Michigan's Nonpoint Source Program

Program Highlights 2007-2012

Michigan Department of Environmental Quality
Water Resources Division

www.michigan.gov/nps

Environmental Assistance Center
800-662-9278

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Michigan's Nonpoint Source Program...

RESTORING AND PROTECTING MICHIGAN WATERS FROM THE EFFECTS OF NONPOINT SOURCE POLLUTION

Frogs return to the Eagle River
(see page 14 and 15)

PARTNERING WITH LOCAL STAKEHOLDERS TO DEVELOP & IMPLEMENT WATERSHED MANAGEMENT PLANS

This Nonpoint Source Pollution Control project was funded through the Michigan Nonpoint Source Program by the United States Environmental Protection Agency (USEPA). The contents of the document do not necessarily reflect the views and policies of the USEPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

INTRODUCTION

The goal of the Nonpoint Source Program is to restore impaired waterbodies and protect high quality waterbodies impacted by nonpoint source pollution. The Department of Environmental Quality (DEQ) has the responsibility of overseeing and implementing the state's Nonpoint Source Management Program by coordinating with many local, state and federal agencies and organizations throughout the State of Michigan. The Nonpoint Source Program is committed to achieving water quality goals by using a balanced approach of education, research, technical assistance, financial incentives and regulation. This report highlights the accomplishments between the years 2007-2012.

The Problem

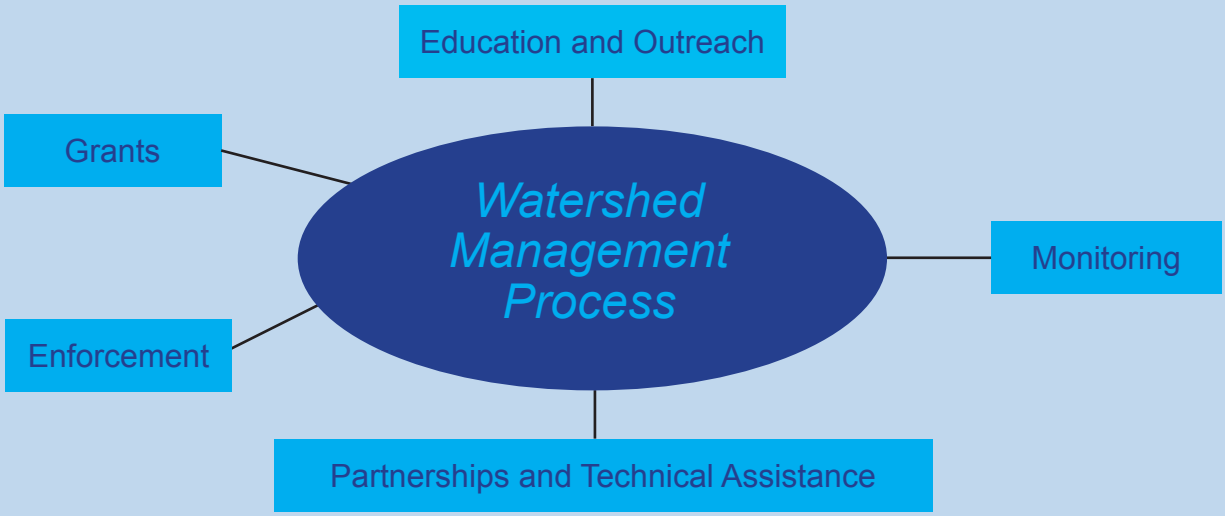
Nonpoint source pollution is the leading remaining cause of water quality problems negatively affecting Michigan's lakes, rivers, wetlands and groundwater. It is caused by rain water washing pollutants such as fertilizer, sediment, oils and grease off the land into our water. Rivers and streams can also be impacted by too much water running off the land causing erosion. They can also be impacted by physical changes, such as ditching and wetland loss.

The Task

Identifying sources of nonpoint source pollution is complex due to the variety and diversity of sources, causes and impairments. The sources and causes of nonpoint source pollution must be identified so that focus can turn to implementing the appropriate solutions to keep runoff and pollutants from entering Michigan's waterbodies.

The Solution

The Nonpoint Source Program uses the watershed management approach to work with a variety of public and private entities to identify, resolve and prevent nonpoint source pollution. This approach recognizes the importance of partnerships and leveraged resources to achieve the shared responsibility for protecting water resources. Components of the watershed approach are highlighted in the diagram below.



Setting Goals

The development of a Nonpoint Source Program Plan is a requirement of the federal Clean Water Act. Michigan's plan outlines environmental goals for the restoration of impaired waters (water bodies not meeting water quality standards), protection of high quality waters and elimination or reduction of nonpoint source pollution. The Nonpoint Source Program Plan includes long and short term goals that are intended to direct resources towards achieving the identified environmental goals. Measures of success have also been developed to assess and track progress with regards to program effectiveness. Measurement reinforces the importance of a goal and managerial priorities, and helps us gauge how well prior actions worked and when adjustments are needed. The measures of success include the following outcomes related to restoration of impaired waters to help us understand how well we are doing.

