

Section 5: Biological Resources

Introduction

Decades before there was a United States, a young George Washington, sent to survey Pennsylvania's western frontier, recognized the rich abundance of the land south of the Ohio River and claimed it all for himself. Although it is doubtful he ever praised the "biological resources" of the Raccoon Creek Region as such, he certainly saw economic potential in its tall timber, fur-bearing animals and fertile soil.

Indeed, the Raccoon Creek Region supports a wealth of biological resources. In dry, scientific terms, these are all the plants and animals, the natural communities and the physical environment of the Region. In more human terms, the biological resources are what we, like George Washington and the First Americans before him, value most highly: cool, shady forests; rich farmland soils; clean, healthy waters; abundant wild creatures of the land, water and air.

A measure of the ecological health of the Watershed is the variety of all its life forms, or "biodiversity." Biodiversity relates to the number of species present, the genetic variation within these individual species and the natural systems within which the organisms live. Human beings are an inseparable part of these ecosystems.

Biodiversity is critically important to the quality of life enjoyed by people in the Raccoon Creek Region. Besides the abundance of game animals like white-tail deer, turkey and sport fish, a healthy watershed provides many services that are often taken for granted. Flood control, water purification, temperature regulation, pollination, oxygen production, photosynthesis, waste decomposition and pest control are difficult to quantify. These services are typically provided quietly, efficiently and without cost.

Somewhat easier to measure is the worth of biodiversity in products that are harvested, sold and used for food, fuel, fiber or medicine. Biodiversity also equates with beauty. Appreciation for that beauty is the economic stimulus for outdoor recreational opportunities such as hiking, biking, hunting and fishing, paddling and eco-tourism.

We stand a significant risk of losing biodiversity and its valuable services, products and opportunities when we carelessly ignore or manipulate the components of our natural world. We also jeopardize the chance to gain future benefits if previously damaged ecosystems are not restored or reclaimed when we have the opportunity.

Historical Changes

Today, we can only imagine what the Raccoon Creek Region might have looked like before the advent of European settlers and the changes they brought about on the landscape. In contrast, prehistoric peoples and the Native Americans survived by living sustainably, in harmony with the land. Indeed, our long-ago predecessors knew no other way of life and lacked the tools or technology to upset nature's balance as did our European-descended ancestors.

Climate-Induced Changes

Earth's climate goes through natural cycles of extremes in cold, warmth, drought and precipitation. But in addition to these normal, long-term changes, recent human population growth has altered climate on a global scale.

During the past 1,000 years, the number of people on earth has grown from about 250 million to over six billion.¹ The consumption of natural resources required to sustain this population has brought about worldwide climate change. Industrialization, deforestation and pollution have greatly increased atmospheric concentrations of water vapor, carbon dioxide, methane and nitrous oxide - greenhouse gases that trap heat near the earth's surface. Humans are pouring carbon dioxide into the atmosphere much faster than plants and oceans can absorb it.² As world population continues to climb, severe weather and its consequences will have an increasing impact on society and the environment.



Figure 5.1: A hazy sun rises over Little Blue Reservoir. 8/29/2007.

In the Raccoon Creek Region, floods resulting from heavy rains and melting snow cause erosion which can damage property, relocate stream channels, aggravate pollution and damage roadways. Residents of the Region identified flooding as one of their biggest concerns (see Section 2: Issues, Concerns & Constraints). Periods of drought and excessive heat are costly as well, resulting in lost crops, forced sale of livestock, higher utility bills and power outages.

¹ NOAA Satellite and Information Service, available at <http://www.ncdc.noaa.gov/paleo/ctl/1000.html>, accessed 6/4/2014

² National Geographic News, Global Warming Fast Facts, available at http://news.nationalgeographic.com/news/2004/12/1206_041206_global_warming_2.html, accessed 6/4/2014

Human-Induced Changes

More obvious and less debatable than global warming are the changes people bring to the land itself. The human pursuit of food, fuel and shelter has drastically altered much of the landscape of the 'civilized' world. Nowhere in the Raccoon Creek Region is this more evident than in the fields of the Pittsburgh Coal Seam. Here the legacy effects of unregulated strip mining and shallow drift mining are legion - hundreds of piles of coal waste, miles of lifeless or impaired streams and farmlands forever lost. An extensive discussion of the Raccoon Creek Region's historic resource extraction industries, their place in US industrial history and environmental impact is found in Section 3: Land Resources.

In citizen surveys conducted to prepare the Raccoon Creek Watershed Conservation Plan, many people expressed concern that new resource extraction industries should be developed carefully, learning from mistakes made in the past. Without a doubt, the energy industry will have a tremendous, far-reaching effect on the natural features of the Raccoon Creek Region and on every aspect of life for its residents.

