CHAPTER 5. LAUREL HILL CREEK

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."

In order to enhance the unique qualities within the Youghiogheny River Basin, several major tributaries will have their own chapters. As such, Laurel Hill Creek Watershed is broken out because of its excellent water quality and historic significance. The Laurel Hill Creek Management Unit will focus on the area of land that is encompassed by all the streams which flow into Laurel Hill Creek before it joins the Casselman River. Where Laurel Hill Creek and the Casselman River converge just before entering the Youghiogheny River, the three waterbodies form a pattern resembling a "turkey's foot." Therefore, this area is called Turkeyfoot.

Laurel Hill Creek
(Photograph courtesy of Jim Sota)

PROJECT AREA CHARACTERISTICS

One of the darlings of the Laurel Highlands Regional of Pennsylvania, Laurel Hill Creek, is a 125 sq. mile watershed located on the eastern flank of Laurel Ridge mostly in Somerset County and in small areas of Fayette and Westmoreland Counties. It has been said that the Laurel Hill Creek Watershed has the most fished creeks in southwestern Pennsylvania. There are a total of 269 stream miles with 247 miles listed as High Quality and 22 as Exceptional Value.

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).

The Laurel Hill Creek Watershed is designated as a high-quality cold-water fishery (HQ-CWF). All the tributaries in this watershed have the HW-CWF designation with the exception of Jones Mill Run and Blue Hole Creek, including the Cole Run and Garys Run subwatersheds. There are 18 named tributaries that flow directly into Laurel Hill Creek.

Among these tributaries there are another seven named tributaries, in addition to the numerous unnamed streams, located within the Laurel Hill Creek Watershed. A listing of all the tributaries, their size and stream designation, is located in Appendix C.

Topography

The project area has a mixture of topographic features. The highest land elevation is located at Laurel Hill at 2,980 feet. Opposite this, the lowest elevation in the project area is located at the confluence of Laurel Hill Creek with the Casselman River. This low point has an elevation of 1,330 feet. The western border is bounded by Laurel Hill, and the Casselman River makes up the eastern border of the region.

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 (CO_2) is a small portion of the makeup of the Earth's atmosphere, but the fluctuations in CO_2 play a huge role in climate change. CO_2 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 CO_2 while decreasing the natural world's ability to offset the emissions. Humans have increased atmospheric CO_2 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% (National Aeronautics and Space Administration (NASA)).

Scientists agree the level of CO_2 in the atmosphere needs to stay below 350 parts per million (ppm) to address the catastrophic impacts of climate change. In 2019, CO_2 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 CO_2 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).

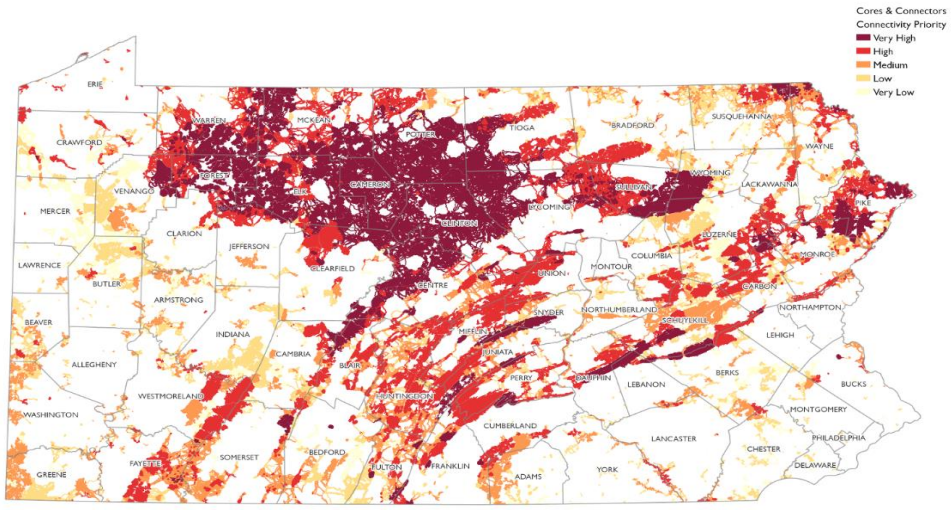
Since the early 1900s, Pennsylvania has recorded an average temperature increase of 1.8° F. Winter temperatures have become warmer at a rate of 1.3° F per decade from 1970 to 2000 in the northeast U.S. Even more alarming, projections show it could be as much as 5.4 °F warmer by 2050 than it was in the 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 record keeping began in 1880.

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 cold-water 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 Laurel Hill Creek Watershed occupies approximately 79,32 acres or 125 square miles. There are 15 municipal units, all within the state of Pennsylvania. It is estimated that 28,250 people live in the Laurel Hill Creek Management Unit. The population by the municipal unit is located in Appendix D.

Land Use Planning & Zoning

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. Zoning ordinances give reasonable consideration to the character of districts and their suitability for particular uses. For example, they encourage orderly development and the most appropriate use of lands.

Ordinances can conserve the value of land and buildings while promoting the conservation of natural resources and prevent environmental pollution. In addition, they promote health and general welfare, avoid undue concentration of population, and provide for adequate light and air. Ordinances have also been written to secure safety from fire, panic and other dangers; lessen congestion on roads; facilitate the

adequate provision of transportation, parking, water, sewage, parks and other public facilities.

Somerset County does not have county-wide zoning; however, they do have regionalized zoning around the airport, interchanges, and the Route 31 corridor.

In January of 2022, the Somerset County Commissioners updated the Subdivision and Land Development ordinances that were in place for the county. The new ordinances were put in place to protect and provide for the public health, safety and general welfare of Somerset County residents. The ordinances also guide future growth and development within the county while protecting and preserving the value of land, the natural beauty, topography, and environment of the county as well as assuring adequate and efficient transportation, sewage, water, and other requirements and facilities.

Wind turbine near Cranberry Glade Lake

Some ordinances of importance, in particular to the Casselman River Watershed, include those for developing campgrounds and/or recreational vehicle parks and wind energy towers.

Income

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. In Appendix E the average and median household incomes for each of the municipal units in the region is listed.

Within the Laurel Hill Creek Management Unit there are approximately 7,733 households. Of those households, 61.7% receive some sort of Social Security income and 38% receive retirement income. Out of those same households only 4.1% receive public assistance while 18.7% 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 more than the 12.1% of Somerset County, Pennsylvania residents. Since the Middle Youghiogheny River Watershed is entirely within Somerset County, we can utilize the county data, although the percentage of people in Pennsylvania living in poverty is equal to the percentage of Somerset County residents (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).

