

## Chapter 2

### Water Quality Conditions in Mahoning and Trumbull Counties

Water can indicate the health of a watershed's ecosystem by studying and identifying the organisms found within it and it can summarize the land use activities within a watershed when analyzed for contaminants and their sources. This chapter highlights current water quality conditions of the water courses in the watersheds of Mahoning and Trumbull Counties. Information presented in this chapter was drawn from official water quality reports, community plans, and watershed action plans.

#### 2.1 Clean Water Act Applications and Reporting

The Clean Water Act (CWA) contains a comprehensive reporting program protecting the Nation's valuable water resources. Sections 305 (b) and 303 (d) of the CWA, required states to create summaries of surface water conditions (305(b) reports) and develop a list of water bodies not meeting state water quality standards (303(d) list). The 305(b) report was to be a routine check on improvements states were making towards the CWA's goals. To address impaired waters listed in the 303(d) document, the state creates measures to improve conditions via the development of total maximum daily loads (TMDLs), water quality specific permitting, and nonpoint source pollution control measures.

Under Federal guidance, the Ohio EPA developed a watershed based method of reporting, "Integrated Water Quality Monitoring and Assessment Report" (Integrated Report). This new reporting method, combines the 305 (b) water quality reports with the 303 (d) list of impaired waters, satisfying CWA reporting requirements for both Section 303 (b) and Section 303 (d). Beginning in 2002, the Integrated Report summarizes the water quality conditions using a watershed's 12-digit Hydrologic Unit Code (HUC).

#### 2.2 Ohio Water Quality Standards

Since the passage of the 1972 Federal Water Pollution Control Act, the Ohio EPA has seen substantial improvement in the overall water quality of its inland streams and rivers. Driven by the growing concern for ecosystem stability, Ohio's water quality standards are based on a set of criteria concentrating on beneficial use designations and biological indices found in Ohio Administrative Code (OAC) section [3745-1-07](#).

Beneficial use designations are based on how humans use a water system and how well the water system is able to nourish a dependent biological community. The designations are made up of two broad groups: Non-Aquatic Life Habitat and Aquatic Life Habitat.

### **2.2.1 Non-Aquatic Life Habitat**

Non-Aquatic Life Habitat uses are broken down into two categories<sup>1</sup>:

1. Water Supply:
  - **Public Water Supply (PWS)** are waters that, with conventional treatment, are suitable for human consumption and meet federal regulations for drinking water;
  - **Agricultural Water Supply (AWS)** are waters that are suitable for irrigation and livestock watering without treatment;
  - **Industrial Water Supply (IWS)** are those waters suitable for commercial and industrial uses, with or without treatment.
2. Recreation (uses in effect only during the recreation seasons, May 1<sup>st</sup> through October 15<sup>th</sup>):
  - **Bathing Waters (BW)** are waters suitable for swimming where lifeguard and/or bathhouse facilities are present, and include any additional areas where water quality is approved by the director;
  - **Primary Contact Recreation (PCR)** are waters suitable for full-body contact recreation such as, but not limited to, swimming, canoeing, and scuba diving; and
  - **Secondary Contact Recreation (SCR)** includes those waters suitable for partial body contact recreations such as, but not limited to, wading.

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<sup>1</sup> Ohio EPA Division of Surface Water, OAC Chapters 3745-1-07.

Under the CWA, an antidegradation rule is required and must be a part of the State's Water Quality Standards. Antidegradation refers to provisions that must be followed before authorizing any increased activity on a water body that may result in a lowering of water quality, including an increase in the discharge of a regulated pollutant, or activities that may significantly alter the physical habitat. This rule establishes a procedure to determine that a discharge is necessary before authorizing it and, along with water quality criteria and beneficial use designations, provides the overall structure of the water quality standards program. The antidegradation rule must protect the existing use of the water body, and only allow a lowering of water quality when it is necessary to support important social and economic development. The state has established procedures and requirements to ensure that the concepts outlined by the federal regulations are met. These requirements include public participation activities, intergovernmental coordination, determination of important social and economic development, and alternative analysis and greater protection for exceptional quality streams. Under the antidegradation rule, rivers were categorized as General High Quality Waters, Superior High Quality Waters, Outstanding State Waters, or Outstanding National Resource Waters. General High Quality Waters are category 2 or 3 wetlands in accordance with Ohio EPA rule 3745-1-54 of the OAC and surface waters not categorized as one of the following three categories:

