

CHAPTER 6. MIDDLE YOUGHIOGHENY RIVER

Originating near Eglon, West Virginia, the Youghiogheny (Yok-i-gay-nee) River, or Yough (Yok) for short, flows in a northerly direction for approximately 132 miles to where it joins the Monongahela River in McKeesport, Pennsylvania. The name is from a native American word meaning “a stream flowing in a contrary direction.”

This Management Unit is the prime jewel for recreation in Pennsylvania, drawing millions of visitors a year from all over the world for the white-water rafting and fishing opportunities. The Middle Youghiogheny River Management Unit focuses on the area of land that encompasses all the streams which flow into the Youghiogheny River from the confluence of the Casselman River through the confluence with Dunbar Creek with the exception of Indian Creek. Information on the Indian Creek Watershed will be in the next chapter.



*Youghiogheny River Watershed OhioPyle State Park
(Photograph courtesy of Clare Kaczmarek)*

While many whitewater boaters consider the section below the falls at OhioPyle State Park as the lower Youghiogheny, when looking at the river holistically the lower portion of the Yough is the section below the dam in Connellsville that flows through Westmoreland and Allegheny Counties before joining the Monongahela River in McKeesport.

PROJECT AREA CHARACTERISTICS

Location

The section of the Youghiogheny River from the “Turkey foot” (area where Laurel Hill, Casselman River, and the Youghiogheny River join together) in Confluence, Pennsylvania, to where Dunbar Creek enters approximately 20 miles upstream of Connellsville, is known in the rafting community as the Middle and Lower Youghiogheny River sections. However, for this report this section will be identified as the Middle Youghiogheny Management Unit. The section from Dunbar Creek to where the Youghiogheny River enters the Monongahela River will be referred to as the lower or bottom Youghiogheny River, which will be covered in a separate plan.

Stream Classification

In order to compare waterways, geographers, geologists, and hydrologists classify each waterbody into stream orders. The higher the stream order, the larger the waterbody. Waterways with stream orders between one to three are headwater streams – meaning they are the start of a watershed. Often, these streams are intermittent; they may not flow all the time and are typically unnamed. Moving up the scale, streams in orders three to five are

slightly larger because they are a merger of order one and two streams. Lastly, larger streams such as the Youghiogheny, Monongahela, and the Ohio Rivers are considered to be between streams orders six to eight, depending on the number of smaller tributaries that have merged into them (Briney, 2019).

Within the Middle Youghiogheny River Management Unit there are 23 named tributaries that flow directly into the Youghiogheny River. There are an additional 20 named tributaries within the Middle Youghiogheny River Management Unit. A listing of these streams and their water quality designation is included in Appendix C.

Topography

The Middle Youghiogheny Watershed has a mixture of topographic features. The physical change has created an elevation ranging from 3,213 feet above sea level on Mount Davis to 910 feet above sea level at South Connellsville. The river dissects the Appalachian Province and creates parallel rounded ridges. The two main ridges are Chestnut Ridge and Laurel Ridge. These ridges are extremely steep and forested with stream-dissected valleys.

Climate & Climate Change

Climate change is a “hot” topic but what actually is climate change? It is important to recognize that climate is not the same as weather. Weather is a short-term measurement of the state of the atmosphere in a single location. It involves air temperature, how much humidity is in the air, both rain and snowfall precipitation, and wind speed. Climate tracks averages and patterns of weather over long periods of time over an entire region. Basically, climate change is the study of changes in the averages and patterns of weather over time.

The Earth’s climate has been changing for many centuries. However, these changes are not equivalent to the changes currently referred to as climate change. Although data supports that the Earth’s rotation and orbit change the amount of solar energy received, and thus alters climate over long time intervals, recent studies support that climate has been drastically fluctuating at an unnatural rate (Carbon Brief, 2011).

Carbon dioxide (CO₂) is a small portion of the makeup of Earth’s atmosphere but the fluctuations in CO₂ play a huge role in climate change. CO₂ is a common, naturally occurring gas. We inhale oxygen and exhale carbon dioxide. It is the most natural cycle on Earth; plants take in carbon dioxide and release oxygen.

However, human activities have exacerbated this natural cycle and have offset the amount of carbon dioxide our atmosphere can handle. It is widely accepted that the warming of global temperatures is a direct result of man-made emissions of greenhouse gasses (Carbon Brief, 2011). Burning fossil fuels and stripping the land of trees and plants has increased the amount of CO₂ while decreasing the natural world’s ability to offset the emissions. Humans have increased atmospheric CO₂ concentration by 48% since the Industrial Revolution began, a greater leap than what had happened naturally over a 20,000-year period up to 1850. Since 1950, our fossil fuel consumption has increased by 550% while

carbon dioxide emissions have increased by 500% Earth (National Aeronautics and Space Administration (NASA)).

Scientists agree the level of CO₂ in the atmosphere needs to stay below 350 parts per million (ppm) to address the catastrophic impacts of climate change. In 2019, CO₂ concentrations surpassed 415ppm in the atmosphere, the first time this has occurred in at least 2.5 million years (NASA). The last measurement recorded on NASA's website during the writing of this conservation plan was 421ppm in April 2023.

The current range of uncertainty lies between 350 ppm and 450 ppm, a threshold that is rapidly approaching. Exceeding 450 ppm will land the Earth in the high-risk zone, a point where there will be irreversible tipping points. There are already irreversible impacts at current CO₂ levels from intense heat waves, heavy rainfall events, increased drought durations, melting ice caps and warming sea levels. There are many ways in which climate change will impact, and is already impacting, the Youghiogheny River Watershed (NASA and Staeffen, et. al, 2015).

Since the early 1900s, Pennsylvania has recorded an average temperature increase of 1.8° F. Winter temperatures have become warmer at a rate of 1.3° F per decade from 1970 to 2000 in the northeast U.S. Even more alarming, projections show it could be as much as 5.4 °F warmer by 2050 than it was in the 1990s. Since the late 1800s, global temperatures have increased by about two degrees Fahrenheit. According to the NASA website on Global Climate Change, 19 of the warmest years have occurred since 2000, with the exception of 1998. The years 2016 and 2020 are tied for the warmest year on record since we started keeping track back in 1880 when record keeping began.

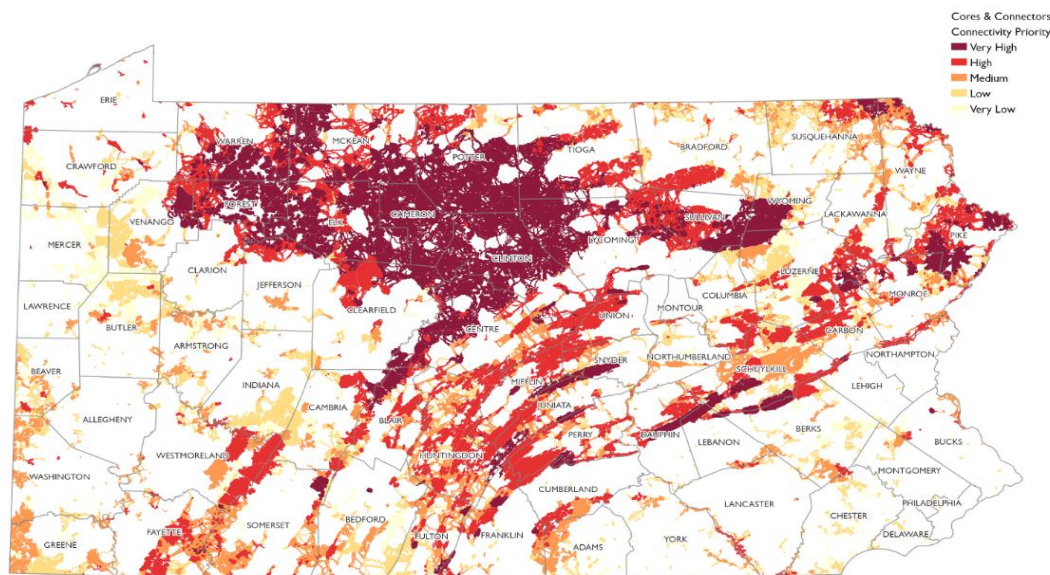
In addition to the higher temperatures, Pennsylvania has also seen an increase in annual precipitation which is expected to increase by 8%, with a winter increase of 14%. Increased precipitation goes hand-in-hand with a higher frequency of large storm events, changes in peak stream flows and decreased snow cover.

The temperature of water in streams is an important factor in maintaining a healthy aquatic ecosystem. However, increased temperatures can lead to warmer streams. This does not sit well with the coldwater fish species like Brook Trout. Projections show Pennsylvania could be unsuitable for cold-water fish species by the year 2100 if greenhouse gas emissions are not curbed.

As precipitation changes and temperatures increase, a longer growing season and changes in stream flows are expected to occur. The peak stream flows are expected to occur 10-14 days earlier, and summer low-flows are expected to last about a month longer. This could also impact our forest ecosystems that rely on the early spring flows of ephemeral streams.

As the climate changes and plant hardiness zones shift northward at an estimated 13.6 miles per decade, species are inhibited by habitat fragmentation when they would instinctively move north with suitable climate for their habitat needs. Maintaining and

restoring habitat connectivity is crucial in a holistic approach to conservation efforts. As mapped out by the Pennsylvania Natural Heritage Program, areas within the Youghiogheny River Watershed range from medium to very high priority in connectivity priority.



Climate Change Connectivity Priority Scores

Recommendations set forth in this River Conservation Plan are steps forward in addressing climate change impacts to our regional ecosystems. Efforts to mitigate impacts of severe weather events by repairing riparian buffers, reducing loss of tree cover, and protecting land from habitat degradation are identified. Informed citizens urging others to participate in water and habitat conservation will help mitigate climate change impacts locally.

Socioeconomic Profile

Demographics & Population Patterns

The Middle Youghiogheny Watershed occupies approximately 105,089 acres or 164 square miles. In that area there are 13 municipal units, all in Pennsylvania. It is estimated that 41,098 people live in the Middle Youghiogheny River Management Unit. The population by the municipality is identified in Appendix D.

Land Use Planning & Zoning

In 2019, Fayette County updated its County Comprehensive Plan to manage future growth and development, in addition to infrastructure needs. Some of those needs were identified as preserving agricultural lands and open space, conserving natural resources and enhancing land-use controls. The objectives were to enhance economic development and tourism opportunities; increase housing and diversity of housing available; improve cooperation between all levels of local government; and enrich quality of life while preserving the essential rural character of the county (HRG, 2019).

Saltlick and Springfield Townships in cooperation with Wharton Township, Stewart Township, Henry Clay Township, Ohio pyle Borough, and Markleysburg Borough, have partnered to form a regional vision for their communities in establishing the Fayette County Mountain Area Multi-Municipal Comprehensive Plan. In 2006, growing demands on municipal services, traffic conflicts, and infrastructure expansions due to increased tourism in the area, made it clear that a plan was necessary to embrace growth in a more structured and less haphazard manner. The comprehensive plan clearly states that, “the partnership between the Mountain Area municipalities will encourage economic growth and new development to enhance municipal resources while ensuring the preservation of the high quality of life presently enjoyed by residents” (Mackin Engineering, 2010). Additionally, many of the visions in this comprehensive plan are consistent with the needs and recommendations being identified in this River Conservation Plan, such as supporting the remediation of abandoned mine drainage, eliminating litter and illegal dumping, extending public sewage and water services, updating the Act 537 plan, identifying a location for a park-n-ride and extending the Indian Creek Valley Trail (Mackin Engineering, 2010).

Zoning is an important tool available to communities. Although it can be viewed in a negative light as an infringement of landowner rights, when used properly, zoning can help safeguard a community’s character. Overall, zoning in Fayette County is directed by the county unless the local municipalities have their own zoning. There are several municipalities in the Middle Youghiogheny River Management Unit that are not under the county’s governance for zoning; they include: City of Connellsville, Ohio pyle Borough, Henry Clay Township, Stewart Township and Wharton Township.

Income

The average and median household incomes for each of the municipal units in the region is located in Appendix E. The median household income is the point where half the people make more and the other half make less; fundamentally, it is the middle point. It is used over the mean or average income for statistical analysis because individuals with extremely high salaries may skew the results and bring the average up. Per capita income is another common figure utilized when comparing incomes. Essentially, the per capita income is the average income earned per person (age 15 and older) in a given area and within a specific year.

The Middle Youghiogheny Management Unit has approximately 10,733 households. Of those households, 70% receive some sort of Social Security income and 39.3% receive retirement income. Out of those same households only 7.3% receive public assistance while 40% receive food stamps or Supplemental Nutrition Assistance Program benefits.

Poverty

The federal poverty level is a measure used to determine the level of income at which an individual or family qualifies for federal benefits and programs. This level is a set minimum amount that a family needs to provide clothing, shelter, transportation, and other necessities.

As of 2021, 13.5% of the people in the United States are living below the poverty level. That is slightly less than the 15.7% of Fayette County, Pennsylvania, residents and a little bit higher than the 12.1% of residents in Somerset County and the entire state of Pennsylvania (U.S. Census Bureau, 2023).

Environmental Justice

Environmental justice is defined as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys: the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work” (U.S. EPA).