ENVIRONMENTAL GOALS TO ACHEIVE BY 2012

Restore Waterbodies ⇨

Goal: **10 Waterbodies**
Results = 34 Waterbodies Restored
***all water quality impairments due to nonpoint source have been corrected**

Partially Restore Waterbodies ⇨

Goal : **20 Waterbodies**
Results = 25 Waterbodies
*** a specific nonpoint source water quality impairment has been corrected but more still remain**

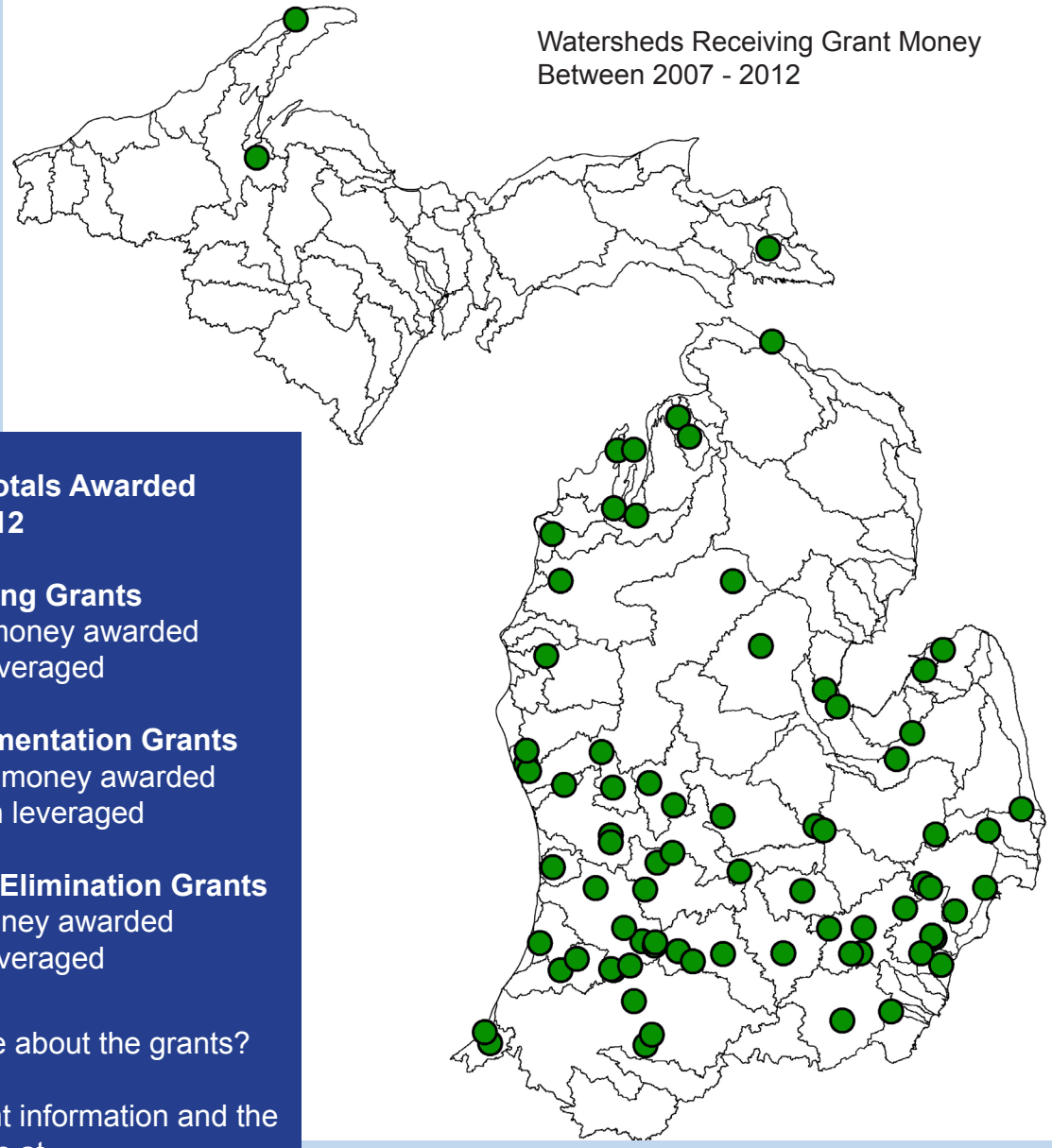
Restore Sub-Watersheds ⇨

Goal: **5 Sub-Watersheds**
Results = 5 Sub-Watersheds
*** subwatersheds are fully restored or significant watershed wide improvements are achieved**

Results of the above measures are provided every two years to coincide with updates to the Water Quality and Pollution Control in Michigan Sections 303(d), 305(b) and 314 Integrated Report (Integrated Report). The Integrated Report however does not track the progress made for improving or protecting watersheds. Progress made in these areas is determined using other methods, some of which are highlighted in this report.