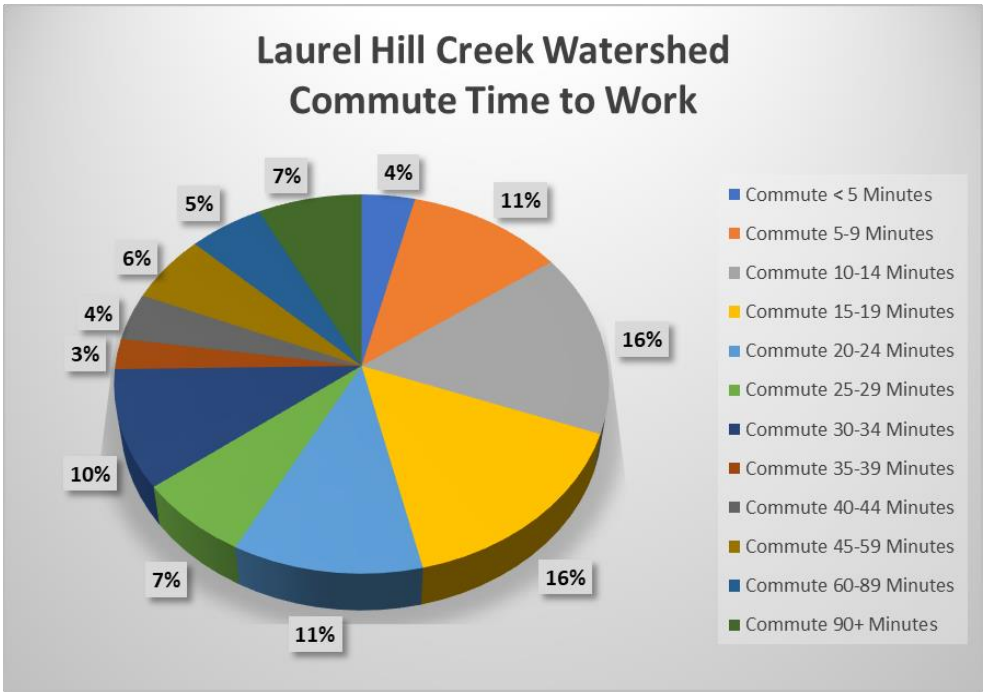
Prior to March 2023, in order for a community to qualify as an Environmental Justice Area, either 20% or more of the people living in a census tract are living in poverty or 30% or more of the population in the census tract is considered a minority. Census Tract 2605 skirts the western portion of this management unit including Allen Creek, Blue Hole Creek, Gary's Run, Fall Creek, Sandy Run and its tributary Harbaugh Run. This Census Tract was identified because 26% of the population living in this Census Tract are living in poverty.

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

In the Laurel Hill Creek Watershed, approximately 11,521 individuals are in the workforce. Of those individuals 72.7% work in the state and county in which they reside. Of the remaining individuals, 24.6% work within the state of their residence but outside the county, and 2.7% work outside the state of their residence.

The majority of the workforce, 65%, has a commute under 30 minutes with 31% percent spending less than 15 minutes. Approximately 4% work from home. This data is based on data submitted in 2020 and the start of the Coronavirus pandemic. This was a time of transition in the 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 – 16%
2. Manufacturing – 14%
3. Construction– 12.5%
4. Accommodations/Food Service– 10%
5. Retail Trade – 9%

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. The discharge from the Seven Springs sewage treatment plant flows into Laurel Hill Creek. Public sewage is available in Seven Springs and Confluence. Many other multiple source sewage systems exist including local campgrounds.

Drinking Water
Seven Springs Municipal Authority provides drinking water to portions of the Laurel Hill Creek Watershed. Similar to sewage system infrastructure, the service areas often extend outside of the Youghiogheny River Watershed.

Internet Service
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 Coronavirus 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. Within the Laurel Hill Management Unit there are portions of five school districts: Connellsville and Uniontown in Fayette County, and Rockwood, Somerset and Turkeyfoot Valley in Somerset County.

LAND RESOURCES

Geology
Laurel Hill Creek is located within the Allegheny Mountain Section of the Appalachian Plateau's 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 Laurel Hill anticline, the Youghiogheny syncline, and the New Lexington syncline. The rock strata are exposed at the land surface from west to east across the area (Laurel Hill Creek RCP).

The bedrock of the ridges varies from the Burgoon, Mauch Chunk, Pocono, Pottsville, and the Allegheny Group, which is composed of gray sandstones and shales. Sections of sandy cross bedded limestone, referred to as Loyalhanna limestone, outcrop in places along the ridgeline. These bedrock strata formed between the Devonian, Mississippian, and Pennsylvanian periods, ranging from 280 to 400 million years ago (Smith, 1998; 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 weather, vegetation, climate, and time. Sedimentary rocks, such as shale, sandstone, and limestone, are prevalent in the Youghiogheny Watershed and subsequently along Laurel Hill Creek. 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 of 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.

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. Somerset County has five different soil associations. Of these, only three are found along Laurel Hill Creek. Fayette County has five different soil associations. Of these, only two are found along the creek. These associations are important, especially to the general public, to provide basic information about soil and to provide a general guide for watershed management.

- **Rayne-Gilpin-Wharton-Cavode**
  Description- Nearly level to very steep, deep and moderately deep, well-drained to somewhat poorly drained soils; on hills and ridges.
  Location- Generally located at nearly level to very steep tops and side slopes of hills and ridges; predominantly on broad uplands on hills and ridges that are dissected by streams.
  Land Use- Mostly used for crops, hay, and pasture. A few areas are used for urban and industrial developments and for surface mining of coal.
  Limitations- The moderate depth to bedrock, the slope, and the seasonal high-water table.

- **Hazelton-Cookport**
  Description- Nearly level to very steep, deep, well-drained and moderately well-drained soils; on foot slopes of hills and on mountains.
  Location- Nearly level to the very steep tops and side slopes of hills and mountains. The areas are predominantly on broad mountains and hilly valleys between the mountains.

Land Use- Mostly wooded, except the areas that are cleared for crops, hay, and pasture. A few areas are used for homesites and recreation.
Limitations- Mostly stony soils, the slope, and a seasonal high-water table.

- **Leck Kill-Albrights**
  Description- Gently sloping to very steep, deep, well-drained to somewhat poorly drained soils; on hills and ridges.
  Location- Occupies the gently sloping to very steep tops and side slopes of hills and ridges. The areas are predominantly on broad uplands that are dissected by streams and drainage ways.
  Land Use- Mostly cleared for cropland, hay, and pasture. Small areas are used for homesites and recreation. The soils are mostly suited to farming.
  Limitations- The slope and a seasonal high-water table.

- **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 but 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- On the 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- Soil limitations for farming due to wetness and erosion.. Also has severe limitations for sewage disposal because of restricted permeability and seasonal wetness.

