Chapter 7

Regionally Important Critical Resources

A list of critical resources was identified in the planning process as areas warranting protection under Eastgate's Areawide Water Quality Plan (AWTMP). These categories represent regionally significant resources either facing harsh deterioration and needing additional support for their restoration or will face deterioration if protective measures are not adopted. This chapter emphasizes the need to facilitate proper management and protection of regionally important resources sensitive to local land use activities. It also makes a series of recommendations for consideration by state and local management agencies that can be used to protect special resources.

7.1 Defining Critical Resources

Critical resources are defined regionally based on an understanding of the potential for sources of pollution to quickly effect water quality. The following categories represent critical resources valuable to Mahoning and Trumbull Counties:

- Surface Drinking Water Resources
- Ground Water Resources
- Riparian Zones and Floodplains
- Distinctive Regional Water Resources

7.2 Surface Drinking Water Resources

Abundant surface drinking water sources define the distinctive water sources in Eastgate's planning region. The management and protection of these regional water sources, as well as the tributaries providing water is critical for the region. The following section discusses the rivers and reservoirs utilized to provide drinking water.

The quality of surface drinking water supplies varies by location and is dependent upon activities taking place within the watershed. **Table 7-1** summarizes the active drinking water sources and their locations.

Table 7-1: Surface Drinking Water Sources

Drinking Water Source	Watershed	HUC 12	Water Supplier	County
Meander Creek Reservoir	Mahoning River	050301030703, 050301030702	Mahoning Valley Sanitary District (MVSD)	Mahoning County
Mosquito Creek Reservoir	Mahoning River	050301030502	City of Warren	Trumbull County
Evans Lake	Mahoning River	050301030805	Aqua Ohio	Mahoning County
Lake Hamilton	Mahoning River	050301030806	Aqua Ohio	Mahoning County
Mahoning River	Mahoning River	050301030306	City of Newton Falls	Trumbull County
Grand River	Grand River	041100040102	Village of West Farmington	Trumbull County
Berlin Reservoir	Mahoning River	050301030204, 050301030102, 050301030202	Back up supply for MVSD	Mahoning County, Stark County, Portage County

7.2.1 Meander Creek Reservoir

The reservoir serves as the primary drinking water source for numerous townships and municipalities in Mahoning and Trumbull Counties. It is owned and maintained by the MVSD and at full capacity holds 1,546 million cubic feet. Berlin Reservoir, a recreational water source owned and maintained by the United States Army Corps of Engineers (USACE), is in western Mahoning County. Berlin reservoir provides Meander Reservoir with water in the event of a drought.

The Meander Reservoir is protected by a natural, forested buffer created from surrounding lands owned by the MVSD. The buffer acts as a filtration system, filtering pollutants such as nutrients, sediment, and other contaminates originating from agriculture, residential and commercial development activity. However, tributaries feeding Meander Creek and the reservoir remain unprotected.

The Meander Creek watershed encompasses 54,534 acres or 85.2 square miles. Land use activities within the watershed have the potential to impair the water quality of the drinking water source. Agricultural activities, such as unrestricted livestock access to waterways, manure application, and agricultural product application (i.e. fertilizer, herbicides, pesticides) harm water quality by adding nutrients, chemicals, and sediment to the waters. As the watershed transitions to a suburban setting along its eastern boundary,

activities from commercial establishments and residential developments, via storm sewer systems, add additional sediment, excess nutrients, chemicals, and litter. Construction activities from surrounding development increases sediment loads, while unsewered areas of the watershed add additional concerns for water quality. According to the Mahoning County District Board of Health, areas of failing HSTS's are located within the watershed, along tributaries to Meander Creek.

Miles of roadways traverse the watershed adding litter, road salts, and other roadway-related pollutants. Two major interstate systems bisect the reservoir, I-80 and I-76, and both contain high volumes of truck traffic. Construction to widen I-76, to protect the reservoir from hazardous material spills, began in Spring of 2006 and concluded in September 2009. The reconstruction project included a first for the Ohio Department of Transportation, the creation of the state's first spill containment system. The containment system prevents contaminants from reaching the reservoir by channeling them through a series of drainage pipes, inlets, and roadside ditches. Any contaminants are then guided to one of two containment basins located at either the end of the eastbound or westbound bridge. Each basin is equipped with a shut off valve to prevent hazardous materials from reaching the reservoir. Should a hazardous material spill occur, emergency responders have approximately 30 minutes to shut the valves off.

According to the reservoir's SWAP, land use in the MVSD protection area is comprised of deciduous forest and agricultural land uses such as pasture/hay and row crop. The SWAP"s summary indicated possible impacts to the surface water source from the surrounding environment include "agricultural runoff from row crops and animal feed lots, oil/gas wells, road/rail stream crossings, failing home and commercial septic systems, and new housing and commercial development that could increase runoff from roads and parking lots"2. Many of the mentioned impacts have already been detected within the CMZ area as findings of pesticides and septic system effluent are or were present in the finished water. Sulfur Run, a tributary to the reservoir has been noted to contain effluent from upstream septic systems. Although not a source of contamination, but a potential source due to its age, is a 72-inch sanitary sewer line crossing the reservoir and carrying wastewater to the Meander Wastewater Treatment Plant. Other potential sources include several oil and gas wells located throughout the CMZ.

In 2018, Eastgate drafted a Nine-Element Nonpoint Source Implementation Strategic Plan for the Lower Meander Creek Watershed as a tool for local entities to identify existing issues regarding nonpoint sources of pollution. The plan is a requirement for any projects identified applying for Ohio EPA 319 grant funding.