Forest fragmentation: pipelines, power corridors and roadways

Underground pipe lines and above ground power corridors are built to move fuels and electricity from the places they are produced to places they are consumed. Although pipelines are buried, their construction, monitoring and maintenance require open corridors, kept free of woody vegetation. Electric power transmission lines, although suspended on towers well above ground, also need right-of-way maintenance that causes fragmentation of forest land cover. Roadways and transportation corridors have become a defining feature of our landscape as our modern way of life centers around automobiles.

Although the widths of pipelines, power lines and roadways vary, they have the common effect of fragmenting large tracts of forest into smaller ones. While pipelines and power lines can be planted with wild game food grasses, the loss of continuous woodland tracts causes serious disruption to birds, animals and plants that depend on the shade and shelter of larger forest areas. Undivided blocks of tree-covered land are especially valuable and should be maintained or



Figure 5.2: High-tension towers march across the rolling terrain of Hopewell and Center Townships. Note the deer grazing at lower left. 4/13/2014.

restored wherever possible. Deep forests provide many benefits:

- Habitat for wide-ranging, rare and endangered species
- Resistance to invasive plants, animals and microbes
- Less timber damage from wind and ice storms
- Water filtration and carbon storage³
- Recreation and tourism opportunities

As forest fragmentation occurs, some species benefit from it while others are harmed. Winners tend to be habitat generalists that tolerate disturbance and can coexist with people. These include the raccoon, opossum, white-footed mouse, blue jay and American crow. Wildlife losers include species such as forest hawks that tend to be intolerant of disturbance; salamanders that have poor dispersal abilities and forest-interior songbirds. Other losers are species that are already rare or have very limited ranges, such as the timber rattlesnake, Allegheny wood rat and the northern flying squirrel. This shift in species composition is troublesome because species of conservation concern tend to be lost, replaced with species that tend to be wide-ranging and common both in Pennsylvania and elsewhere.⁴

Penn State University's online [Marcellus Field Guide](#) addresses the question of forest fragmentation and potential benefits of new habitats for wild game species:

"A question that often comes up is whether the edges and new habitats created through fragmentation can be beneficial for some of our game species such as white-tailed deer and wild turkey. The answer will depend on the type of edge habitat and how it is managed. Whether an edge habitat is good or bad for a species depends on characteristics of both the species in question and the type of edge. If the edge or the new habitat provides a resource that is used by the species and is either not available or is in low supply within the forest, it can be beneficial. For example, depending on how it is configured and seeded, a pipeline or a restored pad could provide foraging habitat for turkey and deer. On the other hand, a pad covered in stone would not provide any resources for most wildlife species so would not be beneficial. Large and expanded roads also would not provide a beneficial edge. In some situations, animals may be attracted to an area because of the type of habitat provided, but either their survival or the survival of their nests or young is poor in these areas because of the predators that are also attracted there. This is termed an ecological trap. One of the goals of management is to manage pipelines and restored pads so they provide habitat

³ Johnson, Nels, et al, Natural Gas Pipelines, Excerpt from Report 2 of the Pennsylvania Energy Impacts Assessment, December 16, 2011, The Nature Conservancy, Pennsylvania Chapter, available at <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/pennsylvania/ng-pipelines.pdf>, accessed 6/4/2014

⁴ Brittingham, Margaret, Penn State Marcellus Shale Electronic Field Guide, available at http://www.marcellusfieldguide.org/index.php/guide/ecological_concepts/habitat_fragmentation/, accessed 6/4/2014

without becoming ecological traps. This means that there are opportunities for positive benefits for some species depending on when and how the areas are reclaimed and managed and the level of human disturbance in the area.”⁵

Light pollution

An often-overlooked factor in the alteration of our natural world is light pollution. The International Astronomical Union defines light pollution as “artificial light that shines where it is neither wanted, nor needed.”⁶ When artificial outdoor lighting becomes inefficient, annoying and unnecessary, it is known as light pollution.

Increased development leads to more artificial illumination at night. In rural areas where the only night lights used to be the moon and stars, suburban sprawl has brought glaring exterior lighting to roads, private yards and commercial centers. The collective impact of stray outdoor lighting can blot out even the brightest stars.