Prior to March 2023, in order for a community to qualify as an Environmental Justice Area in Pennsylvania, either 20% or more of the people living in a census tract are living in poverty, or 30% or more of the population in the census tract is considered a minority. Census Tracts 2605 and 2625 in Fayette County, Pennsylvania, are identified as Environmental Justice Communities within the Middle Youghiogheny Management Unit due to 26% of the population living in poverty. Impacted areas in Census Tract 2605 include: Workman Run, Laurel Run, and an unnamed tributary that enters the Youghiogheny River in Springfield Township. According to Census Tract 2625, impacted streams include Dunbar Creek and its tributaries Rock Run and Glade Run, as well as the headwaters of Meadow Run where 21% of the population live in poverty.



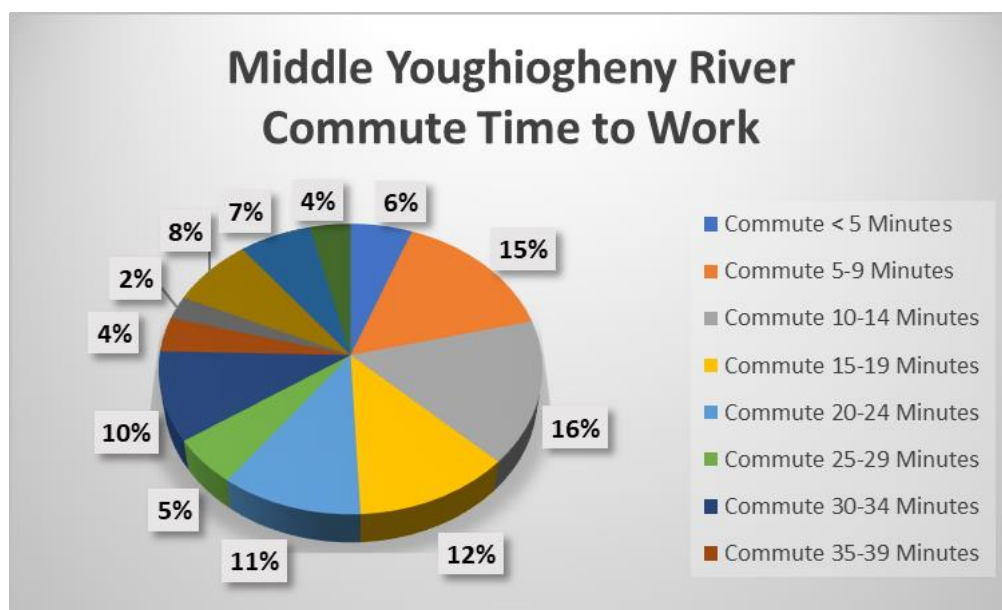
All citizens deserve clean, safe drinking water

In March 2023, Pennsylvania rolled out a new program to designate Environmental Justice Areas, adding environmental hazards and risk into the equation. As part of this program, census block groups are re-evaluated every two years to determine their Environmental Justice Area status.

Employment

The Middle Youghiogheny River Watershed has 17,379 individuals in the workforce. Of those individuals 69.3% work in the state and county in which they reside. Of the remaining individuals, 26.7% work within the state of their residence but outside the county, and 4% work outside the state of their residence.

The majority of the workforce, 65%, has a commute under 30 minutes with 37% percent spending less than 15 minutes. Approximately 3% work from home. This information is based on data submitted in 2020 at the start of the Coronavirus pandemic. This was a time of change in our workforce, with many companies modifying schedules and employees' abilities enhancing working from home opportunities.



The top five employment industries within the Middle Youghiogheny River Management Unit include:

1. Health Care/Social Assistance – 19%
2. Retail Trade – 14%
3. Accommodations/Food Service – 11%
4. Manufacturing – 11%
5. Construction – 8%

Utilities and Infrastructure

Public utilities vary in their availability, coverage, and reliability within the entire Youghiogheny Watershed. Broadband internet, cell phone service, sewage and drinking water systems that serve the public and their residential and commercial needs, electricity, and natural gas are all examples of utilities that exist in some portion of the Youghiogheny Watershed. Areas with elevated population density and areas that have increased tourism use are often better equipped than nearby rural areas.

Public Sewage

Public sewer systems are situated throughout the watershed and some systems may transfer water that originates in one watershed to another. Seven Springs uses groundwater wells that are located in the Indian Creek Watershed. Public Sewage is available in Dunbar, Connellsville, Ohiopyle, and Confluence. Many other multiple source sewage systems exist including Fallingwater and the Ohiopyle State Park Systems.

Public Drinking Water

There are many drinking water systems throughout the watershed. Similar to sewage system infrastructure, the service areas often extend outside of the Youghiogheny River Watershed. Larger utilities include Municipal Authority of Westmoreland County, National Pike Water Authority, PA American Water, and North Fayette Municipal Authority.

Internet Services

Internet service is available through DSL or fiber optic in many parts of the watershed. There are still areas that do not have reliable access. Many internet utilities in the area were expanding their systems during the pandemic due to the increase in demand from business and homeowners.

Natural Gas

Natural gas is available through direct service lines and storage tanks at individual points of use. Service through direct service lines is non-existent in the rural areas. There are many different companies who offer delivery to businesses or homes. Additionally, many offer tank rentals and service contracts.

Education

Pennsylvania area school districts are community-oriented with the potential of having more than one school district per county. In the Middle Youghiogheny River Management Unit there are portions of five school districts: Connellsville, Laurel Highlands and Uniontown in Fayette County, and Turkeyfoot Valley in Somerset County.

LAND RESOURCES

Geology

The Middle Youghiogheny River is located in the Allegheny Mountain Section of the Appalachian Plateaus Physiographic Province. The Allegheny Mountain Section is where erosional remnants of upward folds of the earth's crust or "anticlines" remain. The low hills and valleys between these two ridges are on the downward parts of the folded crust or "syncline" (Smith, 1998; Wagner and Coxe, 2000). The three major geologic structures are the Chestnut Ridge and Laurel Hill anticlines which are oriented in an east-to-west trend, followed by the Ohiopyle [Ligonier] syncline.

The bedrock of the ridges varies from Catskill, Oswayo, Shenango, Burgoon, Mauch Chunk, Pottsville, and the Allegheny Group, which is composed of gray sandstone and shales. Common examples of sedimentary rocks found in the corridor are sandstone, shale, and limestone. The bedrock strata formed between the Devonian, Mississippian, and Pennsylvanian periods, ranging from 280 to 400 million years ago (Smith, 1998, and Wagner and Coxe, 2000).

Soil Characteristics

Soil is a record of the geological climatic history of the region (Blumberg, et. al, 1982). The physical landscape depicts how the land is used; the soil type and conditions influence the determination of these land uses. For example, mining only occurs in areas where coal and limestone deposits exist. In Pennsylvania, the soil is influenced by weathering, vegetation, climate, and time. Sedimentary rocks, such as shale, sandstone, and limestone are prevalent in the Youghiogheny Watershed and subsequently along the Middle Youghiogheny River.

The development of soil relies on several factors: climate, plant and animal organisms, parent material, time, and differences in elevation. Soils with similar characteristics, such as horizons (soil layers), thickness, and arrangement are identified as soil series. The influence that each factor of the soil varies, creating the diversity of soil series, both locally and regionally. These series are commonly named after towns or geological features where they were first discovered and mapped. They can differ in texture of the surface soil, slope, and stoniness, among other characteristics. These differences divide the soil series into phases, and the phases are a feature that can be used to determine management practices. It is important to note that there can be several phases within a soil series that can exist. Individual soils have different characteristics that affect their behavior and may limit some uses. For example, soils with seasonally high-water tables are not ideal for farming as they frequently experience flooding. Therefore, the type of soil determines the use of the land.

Soil Associations

Soil associations consist of two or three major soil types, and a few minor soil types, grouped together. They are landscapes with distinct, proportional patterns of soils. Individual soils can occur in more than one soil association, just in different proportions or patterns. Fayette County has five different soil associations. Of these, only four are found along the Middle Youghiogheny River. These associations are important, especially to the general public, to provide basic information about soils and to provide a general guide for watershed management.

- **Gilpin-Wharton-Earnest**

Description- Moderately deep and deep, well-drained and moderately well-drained, medium textured, nearly level to very steep soils underlain by acid shale and some sandstone bedrock on uplands.

Location- Smooth rounded hills and irregular or undulating slopes are common.

Land Use- Some of the better farming soils in Fayette County. Area is adapted to pasture and general crops.

Limitations- Moderate to severe limitations for use as building sites.

- **Dekalb-Hazleton-Cookport**

Description- Moderately deep and deep, well-drained, and moderately well-drained. Moderately coarse textured and medium textures that are level to very steep soils underlain by bedrock that is dominantly acid sandstone on uplands.

Location- Generally located along Chestnut Ridge and Laurel Hill along the Youghiogheny River.

Land Use- Well-suited for trees as soils are not good for farming.

Limitations- Most uses restricted by the depth to bedrock of the Dekalb soils and the seasonal wetness of the Cookport soils.

- **Upshur-Albrights**

Description- Deep, well-drained to somewhat poorly drained, gently sloping to very steep, reddish soils on uplands.

Location- Upper slopes of Chestnut Ridge and Laurel Hill.

Land Use- Well-suited to crops and trees with Black Locust and Yellow Poplar growing naturally. Beef cattle and general farming are principal agricultural uses. A few large stone quarries produce road gravel in this association.

Limitations- Limitations on farming due to wetness and erosion. It has severe limitations for sewage disposal because of restricted permeability and seasonal wetness.

- **Monongahela-Philo-Atkins**

Description- Deep, moderately well-drained and poorly drained, medium textured, nearly level to sloping soils on stream terraces and floodplains.

Location- Steep valley sides or escapements. Soils formed in deep alluvial deposits and are common along the Youghiogheny River.

Land Use- Soils commonly used for community and industrial development throughout Fayette County. Limited space for future development because of the narrow areas between rivers and the steep valley sides.

Limitations- Moderate to severe limitations as sites for buildings. The low floodplain along rivers and streams are subject to flooding.

Prime Agricultural Soils

Prime farmland is defined by the U.S. Department of Agriculture as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Additionally, this land has to be available for these uses. It can be cultivated land, pastureland, or forestland, but cannot be urbanized land or water areas. Prime farmland has a dependable supply of moisture, a favorable growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, few or no rocks, and is not excessively erodible or saturated with water for long periods. The slope is mainly between 0 to 6%. Overall,

prime farmland is of major importance in meeting the nation’s short and long-range needs for food and fiber and should be used wisely.

There are 27 different prime agricultural soils within Fayette County (Natural Resources Conservation Service).

Land Use

The Middle Youghiogheny River Watershed is nearly 86% forested, the highest percentage out of the subwatersheds within the Youghiogheny River Watershed. Overall, development is low within the subwatershed and is dominated by forested lands.

Ownership

For this plan, properties are categorized as private property, public lands or state lands.

Private property refers to the by private parties, essentially anyone or anything other than the government. Public lands are any lands and interests in lands owned by the United States (U.S.) (Cornell Law School). State lands are properties owned by a U.S. state which provide opportunities for enjoying healthy outdoor recreation and serve as outdoor classrooms for environmental education (DCNR).

The Middle Yough/Dunbar Creek Watershed does not have any properties listed as public, but a majority of the watershed is made up of State Lands (*Public Lands*)(PAD_StateLands).

There are three State Land properties totaling about 38,899.19 acres. State Game Lands 51 contains 16,862.35 acres. Ohiopyle State Park has about 17,047.26 of its total 18,658.3 acres located in the watershed. Finally, State Game Land 111 contains 10223.8 acres with about 4,989.58 acres in the Middle Yough Watershed (PAD_StateLands). The remainder of the watershed is private property (public lands).

TABLE 6-3. LAND USE IN MIDDLE YOUGH

| Acres | Percentage | Land Cover Class |
|--------|------------|------------------------------|
| 882 | 0.9% | Open Water |
| 3,913 | 3.8% | Developed, Open Space |
| 854 | 0.8% | Developed, Low Intensity |
| 448 | 0.4% | Developed, Medium Intensity |
| 226 | 0.2% | Developed, High Intensity |
| 89 | 0.1% | Barren Land |
| 77,967 | 75.6% | Deciduous Forest |
| 255 | 0.2% | Evergreen Forest |
| 11,604 | 11.2% | Mixed Forest |
| 373 | 0.4% | Shrub/Scrub |
| 433 | 0.4% | Herbaceous |
| 5,118 | 5.0% | Hay/Pasture |
| 737 | 0.7% | Cultivated Crops |
| 261 | 0.3% | Woody Wetlands |
| 37 | 0.0% | Emergent Herbaceous Wetlands |

Land Protection

Agricultural Preservation

The Protected Agricultural Lands Database does not list any properties in the Middle Youghiogheny River Watershed.

Conservation Lands

The Middle Youghiogheny River Management Unit including Dunbar Creek does not have any recorded conservation easements according to the PAD-US Geodatabase. Conservation lands in the watershed that are enrolled in some sort of conservation easement or preservation should be submitted to the Geodatabase for inclusion.

Critical Areas

Erosion & Sedimentation

Erosion is a natural process where rocks and soil are removed from one location and deposited in another. This process is often aided by human influences, such as vegetation removal along streambanks. With a lack of vegetation along streambanks and steep slopes, loose soil particles become dislodged and can be washed into streams during periods of precipitation. They are carried by the water and will eventually deposit somewhere downstream. The process of sedimentation will potentially change the stream channel's path. This is apparent throughout the Indian Creek Watershed where soil particles have formed islands or point bars. Over time these particles play havoc to the stream habitat needed for many biological species, such as macroinvertebrates. Sediment not only changes the suitable habitat; it impacts the food source for these species along with the physical and chemical properties of the stream. Sediment in the water can even change the water temperature, heating up a cold-water stream. More information about erosion and sedimentation is located in the section on Water Resources.

