

October 2007

## Beaver Creek and Grand Lake St. Marys Watershed TMDL Report

### **What are the essential facts?**

- *Ohio EPA studied the Beaver Creek and Grand Lake St. Marys watershed and found water quality problems at all of the locations measured.*
- *The watershed can make progress towards restoration with practical, economical actions.*
- *You may review the work to date.*
- *Improving the streams and lake depends on the participation of the watershed's residents.*

**What is the significance of this report?** *The Beaver Creek and Grand Lake St. Marys Watershed TMDL Report is a tool that will include local ideas from the endorsed watershed action plan to help improve and maintain water quality and habitat in the watershed.*

**What is a watershed?** *A watershed is the land area from which surface runoff drains into a specific body of water.*

### **Where is the Beaver Creek and Grand Lake St. Marys watershed?**

The Beaver Creek and Grand Lake St. Marys (Beaver-GLSM) watershed is located in west central Ohio in portions of Auglaize and Mercer counties that were impounded in 1845 to make the state's largest inland lake. It is a subwatershed of the Wabash River, which has its headwaters in eastern Indiana and western Ohio. The watershed drains 171 square miles.

An estimated 25,000 citizens reside in the Grand Lake St. Marys and Beaver Creek watershed year round, with nearly 11,500 people living in the City of Celina, which draws drinking water from the lake. The population expands in the summer months with vacationers at the state park and various religious and youth camps.

- Overall, the land use in the Beaver-GLSM watershed is 80.5 percent row crop and pasture land, 12 percent wetlands or open

water, 4 percent forested, and 3 percent urban/residential.

- According to the agricultural statistics, there are 295,400 "animal units" of hogs, poultry and cows in the watershed.
- Recreational opportunities abound in the watershed with camping, fishing, boating and hunting on or in the vicinity of

Grand Lake St. Marys. There are two bike paths, and several religious historical sites on the south side of the lake.

To focus its work, Ohio EPA divided the watershed into two areas: the eastern portion draining into Grand Lake St. Marys and the western portion draining into Beaver Creek downstream of the lake (see map on page 2).



*Monitoring tributary to Grand Lake St. Marys during winter thaw.*

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## How does Ohio EPA measure water quality?

Ohio is one of the few states that measures the health of its streams by examining the number and types of fish and aquatic insects in the water. An abundance of fish and insects that tolerate pollution is an indicator of an unhealthy stream. A large number of insects and fish that are sensitive to pollution indicates a healthy stream. In 1999, comprehensive biological, chemical, and physical data were collected by Ohio EPA scientists. Additional water chemistry data were collected in 2005-06 at selected locations and at varying stream flows during the winter and spring to support the load reduction models.

The watershed's conditions were compared with state water quality goals to determine which stream segments are impaired, and how much needs to be done to restore good stream habitat and water quality.

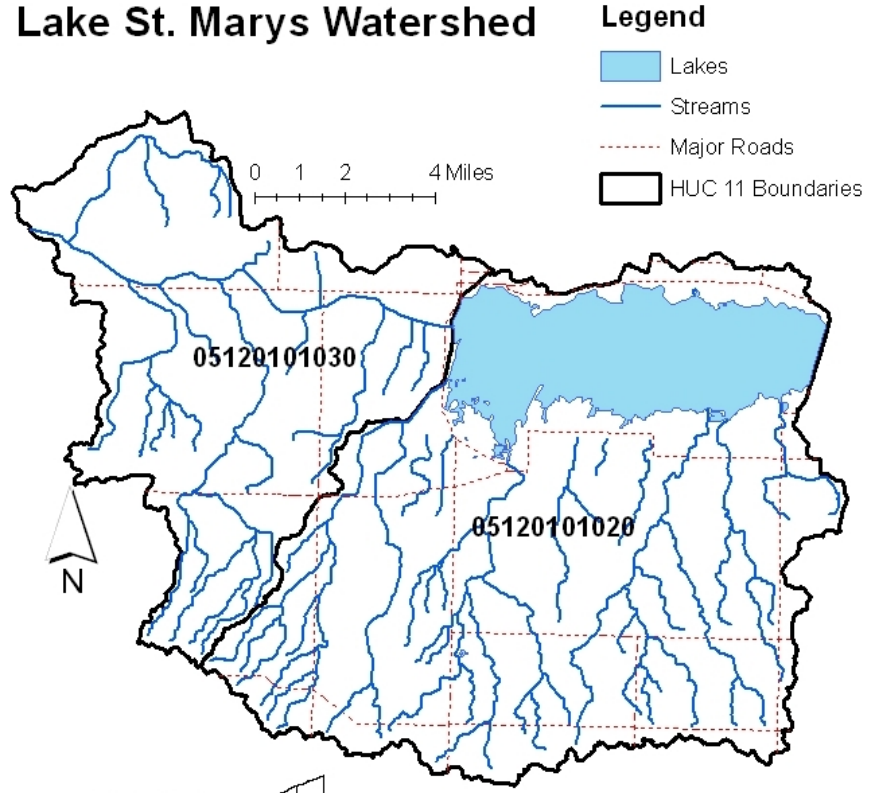
## Was Grand Lake St. Marys studied?