The National Institute of Environmental Health Science relates this story:

“...when a 1994 earthquake knocked out the power in Los Angeles, many anxious residents called local emergency centers to report seeing a strange “giant, silvery cloud” in the dark sky. What they were really seeing—for the first time—was the Milky Way, long obliterated by the urban sky glow.”⁷

Many researchers consider light pollution to be one of the fastest growing and most pervasive forms of environmental pollution. A growing body of scientific research suggests that light pollution can have lasting adverse effects on both human and wildlife health. Turning off the lights not only saves energy, it can help save wildlife as well. The luminous orange glow that haloes cities and suburbs threatens wildlife by



Figure 5.3: Night-lights imagery by NASA's Earth Observatory, 2012, showing dark skies between Routes 30 and 22; also south of Avella. Note light pollution tracing the Ohio River and Route 18 south of Route 22.

⁵ Ibid.

⁶ International Astronomical Union, Controlling Light Pollution, available at http://www.iau.org/public/themes/light_pollution/, accessed 6/5/2014

⁷ Chepesiuk, Ron, National Institute of Environmental Health Science, Environmental Health Perspectives, Missing the Dark: Health Effects of Light Pollution, available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2627884/>, accessed 6/5/2014

disrupting biological rhythms and interfering with the foraging and breeding behavior of nocturnal animals.⁸

Fireflies are particularly sensitive to nighttime light conditions. Fireflies typically will not make an appearance where there is bright ambient light, such as full moon evenings. If artificial light interrupts fireflies' ability to signal each other, it could disrupt mating, meaning fewer fireflies will be born each year.⁹

Residents of the more rural areas of the Raccoon Creek Region are fortunate to enjoy darker skies than those living closer to urbanized areas. Southwestern Beaver County and northwestern Washington County are often graced with clear views of the Milky Way, shooting stars and constellations – nature's free nighttime light show.

Native Wildlife

Wildlife is the most dynamic and engaging part of our natural world. Human interactions with wildlife can be exciting, absorbing, enriching and rewarding – sometimes dangerous, costly or aggravating – but never boring. Even for those who do not consider themselves “outdoorsy,” spotting a grazing fawn, hearing a coyote howl at night or passing under the shadow of a soaring hawk reminds us that we share with these creatures a much larger world than the routine confines of our homes and workplaces.

The Raccoon Creek Region is blessed with a natural abundance of native wildlife in the form of mammals, birds, fish, amphibians and reptiles. Every species has a critical role in the web of life that sustains and enriches us. Every species has its own needs for food, shelter and specialized habitat. It is our duty to understand these needs so that we can preserve and enhance the natural areas our wild companions need in order to survive and flourish.

A diversity of wildlife and fisheries lends great recreation potential to the Region. Hunting, fishing, wildlife watching, birding, hiking, paddling and camping are perennial favorite



Figure 5.4: A tom turkey dances with a hen on a sunny spring day, 4/1/2014.

⁸ Guynup, Sharon, (4/17/2013) National Geographic News, Light Pollution Taking Toll on Wildlife, Eco-Groups Say, available at http://news.nationalgeographic.com/news/2003/04/0417_030417_tvlightpollution.html, accessed 6/5/2014

⁹ Firefly.org, About Light Pollution, available at <http://www.firefly.org/light-pollution.html>, accessed 6/5/2014

activities of Pennsylvanians and tourists who spend over \$21 billion per year in outdoor recreation pursuits statewide.¹⁰ Outdoor tourism and recreation has long been one of the PA's top economic generators. Protecting our natural wildlife and the food, water, cover and space they require is a wise investment for all.

Wildlife is a renewable resource of great interest to the residents of the Raccoon Creek Region. This section of the 20D Raccoon Creek Region Conservation Plan highlights a sampling of some of the wildlife resources that are native to the area. Threatened, endangered and invasive species are described later in this section.

Terrestrial Wildlife

Terrestrial wildlife describes animals that live primarily on the land within the Region: birds, mammals, amphibians and reptiles. Before the advent of European immigrants, the Raccoon Creek Region teemed with wildlife we seldom see now. White settlers considered many species to be nuisances, driving them away or hunting them to the point of extirpation (removal or destruction) or total extinction. Bears, wolves, mountain lions, weasels, crows, hawks, owls, venomous snakes were feared and misunderstood to be dangerous, destructive or vicious predators of people. Otter, beaver and other furbearers were ravaged by market hunting and trapping. Even white-tail deer populations were depleted to the point of scarcity. Passenger pigeons, once so bountiful that clouds of them darkened the skies, were driven to extinction in 1912.

Throughout the 1800s, habitat was irreversibly altered or lost completely by clear cutting for agriculture, fuel, building construction and timber props for coal mines. Streams became so polluted with silt, manure, sewage, offal and mine drainage that fish and aquatic organisms could not survive in many headwaters.



Figure 5.5: A hillside in what is now Raccoon Creek State Park is denuded to cut timber props to hold up the roofs of coal mines, ca. 1930s. Photo courtesy of Park archives.