Grants at a Glance

One of the ways the Nonpoint Source Program assists local stakeholders in addressing watershed threats and impairments is through utilizing a combination of federal and state funding sources to provide pass-through grants. This money is awarded annually on a competitive basis to eligible organizations/agencies through a Request for Proposals. Nonpoint Source grants are targeted towards identified priority areas in need of restoration or protection. Planning grants have been used to develop watershed plans. Implementation grants are awarded to implement high priority protection and restoration recommendations from approved watershed managment plans.



Grant Type and Totals Awarded Between 2007-2012

Watershed Planning Grants
$3,850,927 grant money awarded
$828,525 match leveraged

Watershed Implementation Grants
$25,584,264 grant money awarded
$13,173,114 match leveraged

Illicit Connection Elimination Grants
$588,450 grant money awarded
$267,650 match leveraged

Want to know more about the grants?

Check out the grant information and the Project Fact Sheets at
www.michigan.gov/nps

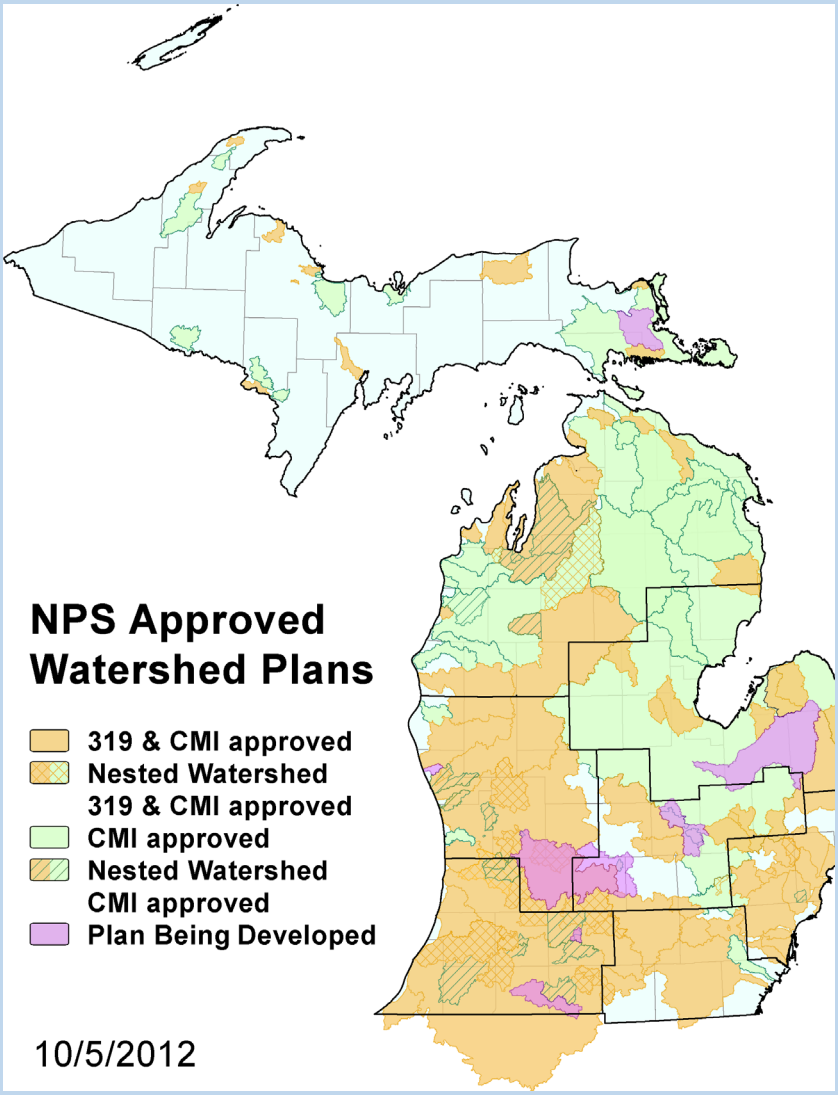
WATERSHED MANAGEMENT PLANNING

Creating a strategy for restoring and protecting rivers and lakes.

A Watershed Management Plan (WMP) is a strategy and a work plan for achieving water resource goals. Its purpose is to guide watershed coordinators, resource managers, policy maker, and community organizations to restore and protect the quality of of rivers, streams, lakes and wetlands of a given watershed. The watershed planning process uses a series of steps to characterize existing conditions, identify and prioritize problems, define management objectives and then identify priority actions needed to achieve the specific watershed goals. Nonpoint source staff work with local stakeholders in priority watersheds through guidance and technical assistance to ensure WMPs meet specific state and federal criteria.

BETWEEN 2007 AND 2012

60 Watershed Management Plans were approved.



WANT TO KNOW MORE?

Visit the Nonpoint Source Program website to find out more about the watershed management planning process, find links to approved watershed plans and identify staff that can help.

* Clean Michigan Initiative (CMI) Approved refers to the state criteria for a watershed plan described in the Part 88 rules promulgated under Part 196, Clean Michigan Initiative Implementation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.
* 319 Approved referes to the federal criteria for a watershed plan established by USEPA in the “Nonpoint Source Program and Grants Guidelines for States and Territories.”

