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Section A › Manmade Resources

The Turtle Creek Greenway spans four municipalities: Trafford Borough, Penn Township, the Municipality of Monroeville and the Municipality of Murrysville.

Population

The four municipalities comprise a very urban area, with a population of 71,048 per the 2000 Census, as follows:

- 🌳 Trafford Borough – 3,236
- 🌳 Penn Township – 19,591
- 🌳 Monroeville – 29,349
- 🌳 Murrysville – 18,872

What is a manmade resource?

-A manmade resource includes anything that does not exist naturally. For purposes of this plan, manmade resources includes population, land use, parks and recreation, historic and cultural resources, and schools.

Existing Land Use

The Turtle Creek Greenway primarily consists of undeveloped land full of steep slopes, wetlands, floodplains, and open space. However, some of the parcels are classified as other land uses based on County Tax Assessment data and field views, as shown on **Map 2.1: Land Use**.

Agriculture

There are six parcels classified as agriculture. Five parcels are located within Murrysville and one is located in Penn Township. The parcel in Penn Township is approximately 65 acres and is enrolled as part of an Agricultural Security Area (ASA). ASAs are lands enrolled in a statewide designation program that was established to promote and conserve agricultural land as well as the agricultural lifestyle and heritage across the Commonwealth. Local municipalities work in cooperation with land owners to secure the land and the right to farm. An ASA can be comprised of several different farms, but each farm must be 10 acres each (they do not need to be adjacent) and collectively, the ASA must meet a minimum of 250 acres. To be considered part of an ASA, the land must be viable agricultural land including pasture, woodland, and cropland. ASA properties are reviewed every seven years to validate their eligibility. One ASA, which totals more than 64 acres, is located within the project area, as shown **Map 2.1: Land Use**.

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Commercial

There are five parcels classified as commercial and are located sporadically throughout the Greenway. Within Trafford and Murrysville, the Greenway Corridor is very narrow, due to the developed nature of the adjacent parcels, many of which are commercial in nature.

Industrial

There are four parcels classified as industrial (mini-storage facilities, etc.), located in Murrysville and Monroeville.

Public

There are 21 parcels classified as public, meaning that the property is owned by one of the municipalities. Each of the municipalities except for Penn Township owns public parkland within the Greenway.



Right-of-Way

The Turtle Creek Greenway encompasses the Turtle Creek Industrial Railroad (TCKR) corridor, which is an active rail line; in addition, a section in Trafford Borough is owned and operated by Norfolk Southern. The Greenway also spans the Pennsylvania Turnpike/Interstate 76 and as such, there are a number of parcels that are owned by the Pennsylvania Turnpike Commission as right-of-way.

Utility

There are five parcels classified as Utility, most of which are part of the Franklin Township Sanitary Authority's sewage treatment plant.

Single Family Residential

There are 27 parcels classified as single family residential within the Greenway. These are parcels that contain a single family home, whereby the Greenway only encompasses the undeveloped portion of the lot.

Vacant Land

There are 23 parcels classified as vacant land, which includes all land that is currently undeveloped. One of these parcels is owned by the Regional Trail Corporation (RTC), alongside Saunders Station Road in Monroeville, and provides public access to the Greenway.



Parks and Recreation

As mentioned earlier, each of the municipalities owns and operates public parks within the Greenway. The following is a description of each of the public recreation areas that can be found within the Turtle Creek Greenway, as shown on **Map 2.2: Parks and Recreation**.

Penn Forest Football Club (Trafford)

The Penn Forest Football Club is currently leasing the recreational fields, owned by CBS Corporation (formerly Westinghouse) in Trafford Borough. The multi-use recreational fields are located under the Westinghouse Bridge that carries S.R. 130 over Turtle Creek into Trafford.

B-Y Park (Trafford)

At almost 21 acres, Trafford's B-Y Park has been renovated into one of the showcase parks in the area. The Park is located on S.R. 130 with the main entrance across the street from the Christian Life Church. The beautiful B-Y pond is the centerpiece of the park and provides patrons with fishing and ice skating opportunities. Three pavilions are located within the park; each one contains picnic tables and has electric and water available for park visitors. The pavilions are managed by Trafford Borough and are available for rent during spring and summer months. Other amenities include picnic tables, barbecue pits, and all types of outdoor fun. As a volunteer recycling community, the Borough offers recycling containers for paper and cans at the back entrance of the park along Forbes Road (Trafford Borough, 2010).



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Kelvington Park (Monroeville)

While not within the Greenway's boundary, Kelvington Park is located just north of the boundary in Monroeville. As Monroeville's Inter-Park Trail System shows proposed trail connections between the Greenway and the Park, it is included on the maps in this plan. Kelvington is a 48-acre conservation park, which features baseball fields as well as a hiking trail.



Unnamed Parkland (Monroeville)

The Municipality of Monroeville owns a piece of property within the Greenway that is unnamed parkland.

Beechwood Park (Monroeville)

Located behind Ramsey School on Ramsey Road in Monroeville, Beechwood Park is an 83-acre community park that offers soccer fields, basketball courts, tennis courts, baseball fields, and a playground and picnic area.

Beechwood also features a hiking trail through wooded forests.

Bel Aire Pool (Monroeville)

Bel Aire Pool is located near Valley Park in Monroeville off Abers Creek Road. A special use park, Bel Aire is 16 acres and facilities include basketball courts, pavilions, playlots, a community pool, and volleyball courts.

Heritage Park (Monroeville)

Heritage Park is a 155-acre park located off Saunders Station Road on Cypress Drive in the Heritage Plan. A master site plan was completed for the park in 2000 as part of the Monroeville Comprehensive Recreation, Park, and Open Space Plan. A neighborhood park, Heritage Park offers basketball courts, baseball fields, tennis courts, and a playground and picnic area. Heritage Park also features a hiking trail, with access to the trail from Saunders Station Road.

Valley Park (Monroeville)

Valley Park, 17 acres, is located along Abers Creek Road in Monroeville. A special use park, facilities include a deck hockey rink, softball fields, and soccer fields.

Alpine Park (Monroeville)

Alpine Park, 69 acres, is located at the end of Altaview and Luzerne Drives in Monroeville. A neighborhood park, facilities include playgrounds, basketball courts, pavilions, softball fields, and tennis courts.



Pleasant Valley Park (Murrysville)

Pleasant Valley Park is a 262-acre park that features woodlands, open fields, hilltops, and remote valleys. Located in Murrysville off Pleasant Valley Road, the park is a new addition to Murrysville park system. Murrysville purchased the parkland in 1999 to meet the growing recreational needs of the community. Due to its topography, the park was not developed as an active park, but rather as a passive open area. A parking lot was constructed in 2005 and a network of trails is proposed, with a 2.5 mile section currently open for public use. While there has been discussion in the past about selling the land, Murrysville residents have expressed a desire to maintain the land as a passive recreation area. Currently, Westmoreland County and Murrysville are in the process of trying to acquire additional property that would connect Pleasant Valley Park with Duff Park and expand its greenway and open space network (see [Figure 2-1](#)).

Duff Park (Murrysville)

Duff Park is a 148-acre hilly and heavily wooded, natural area located in Murrysville and serves as the ending point for the Turtle Creek Greenway. The park parallels Route 22, with its main entrance located off of School Road, approximately 1,000 feet south of the intersection with Route 22. Known for its old growth deciduous forest and for its variety and numbers of native wildflowers, Duff Park was recently designated by DCNR as a Wild Plant Sanctuary.

Numerous trails offer park goers varying trail difficulties from a relaxing walk to a strenuous workout. For example, the Funk Trail provides a flat walking and biking route



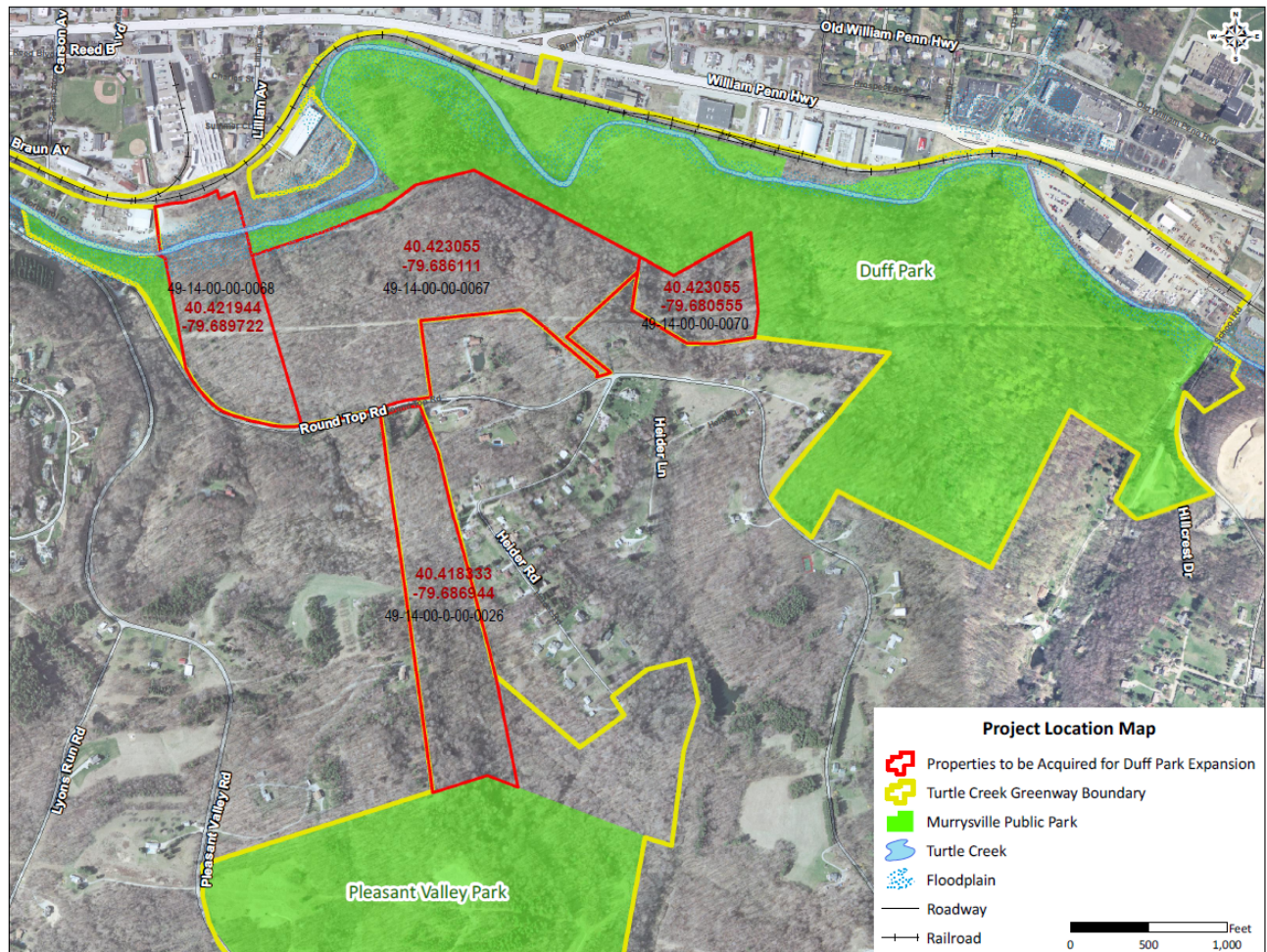
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along Turtle Creek for about 1.5 miles and then goes up an incline until it reaches Round Top Road. Connecting trails provide the walker or biker with easy walking or strenuous climbs depending on which one is selected. A pavilion provides a quiet site for a picnic, or it may be rented for group activities (Municipality of Murrysville, 2010).

Westmoreland County is planning to expand Duff Park through acquisition of additional parcels. In 2010, the County was approved for a grant through DCNR for acquisition funding. The proposed expansion is approximately 100 acres over four (4) separate parcels. The County is hoping to use the value of the one (1) donated parcel to provide matching funds for the other three (3). **Figure 2-1** shows the proposed expansion and the parcels to be acquired.

Figure 2-1: Proposed Duff Park Expansion



Historic and Cultural Resources

There are no eligible or listed historic resources located within the Turtle Creek Greenway.

Schools

The Greenway crosses through three school districts: Penn-Trafford, Franklin Regional, and Gateway.

Penn-Trafford School District

Penn-Trafford School District serves Penn Township and Trafford Borough (in addition to Penn Borough and Manor Borough) and had an enrollment of 4,370 in 2008-2009. Penn-Trafford includes one high school (Penn-Trafford High School), two middle schools (Penn Middle and Trafford Middle), and six elementary schools (McCullough, Level Green, Sunrise Estates, Trafford, Harrison P, and Ryan Hunton).

Franklin Regional School District

Franklin Regional School District serves Murrysville (in addition to Delmont and Export Boroughs) and had an enrollment of 3,728 in 2008-2009. Franklin Regional includes one high school (Franklin Regional High School), one middle school (Franklin Regional Middle School), and three elementary schools (Heritage, Newlonsburg, and Sloan). All of the schools are located at the campus in Murrysville at the intersection of School Road and Old William Penn Highway except for Sloan Elementary.

Gateway School District

Gateway School District serves Monroeville (as well as Pitcairn Borough) and had an enrollment of 4,067 in 2008-2009. Gateway has one high school (Gateway High School), two middle schools (Moss Side Middle School for grades 5 and 6 and Gateway Middle School for grades 7 and 8), and five elementary schools (Evergreen, Dr. Cleveland Steward, Jr., Pitcairn, Ramsey, and University Park). In 2007, Gateway reconstructed its high school complex, which also includes the Monroeville Public Library.

Future Land Use

Allegheny County, Westmoreland County, Monroeville, Murrysville and Penn Township all have adopted comprehensive plans, as well as comprehensive parks and recreation plans, which identify the need to preserve the Turtle Creek Greenway as open space and for public recreation. However, comprehensive plans are not enough to ensure that this Greenway remains undisturbed for future generations.