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 it should be used wisely.

There are 42 different prime agricultural soils within Somerset and Fayette Counties (Natural Resources Conservation Service).

Land Use

When compared to the other subwatersheds of the Youghiogheny River, Laurel Hill Creek has a low development and high-forested land use. However, due to the desire for secondary residences, vacation homes or rentals, it is likely that development in this subwatershed will increase. Seven Springs is one of the only areas in the watershed where large amounts of land, in close proximity, is developed.

Ownership

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

Private property refers to the ownership of property 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).

TABLE 5-1. LAND USE IN LAUREL HILL CREEK

Total Acres	Percent	Land Cover Class
302	0.4%	Open Water
4,344	5.6%	Developed, Open Space
465	0.6%	Developed, Low Intensity
239	0.3%	Developed, Medium Intensity
28	0.0%	Developed, High Intensity
271	0.3%	Barren Land
54,349	69.5%	Deciduous Forest
189	0.2%	Evergreen Forest
4,399	5.6%	Mixed Forest
479	0.6%	Shrub/Scrub
270	0.3%	Herbaceous
9,672	12.4%	Hay/Pasture
2,538	3.2%	Cultivated Crops
471	0.6%	Woody Wetlands
149	0.2%	Emergent Herbaceous Wetlands

The Laurel Hill Creek Watershed does not have any properties listed as public (*Public Lands)*. The watershed does have five properties listed as State Lands (PAD_StateLands). There are two properties entirely located in Laurel Hill Creek Watershed, Laurel Hill State Park, with 3,872.7 acres, and Kooser State Park containing about 225.0 acres. The remaining three properties are partially located in the watershed. State Game Land 111 contains 10,223.8 acres with about 5,234.22 acres in Laurel Hill Watershed. Laurel Ridge State Park contains 14,437.58 acres with about 3,181.87 acres in the watershed. Finally, there is Forbes State Forest which has 43,204.66 acres in total. Due to the property shapes of Forbes State Forest, it is difficult to estimate an accurate acreage total. Excluding Forbes State Forest, there is a total of

12,513.79 acres of State Land in the Laurel Hill Watershed (PAD_StateLands). The remainder of the watershed is private property (public lands).

Pasture and hay are the second leading land use in the Laurel Hill Creek watershed preserving the agricultural landscape in important

Land Protection

Agricultural Preservation

The Protected Agricultural Lands Database lists three properties located in the Laurel Hill Creek Watershed, totaling approximately 398.4 acres. The easements for protected agricultural land are listed as being held by the local government in Somerset County.

Conservation Lands

Laurel Hill Creek Watershed does not have any recorded conservation easements according to the PAD-US Geodatabase.

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 a place 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, there are no active underground coal mines in operation in the Laurel Hill Creek Watershed. There are 14 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. There is one inactive underground mine, and currently no active underground mines.

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 Laurel Hill Creek Watershed, three Non-Coal Mining sites exist.

Oil & 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 one of two ways—either by 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 permitted in Pennsylvania and it has an extensive history. There were 56 oil and gas sites in the Laurel Hill Creek watershed. There are 16 active well sites, 27 plugged wells, two abandoned, 10 that were permitted and never drilled and one that has a "regulatory inactive" status.

Landfills & Illegal Dumps

Although no permitted landfills exist within the Laurel Hill Creek Watershed, 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 Counties in 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 four illegal dumpsites documented within the Laurel Hill Creek Watershed, although there are frequently new dumpsites reported or sites that lie on private property.

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 two sites regulated under RCRA in the Laurel Hill Creek Watershed. More information about the specific sites is located in Appendix F.

    - 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 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 Laurel Hill Creek Watershed there are currently 12 inactive and eight active underground storage tanks. A listing of all the tanks active, closed and removed is located in Appendix G.

- 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 Laurel Hill Creek Watershed.

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 no land restoration projects that have been identified in the Laurel Hill Creek Watershed.

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. Over the past few years, the Pittsburgh area has had hillsides, taking out houses and roads. 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

Roughly 70% of this watershed is forested, 24% agricultural and 6% is mixed with development types. This watershed has been identified as "Special Protection Waters" by the Pennsylvania Department of Environmental Protection. A DCNR River Conservation Plan was drafted in July, 2005, but never formally finalized or listed on the Rivers Registry. The draft plan identified a number of issues such as sediment and nutrients from farms, sewage from homes and businesses, and loss of water in some of the tributaries and main stem due to intense water withdrawals.

The Jones Mill Dam
(Photo courtesy of Ashley Shuster)

Laurel Hill Creek was listed in America's Most Endangered Rivers Report in 2009 due to water withdrawals. It was nominated in August, 2009 as a Critical Water Planning Area by the Pennsylvania Department of Environmental Protection and has yet to be formally adopted by the Ohio Regional Committee of the State Water Plan under ACT 220. With the re-establishment of the Regional and Statewide Committees in 2019, the Laurel Hill Creek Critical Water Resources Plan has been updated, but the public meeting and subsequent official vote by the Regional Committee will not happen until 2024.

Water Quality

Most of the water quality within this watershed meets the High-Quality or Exceptional Value parameters as set forth by the Pennsylvania Department of Environmental Protection Chapter 93 Code. However, several sections in the upper reaches of the watershed are listed on the 303d of impaired waters due to sediment and nutrients.

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 procedures. These rules spelled out the "designated uses" for the waterways. The designated uses are aquatic life and human health with various subcategories such as contact recreation. If these designated uses are not being attained in a particular waterway, then the stream was deemed to be impaired.

The 2022 Pennsylvania Integrated Water Quality Report lists Laurel Hill Creek as a restoration priority for sediment and nutrient contamination in its upper section. This section of Laurel Hill Creek runs from its headwaters along Route 31 in Bakersville, Somerset County, to Laurel Hill State Park where a majority of the land is farmed. The impaired area is roughly 36 square miles and contains approximately 83 stream miles. The Integrated Report states that either a TMDL, or Alternative Restoration Plan, be developed. The Pennsylvania Department of Environmental Protection created a Draft TMDL that recommends load reductions in sediment and phosphorus. It is unclear whether the TMDL will move forward or a new plan, such as an Alternative Restoration Plan, will be created.

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 offices issue the majority of NPDES permits for sewage, industrial waste, stormwater, concentrated animal feeding operations and biosolids.

There are at least 13 NPDES permits that have been issued in this watershed. A list of the NPDES permits is located in Table 5-4. Eleven have known permit numbers. Further research is needed to determine whether Hidden Valley and Seven Springs permits for sewage, drinking water, or other sites are located within the Laurel Hill Creek Watershed. The New Enterprise Stone and Lime Bakersville Quarry has many violations and further investigations should take place to determine the severity, causes and solutions. It is noted on one of the reports that the US Environmental Protection Agency is asking for additional information.

