

March 2010

Twin Creek Watershed TMDL Report

What are the essential facts?

- *Ohio EPA studied the Twin Creek watershed and found water quality problems at several of the locations measured.*
- *The watershed can make progress towards restoration with practical, economical actions.*
- *Much of the watershed is high quality because of undisturbed habitat and highly shaded streambanks. Streams can often be preserved through good land use decisions.*
- *Improving the streams depends on the participation of the watershed's residents.*

What is the significance of this report? *The Twin Creek Watershed TMDL Report is a tool 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 Twin Creek watershed?

The Twin Creek watershed is located in southwestern Ohio west of Dayton in portions of Darke, Preble, Montgomery, Butler and Warren counties. It is a subwatershed of the Great Miami River. The Twin Creek watershed drains 316 square miles.

Larger municipalities in the watershed include Germantown, Lewisburg, Gratis, Farmersville, West Alexandria and part of Carlisle. The number of people living in the towns in the watershed in 2000 was over 11,000. The remainder of the watershed is predominantly rural.

What is the Twin Creek watershed like?

Land use is predominantly row crop agriculture for corn, soybeans, and winter wheat with some livestock production.

The upper watershed is slightly more agricultural (75% row crop)

than the lower watershed (62% row crop). This difference is accounted for with the upper basin is 10% forested while the lower is 22% forested.

The Five Rivers Metro Parks owns or holds conservation easements on more than 4,000 acres within lower Twin Creek watershed. Much of this land was

purchased with the intent of protecting the water quality of Twin Creek.

To focus its work, Ohio EPA divided the watershed into two areas: the northern portion from the headwaters to upstream of Bantas Fork and the southern portion from Bantas Fork to the mouth (see map on page 2).



Twin Creek upstream of Halderman Drive, looking downstream.

Twin Creek Watershed TMDL Report

How does Ohio EPA measure water quality?

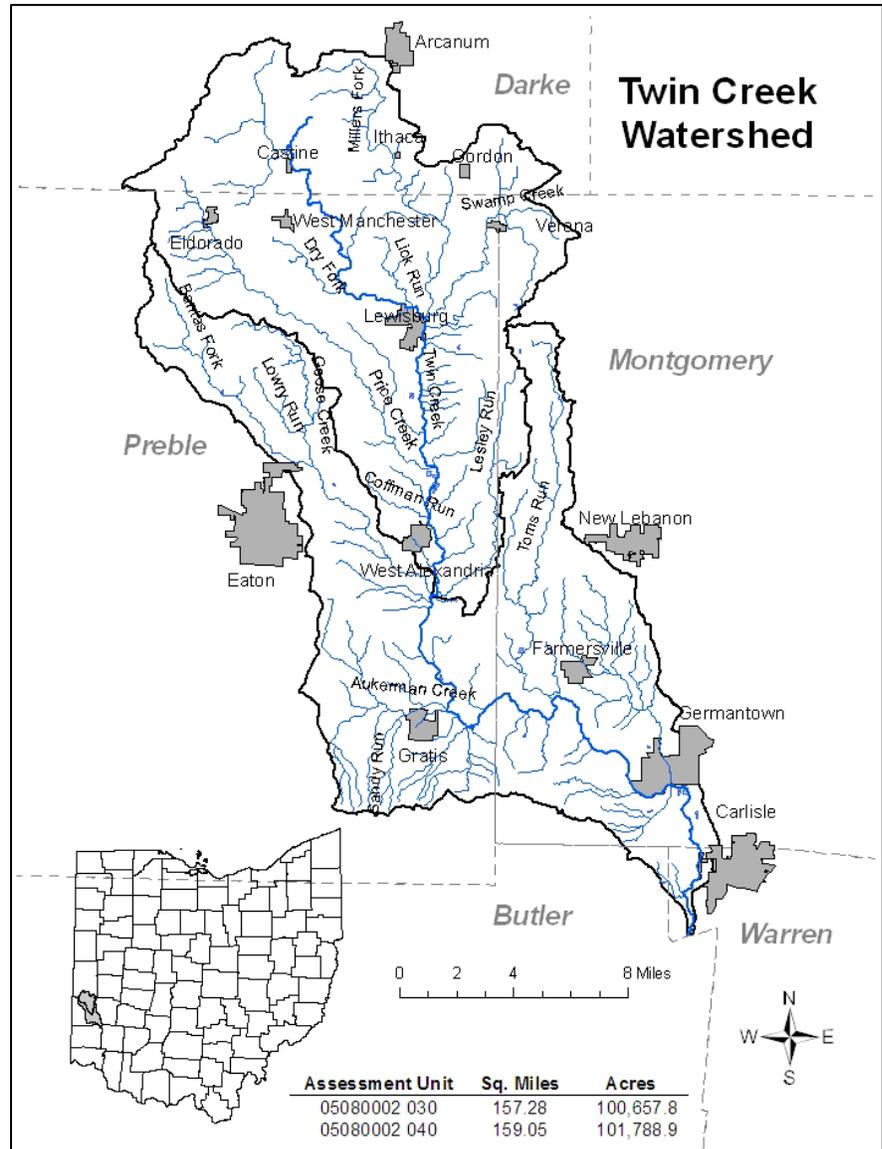
Ohio is one of the few states that measures the health of its streams by examining the number and types of fish and aquatic insects in the water. An abundance of fish and insects that tolerate pollution is an indicator of an unhealthy stream. A large number of insects and fish that are sensitive to pollution indicates a healthy stream. In 2005, comprehensive biological, chemical, and physical data were collected by Ohio EPA scientists. Additional water chemistry data were collected in 2006 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.