- **Superior High Quality Waters** are water systems having exceptional ecological values. Ecological values are based upon the combination of the presence of federal and/or state threatened or endangered species and a high level of biological integrity;
- **Outstanding State Waters** are water systems having special significance to the state due to exceptional ecological and/or recreational values; and
- **Outstanding National Resource Waters** are water systems having a national ecological or recreational significance. National ecological significance may include providing habitat for populations of federal endangered or threatened species or displaying some unique combination of biological characteristics. National recreation significance may include designation in the national wild and scenic river system.

The Ohio EPA lists all designated Superior and Outstanding State Waters in OAC Section 3745-1-05, Tables 5-4 through 5-7. Mill Creek, a waterway that traverses through Mahoning County's largest Metropolitan Park, is recognized as a General High Quality Water because it is not found within the Superior High Quality Waters, Outstanding State Waters, or Outstanding National Resource Waters tables located in OAC 3745-1-05 (Tables 5-4 through 5-7). According to Table 5-4, Baughman Creek, a tributary to the Grand River in Trumbull County, is listed as a Superior High Quality Water. A portion of the Grand River in Ashtabula County is designated as an Outstanding State Water based on exceptional ecological value (Table 5-5). Though this segment is not located within Eastgate's planning area, it is important to note the segment is located downstream of Trumbull County. Therefore, any activity within Trumbull County's stretch of the Grand River poses a threat to the outstanding portion of the river.

### **2.2.2 Aquatic Life Habitat**

Complimenting the Non-Aquatic Life Habitat category are Aquatic Life Habitat use designations. These designations are broken down into five categories defined by the Ohio Water Quality Standards that apply to Northeast Ohio. The following is a summary of each category<sup>2</sup>:

- **Warmwater Habitat (WWH)** – these are waters capable of supporting and maintaining a balanced, integrated, adaptive community of warmwater aquatic organisms;
- **Exceptional Warmwater Habitat (EWH)** – these waters can support and maintain an exceptional or unusual community of aquatic organisms characterized by a high diversity of species, especially by those who are highly intolerant and/or rare, threatened, endangered, or of a special status (i.e. declining species);
- **Coldwater Habitat (CWH)** – these waters support cold water organisms and/or those which are stocked with salmonids with the intent to facilitate a put-and-take fishery on a year-round basis;

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<sup>2</sup> Complete, legal definitions of each Aquatic Life Habitat use designation are found in OAC Section 3745-1-07.

- **Modified Warmwater Habitat (MWH)** – waters in this category have been found to be incapable of supporting and maintaining a balanced, integrated, adaptive community of warmwater organisms due to extensive modifications of the physical habitat; and
- **Limited Resource Water (LRW)** – are small water systems with drainage areas less than 3 square (sq.) miles that have been irretrievably altered to the extent that no aquatic life can be supported. The Ohio EPA will apply this designation to streams having “natural background conditions” which often preclude other types of biology from being present.

Embedded within the Ohio EPA’s Water Quality Standards are tables summarizing Ohio’s water quality and categories on a drainage basin level. Each drainage basin table includes surveyed water body segments, a life use designation (Aquatic and Non-Aquatic), water supply, and a recreation use summary. According to the tables for the Grand River, Little Beaver Creek, and the Mahoning River (includes the Pymatuning drainage basin) drainage basins (OAC 3745-1-10, 3745-1-15, 3745-1-25 respectively), the water segments surveyed all have a non-aquatic use designation of both industrial and agricultural water supplies with primary contact recreation. All assessed river and stream segments located within the Mahoning and Trumbull County portions of the Grand River, Pymatuning, Mahoning River, and Little Beaver Creek Watersheds have Warmwater Habitat aquatic life use designations, apart from a Grand River stream segment located in Farmington Township, Trumbull County. An Exceptional Warmwater Habitat designation was assigned to that segment of the Grand River.

