State of Ohio Environmental Protection Agency

Fact Sheet

January 2010

Mad River Watershed TMDL Report

What are the essential facts?

- *Ohio EPA studied the Mad River watershed and found water quality problems at some of the locations measured.*
- *The watershed can make progress towards restoration with practical, economical actions.*
- *Improving the streams depends on the participation of the watershed's residents.*

What is the significance of this report? *The Mad River 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 Mad River watershed?

The Mad River watershed is located in west-central Ohio in Logan, Champaign, Clark, Miami, Greene, and Montgomery counties. It is a subwatershed of the Great Miami River, flowing southwest until it joins with the Great Miami River in Dayton. The watershed drains 657 square miles.

An estimated 170,000 citizens reside in the Mad River watershed year round. The larger communities in the watershed include Springfield, Urbana, Fairborn, West Liberty and part of Dayton.

Overall, the land use in the Mad River watershed is 67 percent row crop and pasture land, 19 percent urban/ residential, and 11 percent forest.

The watershed contains a number of glacial remnant wetlands know as "fens." Fens are peat-forming alkaline wetlands that are maintained by constant flows of cool ground water. Most fens occur in western Ohio, particularly in Champaign, Logan, and Clark counties. Perhaps the best known fen is Cedar Bog, located four miles south of Urbana.

To focus its work, Ohio EPA divided the watershed into five areas: the headwaters; Mad River between Kings and Chapman creeks; Buck Creek; Mad River from Chapman to Mud creeks; and the lower Mad River draining into the Great Miami River in Dayton (see map on page 2).

Mad River in autumn at County Line Road

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 indicate a healthy stream.

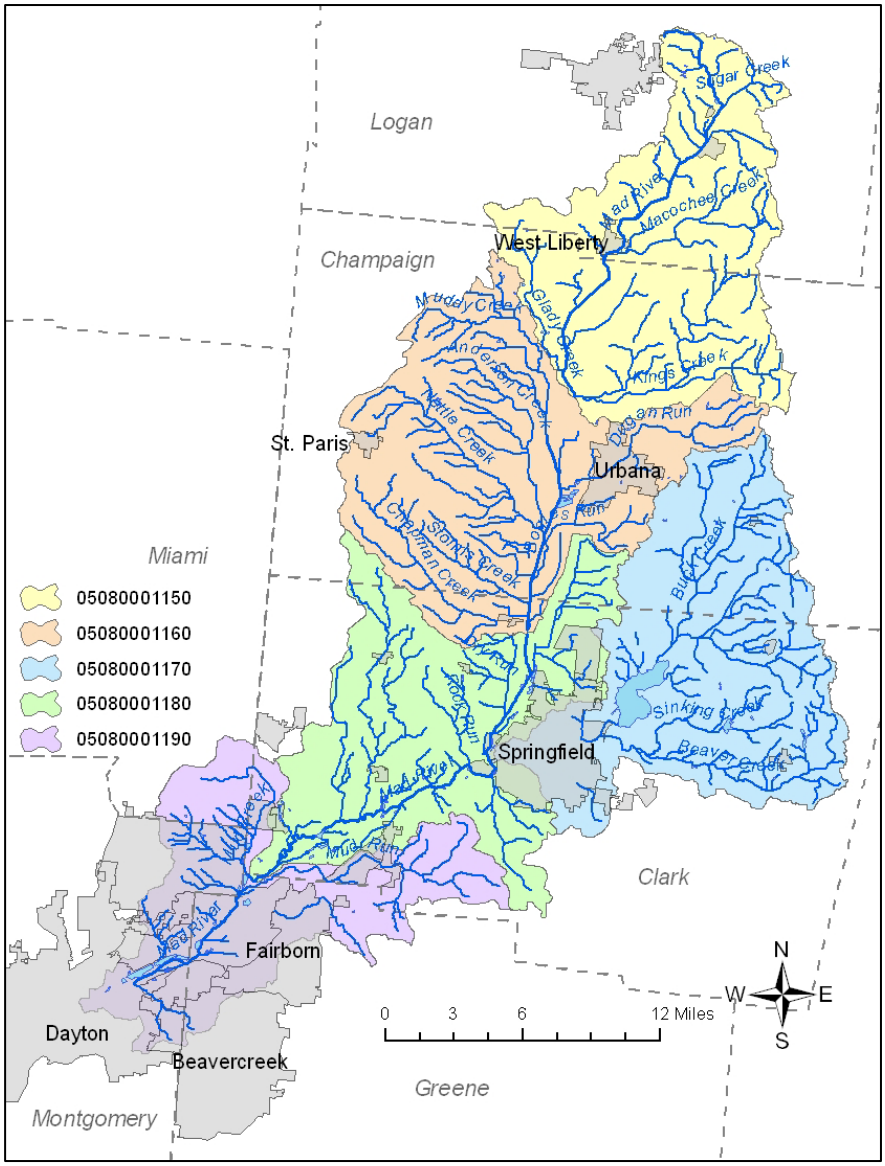
In 2003, comprehensive biological, chemical, and physical data were collected by Ohio EPA scientists. Additional water chemistry data were collected in 2004 at selected locations and at varying stream flows during the winter and spring to support the load reduction models.

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 Mad River watershed?

Ohio EPA's study of 110 sites on 48 streams in the watershed showed that although biological problems are found throughout the watershed, many nice areas remain. About 79 percent of the sites fully meet the goals associated with healthy warmwater habitat streams; 15 percent of sites partially meet the goals; and 6 percent of sites do not meet goals.