Penn Township and the Municipality of Murrysville experienced the largest population increases in Westmoreland County between 1990 and 2000 as well as over 700 new housing units, each. While Trafford Borough experienced a slight population decline, they saw an increase in homes as well. Monroeville had a slight population increase between 1990 and 2000 (less than 1%) but saw an increase of 515 housing units. All three Westmoreland County municipalities are located in the Urban/Suburban Development Triangle (Westmoreland County Comprehensive Plan).

The development pressure within these municipalities is likely to continue, despite the economic downturn. With so much of the Turtle Creek Greenway classified as vacant land, there is a real development threat to the Greenway, mostly as a result of new residential development.

Section B › Natural Resources

Water Resources

Precipitation is water that falls from the sky as rain or snow. The amount, duration, and location of precipitation across the watershed strongly influences the movement of the water. While much of the precipitation evaporates directly back into the atmosphere, some infiltrates the soil or flows over the earth's surface as runoff.

The amount and rate of infiltration depends upon vegetation, land cover, texture and porosity of the soil, steepness of the slopes, and intensity and duration of the precipitation event. Upon infiltrating into the soil, the subsurface water is either absorbed by the roots of vegetation or it continues to move and becomes part of the groundwater system.

The water that is absorbed by roots travels through the plant and transpires, which cools the air as it becomes available for condensation and cloud formation. This amount is not insignificant as the average mature shade tree releases between 34 and 70 gallons of water each warm weather day. This capability to remove subsurface water is useful when planning for stormwater infiltration because an area planted with trees or other vegetation will be able to accommodate more stormwater volume than one without trees—efficiently putting the water back into the atmosphere.

The precipitation that is not absorbed by plant roots percolates through the soil and fills the porous rock layers beneath the earth's surface, becoming an integral part of recharging the groundwater supply. The differing geologies of watersheds determines the volume of the groundwater that is stored; this stored water serves to recharge and supply well, seeps, springs, streams, and rivers.

What are natural resources?

-Natural resources occur naturally within environments that exist relatively undisturbed by mankind, in a natural form. For purposes of this plan, they include water resources, natural areas, geology, soil, steep slopes and landslide prone areas, and ridge tops and scenic view sheds.

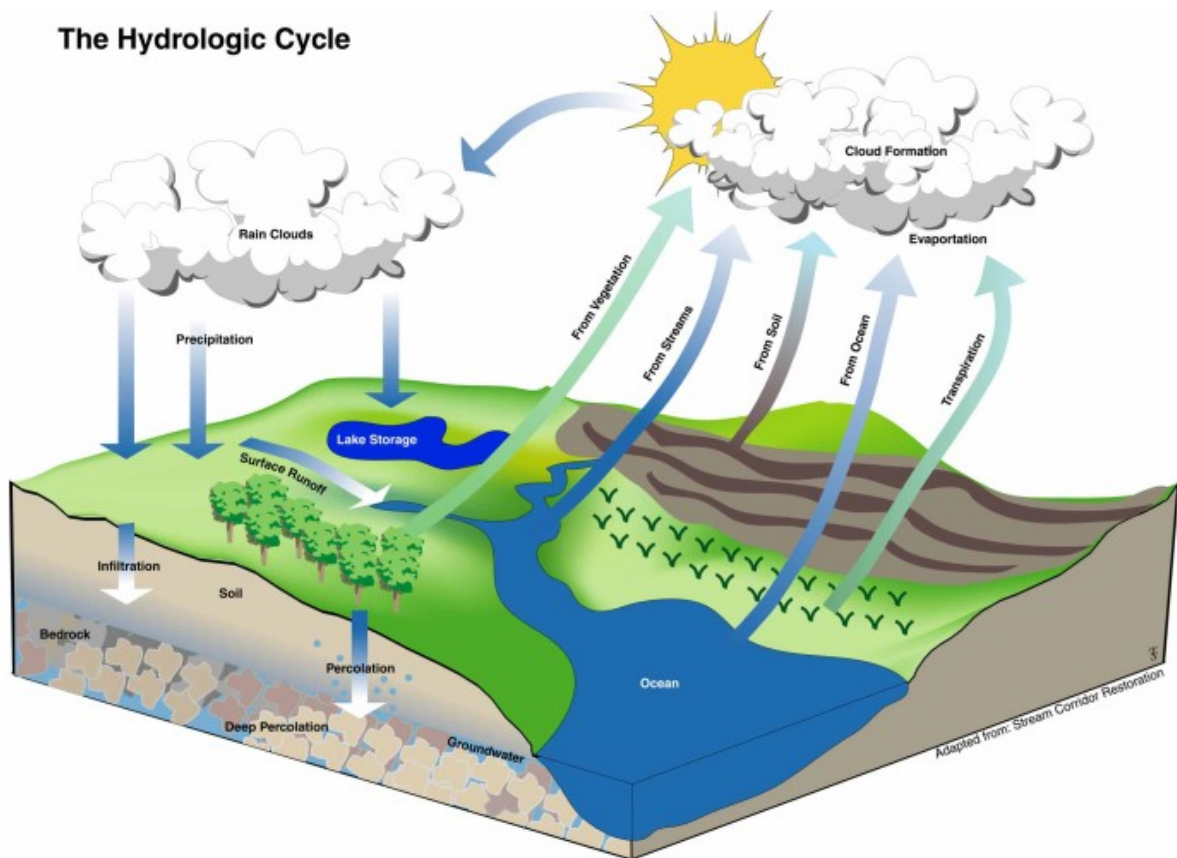


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The movement of water through a watershed strongly depends upon the precipitation in the region and the conditions across the landscape. Precipitation occurs year round within the humid continental region. According to the Natural Resource Conservation Service (NRCS), for Pittsburgh, the total annual precipitation is 37.8 inches with a yearly winter average of 17.13 inches and a yearly summer average of 20.0 inches (NRCS, 2010). There are exceptions, however, such as the very wet years of 2003–2004 and the drought years of 2001–2002.

Water resources are continuously recycled and reused (Figure 2-2) in the natural environment, sustaining the natural systems on and under the earth's surface (NRCS, 1998). In turn, this same water is a vital resource for humans for drinking, recreation, use in industry and growing crops.

Figure 2-2: The Hydrologic Cycle

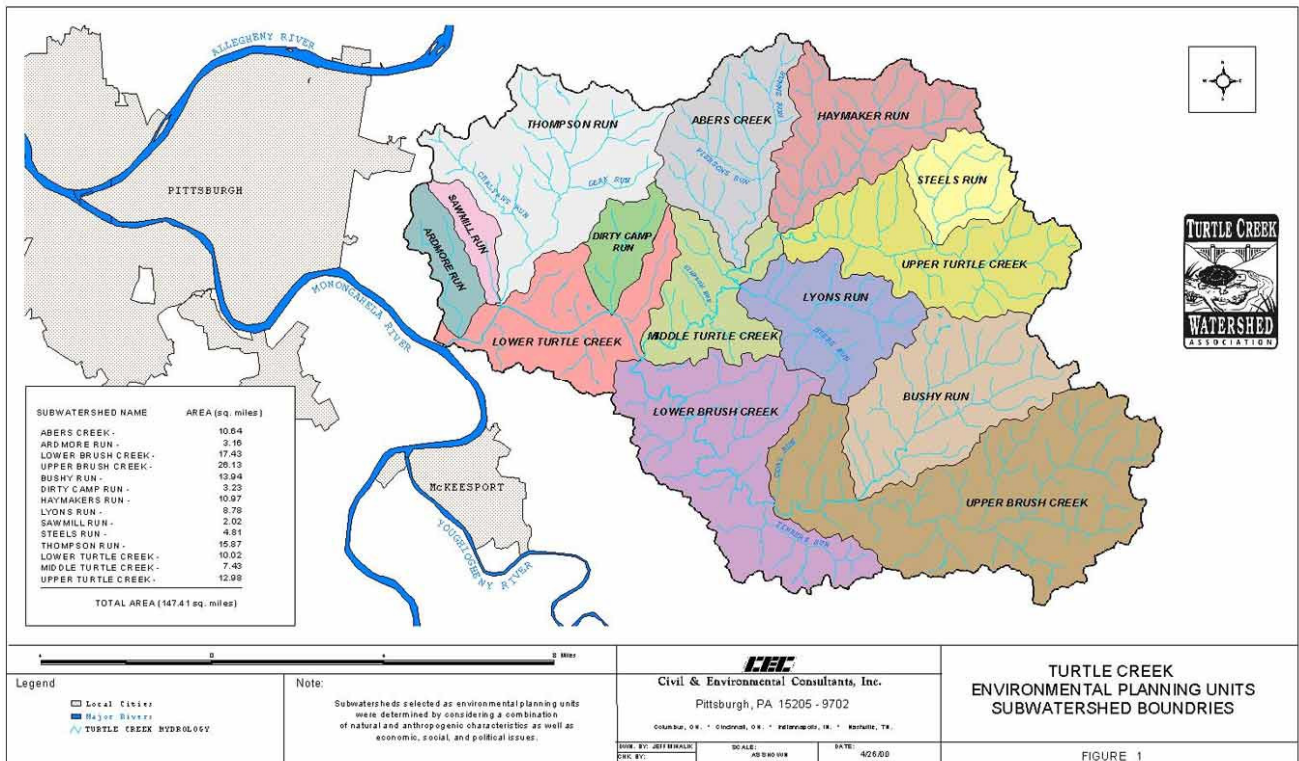


Watersheds

A watershed may be defined by connecting points highest in elevation (ridgetops) but it is made of the LAND within that boundary. What happens on that land and in the air above it is reflected in the water resources impacted by the land and air. Every river, stream, and tributary has an individual watershed, which then form larger watersheds. The project area is located within the Turtle Creek Watershed (**Figure 2-3**), which encompasses 147 square miles of drainage area and 33 communities from just east of Pittsburgh to the western edge of Greensburg (TCWA, 2010). The Turtle Creek Watershed is a part of the Monongahela River Watershed, the larger Ohio River Watershed, the Mississippi River Watershed, and ultimately the Gulf of Mexico Watershed. Thus, what happens in the Greenway affects the Gulf of Mexico.

In addition, the Turtle Creek Watershed is divided into 14 subwatersheds. Although the watershed is comprised of many waterways, the main watercourse through the project area is Turtle Creek, which flows through the center of the Turtle Creek Watershed from the east and empties into the Monongahela River. Thus, the Turtle Creek Greenway project area falls mostly within the Middle and Upper Turtle Creek Subwatersheds, with very small sections within the subwatersheds of Haymaker Run, Abers Creek, Lyons Run, Lower Turtle Creek, and Lower Brush Creek.

Figure 2-3: Turtle Creek Watershed Map



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The Middle Turtle Creek subwatershed contains 15.7 miles of streams and drains approximately 7.43 square miles of area within the municipalities of Trafford, Penn Township, Monroeville, and Murrysville. In 2001, the Middle Turtle Creek subwatershed had an impervious cover of 16.2% and was classified as an impacted stream (TCWRCP, 2002). An impacted stream is one that “possesses a watershed impervious cover ranging from 11 to 25 percent and shows clear signs of degradation due to watershed urbanization...stream banks become unstable...stream biodiversity declines to fair levels, with most sensitive fish and aquatic insects disappearing from the stream,” (Stormwatercenter.net, 2010).

The Upper Turtle Creek subwatershed contains 18.2 miles of streams and drains approximately 10.02 square miles within the municipalities of Delmont, Murrysville, Export, and Salem and Penn Townships. In 2001, the Upper Turtle Creek subwatershed had an impervious cover of 8.1% and was classified as a sensitive stream (TCWRCP, 2002). A sensitive stream is one that has “a watershed impervious cover of zero to 10 percent...sensitive streams are of high quality and are typified by stable channels, excellent habitat structure, good to excellent water quality, and diverse communities of both fish and aquatic insects,” (Stormwatercenter.net, 2010).

Surface Waters

Surface water is water found on the land surface such as rivers, streams, lakes, ponds, reservoirs, wetlands, seas, and oceans. Surface waters are in constant interaction with water stored below the surface in openings in rock material, called groundwater, which will be discussed later in more detail. Surface water, therefore, is influenced by the quality of the groundwater, as well as inputs from land-use practices associated with farming, forestry, mining, and other activities (Wikipedia, 2010). For purposes of this plan, we will

be discussing freshwater surface waters only—rivers, streams, lakes, ponds, reservoirs, and wetlands.



Rivers and Streams

The Pennsylvania Code, Chapter 93 sets forth water quality standards for the surface waters of Pennsylvania, including wetlands. The standards are regulated by the PA Department of Environmental Protection (PADEP) and are based upon water uses, which are to be protected and are

considered by the Department in implementing its authority under the Clean Streams Law and other statutes that authorize protection of surface water quality (Commonwealth of PA, 2010).

Streams within the project area were classified according to the following regulatory definitions, per the Clean Stream Streams Law of the Pennsylvania Code, and based on their condition at the time of fieldwork, which was conducted in the fall of 2010.