### **2.2.3 Attainment Designation**

Aquatic Life beneficial use designations were designed to protect aquatic life in our water bodies. When assessing stream health, biological indices are used to measure current biological communities compared to expectations for its assigned use designation. Those biological indices include the Index of Biological Integrity (IBI), Modified Index of Well-being (MIwb), and the Invertebrate Community Index (ICI). Attainment of the stream’s use designation, i.e. WWH, is based on a measurement of the current biological community by means of the indices, and is assigned one of the following:

- **Full Attainment** – all three indices meet applicable criteria specified by Ohio water quality standards;
- **Partial Attainment** – at least one of the indices does not attain and biological community performance is fair; and
- **Non-Attainment** – all indices fail to attain, or any index indicates poor or very poor performance.

### 2.3 Summary of Nonpoint Sources in Mahoning and Trumbull Counties

Over the years, a new pattern has emerged in Ohio regarding point and nonpoint source pollution. Impairments caused by point source pollution are decreasing, while those caused by nonpoint sources are increasing. Based on results from state wide surveys, the Ohio EPA asserts that nonpoint source impacts, such as:

*“urban storm water, siltation of substrates, and habitat degradation are becoming increasingly evident as historically more pronounced impacts from point sources (i.e. municipal WWTPs, some industrial effluents) are reduced. Since 1988, there has been a 48% decline in point sources as a major source of impairment in reassessed stream and river segments... Nonpoint sources have emerged as a major source of impairment in streams and rivers during this period, with increases including 70% for agricultural sources to 123% for hydromodification related nonpoint source impairments. While successes resulting from the abatement of point sources have been documented, there are other indications that impacts from nonpoint source runoff, habitat degradation, and watershed disturbances may be worsening. Siltation of substrates and habitat degradation are now the second and third leading causes of aquatic life impairment in Ohio streams and rivers, surpassing ammonia and heavy metals. These impairments are principally the result of agricultural land use, intensive urbanization, and suburban development, the latter of which is emerging as one of the most significant threats to watersheds... Increasingly, water pollution problems are associated with nonpoint sources such as construction sites, farm*

*land, abandoned mines, landfills, pits and lagoons, oil and gas wells, domestic sewage systems, manure and treatment processing residuals”.*

According to the Ohio EPA the top seven major causes of impairment (state-wide) are habitat modification, siltation, organic enrichment/low dissolved oxygen (D.O.), flow alteration, nutrients, metals, and ammonia. The major sources of impairment include hydro-modification, agriculture, municipal (including CSOs) and industrial discharges, mining, and urban runoff<sup>2</sup>. According to the 2016 Integrated Report, the leading “High Magnitude Causes” of impairment in Mahoning County and Trumbull County surface water systems include:

- Direct Habitat Alterations;
- Organic Enrichment/Dissolved Oxygen;
- Nutrients;
- Flow Alteration, Siltation, Wetland Alteration, and Unionized Ammonia; and
- Unknown sources.

The sources complimenting the causes are “High Magnitude Sources”, and those include:

- Channelization Due to Development and Natural Causes;
- Major Municipal Point Sources, Dam Construction, Urban Runoff/Storm
- Sewers, Combined Sewer Overflows (CSO);
- Unknown sources;
- Contaminated Sediments; and
- Riparian/Stream Bank Vegetation Removal.

The water quality of Mahoning and Trumbull County is dependent upon land use activities that exist within four watersheds: Grand River Watershed, Pymatuning Watershed, Mahoning River Watershed, and the Little Beaver Creek Watershed. The following is a summary of the nonpoint sources of pollution existing within the watersheds based on the Ohio EPA’s various monitoring reports and existing watershed plans. Pollution sources mentioned are of those found within Eastgate’s planning region. However, it is important to note that pollution

originating outside and downstream of the planning region can and does find its way into the watersheds shared by Mahoning and Trumbull Counties (i.e. Mahoning River Watershed).