By the latter part of the 19th Century, attitudes began to change, leading to the founding of the PA Fish Commission (now the PA Fish & Boat Commission) in 1866 and the Pennsylvania Game Commission in 1895. Decades of work by these and other state agencies, sportsmen and enlightened citizen partners led to large-scale improvements in habitat, pollution control and species re-introduction. Today, the biologists, resource managers and law enforcement

¹⁰ Pennsylvania's Return on Investment in the Keystone Recreation, Park and Conservation Fund: The Trust for Public Land, 2010, available at <http://cloud.tpl.org/pubs/benefits-pa-keystone-roi-report.pdf> accessed 6/10/2014

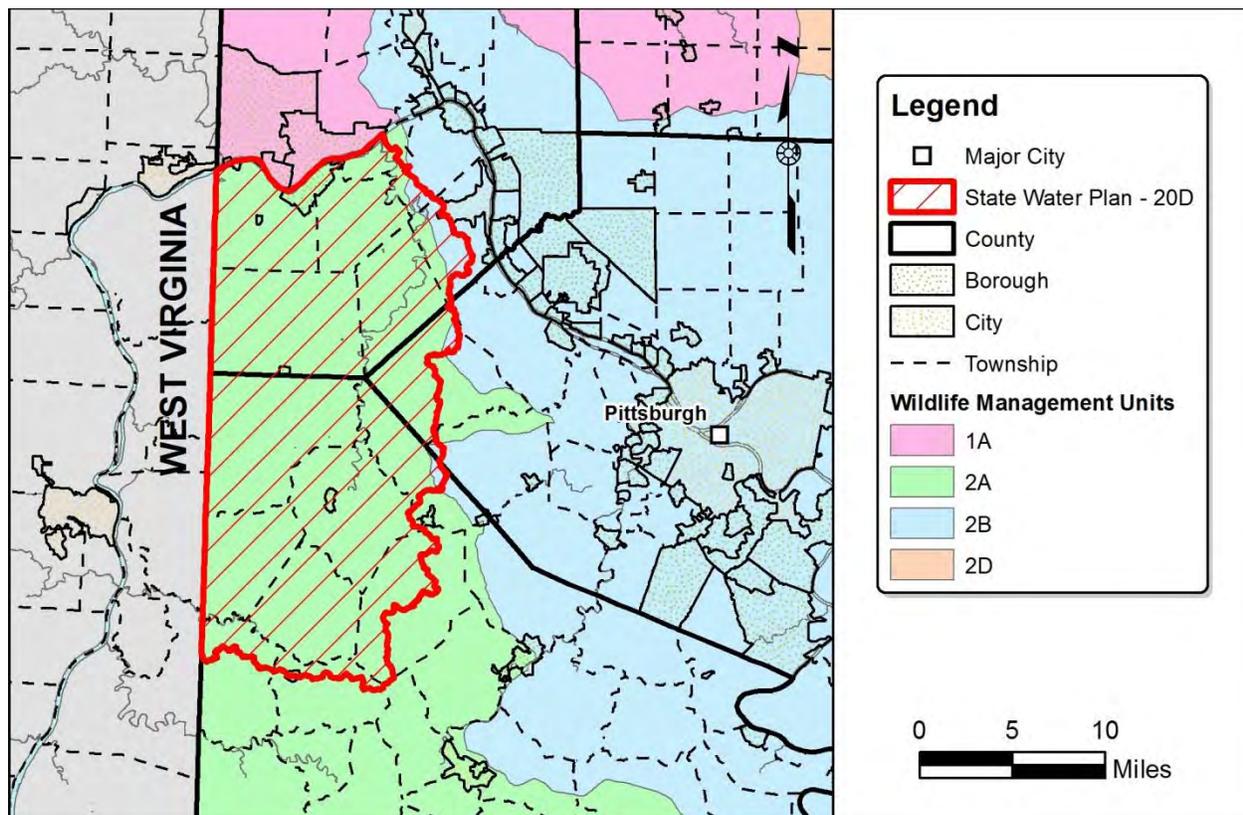
professionals of these agencies perform a wide variety of duties ranging from protection of threatened and endangered species, harvest management, habitat enhancement, pollution prevention, research, education, public relations and more.

Mammals

Native mammals include some of the Region’s most well-known wildlife: white-tailed deer, raccoons, opossums, skunks, squirrels, woodchucks, muskrats and hares are common sights, even in suburbia. Many carnivorous (meat-eating) species, especially large and/or solitary predators like bobcats and fishers, need larger tracts of territory to reproduce and thrive than do herbivores (plant eaters). Survival of these species is threatened by shrinking and increasingly fragmented habitat.