Fish & Wildlife Habitat

- **Riparian Corridors**, the vegetative areas adjacent to streams, are important to the health of the watershed, providing important habitat that impacts both aquatic life and terrestrial wildlife. By providing shade to the streams, riparian corridors allow streams to maintain cool temperatures that support trout populations and more importantly the macroinvertebrates that serve as the food source for the trout. The plants and shrubs that naturally grow along streambanks also provide adequate shelter for some terrestrial wildlife. More information about the benefits of riparian corridors is located in the Water Resources section.
- **Floodplains** are natural areas of low-lying ground next to some stream segments that increase the stream's capacity to move water during periods of high flows. These areas tend to have vegetation that is water-tolerant and good for absorbing and filtering the stream's excess flow. Floodplains exist for a purpose and that is to provide property for excess water, to decelerate the speed at which it flows, and to alleviate potential flooding downstream. More information about Floodplains is located in the section on Water Resources.

- **Wetlands** are areas of land that for at least part of the year are covered with water, maintain a dominance of water loving plants, and have soils that are hydric or wet in nature. Wetlands are essential as they are sites of groundwater recharge; they are also excellent filtering agents and are essential in flood prevention. More information about Wetlands is located in the Water Resources section.

Hazardous Areas

Coal Mining

Coal mining has occurred for many years throughout Pennsylvania, Western Maryland and Northern West Virginia. Many of the mines were referred to as farmer, wildcat, or punch mines. Both surface and underground mining have occurred and, in some areas, still present today.

Currently, no active underground coal mines are in operation in the Middle Youghiogheny Watershed. There are 206 permitted surface mines. Many of these are inactive and some were never approved or in operation. Remediation of many of these sites is completed or ongoing. The Watkiss mine, operated by Purco Coal, has recently been reclaimed and upgraded with treatment systems to reduce the impacts on the receiving waters so that Jonathon Run, a beloved area, can be used for a wide range of recreational activities.

Non-Coal Mining

Mineral mines or quarries are industrial mines where operators are removing rocks like limestone and shale that are later crushed down into various sizes for construction activities.

Often the impacts of quarries are similar to those of coal mining: water quality degradation, increased truck traffic and air pollution. Damage to homes during blasting can occur. Because rocks, and soil are removed, the topography of the site changes, which could lead to a change in natural drainage patterns. The aesthetics of the remaining product scars the landscape and takes years before new trees begin to grow and heal the landscape.

Within the Middle Youghiogheny Watersheds, six Non-Coal Mining sites exist.

Oil and Gas

Natural gas has been extracted from the Youghiogheny Watershed for nearly 150 years. The first documented oil well in Pennsylvania was established in 1859 (Dilmore et al., 2015). Overtime, extracting these resources has been done via conventional or unconventional drilling. Conventional drilling is the most common method. Small conventional well sites are common throughout the entirety of Appalachia.

Unconventional or hydraulic fracturing is currently banned in Maryland. West Virginia and Pennsylvania have an extensive fracking history and it is currently allowed in both states.

There were 71 oil and gas sites in the Middle Youghiogheny River Management Unit. There are 19 active well sites, 29 plugged wells, 3 abandoned, 19 that were permitted and never drilled and 4 that have a “regulatory inactive” status.

Landfills and Illegal Dumpsites

Although no permitted landfills exist within the Middle Youghiogheny River Management Unit the area is not immune to trash disposal. Some people, in lieu of trash pickup, opt for burning or burying their trash, and others just dispose of it along back roads in illegal dump sites.

Trash pickup within the watershed is not mandatory, and there are costs associated with having weekly trash pickup. There are no operating landfills within this portion of the watershed, but several exist in Fayette and Westmoreland County, Pennsylvania.

Illegal dumpsites along the roadside are not only unsightly but can have environmental, health and safety, and economic impacts that are hazardous to the area. Environmentally, these dumpsites can pollute the soil, air, and water. Chemicals may leach out into soil, into the water table, and into the streams. If burned, the chemicals in plastics and other items can be released into the air and are toxic to breathe for any one downwind. Illegal dumpsites also pose health and safety issues, especially to children who may play near the dumpsites.

Economically, property values can decrease and property owners can be held liable.

The cost of cleanup can be expensive. Items disposed of at these orphan dumps vary from site to site but typically can contain furniture, household trash, tires, electronics, vehicle parts, paint and other chemicals.

There are 15 illegal dumpsites documented within the Middle Youghiogheny River Management Unit, although there are frequently new dumpsites reported or sites that lie on private property.



Volunteers following one of the tire cleanups held annually on the Youghiogheny River.

Waste Sites

Waste sites are categorized by two programs: The Resource Conservation Recovery Act (RCRA) and Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The major difference between these two programs is that RCRA regulations are for waste facilities that are currently active in operation where CERCLA manages the remediation of abandoned and inactive facilities.

- RCRA is federal legislation that was passed in 1976 that oversees solid waste from “cradle to grave” or origination to disposal (U.S. Environmental Protection Agency). Regulations are in place to manage generation, transportation, treatment, storage, and disposal. The waste can be in either solid, liquid or a gaseous state. Under the legislation the waste is divided into two categories: Subtitle C – Hazardous waste and Subtitle D - Non-Hazardous waste. Although underground storage tanks are managed as a non-hazardous waste, they have been pulled aside to give them the attention they need.
 - Hazardous Waste is managed by the United States Environmental Protection Agency (U.S. EPA) although they may authorize state agencies to implement key provisions of the hazardous waste requirements. A hazardous waste is any waste that is ignitable, corrosive, reactive, or toxic. There are three sites regulated under RCRA in the Middle Youghiogheny River Management Unit, all are Captive Hazardous Waste Generator sites.
 - Non-Hazardous Waste is managed by states; however, the Environmental Protection Agency sets minimum standards for how facilities should be designated and operated. This includes the issuance of permits that ensure compliance and federal criteria for municipal and industrial waste landfills. The practice of open dumping is banned. Individual states may implement more stringent requirements.
 - Underground storage tanks are also regulated as a Non-Hazardous Waste. In order to be classified as an underground storage tank, the tank, combination of tanks and piping must have at least 10% of its combined volume underground. Underground means below the surface and surrounded by soil. A fuel tank in a person’s basement is not considered an underground storage tank. In Pennsylvania, storage tanks must be registered annually and a valid operating permit is required before operations can start. Within the Middle Youghiogheny River Management Unit there are currently nine inactive underground storage tanks and nine active USTs. A listing of all the tanks active, closed and removed is located in Appendix F.

- The Comprehensive Environmental Response Compensation Liability Act (CERCLA), more familiarly known as Superfund, investigates and cleans up sites contaminated with hazardous substances. The United States Environmental Protection (US EPA) agency was granted responsibility for overseeing cleanup activities at uncontrolled or abandoned waste sites as well as accidents, spills, or other emergency releases of pollutants and contaminants. When responsible parties can be identified, their participation can be assured through orders, consent decrees, or small party settlements. Costs are also recovered from financially viable individuals or companies upon completion of the cleanup action. When a responsible party cannot be identified, the US EPA ultimately cleans up the site.

Across the country more than 40,000 Superfund sites exist. The worst of these sites requiring long-term remediation are put onto a list known as the National Priorities List. No National Priority List or active Superfund sites exist in the Middle Youghiogheny River Management Unit.

Brownfields

Brownfields are defined as any previously developed property that has been contaminated by hazardous waste and identified by the United States Environmental Protection Agency as a candidate for cleanup. These sites possess a risk to human health and/or the environment. Expansion, redevelopment or reuse of the land may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

There are four land restoration projects that have been identified in the Middle Youghiogheny River Management Unit.

Landslides

“Landslides are a natural geological process involving the movement of earth materials down a slope” (Delano & Wilshusen, 2001). Because of the damage that can occur to buildings, roadways, etc., they are deemed a significant geological hazard. The extent of damage from landslides does vary depending on location, the amount of earth that is moved, the speed at which it moves, and any influences by humans.

A landslide occurs naturally when land, including rocks, soils, earth, and soil slip or move. This typically occurs due to certain geological features and gravity. It is also aided by heavy periods of precipitation that saturate the soil and by human influences. Human influences, such as construction activities, modify the slope leaving some areas susceptible to landslides.

The Youghiogheny Watershed is highly susceptible to landslides. In June 2022, the hillsides above Yough Lake along Route 40 had a massive movement and closed the main transportation route for several weeks.

Sinkholes/Mine Subsidence

“Sinkholes are a subsidence feature that can form rapidly and are characterized by a distinct break in the land surface and downward movement of surface materials into the resulting hole or cavity” (Kochanov 2015). Although sinkholes can occur naturally, it is more prevalent in central and eastern portions of Pennsylvania where carbonate bedrock exists.

That does not mean the Youghiogheny Watershed is immune. Human influences such as underground mining, installation of utilities underground, or excessive pumping of groundwater can also cause subsidence, leading to the development of sinkholes. Technically, when subsidence is caused by mine drainage, it is termed mine subsidence rather than a sinkhole.

WATER RESOURCES

The outflow of water from the US Army Corps of Engineers’ dam, known as Yough Lake, supplies cold water to the Youghiogheny River for over ten miles to Ohiopyle State Park. Cold water releases allow the river to maintain a High-Quality Cold-Water Fishery status. It also has favorable conditions for the Chestnut Ridge Trout Unlimited to manage a Pennsylvania Fish and Boat Commission Cooperative trout nursery by the outflow of the lake. The trout, when big enough, are used for children’s fishing derbies and to stock the river and many of its tributaries. However, there were occasional fish kills in this section due to fluctuations of oxygen during times of lake water turnover in the Fall and Spring. This has been improved by better management of the water releases from the dam.



The Middle Youghiogheny is fortunate to host a multitude of recreational opportunities, but without clean water these opportunities would not exist

turnover in the Fall and Spring. This has been improved by better management of the water releases from the dam.

This section of the river from the outflow to the City of Connellsville, Fayette County, is known as “The Middle Yough.” The 20 plus-mile section from Ohiopyle downstream to Connellsville is used most frequently by whitewater enthusiasts. That section features Class III to V rapids. Access is difficult because of the rocky steep slopes to the river. The area is distinctly “wild” in appearance.

There was a Pennsylvania Department of Conservation and Natural Resources River Conservation Plan developed for the corridor of the Middle Yough in December, 2001. This report will update the plan and expand it to include the Upper

Youghiogheny River in Maryland and West Virginia and all of its tributaries to Connellsville, Pennsylvania.

Water Quality

What was once a sterile environment for trout and aquatic organisms from abandoned mine drainage, uncontrolled sewage and sediment, the Youghiogheny River has made a remarkable recovery. Water quality from the outflow is consistent with sustaining a cold-water ecosystem, and many tributaries to the Youghiogheny River continue to add cold, clean water to sustain it. The majority of streams in this management unit have water quality designations of exceptional or high-quality cold-water fishery. Stulls Run is the only warm water fishery, and Dunbar Creek has some segments and tributaries designated as a trout stocked fishery. Currently, there is a petition to the Environmental Quality Board by the Pennsylvania Department of Environmental Protection to upgrade the Dunbar Creek subwatershed to Exceptional Value status due to improved water quality, aquatic organisms and the resurgence of native Brook Trout populations.

Current Conditions

Water Quality Standards are the foundation of the water-quality based control program, mandated by the Clean Water Act. These standards form the legal basis for controls on the amount of pollution entering waters from sources such as industrial facilities, wastewater treatment plants and storm sewers. Standards are also the technical basis for reducing runoff from rural and urban areas. A standard can consist of either numeric or narrative limits for a specific physical or chemical parameter. When a stream or lake is not meeting adopted water quality standards, the assessment may lead to a determination of impairment, initiating further action such as a Total Maximum Daily Load limit (TMDL) or other regulatory procedure. These rules spell out the “designated uses” for the waterways.

The Commonwealth of Pennsylvania Title 25, Chapter 93 of the Pennsylvania Code identifies the protected water uses. The Protected Uses are: Aquatic Life (Cold Water Fishery (CWF), Warm Water Fishery (WWF), Migratory Fishery (MF), Trout Stocked Fishery (TSF), Water Supply, Recreation, and Fish Consumption. Special Protection Waters will be further identified as High Quality or Exception Value. The Pennsylvania Fish and Boat Commission also add classifications for a stream, such as: Wild Trout Stream or Class A Wild Trout Stream for added protection. If these designated uses are not being attained in a particular waterway, then the stream is deemed to be impaired.

The entire Middle Youghiogheny River Watershed is attaining its protected use for water supply and recreation. In addition, most of the river’s tributaries are attaining the protected use for Aquatic Life. However, atmospheric deposition (acid rain) had a detrimental effect on western Pennsylvania. Consequently, mercury entered the streams and some lakes. In water, the mercury turns into methylmercury which is easily absorbed by fish. The Pennsylvania Fish and Boat Commission has fish consumption limits posted. The main stem of the Youghiogheny and several tributaries do not attain the protected use for Fish Consumption.

Other impairments to aquatic life continue to be abandoned mine drainage (low pH and metals), failing septic and sewage systems, sediment and siltation, loss of riparian buffers, habitat alterations, low oxygen and warmer temperatures in cold water streams.

