring activities along watershed boundaries minimized staff travel and ensured that staff obtained a complete picture of the extent and causes of impairments within each watershed as well as the controls necessary to protect and restore each watershed. Likewise, staff understood that implementing nonpoint source (NPS) controls at individual sites without the benefit of a watershed plan was not the best use of resources and not as likely to achieve the desired environmental results. Therefore, most of the programs implemented by the WB to restore and protect the surface waters of the state are currently organized along watershed boundaries.

In the 1980's, the WB developed a Five-Year Basin Plan to coordinate and organize the reissuance of NPDES permits (as well as the monitoring necessary to support the development of NPDES permits) on a watershed basis. In order to maintain a consistent workload, approximately one-fifth of Michigan's NPDES permits are reissued each year. Since Michigan attempts to reissue all permits in a given watershed during the same year, individual watersheds become NPDES permit priority areas once every five years. In any given year, priority basins are distributed throughout the state to facilitate a consistent NPDES permit workload among the district offices and facilitate consistent monitoring effort across the state. Watershed monitoring is conducted two years prior to permit issuance to allow adequate time for data collection, analysis, interpretation and incorporation of results into the permit development process. Other WB programs have been inserted into this process to gain monitoring efficiencies and improve coordination between the programs protecting the waters of the state. Figure 1 shows how the state's watersheds have been divided for implementation of the Five-Year Basin Plan. An example of how the various WB programs are implemented in a given watershed is provided in Table 1.

Selected WB Programs

The following WB programs have been organized along watershed boundaries or modified to some extent in order to maximize the environmental and logistical benefits associated with a watershed management approach to restoring and protecting the waters of the state:

NPDES Permits: The NPDES permit process was initiated by The Federal Water Pollution Control Act amendments of 1972. The purpose of the program is to control the discharge of pollutants into surface waters by imposing effluent limitations to protect the environment. The NPDES permit program was primarily responsible for the dramatic improvements in water quality observed in many of the most grossly polluted waters of the state. Also, the WB coordinates watershed activities with the Department of Natural Resources (DNR) by providing the DNR with all NPDES public notices then consulting with the DNR regarding permit requirements for trout streams, intake structures and thermal discharges. As noted above, the environmental and logistical benefits of re-issuing NPDES permits on a watershed basis were among the earliest drivers of the WB's efforts to develop watershed management approaches to restoring and protecting the waters of the state.

NPDES Watershed Based Municipal Separate Storm Sewer Systems (MS4) Permits: Municipalities in urban areas are required to have storm water control permits. One MS4 general permit allows for watershed-based, locally driven, flexible programs for dealing with wet weather issues. Jurisdictions within a watershed collaborate on a watershed management plan intended to assess the status of the ecosystem; define short and long term goals and actions; and commit to implementing wet weather controls.

Groundwater Discharge Permits Program: The Groundwater Discharge Permits Program regulates the discharge of wastes and wastewaters to the ground or groundwater of the state. The WB recognizes the connection between groundwater and surface water and has initiated efforts to organize the Groundwater Program along watershed boundaries. In addition, this approach will improve program efficiency by more evenly distributing the permit re-issuance and inspection workload over a five year cycle.

Routine Compliance Activities: Several types of inspections are conducted at facilities with NPDES or Groundwater Discharge permits. Compliance Survey Inspections (CSIs) are conducted at all facilities classified as "majors" by the NPDES Permit Program and at many of the other facilities. Federal and Michigan Industrial Pretreatment Program (IPP) Inspections, Federal IPP Audits and Biosolids Program Inspections are also conducted. The inspections and audits are conducted by WB staff on a schedule designed to be consistent with the Five-Year Basin Plan and are conducted prior to permit issuance so that effluent quality data generated as part of the inspections and other pertinent information are available to support permit development.

Water Quality Monitoring: In 1997 the DEQ developed “A Strategic Environmental Quality Monitoring Program for Michigan’s Surface Waters” to describe the monitoring activities necessary for a comprehensive assessment of water quality. The strategy consists of nine interrelated elements including: fish contaminants, water chemistry, sediment chemistry, biological integrity, wildlife contaminants, bathing beaches, inland lake quality and eutrophication, stream flow, and volunteer monitoring. The monitoring strategy guides use of a portion of the 1998 Clean Michigan Initiative; a voter approved bond to restore and protect Michigan’s environment. Also, the monitoring strategy recognizes the importance of coordinating monitoring activities on a watershed basis consistent with the Five-Year Basin Plan. In many cases, monitoring is coordinated or conducted cooperatively with other state or federal agencies. For example, the DEQ works closely with the DNR to conduct fish and wildlife contaminant monitoring projects and monitor aquatic life in rivers and streams. Some water chemistry monitoring and fish contaminant monitoring projects are conducted cooperatively with the United States Geological Survey and United States Environmental Protection Agency, respectively.