To aid in the management of wildlife, the PA Game Commission has divided the state into Wildlife Management Units (WMU). These WMUs are based on land use, habitat, public land ownership, human density and physical features. Figure 5.4 defines the WMUs within the Raccoon Creek Region. Nearly the entire Region lies within WMU 2A; two small sections of WMU 2B are located along the eastern boundary of the watershed.

Figure 5.6: PA Game Commission Wildlife Management Units (WMUs) in the 20D Sub-basin



Bats are the only mammals that fly. Often feared and misunderstood, bats help to control insect populations by consuming up to one-quarter of their body weight in a single feeding. All of Pennsylvania's bats are nocturnal – active mostly from early evening to early morning. Next to humans, the greatest threat to bats is White Nose Syndrome, a disease covered in greater detail in the “Invasive Microbes” discussion.

Birds

This section about birds of the Raccoon Creek Region was contributed by Michael Fialkovich, Bird Reports Editor, Three Rivers Birding Club, and Vice President, Pennsylvania Society for Ornithology.

The Raccoon Creek Watershed provides habitat for a wide variety of birds at all seasons. The various habitats ranging from marsh to forest attracts and supports birds that breed, migrate and winter in the region. Some of the most colorful neotropical migrants in North America use the area for nesting, while others use the habitats as stopover sites to rest and refuel before continuing their migration.

Streamside areas are the home of Yellow-throated Warblers, Yellow Warblers, Song Sparrows and Warbling Vireos. Yellow-throated Warblers prefer sycamores which grow along the watercourses for foraging and nesting while Yellow Warblers, Common Yellowthroats and Song Sparrows nest in brushy vegetation. Cerulean Warblers (a species in decline) continue to nest in the area.



Figure 5.7: A Belted Kingfisher, *Megaceryle alcyon*, watches intently for its next meal at Raccoon Creek State Park's upper lake, 7-1-2013.

Wetlands with emergent vegetation such as cattails are the home of Red-winged Blackbirds, Swamp Sparrows and Tree Swallows. Many wetlands are manmade as part of the reclamation process for area surface mines, so they pull double duty as water purification systems and avian habitat. Rusty Blackbirds use the wetlands during their migration from the southern states where they winter to the bogs of northern Canada where they nest. This is a species currently under intensive study due to its alarming decline over the last decade. Stopover habitats during migration are monitored by the Pennsylvania Game Commission in an effort to determine this species' movements through the state as one important part of the puzzle to determine what can be done to reverse the downward trend in the population.

The wetlands also attract a surprising variety of migrant waterbirds. Virginia Rail, Sora, Common Gallinule and American Bittern were discovered using the marshes as stopover sites during migration. Shallow ponds with muddy margins in the grasslands in Findlay Township

have been the only consistent location in the area to attract an impressive variety of migrating shorebirds, some representing rare species for the state such as phalaropes, Buff-breasted Sandpiper, Snowy Plover, American Avocet, Long-billed Dowitcher, Willet and Whimbrel. Spotted Sandpipers and Killdeer use the pond margins for nesting. In all, 31 species of shorebirds have been recorded. A large Great Blue Heron nesting rookery has been active along Raccoon Creek for many years. Wood Ducks and Hooded Mergansers use standing dead trees with cavities for nesting.

Extensive reclaimed surface mines attract grassland dependent species. Short-eared Owl, Northern Harrier, Vesper Sparrow, Savannah Sparrow, Henslow's Sparrow, Grasshopper Sparrow, Eastern Meadowlark and Bobolink have all bred in the grasslands. Rough-legged Hawks that breed in the arctic spend the winter in the area. Shrub borders adjacent to the grasslands and roadsides attract nesting Brown Thrashers, White-eyed Vireos, Yellow-breasted Chats, Blue-winged Warblers and Prairie Warblers during the summer and American Tree Sparrows in the winter. Game species including Wild Turkey, Ruffed Grouse and American Woodcock are widespread. Woodcocks and turkeys use the grasslands for feeding and courtship displays, and shrub areas for nesting, so they rely on a variety of habitat types to survive.



Figure 5.8: Canada geese take flight on the Findlay Grasslands, a reclaimed strip mine turned important bird habitat, 4-5-2005.

Great Horned Owls, Eastern Screech-Owls, Black and Yellow-billed Cuckoos, Wood Thrushes and Hooded Warblers use wooded sites. A pair of Long-eared Owls nested just outside the area during the late 1980s, one of only six confirmed nesting pairs discovered during the first Pennsylvania Breeding Bird Atlas Project, 1983-1989. Others have been occasionally detected during migration within the watershed. Due to extremely elusive behavior, their current status is unknown and they are listed as Threatened by the Pennsylvania Game Commission.