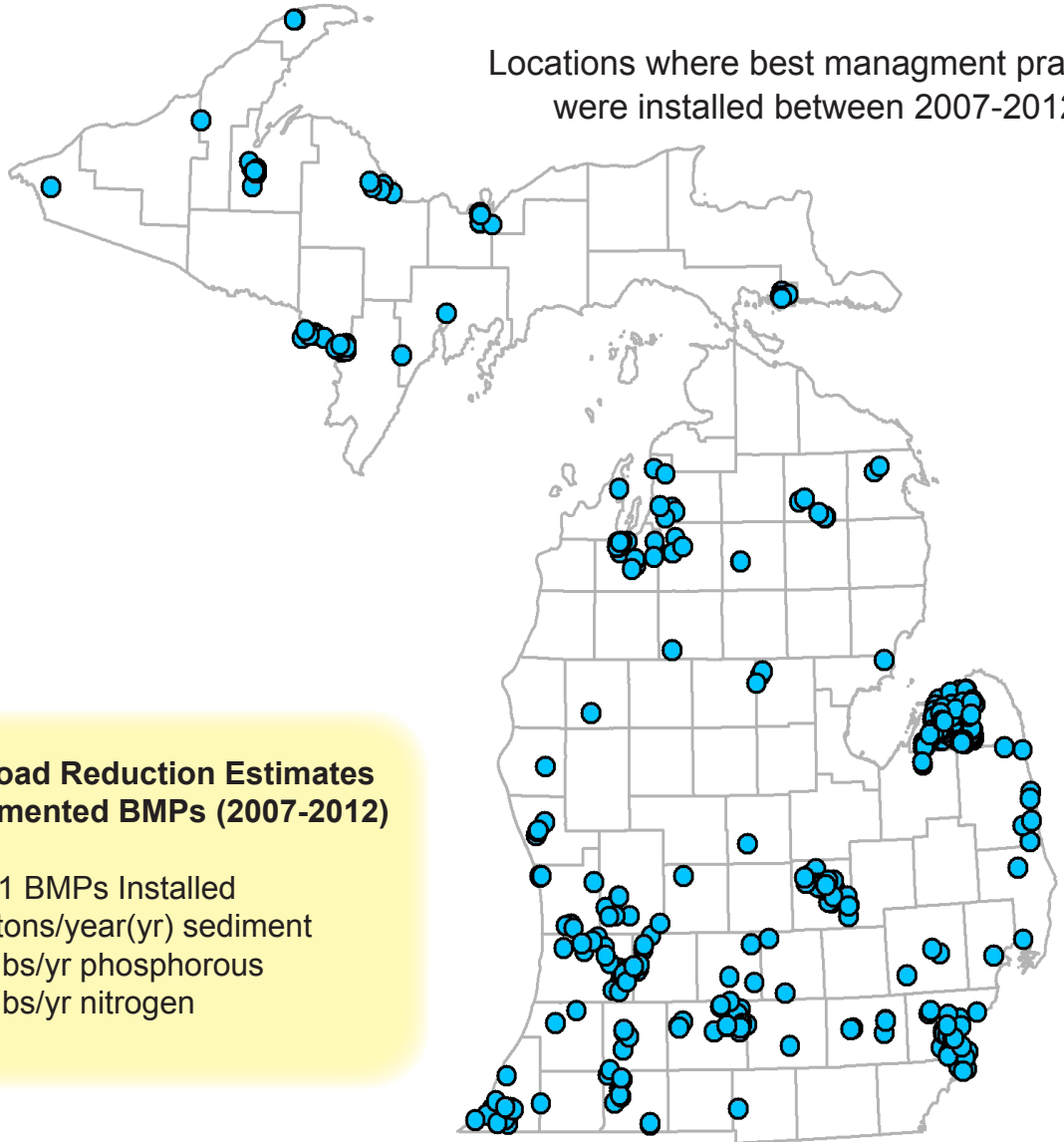
RESTORING

Integrated Solutions to Eliminate Nonpoint Source Problems

The approved WMPs outline best management practices (BMPs) needed to resolve a wide array of nonpoint source pollution sources and causes to meet pollution reduction goals. The Nonpoint Source grants help communties implement a variety of BMPs. Depending on watershed priorities these could be either managerial, educational or physical solutions that are integrated together. Completed physical BMPs and the estimated pollutant load reductions are tracked through the grant reporting process to help quantify the level of impact each practice has in the watershed.

BMPs are structural or non-structural solutions for managing nonpoint source pollution.

Locations where best managment practices were installed between 2007-2012.