Nonpoint Sources (NPS)

In Pennsylvania, nonpoint source pollution originates from six key sources: abandoned mine drainage, agriculture, silviculture, urban run-off and sewage systems, residential run-off and atmospheric deposition. The Pennsylvania Department of Environmental Protection is tasked with implementing Pennsylvania's Management Plan and tracking the Commonwealth's NPS pollution reduction efforts. Watershed Implementation Plans (WIP) are developed and 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 water quality standards. The TMDL is a planning tool to address impaired streams listed under Section 303(d) of the Federal Clean Water Act.

In addition to the Section 319 Program, an Integrated Water Quality Monitoring and Assessment Report is sent to the US Environmental Protection that lists the level of attainment of designated uses of Pennsylvania's streams. Also known as the Integrated List, the report combines reporting documents, the 303(d) list and 305(b) report, and lists those waters that are impaired and describes both the source and cause of the impairment.

Currently, the upper section of Laurel Hill Creek from its headwaters to Laurel Hill State Park Lake is listed as impaired for Aquatic Life due to siltation, phosphorus and low DO from agriculture. The Pennsylvania Department of Environmental Protection has identified Laurel Hill Creek as a priority for restoration. It has suggested that either a TMDL or an "Alternative Restoration Plan" be developed. Approximately, 36 square miles or 83 stream miles are impaired for Aquatic Life due to sediment, phosphorus and low dissolved oxygen. It is unclear whether the Draft TMDL will be approved or whether a new plan, such as Alternative Restoration Plan will be developed.

Cranberry Glade Lake, Turkeyfoot Township, Somerset County

<u>Lakes and Reservoirs</u>

There are 16 lakes that are either used for recreation or water supply within the Laurel Hill Creek Watershed. Currently, there is very little water quality data available on the lakes in the Laurel Hill Watershed. Acid deposition has created lower pH in Cranberry Glade Lake. Laurel Ridge Lake along Coxes Creek Road experiences nutrient enrichment from a farm upstream from their campground during times of snowmelt or heavy rain events. Kooser Lake at the state park experiences flushes of alkalinity and limestone particles from the Bakersville Quarry in its headwaters.

Table 5-2. identifies these lakes and the stream they are located on.

TABLE 5-2. RECREATIONAL OR WATER SUPPLY LAKES IN THE LAUREL HILL CREEK WATERSHED

Name	Location	Drains from/to
Laurel Ridge Lake	Somerset Township	Unnamed trib to Laurel Hill Creek
Laurel Hill Creek Reservoir	Jefferson Township	Laurel Hill Creek
Kooser Lake	Kooser State Park	Kooser Run
Lake at Hidden Valley	Hidden Valley	Kooser Run
Pioneer Park	Jefferson Township	Laurel Hill Creek
Laurel Hill Lake	Laurel Hill State Park	Laurel Hill Creek
Jones Mills Run Dam	Laurel Hill State Park	Jones Mills Run
Blue Hole	Forbes State Forest	Blue Hole
Camp Conestoga Lake	Jefferson Township	Laurel Hill Creek
Lake Tahoe	Seven Springs	Allen Creek
Lake Gosling	Seven Springs	Allen Creek
Clairton Lake	Lower Turkeyfoot Township	Sandy Run
Cranberry Glade Lake	Lower Turkeyfoot Township	Cranberry Glade Run
Lake Pyle	Upper Turkeyfoot Township	Sandy Run
Triss Lake	Camp Soles, Rockwood	Lost Creek
Scottyland Camping Resort	Middlecreek Township	Lost Creek

Source Water Protection Plans

The Pennsylvania Department of Environmental Protection conducts assessments of the susceptibility of public water system water sources to contamination. These assessments have been done in accordance with Pennsylvania's Source Water Assessment and Protection Program and the Safe Drinking Water Act. A Source Water Protection Plan or a Wellhead Protection Plan should include the following information: the source water area delineation with hydrogeological information; contaminant source inventory and discussion (agricultural, waste management, transportation route, nonpoint and point discharges); Risk Management and Implementation; Contingency Planning and possible location of new water sources to use for drinking water.

Table 5-3 below lists the Source Water Assessment and Protection Plans approved by the Pennsylvania Department of Environmental Protection. Note that the Somerset Borough Municipal Authority's plan for the surface source is now voided. The water allocation permits to renew their source were rescinded. A plan was completed and approved for the Seven Springs Borough Municipal Authority, but further information has to be found.

TABLE 5-3. SOURCE WATER ASSESSMENT AND PROTECTION PLANS IN THE LAUREL HILL CREEK MANAGEMENT UNIT

Number	Name	Type
PWS# 4560042	Borough of Somerset	8 groundwater wells
PWS# 4560042	Somerset Borough Municipal Authority	Surface - Laurel Hill Creek*
	Seven Springs Water Authority	

*Allocation permit was not renewed for this source

In addition, there are numerous other potable water supplies in the Laurel Hill Creek Watershed that do not have Wellhead Protection Plans or Source Water Assessment/Protection Plans. Some of these are the Hidden Valley well, Laurel Hill Creek and Kooser State Park springs and wells, Scottyland Camping Resort well, and many others. A recommendation in this report should be to canvas the watershed and assist these entities in development protection plans.

Water Availability/Quantity

In August 2009, Laurel Hill Creek was nominated as a Critical Water Planning Area by the Ohio River Water Resources Committee under ACT 220 of the State Water Plan. At that time water withdrawals were from both surface and groundwater sources to supply multiple uses outside of the Laurel Creek basin. It was determined that water use was over the amount of water available in the watershed. To make matters worse, discharges for these withdrawals are also outside the basin.

Currently, the surface water supply is no longer in use at the Borough of Somerset Municipal Authority in Bakersville. However, the amount pulled from the wells has been increased to offset that loss. A formal vote to declare Laurel Hill Creek Watershed a Critical Water Planning Area is due in 2024. There is also a newly formed Jefferson Township Authority in the same vicinity as the Somerset Municipal Authority. It is unclear whether the Jefferson Township Authority is handling sewage or water or both. There is also inadequate information as to the number of other water suppliers in the watershed who have not registered with the Pennsylvania Department of Environmental Protection. A recommendation in this plan would be to canvas the watershed for any and all withdrawals being used for water supply.