Point Source

For discharges from a point source (basically a pipe), a National Pollutant Discharge Elimination System (NPDES) permit is required. The Pennsylvania Department of Environmental Protection issues the majority of NPDES permits for sewage, industrial waste, stormwater, concentrated animal feeding operations and biosolids. NPDES permits in the watershed are identified in Appendix H.

Nonpoint Source

In Pennsylvania, nonpoint source pollution originates from many sources: abandoned mine drainage, agriculture, silviculture, urban/rural/industrial run-off, failing septic systems, and atmospheric deposition. Several tools are available to the states in order to help assess and restore impaired streams.

One tool is to develop Watershed Implementation Plans (WIPs). Funding from the Federal Clean Water Act Section 319 Program is used to implement restoration projects. Another tool used to reduce nonpoint pollution is to develop a TMDL (Total Maximum Daily Loads) for a particular watershed. A TMDL is the amount of pollutant loading that a waterbody can assimilate and meet our water quality standards. If a TMDL or a WIP is not needed, then a Water Quality Assessment is a final tool that a state could use to address the impaired stream and restore it. All of the planning tools/assessments must be approved by the US Environmental Protection Agency.

Six tributaries within the Middle Youghiogheny River Management Unit are impaired not meeting their designated use. They are listed in Appendix G.

- **Atmospheric Deposition**

Low pH in many tributaries throughout the Middle Youghiogheny has impaired several streams. The cause of low pH could be from atmospheric deposition (acid rain) or abandoned mine drainage (AMD). Several assessments (listed below) were conducted in order to determine the source of the impairment.

Drake Run enters the Youghiogheny River below the Casselman River near Draketown. This is the water supply for the Borough of Confluence. An assessment as to why the water was acidic was completed for Chestnut Ridge Trout Unlimited by Hedin Environmental. It was decided that acid deposition plagued the watershed. This section of Drake Run is impaired for Fish Consumption due to mercury.

Ramcat Run enters the Youghiogheny in Ohiopyle State Park. A Coldwater Heritage Plan was developed by the Fayette County Conservation District. During the water quality and biological testing for the report, the partners found that native Brook Trout existed in the headwaters and the lower section of Ramcat Run but were absent in the middle section. It was determined that acid deposition along with previous mining activities were creating poorer water quality, preventing the trout and aquatic insects from populating that area of the stream. Several projects were discussed in order to improve the water quality but due to steep slopes, many were discarded.

- **Abandoned Mine Drainage**

As with many streams in southwestern Pennsylvania, the Middle Youghiogheny River Management Unit is impacted by abandoned mine drainage (AMD). In order to remove impaired streams from the Integrated List of Impaired Waters, several abandoned mine reclamation projects were constructed on some of the tributaries surrounding Ohiopyle State Park.

Cucumber Run is located mostly in Ohiopyle State Park. This watershed is best known for its beautiful waterfall used in many brochures and wedding photos. Unfortunately, its headwaters were mined for coal many years ago. The PA Department of Environmental Protection has two anoxic limestone drains, built in June 1997, located in the picnic area, working to treat aluminum and iron discharges.

Laurel Run, a tributary to Meadow Run, has the Harbison Walker Abandoned Mine Drainage Treatment System as well as the Kaiser Refractories mitigation project. Both of these projects treat low pH and metals.

Jonathan Run is a 6.1-mile watershed located mostly within Ohiopyle State Park; its headwaters were also allowed to be stripped for coal. Chestnut Ridge Trout Unlimited, the Western Pennsylvania Conservancy and Ohiopyle State Park have entered into an agreement to establish an alkaline sand project to improve the water quality along the main stem of Jonathan Run.

Morgan Run enters the Youghiogheny where Camp Carmel is located. Chestnut Ridge Trout Unlimited constructed a treatment system in its headwaters to treat low pH and metals.

Dunbar Creek, although largely forested, is by no means pristine. Some ridge-top areas along the basin's rim (headwater areas of Irishtown Run, Glade Run tributaries and upper Dunbar Creek) have been mined for coal in the past. Historic non-coal mining sites are also located in the study area. Several small sandstone quarry sites are located on the slopes surrounding the Irishtown Run-Dunbar Creek confluence. There are also small, localized sites where iron-bearing rock was excavated to support iron production in

the area (Furnace Hill, Factory Hill) earlier in the twentieth century (PADEP Stream Redesignation Report, 2021). Several sections in the upper reaches of the watershed (specifically Glade Run) are listed on the 303d of impaired waters due to sediment and abandoned mine drainage. In March 2009, a TMDL was developed for the Glade Run Watershed.

In 2003, Chestnut Ridge Chapter, Trout Unlimited constructed an acid mine drainage treatment system on the Glade Run headwaters. The chapter has also continued an alkaline sand treatment project at various locations in the Glade Run watershed since 1998. Recently, the Western Pennsylvania Conservancy completed construction of two additional treatment systems on Glade Run, and plans another. The combined effects of these projects show that the negative impacts of acid mine drainage can be reversed

- **Sedimentation**

Sediment yield from erosion has been high in the mining impacted watershed due to unpaved roads. But paved roads also increase runoff from PA Route 119 which affects Gist Run, and Furnace Hill Road, which closely parallels Dunbar Creek from Dunbar Borough to the Confluence with Tucker Run, then closely follows Tucker Run. Fine sediments affect aquatic ecosystems by increasing stream turbidity, fill in pools where fish can hold, fill and cover streambed gravels suitable for spawning, disrupt macroinvertebrate communities and modify the chemistry by introducing nutrients and other contaminants (Skelly and Loy, Dunbar Creek Assessment, 2009).

Sediment loads have also been associated with an old railroad line extending from Dunbar Borough along Dunbar Creek all the way to the lower section of Glade Run. Because of the narrow width of the valley bottom through most of this distance, both the road and the railroad have pinched (channelized) the stream and its floodplain through this entire upper area.

Source Water Protection

The Safe Drinking Water Act allows states to initiate a program to assess the vulnerability to contamination of all public drinking water sources. The effort encompasses both large and small water systems. Water can be pulled from many different sources, such as groundwater aquifers, springs or even surface flow from a river or stream. Note: Confluence and Ohio Pyle Borough pull from sources that are impaired with mercury. However, the water quality shows that the mercury is below the threshold limit and is safe for drinking water purposes. Table 6-2 below lists the Source Water Assessment Plans for the Middle Youghiogheny River Watershed.

TABLE 6-2. SOURCE WATER ASSESSMENT PLANS FOR THE MIDDLE YOUGHIOGHENY RIVER MANAGEMENT UNIT

| Number | Facility | Type | Source |
|---------|-------------------------------|--------------------|--------------------|
| 4560033 | Confluence Borough | 2 Wells, 1 Surface | Drake Run |
| 5260015 | Ohiopyle Borough | Surface | Youghiogheny River |
| 4560048 | National Pike Water Authority | 2 Wells | Beaver Creek |
| 4560045 | Nemacolin Woodlands Resort | Surface | Lake Louise |
| 5260042 | New Meadow Run | Wells | Meadow Run |
| 5260043 | Spring Valley Community | Wells | Meadow Run |

Source: Pennsylvania DEP Source Water Program

Lakes and Reservoirs

- **Deer Lake**

Deer Lake is located in Wharton Township, Fayette County. In 1906, Mr. Charles Seaton built a dam across Meadow Run in order “to provide a pool for pleasure.” Years later, the estate sold and is now a private community of homes. Recreation on the 78-acre lake includes boating, fishing, and swimming. A nature trail surrounds the lake. Because the lake traps the sediment, Meadow Run below the lake is clear. The lake was dredged several years ago, but unless the sediment from upstream is reduced, the lake will need to be dredged again.

Though Deer Lake captures sediment that would otherwise flow into Meadow Run, the impoundment presents the potential for increasing summer temperatures in Meadow Run downstream. The relatively shallow reservoir heats during summer, and unless discharges from the impoundment are managed properly, through adequate discharge via cooler “bottom release,” trout populations in Meadow Run could be jeopardized by higher temperatures.

- **Lake Louise**

Lake Louise is the drinking water reservoir for Nemacolin Woodlands Resort and Spa.

Important Components of Watershed Health

Wetlands

Wetlands are areas of land that, for at least part of the year, are covered with water. They also maintain a dominance of water-loving plants and have soils that are hydric or wet in nature. Wetlands are essential because they are sites of groundwater recharge; they are excellent filtering agents and are essential in flood prevention. In Middle Youghiogheny, there are 1,819 acres of wetlands.

Wetlands are broken down and classified into systems. Within Middle Youghiogheny, wetlands are Riverine, Palustrine, or Lacustrine. Middle Youghiogheny contains 516 acres of Riverine wetlands. Riverine wetlands contain deep water habitats that are contained within a channel (National Wetlands Inventory, 2019). These channels are open conduits that are created naturally or artificially, and they periodically or continuously contain flowing water. Additionally, these conduits provide a link between two bodies of water (National Wetlands Inventory, 2019).

Palustrine wetlands are in non-tidal areas that are dominated by trees, shrubs, persistent emergent and emergent mosses or lichens (National Wetlands Inventory, 2019). According to the National Wetland Inventory, Middle Youghiogheny has 706 acres of Palustrine wetlands. Most of these wetlands are forested (297 acres), unconsolidated bottom (170), scrub-shrub (156 acres), and emergent (82 acres). Forested wetlands are characterized by woody vegetation that is 20 ft tall or taller. Unconsolidated bottoms wetlands consist of deepwater habitats with at least 25% cover of particles smaller than stones and a vegetative cover less than 30%. Scrub-shrub wetlands include areas that are dominated by woody vegetation less than 20 ft tall. Finally, emergent wetlands consist of perennial plants, excluding mosses and lichens, that are the tallest lifeform with at least 30% areal coverage (National Wetlands Inventory, 2019).

Other than Palustrine and Riverine wetlands, Lacustrine wetlands make up for 105 acres of Middle Youghiogheny. Lacustrine systems include wetlands and deepwater habitats within a topographic depression or a dammed river channel, lacking trees, shrubs, persistent emergent, and emergent mosses or lichens with 30 percent or greater coverage, and total an area of at least 20 acres (National Wetlands Inventory, 2019).

Floodplains

Floodplains are another important component to watershed health. These are natural areas of low-lying ground next to stream segments that increase the stream's capacity to move water during periods of high flow. These areas tend to have vegetation that is water-tolerant and that is good for absorbing and filtering the stream's excess flow. Floodplains exist for a purpose, and that is to provide a

location for excess water, to decelerate the speed at which it flows, and to alleviate potential flooding downstream.

Flood areas were determined from the National Flood Hazard Layer provided by FEMA (FEMA, 2021) and land cover data (MRLC, 2019) and were determined from the for each flood plain to determine if the area was developed, natural, or farmland. The Middle Youghiogheny has a total of 2,063 acres of floodplains. Of that 2,063 acres, 677 acres are developed and 201 acres are farmland. The remaining 1,186 acres are natural. It is critical that these areas remain undeveloped. Development in floodplains decreases the safety net they provide and can result in flooding downstream. Cutting down trees, mowing riparian buffers, and development in floodplains is done at an area's peril. Communities that have participated in these activities often wonder why they are now experiencing flooding and bank erosion.

Riparian Corridors

The 1,186 acres of natural floodplain areas are considered riparian corridors. Riparian corridors are vegetated areas of land adjacent to streams. They, too, play an important role in stream health. They are the interface between terrestrial and aquatic ecosystems (Oates, 2000). The wider the buffer, the more effective it functions. Riparian vegetation typically includes trees, shrubs, and grasses that depend on wet environments to survive. Buffers provide many benefits to area streams including, reduction of water temperature; pollution, sediment, and nutrient trapping; channel stability; flood control; providing habitat; economic value; and recreational and aesthetic values. It is critical that these areas remain undeveloped.

Water Quality Monitoring

Socioeconomic activities, urbanization, industrial operations, and agricultural production influence the environment and have increased dramatically during the past few decades, affecting freshwater environments (UNEP and WHO, 1996). These human induced impacts have created a pressing need for comprehensive and accurate assessments of trends in water quality, to raise awareness of the need to address the consequences of present and future threats of contamination, and to provide a basis for action at all levels. Reliable monitoring data is the essential basis for such assessments. Monitoring is important as it provides information that permits rational decisions to be made on describing water resources and identifying actual and emerging problems of water pollution, formulating plans and setting priorities for water quality management, developing and implementing water quality management programs, and evaluating the effectiveness of management actions.

Chemical Water Monitoring

Chemical water monitoring is the sampling and analysis of water constituents and conditions (EPA, 2009). These may include introduced pollutants, such as pesticides, metals, and oil; constituents found naturally in water that can, nevertheless, be

affected by human sources, such as dissolved oxygen, and nutrients. There has been extensive chemical water quality monitoring occurring in the Middle Youghiogheny since 2010 by the Municipal Authority of Westmoreland County. Twenty-nine sites have been monitored historically, however, only three are currently sampled: Ramcat, Morgan Run, and Meadow Run. Additionally, there has been water quality sampling throughout the watershed for mine passive treatment systems, but it is no longer occurring.