Birds and all wildlife are impacted by development, pollution and disturbance. This has been the case where development is in progress. The new interstate (I-576) that was completed a few years ago impacted the grassland birds and continued development of light industry is reducing habitat. Short-eared Owls no longer nest in the area (although they continue to winter here) and the population of Vesper and Henslow's Sparrows is in decline. It's a dilemma because the original disturbance of surface mining resulted in grassland habitat through the reclamation process that eventually attracted birds not found in the surrounding area. Water pollution from mines is treated using wetlands that now attract wetland dependent birds;

however the water still contains iron oxide, evidenced by the orange coloration. Preserved areas like Raccoon Creek State Park and provides safe haven for a variety of birds however it does not cover all habitat types. The State Game Lands / Hillman State Park in Bavington contain a good variety of habitats. Hopefully some of the specialized habitats such as grasslands and wetlands can be preserved for the future.

References:

Pennsylvania Birds, The Journal of the Pennsylvania Society for Ornithology
<http://www.pabirds.org/PABIRDS/BackIssues/PBV19N1.pdf>

Pennsylvania Game Commission Website
<http://www.portal.state.pa.us/portal/server.pt?open=514&objID=621014&mode=2>

Amphibians and Reptiles

Pennsylvania possesses a diversity of native amphibians and reptiles, collectively known as herptiles, or casually as “herps.” Herp species are found in PA almost equally: thirty-six species of amphibians and thirty-seven species of reptiles. Herptiles are further divided into five main groups: salamanders, frogs, lizards, turtles and snakes.¹¹

Herptile populations and species diversity are good indicators of the health of natural places. Major threats to herps are habitat loss, habitat degradation, loss of seasonal wetlands (essential to some species for reproduction), water pollution, acid deposition in rain and snow, wetland draining and/or flooding, and habitat fragmentation.

Herptiles are under the jurisdiction of the PA Fish and Boat Commission (PFBC). More information about individual species can be found at the [PFBC webpage on Amphibians and Reptiles](#).



Figure 5.9: Gray tree frog, *Hyla versicolor*, a small creature with a mighty voice, joins the night-time heralds of spring, 5/26/2005.

¹¹ Shaffer, Larry. Pa Amphibian & Reptiles, 7th edition (Pennsylvania Fish & Boat Commission, 1991), page no. 12.

Compared to birds, mammals and other groups of organisms, much less is known about Pennsylvania's reptile and amphibian species. In 2013, the Pennsylvania Amphibian and Reptile Survey (PARS) was launched to determine the distribution and status of all herptiles throughout Pennsylvania, building upon previous study efforts and combining modern technology with an army of citizen scientists known as "herpers." The project is a joint venture between the PA Fish & Boat Commission (PFBC) and the Mid-Atlantic Center for Herpetology and Conservation (MACHAC), funded by the PFBC (via the US Fish & Wildlife Service's State Wildlife Grants Program), the PA Department of Conservation and Natural Resources (Wildlife Resources Conservation Program), and MACHAC.¹² The PARS study is already showing encouraging results: several species of herps not seen for over 50 years thought to be extirpated (locally extinct) from Pennsylvania have been rediscovered!



Figure 5.10: Youngsters meet an Eastern Box Turtle (*Terrapine carolina carolina*) at Raccoon Creek State Park, 7/18/2007.

Aquatic Wildlife

Aquatic wildlife, for the purposes of the 20D Raccoon Creek Watershed Conservation Plan, are those animals and plants that live in streams, ponds and lakes within the Region.

Throughout Pennsylvania, a "designated use" classification system has been developed to protect aquatic life under the federal Clean Water Act. Aquatic life is propagated and maintained based on the designated use of a stream. Within the Raccoon Creek Region the designated uses for streams are Cold Water Fishes (CWF) and Warm Water Fishes (WWF) for aquatic life and High Quality Waters (HQ) and Exceptional Value Waters (EV) for special protection. Please refer to Section 4, Water Resources, Table 4.2 for additional information on designated uses of streams in the Raccoon Creek Region.

The Pennsylvania Natural Heritage Program's Aquatic Community Classification (ACC) project "describes patterns in aquatic biodiversity to help conservation activities and aquatic resource management in the region." Simply put, the ACC was designed to gather information about

¹² PA Amphibian & Reptile Survey, 2014 First Anniversary Newsletter, available at <http://paherpsurvey.org/doc/PARS-July-2014-Newsletter.pdf>; accessed 8/9/2014.

existing conditions in PA's streams, identify high-quality waterways for preservation and select lower quality waters for restoration. The [Aquatic Community Classification website](#) provides interactive mapping and a wealth of information about aquatic biodiversity and aquatic resource management.¹³

The ACC defines and details three major communities of aquatic organisms: mussels, macroinvertebrates and fish.