Pollutant Load Reduction Estimates from Implemented BMPs (2007-2012)

Total: 611 BMPs Installed
402,285 tons/year(yr) sediment
341,088 lbs/yr phosphorous
678,582 lbs/yr nitrogen

RESTORING

Example: Eliminating Nonpoint Source Pollutants to Restore a waterbody

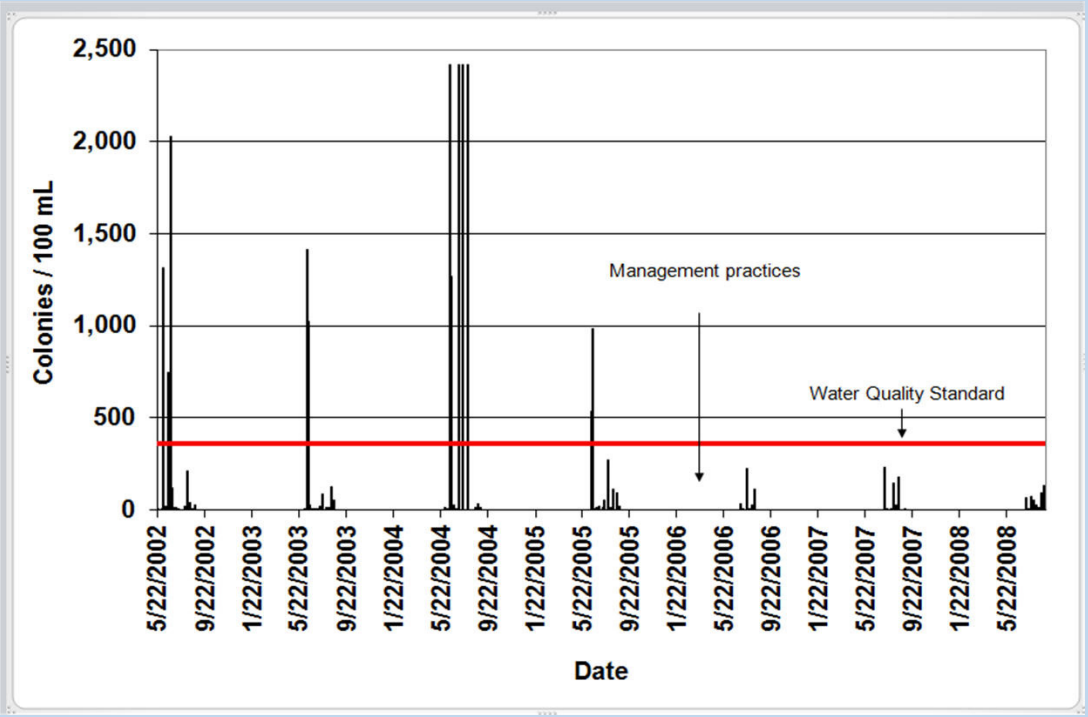
Water Quality Problem: The water at Forester County Park, on Lake Huron in Sanilac County, was listed in Michigan's Integrated Report as not meeting water quality standards in 2004 and 2006 due to high *E. coli* bacteria.

Cause: Big Creek: Approximately 50 cattle had uncontrolled access causing excessive sediment and polluted run-off to enter Big Creek. Also, 50-70 cattle had uncontrolled access causing excessive sediment and polluted runoff to enter Cherry Creek. In addition, contaminated runoff from a feed lot and sediment from farm fields entered Cherry Creek. Both streams drain directly to Lake Huron just north of the park.

Solution:

- Relocated cattle away from streams with 1000 feet of fence
- Planted trees on 23 acres of ravine along Big Creek
- 25 acre conservation easement on Cherry Creek
- Implemented 10 acres no-till planting
- Installed 700 linear feet of filter strip
- Stabilized 1,500 feet of streambank
- Installed rain gutters on farm buildings and a retaining wall to control feedlot runoff.

Results: The summer *E.coli* sampling results at Forester Park show that water quality standards were met after management practices were installed.



RESTORING

Example: Eliminating Nonpoint Source Problems to Partially Restore a waterbody

Water Quality Problem: Carrier Creek a designated county drain in Eaton County is a tributary to the Grand River. Four miles of the creek were listed in Michigan's Integrated Report as not meeting water quality standards due to degraded instream habitat and excessive sedimentation.

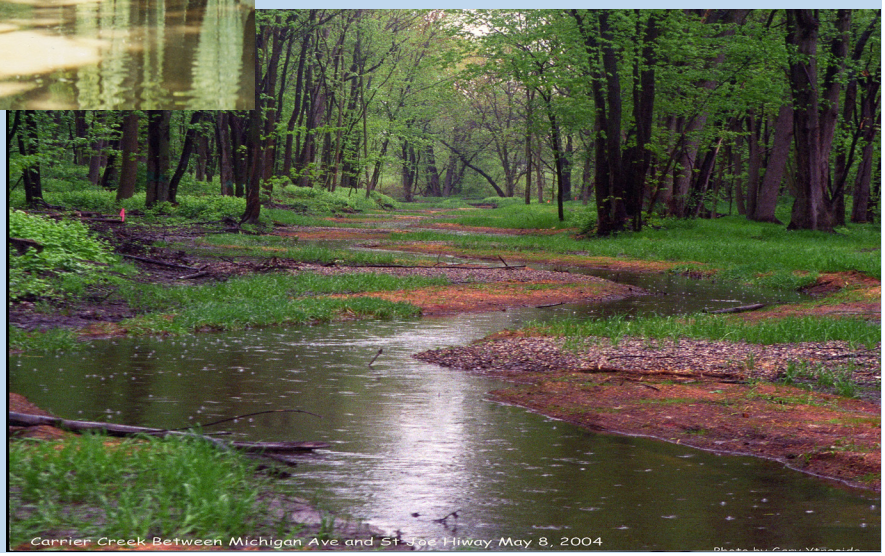
Cause: Historic channel straightening practices and urban runoff resulted in eroding streambanks and high sedimentation rates.