- Perennial streams exhibit defined bed and bank features, and continually transport flow throughout the year. Perennial streams generally support a wide variety of macroinvertebrate and vertebrate organisms.
 - ⇒ In the project area, Turtle Creek, Simpson Run, Lyons Run, and Abers Creek are classified as perennial streams, per USGS mapping. It should be noted; however, that due to significant erosion and deposition upstream, the channel of Simpson Run becomes full of sediment and debris, and at times, is not visible on the surface in the Greenway.
- Ephemeral streams are linear depressions or drainage ways that exhibit defined erosional features, such as defined bed and scoured banks, but only transport runoff during precipitation events and are dry throughout the remainder of the year. These streams are not capable of supporting benthic macroinvertebrates organisms.
 - ⇒ The identified ephemeral channels within the project area are a result of stormwater runoff from the surrounding uplands during precipitation events.
- Intermittent streams exhibit defined alluvial bed materials and bank features and transport flows periodically throughout the year. Intermittent streams are capable of supporting macroinvertebrate organisms during portions of their aquatic life cycle.
 - ⇒ Two intermittent channels were noted during field views along the steep slopes in the wooded area along the TCIRR right of way

Under Chapter 93, streams are assigned a protected water use. Included as sub-categorizations under the Aquatic life protected water use are Warm Water Fishes (WWF), a Cold Water Fishes (CWF), and Trout Stock Fishery (TSF). As the name warm suggests, WWF are those waters containing fish and other aquatic species indigenous to a warm water habitat; CWFs contain species indigenous to a cold water habitat; and TSF are streams that are conducive to stocking with trout by the Pennsylvania Fish and Boat Commission (PFBC) and typically contain species indigenous to a warm water habitat. Unlike WWFs and CWFs, impacts to TSF typically require coordination beyond the standard with the PFBC during permitting processes.

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As previously mentioned, Turtle Creek is the primary waterway within the project area (**Map 2.3: Water Resources**). According to the PADEP 25 PA Code Chapter 93 classifications, Turtle Creek from the source to the confluence with Brush Run at the western end of the project area is a TSF (Commonwealth of PA, 2010). From its confluence with Brush Run until it empties into the Monongahela River near Braddock, Turtle Creek is designated as a warm water fishery (WWF). This latter portion of Turtle Creek, however, is just outside the project area. As a TSF, Turtle Creek is protected under Pennsylvania’s Clean Streams Law of 1931 and maintained as a waterway suitable for trout survival and recreational fishing. The Pennsylvania Fish and Boat Commission (PFBC) stocks the stream with trout from February 15 to July 31 and maintains and propagates fish species and additional flora and fauna, which are indigenous to the warm water habitat.

The confluences of Simpson Run, Lyons Run, and Abers Creek with Turtle Creek are also located within the project area. Simpson Run flows southeast through Beechwood Park in Monroeville while Lyons Run flows northwest parallel to the PA Turnpike and along the border between Penn Township and Murrysville. Abers Creek flows into Turtle Creek near Valley Park along Abers Creek Road in Monroeville. These three perennial streams and the several Unnamed Tributaries (UNT) to Turtle Creek within the project area are classified and maintained as Trout Stocked Fisheries. Thus, they fall under the same protections and PFBC maintenance as Turtle Creek.

Haymaker Run, which empties into Turtle Creek west of the end of Duff Park and Steel’s Run, which hits Turtle Creek above north of Duff Park just outside of the Project Area, are high quality (HQ) CWF; the only ones in the Turtle Creek Watershed.

Lakes, Ponds, and Reservoirs

Lakes and ponds are inland bodies of water that form through natural processes, such as glacial, tectonic, and volcanic activities. In the United States, most natural lakes formed thousands of years ago when the advance of the glaciers caused great depressions to form, and over time, filled with water. There is no clear-cut difference between a lake and a pond; however, lakes generally tend to have visible waves, are deeper, have rooted plants that are only able to grow close to shore, and water temperatures vary based on the depth.

Natural lakes and ponds are uncommon and occur only in the northwestern and northeastern portions of Pennsylvania. Reservoirs, or impoundments, on the other hand, are quite common in Pennsylvania and involve the “impounding” of a stream or river by a man-made dam. Although they are not true natural forming lakes, reservoirs share many of the features of lakes and ponds and are often referred to as such. The purpose of a reservoir typically is to supply a community’s drinking water.

There are no lakes or reservoirs in the project area; however, there are four ponds: 1) underneath the bridge (Westinghouse Bridge) that carries S.R. 130 over the CBS/Westinghouse Property and Penn Forest Football Fields, 2) the pond in B-Y Park, 3) the pond near the overpass of the PA Turnpike, 4) a private pond on parcel in Monroeville near Alpine Park. See **Map 2.3: Water Resources** for their specific locations. The B-Y Park pond was also identified as a National Wetland Inventory (NWI) wetland by the U.S. Fish and Wildlife Service (USFWS). These ponds provide various functions in terms of wildlife habitat and stormwater management while the B-Y Park pond also serves as a recreational resource for local residents.

Wetlands

Wetlands are transitional areas between terrestrial and aquatic environments (Cowardin, Carter, Golet, & LaRoe, 1979) where the water table often exists at or near the surface, or where the land is inundated by water. Wetlands frequently exhibit a combination of physical and biological characteristics indicative of both terrestrial and aquatic systems. There are three (3) specific hydrological and natural features that identify a wetland system:



- 1) the presence of hydric soils,
- 2) inundated or saturated hydrologic conditions during part of the growing season, and
- 3) a predominance of hydrophytic (water-loving) vegetation (Environmental Laboratory, 1987).

Wetlands perform a myriad of functions that help to preserve and protect the health of the streams including (NRCS, 1996):

- 🌲 Streambank stabilization - wetland vegetation impedes the erosive force of floodwater and holds the soil in place;
- 🌲 Surface water storage – wetlands help to prevent flooding by temporarily storing water, allowing it to soak into the ground and/or evaporate;
- 🌲 Sub-surface water storage – wetlands serve as a reservoir for rainwater and runoff

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by serving as a recharge area for water tables and aquifers;

- Nutrient cycling – wetlands enhance the decomposition of organic matter and incorporate the nutrients back into the food chain;
- Particle retention – wetlands filter out sediments and particles suspended in runoff water, thus preventing lakes, reservoirs, and other downstream water resources from being affected by sediment loading;
- Aquatic habitat – wetlands provide breeding, nesting, and feeding habitat for many species of birds, fish, and other wildlife.
- Values to society – wetlands provide opportunities for hunting, fishing, photography, education, and enjoyment.

The National Wetlands Inventory (NWI) is a U.S. Fish and Wildlife Service-maintained database developed from aerial photography that denotes those wetlands that are either visible from aerial photography or can be classified from infrared photography. The information is used by Federal, state and local agencies, academic institutions, and private industry for management, research, policy development, education and planning activities.

Map 2.3: Water Resources depicts the location of the two NWI wetlands within the project area. One NWI wetland is the pond at B-Y Park and the other is located at the current location of the Franklin Township Municipal Sanitary Authority (FTMSA). Seasonal and weather variations during the time of the NWI mapping, limits the validity of the mapping and can result in smaller, pocket wetlands not appearing in the inventory.

Field reconnaissance confirmed the location of one of the two NWI wetlands and revealed an additional ten (10) potential palustrine wetland systems within the project area. Palustrine wetlands include all “nontidal wetlands dominated by trees, shrubs, persistent emergent plants, or emergent mosses or lichens, as well as small, shallow open water ponds or potholes. Palustrine wetlands are often called swamps, marshes, potholes, bogs, or fens,” (Webster’s Dictionary, 2010). The B-Y Park pond was confirmed, while the NWI wetland identified at the location of the FTMSA was not verified. The additional wetlands identified were composed of palustrine emergent, scrub-shrub, forested, and open-water systems and were located adjacent to and/or associated with existing watercourses, mainly Turtle Creek. The assessment of these potential wetlands was only visual and did not involve an official evaluation to U.S. Army Corp of Engineer (USACE) standards. A detailed wetland inventory is needed to assess and identify the location and function of each of these potential wetlands.

Floodplains

Floodplains are the land directly adjacent to waterways, such as rivers and streams, that are subject to recurring inundation (OAS, 1991). As heavy or continuous rainfall exceeds the absorptive capacity of the land, the flow capacity of rivers and streams will be maximized causing the water to overflow the stream banks into the adjacent floodplains. Thus, floodplains function as temporary natural floodwater storage areas within a watershed. The soils of undisturbed/natural floodplains are deposited as floodwaters recede and function to absorb large amounts of water, thus mitigating flooding effects. When a stream overflows its banks, undisturbed floodplains capture the water, distribute the flow, and reduce the floodwater's velocity; thereby, reducing the erosive forces of the water on the stream channel. Another important function of floodplains is to allow streams to naturally meander. Meanders lengthen stream channels so they hold more water and reduce the downhill elevation gradient of the water flow, which reduces the kinetic energy and erosion potential.



Floodplain alterations, such as the removal of vegetation and encroachment by development, interrupt the natural relationship between the stream and its floodplain. The encroachments inhibit the normal water retention function of the floodplain, increasing the risk of significant upstream and downstream flood damage. In addition to reducing floodwaters, undisturbed floodplains exhibit a variety of ecological functions that directly benefit the health of the watershed including retention and release of groundwater, vegetative stabilization of stream banks, sediment and toxicant filtering from surrounding uplands, production of food sources, and cover and protection for wildlife.

The National Flood Insurance Act of 1968 made flood insurance available for the first time with the creation of the Federal Insurance Administration. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas. These Acts were implemented to handle

issues of floodplain alterations and subsequent watershed flooding. The Federal Emergency Management Act (FEMA) was given the authority to administer the laws outlined in both Acts. FEMA also conducts routine flood insurance studies throughout the country to develop risk data that can be used during land use planning and floodplain management. In 1994, the Acts were expanded through the National Flood Insurance Reform Act and serve as a foundation for the Nation Floodplain Insurance Program (NFIP), which assists in community floodplain and flood insurance planning through the implementation of local floodplain management ordinances. All four municipalities within the project area participate in the NFIP and have adopted and enforce minimum NFIP floodplain management standards; however, some floodplain encroachment occurred prior to the development of these ordinances and, as a result, some business districts and residential areas experience routine flooding.

Floodplains within the project area are depicted on **Map 2.3: Water Resources**. Within the Turtle Creek Greenway, the functionality of the floodplains has been altered in several areas by commercial buildings, residential yards, and parking lots, leaving the floodplains with less vegetation and space to retain flood flows and sediment and provide habitat for riparian species. For example, the Turtle Creek Industrial Railroad is located within the floodplain of Turtle Creek at various points throughout the project area. This is most evident in areas where the streambanks directly abut the railroad corridor and wash outs during high water events have occurred. In Trafford Borough across from B-Y Park, commercial business parking lots have been constructed within the floodplain, and buffering vegetation is minimal to protect against flood waters. In Murrysville, floodplain encroachment occurs toward the eastern most extent of the project area where commercial businesses are prevalent along Route 22. Because the project boundary predominantly follows the railroad corridor rather than Turtle Creek, most floodplain encroachments within Murrysville occur directly adjacent to the Turtle Creek Greenway project area.

Riparian Areas

A riparian buffer is the land and vegetation adjacent to streams, rivers, and lakes that functions as a transitional zone between land and water to slow the velocity of surface runoff, reduce erosion, filter pollutants, absorb excess water, and provide habitat for various flora and fauna. Mowing or removing the vegetation from the riparian buffer increases flooding potential and reduces the capacity to perform crucial functions that help preserve stream health. A functioning riparian buffer can reduce flooding by retaining water in its vegetation and soil. The root system of the riparian vegetation prevents soil loss and bank failures. The woody debris and leaves from the riparian vegetation enter the stream and break down into the nutrients and organic matter utilized by aquatic organisms, such as macroinvertebrates and fish. The nutrients and organic matter provide much of the initial energy for the stream system, ultimately supporting the

aquatic organisms downstream (NCSU, 2010). Other advantages of riparian buffers include the ability of native vegetation along the banks to bend in high water and directly cover the banks, thus reducing erosion. Streamside trees and shrubs provide shade that reduces water temperatures. Cooler water holds more dissolved oxygen, reducing stress upon aquatic organisms, and that improves fishing. This is vital as much of Turtle Creek in the Greenway being stocked with trout that need cooler waters and higher dissolved oxygen levels.

The biggest threats to riparian areas in the project area are stormwater runoff, flooding, erosion and sedimentation, and invasive species. Flooding is a significant problem within the project area. During heavy rainfalls, stormwater runoff from the adjacent uplands is channeled through the numerous valleys and ephemeral channels into the Turtle Creek stream valley. The funneling of the water causes erosion and carries sediment down the hillsides into Turtle Creek. The addition of the upland runoff exacerbates already heightened water levels of the creek, creating erosive forces that wear away at the stream's banks. Some sediment is deposited along the low-lying floodplains, burying native species and allowing for opportunistic invasive plant species, such as Japanese knotweed (*Polygonum cuspidatum*) to thrive.



Groundwater

Groundwater is water stored beneath the land surface in pores and openings of soil and rock formations in the saturated zone. Commonly referred to as separate entities, groundwater and surface water are constantly interchanging as groundwater emerges to the surface in valleys and seeps and surface water percolates downward into underground storage areas of rock and soil, called aquifers. As a result of this exchange, the quality of streams and lakes can directly impact the quality of groundwater (CTIC, 2010).

Topography is the primary factor that dictates the pattern of water movement in a region. Water typically moves from areas of high elevation to lower elevation and from shallow to deeper aquifers. Water levels are most affected by precipitation patterns, with levels generally highest in early spring and fall and lowest during late spring, summer, and early winter.

In Pennsylvania, sources of groundwater contamination include pesticide application, above ground and under ground storage tanks, surface impoundments, landfills, hazardous waste sites, industrial facilities, mining and mine drainage, pipelines, sewer lines, and spills (Frey, 1996). All of these sources contain hazardous chemical compounds that can leach into the soil and subsequently contaminate groundwater supplies via infiltration and fluctuations in water table depths. \

In areas where groundwater is the source of drinking water, groundwater contamination can often impact public water supply. Within Allegheny County, drinking water supplies are primarily from surface water sources; only 10% comes from groundwater (ACED, 2008). Turtle Creek water is part of what Pennsylvania American Water takes in at their Hayes Mine intake on the Monongahela River. In Monroeville, the public water supply is provided by the Monroeville Water Authority, who obtains their water from local surface water.

In Westmoreland County, four (4) of the eight (8) water suppliers obtain at least part of their water from groundwater supplies (WCCP, 2005). Trafford's water is supplied by Penn-Wilkesburg Joint Water Authority, which obtains their water from the Allegheny River (Fluoride Now, 2010). The Westmoreland County Municipal Authority also obtains their water from local surface waters and provides water service to the Municipality of Murrysville and Penn Township (Penn Twp, 2010). In addition, private wells provide water in areas that are not served by public systems.