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 the Laurel Highlands area, there are 1,664 acres of wetlands. Wetlands are broken down and classified into systems. Within the Laurel Highlands, wetlands are Palustrine, Riverine, or Lacustrine. 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, the Laurel Highlands have 1,036 acres of Palustrine wetlands. Most of these wetlands are forested (527 acres), Unconsolidated bottom (184 acres), scrub-shrub (179 acres), and emergent (145 acres). Forested wetlands are characterized by woody vegetation that is 20 ft tall or taller. Unconsolidated bottom 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. Forested wetlands are characterized by woody vegetation that is 20 ft tall or taller. Finally, emergent wetlands consist of perennial plants, excluding mosses and lichens, that are the tallest lifeform with at least 30% areal coverage.

The Laurel Highlands also contains 447 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).

Other than Palustrine and Riverine wetlands, Lacustrine wetlands make up 181 acres of the Laurel Highlands. Lacustrine systems include wetlands and deepwater habitats within a topographic depression or a dammed river channel, lacking trees, shrubs, persistent emergents, and emergent mosses or lichens with 30 percent or greater coverage, and total an area of at least 20 acres (National Wetlands Inventory, 2019).

A very large wetland banking system was recently completed in the headwaters of Laurel Hill Creek in Jefferson Township, Somerset County. It was because of the Pennsylvania Turnpike Commission's expansion of the Turnpike through the watershed.

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 are 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) was used to determine if the area was developed, natural, or farmland. The Laurel Hill area has a total of 3,452 acres of floodplains. Of that 3,452 acres, 282 acres are developed, and 347 acres are farmland. The remaining 2,822 acres are natural. It is critical that these areas remain undeveloped. Development in floodplains annihilates 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 2,822 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 (Source Water Protection).

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. In 1989, the Somerset Conservation District provided water quality data for portions of the Laurel Hill Watershed as a historic baseline to be compared to future monitoring (Largent, 1989). The Municipal Authority of Westmoreland County has conducted

sampling at two locations throughout the watershed: Laurel Hill Creek and Ramcat Run.

Biological Sampling

A freshwater sponge found in Kooser Run

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. The last known benthic macroinvertebrate assessments for Laurel Hill Creek occurred in 2003 and were reported in the Laurel Hill Creek River Conservation Plan (Pennsylvania DCNR, 2005). Eleven sections of the mainstem of Laurel Hill Creek along with 12 tributaries were sampled. In 2011, and 2014-2016, extensive research was conducted on 20 headwater streams within Laurel Hill Watershed to assess Brook Trout populations (Argent, Kimmel, & Gray, 2018). The study found overall declines in fish populations.

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 recreation. Levels of E. coli and total coliform are tested for drinking water and water contact recreation. Fecal Coliform testing can also be conducted to monitor compliance of NPDES permit discharges. This is necessary as there are known facilities that consistently exceed their permitted discharges in the watershed. One location within the Laurel Hill Watershed is tested for bacteria through the

Mountain Watershed Association's Swimmable Waters Program. Any additional summer swimmable waters that are popular in the watershed need to be tested for E. coli for the protection of the community.

Dataloggers

Between 2011 and 2017, two dataloggers were used to gather much needed baseline water quality data for Laurel Hill Creek. 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 were used to monitor 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 Upper 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.

Through the years of colonization, invasive evaders 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 the 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 remaining in Pennsylvania have been maintained in the

Youghiogheny River Watershed due to the numerous amounts of state park and forest lands.

The Laurel Hill Creek Watershed is located in portions of the Appalachian Hemlock Northern Hardwood Forest and North Central Interior Floodplain Forest. Appalachian Hemlock Northern Hardwood Forest are typically found containing cool, moist slopes containing Eastern Hemlocks, maple, beech, Tulip Poplar and birch species. The North Central Interior Floodplain Forest is 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 Greatest Conservation Need

Several species are classified as rare, endangered, or threatened reside in Laurel Hill Creek Watershed. These include several species of plants, fish, amphibians, reptiles, birds, and mammals.

Species of Special 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 natural resource agencies are to be contacted if any land disturbance activities are planned in order to determine if those activities could potentially impact any species of special concern or their habitat.

Within the Laurel Hill Creek Watershed eight 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 habitat 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.

Within the Laurel Hill Creek Watershed there are 61 species identified as SGCN. Six, have been identified as globally or regionally important species, including three birds (Cerulean Warbler, Long-tailed Duck, and Lesser Scaup), one butterfly (West Virginia White), one moth (Splendid Palpita), and one sensitive species not identified in order to protect the species.

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 spread 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 its 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 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 **Waterthyme** 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 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 by contact with it. 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, Canda, 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 branched stems with fibrous roots that fan-like underwater leaves that can be submerged 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 to spread 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 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. Similar to Sawtooth Oak, many people do not see Wisteria as an invasive species, 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 borers have 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 Western Pennsylvania Conservancy and Mountain Watershed Association completed a mussel survey in 2021. This clam can alter the ecology of aquatic systems making it less hospitable to native assemblage 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 with detrimental impacts. It caused a fungal disease that virtually eliminated mature American Chestnut trees.

- **New Zealand Mud Snail (Potamopyrgus antipodarum)** is currently suspected to be present in Cranberry Glade Lake, Somerset County, a tributary to Youghiogheny River via Cranberry Glade Run and Laurel Hill Creek. New Zealand Mud Snail is extremely prolific, and consumes organic matter in the benthic environment of lakes and streams, disrupting the native food chain. Pennsylvania Fish and Boat Commission is working to confirm reports of this invasive snail in Cranberry Glade Lake.

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. Even 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 the native species. Even roads and 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 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 forests 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**
  The threats that these activities pose, their supporting infrastructure such as pipelines, access roads, etc. are also of concern. Some of the 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 accidently 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 that 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, transport pollutants, lead to an increase in peak flows that can lead to flooding, channel erosion and water temperature, 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 help with nutrient exchange, modify hydrology, stabilize 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 accidently collected and are often injured or killed during the collection process. This includes plants being 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 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 a harvest limitation, which has been done in Maryland for American Ginseng. It 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 to tourism today and probably even more 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. If a designated path is available, it needs to be used 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 in designated areas by staying 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. NHAs can be identified according to the following classifications (Smith, 1998, and Wagner and Coxe, 2000):

- **Biological Diversity Area (BDA**) - An area that contains plants, animals, or natural communities of state or federal special concern, and/or high-quality examples of natural communities or exceptional native diversity.

- **Landscape Conservation Area (LCA**) - A large contiguous area important because of its size, open space, habitats, and/or inclusion of one or more Biological Diversity Areas, and although including a variety of land uses, has not been heavily disturbed and thus retains much of its natural character.

A Natural Heritage Inventory (NHI) was conducted in Somerset County in 2006, to catalog important biological resources and to identify and map the Natural Heritage Areas within each county. A total of 11 BDAs and 1 LCA were identified in the Laurel Hill Watershed. The designated areas are listed in Table 5-4 with a description of each site in Appendix J.