Biological Sampling

Biological sampling is an evaluation of the condition of a waterbody by sampling species that spend all or part of their lives in that waterbody. Sampling is conducted to gather a representative sample of the biological community located in the waterbody (USEPA, 2011). For each site sampled, specific attributes, known as biological indicators, are compared to the conditions expected for that indicator based on reference sites. Biological indicators may include fish, benthic macroinvertebrates, algae, amphibians, aquatic plants and birds. Data collected at reference sites provide a benchmark for assessing the biological condition of surveyed sites. Metrics are quantitative measures of biological indicators and can provide information on both the present and past effects of anthropogenic stress on aquatic systems. Physical and chemical changes in freshwaters can produce diverse biological effects, ranging from severe, such as a total fish kill, to subtle, such as changes in enzyme levels or subcellular components of organisms. These sorts of changes can indicate that the ecosystem is under stress and that it has become unbalanced. As a result, there could be possible implications for the intended uses of the water and even risks to human health. Biological sampling is important as it provides a baseline to help ensure that the quality of waters and their associated aquatic life uses are protected and maintained. There have been no complete long-term macroinvertebrate studies in the Middle Youghiogheny. Complete biological monitoring programs need to be established, as they provide valuable information about the long-term health of the watershed.



In 2023, Eastern Hellbender Surveys were conducted in the Youghiogheny River Watershed by Mountain Watershed Association and Western Pennsylvania Conservancy.

Bacteria Sampling

Bacteria present in water is one of the most important water quality issues world-wide, specifically to sources of drinking water and water used for swimming. What exactly is being tested for through swimmable waters? Testing can be conducted to monitor compliance of NPDES permit discharges for fecal coliform. This is necessary as there are known facilities that consistently exceed their permitted discharges in the watershed. Any summer swimmable waters that are popular in the watershed need to be tested for E. coli for the protection of the community. Currently, there are seven sites being tested for bacteria through the Mountain Watershed Association's Swimmable Waters program.

Dataloggers

Between 2011 and 2017, five dataloggers were used to gather much needed baseline water quality data for tributaries in the Middle Youghiogheny Watershed. The dataloggers were primarily installed to monitor for impacts related to drilling within the Marcellus Shale formation. While drilling was not prevalent in the watershed, the Mountain Watershed Association was proactive in collecting baseline data that could be used if drilling activities were to take place. Solinst Jr. LTC leveloggers monitored conductivity, temperature, and water level of the stream every 15 minutes. The data was then downloaded every two weeks and analyzed for any spikes in conductivity.

While dataloggers are no longer deployed in the watershed, historic data has established baseline conditions. If drilling once again becomes active and threatens these water resources, resuming water quality monitoring with dataloggers will be warranted.

BIOLOGICAL RESOURCES

Natural Setting

The Youghiogheny River Watershed has a rich history. It has experienced industrial impacts, such as mining for both coal and minerals, hydroelectric dams, and wind turbines. It also has a vast amount of agriculture as well as natural space with numerous state and federal lands available for recreation by tourists and local residents.

The Middle Youghiogheny River Management Unit is located within the Appalachian Plateau in Maryland and within the Allegheny Mountain Section of the Appalachian Plateau Province in Pennsylvania. It is known for having the highest elevations that parallel mountain ridges separated by deep gorges creating whitewater conditions.



Trillium is a native plant commonly found in the Youghiogheny River Watershed

Through years of colonization, invasive invaders and natural events, the landscape in the watershed has evolved. Impacts of past colonization such as mining, logging, and agriculture have left their scars, but foreign invaders like invasive species have also had dramatic impacts, especially on our hemlocks, ash, and chestnut trees. This does not even take into account the amount of sprawl that the watershed has experienced with vacation homes and rentals, four-season resorts along with infrastructure to support these tourists.

Most of the landscape is composed of second and third growth stands of timber containing maples, oaks, Black Cherry, and Tulip Poplar trees. Rhododendron, Mountain Laurel along with blackberries, blueberries and huckleberries are common. Fortunately, some of the oldest, old growth forests remain in Pennsylvania in the Youghiogheny River Watershed due to the numerous state parks and forest lands.

Appalachian Hemlock Northern Hardwood Forests are typically found containing cool, moist slopes with Eastern Hemlocks, maple, beech, Tulip Poplar and birch species. The North Central Interior Floodplain Forests are typically found along rivers and bottomlands. River scour communities, or communities where the force of the flow has caused the removal of sediment from the streambed or streambanks of a waterbody, especially along the Youghiogheny River, provide habitat for many rare plant species. This watershed boasts of diversity for natural communities, including but not limited to streams, ponds, lakes, wetlands, grasslands, open marshes, bogs, swamps, floodplains, forests, marshes and vernal pools.

Biodiversity

Clean air, clean water, and fertile soils are required for a healthy ecosystem that benefits everyone and everything. Having a diversified population of plants and wildlife is essential, and the more diversified community of organisms increases that ecosystem's resilience. A resilient ecosystem is important especially with all the stresses and challenges organisms face to survive between predators and invasive species.

Over the next few sections, the biodiversity that this watershed contains will be discussed in much further detail through natural heritage areas, species of concern, species of greatest conservation needs, important bird and mammal areas.

Species of Concern

Species of special concern (rare, threatened, or endangered species) are tracked by the state and federal natural resource agencies. It is a matter of policy for the resource agencies not to provide specific site location information in order to provide a level of protection to these organisms and their critical habitats. The state's natural resource agencies are to be contacted if any land disturbance activities are planned to determine if those activities could potentially impact any species of special concern or their habitat.

Within the Middle Youghiogheny River Management Unit 15 species of concern have been identified.

Species of Greatest Conservation Need

Species of Greatest Conservation Need (SGCN) include plants and animal species in which the species themselves or their habitats are declining to a level of concern. This listing is a broader group than the species of concern, but the species of concern are also identified as SGCN. The purpose of identifying these species is so that conservation activities and protections can be made in an effort to keep them from being identified as a rare, threatened or endangered species.

There are 93 SGCN located within the Middle Youghiogheny River Management Unit. Of those listed there are five birds, two mammals, two butterflies, three moths and one sensitive species not identified for protection purposes that are listed as being globally or regionally important. A full listing of species is available in Appendix. G.

Invasive Species

A number of invasive species are found in the watershed. An invasive species is defined by the United States Department of Agriculture (USDA) Forest Service as “a species that is non-native to the ecosystem under consideration; and, whose introduction causes or is likely to cause economic or environmental harm, or harm to human health” (Executive Order 13112). There are both plant and animal invasive species within the watershed boundary.

Invasive species can be damaging to native species, infrastructure, agriculture, and ecological processes vital for native and foundation species. The ecological impacts of invasive species vary depending on the species and its means of taking over an area. Many invasive species are nearly impossible to control once they have taken over an area. In all cases, prevention and early treatment is of utmost importance. The USDA Forest Service recommends the following management practices to prevent the introduction of invasive species:

1. Inspect any plants or trees for egg masts or plant seeds before bringing them into the watershed or transporting them between watersheds.
2. Inspect and clean any forest machinery for egg masts or plant seeds before transporting the equipment between watersheds.
3. Inspect and clean all fishing, kayaking, or boating equipment using hot water and letting dry completely before entering a different body of water.
4. Limit transport of firewood from far away areas into the watershed; find locally sourced firewood.

Plants

Invasive plants have a tendency to displace natives and dominate landscapes, especially areas that have recently been disturbed. Some invasive plants, such as the ground vine mile-a-minute, smother natives. The invasive tree-of-heaven produces a chemical in its roots that prevents the establishment of other plants (Jackson and Grover). Others outcompete native plants for sunlight and nutrients.

Once an invasive plant is introduced to an area, especially after a land disturbance has occurred, it often takes over the area and spreads rapidly. This causes issues for wildlife, including lack of necessary food resources from native plants and inability to traverse through thick stands of some invasive plants.

- **Japanese Knotweed** was introduced from East Asia in the late 1800s as an ornamental plant to help stabilize streambanks. It spreads profusely, dominating native plants in wetlands, stream corridors, forest edges, drainage ditches, etc. It can grow up to 11 feet and due to its extensive network of underground rhizomes, it is very difficult to eradicate and control.

Japanese knotweed has multiple impacts to land and streams. The dense thickets of knotweed outcompete native species due to the deep root system, making it difficult for other species to grow. It compacts the soil, limiting its ability to absorb water and nutrients which results in a decrease of food and habitat available for birds and other wildlife. These deep roots can cause streambanks to erode, increasing flooding. The plants release toxic chemicals to wildlife that eat them as well as to area streams. These chemicals then degrade the water quality and harm aquatic life such as fish and macroinvertebrates.

- **Garlic Mustard** was introduced in the United States in the 1880s, brought in by early settlers to New York for medicinal purposes. This flowering herb spreads rapidly through upland forest habitats where it outcompetes native plants. It is especially concerning because certain rare butterflies lay their eggs on it instead of native species. When the eggs are laid on garlic mustard, they fail to develop. Like stiltgrass, garlic mustard is hard to eradicate because it can remain dormant for five years (Maryland Department of Natural Resources, 2016).
- **Purple Loosestrife** was introduced to Maryland in the 19th century. It arrived in ships' ballast water and attached to other materials. It was imported as a medicinal and decorative plant. While the plant is attractive, it reproduces quickly and outcompetes native plants, disrupting food chains and habitats in wet areas and marshes (Maryland Department of Natural Resources, 2016).
- **Kudzu** was introduced to the United States from Asia during the 1876 World's Fair in Philadelphia, Pennsylvania. During the Great Depression, it was touted as a way to reduce farmland erosion. It is a deciduous, climbing, semi-woody perennial vine that can grow 35-100 feet long. It spreads via runners, rhizomes and from nearly every node that touches the ground. In its third year it produces flowers from June to September. It spreads rapidly

in open areas, including disturbed areas such as abandoned fields, roadsides, and forest edges. (Kling, 2022).

- **Hydrilla** or **Waterhyme** is a fast-growing, submersed, rooted aquatic, invasive plant that can grow in water up to 20 feet deep and can survive at depths of 40 feet, if the water is non-turbid. It forms dense mats at the surface of water which can restrict native vegetation, irrigation practices recreation, hydroelectric production and water flow. It can invade slow to still water systems. It is believed to be native to Asia or Africa and was first introduced into North America as an aquarium plant in the 1950s (Hydrilla, 2018).
- **Japanese Barberry** is an ornamental shrub first transported to the United States in 1875. Historically, it was used as a living fence for livestock and for herbal medicines. It is now used as an ornamental hedge plant and can be a nuisance as it harbors ticks that can cause Lyme disease. Although invasive, it is still sold in nurseries and garden centers.
- **Poison Hemlock** is a tall poisonous invasive plant commonly mistaken for Queen Anne's Lace. It is an erect, bi-annual (meaning it takes two years to complete its life cycle and flower) that can grow six to ten feet high. It is toxic and can be fatal to humans and livestock if ingested, affecting the respiratory, central nervous, and reproductive systems. It can also cause skin rashes through contact. It is native to northern Europe, western Asia, and North Africa. It was introduced in North America in the 1800s as an ornamental and has spread throughout American, Canada, and Mexico. (Behnke, 2022).
- **Carolina Fanwort** is an herbaceous perennial aquatic plant that is an early identification species, just beginning to be a problem in Pennsylvania. It contains long brached stems with fibrous roots that fan-like underwater leaves that can be submersed or floating. Native to South America, it was introduced as an aquarium plant. Once established, the dense growth of this plant can impede water flow and clog drainage canals and freshwater streams thus impacting recreation, agricultural and aesthetic uses. It can form dense stands, crowding out native species.
- **Japanese Angelica Tree** is another early identification species, just beginning to be a problem in Pennsylvania. This upright, deciduous shrub or tree can reach a height of 20-40 feet with a 15-30 ft in width. The stems are covered in spines, and in the fall, leaves turn yellow to reddish purple. It suckers from its base, in addition to spreading from the dispersal of its berries that are eaten and distributed by wildlife.

- **Sawtooth Oak** is an early identification species, just beginning to be a problem in Pennsylvania. It has been spotted in recent years to escape plantings and establish in nearby forests, displacing native vegetation. It is native to Asia and has been widely planted in the United States as an ornamental and as food for wildlife. While it is no longer recommended for planting in the United States, it is still sold and many places debate listing it as an invasive species.
- **Wisteria** is an early identification species, just beginning to be a problem in Pennsylvania. Many people do not see Wisteria as an invasive species since it is similar to Sawtooth Oak, and it is still commonly sold at nurseries, garden centers, and online. Native to Asia, these plants were imported for landscaping uses. While wisteria is native to the region the non-native species have become more desirable for their colors.

Animals

Invasive invertebrates and vertebrates commonly disrupt food chains, outcompete native species, and interrupt other ecological processes. Invasive insects, with no effective natural predators, can decimate native vegetation. Many invasive insects have no effective defense against them. It is paramount to prevent the spread of invasive insects. Below is a list of common invasive species identified or speculated to be located within the Youghiogheny Headwaters.

- **Emerald Ash Borers** have already destroyed a significant population of ash trees and are expected to cause close to 100% mortality of ash trees in the United States. Because of its rapid spread and thriving population, the Emerald Ash Borer has almost no effective controls.
- **Hemlock Woolly Adelgid** is slowly killing the Eastern Hemlock, an important species for headwater health. The Hemlock-Northern Hardwood Forests are a key wildlife habitat. Maryland has over 42,000 acres of vulnerable hemlock forest at risk of infection by the Hemlock Woolly Adelgid. The Maryland Department of Agriculture is working on a treatment and suppression plan.
- **Gypsy Moths** devour the leaves of oaks and other hardwood species, impacting several key wildlife habitats.
- **Spotted Lanternfly** has wreaked havoc in Pennsylvania and the majority of Maryland; however, it has not been identified in Garrett County as of March 2023. Somerset County was added to Pennsylvania's list of quarantine counties in March of 2023.
- **Rusty Crayfish**, like the Virile Crayfish, are a great threat to native crayfish diversity in the Youghiogheny River. These crayfish have the capacity to

displace native crayfish and later aquatic food webs. While they are found in Pennsylvania and West Virginia, they have not been identified in the Maryland portion of the Youghiogheny River, although they are found in other portions of Maryland.