What is the condition of the Twin Creek watershed?

The 2005 survey found no sites or reaches to be in non-attainment of applicable biological criteria, with all fish communities meeting or exceeding their assigned aquatic life goals. Overall, the basin achieved full attainment at 32 of 48 stations (67%). Most impairment, found only within the macroinvertebrate communities, was either attributed to or exacerbated by naturally-occurring low flows. Of the impaired sites, 14 of 15 were located on tributaries and not on Twin Creek itself.

The Twin Creek mainstem reaffirmed itself as worthy of its exceptional status in 2005. While Twin Creek does not stand out in



terms of species diversity (the number of species), Twin Creek is among the best in terms of a balanced biological community.

Stream channelization, drainage tiles, and loss of floodplains and streamside vegetation have degraded the streams, particularly in the agriculturally-dominated headwaters area. When streams are widened and deepened, they contribute excess soil to the stream, which destroys habitat for fish and other aquatic life.

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. 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

Twin Creek Watershed TMDL Report

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.

How will water quality get better?

The Twin Creek 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 cleanup 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 bacteria, phosphorus, ammonia, sediment and improving habitat. Ohio EPA can address some of the Twin Creek problems through regulatory actions, such as permits for wastewater and storm water dischargers. Other actions, such as committing to agricultural best management practices and reduced home sewage system failures, will depend on local residents.

What actions are needed to improve water quality?

Because there are several reasons why streams in the Twin Creek 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

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

- ◆ **Manage nutrients in agricultural areas to reduce runoff**
 - *Develop and improve nutrient management plans to address site-specific resource concerns*
 - *Implement NRCS 633 standards for winter application of manure*
 - *Plant winter cover crops to provide manure application sites*
 - *Install tile drainage control structures*
 - *Restore and use wetlands to filter runoff, remove nutrients*
- ◆ **Improve erosion and sediment control in all areas**
 - *Practice conservation tillage on row crop farms*
 - *Install filter strips along all agricultural tributaries*
 - *Restore and utilize wetlands to filter runoff and remove sediments*
 - *Establish and protect riparian buffers on streams*
 - *Utilize bank erosion control structures where appropriate*
- ◆ **Eliminate bacteria problems**
 - *Improve planning for environmentally sustainable manure management at livestock and poultry production facilities*
 - *Improve treatment at Lewisburg WWTP*
 - *Reduce home sewage treatment system failures*
 - *Educate citizens about proper maintenance of home sewage treatment systems*

