

Kalamazoo River Watershed Phosphorus Reduction

Five years of progress

The Kalamazoo River watershed is largely rural, but has a legacy of serious industrial and nutrient pollution. One persistent problem is excess phosphorus in the system, resulting in heavy algae growth and reduced water quality—low oxygen levels, poor clarity, and decreased fishing and boating opportunities.

The Michigan Department of Environmental Quality (MDEQ) has approved a Total Maximum Daily Load (TMDL) that specifies the maximum amount of phosphorus (P) the Kalamazoo River system can receive and still meet water quality standards. A large, diverse group of area citizens is working together to reduce P inputs through a variety of voluntary strategies.

One pound of phosphorus can grow more than 7,500 pounds of algae. (Photo courtesy of the University of Connecticut)



Estimates are that about one-third of the P comes from “point source” discharges. These are typically community and industrial facilities that discharge directly into a river or stream through a pipe after the waste has been treated to reduce contaminants. These facilities are regulated by permit from MDEQ.

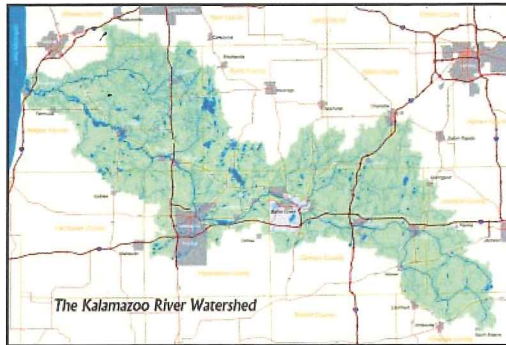
The contributions from “non-point sources” are diverse and dispersed, not usually regulated by permit, and make up two-thirds of the problem. Examples of non-point sources include runoff from roads, parking

lots, construction sites, lawns, farms, industry and commercial activities; poorly functioning septic systems; nutrients from livestock, pets and wildlife; and illicit connections to storm sewers.

The 2012 target is to reduce phosphorus by 23 percent from point sources and by 50 percent from non-point sources during the growing season (July through September). Specific non-point source strategies are being pursued in several areas including agriculture, construction sites, greenhouse nutrients, in-stream sources, land use design, on-site sewage disposal systems,

storm water management, transportation, sub-basin management, turf management and alternative landscapes.

Other closely related efforts include awareness, education, stewardship development, monitoring and assessment, reporting and tracking of P reductions. Obviously, one group will not be able to do all of this, and there are additional water quality problems to address. Therefore, partnerships and shared responsibilities are extremely important, and are a strong component of the efforts to restore and enhance the environmental, economic, community and recreational benefits of this important regional resource.



TMDL Committee hard at work.

Kalamazoo River Watershed Phosphorus Reduction

Awareness, education and stewardship

Several highly visible activities have been undertaken to re-introduce area citizens and decision makers to the numerous values of the Kalamazoo River watershed, the opportunities it offers and the challenges it faces, including:

- *Kanoe the Kazoo*—During two summers (2003-2004), nearly 1,000 people canoed, kayaked or visited the river and talked about its future.



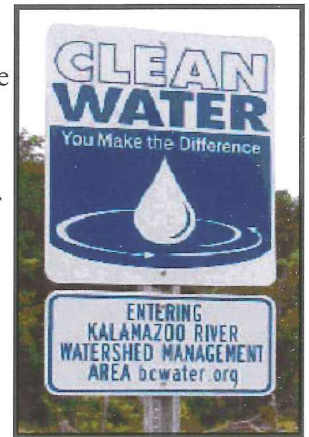
- *Super Soils Test Saturday*—Approximately 1,500 free residential soil tests were analyzed from 2001 to 2004. Homeowners began to understand the impacts of P on their water quality, and that they need to test their soils before fertilizing.



Free soil tests at a local retailer.

- *Watershed Public Policy Forum*—In 2003 citizens and officials came together to discuss the future of the watershed in light of problems with PCBs, phosphorus and dangerous abandoned dams.
- *Kalamazoo River Clean Sweep*—In 2004 this event built upon previous successes in the Battle Creek area by recruiting citizens to clean up the riverbanks.

- *Watershed Short Courses*—Three short courses focusing on locally relevant issues were conducted under the leadership of the conservation districts and MSU Extension.
- *Lake Allegan Carp Derbies*—Two carp derbies allowed fishers and others to discover Lake Allegan and discuss its problems.
- *Sign the Watershed*—Numerous groups are working together to sign the watershed so that citizens can be educated about and identify with the watershed.
- *Marking storm drains*—Labels are being placed on storm drains stating that all materials drain to the river.