7.2.2 Mosquito Creek Reservoir

The Mosquito Creek Reservoir, an impoundment in the Mosquito Creek watershed, is owned and maintained by the USACE. The reservoir drains 24,220 acres in Trumbull County and southern Ashtabula County and at full capacity, the reservoir stores 4,535 million cubic feet of water. The reservoir serves as a drinking water source for the City of Warren and surrounding unincorporated areas of Trumbull County.

Many activities taking place within the Mosquito Creek Watershed, and directly adjacent to the reservoir, can impair the water quality of the reservoir. The watershed tributary to the reservoir is mainly rural in nature, but transitions to a suburban setting along its southeastern boundary. Agricultural and suburban land uses can impact water quality by introducing nutrients, sediment, and land application products into the reservoir via its tributaries. Activities from commercial establishments and roadway systems add other pollutants such as litter, road salts, and sometimes hazardous materials. The unsewered areas of the watershed are a problem as well. According to the Trumbull County General Health Department, areas of failing HSTS's are located within the watershed and within the immediate vicinity of the reservoir.

Almost all the USACE owned land along the northern and northwestern area is leased to ODNR's Division of Wildlife for fish and wildlife management. The northern, wildlife refuge is a haven for migratory birds and host to a blue heron rookery. The refuge is closed to the public except during designated field days. The southern portion of the reservoir contains Mosquito Lake State Park and is open to recreational usage. The recreational use of the drinking water source is concentrated in the southern portion of the reservoir and just upstream of the drinking water intake. According to ODNR's website for Mosquito Creek Lake, "unlimited horsepower boating is permitted on the lake. (Watercraft) Fuel...is available". Due to the presence of recreational watercraft and their known usage of petroleum-based products, the threat of petroleum leaks exists that in turn can harm the quality of the drinking water.

7.2.3 East Branch Mahoning River

The East Branch Mahoning River drains the upper reaches of the Mahoning River watershed. The upper Mahoning serves as a surface drinking water source for two communities, the Village of Sebring3, Mahoning County, and the City of Newton Falls, Trumbull County. In its entirety, the Mahoning River flows through five Ohio counties, is 108 miles in length, and drains approximately 1,133 square miles.

The Village of Sebring manages a community public water system that provides drinking water drawn from the Mahoning River to households in southwestern Mahoning County. Raw water is drawn from the river at a location upstream of the village in Columbiana County. Due to this location, any impairments to the drinking water source would originate within Columbiana County, outside Eastgate's AWTMP Area. Land use

in this portion of the Mahoning River protection area is predominantly agricultural with pasture/hay comprising the remaining area. Additional uses include deciduous forest and row crops. According to the SWAP, possible impacts to surface water quality from the surrounding environment include "agricultural runoff from row crop agriculture, manure handling facilities and runoff from animal feedlot operations, oil and gas wells, failing home and commercial septic systems, spills and releases from recreational boating on public and private lakes, new housing and commercial development that could increase runoff from roads and parking lots, and numerous road bridges over the streams/rivers".

The City of Newton Falls withdraws water from the East Branch of the Mahoning River and within city limits. The Mahoning River flows mainly through rural, agricultural-based areas before reaching the water intake for the city. The city manages a community public water system providing drinking water drawn from the Mahoning River to households within the city, Newton Township, and southern portions of Braceville Township. Land use within this portion of the river's protection area includes agriculture, pasture/hay farms, deciduous forests, and row crops. According to the SWAP summary, possible impacts to surface water quality from the surrounding environment include "agricultural runoff from row crop agriculture, oil and gas wells, failing home and commercial septic systems, spills and releases from recreational boating on public and private lakes, new housing and commercial development that could increase runoff from roads and parking lots, numerous road crossings over the Mahoning River and its tributaries, and wastewater discharge from treatment facilities upstream of the intake". Reports from water treatment plant personnel indicate that an increase in raw water turbidity occurs after a series of heavy rainfalls and is noticeable in Kale Creek, a tributary upstream of the water intake4. The increase in turbidity is indicative of the agricultural activities and soil erosion problems upstream. Levels of Atrazine and increased algal growths around the intake increase during the summer months when the agricultural growing season is at its peak. The unsewered areas of Newton Township (i.e. Scott Street) are existing concerns for water quality. The Trumbull County has identified this area as a high priority for funding to remedy the failing septic systems by installing sanitary sewer.

7.2.4 Yellow Creek

Yellow Creek is a subwatershed of the Mahoning River and is the primary watercourse that supplies water to two drinking water sources. Beginning in Columbiana County, Yellow Creek flows through, in order of succession, Beaver Lake (Columbiana County), Pine Lake, Evans Lake, and Lake Hamilton. Pine Lake, Evans Lake, and Lake Hamilton are maintained and operated by Aqua Ohio, Inc., of which Evans Lake and Lake Hamilton, are drinking water sources for residents in Mahoning County.

The Yellow Creek watershed is mainly rural, but transitions to a suburban and urban setting as it travels to its confluence with the Mahoning River in the City of Struthers. Many activities take place within the watershed have the potential to impair the water quality of the watershed and its lakes. According the Yellow Creek Watershed Action Plan, nutrients, pathogens, and acid mine drainage are impairments to water quality within the watershed. Land within the watershed is rapidly developing, especially near Pine and Evans Lakes. Though protected by a thin natural buffer, the lakes have experienced some bank erosion and increased sedimentation loads from development. Areas of growth within the watershed are occurring, for the most part, in unsewered areas.