Solution: Two projects were funded that included:

1) Restored the stream channel by stabilizing 3,771 linear feet and reconnecting the channel to its floodplain.
2) Created a 32 acre wetland at the creek headwaters to capture stormwater runoff and decrease stream flashiness.

Result: The stream channel and its hydrology have been stabilized, stream bank erosion has been reduced and aquatic habitat improved. Fish and macroinvertebrate communities are responding and future monitoring is planned to document further improvements.

Carrier Creek Before Stream Restoration.



Carrier Creek: One year after stream restoration.

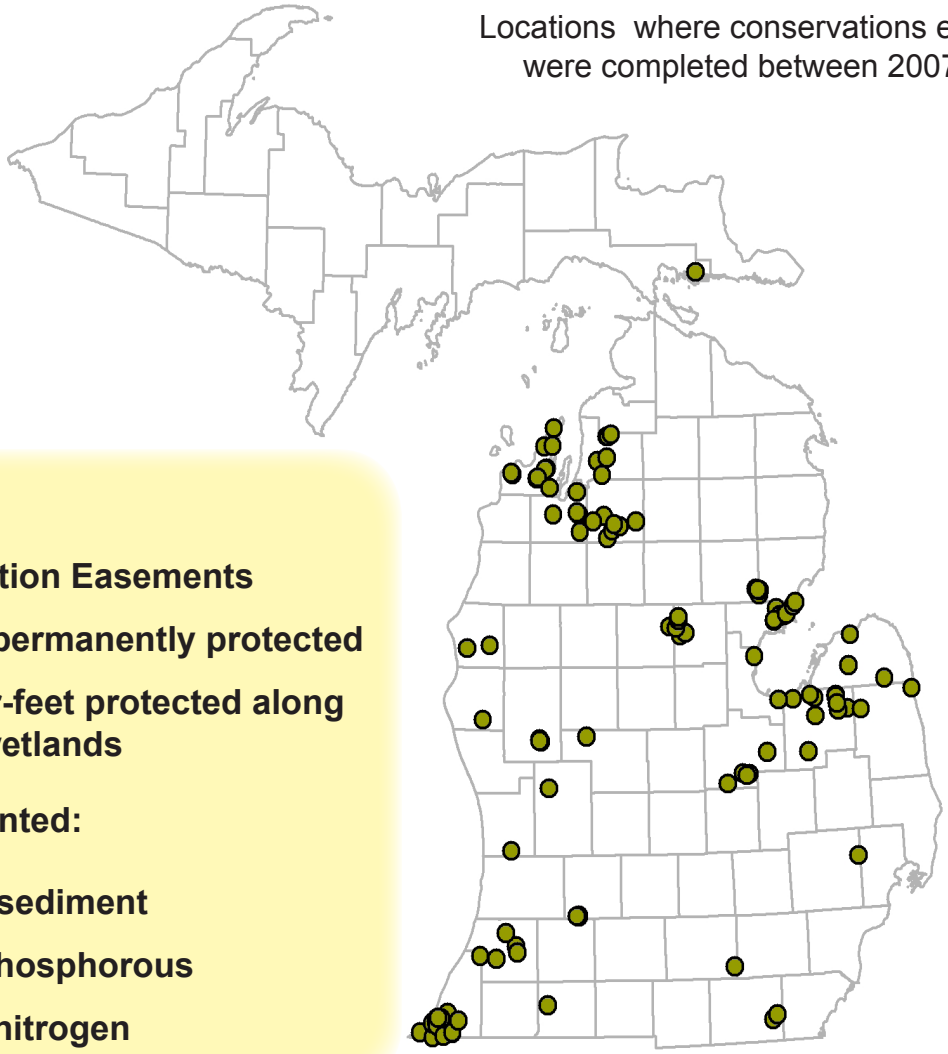
PROTECTING

Keeping high quality waterbodies healthy

The Nonpoint Source Program helps to protect high quality water by preventing a nonpoint source problem before it happens. Two of the main techniques to prevent nonpoint source problems are land use planning and conservation easements. During the watershed planning phase protection priorities are identified typically through a land use policy analysis and a conservation priority mapping process from a water protection perspective.

The Nonpoint Source Program grant funds have helped to implement conservation easements and land use policy changes in priority areas. Conservation easements on priority land adjacent to lakes, rivers and wetlands permanently prevent nonpoint source problems by keeping the land in its natural state.

Locations where conservations easements were completed between 2007-2012.