TABLE 5-4. NATURAL HERITAGE AREAS IN THE LAUREL HILL CREEK WATERSHED

Site Name	Management Type	Significance
Blue Hole Run	BDA	Exceptional
Humbert Floodplain	BDA	Exceptional
Jones Mill Run	BDA	Exceptional
Laurel Hill Creek	LCA	Exceptional
Barronvale	BDA	High
Cranberry Glade Lake	BDA	High
Jimtown	BDA	High
Laurel Hill State Park	BDA	High
Laurel Hill Tunnel	BDA	High
Confluence Valley	BDA	Notable
Indiantown Slopes	BDA	Notable
Shafer Run	BDA	Notable

The information recorded in NHI should be considered during planning processes to ensure the protection of these resources. Appropriate buffers should be established around BDAs to protect wildlife, maintain hydrology and prevent invasive species from entering the areas.

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 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 IBI, it 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.

There are portions of two IBAs within the Laurel Hill Management Unit (see Table 5-5). Both are Pennsylvania state prioritized sites. The Youghiogheny Valley, Ohiopyle State Park IBA, has a recognized site status while the Laurel Ridge Forest Block has a potential site status.

TABLE 5-5. IMPORTANT BIRD AREAS IN THE LAUREL HILL CREEK MANAGEMENT UNIT

IBA	Acres	Status	Priority
Youghiogheny Valley, Ohiopyle State Park	157,319	Recognized	State
Laurel Ridge Forest Block	65,810	Potential	State

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, and sites must meet at least one of these criteria 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 habitats.

- 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 or 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 or 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 Laurel Hill Watershed the Chestnut Ridge/Laurel Ridge IMA has been designated. The area encompasses 500,000 acres of federal, state, and local lands open to the public in addition to some private lands that extend beyond the Youghiogheny River Watershed. It has been identified because it sustains a confirmed viable local population of a SGCN, and the species or subspecies regularly occurs at the site during one or more seasons. It also includes a wild population of mammals that can be viewed in their natural habitat and has a natural area associated with an established educational program that interprets the natural history of resident mammals. The ridges are the dominant features of the Laurel Highlands, and the steep and heavily deciduous forests in the area provide a variety of other general riparian and upland habitats, as well as caves and rocky

areas. There are several state parks and Forbes State Forest within this IMA. Noteworthy mammals residing in the area include the Least Shrew, Eastern Small-Footed Myotis, Northern Myotis, Indiana Myotis, Appalachian Cottontail, Allegheny Woodrat, Northern River Otter, Bobcat, and Least Weasel. Primary threats to the area include excessive past logging that left lasting effects, development encroachment, and the increasing number of vacation homes.

CULTURAL RESOURCES

The Laurel Hill Creek Watershed is located in an area that is widely known for its vast wilderness, recreational opportunities and deep history. As part of the Laurel Highlands region, the area is often referred to as Pittsburgh's playground since it is within an hour's drive from Pittsburgh proper due to easy access via the Pennsylvania Turnpike.

Recreational Resources

It has three historic, covered bridges and is home to two four-season resorts (Hidden Valley and Seven Springs). Numerous campgrounds and cabins are found throughout the basin as well as Camp Conestoga, a Scouts BSA Camp located in Laurel Hill State Park, and Camp Soles on Lost Creek in Middlecreek Township.

Trails

Trails are greenways between communities providing a vital connection from one small town to the next. These pathways are an asset to the Indian Creek and Youghiogheny River Watershed communities that not only provide users with recreational opportunities, but can be used as transportation passageways. As a region that experiences low-income levels and a higher quantity of families living in poverty, it benefits from the trail as legitimate transportation corridors.

There are 25 trails located or that pass through the Laurel Hill Creek Watershed. They are identified in Appendix K.

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 between being free to having to pay an access or user's fee.

Within the Laurel Hill Creek Management Unit there are three Pennsylvania State Parks (Kooser, Laurel Hill, and Laurel Ridge) and one state forest. In Pennsylvania, state parks are made available free for all visitors. However, some concessions within the parks may have a user fee, such as boat or bicycle rentals.
Other recreational opportunities in the Laurel Hill Creek Watershed include Seven Springs Resort, Highlands Sporting Clays, Beggs Park, Kings Covered Bridge Park, and Kingwood Elementary School.

- **State Forest**
  Forbes State Forest is the only Pennsylvania State Forest within the Youghiogheny River Watershed; however, its territory extends beyond the Youghiogheny Watershed into that of the Conemaugh River. It is located in parts of Fayette, Somerset, and Westmoreland Counties and spreads across the ridges of the Laurel Highlands region, encompassing over 60,000 acres. It is managed for pure water, recreation, scenic beauty, plant and animal habitat, sustainable timber and natural gas, and many other uses and values following the Forbes State Forest Resource Management Plan. Forbes State Forests has over 360 miles of shared-use trails and forest roads including 11 miles of the Laurel Highlands Hiking Trail. There are also 115 miles of groomed snowmobile trails for use in the winter. The state forest recreational activities such as wildlife watching, sightseeing, hunting, fishing, mountain biking, cross-country skiing, snowshoeing, and horseback riding are permitted. Primitive camping is also permitted where posted. A permit is required for longer stays. In addition, there are six motorized sites available, but they require a permit which can be obtained at the district office in Laughlintown or online through the state forests website.

- **State Parks**
  Laurel Hill State Park is the largest of the three state parks encompassing 4,062acres. The park features a 63-acre recreational lake for swimming, boating, and fishing. In addition, the park has a variety of picnicking options and trails. One of the oldest hemlock forests is featured along one of the park's various trails.

  Kooser State Park is a 250-acre park in the Laurel Highlands region of Pennsylvania that attracts visitors for its beautiful trout stream that flows the length of the park. The park's original design was stamped by the Civilian Conservation Corps project in the 1930s which established the existing lake. This small, quaint park is suited for family outings, small groups, picnicking, fishing, hiking, camping, and cross-country skiing.

  Laurel Ridge State Park/Laurel Highlands Hiking Trail is a 13,625-acre park that stretches along the Laurel Mountain from Ohiopyle to the Conemaugh River Gorge near Johnstown, Pennsylvania. The main feature of the park is the 70-mile Laurel Highlands Hiking Trail. Features

Three generations of backpackers at the Route 653 shelter area of the Laurel Highlands Trail

included Adirondack shelters, tenting area, water stations and pit toilets. Shelters can be reserved ahead of time through the state park reservation system.

Camping

Camping is a popular recreational activity that increased in popularity due to the Coronavirus pandemic in 2020 to 2021. In the Laurel Hill Creek Watershed there are a variety of campgrounds available plus two youth camps, one of those being a scout camp. Information about amenities and programs is available on each camping sites' website. There are also a variety of cabin and Airbnb rentals available in the area.