Yes, Grand Lake St. Marys was sampled for chemical water quality in 1999 and is discussed in the report. Formal TMDL methodologies for Ohio lakes do not currently exist, so the lake's analysis is less detailed than that of Beaver Creek and the lake tributaries. However, impairments and recommendations for improvement to the lake are included in the report.

## What is the condition of the Beaver-GLSM watershed?

Ohio EPA's study of 22 sites on 11 small streams in the watershed showed that it ranks in the 10 most impaired watersheds in Ohio. No streams meet the

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HUC 11	Area (ac)	Area (sq. mi)
05120101020	71,901	112.5
05120101030	37,467	58.5

goals associated with healthy warmwater habitat streams. Even if the streams are compared to the lesser goals associated with modified habitats, only one site (4 percent) would meet water quality goals, 18 percent would partially meet the goals, and 77 percent would not meet the goals.

Many small streams such as Barnes Creek, Little Chickasaw and Chickasaw creeks, Prairie, Burntwood and Coldwater creeks, which all drain to the lake, and Beaver Creek downstream of the lake, are impaired because of physical changes to the land.

Stream channelization, drainage tiles, and loss of floodplains and streamside vegetation have degraded the creeks and lake. When streams are widened and deepened, they contribute excess soil to the stream, which destroys habitat for fish and other aquatic life. Soil carried through ditches degrades Grand Lake St. Marys and other sub-watersheds of the Wabash River system.

When trees along the stream banks are removed, the lack of shade allows the water temperature to increase, which decreases the amount of dissolved oxygen for aquatic organisms.

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This is worsened by manure runoff and untreated sewage flowing from failing home septic systems and small communities without any wastewater collection or treatment.

Lack of water in small headwater streams, especially in the summer, makes it hard for pollutants to be absorbed and treated by the natural stream ecology. Agricultural drainage improvements such as tiling and routine dredging contribute to uneven and unsustainable water flow in these small streams, making it difficult to support good aquatic life communities.

Excessive nutrient inputs to the lake have promoted growth of algae that contribute to a high level of organic material that is expensive to remove from the raw drinking water. The city of Celina is currently under orders to reduce total trihalomethanes (TTHMs) levels in their finished water. TTHMs are chemical byproducts created when chlorine is added for disinfection and reacts with organic material.

## How will water quality get better?

The Beaver/GLSM watershed is included on Ohio's list of impaired waters. Under the Clean Water Act, a cleanup plan is required for each impaired watershed. This clean-up plan, known as a total maximum daily load (TMDL) report, calculates the maximum amount of pollutants a water body can receive and still meet standards (goals). The TMDL report specifies how much pollution must be reduced from various sources and recommends specific actions to achieve these reductions.

The TMDL report will provide specific numeric goals for reducing pollutants, including pathogens,

## What are the three most important "fixes" in the watershed?

- ◆ **Manage livestock manure to reduce nutrient runoff**
  - *Develop and improve nutrient management plans to address site-specific resource concerns*
  - *Make on-farm improvements (e.g., installation of manure storage, covering or elimination of open lots) to reduce need to apply manure during periods vulnerable to runoff losses*
  - *Implement NRCS 633 standards for winter application of manure*
  - *Plant winter cover crops to provide manure application sites*
  - *Install tile drainage control structures*
  - *Consider programs to transport nutrients out of watershed to areas where more needed*
- ◆ **Improve erosion and sediment control in all areas**
  - *Practice conservation tillage on row crop farms*
  - *Install filter strips along all agricultural tributaries*
  - *Storm water controls in developing areas and construction sites*
  - *Establish and protect riparian buffers on streams*
- ◆ **Eliminate pervasive bacteria problems**
  - *Provide and/or improve manure storage at livestock operations*
  - *Improve planning for environmentally sustainable manure and nutrient management at livestock and poultry production facilities*
  - *Reduce home sewage treatment system failures*

phosphorus, sediment and improving habitat. Ohio EPA can address some of the Beaver-GLSM problems through regulatory actions, such as permits for wastewater and storm water dischargers. Other actions, such as committing to proper manure management and reduced home sewage system failures, will be up to local residents.