Monitoring data are used by a variety of programs to guide future actions and monitoring is scheduled to provide results in time to influence actions such as the development of NPDES permits. Monitoring results are summarized in reports prepared by WB staff or contractors. In most cases, reports are organized to summarize results on a watershed basis.

Total Maximum Daily Load (TMDL) Allocations: The Federal Clean Water Act requires states to develop TMDLs for water bodies that do not meet applicable Water Quality Standards. Each TMDL must include waste load allocations for point sources and load allocations for nonpoint sources such that the sum of the allocations (plus a margin of safety) is not greater than the loading capacity of the water for the pollutants addressed by the TMDL. The development of TMDLs necessitates a watershed management approach given that all sources must be included and all controls considered. Also, TMDL development and issuance (including the monitoring required to identify sources and track the effectiveness of controls) is scheduled consistent with the Five-Year Basin Plan where practical.

NPS Program: The goals of the NPS Program are to prevent, eliminate or reduce nonpoint sources of pollution in support of watershed restoration and protection. One approach used in the NPS Program is to support the development and implementation of watershed plans. These plans vary considerably with the size of the watershed, scope of issues and in level of detail. All watershed plans consider the primary problems caused by NPS pollution and possible actions to reduce or eliminate them. The watershed plans are implemented on a local level as resources are available. The WB recently completed a monitoring strategy for the NPS Program that among other things will help ensure that NPS monitoring needs are identified and implemented consistent with the Five-Year Basin Plan. The monitoring strategy requires development of an NPS Multi-Year Plan to help facilitate a watershed approach to NPS monitoring through better planning. Better integration of NPS source related monitoring with point source monitoring (and other

types of assessments) will allow work to be completed more efficiently and yield a more complete picture of the impairments and causes of impairments in each watershed.

Also, the WB recently embarked on an effort to “re-engineer” the NPS Program. Internal and external participants are discussing a variety of recommendations including actions that will enhance Michigan’s focus on implementing NPS pollutant controls at the watershed level.

Remedial Action Plans (RAP) and Lakewide Management Plans (LaMP): Annex 2 of the Great Lakes Water Quality Agreement between the United States and Canada requires the development of RAPs to restore designated Areas of Concern and LaMPs to restore and protect each of the Great Lakes. Michigan has 14 Areas of Concern where water quality degradation has caused beneficial use impairments. The DEQ, in consultation with other state and federal agencies and stakeholders, leads efforts to develop RAPs to be implemented at each Area of Concern. These RAPs take a watershed based approach to identifying causes of impairments and actions to restore each Area of Concern. In addition, the governments are required to develop and implement LaMPs to restore and protect the open waters of the Great Lakes. The LaMPs take a watershed based approach to identifying causes of impairments and solutions in each Great Lake.

Local Watershed Initiatives: The DEQ supports a number of local watershed initiatives intended to involve local organizations and citizens in the development of solutions to watershed problems. For example, in response to several algae blooms in Ford and Belleville Lakes on the Huron River, the DEQ facilitated the development of the Huron Watershed Initiative to develop a comprehensive watershed approach to address point and nonpoint sources of nutrients to the watershed.