Mussels

Mussels are “filter feeders,” which means that they pull water through their gills to extract particles of food. They require relatively clean water to survive, and are particularly sensitive to Abandoned Mine Drainage (AMD), industrial discharge, urban runoff pollution and commercial dredging. Mussels prefer gravelly, sandy or muddy habitats where they can burrow into the stream bottom. Typically, they are found in larger streams and in rivers that contain sufficient nutrient levels to supply them with food.¹⁴

Freshwater mussels are the most imperiled taxonomic group in North America. The lower main stem of Raccoon Creek and the Ohio River near the mouth of the creek are waterways showing recovery in native mussel populations. The PA Fish & Boat Commission has documented the presence seven rare mussel species in the Montgomery Pool of the Ohio River near the mouth of Raccoon Creek.¹⁵ Please see Table 5.5 for a listing of these species and further discussion of their status.

Macroinvertebrates

Macroinvertebrates are aquatic animals without a backbone. These include aquatic insects, worms and crustaceans (like crayfish or scuds), which generally occupy the lower levels of food webs in aquatic systems. Macroinvertebrate communities are key indicators of overall stream health because they usually respond to environmental stress in predictable ways, based on their levels of tolerance to different stressors like pollutants and low dissolved oxygen levels.¹⁶ Indicators of good stream health in the Raccoon Creek Region include various species of stonefly, mayfly, dobsonfly, and casemaking caddisfly.¹⁷

¹³ Pennsylvania Natural Heritage Program, Aquatic Community Classification Project, available at <http://www.naturalheritage.state.pa.us/aquaticsIntro.aspx>; accessed 8/9/2014.

¹⁴ Pennsylvania Natural Heritage Program, Aquatic Community Classification Project, Aquatic Communities of Pennsylvania, available at <http://www.naturalheritage.state.pa.us/aquaticsCommunity.aspx>; accessed 8/9/2014.

¹⁵ PAFBC Species Impact Review #42038, Christopher A. Urban, Chief, Natural Diversity Section; letter dated 2/26/2014.

¹⁶ Pennsylvania Natural Heritage Program, Aquatic Community Classification Project, Aquatic Communities of Pennsylvania, available at <http://www.naturalheritage.state.pa.us/aquaticsCommunity.aspx>; accessed 8/9/2014.

¹⁷ Pennsylvania Department of Environmental Protection, Watershed Snapshot, 2009; available at <http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/watersnapshot/participation.htm>; accessed 8/9/2014.

Fish

Macroinvertebrates are an important food source for many fish. Just like macroinvertebrates, fish are influenced by water quality and the overall condition of the watershed in which they live. For example, mud and sediment entering a waterway from a mismanaged construction site may smother the habitats that developing fish require, preventing them from reaching adult life stages.¹⁸

Different species of fish need different food resources. They also have different spawning and habitat needs and requirements. The Pennsylvania Fish & Boat Commission (PFBC) works to improve habitat in a variety of ways, from assisting volunteer groups with conservation projects to improve fish habitat in local lakes and streams, coordinating the removal of dams and other blockages to natural fish movement and providing technical guidance on designing riparian buffers. The PFBC's Habitat Improvement website provides detailed information on building fish habitat enhancement structures, establishing riparian buffers on waterways and other methods to improve aquatic habitats.¹⁹

Fishing is named as a popular pastime by residents and visitors to the Raccoon Creek Region (please see "Section 2: Issues, Concerns and Constraints"). Pan and sport fish are plentiful in Raccoon Creek State Park's main lake and Cross Creek County Park's lake. The PFBC stocks trout in Mill Creek in Greene Township and Traverse Creek in Hanover Township, Beaver County. The lower reaches of the main stem of Raccoon Creek are also popular for fishing although public access to the creek is scant. Fishing in the upper reaches of Raccoon Creek and many headwater tributaries is limited due to Abandoned Mine Drainage.



Figure 5.11: Boys enjoy a morning's fishing at Southside Sportsmen's Club in Greene Township, 7/16/2007.

¹⁸ Pennsylvania Natural Heritage Program, Aquatic Community Classification Project, Aquatic Communities of Pennsylvania, available at <http://www.naturalheritage.state.pa.us/aquaticsCommunity.aspx>; accessed 8/9/2014.

¹⁹ PA Fish & Boat Commission, Habitat Improvement, available at <http://fishandboat.com/habitat.htm>; accessed 8/9/2014.