Boating

The Laurel Hill Creek Watershed offers many options for boating. 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. Laurel Hill Creek Reservoir is a great place for flat water adventures. From Trent, near Laurel Hill State Park, to Ursina, 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 PA Fish and Boat Commission.

In total, there are more than 18 miles of continuous river miles with no dams. Confluence is located at the convergence of the Youghiogheny River, the Casselman River, and Laurel Hill Creek.

Several of the smaller tributaries are considered boatable after heavy rains or a spring melt. The American Whitewater's River website has information related to Laurel Hill Creek boating information, including flows, directions to access points and any important alerts.

Laurel Hill Creek Reservoir is a man-made reservoir where limited boating is available. Rentals are available through Hazelbakers at the state park beach. Canoes, kayaks, SUP Boards are available to rent. A valid launch permit is required to boat on Laurel Hill Creek Reservoir.

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 goal, 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 if fishing on known trout streams a trout stamp is required. Resident and non-resident licenses are available to purchase at a variety of sporting goods stores and online through the PFBC website.

Laurel Hill Creek is a destination fishery among anglers who visit the Laurel Highlands region of Pennsylvania. First off, the entire watershed is designated as a High-Quality Coldwater Fishery with four streams receiving Pennsylvania's highest stream designation of Exceptional Value. Native Brook Trout are found in all of the tributaries of Laurel Hill Creek. For the regular trout season, the PFBC stocks Rainbow and Brown Trout the entire length of the main stem of Laurel Hill, as well as in several tributaries: Allen Creek, Jones Mill Run, Kooser Lake, Kooser Run, Shafer Run. The regular trout season starts on Opening Day and ends at midnight on Labor Day.

A fly fisherman on Buck Run

There are two Special Regulation Delayed Harvest Artificial Lures areas located on the main stem of Laurel Hill Creek. Open to fishing year-round, it is permitted on a 24-hour basis. The minimum size is nine inches and the daily creel limit is three trout from June 15 through Labor Day. From the day after Labor Day to June 14, the creel limit is zero. One Delayed Harvest area is located in Bakersville at the Jimtown Bridge (T-364) 2.33 miles to Laurel Hill State Park Lake. This section is also 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, larger trout, approximately 2-3 years old, measuring between 14 to 20 inches will be distributed among the selected waters. The second Delayed Harvest Artificial Lures section (not a Keystone Select Trout Water) is located from the footbridge on State Game Lands 111, Humbert, 1.26 miles downstream to Paddytown Hollow Run.

There are also three locations where Stocked Trout Waters are open to fishing year-round: Laurel Hill State Park Lake, Blue Hole (its confluence with Garys Run to its mouth) and Fall Creek (its confluence with Ansell Run to its mouth).

Cranberry Glade Lake has the following fish species: Black Crappie; Yellow Perch; Bluegill; Pumpkinseed; Northern Pike; Largemouth Bass; Brown Bullhead; Common Carp, and Golden Shiner.

In addition to trout, the lakes at Laurel Hill and Kooser State Parks provide many species of fish: Northern Pike; Bluegill; Pumpkinseed; Black Crappie; Yellow Perch; Rock Bass; Largemouth Bass; Brown Bullhead; Yellow Bullhead; White Sucker; Golden Shiner; and Carp.

Hunting

The entire Laurel Hill Creek Management Unit is located within the 2C Wildlife Management Unit for hunting as designated by the Pennsylvania Game Commission (PGC). 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. More information about hunting seasons in Pennsylvania is available at the PGC website. However, prior to hunting 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. Portions of State Game Lands 111 are located within the Laurel Hill Creek Watershed.

The entire Forbes State Forest is open to hunting with the exception of the Natural Areas and public picnic areas. Within the state forest, three tracts Barron, Blue Hole, and Laurel Mountain have management practices in place to improve conditions. These areas are open to hunting.

Additional private lands are open to hunting via the Hunter Access Program (HAP). Created in 1936, the HAP was designed to increase hunting opportunities, improve game conditions and improve wildlife habitat on farms. Private lands are made open to hunters via a term-lease agreement between landowners and the PGC. There are numerous properties enrolled within the Laurel Hill Creek Watershed.

Hunting is also permitted in the majority of Pennsylvania State Parks. Laurel Hill State Park has 2,200 acres and Laurel Ridge State Park has 13,625 acres where hunting, trapping, and dog training are permitted during the appropriate seasons. The parks' websites have additional information.

Barronvale Covered Bridge
Photo courtesy of Ashley Shuster

Covered Bridges

Somerset County, Pennsylvania, is known for its covered bridges. There are three covered bridges in the Laurel Hill Creek Watershed: Kings Covered Bridge, Barronvale and Lower Humbert Covered Bridge.

Golfing

There are three golf courses located within the Laurel Hill Creek Watershed. Highlands Golf Clubs at Seven Springs and Hidden Valley and Kings Mountain.

The Highlands Golf Clubs at Seven Springs and Hidden Valley are challenging courses offering a high-level experience without requiring membership. The Seven Springs Course is a par 71, mountaintop terrain course with just over 6,500 yards. It is a beginner-friendly course, but also offers a challenging round for advanced players. The Hidden Valley course is an 18-hole course with tree-lined fairways. Like the Seven Springs course, it is a challenging yet friendly course to all levels of golfers (Highlands Golf Clubs).

Kings Mountain is a public golf course outside Rockwood, Pennsylvania, that offers a nine-hole, par 36 golf course nestled in between Forbes State Forest and Laurel Ridge State Park. In 2017, the Vin De Matix Winery opened on the lower level of the clubhouse.

Sporting Clays and Much More

In addition to the golf clubs, the Highlands Sporting Clays offers one of the best facilities in the country for novice and competitive shooters of all ages (Highlands Sporting Clays). Sporting clays is a practice in patience and precision. Unlike skeet shooting, the sporting clays targets are thrown at a variety of angles, speeds, elevations, distances and trajectories to mimic hunting conditions. Highlands offers three different courses—two standard and one super sporting course with multiple shooting stations. They also offer a practice area. The facility hosts a variety of tournaments, private lessons as well as corporate and non-profit events (Highlands Sporting Clays).

Out of the Sporting Clays Lounge, additional recreational opportunities are also available such as snowmobile and snowshoe tours, and fishing opportunities, including fly fishing guide services.

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 could 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.

Laurel Hill State Park offers a wide variety of environmental education and recreational programs. Through hands-on activities, guided walks and evening programs, participants gain appreciation and understanding of the park's natural and cultural resources and enjoy diverse recreational opportunities. Curriculum-based environmental education programs are available to schools and youth groups. Teacher workshops are available.

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 out of the house. 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.

Monongahela 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, though 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 Turkeyfoot Path (Figure 5-x). 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.