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:

- All wastewater treatment plants (WWTPs) will be required to monitor total phosphorus in effluent. Lewisburg WWTP will be given a goal to discharge no more than 1.0 milligram per liter.
- Failing or poorly operating home sewage treatment systems

(HSTSs) should be inspected and improved in rural, urban and developing areas by the county health departments.

- Sediment flowing into streams is a concern in both agricultural and developing areas. Controls include reducing erosion with cover crops or conservation 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 stream drainage maintenance.
- Nutrient loading from livestock operations and agriculture chemicals would be abated by conservation and management practices promoted by the USDA Natural Resource Conservation

Twin Creek Watershed TMDL Report

Service. Suggestions include adoption of phosphorus index and nitrogen index strategies to address nitrogen leaching and phosphorus concentration buildup on agricultural land.

- Agricultural producers are encouraged to buffer streams near crop land using filter strips and streamside vegetation. This will help to filter sediment and nutrients out of runoff and will provide in-stream shade and habitat to reduce temperatures, thereby increasing dissolved oxygen content and reducing algae blooms.
- Agricultural producers are encouraged to participate in wetland restoration in areas of land that consistently retain water. Wetlands are a natural filtering mechanism for nutrients and sediment.
- 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, interested citizens and agencies have come together to chart a course for the watershed's

future, referred to as the Watershed Advisory Group. The Three Valley Conservation Trust, in consultation with the Advisory Group, submitted a watershed action plan (WAP) for the Twin Creek watershed in November 2007, which was conditionally endorsed by the Ohio Department of Natural Resources. The watershed coordinator is updating the WAP for resubmittal. Ohio EPA consulted with the Advisory Group and watershed coordinator throughout the process of writing the TMDL report and the TMDL and WAP complement each other.

The Three Valley Conservation Trust and the WAG are serving as community advocates for the watershed, and have become important forces to maintain momentum and sponsor improvement efforts. For example, they have established a strong outreach program to engage the public with factual information and promote activities to restore and protect the watershed. Those groups have also been instrumental in helping with the implementation of water quality improvement projects, as discussed below.

Are any actions already underway?

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

- The Miami Conservancy District began a pilot program 2006

that focuses on reducing nitrogen and phosphorous runoff throughout the Great Miami River basin, including the Twin Creek watershed. The trading program provides opportunities for agricultural producers to receive funds to improve their operations in exchange for implementing nutrient reduction practices on their land. These "on the ground" projects then generate "credits" that wastewater treatment plants can use to meet regulatory requirements.

- Five jurisdictions—Carlisle, Germantown, German Township, Montgomery County and Warren County—have developed a storm water management plan.
- In cooperation with the Advisory Group, the watershed coordinator held multiple public meetings in 2006. These focused meetings were open to all watershed residents and interested parties and explained the WAP project and gathered views of participants.
- The Three Valley Conservation Trust has facilitated the formation of multiple conservation easements throughout the watershed. One of the major reasons the water quality is so high in Twin Creek is that there are long stretches of unbroken streambank habitat. Conservation easements help to protect that habitat next to streams, preserving the high water quality.

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.ohio.gov/dsw/Home.aspx>.

The final TMDL report was approved by U.S. EPA on March 4, 2010. The final report is available at <http://www.epa.ohio.gov/dsw/tmdl/index.aspx>.

For further information, please contact Marianne Piekutowski, Ohio EPA, Southwest District Office, 401 E. Fifth St., Dayton, Ohio 45402, or sent via email to marianne.piekutowski@epa.state.oh.us.