Results:

- **117 Conservation Easements**
- **10,538 acres permanently protected**
- **159,342 linear-feet protected along rivers/lakes/wetlands**

Pollutants Prevented:

- **3,925 tons/yr sediment**
- **8,095 lbs/yr phosphorous**
- **32,012 lbs/yr nitrogen**

PROTECTING

Example: Protecting high qualty waters through conservation easements

The Prairieville Creek Watershed, located in southern Barry County, was identified as a Priority Conservation Area (PCA) through the prioritization process completed with assistance from a Nonpoint Source grant. The creek is a primary tributary and provides about 21% of Gull Lake's annual water input. It contains many different wetland communities including a bog, prairie fen and emergent marsh. The goal was to protect the high water quality and stream stability through maintaining the natural vegetation along the creek and keeping adjacent wetlands intact. The Southwest Michigan Land Conservancy received a Nonpoint Source Implementation grant to protect this priority conservation area through permanent conservation easements. For more information on the Prairieville Creek PCA click here: **http://ftwrc.org/**

Prairieville Creek: running through protected properties

Solution: Conservation easements on 33% (205 acres) of the Prairieville Creek PCA.

Result: Protected 50% of PCA
6 Conservation Easements
310 acres: includes 6,000 feet of creek frontage

Prevents: 39 tons of sediment/year
183 pounds of phosphorous/year
1,583 pounds of nitrogen/year

EVALUATING

Example: Tracking progress to identify improvements in watersheds

One of the ways that the Nonpoint Source Program is tracking improvements in watersheds is through understanding stream flashiness. Stream flashiness refers to stream flow response to storms. Streams that rise and fall quickly are considered flashier than those that maintain a steadier flow. An increase in flashiness, often due to changing land use, is a common cause of stream channel instability, stream bank erosion and degradation of aquatic life due to excessive sediment loads.

To understand the flashiness status of Michigan watersheds the Nonpoint Source Program conducted a flashiness analysis in both 2007 and 2012. The Richards-Baker Flashiness Index uses data from United States Geological Survey gaging stations to quantify the frequency and rapidity of short term changes in stream flow. Every five years this analysis is expected to be completed to let the DEQ know if stream flashiness is increasing, decreasing or staying the same.

Click here to find out more about Hydrologic Analysis and nonpoint source pollution.

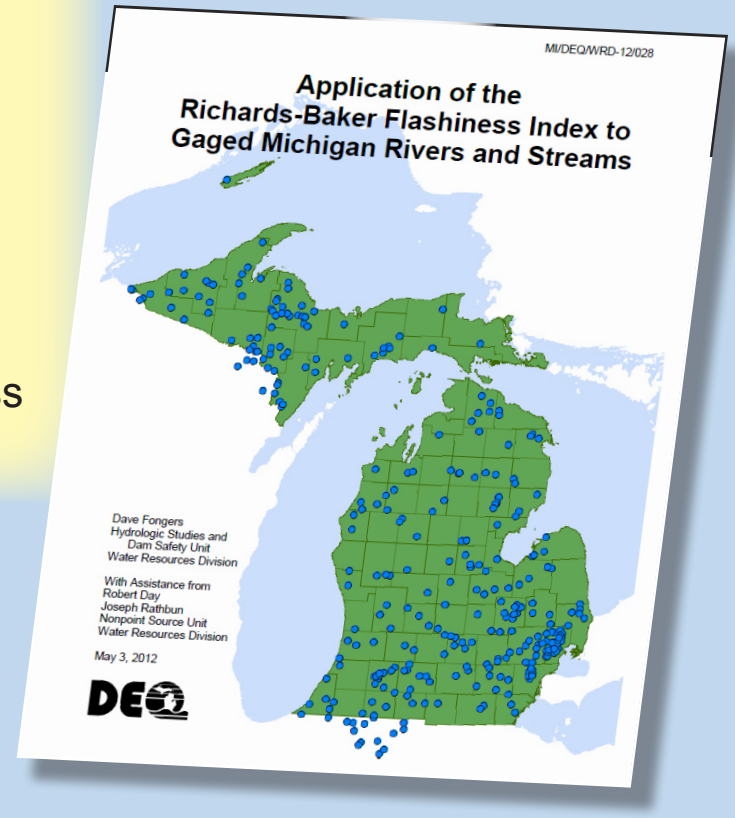
Flashiness Baseline

Results from 2007 and 2012
72 Stream Gages Analyzed

29 Streams = ↑ Flashiness

14 Streams = ↓ Flashiness

29 Streams = Stable Flashiness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Application of the Richards-Baker Flashiness Index to Gaged Michigan Rivers and Streams

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With Assistance from
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May 3, 2012

DEQ

EVALUATING

Example: Tracking progress to identify improvements in watersheds

The Nonpoint Source Program also tracks improvements in watersheds through long-term monitoring. One example of this is the Nonpoint Source Program's 15 year committment to monitor the effectiveness of the Eagle River restoration projects as part of the Nonpoint Source National Monitoring Project.

The Eagle River in Keweenaw County is listed in Michigan's Integrated Report as not meeting water quality standards due to high copper concentrations and poor macroinvertebrate (aquatic insects) communities. Between the 1840s and early 1900s, several copper mines discharged ore processing wastes ("stamp sands") into both the East Branch and West Branch of the Eagle River forming deposits up to 6 feet thick. These deposits have smothered instream habitat features, and an 8.5 mile reach of the Eagle River is impaired.