Natural Areas and Habitat

According to the PA Code, a natural area is an area of unique scenic, historic, geologic, or ecological value and of sufficient size and character for its maintenance to occur naturally through physical and biological processes, usually without direct human intervention (Commonwealth of PA, 2010). For purposes of this report, natural areas will include Natural Heritage Inventory sites, Important Bird Areas, and important habitats for species of conservation concern, including threatened and endangered species.

County Natural Heritage Inventory (NHI)

The Natural Heritage Inventories (NHI) for Allegheny and Westmoreland Counties, conducted and published by the Western Pennsylvania Conservancy (WPC) in 1994 and 1998 respectively, identify and map the most significant natural heritage areas, which include natural areas (NA), biological diversity areas (BDA), dedicated areas (DA), landscape conservation areas (LCA), other heritage areas (OHA) and managed lands. More specifically, the study identified plant and animal species and communities that are unique or uncommon in each county. The NHI also covered areas that are important for general wildlife habitat, education, and scientific study (WPC, 1994).

The NHI for Westmoreland County did not reveal any significant natural heritage areas within the project area (WPC, 1998). According to the NHI of Allegheny County, the Turtle Creek Greenway project area contains one (1) BDA—the Simpson Run BDA. Locations of the NHI areas are shown on **Map 2.4: Natural Areas**.

Simpson Run BDA

A BDA is an area of land that contains and supports state or federally protected plant or animal species of special concern, exemplary natural communities, or exceptional native biodiversity. This BDA has been documented as a special species habitat, which is located within the Mesic Central Forest Community on the lower southwestern slopes of the valley. This forest community is located along a northern tributary to Turtle Creek, Simpson Run, and qualifies this BDA as a high value site. Simpson Run enters Turtle Creek just downstream of the



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Saunders Station Road crossing. As a Mesic Central forest community, the canopy is characterized by tulip poplar (*Liriodendron tulipifera*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and Eastern hemlock (*Tsuga canadensis*). The understory is predominantly saplings of the aforementioned trees, as well as black birch (*Betula lenta*), elm (*Ulmus sp.*), and white ash (*Fraxinus americana*).



As such, recommended conservation measures for this area include efforts to protect the unnamed identified state or federally protected plant species of special concern and habitat by assuring that unnecessary clearing does not occur in the upland and that erosion resulting from development is kept to a minimum. All Terrain Vehicles (ATVs) are a problem in the valley for the plants, natural forest community, and the stream; thus, to protect these natural resources, elimination of

ATVs in this valley is recommended. Logging in the forest at this site would be detrimental to the identified special species since light, soil, and moisture changes, as well as physical damage to plants would result. Further development within the BDA boundaries could result in further habitat loss for the special species, increased erosion, and the general need for infrastructure to accommodate development. Protection of the species could best be achieved if the forest is permitted to revert to a mature community on its own and disturbance is kept to a minimum (WPC, 1994). In order to protect this area, coordination with the property owners within the BDA would be necessary as the majority of the parcels within this area are privately owned.

Important Bird Areas (IBA)

Habitat loss and fragmentation are the most serious threats facing birds in Pennsylvania. To help curb these threats and reverse declining bird populations, the Important Bird Area (IBA) program was established by Birdlife International in Europe. While there are not any identified IBAs currently in the Turtle Creek Greenway project area, it is worth noting that the program helps to promote proactive habitat conservation, benefiting birds and biodiversity, by focusing attention on the most essential and vulnerable areas. The IBA program identifies large or small, public or private tracts of land that are part of a global

network of places recognized for their outstanding value to bird conservation. Even though it is a voluntary program, each IBA has to meet a set of objective criteria. The IBA program is carried out in the United States by the National Audubon Society.

Wildlife Habitat

The project area of the Turtle Creek Greenway Plan is 1,208 acres and comprised mostly of forested areas, but also floodplain, wetlands, streams, and ponds. All of which provide valuable habitat for wildlife as well as food, water, and shelter. The Turtle Creek Greenway project area is located within the Pittsburgh Plateau Ecoregion. Ecoregions are large contiguous tracts of land where local ecosystems reoccur more or less throughout the region in a predictable manner. Ecoregions provide a geographic framework for assessment, inventory, and overall management of environmental resources. To identify these areas, the Environmental Protection Agency (EPA) has developed ecoregion maps of North America based on patterns of abiotic and biotic factors that shape ecosystems, such as geology, physiography, climate, hydrology, soils, vegetation, wildlife, and land use (EPA, 2000).

The Pittsburgh Plateau Ecoregion, according to DCNR habitat quality studies (2001), ranked “poor” in terms of wildlife habitat (**Figure 2-4**). Overall for the ecoregion, stream and wetland quality were noted as degraded and forests are relatively fragmented. Grassland habitat was well represented. Even though only a moderate increase in development was noted, road densities for this ecoregion were some of the highest in the state. High deer abundance is an issue that is impairing forest quality and regeneration. Recommendations for this ecoregion include habitat conservation priorities, such as maintaining or improving grassland habitats, reclaiming surface mines as wildlife enhancement areas, limiting forest fragmentation, and providing connectivity along reforested riparian zones. Stream and water quality improvement were also recommended as a major focus to protect the highly diverse fish and amphibian fauna (DCNR, 2001).

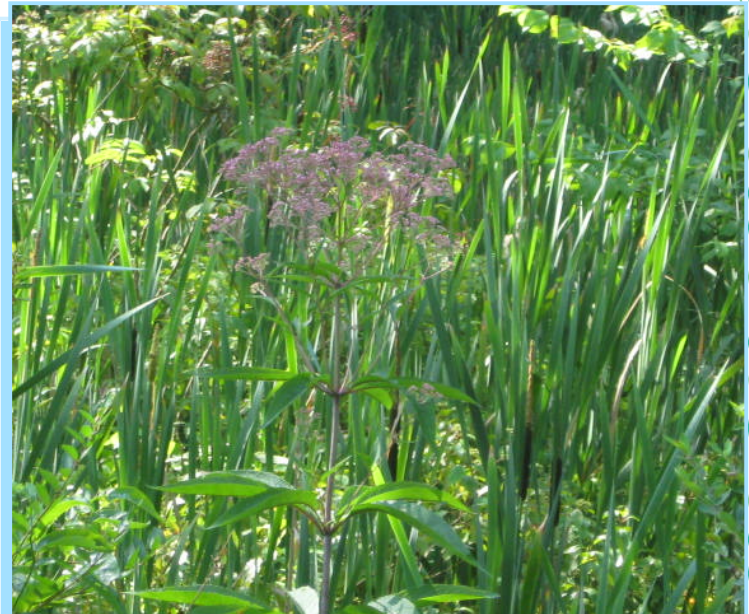
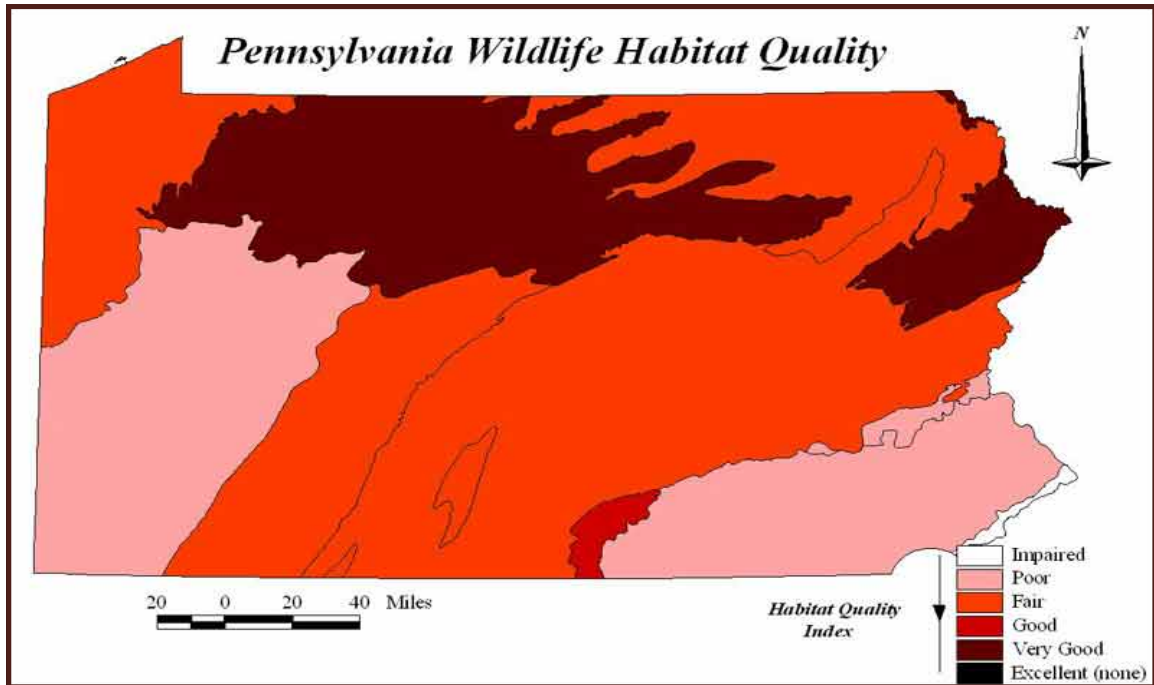


Figure 2-4: Pennsylvania Wildlife Habitat Quality



Forests and Woodlands

The Pittsburgh Plateau Ecoregion has historically been described as mostly Appalachian Oak Forest and also Mixed Mesophytic Forest (USFS, 1994). These forests are characterized by mixed oak forest, oak-hickory-chestnut forest, oak-pine forest, hemlock forest, floodplain forest, and swamp forest. Due to a history of timbering within the state, the current forests are second and third growth forests. During field reconnaissance, the predominant tree species noted were sugar maple, red maple, sycamore, black cherry, black walnut, tulip poplar, and hickory.

Today, forested areas account for approximately one-third of Allegheny County's landscape and provide many benefits, including slope stability, aesthetic value, habitat, recreation, stormwater runoff prevention, and water quality protection. Tree cover can significantly reduce both the quantity and velocity of surface runoff into local waterways, reducing sediment loads and flooding as well as improving water quality by trapping excessive nutrients and sediments. Tree cover within riparian areas shades waterways and wetlands, thereby maintaining a lower water temperature, which is important to aquatic ecosystems and habitats (ACED, 2008).

In Westmoreland County, forests cover approximately 331,700 acres. The Penn State School of Forest Resources estimates this forest land is mostly privately owned by

approximately 12,500 landowners and this standing timber is worth an estimated \$300 million. The county's forests are mainly deciduous with some coniferous cover. The primary species found are red oak, black oak, white oak, yellow poplar, sugar maple, beech, hemlock, white pine, ash, black cherry, and red maple (WCCP, 2005).



Forested habitat for wildlife is becoming more fragmented and impacted due to human-induced impacts such as development, encroachment, and pollution. Like other semi-urban areas, the project area is also threatened by these factors. Interstate 376 and State Route 22 provide easy access to Pittsburgh and have helped to encourage development. Since the early 1990's, the greatest population increases within Allegheny County have been in forested areas, according to the University of Pittsburgh's Center for Social and Urban Research (ACED, 2008). This trend is evident in the project area, where the general character is that of a highly-developed suburban landscape with pockets of green space and forested areas. The majority of the forested areas are located on steep slopes and ridges of stream and river valleys. Some of these areas are owned by the municipalities as part of their local park system, but the overwhelming majority of forested area is privately owned (ACED, 2008). Publicly-owned land, which includes public recreational parks, schools, municipal parks, preserved land, and random tracts of municipal properties, comprises 604 acres or 50% of land within project area, while the remaining 604 acres is privately-owned land.

In addition to reducing forest cover and fragmenting habitat, the interstates, local roads, and residential and commercial developments have altered the hydrological characteristics of watersheds. The flooding that has resulted has caused severe problems for the Turtle Creek Industrial



Railroad and downstream communities. With rural municipalities continuing to grow and develop, water management has become increasingly expensive, placing strain on limited economic resources. In response, municipalities have developed and updated stormwater management requirements to help compensate and prevent future flooding (See Act 167 below). However, the economic value of forested areas as natural flood control and prevention is often underestimated. Thus, maintaining adequate vegetative cover in critical locations and within the greenway along Turtle Creek will also be important to reduce flooding (ACED, 2008).

Aquatic Habitat - Wetlands / Open Water

As a stream valley, the Turtle Creek Greenway contains a fair amount of water resources including wetlands, streams, vernal pools, ponds, and groundwater seeps. These resources provide habitat and sustenance for a variety of aquatic and terrestrial species. Some species, such as fish, need water on a continual basis, whereas, waterfowl, reptiles, and amphibians rely on aquatic ecosystems for only a portion of their life cycle. For example, most salamanders require small wetlands and vernal ponds for breeding, and ultimately overall species survival.

Like terrestrial wildlife populations, aquatic species are also threatened by direct habitat loss from development as well as habitat degradation from stormwater runoff, invasive species, pollution, and erosion and sedimentation. Regarding amphibian habitat, research suggests that habitat connectivity is as important as habitat availability for maintaining populations. Undeveloped corridors or conservation greenways, along waterways or through wooded areas are important for amphibian population dispersal and maintaining their communities. These greenways primarily serve to link and protect natural resources, and may incorporate both public and private land. Some species of salamanders, such as *Ambystoma* salamanders, have been found to utilize an area of forest up to 550 feet from their aquatic environment. Other species may utilize a greater distance of forest, but further research is needed to fully understand the habitat needs of amphibians (DCNR, 2001). Conservation of the Turtle Creek Greenway would help to preserve a corridor for amphibian populations along the stream as well as preserve habitat for a variety of wildlife.