### **2.3.1 Grand River**

The Grand River watershed contains 705.5 acres of land and 165.5 miles of streams draining north into Lake Erie. The northwest corner of Trumbull County is in the Grand River watershed, specifically the Upper Grand River watershed. The Upper Grand makes up 521.4 acres of the greater Grand River watershed, with Trumbull County containing 142.6 acres of that total. The mainstem of the Grand River serves as the Village of West Farmington's drinking water source.

A Biological and Water Quality Study of the Upper Grand River was conducted in 2007 with a Total Maximum Daily Load (TMDL) report following in 2013. TMDL reports identify and evaluate water quality problems in impaired water bodies and propose solutions to bring those waters into attainment with water quality standards. Water quality conditions within the Upper Grand River watershed are reflective of historic glacial activity that formed three types of streams: lowland streams, upland headwaters, and the non-wadable Grand River mainstem. The lowland streams are sluggish and contain fine substrates not expected to support biological communities in the ecoregion. The Grand River headwater streams contain bedrock in shallow areas where flow is not sustained through summer months.

Appendix B of the 2013 TMDL report summarizes the water quality conditions of the watershed, while Appendix D provides a summary of the watershed's impairments. Causes of impairments in the watershed include direct habitat alterations, natural conditions, organic enrichment, low flow alterations, total dissolved solids, nitrogen and ammonia. Sources of impairments include natural sources, sewage discharges in unsewered areas, and livestock access to streams and manure storage, handling, and application operations. Appendix B identifies the following areas of high quality for further protection:

- Baughman Creek- Baughman Creek is a Superior High Quality Water for antidegradation. Therefore, channelization activities in streams should be avoided.
- The Grand River is one of a few Ohio streams supporting self-sustaining and native walleye and muskellunge populations. The mainstem reach between Swine Creek to Rock Creek should be considered Superior High Quality Water to increase population protection.

Recommendations for regulatory action resulting from this TMDL analysis include an effluent limit for total phosphorus for one facility and monitoring for total Kjeldahl nitrogen, ammonia and total phosphorus for several other small facilities.

In the Spring of 2003, the Ohio State University Extension joined with the Grand River Partners and the Trumbull County General Health Department to conduct a survey of residents within the upper portion of the Grand River watershed. The survey was constructed to determine resident's attitudes toward water quality protection and land preservation within the watershed, specifically those lands abutting the Grand River and its tributaries. Respondents rated their views on the extent to which activities or events posed a threat to the watershed. Results from the survey indicated the perceived problems in the watershed were failing septic systems and urban sprawl. Trailing the top two concerns, but not lacking importance, were habitat alteration, industry, construction, logging, flooding, animal farming, crop farming, and mining.

### **2.3.2 Pymatuning Watershed**

The Pymatuning watershed was surveyed in 2008 by the Ohio EPA, as part of the "Biological and Water Quality Study of the Ohio Tributaries to the Shenango River". The Pymatuning watershed's headwaters begin in Ashtabula County and flow south into Trumbull County where additional tributaries (i.e. Swine Creek, Yankee Run, Little Yankee Run) join the mainstem. The watershed envelops the rural, northeast portion of Trumbull County, but transitions to an urban setting as it stretches south towards Mahoning County. Most of Pymatuning's mainstem is buffered by the Pymatuning Wildlife Area, but many tributaries to it are not, and serve as express lanes for storm

water runoff. According to the 2008 study results, 13 of the 28 monitored stream segments in Trumbull County are in partial or non-attainment of their aquatic life use designation. The survey cites the causes of impairment as wetland habitat, low dissolved oxygen, flow alterations, sediment/siltation, and unknown. Sources of the impairments include urban runoff, dam/impoundment, unnatural, livestock, channelization, and natural. An underlying factor contributing to the impairments is the watershed's low gradient.