- **Asian Clam (*Corbicula fluminea*)**, has definitely been identified in the Youghiogheny River Watershed in Pennsylvania when the Western Pennsylvania Conservancy and the Mountain Watershed Association completed a mussel survey in 2021. This clam can alter the ecology of aquatic systems, making it less hospitable to native assemblages of freshwater mussels, fish, invertebrates and plants.
- **Chestnut blight** is a fungus that was accidentally introduced on nursery stocks imported from Asia. It was first discovered in 1904 and attacked the American Chestnut tree virtually eliminating mature American Chestnut trees.

Conservation

Conservation Threats

- **Land Conversion/Habitat Loss and Fragmentation**

Habitats can change, and have over the years. One of the greatest historical changes occurred following the glaciers. While they never quite advanced to Maryland, they did impact lower portions of the Youghiogheny River Watershed in Pennsylvania. Habitats can change via natural circumstances such as storms, floods, and fires, or they can be a result of human activities, such as clearing lands for development or agriculture.

Since colonization nearly 400 years ago, the Northeast region of the United States continues to be one of the most densely populated regions in the country (Moore et. al, 1997). Housing and urban development has been identified as a top threat in every state in the northeastern United States. Commercial and industrial developments contribute to the sprawl, especially in the Appalachian region with the expansion of wind turbines and communication towers that fragment forests habitats important to our native species. Even roads, railways contribute to the fragmentation of habitats, dividing once larger tracts of land into smaller parcels resulting in more edge habitats as opposed to interior habitats required for some species.

In the United States, the number one greatest threat to biodiversity is habitat loss (Stein et al., 2000). Residential development expanding from cities to rural areas encroaches on the potential habitat for many species of plants and animals. The impacts are not limited to only terrestrial animals, plants, and habitats. Aquatic communities and organisms are also impacted

by development leading to changes in water quality and even quantity. Along with development comes an increase of water consumption or use and then disposal post use that can lead to contamination in area streams, lakes, and rivers.

In order for optimal survival of all plant and animal species, terrestrial or aquatic efforts are needed to preserve continuous habitats when applicable. When continuous habitats cannot be preserved, establishing a corridor is essential so that plants and animals do not become isolated to small parcels. More research including assessments and surveys, are needed so it can be documented and then properly incorporated and used in future planning efforts.

- **Agriculture and Aquaculture**

Large spans of open, cleared lands for agricultural production have an impact on the habitat and connectivity of some SGCN species that require large contiguous forest and grasslands. Aquaculture, including the rearing of trout and other fish species for stocking, may have an impact on native species and their habitats.

- **Energy Production and Mining**

Maryland produces over half of the energy it uses in-state from coal deposits and gas reserves in western Maryland, as well as hydroelectric potential in some rivers, solar energy and wind in the western mountain ridges, like those in the Deep Creek Management Unit. In addition to the threats that these activities pose, their supporting infrastructure such as pipelines, access roads, etc. are also of concern. Some of these greatest concerns are the increases in fragmentation of forest lands and other habitats. Other concerns are the placement of large facilities for wind and solar being located in movement corridors for birds and bats or the displacement of feeding areas, degrading the overall health of the habitat.

- **Transportation, Service Corridors, Culverts and Dams**

Transportation corridors provide a multitude of threats from fragmentation: increased predator access; physical barriers isolating populations; increased wildlife mortality via roadkill; easy pathways for the spread of invasive species; and noise disturbances leading to an overall decrease for quality of life.

Many invasive species have been introduced accidentally via packaging materials on shipments from other countries. Once these species are introduced, they are often hard to eradicate. See the section on invasive species for more information.

One impact of transportation, even at the local level that is often overlooked is road stream crossings. Depending on the type and placement of road culverts, if improperly placed, they can block upstream movement for aquatic organisms that rely on movement for reproduction, such as trout. These conduits can also disrupt ecosystem processes such as hydrology, sediment and debris transportation.

Like culverts, dams also alter the flow patterns, transportation of sedimentation, and limit the movement of aquatic organisms. Aquatic organisms, especially fish and mussels become isolated and cannot return upstream in order to reproduce. Unnecessary dams should be removed, and necessary dams should have some type of aquatic organism passage.

- **Impervious Surfaces and Riparian Buffers**

Impervious surfaces are surfaces that do not allow for the percolation of water through them into the subsurface. These include things such as paved roadways and parking lots. These surfaces can accelerate runoff and transport pollutants, leading to an increase in peak flows that can lead to flooding, channel erosion, and water temperature changes, all of which can impact the quality and quantity of aquatic communities.

Transitional zones between terrestrial and aquatic habitats that provide a buffer, commonly known as riparian buffers, provide many beneficial functions. Not only do these areas host a variety of rare and common species and communities, they also help with nutrient exchange, modify hydrology, stabilization banks, and can even help with water temperatures in the case of forested buffers (Palone & Todd, 1997).

- **Harvesting Impacts**

- *Bycatch and accidental mortality*: These are plants and animals that were not the original target, but were accidentally collected and are often injured or killed during the collection process. Plants are often accidentally trampled.
- *Persecution against species*: Many nuisance or pest species are also being eradicated from certain areas because they are unwanted by people, whether they are captured and released in a different habitat or they are killed on site. In some instances, species are misidentified for something else; for example, many people think that water snakes are copperhead snakes, and because they are undesired by people they are killed. Just like wildlife, plant species are also in jeopardy for being falsely persecuted via misidentification.

- *Excessive harvesting*: The overharvesting of a particular species includes fishing, hunting, and plant harvesting. This is very prevalent for desirable flowers, herbs, or medicinal plants; but the practice can be limited by placing harvest limitations, which has been done in Maryland for American Ginseng, which now requires a permit in order to harvest. The forest product industry also needs to be monitored to ensure they are following regulations and incentives like the Sustainable Forestry Act of 2009. This act encourages good practices through the use of incentives for harvesters. Even with protections in place, sometimes SGCN are impacted by fragmentation and invasive species.
- **Human Influences via Outdoor Recreation**

The outdoor recreation industry is a huge component for tourism and probably even more so following the Coronavirus pandemic. However, certain activities can have drastic impacts to the plants and wildlife surrounding them. Below is a listing of some activities and their potential impacts.

 - *Hunting and Fishing*

Hunting and fishing draw in millions of people annually and are beneficial in helping maintain biological systems so that species do not become overpopulated for their available habitat. Managing the harvest is essential so that species do not become overharvested. Sportsmen need to be careful that they do not transport invasive species from one location to another; this is particularly important for fishermen. They also need to watch that they step on designated paths when available to reduce the accidental trampling of potentially sensitive plant species and small animals, such as salamanders and frogs.
 - *Motorized Recreation/Bicycling*

Motorized recreational vehicle riding can upset or destroy natural lands and habitat for significant plant and animal species. They can increase erosion, provide easy transportation for invasive species disturbance, and can even cause mortality via accidental trampling. Riders need to stay on designated paths for motorized and non-motorized riding.
 - *Boating Activities*

Boating in sensitive areas can impact bird nesting habitats or cause direct mortality of aquatic species. Boats that have not been thoroughly cleaned and/or dried between waterways have the potential to transport invasive species from one waterway to another.

- Hiking/Wildlife Observation
Wildlife observation and hiking should be done on designated trails and paths. This will help reduce erosion in sensitive habitats, eliminate accidental trampling, and reduce the spread of invasive species.
- **Invasive Species** – See section on invasive species
- **Climate change** – See previous section on climate change

Important Areas for Conservation: Natural Heritage Areas

Natural Heritage Areas (NHAs) are designated areas of ecological importance, including those relatively undisturbed by human activity, potential habitats for species of special concern, significant assemblages of plants and animals, and areas important for general wildlife habitat, scientific study and recreation.

A Natural Heritage Inventory (NHI) was conducted in Fayette counties in 2021 to catalog important biological resources and to identify and map the Natural Heritage Areas within each county. A total of 26 NHAs have been identified in the Middle Youghiogheny Management Unit. Descriptions of each NHA in the watershed can be found in Table 6-3.

TABLE 6-3. NATURAL HERITAGE AREAS IN THE MIDDLE YOUGHIOGHENY

| Site Name | Management | |
|------------------------------------|------------|--------------|
| | Type | Significance |
| Bear Run | NHA | Global |
| Beaver Creek at Noah's Glade | NHA | Regional |
| Beaver Creek Preserve | NHA | State |
| Camp Carmel Slopes | NHA | Global |
| Chestnut Ridge at Limestone Run | NHA | Regional |
| Chestnut Ridge Quarry | NHA | Regional |
| Deadman Run | NHA | State |
| Deadman Run Headwaters | NHA | State |
| Deer Lake | NHA | Global |
| Ferncliff Natural Area | NHA | Global |
| Fort Necessity | NHA | State |
| Jonathan Run Falls | NHA | Global |
| Jonathan Run Trail | NHA | State |
| Jumonville | NHA | Global |
| Laurel Run and Connellsville Beach | NHA | Regional |
| Laurel Run Headwaters | NHA | State |
| Lower Indian Creek | NHA | Global |
| Lower Youghiogheny River Gorge | NHA | Global |

TABLE 6-3. NATURAL HERITAGE AREAS IN THE MIDDLE YOUGHIOGHENY (continued)

| Site Name | Management | |
|---------------------------------|------------|--------------|
| | Type | Significance |
| Markleysburg Bog | NHA | Regional |
| Meadow Run | NHA | Global |
| Middle Morgan Run | NHA | Regional |
| Middle Youghiogheny River Gorge | NHA | Global |
| Mill Run Road | NHA | Global |
| North Trout Hollow | NHA | Regional |
| Upper Glade Run | NHA | State |
| Upper Lick Run | NHA | Regional |

The information recorded in each NHI should be considered during planning processes to ensure the protection of these resources. One recommendation is that appropriate buffers be established around NHAs to protect wildlife, maintain hydrology, and prevent invasive species from entering the areas. Another implementation goal of this RCP is to work towards gaining “formal dedication” of additional NHAs.

Areas can gain formal dedication by becoming a PA DCNR- designated Natural Area. A Natural Area is an area of unique scenic, historic, geologic, or ecological value that will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention and with restricted use of the area (PA DCNR).

Important Bird Areas

The Important Bird Area (IBA) Program was established in the 1980s in Europe by Birdlife International. In the United States, the National Audubon Society became a partner organization and manages the program in 46 states including Maryland, Pennsylvania and West Virginia.

The goal of the program is threefold: identify, monitor, and conserve areas that are the most essential for sustaining native bird populations. Once identified, sites are

TABLE 6-4. IMPORTANT BIRD AREAS IN MIDDLE YOUGHIOGHENY MANAGEMENT UNIT

| IBA | Acres | Status | Priority |
|---|-----------|------------|----------|
| Youghiogheny Valley, Ohioopyle State Park | 157,319 | Recognized | State |
| Youghiogheny Valley | 49,139 | Identified | State |
| Allegheny Mountain Forest Block | 3,742,095 | Recognized | Global |
| Pleasant Valley | 17,063 | Identified | State |

monitored for changes to habitat or species that reside or visit the area. Lastly, conservation efforts for long-term protection are prioritized to these sites. IBA sites are identified as essential habitats for one or more species of vulnerable bird populations including nesting areas, migration stops, and wintering grounds. Sites can be established on public and private lands, and just because a site is identified as an IBA does not mean the public has access to it. Sites are designated with bird and habitat protection in mind, not public access for bird watching.

Important Mammal Areas

In 2001, the Pennsylvania Game Commission initiated the Important Mammals Area Project to promote the conservation of mammals through the identification of critical habitats and to educate the public about the importance of mammals, modeling it after the Important Bird Areas project. The project was a joint venture among the Pennsylvania Game Commission, National Wildlife Federation, Pennsylvania Wildlife Federation, Federation of Sportsmen's Clubs, Mammal Technical Committee/Pennsylvania Biological Survey, and the Carnegie Museum of Natural History.

There are five categories of which sites must meet at least one in order to be nominated. However, they can be nominated for more than one category.

- Habitats that support diverse or unique mammal communities by supporting significant populations of species or subspecies with specific habitat requirements or are representative of rare, threatened, or unique species.
- Habitats that support high density mammal populations with habitats that support significant aggregations of mammals during one or more seasons or support important core populations or population segments.
- Habitats that support species or subspecies listed as endangered or threatened by the Pennsylvania Biological Survey. The site supports a confirmed viable local population of species or subspecies that regularly occur at the site during one or more seasons.
- Habitats that support species or subspecies that are declining or vulnerable nationally or listed as candidate species by the Pennsylvania Biological Survey (specifically candidate-proposed, candidate-at-risk, candidate-rare). Sites must sustain a confirmed, viable local population of species or subspecies that regularly occur at the site during one or more seasons.
- Habitats that are important for wildlife viewing and public education. The sites include wild populations of mammals that can be viewed in their natural habitat or natural areas associated with an established educational program that interprets the natural history of resident mammals.

Within the Middle Youghiogheny River Watershed, no Important Mammal Areas have been identified.