## What actions are needed to improve water quality?

Because there are many reasons why streams in the Beaver-GLSM watershed fail to meet water quality goals, several actions are required to improve the current condition and protect the watershed in the future. The recommendations should focus on reducing pollutant loads and/or increasing the capacity of the streams to handle the remaining pollutant loads.

Maintaining a natural flow regime is important for protecting

water quality and aquatic biological communities. The basic principles of providing floodplain connectivity, stable stream morphology and watershed hydrology that approximates natural conditions are applicable to all areas of the watershed. Likewise, stream buffers are appropriate for all land use types in the watershed. Other actions include:

- Municipal- and county-owned wastewater treatment plants will be required to monitor total phosphorus with a goal to discharge no more than 1.0 milligram per liter. Plants not meeting this goal will need to be upgraded.
- Home sewage treatment systems (HSTSs) should be addressed in rural, urban and developing areas by the county health departments.
- Sediment flowing into streams is a concern in both agricultural and developing areas around the lake. Controls include reducing erosion with cover crops or conser-

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vation tillage; providing buffers along stream banks; identifying concentrated flow paths from agricultural fields and implementing site-specific practices to reduce sources of sediment and nutrient load, and adopting measures that maintain stream stability during land disturbance activities such as construction.

➤ Nutrient loading from livestock operations and agriculture chemicals would be abated by conservation and management practices promoted by the USDA Natural Resource Conservation Service. Suggestions include adoption of phosphorus index and nitrogen index strategies to address nitrogen leaching and the long-standing trend of phosphorus concentration buildup on agricultural land in the watershed.

➤ Livestock producers are encouraged to provide improved manure and residual nutrient management on the production area of their operations, including developing protocols for reducing the potential for uncontained manure or polluted residuals to leave the site during runoff events. Abatement of systems that contribute to dry weather discharges of manure and nutrients to waters of the State should be immediately fixed, as they are especially harmful. These waste streams have the potential to be less dilute and more acutely toxic to the aquatic ecosystem.

➤ Residential, commercial and other urban areas can reduce overland loading of nutrients by practicing better timing and rate of fertilizer application.

## Who is responsible for taking action?

Implementation of this report's recommendations will be accomplished by state and local partners, including the voluntary efforts of landowners.

Locally, discussion of actions to restore the watershed has occurred as diverse partners have worked to develop watershed action plans. The Grand Lake/Wabash Watershed Alliance (GLWWA) submitted a draft watershed action plan for the Wabash River Watershed in June 2007 and has updated the endorsed Grand Lake St. Marys Plan. We expect this combined plan, which includes actions for all streams in the Grand Lake and Wabash River watersheds, to receive full state endorsement by the end of this year or early 2008.

GLWWA and its partners in three counties are serving as community advocates for the watershed, and have become important forces to maintain momentum and sponsor improvement efforts. For example, the Lake Improvement Association has established a strong outreach program to engage the public with factual information and promote activities to restore and protect the lake.

Additionally, Ohio EPA's 208 Program may provide a venue for local citizens to design and direct actions that abate pollution and preserve clean water within the watershed.

## Are any actions already underway?

In addition to the watershed action plans discussed above, several activities indicate a high interest in restoring the watershed:

- The Ohio Department of Natural Resources (ODNR) has funded winter cover crop demonstrations on four local livestock producer farms.
- Local workshops were hosted by GLWWA to train livestock operators on winter manure application standards.
- In August 2006, "Summit on the Lake" was held to discuss issues with a panel of resource professionals and government officials.
- In cooperation with ODNR, five deep water sediment traps at the mouths of tributary streams have been installed and are being monitored.
- Local groups established a protocol for stakeholders and the Soil and Water Conservation District to monitor manure application and provide outreach to producers and residents.

**Where can I learn more?** The Ohio EPA report containing the findings of the watershed survey, as well as general information on TMDLs, water quality standards, 208 planning, permitting and other Ohio EPA programs, is available at <http://www.epa.state.oh.us/dsw/index.html>.

The draft Beaver Creek and Grand Lake St. Marys TMDL report was available for public comment from June 15 through July 16, 2007. The final TMDL report was approved by the U.S. EPA on September 28, 2007. The final report is available at <http://www.epa.state.oh.us/dsw/tmdl/BeaverCreekWabashTMDL.html>.

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