The Struthers/Mahoning Valley Division of Aqua Ohio provides drinking water drawn from Evans Lake to residents in mid and eastern Mahoning County. Land uses in the overall protection area of Evans Lake gradually changes from rural to suburban as the water flows north. According to Aqua Ohio's SWAP, potential sources of contamination include inactive surface mine drainage, failing septic systems, gas and oil wells, overhead power transmissions, and chemical spills. Water hardness, as a product of acid mine drainage (AMD) has become a large issue for Evans Lake and Lake Hamilton as indicated by water samples. The SWAP report indicates that numerous mines discharging into the two drinking water source lakes. Sewage is also an issue of concern. Although the report indicated that near Evans Lake, residential septic system failures is minimal, and according to the Mahoning County District Board of Health, a small area of failing HSTS's located west of Evans Lake were identified, as well as sewage discharged from two RSTS's, as problematic. The two RSTS's, located west of Evans Lake, discharge waste into the lake and have had "reported problems with high total coliform counts, high total phosphates, and nitrate-nitrogen concentrations"5. Raw sewage has also become a problem for Lake Hamilton, as it discharges from a main interceptor along Yellow Creek. Additional contaminants of concern noted in the SWAP include runoff containing herbicides, pesticides, and fertilizers into Evans Lake and products of road salt applications (chloride content) within the vicinity of Lake Hamilton and Yellow Creek. Additional information on potential contaminant sources can be found in The City of Campbell's SWAP, as the SWAP covers the broader watershed.

The City of Campbell manages a community public water system providing drinking water drawn from Lake Hamilton also to residents in eastern Mahoning County. Potential contaminant sources for the protection area are based on those found within the Yellow Creek Subwatershed, which overlaps information found in Aqua Ohio's SWAP. Land use within the protection area is comprised of cropland, pasture, woodland, strip mining, and developing suburban and urban areas. According to the SWAP summary, possible impacts to surface water quality from the surrounding environment include "agricultural runoff, leaking underground storage tanks (USTs), oil and gas wells, failing

home and commercial septic systems, and new housing and commercial development that could increase runoff from roads and parking lots"6.

Additionally, strip mining and mine spoil piles in Yellow Creek's protection area could impact the Lake Hamilton's source water. Lake Hamilton is one of three surface impoundments along Yellow Creek, with Pine Lake and Evans Lake being the other impoundments located upstream. Development pressures are increasing along Yellow Creek and within the subwatershed, causing more erosion and sediment loads to trickle downstream into Lake Hamilton. Areas located near Lake Hamilton are urban in nature. As such, activities from urban areas not only increase runoff, but also carry pollutants from streets, parking lots, and lawns into storm sewers that discharge directly into rivers and tributaries. Posing a greater threat to the protection area is the list of leaking UST's. An Ohio EPA review of the Bureau of Underground Storage Tank database found 40 leaking UST sites within the protection area, 17 of which were found within the CMZ. Leaking UST's pose a great threat to the drinking water source as the liquids are petroleum-based products.

7.2.5 Dead Branch-Mud Run

The Dead Branch-Mud Run is a subwatershed of the Grand River Watershed. Beginning at its headwaters in the marshlands of Southeastern Geauga County, the [Grand] river flows into Trumbull County, across a large extensive wetland complex, and then north through Ashtabula and Lake Counties.

The Village of West Farmington manages a community public water system providing drinking water drawn from the Grand River to residents within the village. The Grand River flows through rural, agricultural areas before reaching the water intake. Like the previous subwatersheds, agricultural practices such as unrestricted livestock access, land application products, and manure applications can add nutrients, sediment, and chemicals to the river either directly or via a tributary.

Land use within the protection area is comprised of evergreen and deciduous forests, pasture land, row crops, and wetlands. According to the SWAP, possible impacts to surface water quality from the surrounding environment include "livestock access to the drainage systems and streams, agricultural runoff from row crop agriculture, inadequate on-lot sewage treatment systems, oil/gas production activities, new housing and commercial development that could increase runoff from roads and parking lots, and numerous road crossings over the streams"7. A field survey, conducted by the Ohio EPA, found areas of unrestricted livestock access along the Grand River's mainstem and tributaries. This unrestricted access can promote streambank erosion, increasing the sediment load and the number of pathogens entering the stream. Soil surveys of the protection area conclude soils are not suitable for HSTS's with on-lot treatment8.

7.3 Ground Water Resources

Numerous residents in the City of Cortland, Trumbull County, rely on ground water as their source of drinking water. Protection of ground water systems is more difficult than surface waters, as ground waters ignore political boundaries.

The Ohio EPA and ODNR work together to assist local governments in managing and protecting ground water supplies on a county-wide basis. The Ohio EPA assists in the protection of community ground water supplies and its Division of Drinking and Ground Waters (DDAGW) administers the Ohio Ground Water Protection Program that serves as a guide for other state programs with groundwater responsibilities. This program, in conjunction with Ohio's Well Head Protection Program, helps protect present and future availability of uncontaminated ground water for those on a public well system. The programs monitor the quality of water and conduct studies to identify possible groundwater contaminants and ways to prevent future contamination. Raw water from the wells is analyzed for a range of inorganic parameters and for volatile organic compounds (VOCs).