The main stem of the Mad River is unique in that the high infiltration rate of the sand and gravel aquifers in the watershed supports the strong ground water discharge/base flow component of the Mad River. The ground water component lowers the temperature of the river and provides a more constant base flow.



Most sites on the Mad River and its tributaries that did not meet or partially met water quality goals were impaired because of physical changes to the land and nutrient additions.

Stream channelization, drainage tiles, and loss of floodplains and streamside vegetation have degraded the creeks. When streams are widened and deepened for agricultural drainage, they contribute excess soil to the stream, which destroys habitat for fish and other aquatic life. Soil carried through ditches degrades Mad River and the Great Miami River.

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 available for aquatic organisms. This is worsened by agricultural 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 practices such as tiling and routine ditch clean-outs change both quantity and quality of water flowing to downstream reaches, making it difficult to support good aquatic life communities.

Excessive nutrients entering streams from agricultural and urban runoff, as well as subsurface tile drains, contribute to the growth of algae in streams, particularly where streamside vegetation is sparse. When the algae die, they break down and use up dissolved oxygen that insects and fish need to live.

How will water quality get better?

The Mad River 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 water quality standards (goals). The TMDL report specifies how much pollution must be reduced from various sources and recommends specific actions to achieve these reductions. Ohio EPA adapted loading analysis work by the U.S. Geological Survey.

The TMDL report provides specific numeric goals for reducing pollutants, including pathogens, nitrate, sediment and improving habitat. Ohio EPA can address some of the Mad River problems through regulatory actions, such as permits for wastewater and storm water dischargers. Other actions, such as committing to proper nutrient management and reduced home sewage system failures, will depend on local residents.

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

- ***Improve riparian and in-stream habitat throughout watershed***
  - o *Plant trees along stream banks missing vegetation*
  - o *Cease any channelization activities and allow streams to return to more natural appearance*
- ***Reduce nitrate contributions to streams***
  - o *Consider controlled drainage where plausible*
  - o *Develop and apply nutrient management plans*
  - o *Plant conservation buffers to reduce agricultural runoff*
  - o *Retrofit storm water detention structures in urban areas to reduce first flush chemicals and high flows*
  - o *Plant winter cover crops to provide manure application sites*
- ***Eliminate pervasive bacteria problems***
  - o *Prevent livestock access to streams*
  - o *Reduce home sewage treatment system failures*
  - o *Reduce combined sewer overflows by finishing and implementing the long-term control plan for Springfield*

What actions are needed to improve water quality?

Because there are many reasons why streams in the Mad River 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.

Re-establishing a more 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:

- Home sewage treatment systems (HSTSs) should be addressed in rural, urban and developing areas by the county health departments.
- Protecting drinking water sources by reducing nutrient loading from livestock operations and agriculture chemicals is needed. Using USDA Natural Resource Conservation Service conservation and management practices is encouraged. Suggestions include adoption of nitrogen index strategies to address nitrogen leaching on agricultural land.

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

- Ohio EPA will continue to work with the City of Springfield to address combined sewer overflow issues contributing bacteria to the nearby streams.

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.

The Clark County Soil and Water Conservation District (SWCD) was awarded a 319 grant to develop a watershed action plan (WAP) for the portions of the watershed in Clark County and southeast Champaign County. The grant also provided for implemen-tation of agricultural and urban BMPs. The WAP was endorsed by the Ohio Department of Natural Resources (ODNR) and Ohio EPA in 2006.

In 2008, SWCD supervisors from Logan, Champaign, and Clark counties formed a Joint Board of Supervisors for the Mad River watershed within their counties. With support from ODNR Scenic Rivers, this board has been meeting monthly to develop a draft WAP for the entire watershed. At the time of this report, the draft WAP had been submitted to ODNR and Ohio EPA for endorsement.

Are any actions already underway?

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

- From January 2003 through December 2005, collaboration amongst several groups and many volunteers produced the Mad River Watershed In-stream/Riparian Habitat Improvement Project Summary (http://www.tumadmen.org/html/summary_report.html). During this project, over two miles of stream habitat were restored. Four other projects were referenced at the above web page that include stream buffers with riparian tree plantings and in-stream and stream bank habitat improvements.

- B-W Greenway is restoring and preserving several wetlands within the watershed, including the Hebble Creek wetland in Fairborn. This organization also promotes the installation of rain gardens by educating local home and land owners.

- The Miami Conservancy District (MCD) is planning several projects in the Mad River watershed. The first is a plan to provide cost-share incentives to five communities and organizations to implement innovative local strategies to assist with storm water management requirements, water resource protection related to development, and water impairment issues. The Hidden Hills Detention Basin project in Fairborn has been completed to decrease soil and nutrient runoff into Hebble Creek. Finally, the City of Dayton will install storm sewer collection systems to prevent pollutants stored at a municipal maintenance facility from running into the Mad River.

- MCD monitors water quality regularly within the basin through a volunteer monitoring program. An advisory committee administers a surface water quality credit trading program, which allows permitted dischargers to buy pollutant runoff credits from farmers who voluntarily reduce their runoff.

- Five Rivers MetroParks actively pursues land accrual along the Mad River (in addition to other areas) to aid in conservation.

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 draft Mad River TMDL report was available for public review from September 24 through October 26, 2009. The final TMDL report was approved by U.S. EPA on January 26, 2010. The final report is available at http://www.epa.ohio.gov/dsw/tmdl/index.aspx.

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