### **2.3.3 Little Beaver Creek Watershed**

The Little Beaver Creek watershed weaves in and out of southern Mahoning County. Though mainly located in Columbiana County, land activities upstream in Mahoning County can be detrimental to downstream water quality. The 2006 Integrated Report lists nutrients, siltation, pesticides, organic enrichment/dissolved oxygen, unionized ammonia, flow alteration, natural limits (wetlands), and direct habitat alterations as high magnitude causes of impairment within the watershed. Sources of the causes include major industrial point sources, combined sewer overflows, pasture lands, channelization (development/agriculture), removal of riparian vegetation, onsite wastewater treatment systems (septic systems), and surface mining. According to the Columbiana County Soil and Water Conservation District, the leading nonpoint sources that impact the watershed's water quality include development, sediment, toxic substances, failing septic systems, damaged riparian areas, urban runoff, logging, and animal manure applications.

### **2.3.4 Mahoning River Watershed**

The Mahoning River watershed spans across six counties (Columbiana, Stark, Mahoning, Portage, Geauga, and Trumbull Counties) and is the largest watershed within the two-county area. Nonpoint sources of pollution appear numerous and sporadic throughout the watershed. Agricultural practices along main tributaries such as Meander Creek, the southern segments of Mill Creek and Yellow Creek, in Mahoning County, and along Mosquito Creek and Eagle Creek in Trumbull County appear to contribute organic enrichment, nitrate-nitrite, nutrients, and phosphorus to the impairment of the

watershed's water quality. Riparian zones have been destroyed by unrestricted livestock access and by farming in riparian zones and urban development. Residential and commercial development have sprawled out of the central cities and into the rural areas as seen happening in southern and southeastern Mahoning County and throughout Trumbull County. The outward migration of development leads to deterioration of water quality by habitat and flow alterations, the importing of sediment and nutrients into the tributaries, and by decreasing the amount of dissolved oxygen within the waters. Failing commercial and home septic systems have become a nuisance throughout the watershed with "hot spots" occurring near Mosquito Creek Reservoir, a drinking water supply in Trumbull County and along tributaries Yellow Creek and Mill Creek in Mahoning County. The Integrated Report cites numerous nonpoint sources that impair the watershed's water quality including (but not limited to) metals, suspended solids, siltation and urban runoff/storm sewers.

#### **2.4 Watershed Planning in Mahoning and Trumbull Counties**

There are a few groups in Mahoning and Trumbull Counties taking the initiative to approach various aspects of watershed planning. The Alliance for Watershed Action and Resource Education (AWARE) focuses on education regarding water quality issues by working with local schools to conduct classroom demonstrations of watershed education, apply for grants to accomplish small scale projects with an educational focus, and partner with the local agricultural community to enhance the understanding of soil testing to reduce fertilizer use. The Friends of the Mahoning River are a volunteer run group that has focused on collecting water quality data along the Mahoning River and improving recreation opportunities by actively working to install boat docks and hold cleanup days along the river corridor. These two groups provide a significant and valuable planning resource for advancing approaches to watershed issues by public management agencies and other stakeholder groups, and for building public awareness and responsibility for water quality.

This AWQMP recognizes the importance of volunteer watershed groups and recommends actions to sustain and enhance their varying roles.

#### **2.5 Recommendations**

**Recommendation 2-1:** Local, county and state water quality management agencies are encouraged to participate in and support the major watershed planning groups currently existing in the area.

**Recommendation 2-2:** While no specific organizational model is endorsed, the following principles are encouraged for organizing watershed planning groups:

- watershed planning groups should foster broad stakeholder involvement including local, county, regional, state and federal jurisdictions, and businesses and community organizations with a stake in the river; and utilize stakeholders in goal-setting for the watershed.
- watershed planning groups should pursue a community-based approach that relies on the leadership and technical support of local public management agencies;
- watershed planning groups should emphasize voluntary coordination of management strategies to complement the regulatory programs of local and state agencies;
- watershed planning groups should emphasize public education, awareness and involvement programs to more fully engage the public in an understanding of watershed issues; and
- watershed planning groups should facilitate voluntary technical collaboration among local and state agencies in efforts to address watershed issues and support implementation of water quality measures by local management agencies.