Restoration activities began in 2009 which included relocating much of the stream channel into less-contaminated soils and covering and seeding upland stamp sand deposits. Additional work was completed in 2012 in order to protect the river from groundwater sources of copper. This work included the removal of stand sands and the creation of a new channel.

A stretch of the Eagle River impacted with "stamp sands" prior to restoration.

A stretch of the Eagle River after restoration activities.

EVALUATING

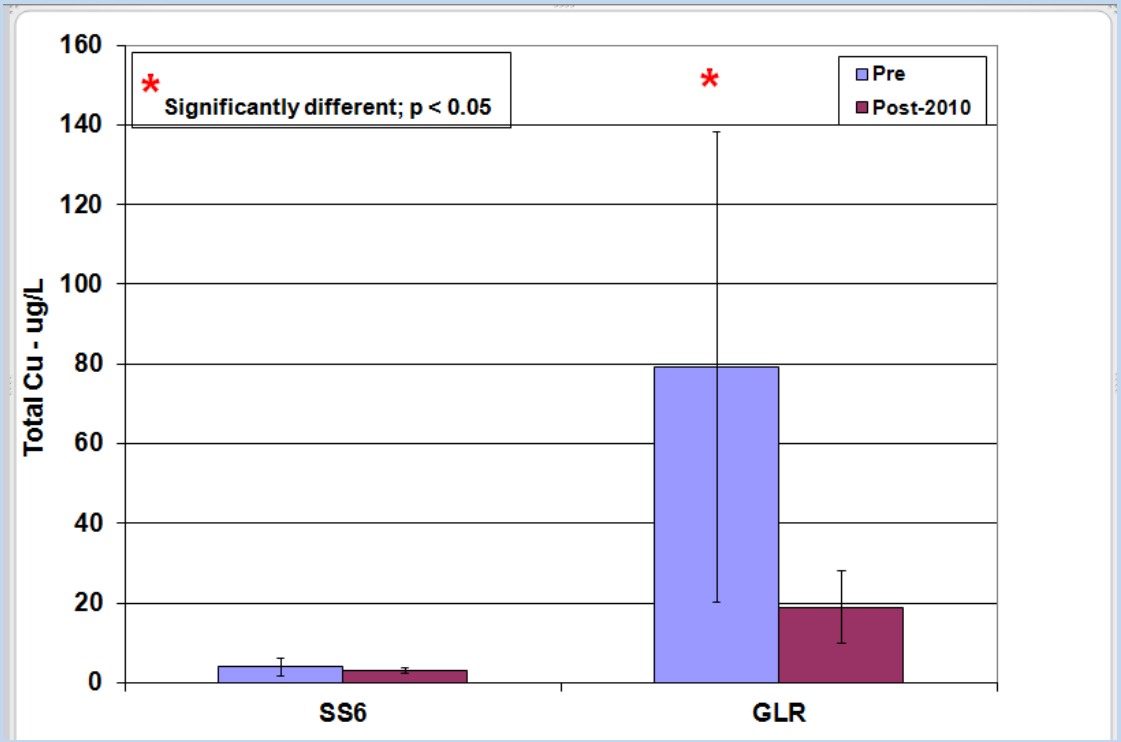
Monitoring Results Before and After the Eagle River "Stamp Sands" Restoration Activities

In order to document the success of the restoration activities long-term post-construction monitoring by DEQ began in 2010 and will continue through 2021. The DEQ monitoring includes water sampling for copper, macro-invertebrate sampling, channel morphology (the shape of the stream) measurements, and riparian vegetation surveys. Results of monitoring for macroinvertebrate and water sampling for copper prior to restoration activities and monitoring through 2011 are shown in the tables below. Both tables show an improvement in water quality conditions after the construction activities.

Macro-invertebrate Sampling Results at One Location in Restoration Area

Metric	2008	2010	2011
	Pre-construction	Post-Construction	
No. of different macro-invertebrate species	2	7	17
Total number of macro-invertebrates	6	22	769

Copper Concentrations in the Stamp Sands Restoration Area Before and After 2009 Construction Activities (Note: more restoration activities were completed in 2012)



Upstream of Stamp Sands **Stamp Sands Reach**

WHAT'S NEXT FOR 2017?

The Nonpoint Source Program Plan was updated in 2012. The goals and measures of success were refined to focus resources on specific priorities and tasks. The following are new targets to achieve by 2017 for restoring and protecting Michigan's water.

RESTORE IMPAIRED WATERS

Solving the problems

- Restore 10 waterbodies
- Remove 20 specific impairments
- Improve conditions in 5 watersheds

PROTECT HIGH QUALITY WATERS

Ensuring healthy waterbodies stay healthy

- Protect 5,000 acres
- No new impaired waterbodies in watersheds with approved WMPs

The Nonpoint Source Program uses many different methods to evaluate progress towards meeting set targets. These include using environmental, social and administrative methdolodies to track progress and evaluate effectiveness. Please refer to the Nonpoint Source Program Plan for a comprehensive listing of specific targets associated with the different tracking and evaluation methodologies.

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