

June 2009

Powell Creek Watershed TMDL Report

What are the essential facts?

- *Ohio EPA studied the Powell Creek watershed and found water quality problems at several of the locations measured.*
- *Water quality improvements can be made with practical, economical actions.*
- *Making water quality improvement depends on the participation of the watershed's residents.*

What is the significance of this report? *The Powell Creek Watershed TMDL Report provides information that can be used to help improve and maintain water quality and habitat in the watershed, including ideas from local watershed planning.*

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

Where is the Powell Creek watershed?

The Powell Creek watershed in northwest Ohio drains parts of Putnam, Defiance, Paulding, and Henry counties. Powell Creek flows into the Auglaize River in the City of Defiance, just upstream from where the Auglaize joins the Maumee River. The largest tributary streams to Powell Creek are South Powell Creek and North Powell Creek.

Powell Creek drains 98 square miles. Over 53,000 acres (83%) of the watershed is used for corn, soybean and wheat production. Forest covers about 8% of the watershed; 7% is developed land.

The watershed is very flat and the soils are mainly clay, deposited in a former glacial lakebed. Part of the Great Black Swamp, which was drained in the nineteenth and twentieth centuries, the area is poorly drained and consequently extensive subsurface drainage is used in most crop fields. Ditches are also widely used to facilitate drainage of farmland.

Incorporated areas in the watershed include parts of the City of Defiance and the Villages of Continental and Miller City. Several homes surrounding the community of Ayersville, located just to the east of the watershed, are within the Powell Creek watershed.

The population of the watershed is small. Continental's wastewater treatment plant is the only point source discharge in the basin. Two confined animal feeding operations are also in the watershed; however, neither have direct discharges to Powell Creek streams.

How does Ohio EPA measure water quality?

Ohio is one of the few states to measure 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 2000, comprehensive biological, chemical, and physical data were collected by Ohio EPA scientists. 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 Powell Creek watershed?

Water quality is below minimum expectations. Results show that these streams are not supporting fishes and other aquatic life found in average streams in this part of Ohio. Of the twelve sites that Ohio EPA sampled in the watershed in 2000, none met the minimum water quality goals.

The safety of the water for human recreation cannot be fully determined because there is not enough data. However, based on the limited number samples collected, there is a strong indication that most streams are polluted with exceptionally high levels of bacteria, therefore

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increasing the risk for water-borne illness.

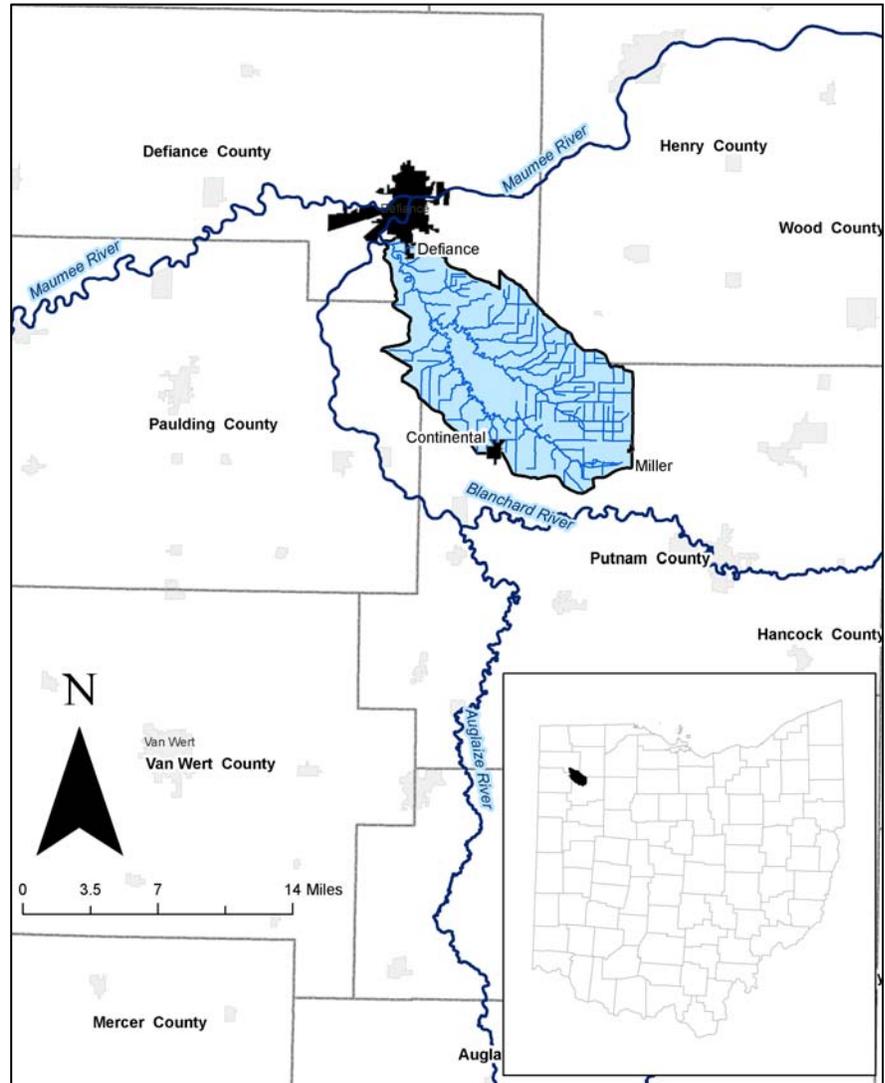
The primary reason these streams do not support healthy aquatic communities is poor habitat. In particular the large amount of fine sediment in these streams makes it difficult for many types of fish and bugs to find the streambed habitats they need.