The Ohio EPA's Well Head Protection Program (WHP) focuses exclusively on community public water systems serving more than 500 people in a year. This program was established through an amendment of 1986 Safe Drinking Water Act. According to the Ohio EPA, a WHP consists of "determining the area in which ground water will travel to the wells in five years (protection area), inventorying all of the potential sources of contamination located within the protection area and developing a plan for protecting their drinking water supply". The SWAP and WHP programs share very similar components, with one exception; the evaluation of the susceptibility of the drinking water source is included in a Source Water Assessment and Protection Program (SWAP). According to the Ohio EPA, the SWAP program was expanded to include all public water systems, so that all public water system assessments would be consistent. Due to this inclusion, the WHP program was replaced by the SWAP in which all public, community well systems that serve greater than 25 different people per day for a period of 60 days per year are required to complete a SWAP.

The Ohio EPA completed a SWAP for the City of Cortland in December of 2002. The protection areas take into consideration several factors such as pumping rate of wells, hydraulic conductivity of the aquifer, and the porosity of the aquifer. The general protection area for the city's well system consists of an area containing an inner and outer protection zone. The inner protection zone is the area providing ground water to the city's wells within one year of pumping, while the outer zone is the area providing water when the wells are pumped for five years. According to the Ohio EPA, the number of pumping years translates to the travel time for a drop of water to reach the well. Based on the Ohio EPA's modeling program, the City of Cortland has two protected areas, due to their two sets of wells and the protection areas not

overlapping during the modeling process. Based on the aerial photograph included in the SWAP, land use within both protection and surrounding areas is urban in nature. The contamination susceptibility of the aquifer was determined using site-specific information (i.e. aquifer composition, topography, soils, rate of water recharge, etc.), pollution potential rating of protected areas, available groundwater quality data, and potential contaminant sources within the protection area. The results of the SWAP evaluation concluded that the aquifers in the protected area have a low susceptibility for contamination due to their 71 to 216 foot protective layer of shale and clay, the depths of the aquifers (174 and 312 feet below the surface), the depths of the water tables (145 and 160 feet below the surface), and water quality results indicate that there has been no impact to the aquifer. The Ohio EPA surveyed the protected area and produced a list of potential contaminant sources including UST's (gas stations, auto repair shops), businesses with potential to leak petroleum products (i.e. maintenance garages, auto repair shops, gas stations, etc.), cemeteries (associated with arsenic and formaldehyde in groundwater), medical facilities (pathogens and medical wastes), and photo shops (chemicals used in photo processing may contain metals, solvents, and organic chemicals).

A Study reported in the Winter 1994 edition of *Journal of the American Planning Association*[1] identified that an increase in surface runoff can represent a net loss in groundwater recharge. Impervious surfaces, along with storm water collection systems and sewers reduce residential and municipal ground water supplies and wetlands that rely on ground and soil water. Due to the increase in impervious surfaces, storm water is directed into catch basins and storm sewer systems, preventing it from permeating into the ground. Focused on the affects land use has on ground water recharging, the journal approaches the topic by looking at how the loss of recharge correlates to development via a model that determines how much of a given rainfall event becomes surface runoff. This model is based on the Soil and Conservation Service's curve-number method and provides an insight to the impact development has on ground water recharge.

7.4 Floodplain and Riparian Zones

Floodplains are delineated areas along rivers and streams that help store flood waters during heavy rain events. Floodplains are comprised of two main boundaries, the 100-year floodplain and the 500-year floodplain. The 100-year floodplain is located close to the river and indicates a 1 percent chance a flooding event will stretch to the outer boundaries of the 100-year floodplain. The 500-year floodplain is located further out from the river and indicates that there is a 0.2 percent chance a flooding event will stretch to the outer boundaries of the 500-year floodplain. **Figure 7-1 and Figure 7-2** illustrate the 100-year and 500-year floodplains in Mahoning and Trumbull Counties as designated by FEMA. Undisturbed, natural floodplains perform beneficial flood management techniques at no cost. Natural floodplains retain and absorb storm waters peaking over top stream banks and reduce non-point source pollution by

[1] Vol. 60, Iss. 1, p. 95

filtering storm water. Aside from their functions, floodplains add aesthetic beauty to rivers and streams and provide vital habitats for plants and animals via the riparian area.