**Recommendation 2-3:** Ohio EPA and ODNR are encouraged to actively consult with watershed groups on the design, funding and implementation of watershed and nonpoint source projects proposed for a watershed.

**Recommendation 2-4:** The State of Ohio should provide base funding to support watershed planning groups that satisfy the criteria of public accountability, local government/agency involvement, technical competence, sustainability, and adequate public involvement.

## **2.6 Discussion**

Water quality problems transcend the boundaries of political jurisdictions. Management responsibilities of water quality agencies are often functionally compartmentalized with sewer agencies focusing on sewers and point source discharge issues, health departments focusing on

on-site systems and associated water quality and public health problems, municipalities and counties are concerned with storm water issues and other nonpoint source problems, and so on.

A watershed approach is critical to an adequate assessment of water quality issues leading to greater awareness of the priority problems to be addressed. The implementation of management solutions through watershed cooperation holds the promise of much more effective, efficient solutions as well. It can be a catalyst for better coordination and innovative strategies by existing management agencies.

Nonpoint source problems can only be understood and effectively addressed on a watershed basis. A watershed focus is indispensable to identifying the nonpoint factors impacting streams. Nonpoint solutions must also take into consideration actions at the landowner and household level. A watershed planning group provides a focal point for mobilizing action at this level. It can facilitate the substantial cooperation needed to implement solutions.

Watershed approaches are not mandated in the State of Ohio and would seem to be complicated by the State Constitution's allocation of primary land management responsibility to local units of government. In the near-term new legislation to establish watershed management authorities is unlikely.

Table 2-1 TMDL Reports and Supporting Documents

Biological and Water Quality Study of the <b>Mahoning River Basin</b> . Ashtabula, Columbiana, Portage, Mahoning, Stark and Trumbull Counties, Ohio, Lawrence and Mercer Counties, Pennsylvania., May 1996.
Biological and Water Quality Study of the <b>Grand and Ashtabula River Basins</b> , including <b>Arcola Creek, Cowles Creek and Conneaut Creek</b> . Ashtabula, Geauga, Lake and Trumbull Counties, Ohio. January 1997.
Biological and Water Quality Study of the <b>Mahoning River and Hines Run</b> . Mahoning River Corridor of Opportunity, CASTLO Property, 2002. Mahoning County, Ohio. December 2002.
Biological and Water Quality Study of the <b>Mahoning River</b> , Mahoning River Corridor of Opportunity, Former Youngstown Sheet and Tube - Campbell Works Coke Plant, 2003. Mahoning County, Ohio. December 2003.
Biological and Water Quality Study of the <b>Mahoning River and Yellow Creek</b> , 2006. Mahoning County, Ohio. November 2006.
Biological and Water Quality Survey of the <b>Mahoning River</b> near Thomas Steel Strip Corporation in Warren. Trumbull County, Ohio. October 2007.
2008 Study Plan for the Pymatuning/Yankee/Little Yankee Watersheds, HUCs 0503010201, 0503010203, and 0503010206 (Ashtabula and Trumbull Counties, Ohio)
Biological and Water Quality Study of the upper <b>Mahoning River and Selected Tributaries</b> , 2006. Columbiana, Mahoning, Portage, Stark and Trumbull Counties, Ohio. November 2008
Biological and Water Quality Study of Crab Creek, 2008. Mahoning County, Ohio. October, 2008
Biological and Water Quality Study of the <b>Upper Grand River Watershed</b> , 2007. Ashtabula, Geauga, Portage and Trumbull Counties, Ohio.
Biological and Water Quality Study of the Lower Mahoning River and Selected Tributaries, 2015