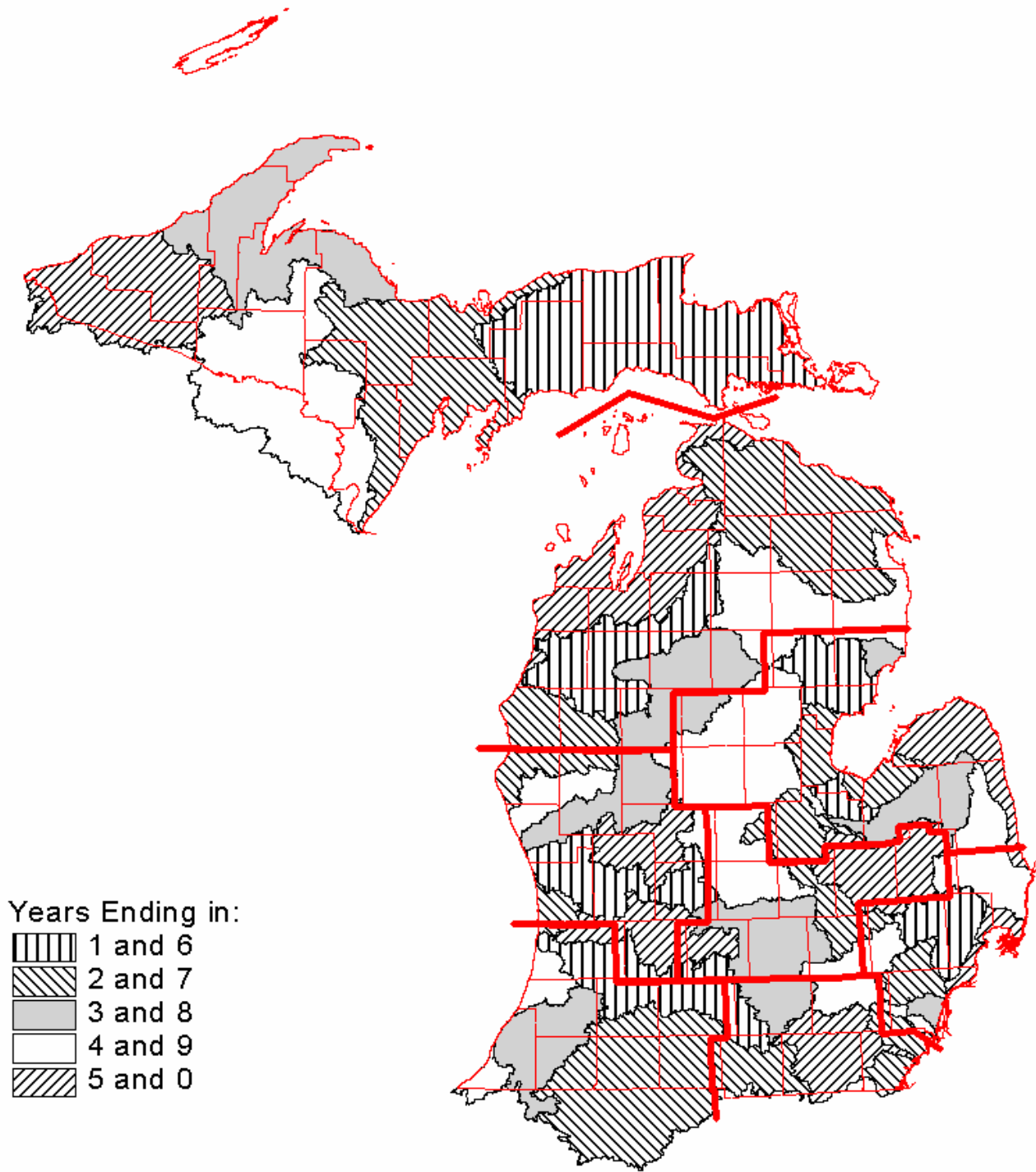


Figure 1. Michigan's five-year rotating watershed monitoring cycle. Watersheds with similar shading are monitored in the same year.

Table 1. Inspection, monitoring and permit development activities organized by major watershed in accordance with the Five Year Basin Plan.

Year 1	Year 2	Year 3	Year 4	Year 5
Permit compliance inspections				
<ul style="list-style-type: none"> • Major permit compliance evaluation inspections • Minor permit compliance reconnaissance inspections • Federal and Michigan IPP inspections • Biosolids compliance reconnaissance inspections 	<ul style="list-style-type: none"> • Major permit compliance reconnaissance inspections • Federal IPP inspections • Biosolids mid-level compliance inspections 	<ul style="list-style-type: none"> • Major permit compliance sampling inspections • Minor permit compliance sampling or evaluation inspections • Federal IPP audits • Michigan IPP compliance inspections. • Biosolids audits 	<ul style="list-style-type: none"> • Major permit compliance reconnaissance inspections • Federal IPP compliance inspections • Biosolids compliance reconnaissance inspections 	<ul style="list-style-type: none"> • Major permits compliance reconnaissance inspections • Minor permit compliance reconnaissance inspections • Biosolids mid-level compliance inspections
Water quality monitoring activities				
	<ul style="list-style-type: none"> • Road stream crossing surveys • Monitoring recommendations requested from stakeholders • Monitoring needs and priorities identified 	Initiate point source, NPS, TMDL, ambient monitoring, and trend monitoring studies including: <ul style="list-style-type: none"> • Discharge monitoring • Whole effluent toxicity monitoring • Rapid bioassessments • Dissolved oxygen monitoring • Water and sediment chemistry monitoring • Fish and wildlife contaminant monitoring • Stream flow monitoring • Inland lake monitoring • Bacteria monitoring • Special studies 	<ul style="list-style-type: none"> • Update electronic databases • Prepare staff reports • Develop draft TMDLs 	<ul style="list-style-type: none"> • Issue TMDLs • Develop Water Quality Based Effluent Limits (WQBEL) for permits
Issue groundwater discharge permits, NPDES individual permits and storm water certificates of coverage (COCs)				
			<ul style="list-style-type: none"> • Groundwater Discharge Permits, NPDES individual permits, and storm water COC re-applications received and reviewed 	<ul style="list-style-type: none"> • Permits and storm water COCs reissued