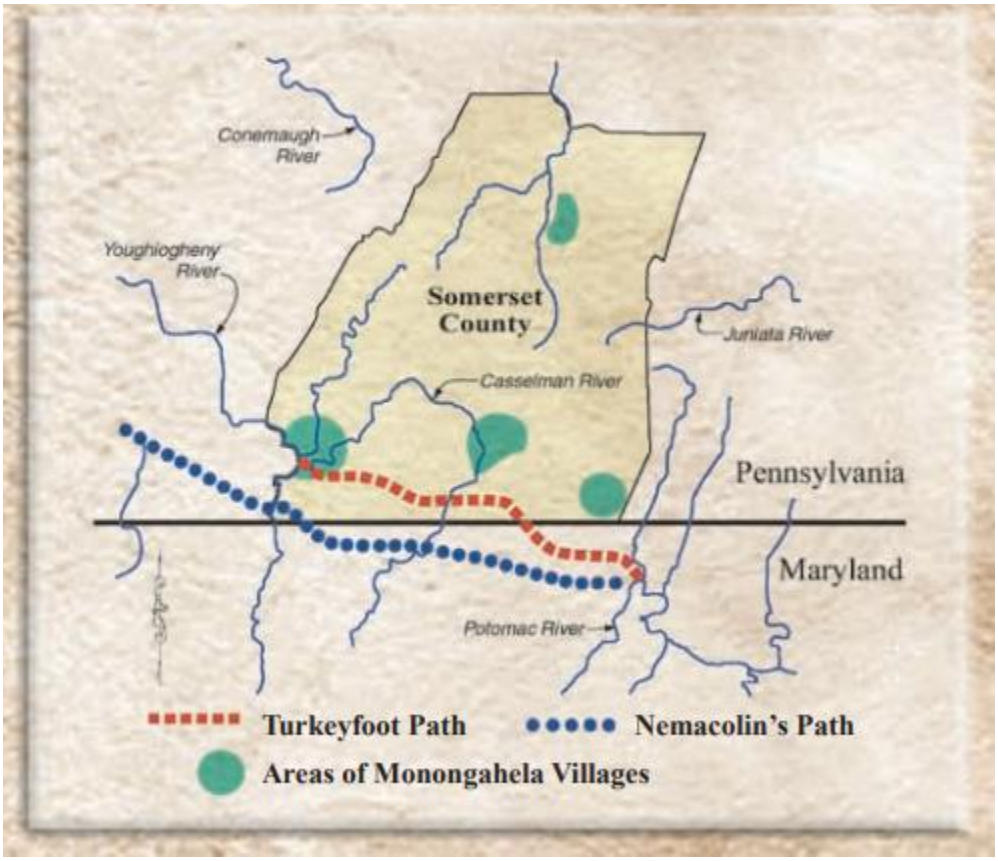


Figure 5-1: Monongahela Villages' locations and trading paths in Somerset County of the Youghiogheny Watershed. Image taken from http://www.phmc.state.pa.us/portal/communities/archaeology/files/mysteryofmonindians.pdf

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 a permanent home. The name Ohiopyle comes from the Lenape, members of the Delaware nation. Their name for the area was "ahi opihəle," 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 (near current day Waterford, Pennsylvania) to tell them to stop the occupation of lands claimed by the English.

Laurel Hill Creek drains the east slope of Laurel Hill in the Laurel Highlands and flows to Confluence where it joins the Casselman River. It flows through three state parks, Forbes State Forest and small private holdings. The creek has clean water, fish, and wildlife unscathed by the abandoned mine drainage that plagues most southwestern Pennsylvania streams. The Laurel Hill Valley escaped the unbridled logging that swept through Pennsylvania far longer than many areas (Pennsylvania DCNR, 2023). The upper portion of the watersheds, steep stream valleys and rugged hills made logging difficult until technology laid the tracks to enable the trees to be hauled to mills. Powerful, slow locomotives climbed the switchback tracks through Laurel Hill and hauled the logs to mills. From 1886 to 1940, logging companies clear-cut the trees, leaving behind a wasteland of brambles prone to forest fires and flooding. Only the Hemlock Trail Natural Area escaped the loggers’ reach.

As the water heads downstream, the creek swells to become Laurel Hill Lake, a park attraction formed by a broad dam built during the Great Depression by men who found work in the Civilian Conservation Corps (Fraser, 2010). The water travels several miles downstream from the outflow and is crossed by two covered bridges. Soon after, the water is impeded again at Whipkey Dam where a 19th-century gristmill once stood. Below this dam, the waters enter its most remote stretch as it

passes through State Game Lands. After the creek begins to widen, it passes Humbert where a third covered bridge is located. It then winds through Ursina and drains into the Yough.

Blueprint drawings of one of the original CCC camp structures at Laurel Hill State Park

Laurel Hill Creek historically suffered from excessive water withdrawals. The creek lacked the regulatory safeguards to protect it from excessive water withdrawals for development and energy extraction. The Pennsylvania Fish and Boat Commission has been forced to relocate stocked trout due to excessively high-water temperatures associated with low flows. The historically largest user, Somerset Municipal Authority, supplies water outside the Laurel Hill Creek Watershed to the Borough of Somerset and two state prisons despite available water supplies from the borough's watershed (American Rivers, 2009). The borough stopped withdrawing from Laurel Hill Creek when the Quemahoning Pipeline was completed (Robbins, 2009). Other heavy water users include the Seven Springs Mountain Resort.

Historical Sites

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

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 Laurel Hill Creek Watershed there are six listed sites on the National Register of Historic Places, of which three are covered bridges.

- **Kooser State Park Family Cabin District**
  Reason for listing: Emergency Conservation Work, Architecture in Pennsylvania State Parks
  Listing Date: 2/12/1987
  Property Category: District
  Civilian Conservation Corps Camp S-99

- **Barronvale Bridge**
  Reason for listing: Covered Bridges of Somerset County Engineering and Transportation
  Listing Date: 12/11/1980
  Property Category: Structure

- **King's Bridge**
  Reason for Listing: Covered Bridges of Somerset County Engineering and Transportation
  Listing Date: 12/11/1980
  Property Category: Structure

- **Lower Humber Bridge**
  Reason for Listing: Covered Bridges of Somerset County Engineering and Transportation
  Listing Date: 12/10/1980
  Property Category: Structure

- **Laurel Hill RDA**
  Reason for Listing: Emergency Conservation Work, Architecture in Pennsylvania State Parks
  Listing Date:5/18/1987
  Property Category: District

- **Miller's Store** (Trent House and General Store)
  Reason for Listing: Commerce, Architecture
  Listing Date: 7/24/1982
  Property Category: Building

The historic Trent House Inn