In addition, many workshops, trainings and publications were developed and delivered addressing topics such as storm water management, turf management and lawn care, soil erosion, nutrient and pesticide management, groundwater protection, volunteer stream monitoring and irrigation. Currently 21 communities are working cooperatively on educational programs addressing a wide variety of issues related to storm water.

Phosphorus reductions

The point source contributors are already meeting the target of reducing inputs by 23 percent.

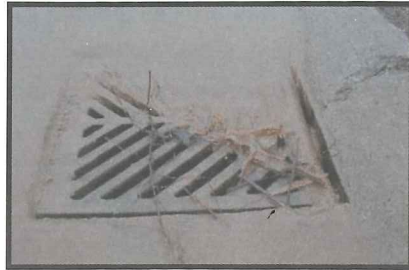
	APR	MAY	JUNE	JULY	AUG	SEPT
Point source total pounds	4852	6053	5088	5541	4480	4375
Waste-load allocation	8700	8700	8700	8700	8700	8700
1998 baseline	8700	8700	8700	8700	8700	8700
% reduced from 1998	44.2%	30.4%	41.5%	36.3%	48.5%	49.7%
Goal attained	yes	yes	yes	yes	yes	yes

Reductions in the non-point source category are more difficult to quantify. Here are a few success stories:

- *Storm water*—Twenty-one communities have developed joint watershed plans, implementing housekeeping and best management practices, and identifying and removing illicit connections

Kalamazoo River Watershed Phosphorus Reduction

of sanitary sewers to storm drains. The LaVista Storm Drain Project will reduce by at least 50 percent the volume and loading of phosphorus and other nutrients to Goguac Lake, Battle Creek's largest. The City of Portage Consolidated Drain Project is an innovative regional storm water treatment system consisting of wet detention, constructed wetlands, public trailways, educational features and habitat enhancements.



Numerous rain garden workshops have been offered to landowners and developers, and demonstration rain gardens have been installed at Maple Street School in Kalamazoo and at the Kellogg Biological Station (KBS).

MAPLE STREET SCHOOL FOR THE ARTS DEMONSTRATION RAIN GARDEN

What is a Watershed?
A watershed is all of the area that collects rainwater, and then drains into a single stream or lake. Shaded to the right, is the Axtell Creek Watershed. This sub-watershed, is connected to the Kalamazoo River through Portage Creek.

What is a Rain Garden?
A rain garden is an attractive area of native plants that collects rainwater from hard surfaces such as roofs and parking lots. The plants act as a sponge and absorb the water. The deep systems filter and clean the water before it reaches streams, rivers and lakes.

What can you do?
Participate in protecting our watershed by installing your own small rain garden.

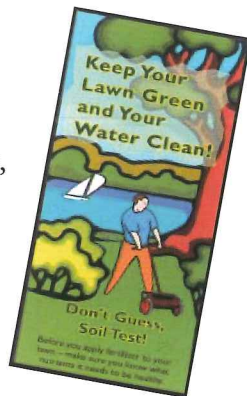
Over 35 species of wet tolerant plants were installed in September of 2003 to help protect Axtell Creek.

PARTNERS
Kalamazoo Public Schools, Kalamazoo Nature Center, City of Kalamazoo, Dept. of Public Works, Kieser & Associates, Michigan Dept. of Environmental Quality

"If it gets in the street, it gets to the creek"

This project has been funded wholly or in part by the US EPA under assistance agreement #2003074200.

- **Turf grass**—Initiatives include Super Soils Test Saturday, which conducted nearly 1,500 free residential soil tests over a three-year period. During the testing, landowners were given water quality and turf management assistance from local retailers, Master Gardener volunteers and TMDL committee members. From those soil tests, approximately 99 percent