Aquatic Habitat - Streams

As habitat, the approximately 37,400 feet of perennial stream within the project area provide habitat for both terrestrial and aquatic species as well as a water source for terrestrial species. Similar to many streams in Pennsylvania, Turtle Creek's stream habitat is threatened by declining water quality and loss of forest cover in riparian areas, due to development. Within the Turtle Creek Watershed, water quality degradation sources include abandoned mine drainage (AMD); non-point source pollution from roads and

development; Combined Sewer Outflows (CSO); and erosion and sedimentation from land development.

The diversity, number, and type of aquatic life present, including macroinvertebrates, fish, and freshwater mussels within a stream are often indicative of the stream's water quality. For example, macroinvertebrates are organisms that are generally associated with soil or stream substrates, lack backbones, and can be seen without magnification. In



streams, macroinvertebrates are typically insect larvae, which hatch from eggs laid in the summer, grow all year in the stream, and then emerge the following summer. Due to their presence in the stream throughout the year, limited mobility, and ease to collect, these organisms are a good way to evaluate the water quality of a stream. Moreover, macroinvertebrates differ in their tolerance to the amount and types of pollutions. For example, damselfly and dragonfly larvae are a sign of good water quality, whereas worms and midges are indicators of poor water quality (EPA, 2009).

Even though PADEP is required by Section 303(d) of the Federal Clean Water Act to identify all surface waters (i.e., streams and lakes) in the state that do not meet water quality standards, only 26 stream miles in the TCW have been designated as impaired, making them eligible for state clean-up plans. For impaired streams, PADEP develops a Total Maximum Daily Load (TMDL), which is an estimate of the maximum amount of point and nonpoint sources of pollution that can be assimilated by a stream without causing impairment or water quality standards to be violated.

Through the efforts of local volunteers, the Turtle Creek Watershed Association conducts water quality studies on Turtle Creek and other local waterways. Volunteers gather valuable and scientifically defensible water quality data to be used as the basis for new strategies and projects to improve water quality, reduce stormwater damage, create fishable streams, and bolster the local economy and competitiveness. The monitoring includes tests to determine dissolved oxygen levels, turbidity, pH, acidity, alkalinity, and metal values. In the spring and fall, volunteers also perform a survey of the macroinvertebrates living in the stream, which are also used as an indicator of water quality.

In addition to the water quality monitoring, the Turtle Creek Watershed Association also completed the Turtle Creek Watershed River Conservation Plan in 2002. The report

outlines the major threats to the water quality by subwatershed. The two major threats are AMD and urbanization. Since the Turtle Creek Greenway falls mostly within the Middle and Upper Turtle Creek Subwatersheds, only the water quality issues of these subwatersheds will be discussed in this report.

Middle Turtle Creek Subwatershed

The Middle Turtle Creek subwatershed contains 15.7 miles of stream and a drainage area of 7.4 square miles. Portions of Trafford, Penn Township, Monroeville, and Murrysville comprise the subwatershed (see [Figure 2-3](#), page 2-13). In 2001, no abandoned mine land was present in the Middle Turtle Creek subwatershed and only 0.1% of the subwatershed had been mined for the Pittsburgh Coal (TCWRCP, 2002).

According to the RCP, 19.24 miles of the main stem of Turtle Creek, from its source in Delmont downstream to the confluence with Thompson Run, was listed on the Section 303 (d) List of Impaired Waters due to metals, pH, suspended solids, nutrients, and siltation impairment from acid mine drainage (15.78 miles); removal of vegetation, small residential runoff and bank modifications (2.68 miles); and urban runoff/storm sewers (0.78 miles) sources (TCWRCP, 2002).

The Wilkesburg-Penn Joint Water Authority, the Monroeville Water Authority, and the Municipal Authority of Westmoreland County provide 48% of residents in the Middle Turtle Creek subwatershed with public drinking water. ALCOSAN and the Franklin Township Municipal Sanitary Authority provide 85% of the subwatershed area with public sewer service and discharge treated effluent into Middle Turtle Creek via the Meadowbrook Road Water Pollution Control Plant. In addition, ALCOSAN is responsible for three CSO regulators that discharge untreated sewage/stormwater to Middle Turtle Creek (TCWRCP, 2002).

Upper Turtle Creek Subwatershed

The Upper Turtle Creek subwatershed contains 29.0 miles of stream that drains a 13-square-mile area and encompasses portions of the municipalities of Delmont, Murrysville, Export, and Salem and Penn Townships. In 2001, abandoned mine land comprised 1.78 square miles in the Upper Turtle Creek subwatershed; 56.3% of the subwatershed had been mined for the Pittsburgh Coal. 19.24 miles of the main stem of Turtle Creek, from its source in Delmont downstream to the confluence with Thompson Run, has been listed on the Section 303 (d) List because of metals, pH, suspended solids, nutrients, and siltation impairment from acid mine drainage (15.78 miles); removal of vegetation, small residential runoff, and bank modifications (2.68 miles); and urban runoff/storm sewers (0.78 miles).

Water quality data studies conducted by TCWA (1998) and by the USACOE showed a

severely depressed pH (as low as 3.09), which, except for the most tolerant macroinvertebrate taxa, are not typically supportive of most aquatic life (including fish). This portion of stream is classified as a TSF. Because of net acidic AMD inputs (e.g., Delmont and Export discharges), severe pollutant loads (i.e., elevated instream iron, aluminum, and acidity concentrations) impact the Upper Turtle Creek subwatershed. Qualitative benthic macroinvertebrate surveys conducted by PADEP (1998) and USACOE (1998) at several locations within the subwatershed revealed benthic communities composed of pollution tolerant taxa including Oligochaeta (segmented worms) and Chironomidae (midges). Likewise, fish surveys conducted by PAFBC revealed the absence of fish in Upper Turtle Creek (because of severe pH depression) (TCWRCP, 2002).

The Municipal Authority of Westmoreland County provides 72% of the Upper Turtle Creek subwatershed with public drinking water while the Franklin Township Municipal Sanitary Authority provides 60% of the residents with public sewer service. Five CSO regulators owned by the City of Export discharge untreated sewage/stormwater into Upper Turtle Creek.

To continue to maintain and protect the Turtle Creek’s water quality as a Trout Stocked Fishery, routine water quality studies by natural resource agencies as well as the TCWA are recommended.

Wildlife

The Turtle Creek Greenway project area is home to a variety of birds, mammals, amphibians, and reptiles that are typical of Southwestern Pennsylvania, as listed in **Table 2.1**. Comprehensive wildlife studies identifying all species present within the area have not been conducted; however, during field reconnaissance, Mackin environmental professionals observed signs of wildlife usage throughout the project area. Amphibians and reptiles seen included an American toad, garter snake, gray tree frog, and bullfrog. Evidence of wildlife utilization consisted predominantly of whitetail deer tracks, trails, and scat. Mackin environmental

Table 2.1: Wildlife Listing

Common Name	Scientific Name
White-tailed deer	<i>Odocoileus virginianus</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Beaver	<i>Castor canadensis</i>
Woodpecker	<i>Picidae</i>
Porcupine	<i>Erethizon dorsatum</i>
Squirrels	<i>Sciurus spp.</i>
Wild turkey	<i>Meleagris gallopavo</i>
Eastern cottontail rabbit	<i>Sylvilagus floridanus</i>
Various raptors	<i>Falconiformes</i>
Various owls	<i>Strigiformes</i>
Ring-neck pheasant	<i>Phasianus colchicus</i>
Red fox	<i>Vulpes fulva</i>
Coyotes	<i>Canis latrans</i>
Raccoon	<i>Procyon lotor</i>
Opossum	<i>Didelphis virginiana</i>
<i>Source: Upper Crooked Creek River Conservation Plan, 2001</i>	

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professionals also observed raccoon tracks near Turtle Creek and numerous squirrel nests in the upper branches of the tree canopy.

Land development, habitat loss, and habitat fragmentation are the primary threats to wildlife throughout the state. Overall habitat quality estimates suggest that less than 10% of the state is represented by good quality habitat for wildlife

(DCNR, 2001). As habitats become degraded, opportunistic wildlife flourish while other species' populations decline, need to relocate, or may be decimated. Fragmented habitats become more susceptible to degradation and wildlife populations become isolated. To maintain the resilience and longevity of an ecosystem, biodiversity is key.

Birds

A variety of avian species were also seen and heard such as American goldfinch, turkey vulture, great blue heron, mallards, crow, pileated woodpecker, American robin, cardinal, hawk, black-capped chickadee, Red-winged blackbird, starling, mourning dove, rose-breasted grosbeak, blue jay, and killdeer. The dense scrub-shrub understory and rolling topography provides cover for resting, mating, rearing, and foraging activities for many species of birds and mammals. Oak and cherry tree species also provide valuable food sources for whitetail deer and birds that are present within the project area.

The Audubon Society of Western PA (ASWP) holds a Christmas Bird Counts (CBC) to identify and count birds within a specific geographic region. The CBC is conducted annually during a Saturday around Christmas day. The count is organized in geographic circles; thus, the closest CBC conducted is the Pittsburgh CBC, which encompasses Pittsburgh and much of the North Hills of Allegheny County. This larger area is then subdivided into smaller areas that are assigned to teams consisting of bird experts and volunteers (ASWP, 2010). Currently, there is not a CBC held within the project area; however, the densely forested stream valleys of the project area are ideal bird habitat and could provide this wonderful educational opportunity. A full List of Birds of Pennsylvania can be found in [Appendix F: Official List of the Birds of Pennsylvania](#).

Reptiles and Amphibians

Started in 1997, the Pennsylvania Herpetological Atlas Project was a 6-year study examining the distribution of reptile and amphibian species within the state. Funded through the Pennsylvania Wild Resource Conservation Fund and private donations, volunteers from environmental organizations, colleges and universities, and state agencies documented species type, critical habitats, locations, and photographs for the project. In 2004, the Atlas project was revitalized as an on-line form for the public to participate and called the Pennsylvania Online Herpetological Atlas. **Table 2.2: Amphibians and Reptiles of Conservation Concern** lists the amphibian and reptile species of conservation concern found within Allegheny and Westmoreland Counties. For this project, the Amphibian and Reptile Technical Committee identified 36 species of conservation concern to focus on for data collection. These species were targeted for investigation due to evidence of declining populations, restricted and/or patchy distribution, and susceptibility to threats such as habitat destruction or over collection by humans (POHA, 2009).

No official studies of reptiles and amphibians species have been specifically conducted on the project area; however, during invasive species eradication efforts in Duff Park, several species were noted including the American Toad (*Bufo americanus*) and slimy salamander (*Plethodon glutinosus glutinosus*).

Threatened and Endangered Species

Threatened and endangered (T&E) plant and animal species within Pennsylvania are tracked through the Pennsylvania Natural Diversity Inventory (PNDI) database as part of the Pennsylvania Natural Heritage Program (PNHP). PNDI is a partnership between natural resource agencies, including the DCNR, PA Game Commission (PGC), PA Fish and Boat Commission (PAFBC), and U.S. Fish and Wildlife Service (USFWS). These agencies conduct inventories and collect data to identify rare, threatened, and endangered species in the state. The data is housed in the PNDI, which provides the most accurate and up-to-date data on ecological resources to allow for planning, conservation, and natural resource management of these areas.

Agency coordination and a review of the PNDI revealed two (2) Pennsylvania Rare, Threatened, or Endangered Species within the project area. DCNR identified the snow trillium (*Trillium nivale*) as a PA rare species (DCNR, 2010) while the PAFBC identified the American brook lamprey, a PA State Candidate Species, (PAFBC, 2010). The location and identification of individual species is not provided in order to protect this vulnerable species. The PGC and USFWS did not identify any threatened or endangered species within the project area. PNDI results are found in **Appendix G: PNDI Correspondence**.

Table 2.2: Amphibians and Reptiles of Conservation Concern

Common Name	Scientific Name	County
Four-toed salamander	<i>Hemidactylium scutatum</i>	B
Hellbender (salamander)	<i>Cryptobranchus alleganiensis</i>	B
Jefferson salamander	<i>Ambystoma jeffersonianum</i>	A
Marbled salamander	<i>Ambystoma opacum</i>	W
Fowler's toad	<i>Bufo fowleri</i>	B
Northern cricket frog	<i>Acris crepitans</i>	A
Northern leopard frog	<i>Rana pipiens</i>	B
Western chorus frog	<i>Pseudacris triseriata</i>	A
Mountain chorus frog	<i>Pseudacris brachyphona</i>	B
Common map turtle	<i>Graptemys geographica</i>	A
Eastern box turtle	<i>Terrapene carolina</i>	B
Spotted turtle	<i>Clemmys guttata</i>	B
Wood turtle	<i>Clemmys insculpta</i>	B
Eastern fence lizard	<i>Sceloporus undulatus</i>	B
Eastern hognose snake	<i>Heterodon platirhinos</i>	A
Eastern massasauga rattlesnake	<i>Sistrurus catenatus catenatus</i>	A
Eastern ribbon snake	<i>Thamnophis sauritus sauritus</i>	B
Kirtland's snake	<i>Clonophis kirtlandii</i>	B
Mountain earth snake	<i>Virginia pulchra</i>	W
Northern copperhead	<i>Agkistrodon contortrix mokasen</i>	B
Rough green snake	<i>Opheodrys aestivus</i>	B
Queen snake	<i>Regina septemvittata</i>	B
Shorthead garter snake	<i>Thamnophis brachystoma</i>	A
Smooth green snake	<i>Opheodrys vernalis</i>	B
Timber rattlesnake	<i>Crotalus horridus</i>	W
A = Allegheny; W = Westmoreland; B = Both Counties		
Source: Pennsylvania Herpetological Atlas Project, 2004		

Invasive Species

Like many natural areas, the Turtle Creek Greenway project area is susceptible to invasive plant and animal species. Invasive species are any non-native plant, animal, or other organism that is introduced into an ecological system that causes economic or environmental harm. Invasive species are one of the largest threats to wildlife habitat in the state. Not all introduced species are harmful to native species or ecosystems, but some can have severe ecological and economic impacts. The presence of invasive species can lead to a ripple effect throughout the ecosystem causing shifts in the food chain and reducing food availability for native species. Human influences such as development, ecosystem degradation, habitat fragmentation and pollution can all weaken natural systems and provide opportunity for invasive species to flourish.