CULTURAL RESOURCES

Recreational Opportunities

Trails

Trails are an asset to a community whether designed for recreational purposes or as a connector to a neighboring community. In the Middle Youghiogheny River Management Unit, the majority of trails have been established for recreational purposes to allow visitors the opportunity to enjoy the natural surroundings of the region. Trail uses in the area vary among walking/hiking, mountain biking, cross-country skiing, equestrian use, and all-terrain vehicles or off-road vehicles. There are 25 trails or trail systems in the management unit.

Parks

Parks are areas of land set aside for public use maintained for enjoyment and the recreational use of people (Landes, 2004). Parks can vary from small neighborhood parks to large state or federal parks. They can be publicly or privately owned and may vary with access being free or having a user's fee.

In the Middle Youghiogheny River Management Unit there is one state park, and a nature preserve. Additional recreational facilities include 12th Street Park, Ainsley Road Ballfield, Austin Avenue Park, Cameron Basketball Court Park, Dunbar Ballfield, East Park, Farmington Ballfields, Fort Necessity National Battlefield.

- **Ohiopyle State Park**

Ohiopyle State Park contains 20,500 acres of rugged, natural beauty in the Laurel Highlands region of Pennsylvania. It is one of Pennsylvania's premier state parks as it provides some of the best whitewater boating in the eastern US, in addition to the numerous trails and picnicking facilities. While there is no designated swimming beach, recreational users flock to the park to swim, especially areas like the Meadow Run Natural Waterslides and below Cucumber Falls. Swimming is not permitted directly above or below the main waterfalls. Scenic vistas, wildflowers, and wildlife capture the hearts of photographers. The park also features an environmental education center near the main waterfalls in Ohiopyle Borough.

- **Nature Preserves**

The Bear Run Nature Reserve offers 5,118 acres of watershed protection and recreational opportunities. The reserve is managed to protect, conserve and restore land and water for the diversity of the region's native plants, animals and their ecosystems. The reserve offers hiking trails, backcountry campsites, hunting and fishing opportunities.

Camping

Camping is a popular recreational activity that increased in popularity due to the Coronavirus pandemic in 2020 to 2021. Within the Middle and Lower Youghiogheny Management Unit there are two private campgrounds, one state park campground, one church camp, and backpacking/backcountry camping opportunities. Information about amenities and programs for each camping opportunity is on their websites. There are also a variety of cabin and Airbnb rentals available in the area.

Boating

The Dunbar/Middle/Lower Yough Watershed offers many options for boating. The Middle and Lower Yough are major whitewater boating destinations and heavily visited during summer months. Many sections of the main stem contain small rapids (Class I). Other sections require a higher level of skill and proper gear in order to handle the continuous gradient.

From Confluence to Connellsville, a paddler will enjoy scenic views and quality Class II and III rapids. Access points along the river have been established, in part by the Pennsylvania Fish and Boat Commission and Ohiopyle State Park. Dunbar Creek contains several sections that offer Class IV and V rapids and should only be attempted by skilled paddlers and crews.



Boating and specifically whitewater is an extremely important industry in the Ohiopyle region

The Lower and Middle Yough offer guided rafting trips and equipment rentals. Training, lessons, and instruction are offered by several outfitters.

Several of the smaller tributaries are considered boatable after heavy rains or a spring melt. American Whitewater's River Info page has information including flows, directions to access points, and any important alerts.

Fishing

Fishing in Pennsylvania is regulated by the Pennsylvania Fish and Boat Commission (PFBC). They work to protect, conserve and enhance the aquatic resources and provide fishing and boating opportunities. In an effort to achieve their goals, they handle streams through various management designations and stream stockings.

In order to fish in Pennsylvania, all anglers ages 16 and up are required to purchase an annual fishing license, and for known trout streams a trout stamp needs to be purchased. Resident and non-resident licenses are available to purchase at a variety of sporting goods stores and online through the PFBC website.

There is no closed season on trout along the Youghiogheny River from the mouth of the Casselman River downstream to the confluence with Ramcat Run and from the PA Route 381 bridge at Ohiopyle downstream to the mouth of the river. The daily creel limit from opening day of trout season through Labor Day is five trout. The day after Labor Day to the opening day of the trout season of the following year, the creel limit is three trout. For all other species inland regulations apply.

A special regulation applies to the Tackle Trophy Trout section 9.2 miles from the mouth of Ramcat Run to the SR 381 bridge in Ohiopyle. This section is open to fishing year-round. Fishing is permitted on a 24-hour basis. The minimum size is 18 inches from the opening day of trout season through Labor Day. The daily creel limit is one trout. For the day after Labor Day to 8:00 am on opening day of trout season, no trout may be killed or had in possession. There are no tackle restrictions.

There are two streams that have been designated as Class A Streams. These water bodies contain populations of naturally reproducing trout of sufficient size and abundance to support a long term and reward sport fishery. They include 2.58 miles of Lick Run and 2.29 miles of Rock Spring Run.

Additional tributary streams stocked with trout from opening day of Trout Season to Labor Day include:

Dunbar Creek from the stone quarry along SR 1055 to Sheepskin Trail crossing downstream of the ballfield. There is also a special regulation section on Dunbar Creek that is catch and release fly fishing only, which is 4.22 miles from the confluence of Glade Run to the stone quarry on SR 1055.

Meadow Run - 200 meters upstream SR 2015 bridge to 240 meters downstream to SR 0381 bridge and Beaver Creek to bridge on Dinner Bell Road. Meadow Run also has a Special Regulation section designated as a Keystone Select Stocked Trout Water. It is a program that provides anglers with an opportunity to fish for larger trout. Under the program, trout approximately 2-3 years old measuring between 14 to 20 inches will be distributed among the selected waters. The section is 2.2 miles from the SR 2011 bridge (Dinner Bell Road) adjacent to Ohiopyle State Park Office downstream to its mouth.

Hunting

The entire Middle Youghiogheny Management Unit is located within the 2C Wildlife Management Unit for hunting as designated by the Pennsylvania Game Commission. Wildlife management units are delineated based on habitat and human-related characteristics, such as population density, public vs private land ownership, recognizable features consisting of roads and streams, as well as land use practices like agriculture, timbering, and development. They are used to manage all game with the exception of Elk, waterfowl, and migratory game birds. Hunting is permitted on public and private lands during the appropriate hunting

seasons. The Pennsylvania Game Commission website has more information about Pennsylvania hunting seasons. However, prior to hunting on private lands, landowner permission needs to be obtained even if hunting in forest game and hunter access properties.

State Game Lands (SGL) are lands purchased and managed by the Pennsylvania Game Commission to provide habitat for wildlife, increasing opportunities for lawful hunting and trapping. These lands are open to the public. There are portions of three State Game Lands within the Middle Youghiogheny Watershed that include: SGL 51, 111, and 265.

Hunting is also permitted in the majority of Pennsylvania State Parks. Ohiopyle State Park has 18,000 acres and Laurel Ridge State Park has 13,625 acres where hunting, trapping, and dog training are permitted during the appropriate seasons. More information is available on the park websites.

Golfing

Locations for golfing within the Middle Yough Management Unit are very limited with Nemaquin Resort offering the only opportunities. Nemaquin has two premier courses -Mystic Rock and Shepherds Rock. Mystic Rock is the host for the PGA Tour's 84 Lumber Classic. Golfing these two courses or partaking in the resort's golf academy is reserved for overnight guests and all-access members.

Environmental Education

The Youghiogheny River has unique opportunities for environmental education that should be utilized to their fullest extent. The Youghiogheny holds educational opportunities for people of all ages. It could be utilized as an outdoor environmental classroom or become a topic for an essay contest for school children. It could be a research experience for adolescents through adults or a history lesson detailing the past events that helped shape the nation. There are many other opportunities for children, adults and seniors to continue their education, including subjects about history, science, math, English, biology, hobbies, and environmental stewardship. The Youghiogheny Valley is filled with a vast quantity of historic, cultural and environmental resources that have just begun to be rediscovered. The combination of these resources provides an outstanding opportunity to develop educational programs for both children and adults.

Ohiopyle State Park

Ohiopyle State Park offers a wide variety of environmental education and recreation programs. Through hands-on activities, guided walks, and evening programs, participants gain appreciation, understanding, and develop a sense of stewardship toward natural and cultural resources. Programs focus on the Youghiogheny River, its gorge, and the natural, cultural, and recreational resources of the Ohiopyle area. Curriculum-based environmental education programs are available to schools and youth groups. Teacher workshops are available.

Mountain Watershed Association

Mountain Watershed Association (MWA) is a non-profit, 501©3 organization with the mission to protect, preserve and restore the Youghiogheny River Watershed and its broader communities through conservation, recreation, education and advocacy. Yearly, MWA works with over 3,000 learners over the course of about 50 environmental education events. MWA hosts their own educational events and also visits schools, community centers, scout groups, libraries, and more to teach their watershed education curriculum.

- **Outdoor Lending Library**

Upon receiving a grant from the Fayette County Community Foundation, with materials supplemented by the Grable Foundation and the DEP education grants, MWA has created a library of outdoor gear and educational resources available to the public! This comprehensive and inclusive resource library is located in MWA's office, and items will be available to be checked out during our office hours.

- **Water Guardians After-School Club**

Water Guardians is an after-school education program developed with a generous grant from the Pennsylvania DEP. Water Guardian club meetings provide students with a plethora of opportunities to gain experience through ecology-based activities. Their main goal is to have fun and spark a connection between students and their local environment.

- **Family Field Day at Laurel Hill State Park**

Together with the State Park Rangers at Laurel Hill State Park, Mountain Watershed Association held its first annual Family Field Day in June 2023. Using funds from the DEP's generous education grant, we provided local families with a fun day of outdoor learning and recreation on the shores of Laurel Hill Lake.

- **Indian Creek Watershed Fishing Festival**

This fishing derby and clinic has been hosted annually at CW Resh Park in Indian Head, PA for 15 years. Families came from near and far to enjoy a day of free activities along Indian Creek. The event features free fishing and lunch for kids 12 and under, hands-on environmental education activities, door prizes, a fly-casting clinic with PA Fly Co, and goods from local vendors. The event wraps up with the highly



A Trout Unlimited volunteer working with a youth participant on fly casting

anticipated Indian Creek Duck Race, in which the MWA team released 1000 rubber ducks into the creek.

Fly-Fishing Clinics – 6 per year

In 2022, MWA started hosting free fishing and fly-tying clinics in partnerships with local Trout Unlimited chapters and PA Fly Co, a local fly-fishing business.

Professional Development Trainings – 4 per year

Growing up WILD **Growing Up WILD** is an early childhood education curriculum that builds on children’s sense of wonder about nature and invites them to explore wildlife and the world around them. Through a wide range of activities and experiences, Growing Up WILD provides an early foundation for developing positive impressions about the natural world and lifelong social and academic skills.

Project WILD’s mission is to provide wildlife-based conservation and environmental education that fosters responsible actions toward wildlife and related natural resources.

Population Education is all about people – how many of us there are, how we shape the world, and how we interact with each other. And as the go-to program providing innovative lesson plans and professional development on human population growth and its effects, Population Education supports K-12 teachers across content areas. Our human population has grown from 1 billion to 8 billion in just over 200 years and is expected to grow through this century, so it is critical to examine human impacts on wildlife, climate and natural resources, while working toward equality and justice for the world’s people.

County Conservation Districts

County Conservation Districts (CCD) provide a diversity of programs and services to their constituents that include: abandoned mines, agricultural land preservation, erosion and sedimentation control, floodplain management, forest management, nutrient management program, stormwater management plans, waterway and wildlife management protection, dirt and gravel and low volume road programs as well as environmental education. They accomplish this hosting events and environmental educational programs in addition to sponsoring county Envirothon competitions.

- **Envirothon**

Each CCD works with teachers and professionals throughout Pennsylvania to host an Envirothon competition. High school students are guided through this natural resource environmental education program that combines

classroom learning and outdoor activities. This exposure to nature and seeing how humans impact the natural world provide invaluable lessons for understanding ecosystems and our environment.

At the Envirothon, teams of five high school students compete in field testing using their knowledge in five topic areas – Soils and Land Use, Aquatic Ecology, Forestry, Wildlife, and Environmental Issues. A current environmental issue is chosen each year as the “hot topic” for the focus of this station as well as the oral presentation component. The winners of each county competition, then compete for the state title with that winner representing Pennsylvania at the national Envirothon competition.

Penn State Extension

It is the belief of Penn State Extension to deliver science-based information to people, businesses and communities. They do this through a variety of programs and educational sessions. Each county has an Extension office and the programs available between counties. Some of the more notable programs include: 4-H, master gardener, master watershed, and master well steward programs.

Expanding and supporting existing environmental education in this area would be beneficial to individuals as well as the community at large in fostering a better understanding of the importance of conservation and stewardship. Environmental education also exposes individuals to possible careers in these fields as well as empowers them to be better advocates for environmental justice.

Historical Resources

Watershed History

Little is known about the people of the Youghiogheny Watershed before the arrival of Europeans. It is believed that a clan known as the Monongahela lived in the area approximately from A.D 900 to 1600. They were nomadic gatherer-hunters residing in temporary or semi-permanent camps. Their lives were very much tied to the seasons. Most of their efforts in the spring through the early autumn would have been growing crops. Everyone participated in the planting and harvesting, but women, children, and older adults were responsible for tending the crops during the growing season. Men were responsible for most of the hunting. However, the cooperation of everyone was needed for processing. Men and women butchered the animals; women were responsible for preserving them.