FIGURE 7-1: FEMA Floodplains in Mahoning County

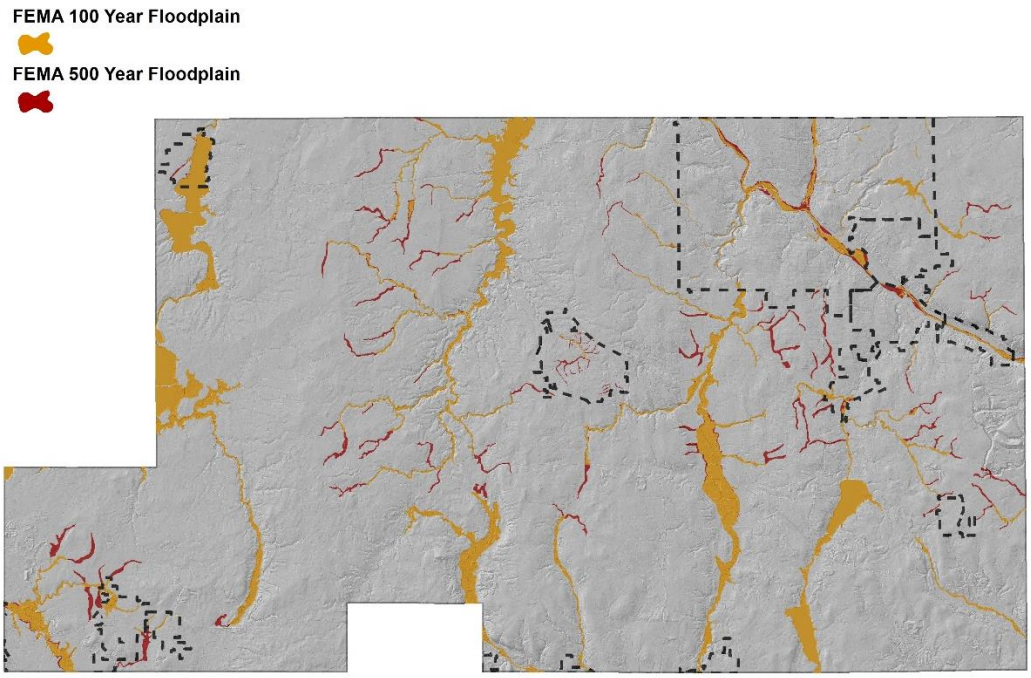
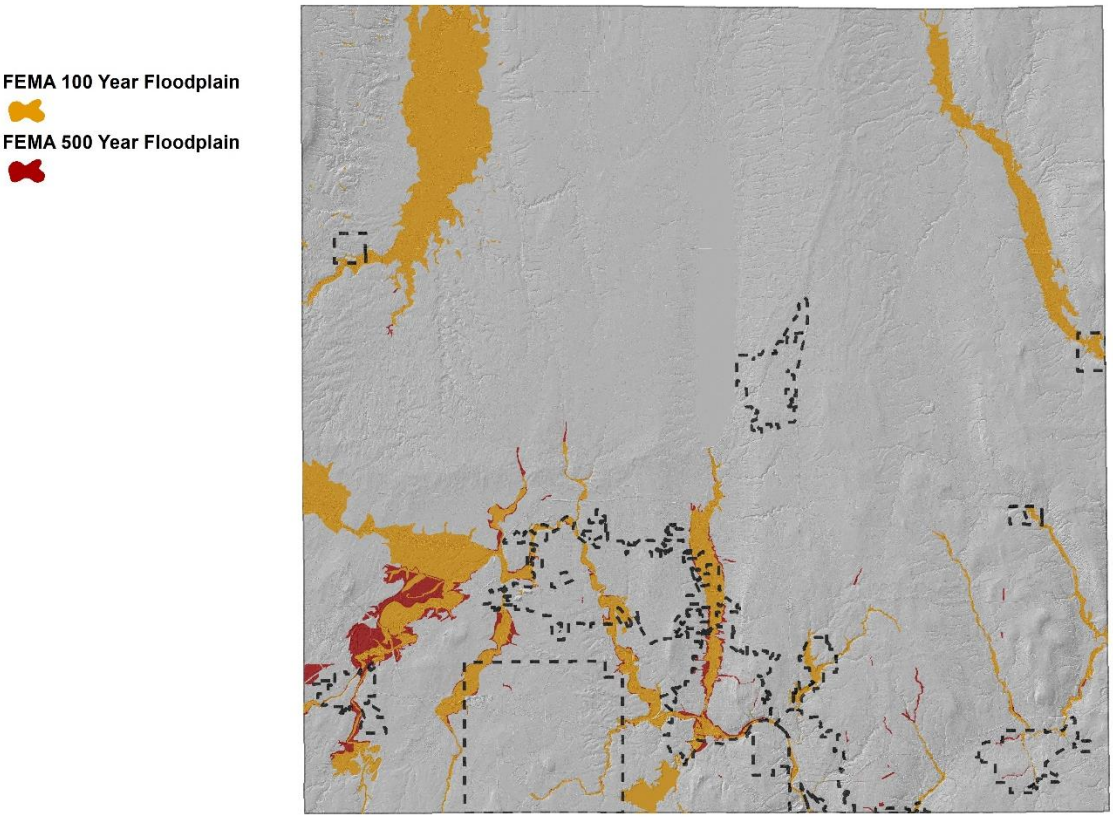


Figure 7-2: FEMA Floodplains in Trumbull County



Riparian areas are the vegetated lands adjacent to waterways (streams, lakes, ponds, rivers, wetlands) and located within the floodplain. Riparian areas are closely related to floodplains as riparian areas perform similar functions and may also be delineated based upon floodplain boundaries. Also known as a stream side corridor or a stream side forest, riparian zones act as natural buffers, filtering out pollutants before reaching the water. According to ODNR's Division of Water, riparian zones "reduce water temperature by sheltering and shading, provide wildlife habitat and protect and create aquatic habitat, provide detritus (leaves and woody debris), which is the basic source of energy for the stream ecosystem, and reduces stream bank erosion through the high durability of tree root mass".

Development is the number one threat to the intrinsic functions of floodplains and riparian zones. The removal of trees and their root structures within the riparian zone weakens steam banks, promotes erosion, and prematurely widens the stream. Without vegetated stream banks, pollutants gain easy access to the water, as they are no longer absorbed by the vegetation. The addition of sediment to a stream makes the stream shallow and destroys instream habitats. Programs are in place throughout the State of Ohio to protect riparian zones and floodplains and include developing riparian model ordinances and establishing conservation easements.