Invasive Plant Species

Current estimates suggest that over one-third of all Pennsylvania plants are non-native (DCNR, 2001). Several invasive plant species common to Pennsylvania, as listed in **Table 2.3**, have been identified throughout the project area including Japanese knotweed (*Polygonum cuspidatum*) and Japanese stiltgrass (*Microstegium vimineum*). Japanese knotweed creates additional problems than other invasive plant species because its root system does not hold soil like many native riparian plants do. Bank erosion is more likely when it takes over, as is the case in much of the Greenway.



In Duff Park, volunteer groups such as the Murrysville Park Volunteers and Friends of Murrysville Parks (FOMP) have been attempting to eradicate Japanese knotweed, but it is an ongoing battle due to the need for repeat herbicide treatments and cutting down plants before they go to seed. To help them in their efforts, FOMP contracted for the 2008 assessment and mapping of eight (8) invasive plant species in Duff Park. The report from this survey includes GIS-mapped locations of populations of the eight (8) species of invasive plants as baseline data to track the success of ongoing efforts to eradicate those species within the park. The eight (8) species surveyed were: Japanese stiltgrass (*Microstegium vimineum*), garlic mustard (*Alliaria petiolata*), multiflora rose (*Multiflora*

Table 2.3: Invasive Plant Species

Common Name	Scientific Name	Description
Garlic mustard	<i>Alliaria petiolata</i>	a woodland flower that crowds out spring ephemerals
Japanese knotweed	<i>Polygonum (Falopia) cuspidatum</i>	a large shrub that grows so dense nothing else will survive; frequently found along river banks, but grows nearly everywhere there is sunlight.
Tree of heaven	<i>Ailanthus altissima</i>	a fast-growing tree that chemically inhibits other trees from germinating near it
Asiatic bittersweet	<i>Celastrus orbiculatus</i>	a vine that overwhelms trees and displaces native, American bittersweet
Japanese honeysuckle	<i>Lonicera japonica</i>	a shrub that grows in forest understory
Japanese barberry	<i>Berberis thunbergii</i>	commonly planted for hedges, this thorny invasive crowds the forest understory
Burning bush	<i>Euonymus alatus</i>	a popular yard shrub that escapes into the woods to crowd the understory
Autumn olive	<i>Elaeagnus umbellata</i>	another shrub invading forests and old fields
Purple loosestrife	<i>Lythrum salicaria. L. virgatum</i>	a wetland invasive threatening delicate wetland ecosystems
Common Reed / Phragmites	<i>Phragmites australis</i>	a wetland plant that displaces native cattails, but has little wildlife value compared to cattails
Common Privet	<i>Ligustrum vulgare</i>	a shrub that escaped from cultivation and seeds are spread by birds.
Border Privet	<i>Ligustrum obtusifolium</i>	a shrub that was planted commonly in the past, but now is invasive

rosa), Japanese and giant knotweed (*Polygonum cuspidatum* and *P. sachalinense*), Japanese barberry (*Berberis thunbergii*), Morrow's and Amur honeysuckle (*Lonicera morrowii*, *L. maackii*), privet (*Ligustrum vulgare*), and burning bush (*Euonymus alatus*).

The mapped area (the entirety of Duff Park and also some neighboring land) consists of 217 acres and is primarily a north-facing wooded slope with old growth characteristics. Most of the trees are mature and range in size from 1.5' to 2' diameter base height (dbh). The typical north-facing slopes are forested in sugar maple, northern red oak, white ash, and Eastern hemlock species. Red and white flowered trillium is also found on these slopes as well as mountain wood sorrel, yellow violet, wild stonecrop, and wild geranium. The northwest-facing slopes of the park, above the Funk Bikeway, have mature black birch, great laurel, and bishop's cap, particularly along watercourses. The north-facing steep slopes of Fernwood Trail have a strong representation of American beech and sugar maple. Virginia waterleaf and black cohosh are also common. In the mature wooded slopes of Duff Park, the study also found patches of Japanese stiltgrass. Along the trails,

burning bush seedlings are present, particularly along small tributaries. Many areas of the park have been heavily infiltrated by garlic mustard, especially in floodplain areas and along Turtle Creek.




The middle and upper elevations, particularly southern slopes, are dry oak woods populated by mature chestnut oaks, white oaks, and black oaks. Northern red oaks, black birch, and white ash are also frequently documented. The shrub layer in these areas consists of sassafras, black cherry saplings, witch hazel, Allegheny serviceberry, flowering dogwood, and deerberry. There are also low-lying layers of lowbush blueberry and greenbrier. The dry oak woodlands seem to suffer the least from invasions of garlic mustard, though patches do exist.

The northern boundary of the park lies in the floodplains of Turtle Creek, and as such the waterway often overflows and native species that thrive on such flooding are found throughout this part of the study area. These include wingstem, trumpetweed, green-headed coneflower, etc. Mature trees, such as elms and sycamores, also characterize the floodplain. Across Turtle Creek, the floodplain is heavily impacted by industrial and commercial uses and knotweed, Japanese stiltgrass, multi-flora rose, Japanese barberry, and privet are all typical.

The southern area of the park, the report indicates, is bounded by woodlots and private residences, and is comprised mostly of recovering pasture around the mid-slope of a southeastern hilltop, as evidenced by invasive shrubs. These include Japanese barberry, honeysuckles, and multiflora rose.

The study area also has immature woodlands along the Black Cohosh Trail. Sugar maple saplings 6" to 8" dbh with scattered black cherry characterize these immature woodlands. This area has frequent grapevine infestation as well as large patches of garlic mustard, often fifty to one hundred feet wide. There is also an old petroleum pipeline right-of-way along the Coronary Trail, and the vegetation along this corridor is mostly old-field vegetation consisting of common milkweed, Allegheny blackberry, white snakeroot, deertongue grass, and path rush. This right-of-way has extensive Japanese stiltgrass. A pine plantation is also present within the park and is infiltrated in many instances by patches of Japanese stiltgrass.

The maps are found in **Appendix H: Invasive Species Mapping for Duff Park**, which indicate the 2008 presence and location of the following invasive species within Duff Park:

-  Japanese stiltgrass (*Microstegium vimineum*)
-  Garlic mustard (*Alliaria petiolata*)
-  Multiflora rose (*Multiflora rosa*)

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- 🌿 Japanese and Giant Knotweed (*Polygonum cuspidatum* and *P. sachalinense*)
- 🌿 Japanese Barberry (*Berberis thunbergii*)
- 🌿 Morrow's and Arrur Honeysuckle (*Lonicera morrowii*, *L. maackii*)
- 🌿 Privet (*Ligustrum vulgare*)
- 🌿 Burning bush (*Euonymus alatus*)

In addition, the report also indicated several notable alien species in the Park:

- 🌿 Jetbead (*Rhodotypos scandens*) was identified in the Round Top pasture area
- 🌿 Linden Arrowwood (*Viburnum dilitatum*) was identified in the pine plantation and Round Top pasture area
- 🌿 Norway Maple (*Acer platanoides*) was found in the floodplains above the Funk Bikeway but appeared to be diseased
- 🌿 Narrowleaf bittercress (*Cardamine impatiens*) is identified along the Spring Beauty Trail
- 🌿 Dame's rocket (*Hesperis matronalis*) was found along the floodplains of Turtle Creek

A repeat survey is underway for 2010 and is also planned for 2012, to provide tracking of the distribution of these invasive plant populations within Duff Park over time. Eradication of invasive plant species within Duff Park is performed by volunteers and the development of the plan has allowed them to create a strategic plan of attack and focus of these efforts.

Invasive Animal Species

Invasive animals, insects, and pathogens can also be a threat to wildlife habitat and ecosystems. There are several common invasive invertebrate and vertebrate species, both aquatic (**Table 2.4**) and terrestrial (**Table 2.5**), in Pennsylvania; however, no specific studies on these species have been conducted in the Turtle Creek Greenway project area.

One species that has been identified in recent years and is currently being monitored as a threat to Pennsylvania's ash trees is the emerald ash borer (*Agrilus planipennies fairmaire*) (USFS, 2008). Native to Asia, these beetles feed on the inner bark and phloem of ash trees and can kill a tree within 3-4 years of infestation. The emerald ash borer (EAB) was originally detected in the Commonwealth in Cranberry Township, Butler County in June 2007.

The PA Department of Forestry and the PA Department of Agriculture have been working together to identify infested areas and to protect unaffected areas from infestation. DCNR conducted a statewide survey as part of a larger national survey to identify the presence of the EAB within the nation. To identify the leading edge of infestation within the state, emerald ash borer traps were placed throughout the state in 2009. These traps help to identify infested and uninfested areas while a public education program is helping to prevent future infestations. Natural resource agencies have requested that firewood not be transported from where it was harvested in order to prevent spreading the emerald ash borer to unaffected areas (PA Department of Agriculture, 2010).

As a result of this study, the seven counties—Allegheny, Mercer, Lawrence, Beaver, Butler, Westmoreland, and Mifflin—where the emerald ash borer has been found, are currently quarantined to prevent the spread of the emerald ash borer (DCNR, 2010). Thus, residents are asked not to transport any firewood from these counties to other areas and not to bring firewood into Pennsylvania.

Table 2.4: Invasive Animal—Aquatic

Common Name	Scientific Name
Bighead carp	<i>Hypophthalmichthys nobilis</i>
Black carp	<i>Mylopharyngodon piceus</i>
European rudd	<i>Scardinius erythrophthalmus</i>
Quagga mussel	<i>Dreissena rostriformis bugensis</i>
Round goby (fish)	<i>Apollonia (Neogobius) melanostomus</i>
Ruffe (fish)	<i>Gymnocephalus cermuus</i>
Rusty crayfish	<i>Orconectes rusticus</i>
Silver carp	<i>Hypophthalmichthys molitrix</i>
Snakehead (fish)	<i>Channa spp.</i>
Tubenose goby (fish)	<i>Proterorhinus semilunaris</i>
Zebra mussel	<i>Dreissena polymorpha</i>

Table 2.5: Invasive Animal—Terrestrial

Common Name	Scientific Name	Type
Norway rat	<i>Rattus norvegicus</i>	Mammal
House mouse	<i>Mus musculus</i>	Mammal
Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>	Mammal
Rock dove or pigeon	<i>Columbia livia</i>	Bird
Ring-neck pheasant	<i>Phasianus colchicus</i>	Bird
European starling	<i>Sturnus vulgaris</i>	Bird
House sparrow	<i>Passer domesticus</i>	Bird
Mute swan	<i>Cygnus olor</i>	Bird
Red-eared slider	<i>Trachemys scripta elegans</i>	Reptile (Turtle)
Dutch gypsy moth	<i>Lymantria dispar</i>	Insect
Hemlock woolly adelgid	<i>Adelges tsugae</i>	Insect
Beech bark scale	<i>Cryptococcus fagisuga</i>	Insect
Emerald ash borer	<i>Agrilus planipennies fairmaire</i>	Insect
Asian longhorned beetle	<i>Anoplophora glabripennis</i>	Insect
Woodboring wasp	<i>Sirex noctilio</i>	Insect

Geology

Geologically speaking, the TCGP project area is located within the Appalachian Plateau Physiographic Province. The Appalachian Plateau is the most extensive physiographic province in the Commonwealth, extending from Greene and Somerset Counties in the southwest, to Erie County in the northwest, and to Wayne and Pike Counties in the northeast. Characterized by highlands, the Plateau over time has been carved by water drainage patterns, forming the typical Pennsylvania landscape of rolling hills, deep valleys, and extensive stream systems (DCNR, 1996).

The project area lies within the Pittsburgh Low Plateau Section of the aforementioned province, which is characterized by the smooth, undulating upland areas, cut by narrow and relatively shallow valleys. During the Pennsylvanian period (299 – 318 million years ago), the bulk of the bituminous coal was formed along the upland areas of this physiographic section. Today, the landscape reflects the history of the mining industry—operating surface mines, old strip mined areas, and reclaimed strip mined areas. Elevation throughout the section varies from 660 to 1,700 feet. Due to the steepness of the valley sides, some areas in the southwestern part of the section are susceptible to landslides (DCNR, 2009).



Three different formations of the Pittsburgh Low Plateau section comprise the project area—Glenshaw, Casselman, and Allegheny formations, as shown on **Map 2.5: Geology**. The Glenshaw formation underlies the majority of the area, while the other two underlie much smaller sections. The Glenshaw formation consists of cyclic sequences of shale, sandstone, red beds, thin limestone, and coal. The Casselman formation consists of cyclic sequences of shale, siltstone, sandstone, red beds, impure limestone, and non-persistent coal. The red beds of these two formations are associated with landslides that occur within the region. The Allegheny formation consists of sandstone, shale, limestone, clay, and coal. This formation contains valuable clay deposits, Vanport limestone, and Freeport, Kittanning, and Brookville-Clarion coal (DCNR, 2009).

Soil

Soil is a complex mix of ingredients: minerals, air, water, and organic matter (both dead and alive), forming at the surface of land. The soil performs many critical functions in almost any terrestrial ecosystem (i.e. a farm, forest, prairie, or suburban watershed) (Soil Society of America, 2009). Understanding the soils within the project area is valuable to local government, municipal planners, developers, and farmers, among others so that effective land use practices can occur. According to the Soil Surveys of Allegheny (Newbury, et. al., 1981) and Westmoreland Counties (Taylor, et. al., 1992), the following soil associations are found within the project area; a brief description of each and their appropriate land use is provided. **Table 2.6** lists the specific soil types found within the project area.