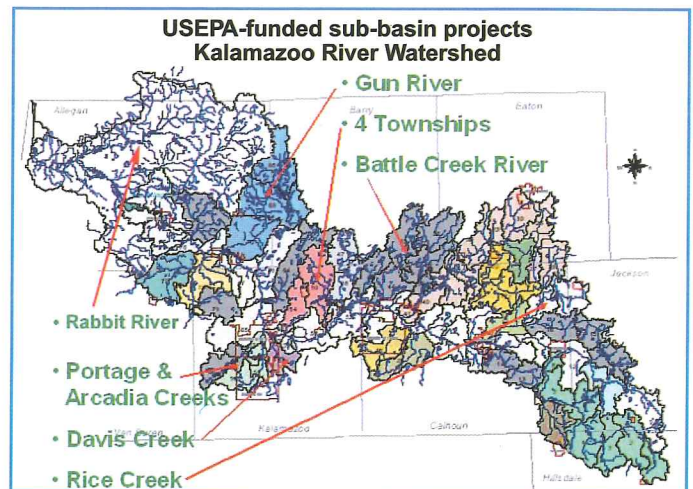
revealed there was sufficient P already in the soil to support healthy, green lawns, therefore requiring no additional P. Retailers now routinely stock phosphorus-free fertilizer. The numerous lawn and garden workshops have been well-attended, and an attractive brochure is proving successful with lake associations and others.

- **Riverbank stabilization and restoration**—Major erosion sites on the Kalamazoo River mainstream, such as the one pictured here, are being stabilized and restored through a partnership between Kieser and Associates, MDEQ,



the conservation districts and the county road commissions. This will result in an annual reduction of over 160 pounds of P from the nine treated sites.

- **Small watershed projects**—The Kalamazoo River Watershed boasts seven active, successful, small watershed projects funded under Section 319 of the Federal Clean Water Act. Each group has initiated detailed studies and discussions on future protection and enhancement of the sub-watersheds, including identifying and prioritizing projects that will reduce P and other contaminants.

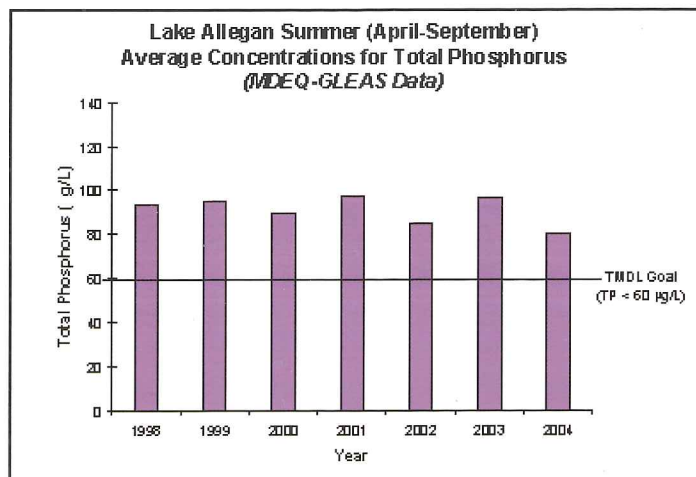


Kalamazoo River Watershed Phosphorus Reduction

- **Agricultural producers**—Farmers are implementing best management practices such as grassed waterways, vegetative filter strips, no-till practices, cover crops, comprehensive nutrient management planning, pasture management and livestock access improvements. The TMDL group organized and hosted two meetings on the Michigan Agricultural Environmental Assurance Program (MAEAP), integrating the P reduction message and offering educational tours of point source facilities.

How is the resource responding?

Lake Allegan sampling in recent years has shown a marked improvement in levels of total P, dissolved oxygen, clarity and diversity in fish populations. However, MDEQ scientists caution that there are many variables and that monthly sampling is not as comprehensive as they would like.



Graph courtesy of Keiser and Associates

MSU Extension at KBS began a regular, comprehensive daily sampling program in June 2004. This is a 2 1/2-year program that will provide much more reliable data on the sources, transport and fate of P within the watershed. Again, P readings at this point are promising, but inconclusive. Phosphorus levels at the inlet to Lake Allegan approached the 2010 target levels in October 2004.

Future efforts

- The TMDL Implementation Committee, with its many partners (more than 100), will intensify its efforts in P reduction throughout the watershed.
- The Gun Lake Tribe of Pottawatomi Indians has received a major grant to provide support for enhancement of watershed resources through a variety of activities, including water quality trading.
- MSU Extension, conservation districts and many area school districts are actively developing a volunteer stream monitoring network to provide coordinated and continued assessment and reporting of the quality of the watershed's stream network.
- Community leaders are joining together to examine alternative strategies for developing a sustainable watershed organization, so that the positive efforts in watershed restoration and enhancement will continue well into the future.

**For additional
information,
or to get involved**

Please call MSU Extension Land and Water Program office at 269-671-2412, ext. 227 or visit these websites:

www.kbs.msu.edu/kzoonps

www.kalamazooriver.net



This project was supported by funds from the U.S. EPA through the MDEQ under Section 319 of the Federal Clean Water Act.