A Riparian Model Ordinance establishes distance lines set back from the banks of a river or stream to maintain proper riparian functions. They are geared toward new development but

address current land owners who want to expand their home or business within the setback area. When sized properly, a riparian setback will allow room for riparian zones to distribute the volume and force of the flood waters. Numerous landowners in Mahoning and Trumbull Counties have experienced property damage from flooding or loss of land due to stream bank erosion. Riparian setbacks can protect structures and reduce the damaging effects of flood waters.

Riparian setback ordinances are established at a local level and tailored to fit each community's needs. Beaver Township, located in Mahoning County, wrote a riparian setback ordinance into their Comprehensive Land Use Plan. In November of 2004, Eastgate worked with the Mahoning County Engineer's Office, township officials, the Alliance for Watershed Action and Resource Education (AWARE), and other resource agencies to develop a riparian setback model for the county and its townships. The committee developed riparian setback regulations modeled after the Chagrin River Watershed Partner's language. Mahoning County had adopted a county-wide riparian setback for any site regulated by the Mahoning County Erosion and Sediment Control Rules, which includes sites one acre or and larger or less than one acre but part of a larger common plan of development or sale which results in the disturbance of more than one acre. These sites must follow the criteria set forth in the Mahoning County Model for the Establishment of Riparian Setbacks also developed from the Chagrin Watershed Partners Model. In addition, several townships within the county have modified and adopted township wide resolutions. Trumbull County has setbacks established in their subdivision regulations and is currently in the process of adopting a county wide resolution.

On a watershed level, riparian setbacks have been identified within several watershed action plans. The Mill Creek Watershed Action Plan identifies the need to implement riparian setbacks for the entire watershed due to unrestricted livestock access, stream channelization, flow alteration, urban runoff impairments, and construction activities. The Grand River Watershed Action Plan identified adding riparian setbacks to zoning regulations to prevent agricultural-related erosion. Meanwhile, the Pymatuning Plan recognizes the need to protect riparian corridors based on public health and safety and as wildlife corridors, recreation areas, and other natural areas. The Draft Lower Mahoning River and Mosquito Creek Watershed Action Plan identifies using riparian setbacks to help eliminate sediment loadings into the water systems caused by construction activities, urban runoff, agricultural practices, and stream bank erosion.

A conservation easement is another tool that aids in the protection of riparian zones. In conjunction with Section 319 of the Clean Water Act, the Ohio EPA facilitates a 319 Grant Program to provide financial assistance for projects that eliminate or reduce and prevent water quality impairments caused by non-point source pollution. Priority funding is given to rivers listed under the Ohio EPA's 303(d) reports, with identified non-point source impairments, or with an endorsed or in-progress Nine-Element Nonpoint Source Implementation Strategic Plan. Under this grant, riparian restoration and protection projects, conservation easements, and other

nonpoint source elimination projects can be funded. An easement is a legally binding agreement that preserves a land's conservation value in perpetuity. Protection under a conservation easement limits actions taking place once the easement is passed onto a legally qualified conservation organization (i.e. land trust) or a government agency.

7.5 Distinctive Regional Water Resources

Every watershed and subwatershed within the Eastgate AWTMP Area has characteristics deserving of regional attention and protective measures. This chapter of the Eastgate AWTMP broadly discussed, the regionally significant critical resources that pertain to all watersheds and subwatersheds within the planning area. However, this section of the chapter goes a step further to identify and discusses waterways and waterways corridors distinctive to this area due to the level of destruction, attraction to development, and high ecological diversity. The lower Mahoning River, Mosquito Creek Corridor, and Mill Creek are three distinctive water resources that exemplify the water systems that have or are undergoing the alterations at an accelerated rate.

7.5.1 Lower Mahoning River

The lower Mahoning River is a distinctive water resource that flows through Mahoning and Trumbull County due to the heavy destruction it experienced over the years. Prior to the industrial years of the river, it flowed freely and was buffered by a lush forested riparian zone. Early naturalists and Ichthyologists, Spencer F. Baird and Jared P. Kirkland, identified species of fish unique to North America within the Mahoning River and several of its tributaries. One of the more famous fishes, the Ohio Muskellunge, was first discovered within the Mahoning River and is only one of few original species to have survived the heavy industrialization of the river. Early depictions of the Mahoning River show it as a navigable waterway for canoeing, a pristine water for swimming, and a perfect location for flour mills. However, the iron ore and related industries found their way into the heart of the planning area and began to utilize the river's waters to their benefit. As industrial development came to the water's edge, so too did transportation routes (i.e. rail and road).

The pollution legacy of the Mahoning River expands beyond current day polluters. For almost a century, the industrial artery of the watershed, the lower Mahoning River (sections Warren to Lowellville), was bruised by the industries that resided along its banks. From the early 1900's until the late 1970's, the river served as a highway for the steel and steel-related industries and the river's water was utilized in cooling processes. Waters from the processes were returned to the river at higher temperatures and with industrial by-products. According to information posted within Chapter 2 of the Plan, the river has well over 100 CSO's discharging raw and untreated sewage.

In the words of Mill Creek's founder, Volney Rogers, "A clear, beautiful, unpolluted river flowing through our city is our rightful heritage.... we must maintain the purity of the Mahoning River, and stop all deposits of old tin cans, rubbish, and filth upon its banks or into the stream. The rubbish there should be removed, grass seed sown in its stead, trees planted along the river borders, and out naturally beautiful Mahoning made an object of attraction instead of repulsion"11. The Mahoning River Restoration and Dam Removal Project is helping to make Roger's statement a reality as Eastgate has taken over a project management role to approach the project in a more cohesive and collaborative manner. Several dams along the river have been removed by the Ohio Department of Transportation, returning more of the river to its free-flowing state. Cities along the river have been actively seeking WRRSP funds to remove the dams and improve water quality along their stretches of the river. The City of Youngstown is currently proceeding with their Long Term Control Plan to address the issue of CSO's that discharge waste directly to the Mahoning River and its tributaries. Additionally, a resident engagement and technical planning program focused on green infrastructure has been occurring within the City of Youngstown to build public support for better Stormwater management practices and provide the city with viable implementation strategies to move forward with.