According to the Soil Survey of Allegheny County (1981), the soil associations within the project area are:

- ✦ Urban land-Philo-Rainsboro association which is deep, moderately well drained soils and urban land on floodplains and terraces. This association is mainly on almost level bottom land adjacent to streams. The majority of this association is used for residential, commercial, and major industrial developments and for major highway and railroad routes.
- ✦ Gilpin-Upshur-Atkins association which is moderately deep and deep, well drained soils underlain by red and gray shale on uplands and deep, poorly drained soils on floodplains. This association is mostly wooded and on steep and very steep sides of valleys, but also includes narrow, nearly level floodplains. It has severe limitations in terms of use other than trees, predominantly because of the steepness and threat of landslides and hazard of flooding on the floodplains.

According to the Soil Survey of Westmoreland County (1995), the soil associations within the project area are:

- ✦ Philo-Monongahela-Atkins association which is deep, moderately well drained to poorly drained soils on terraces and flood plains. These soils are frequently flooded and have a seasonal high water table thus they are severely limited in terms of residential and industrial development and the disposal of septic-tank effluent.
- ✦ Upshur-Gilpin-Clarksburg association which is deep and moderately deep, well drained and moderately well drained soils over red and blown clay shale, siltstone, and sandstone. About three-fourths of this association is woodland, the rest is cropland or pasture. These soils are limited in terms of residential and industrial development due to instability, slow permeability, moderate depth, and seasonal high water table.

Agricultural Soils

Prime agricultural soil is any soil that belongs to Agricultural Capability Classes I, II, II, and IV as defined by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS); soil of statewide significance; and/or the individual county's listing of prime agricultural soil or additional importance soil.

As such, prime farmland soils are land that is naturally more suited for farming and is level to gently rolling. These soils are developed 36 inches or more to bedrock, fairly free of stones, and well drained. Water moves through prime farmland soils at an acceptable rate. Contrary to popular belief, these soils have nothing to do with fertility, as this can be improved with the addition of manure and fertilizers. Prime farmland soils comprise approximately 290 acres or 24% of soils within the project area and are summarized in **Table 2.6** and shown in **Map 2.6: Soils**. Soils of Statewide Importance are very similar to prime farmland soils; however, they typically have steeper slopes or are wetter soils.

The USDA reports that prime farmland is best suited for food, feed, forage, fiber, and oilseed crops, and produces the highest yields with minimal inputs of energy and economic resources. Consequently, utilizing prime farmland soils for farming purposes results in the least damage to the environment (WCCP, 2005).

Hydric Soils

As defined by the National Technical Committee for Hydric Soils (NTCHS), hydric soils are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Under natural conditions, hydric soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. Hydric soils are typically associated with wetlands or wet areas and are one of the three criteria—hydrophytic vegetation, hydric soils, and wetland hydrology—necessary to classify an area as a wetland (Environmental Laboratory, 1987). Hydric soils comprise approximately 215 acres or 17% of soils within the TCGP project area and are summarized in **Table 2.6** and shown in **Map 2.6: Soils**.

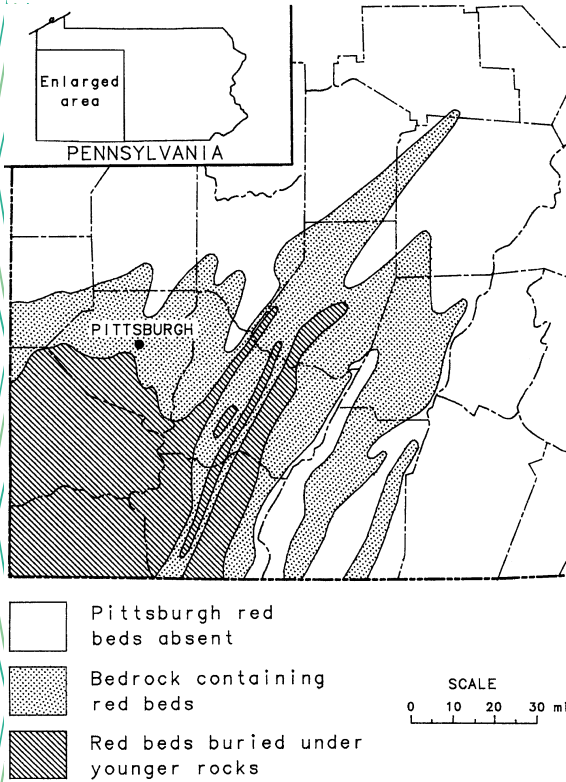
Due to their association with typically wet areas or wetlands, hydric soils are found in floodplains, valleys, and depressional areas where water collects. The high moisture content does not make the soil well suited for development or roadways because of frost action, during which the water expands and contracts. This action can cause cracks and stress on construction materials. Likewise, areas where hydric soils typically occur are prone to flooding and have a high water table; thus land uses that would benefit from such conditions are best suited for these areas. For example, wildlife habitat, green space, and natural flood control are some congruent land uses (Newbury, et. al., 1981).

Table 2.6: Soils

Symbol	Name	Slope Characteristics	Hydric	Prime Farmland
Allegheny County				
At	Atkins silt loam		√	
BrB	Brinkerton silt loam	2 to 8 percent slopes	√	
ErC	Ernest silt loam	8 to 15 percent slopes	√	√
EvC	Ernest-Vandergrift silt loam	8 to 15 percent slopes	√	√
GIB	Gilpin silt loam	2 to 8 percent slopes		√
GIC	Gilpin silt loam	8 to 15 percent slopes		√
GID	Gilpin silt loam	15 to 25 percent slopes		
GpC	Gilpin-Upshur complex	8 to 15 percent slopes		√
GpD	Gilpin-Upshur complex	15 to 25 percent slopes		
GQF	Gilpin-Upshur complex	Very steep		
GvC	Guernsey-Vandergrift silt loam	8 to 15 percent slopes	√	
HaC	Hazleton loam	8 to 15 percent slopes		√
.HTE	Hazleton loam	Steep		
Ph	Philo silt loam		√	√
UB	Urban land			
UCD	Urban land-Culleoka complex	Moderately steep		
UCE	Urban land-Culleoka complex	Steep		
UWB	Urban land-Wharton complex	Gently sloping	√	
UWD	Urban land-Wharton complex	Moderately steep		
WhB	Wharton silt loam	2 to 8 percent slopes	√	√
WhC	Wharton silt loam	8 to 15 percent slopes	√	√
Westmoreland County				
CaB	Calvin silt loam	3 to 8 percent slopes	√	√
GcC	Gilpin channery silt loam	8 to 15 percent slopes		√
GcD	Gilpin channery silt loam	15 to 25 percent slopes		
GoF	Gilpin-Rock outcrop complex	45 to 100 percent slopes		
GuC	Gilpin-Upshur complex	8 to 15 percent slopes		√
GuD	Gilpin-Upshur complex	15 to 25 percent slopes		
GuF	Gilpin-Upshur complex	25 to 75 percent slopes		
GwF	Gilpin-Weikert channery silt loam	25 to 75 percent slopes		
Lo	Lobdell silt loam		√	√
MoB	Monongahela silt loam	2 to 6 percent slopes		√
ShF	Shelocta-Gilpin channery silt loam	25 to 75 percent slopes		
UaB	Udorthents	0 to 8 percent slopes		
UaD	Udorthents	8 to 25 percent slopes		
UdA	Urban land	0 to 3 percent slopes		
UdB	Urban land	3 to 8 percent slopes		
UgB	Urban land-Gilpin complex	0 to 8 percent slopes		
UgD	Urban land-Gilpin complex	8 to 25 percent slopes		
UmB	Urban land-Monongahela complex	0 to 8 percent slopes		
UuB	Urban land-Upshur complex	0 to 8 percent slopes		
UuD	Urban land-Upshur complex	8 to 25 percent slopes		
UwB	Urban land-Wharton complex	0 to 8 percent slopes		
UwD	Urban land-Wharton complex	8 to 25 percent slopes		
VaC	Vandergrift silt loam	8 to 15 percent slopes		√
WeA	Weikert shaly silt loam	0 to 5 percent slopes	√	√
WrD	Wharton silt loam	15 to 25 percent slopes		

Steep Slopes and Landslide Prone Areas

Figure 2-5: Red Beds



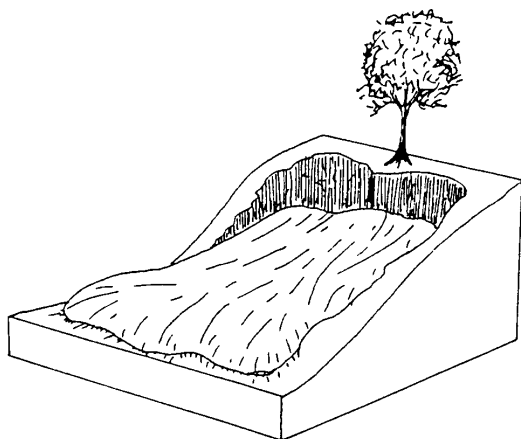
Source: <http://www.pittsburghgeologicalsociety.org/landslide.pdf>

Landslides are common in Pennsylvania because of the hilly terrain, geologic formations, soil types, and steep slopes. **Map 2.7: Steep Slopes** shows steep slopes (15-25%, 25-40%, <40%) within the Greenway.

Many factors can contribute to landslides such as stream erosion, weakened or fractured rock, soil characteristics, earthwork, mining activities, and excess weight on a slope from precipitation and/or ice (Pittsburgh Geological Society, 2009).

Located within the Pittsburgh Low Plateau physiographic region, the majority of the Turtle Creek Greenway project area is underlain with Casselman and Glenshaw formations, both of which consist of cyclic sequences of Pittsburgh red beds. Pittsburgh red beds are a thick, 40- to 60-foot rock layer that consists of a series of mostly reddish, greenish, and grayish claystones and shales. Red beds tend to weather deeply where they occur on hillsides throughout large portions of western Pennsylvania (**Figure 2-5**) and cause earthflow landslides (**Figure 2-6**) defined as “visible, down-slope movement of soil and weathered rock acting as a thick, sticky fluid, typically flowing over bedrock or a layer of clay.” This type of landslide is very common in the Pittsburgh area (Pittsburgh Geological Society, 2009).

Figure 2-6: Earthflow Landslide



Source: <http://www.pittsburghgeologicalsociety.org/landslide.pdf>

Consequently, many municipalities enact land use regulations that restrict development on landslide prone areas, such as steep slopes and areas containing red beds; **Section C: Land Use Regulations** discusses the regulations the project area municipalities have in place. However, unpredictable natural weather events and constantly changing conditions can add an element of uncertainty to identifying prone areas and preventing landslides.

Ridge Tops and Scenic Views

With the Turtle Creek Industrial Railroad paralleling Turtle Creek, a corridor has already been cleared which provides scenic views of the adjacent waterway, wetlands, floodplains, and forested hillsides. The development of the project area was partially based on the vantage point of a person standing within the railroad corridor and looking as far as the eye can see. From that perspective, the Turtle Creek Greenway is in itself a scenic viewshed with its dense, mature forest covering the steep hillsides and stream winding through the valley. Even though residents on the ridgetops typically cannot see the stream valley floor, the vista of the forested edge along their backyard provides seclusion and natural beauty in a semi-urban area. This country feel and privacy is valued among local residents (Landowner Meeting, 2010).

Known to local residents as the Turtle Creek Gorge, this area is encompassed within the Turtle Creek Greenway and includes the mostly undeveloped land and stream valley between Robert's Architectural Products (near B-Y Park) in Trafford Borough east through Penn Township and Monroeville to Thermal Industries in Murrysville. The gorge got its name as the area of Allegheny County with the greatest elevation change within the shortest distance. The gorge is the primary green space within the project area, other than the local and municipal parks and open space. Preserving the natural beauty of the gorge will be a benefit to all area residents as an opportunity to enjoy the recreational and natural beauty the greenway has to offer.

For the most part, the recommended areas for protection include steep slopes, floodplains, wetlands, and forested tracts of land. Thus, from an ecological perspective, this greenway is valuable to protect to preserve its current functions which include wildlife habitat, stormwater and flood control, and hillside stabilization. The economic value of these functions provided by the land is often underestimated and underappreciated.



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Section C › Land Use Regulations

Land use regulations were reviewed for each of the four communities as they pertain to the Turtle Creek Greenway. Municipal zoning ordinances and subdivision and land development ordinances (SALDO) were reviewed to identify existing requirements that are consistent with the goals of the Turtle Creek Greenway Plan—particularly with regards to conservation, open space preservation, stormwater management, landscaping, buffers, etc.

Municipality of Monroeville

The Department of Community Development in Monroeville is in charge of overseeing development within the Municipality through its land use regulations. The Department is responsible for the enforcement of the Municipal Zoning Ordinance, administration of the Municipal Subdivision Ordinance, reviewing subdivision and site plan applications, and developing and implementing the Municipal Comprehensive Plan.

Monroeville adopted their Municipal Zoning Ordinance in 1984, as amended. The Ordinance contains the following requirements that pertain to the Greenway:

-  Zoning Districts—the following zoning districts are encompassed by the Greenway within Monroeville:
 - ⇒ S Conservancy District—Permitted uses include agriculture, cemetery, nature preserve, one-family residential, parks and recreation, and accessory uses. Conditional uses include church and school, golf course, group dwelling A, heliport, major excavation, major timbering and logging operation, public building, public school, stable, and utility substation. Minimum lot area is 20,000 square feet. The majority of the land in in the Greenway is zoned Conservancy.
 - ⇒ R-1 One Family Residential—Permitted uses include agriculture, one-family residential, parks and recreation, and accessory uses. Conditional uses include church and school, dependent dwelling, golf course, group dwelling A, major excavation, major timbering and logging operation, public building, public school, recreation club, and utility substation. Planned residential developments are also permitted. Minimum lot area is 10,000 square feet. The land nearest the brickyard is zoned R-1.
 - ⇒ R-2 One Family Residential—Permitted uses include agriculture, one-family residential, parks and recreation, and accessory uses. Conditional uses include church and school, dependent dwelling, golf course, group dwelling A, major excavation, major timbering and logging operation, public building, public school, recreation club, and utility substation. Planned residential

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developments are also permitted. Minimum lot area is 7,500 square feet. The land between Valley Park and Alpine Park is zoned R-2.