Fine sediment washes off of crop fields and other lands that are susceptible to erosion. However, the stream channel itself can be a significant source of sediment if its banks are eroding. Channel maintenance increases the amount of bank erosion that occurs if vegetation, especially trees, is removed from the sides of the channel. Additionally, digging relatively deep channels improves land drainage but it makes high stream flows more powerful and may increase bank erosion.

Water samples show that the nutrients phosphorus and nitrogen are at high levels. This gives rise to abundant algae production in streams further degrading water quality. Other water pollutants include organic substances that come from manures, plant residues, and oils.

As with sediment, rainfall picks up nutrients and other pollutants that are on the landscape before draining to rivers and streams. The large proportion of crop land in the watershed makes it especially important that fertilizers are managed carefully to prevent losses of nutrients to waterways. Manure that is land applied must also be managed carefully to prevent pollutants such as bacteria and organic matter from washing in to ditches or drainage tiles.

Home septic systems are significant sources of pollution when they are not functioning



properly. Bacteria, nutrients, and organic matter are very concentrated in human waste so any direct or indirect discharge of poorly treated waste can be extremely damaging to water quality. Treated waste from the Village of Continental is also having a negative impact on water quality; however, improvements to this operation are being made.

How will water quality get better?

The Powell 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

TMDL serves as that clean-up plan because it determines the maximum amount of pollutants a water body can receive and 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 provides specific goals for reducing pollutants, including phosphorus and nitrate, sediment, and organic substances. Ohio EPA can address some of the water quality problems through regulatory actions, such as permits for wastewater and storm water

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dischargers. Other actions, such as proper maintenance of home sewage system and appropriate manure management, will mostly be up to local residents.

What actions are needed to improve water quality?

There are many reasons why streams in the Powell Creek watershed are not meeting water quality goals, which mean that several types of actions are needed to make improvements and protect the watershed in the future. The recommendations focus on reducing pollutant loads and/or increasing the capacity of the streams to better handle the remaining pollutant loads.

Generally speaking, streams benefit from having a floodplain that gets flooded at least once every one to two years.

Floodplains protect and to some extent rejuvenate streams by keeping bank erosion in check and



The maintained depth of many ditches and streams reduce floodplain activity, resulting in silty channels.

What are some of the most important “fixes” that watershed residents can address?

◆ Eliminate pervasive bacteria problems

- Reduce home sewage treatment system failures
- Ensure proper manure handling and management at livestock operations

◆ Improve erosion and sediment control in all areas

- Establish and protect riparian buffers and filter strips on all streams and ditches
- Use cover crops in non-growing season on farm fields
- Practice conservation tillage
- Adopt ditch maintenance that minimizes removal of vegetation along the banks and allows for floodplain development

◆ Reduce the amount of nutrients getting into streams

- Use nutrient management techniques on cropland including nitrogen and phosphorus testing indices
- Introduce flow control structures in subsurface drainage systems to limit tile flow in non-growing season
- Create or restore wetlands in low lying areas to store and clean polluted runoff

by storing fine sediment that would otherwise blanket the streambed. Floodplains also filter other pollutants such as nutrients and organic substances in its soils even when flows are lower.

Drainage ditches lack these types of floodplains because they are constructed to hold large stream flows within their banks. Due to the extensive use of drainage ditches in the watershed, a big improvement in water quality can be achieved by adopting an alternative approach to channel maintenance. Ideally, ditches would be reconstructed to be wider than a typical ditch bottom so that small floodplains can form.

Also, agricultural conservation practice will be critical to making improvements in water quality. The dominance of row crop land use in the watershed means that the cumulative effect of polluted

runoff from farms can be drastic. Conservation practices that would be beneficial include:

- Buffers and filter strips along ditches and streams to reduce the amount of pollutants as well as the volume of runoff.
- Cover crops planted for the non-growing season to protect against soil erosion and take-up otherwise free nutrients in the soil. Cover crops also improve soil quality by adding fertility as well as organic matter, which help fields absorb rainwater.
- Nutrient management that increases how efficiently crops used fertilizer and manure so that less nutrients are washed off into ditches and streams. Nutrient management could include adoption of phosphorus index and nitrogen index strategies to address nitrogen leaching and the

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long-standing trend of phosphorus concentration buildup on agricultural land in the watershed.

- Wetland restoration or creation, especially on low lying and poorly drained areas, can store polluted runoff that would otherwise drain to ditches and streams. Wetlands return water back to the soil and groundwater and also filter out pollutants.
- Control of subsurface drainage tiles so that drainage is reduced during the non-growing season can prevent up to 40% of the amount of dissolved fertilizers from leaving farm fields.
- Proper manure management and storage reduces or eliminates the potential for manure losses to ditches and streams. Such actions include providing cover to stored manure and open lots.
- Residue management on row crop fields also protects soils that are otherwise vulnerable to erosion. Crop residues have many similar benefits as cover crops.

Finally, due to the severity of the impact of improperly functioning home septic systems, these systems need to be in working order to have good water quality in the Powell Creek watershed. Proper maintenance of these systems is critical and they should not be modified in any way that compromises their function. County health departments provide



Cover cropping, conservation tillage and nutrient management reduce the amount of pollutants reaching surface drains, ditches and streams.

information and assistance regarding how to best care for these systems. Local officials are also responsible for identifying and reporting those systems that are not functioning properly.

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. At the state level, point source dischargers will be issued permits consistent with

the findings of this TMDL. At the local level, conservation professionals in both public and private sectors are encouraged to work with farm operators to establish conservation practices. Health departments are valuable resources in educating landowner on proper maintenance of home septic systems.

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 Powell Creek TMDL report was approved on June 18, 2009 and can be accessed at <http://epa.ohio.gov/dsw/tmdl/PowellCreekTMDL.aspx>.

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