7.5.2 Mosquito Creek Corridor

The Mosquito Creek Corridor is an area spanning from the southern tip of the Mosquito Creek Reservoir to the Mahoning River and is located within the midst of a developing metropolitan area. The Mosquito Creek and its corridor flow parallel to highly traveled, commercialized transportation routes and undeveloped lands are now considered attractive, prime commercial property. The corridor is covered by a lush forest system, high quality wetlands, natural stream channels, functioning floodplains, and other scarce natural amenities supporting diverse natural resources. A blue heron rookery is present within the corridor, supporting its uniqueness from other natural amenities within the Eastgate AWTMP Area. The corridor is home to federal and state rare, threatened, and endangered species such as the Indiana Bat, Clubshell Mussel, and Bald Eagle. Additionally, it serves as a resting spot for many migratory birds such as Canadian geese, robins, warblers, swallows, herons, tundra swans, great egrets, goshawks, and osprey. One of Ohio's rarer species of reptiles, the massasauga rattlesnake, can also be found in the area.

7.5.3 Mill Creek

Formerly considered a State Resource Water, Mill Creek, a waterway traversing through Mahoning County's largest metropolitan park, is recognized as a General High Quality Water. Over the past few years, Mill Creek has experienced rapid degradation due to activities outside its borders. This degradation continues today as the subwatershed

is rapidly developing, threatening the dynamics of the Creek, its tributaries, headwaters, and surrounding environment. As mentioned earlier in the chapter, development has a direct effect on the dynamics of a stream system. Due to the on-going development within the two townships, Mill Creek, its headwaters and its tributaries all have experienced increased rates of stream bank erosion. This erosion places increased amounts of unwanted sediment into the streambeds causing flood not only in the immediate vicinity, but also downstream.

The Mill Creek MetroParks District has four objectives for helping it fulfill its goal, "to participate in creating a balanced, county-wide, park/recreation and open space system". Of the four objectives, one includes being environmentally sound by giving the highest priority to protecting valuable natural resources. Many areas within the subwatershed contain diverse habitats and sensitive ecological areas. High quality wetlands, natural stream channels, streamside forests, and rare, threatened, and endangered species have been noted within the subwatershed and/or within the vicinity of Mill Creek.

7.11 Recommendations

Most of the threats mentioned in this chapter have been identified elsewhere in the plan and are identified as nonpoint sources of pollution. In its many forms, nonpoint sources of pollution continue to degrade not only the critical resources of our region, but the quality of life. Recommendations for this chapter not only echo those written in other chapters but reinforce how this plan is intertwined with other watershed plans in Eastgate's AWTMP area.

Recommendation 7-1: Public Drinking Water Suppliers are strongly encouraged to preserve all lands surrounding not only their drinking water sources, but those lands immediately surrounding the rivers, streams, and tributaries to the surface water source.

According to the SWAPs, many of the impacts to surface water are forms of nonpoint source pollution. Each SWAP provides strategies and recommendations public water suppliers can take to minimize their surface water impacts. One such recommendation includes purchasing the lands adjacent to the drinking water sources. By protecting the lands surrounding the source, a buffer is created to help filter pollution before it enters the waters.

Although protection of immediate, adjacent lands is important, many pollutants find their way into our surface drinking water via a tributary. Many of the problematic pollution areas are located outside the drinking water source areas and along the tributaries. The same recommendation can apply to those communities, such as the City of Cortland, that rely on ground water for their drinking water supply. Within their SWAP, the Ohio EPA identified protective strategies that can help prevent contamination of ground water. Of the suggestions, the SWAP identified purchasing property and developing rights to guard from contamination.

Recommendation 7-2: Located within each SWAP are recommended protective strategies for each drinking water supplier to consider enacting to protect their drinking water source. The Ohio EPA is encouraged to follow up on the actions and recommendations listed for drinking water suppliers in their Source Water Assessment and Protection (SWAP) program.

In 1996 the Safe Drinking Act was amended to establish a national Source Water Protection Program, targeting all public water drinking sources in the United States. The program addresses both surface waters and ground water wells that are utilized as public drinking water sources. Under the amendment, public water suppliers are required to create Source Water Assessment and Protection (SWAP) reports that identify drinking water protection areas and provide possible contamination sources and information on how to reduce the contamination risk for the waters.

Each report discusses potential contaminant sources and provides a series of protective strategies. The Ohio EPA‘s Division of Surface Water is responsible for restoring and maintaining the quality of Ohio's rivers and streams, while the Division of Drinking and Ground Water informs citizens of where their drinking water comes from (surface or ground sources) and informs Ohio’s citizens of whether or not their drinking water is safe to drink. The Ohio EPA is encouraged to develop a system that will monitor the progress of public drinking water suppliers in their ability to address the protective strategies mentioned in their SWAP. Meanwhile, each drinking water supplier is encouraged to follow the recommendations within their SWAP to protect not only their asset, but to protect the public’s health and the water quality of their supply source.