⇒ M-1 Planned Industrial—Permitted uses include agriculture, ancillary cafeteria, distribution center, light manufacturing, offices, research laboratory, warehousing, and accessory uses. Conditional uses include billboards, commercial communication tower, commercial communication antenna, community Use, freight terminal, gas station, personal care home, hospital, major excavation, major timbering and logging operation, manufacturing, public use, utility substation, and vehicle services. Planned group units are also permitted. The land along the eastern boundary of the Greenway in Monroeville is zoned M-1.

- 🌳 Currently has no specific landscaping standards, buffers, or tree requirements in place (with the exception of one tree for every 5 parking spaces in the case of parking lots)
- 🌳 Currently refers all stormwater to the Stormwater Management Ordinance

Monroeville adopted their Municipal Subdivision Ordinance in 1971, as amended. The Ordinance contains the following requirements in regards to land conservation/sensitive area preservation:

- 🌳 Restricts hillside subdivisions and gives the Planning Commission power to apply stricter standards (beyond the basic regulations) to those subdivisions whose average slope is greater than 15%.
- 🌳 Gives the Planning Commission power to mandate conservation of natural features in an effort to protect from erosion, i.e., existing vegetation, trees, etc.
- 🌳 Any subdivision of five (5) lots or more and/or with an average slope more than 10% must submit plans to the U.S. Soil Conservation Service for review and comment.
- 🌳 Also includes extensive land disturbance standards (applicable to all subdivision and land developments) which seek to reduce or eliminate unnecessary filling or grading.
- 🌳 Timbering and logging is also controlled in an effort to reduce runoff and protect floodplains and wildlife habitats.

Monroeville enacted a Stormwater Management Ordinance in 2005. The following provisions are in place:

- 🌳 Requires compliance with the Turtle Creek Stormwater Management Plan, which was adopted in 1991.

- ✦ Contains extensive and progressive regulations regarding best management practices (BMP's), including requiring compliance with current PA DEP suggested BMP's as well as any techniques outlined in the Turtle Creek Stormwater Management Plan.
- ✦ Includes innovative provisions for alternative “low-impact development” approaches to stormwater, well-outlined provisions for protecting natural depression storage areas, reducing the use of storm sewers, routing roof runoff over lawns, reducing street and sidewalk widths, using permeable surface materials, and constructing cluster developments.

Municipality of Murrysville

In Murrysville, the Community Development Department is responsible for the administration and coordination of planning, zoning, construction permits, code enforcement, and subdivision and land development within the Municipality.

Murrysville enacted their Zoning Ordinance in 2005, as amended. The Ordinance contains the following requirements that pertain to the Greenway:

- ✦ Zoning Districts—the following zoning districts are encompassed by the Greenway within Murrysville:
 - ⇒ R-2 Medium Density Residential District—The purpose of the Medium Density Residential District is to provide an alternative in the choice of housing areas for those persons who desire a relatively low density of single-family development but do not wish to obtain a minimum of one-acre lot and a variety of housing types in the planned residential development. It is expected that off-site sewer and water services would be required because of the density of development provided. The land between the Railroad Corridor and Meadowbrook Road is included in this District.
 - ⇒ B Business District—The purpose of the Business District is to provide areas for the location of commercial and industrial uses in areas of the Municipality where infrastructure can support such uses; to develop and operate these uses in such a manner as to minimize the impact of these uses on that infrastructure and surrounding properties; and to develop and operate these uses consistent with the goals and objectives of the Municipality. There are only a few parcels within the Greenway that fall within this District, located near Duff Park. In addition, some of these parcels are also included in the General Business Overlay. The purpose of the Overlay is to promote and maintain a sustainable mixture of commercial and residential development.

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- ⇒ R-R Rural Residential District—This District is intended to protect environmentally sensitive areas and portions of the Municipality that are not otherwise suitable for development at higher densities. Single-family residential uses on large lots where needs for traffic facilities and utilities are low and where it is appropriate to reserve the rural atmosphere of the Municipality are primary considerations. The land within the “Gorge” along Round Top Road near Duff Park is included in this District.
- ⇒ P-L Public Land District—This District is intended to protect publicly owned land where preservation of land and where land uses are designed to benefit the public interest. Schools, park and conservation areas owned and operated by a governmental entity shall be identified and mapped as public land. Duff Park is encompassed by this District.

- 🌲 Steep slope regulations allow certain types of development to occur on specific percentages of land with slopes greater than 25% and less than 40%, and permits / encourages such land to be used in a natural-like state, such as open space or passive recreation / horticulture
- 🌲 Permits limited conditional uses in areas with slopes greater than 40%.
- 🌲 Requires a landscaping plan to be submitted for any development utilizing a stormwater detention pond/basin, but does not specify standards/performance criteria.
- 🌲 Requires buffering between “incompatible” uses and districts but does not currently have any water protection or riparian protection buffer standards in place.

Murrysville adopted their Subdivision and Land Development Ordinance in 2005, as amended. The Ordinance contains the following requirements in regards to land conservation/sensitive area preservation:

- 🌲 Requires a mandatory dedication of open space, parks, etc. or a fee-in-lieu of, and includes provisions for how much of that land can be environmentally sensitive; also permits either passive or active space (i.e., can be woodlands, pasture, wetlands, etc.).
- 🌲 Erosion and Sedimentation Control standards require adherence to current BMP’s and also restrict timbering activities and require agricultural tilling activities to submit plans to Westmoreland County Conservation District.
- 🌲 Also includes specific regulations regarding residential development in floodplain districts, such as special design standards aimed at protecting watersheds, distinct review criteria, and regulations addressing impacts such as grading, streets, sanitary sewers, utility connections, etc.

Murrysville enacted a Stormwater Management Ordinance in 2006, as amended. The following provisions are in place:

- ✦ Includes good performance standards for stormwater management, including a requirement to meet the regulations of the Turtle Creek Stormwater Management Plan.
- ✦ Also includes design criteria that incorporate good techniques based upon current BMP's recommended by DEP.

Penn Township

Penn Township enacted their Zoning Ordinance in 1995, as amended. The Ordinance contains the following requirements that pertain to the Greenway:

- ✦ Zoning Districts—the following zoning districts are encompassed by the Greenway within Penn Township:
 - ⇒ R-1 Residential District—Permitted uses include single-family detached dwellings, accessory uses, agriculture / horticulture, boarding stables, hobby farms, home gardening, private stables, municipal uses and essential services. Minimum lot size for a single-family home in this district is 30,000 square feet. Most of the Greenway falls within this District.
 - ⇒ A-1 Agricultural District—Permitted uses include agriculture, all types of farming (including dairy cooperatives, greenhouses / nurseries, farm markets, etc.), single-family detached dwellings, stables, public parks and playgrounds, municipal uses, and essential services. Minimum lot size for a single-family home in this district is 1.5 acres.
 - ⇒ M-1 District—Permitted uses include warehouses, self-storage, research and testing laboratories, and business or professional offices.
- ✦ No significant regulations regarding landscape buffers / watershed protections / steep slopes, etc.

Penn Township adopted their Subdivision and Land Development Ordinance in 1993 as amended. The Ordinance contains the following requirements in regards to land conservation/sensitive area preservation:

- ✦ Includes requirement for mandatory open space / parks dedication or fee-in-lieu-of for all subdivisions and land developments (using a ratio calculation specified in the regulations, thus most minor subdivisions would not qualify).
- ✦ Includes requirements for easements along streams, though no dimension is specified, just says, “adequate.”

Turtle Creek Greenway Plan

Penn Township enacted a Stormwater Management Ordinance in 2004, as amended. The following provisions are in place:

- 🌲 Extensive regulations that follow DEP's Model Ordinance and Pennsylvania's Stormwater Best Management Practices Manual very closely.
- 🌲 Includes detailed requirements regarding what is to be shown on the plan, as well as agreements for maintenance and operations (using language from DEP's Model Ordinance).
- 🌲 The general performance standards, prohibited discharges, rate controls, and so forth all follow DEP recommendations.
- 🌲 Additionally, Penn requires a "no harm evaluation" which is often recommended as a best practice but not often implemented in ordinances.
- 🌲 Requires conformance to all Turtle Creek Stormwater Management District standards.
- 🌲 Includes illustrative "plates" regarding requirements for the design of stormwater facilities (the design criteria and standards are based upon the Pennsylvania Stormwater Best Management Practices Manual).
- 🌲 Recommends the use of "typical" calculation methods encouraged by DEP (i.e., TR-20, TR-55, HEC-1, PSRM, Rational).
- 🌲 Requires redevelopment projects to evaluate the possibility of reducing site impervious area by 20%.
- 🌲 Includes appendices that outline Low-Impact Development Techniques, BMP Maintenance, and detailed Runoff Curve numbers and Runoff Factors (all based on current standards recommended for use by DEP).

In addition, Penn Township allows for "stormwater credits," a very good practice that encourages better and more naturally designed stormwater drainage systems (see Section 144-18 (I) for more info):

- 🌲 If natural areas are conserved per the requirements, the applicant may use this as a "credit" when calculating their runoff volume, thus reducing the amount of runoff that needs to be stored and treated (i.e., reducing their Water Quality Volume calculation, or WQv).
- 🌲 Some of the techniques that the Township allows to be used for "credit" include: natural area conservation, stream buffers, disconnection of runoff either rooftop or non-rooftop, grass channels, and "environmentally sensitive development."

Trafford Borough

Trafford Borough enacted their Zoning Ordinance in 2008, as amended. The Ordinance contains the following requirements that pertain to the Greenway:


- Zoning Districts—the following zoning districts are encompassed by the Greenway within Penn Township:
 - ⇒ R-1 Single-Family Residential District—Permitted uses include single-family dwelling only; educational or religious use not conducted as a gainful business, when permitted as an exception and on a street classified as other than minor - marginal access; nursery-kindergarten grades one through six may be on a minor - marginal access street.; park, playground; home gardening without the sale of products, provided that no dust, odor or injurious chemical substance or use shall be permitted; private garage and no other accessory uses; and private swimming pool and no accessory uses. The land north of the railroad along Turtle Creek is zoned R-1.
 - ⇒ C-2 Heavy Commercial District—Permitted uses include all heavy commercial activities permitted, except processes or operations which may be noxious or injurious by reason of dust, odor, smoke, refuse material, gas, fumes, noise, vibration or danger from explosion; all uses permitted in the C-1 District, except secondary uses; and the following or comparable uses (boat and trailer sale, wholesale, storage, building material, except stone-crushing and concrete-mixing, cleaning, dyeing, distributing plant, parcel delivery, ice storage, locker service, beverage distribution or bottling plant, retail lumber sales in a fire-resistant building, major garage, auto repair, filling station, contractor, equipment storage when placed in an opaque enclosure, utility substation, volume- or pressure-control station when screened by organic plantings having a thickness of at least three feet or fire-resistant material to the full height of the equipment attached or resting on the ground, monument works, provided that the process is done within a structure). The small parcel south of the railroad at the intersection of Forbes Road and US 130 is zoned C-2.
 - ⇒ I-2 Heavy Industrial District—Permitted uses include steel fabricators; chemical industries employing more than 10 employees; asphalt manufacture or refining; wrecking or dismantling of motor vehicles, storage of the parts and materials from such operations and the storage of other junk, only within a completely enclosed building or if surrounded by an opaque fence at least seven feet in height; and premix concrete plant.. The Penn Forest Football Club land is zoned I-2.


Turtle Creek Greenway Plan

⇒ P Permanent Preserve District—Areas so classified on the Zoning Districts Map are generally areas of excessive slope, inaccessible land or remnants of land not suited for general uses. These areas may be used for the following purposes or comparable purposes if, in the opinion of the Zoning Hearing Board, they are suited to the characteristics of the land and are not detrimental to adjacent land uses: recreational uses, tree nursery or commercial forest, and landfill when permitted by special exception and when approved by the proper health authorities. The remainder of the land in the Greenway in Trafford is zoned Permanent Preserve.


 No major parameters regarding landscaping, stormwater, buffers, etc.

Trafford Borough adopted their Subdivision and Land Development Ordinance in 1989 with Stormwater Management Standards adopted in 2004. The Ordinance contains the following requirements in regards to land conservation/sensitive area preservation:

 Includes provisions for the Borough to require open space, recreation, or woodland/natural area conservation if a development is deemed “large-scale” and/or “not anticipated” as part of the current Comprehensive Plan/Future Land Use Map.

 Includes good erosion and sedimentation controls.

 Includes provisions for BMP’s.

 Includes Low-Impact Development Techniques identical to those described in Monroeville’s ordinance earlier.

 No reference to Turtle Creek Stormwater Management Plan.

Stormwater Management Act (Act 167)

In 1978 in response to the impacts of accelerated stormwater runoff resulting from land development, the state enacted Pennsylvania's Stormwater Management Act (Act 167). The Act requires counties to prepare and adopt watershed based stormwater management plans, which municipalities are required to use to adopt and implement ordinances to regulate development. Allegheny County is in the preliminary stages of their Act 167 Plan and Westmoreland County is doing Phase I. The Act 167 Plan for the Turtle Creek Watershed was originally written in 1991.

Up until 2009, PA DEP provided technical, administrative, and financial assistance for the preparation of Stormwater Management Plans and funded 75% of the associated costs that the counties incur. At the municipal level, DEP also reimbursed municipalities for 75% of the allowable costs for enacting, administering, and implementing stormwater ordinances. However, Act 167 funding was eliminated from the 2009-10 and 2010-11 Pennsylvania budgets. Consequently, progress on watershed-wide stormwater planning has been slowed.