The Monongahela lived in round, dome-shaped houses 9 ft to 30 ft in diameter. These dome houses were made by cutting down small trees and pushing the cut end into the ground in a circle formation. The tops of the trees were then bent together and tied to make a frame. Poles were then bent around the outside of the frame to make the house more stable. Finally, large pieces of bark were cut and placed over the frame. A hole was left at the top of the roof to allow smoke from

the campfire to escape. During the summer, cattails covered the houses and kept the rain from dripping inside, yet allowing air to circulate. The inside of the house was simplistic. The walls were lined with sleeping benches constructed from sticks and lined with animal skins or plant mats.

The houses were arranged in large circles to form a village. The center of the village was left open for group or ceremonial activities. A large fence, a stockade, surrounded some villages to help protect against raids from unfriendly groups. They had storage rooms attached to their houses, like a kitchen pantry, where they stored dried and preserved foods. Sometimes the storage rooms were used for cooking.

The Monongahela People did not have a complex government. Instead, they had an egalitarian society, where everyone had a say in how the village was run. This is believed because most houses within the village were similar in size; most homes had their own food storage; and there were no apparent differences in how people were buried. Each house controlled its resources, although cooperation between families was necessary for the good of the village.

Historically, known Native trails in the Meyersdale, Pennsylvania area may have been used by the Monongahela for trading with outside groups, such as the



Figure 6-1: Monongahela Villages' locations and trading paths in Somerset County of the Youghiogheny Watershed. Image taken from http://www.phmc.state.pa.us/portal/communities/archaeology/files/mystery_ofmonindians.pdf

Turkeyfoot Path (Figure 6-1). These trails were probably the same ones used for hundreds of years by prehistoric Native groups. Trade evidence is apparent from stone flakes and tools made from rocks from faraway parts of the country.

The Monongahela mysteriously disappeared from the area 400 to 1,000 years ago. Following the Monongahela People, the Shawnee, Seneca, and Delaware tribes utilized the area as a hunting ground but not as a permanent home. The name Ohiopyle comes from the Lenape, members of the Delaware nation. Their name for the area was “ahi opihøle,” which means “white frothy water,” referring to the falls and the whitewater in the area.

The earliest reference to the Youghiogheny River is a caption on a map drawn in 1737 by William Mayo: Spring heads of Yok-yo-gane river, a south branch of the Monongahela. The name originated from one of the dialects from the Lenape and means “a stream flowing in a contrary direction” because it flows north for sixty miles, then north and west. Other variations of the name include Joxhio Geni, Yoxhio Geni, Yayughagany, Youghiogheni, Yehiogany, Yoxhiogany, Yohogania, Yochi Geni, Youghanne, and Yuh-wiac-hanne.

Since the Youghiogheny connected to the broad and boatable Ohio River, these rivers opened access to the entire western frontier. For this reason, Ohio became the target of colonial explorers, traders, armies, and settlers in the 1700s. The basin was strategic, the height of land between the Potomac Valley and the Ohio Valley. Trails from Virginia were among the first routes leading to the interior, and they crossed the Youghiogheny.

Ownership of the Youghiogheny lands was under debate in the 1700s. The Iroquois claimed the land after they spent twenty years fighting other Native Nations for it. The French thought the land was theirs; they dated their claim from 1682 when La Salle canoed the Mississippi and declared that France owned the entire basin. The British believed it should belong to them because they intended to settle the land. They also claimed the land through a 1744 treaty with the Iroquois. In 1753, George Washington made his first appearance in the area at 21 years old to carry a message from the Governor of Virginia to the French at Fort LeBoeuf to tell them to stop the occupation of lands claimed by the English.

Below Confluence, the Youghiogheny continues its northwestern direction towards Ohiopyle. George Washington visited in 1754 before he was president. He paddled a canoe from Great Crossings and camped at a site in Confluence. He paddled downstream and wrote, “At last, it became so rapid as to oblige us to come ashore.” In the mid-1700s, southwestern Pennsylvania was scarcely explored or settled. Natives were scarce due to wars between the Iroquois and other nations in the 1600s. Trying to escape from colonization, Shawnee and Lenape people fled to this region in the 1700s, but they were too scattered to attract missionaries or traders. It was a blank spot on the map, and within this region, Ohiopyle was one of the last communities to be founded around 1770.

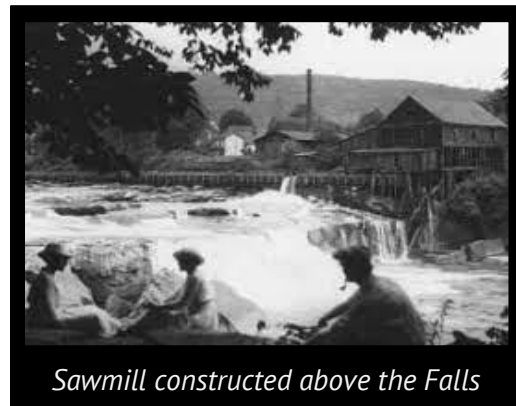
In the late 1800s, Ohiopyle was an industrial town, its economy based on coal and timber. Until 1881, the town was called “Falls City” when it was incorporated as a

borough named Ohiopyle, meaning “white, frothing water” in the Lenape language. The river was used heavily for water power. In 1842, a dam was built above the falls to divert water for a sawmill, but a flood obliterated the dam before the first log was cut. Next, a dam was constructed 400 feet above the falls with a wooden raceway to channel water to a mill. The mill burned before a dollar was made. In 1850, a sawmill was successfully opened at the falls in about 1850 (Figure 8). In 1879, the Falls City Pulp Mill began operating, powered by water from a 400-foot-wide dam built across the river to trap and divert the flow.

In the early 1900s, the Kendall Lumber Company converted the pulp mill into a hydroelectric plant to power a sawmill. In 1906, it added a network that brought electric lights to Ohiopyle. The Falls City Shook Factory, which produced barrel parts, stood at the mouth of Meadow Run where the state park superintendent’s house is today.

From the 1930s on, it was hard times for Ohiopyle. The trees had been cut. However, in the 1960s, Ohiopyle would be transformed into a booming recreation center. The Greater Pittsburgh Parks Association was formed in the early 1930s. In a few years, the group reorganized into the Western Pennsylvania Conservancy to offer conservation education programs and to save open space by acquiring

land. Ohiopyle Park became an idea in the forties when Lillian McCahan wanted to save the Ferncliff peninsula as a natural area. Rare plants were the attention-drawing factor. Barbar’s Buttons and Carolina Tassel-rue, grow no other place in Pennsylvania. Slender Blue Iris, Autumn Willow, and Buffalo Nut typically grow to the south and are scarce in this region. These plants thrive on the peninsula because of the north-flowing river as it transports southern seeds to a northern gorge, protected by its deepness from the coldest weather.



Sawmill constructed above the Falls

In 1951, the owner of Ferncliff was selling the peninsula for \$35,000. A prospective owner planned to cut the timber and build an amusement park. Another power company also advertised the site as a good location for a small industry. McCahan started a series of conversations resulting in a department store owner, Henry J. Kaufmann in Pittsburgh, purchasing the property from the owners for \$40,000 and turning it over to Conservancy ownership. After the acquisition of Ferncliff, the Conservancy, in 1958, announced its dedication to preserving more of the area. The Conservancy received a \$100,000 grant from a Mellon trust fund in 1959 and hired Community Planning Services for planning, land acquisition and park development.

Because the gorge was a priority for protection, the acquisition border was extended upriver to Ramcat Run, where the gap in Laurel Hill begins, and downriver past Bruner Run on the south side of the Yough. Increasing riverfront open space in Ohiopyle was also a goal, so more house acquisition was requested. In 1959, the West Penn Power Company gave river frontage from the Route 381 bridge to Meadow Run. In 1960, the borough of Ohiopyle announced it would vacate an unused right-of-way along the river, and that plans were being drawn for a parking lot, picnic grounds, and a trail. In 1961, Mrs. Albert Fraser Keister sold 589 acres to the Conservancy. This land included two miles of riverfront along the outside shoreline of the Loop and one mile of Cucumber Run, including Cucumber Falls. In 1962, "Keister Park" was increased by 987 acres, protecting Jonathan Run to the mouth where it meets the Yough. In 1963, maps were signed by Governor Scranton, announcing the beginning of an 18,500-acre park at Ohiopyle. It officially opened in 1965.

Like any change in a small town, the new park was not always met with excitement. The state was criticized for clearing trees. Claims of abuse in land acquisition were made but never proven. Locals were upset about losing Front Street, the main street that used to run along the river above the falls. It is believed that a local burned down the Ohiopyle House in 1964, a resort hotel the Conservancy owned. A day before the blaze, a Conservancy employee had been threatened.

Ohiopyle became another central hub of whitewater recreation. From the bottom of the Falls to Bruner Run, the Yough drops 27 feet per mile. The entrance is the first of fifteen rapids. Next comes Cucumber, which may have been named for the Cucumber tree that grows there, or maybe because of copperheads, the snakes that sometimes smell like a cucumber. Dartmouth is named after the Dartmouth Outing Club, which raced there every spring. Dimple was named by some of the first canoeists who scouted the drop and discovered a sunken canoe called "Dimples." Bottle of Wine was named by a canoeist John Sweet, who found a half-full bottle on a rock.

The popularity of the run caused traffic problems. After a transportation study, a bus system was developed. The put-in was moved from the waterfront park on the upper side of 381 to where it is now just below the falls. A paved trail and a small office were built where rangers could check permits. All guided rafting customers park their cars one mile south of Ohiopyle along Meadow Run, and outfitters' buses shuttle people to the put-in. The take-out was another huge problem. Most boaters had been taking out at Stewarton, six miles below Ohiopyle at the site of an old logging settlement. The problem was that everybody had to scramble across the railroad tracks. Chessie System officials, reinforced by a U.S. District Court order, announced in 1978 that nobody could carry boats across the tracks. After considering other locations, Bruner Run was settled on for the new take-out location because it had a good area on top of the hill, the old Mitchell Place, for

private boater's parking, and the road system was not heavily traveled. Boaters started using Bruner in 1979.

The river began to be very congested. In 1970, 17,000 people floated the Yough, and in 1972, 45,000. Today, it is estimated that 250,000 people boat the Lower Yough yearly. A study was conducted to spot major congestion points, measure the time it takes to paddle from one to another and construct a statistical and computer-simulation model of the overall transportation system of the Lower Yough. Based on the maximum time a boater would wait while others went through a rapid of 15 minutes, Strauss (Strauss & Thompson, 1977) determined that 2,000 floaters a day with one boat going down the river every thirty-six seconds were possible. Nine hundred sixty guided customers were already allowed from previous negotiations with the rafting industry, so this number allowed an equal number of non-guided paddlers to access the river. Lines formed at the ranger station when private boater permits were required on a first-come, first-served basis. There was once a group of 400 private boaters waiting, some of whom waited for four hours. In 1978, there were almost riots two or three times. People were acquiring permits, which were free then, and selling them to rafting companies.

In 1979, a new plan was formed. A guide company launches every half hour, from 8 am to 1:30 pm. Non guided boaters, in clusters of up to sixty, launch every half-hour between the commercial groups. Additionally, a bus token would be acquired for \$1.25. Those who wanted to run the loop would have to wait till 2 pm. People caught sneaking onto the river were fined \$50. The systems have evolved over the years to a point where it is difficult to find current information on the number of permits and where the money is allocated. It costs \$10 on the weekend to do the entire run, including the shuttle—\$5.00 for the loop.

Historical Sites

- **World Heritage Sites**

In 2019, Fallingwater was designated as a World Heritage Sites when the 20th Century Architecture of Frank Lloyd Wright was accepted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) for inclusion on the World Heritage List. This acceptance added eight Frank Lloyd Wright's architecturally designed buildings that spanned 50 years of Wright's career.

- **National Register of Historic Places**

The National Register of Historic Places was established by the National Historic Preservation Act of 1966. The National Parks Service maintains the list nationally. In Pennsylvania, it is administered by the Pennsylvania State Historic Preservation Office within the Pennsylvania Historic Museum.

For consideration or placement on the National Register, a landowner applies to the State Historic Preservation Office. The first step is the completion of a Historic Resource Survey. This provides a historical description of the buildings, sites, structure, object, or district that the landowner would like placed on the National Register. The state office reviews the forms and, if needed, reaches out to the landowner for additional information to determine if it meets eligibility guidelines. If not, the landowner is provided appeal information. If a property does meet the initial eligibility, it is then nominated to the State Historic Preservation Board. If the Board approves the nomination, it recommends placement to the National Parks Service. Again, if it is denied by the Historic Preservation Board, the landowner is given information about how to appeal.

Within the Middle Youghiogheny Management Unit six sites have been listed on the National Register.

- **Fayette-Springs Hotel, also known as Stone House**
Listed Reason: Architecture
Listed Date: 11/27/1995
Listed Category: Building
- **Kentuck Knob**
Listed Reason: Architecture
Listed Date: 5/16/2000
Listed Category: Building
- **Downer Tavern**
Listed Reason: Architecture
Listed Date: 11/27/1995
Listed Category: Building
- **Rush House**
Listed Reason: Commerce, Transportation
Listed Date: 3/3/1978
Listed Category: Building
- **Fort Necessity National Battlefield**
Listed Reason: Military, Exploration/Settlement
Listed Date: 10/15/1966
Listed Category: District
- **Fallingwater**
Listed Reason: Landscape, Architecture, Conservation
Listed Date: 7/23/1974
Listed Category: Building