Recommendation 7-3: Both counties and their zoned communities are encouraged to adopt and implement riparian setbacks on all streams, rivers, and their tributaries within their respective communities. Because flowing water does not follow political boundaries, it is important for communities that share a common water course work together to create uniform language. Uniform language will help prevent downstream flooding and ensure the health of the watershed.

The purpose of a riparian setback ordinance, when properly applied, is to protect the health, safety, and welfare of residents and to prevent property damage or loss due to flooding and erosion, and to protect the water quality of the creeks, streams, and rivers within a watershed system. Healthy, well-vegetated riparian zones benefit communities by:

- Decreasing the stream flow energy and reducing stream bank erosion rates, property damage, and threats to public safety;
- Storing water within wetlands and natural floodplains for protection against flooding;

- Minimizing public investment in future stormwater management and stream restoration projects;
- Improving property values, while improving aesthetic green space; and
- Protecting valuable drinking water sources by filtering out pollutants prior to entering the water system.

Riparian setback ordinances do not make lots unbuildable but regulate uses of riparian areas and limit development within specific distances of streams. By creating setbacks, the riparian area can naturally slow, store, and release stormwater over time, thus providing cost effective flood and erosion control and water quality protection.

Educational programs and workshops are a crucial component to making riparian setbacks acceptable to officials and residents. Many misconceptions regarding the ordinance are common. Township officials and residents need to be assured that riparian setbacks are designed with the landowner as well as the environment in mind.

Recommendation 7-4: Each community within the Eastgate AWTMP region is encouraged to develop land use plans that incorporate measures protecting the region's critical resources by focusing on smart growth strategies that prioritize redevelopment of properties over the development of natural areas and green space.

Land Use planning allows communities to grow while sustaining their identity and natural, open space areas. Land use plans help direct growth by mapping out areas of the community set aside for commercial/industrial growth, residential/agricultural growth, and natural, open space preservation.

Preserving open space through land use planning can be an economic value, as well as contribution to the quality of life for communities. Incorporating open space within a development plan not only provides recreational opportunities, via the creation of parks, but it provides a greater economic value to homes adjacent to it. Conserving large, continuous areas of land reduces and slows storm water runoff, absorbs pollutants, and reduces flooding. On a watershed scale, open space serves as a filter and sponge that absorbs storm water carrying pollutants, debris, and trash on its way to a water course. Both scenarios provide economic values to communities via a reduction in the cost of storm water infrastructure and water treatment.

Recommendation 7-5: The Eastgate AWTMP encourages the State to continue funding programs to help communities and agencies preserve lands integral to the health of our region's critical resources.

Over the past few years, communities have been able to conserve more than 1,700 acres of land throughout Mahoning and Trumbull Counties thanks to the Clean Ohio Conservation

Fund. Programs such as the Clean Ohio Conservation Fund, the Ohio EPA's 319 grant program, and other land preservation minded programs have afforded numerous sensitive areas protection and the chance for natural restoration.

The Ohio EPA houses the 319 Grant program through their Division of Surface Water and utilizes the program to fund projects that help curb nonpoint source pollution. 319 grant funds have been utilized by the planning area's soil and water conservation districts and nonprofit groups to establish several conservation easements along impacted streams. The same grant has also provided funding for the creation of conditionally endorsed watershed action plans for several of the watersheds in our region. Endorsed watershed action plans open up other funding avenues that can be utilized to preserve additional sensitive lands within the planning area, especially within the drinking water watersheds.

Recommendation 7-6: Watershed Action Plans need to be created for all major watersheds and sub-watersheds within the Eastgate AWTMP Area.

All the major watersheds, along with one subwatershed, within Eastgate's AWTMP Area have created and submitted for review and approval draft watershed action plans. According to the Ohio EPA, the plans have been reviewed and returned to their respective entities with comments and questions needing addressed. However, many of these plans are awaiting help with their final touches in order to be resubmitted. Once they are resubmitted and approved, the plans will need implementation assistance, as many of the entities who created the plans lack the resources and personnel to implement the plans.

Three vital subwatersheds within Mahoning and Trumbull Counties are without watershed action plans- the Meander Creek, Yellow Creek, and Mosquito Creek/Lower Mahoning watersheds. These watersheds contain our region's sources of drinking water, the Meander Reservoir, Evans Lake, and Mosquito Creek Reservoir (respectively). Without watershed action plans, funding sources to protect the land within the watershed and surrounding the sources are more difficult to obtain. This Eastgate AWTMP update recommends those entities who manage the region's drinking water sources and local government agencies come together to create and submit watershed action plans for their respective areas. An Ohio EPA and ODNR endorsed watershed action plan can help create protective goals and measures to assure consumers that their drinking water is being protected. An endorsed watershed action plan can access funding sources for the establishment of conservation easements along tributaries and mainstems and for the protection of the lands surrounding the sources.

Recommendation 7-7: Wetlands, whether they are low or high quality, play an integral role in the protection of our region's water quality. As more wetlands become increasingly threatened by development, it is encouraged that they are left in their natural state or incorporated into development plans.

The economic benefits of wetlands are endless. Similar and in addition to riparian setbacks, wetlands provide a natural buffer and filtering system that intercepts pollutants before they enter surface water systems. Wetlands not only provide a gradual recharge of groundwater, but they also moderate groundwater levels. Incorporating wetlands within a proposed development can minimize development costs by utilizing nature as a detention basin. Wetlands not only provide economic benefits to a development they also add aesthetic values.