Wildlife Viewing Etiquette

Watching and photographing wildlife is an increasingly popular recreational activity. Watching, however, should not add to the stress many species are already experiencing from human activities, pollution, loss of habitat, etc. Observing a few simple rules will help preserve the well-being of our wild companions.

Be respectful

Learn and obey the rules for using public lands like state parks and game lands. Do not trespass on private property. Be tactful and courteous in seeking the landowner's permission before entering. Even if it is 'just' the woods, every parcel of land has an owner, regardless of whether there are houses nearby.

Be unobtrusive

Observe animals from a distance with binoculars or a spotting scope. Avoid crowds. Be quiet. Tread lightly. Leave the electronic gizmos behind. Listen and watch without distracting wildlife, other observers or yourself.

Control your pets; be mindful of your youngsters

Keep pets on a leash or leave them at home. Be sure your little ones do not stray into harm's way. Teach them to appreciate wild creatures. Help them grow up to be good stewards of our natural world.

Take only pictures; leave only footprints

Leave no litter, cigarette butts, candy wrappers, food containers, etc. Do not drive your car, truck or ATV off-road in places it is clearly forbidden. Do not drive over soft, wet soils. Stay on established trails; do not trample fragile plant communities, nesting areas or sensitive habitats, especially wetlands.

Do not feed wildlife in state parks or forests

Wildlife watching is your chance to learn how animals live naturally. Do not create artificial situations by offering food to attract wild creatures. They are often sickened by human food or can become so dependent they forget how to find food on their own. People can be injured by too-close encounters with wild animals seeking food. Remember to let wildlife be wild!²⁰



Figure 5.12: Amelia Boser and her grandmother Betsy Woodling watch a nesting pair of Bald Eagles at an undisclosed location in the Raccoon Creek Region. 5/10/2014.

²⁰ Korber, Kathy and Hal, Pennsylvania Wildlife: A Viewer's Guide, (1994), Northwoods Publications, Inc., Lemoyne, PA.

Native Vegetation

Plants native to the Raccoon Creek Region are those which evolved here or became naturalized to this area over geologic time (thousands of years). Native plants can also be called “endemic” or “indigenous” to this area. Their presence in our region is the result of only natural processes with no human intervention. In North America a plant is often considered native if it was present before European colonization.



Figure 5.13: Ants pollinate Dutchman’s breeches (*Dicentra cucullaria*). Note the ant inside the fourth flower from left. 4/24/2006.

Non-native plants are those which evolved elsewhere – in other regions of North America or on other continents. Many of our most popular and common landscape trees, shrubs and flowers are not native. While most non-native species cause little harm in residential landscapes, some have become problematic due to their ability to choke out native vegetation. These are called invasive plants, or exotic invasives, meaning they evolved elsewhere and were introduced to this area, either deliberately or accidentally. Invasive plants often cause ecological harm and economic damage. An extensive discussion of invasive plants is included later in Section 5.

Invasive plants are usually introduced by people either accidentally or on purpose, into a region far from their native habitat. They are problematic because they grow quickly and aggressively, spreading and displacing other plants. They commonly appear on disturbed ground around construction sites, in farm fields or abandoned areas. Plants listed in the Invasive Plants section of this Plan should not be used in home landscaping because they can escape cultivation and spread rapidly through surrounding ecosystems.

Despite their detrimental effects, many invasive plants are universally available in garden catalogs and home improvement stores. Norway Maple is one of the most widely planted street trees in the United States. But its dense shade, tolerance of poor soil, multitude of seeds and early spring leafing-out chokes native trees in its shadow.

English Ivy is the plant of “Ivy League” fame. But its rapid climbing ability and smothering foliage can kill a tree, branch by branch, or bring it down by the sheer weight of the ivy vine.

Older vines can reach a foot in diameter.²¹ English Ivy shoots can force their way through window frames, between siding boards and through cracks in masonry, growing through darkness, causing bricks to shift and leading to costly structural damage.²²

Native plants are much better choices for landscaping because they are adapted to a specific environmental niche and have natural controls that keep them in balance. They often require less fertilizer, watering or pruning and therefore cost less to maintain than non-natives. A native plant is one which grew within this region before Europeans settled here. Native plants include ferns and clubmosses; grasses, sedges and rushes; perennial and annual wildflowers; and the woody trees, shrubs, and vines which covered “Penn’s Woods” when settlers first arrived. There are over 2,100 native plant species known in Pennsylvania.²³ Many garden centers and nurseries now offer native plants for use in residential and commercial landscaping.



Figure 5.14: English Ivy, *Hedera helix*. Photo: Kew Royal Botanic Gardens website.



Figure 5.15: Tender new leaves of a native American beech tree (*Fagus grandifolia*) unfurl in the spring sunshine. 5/6/2010.

²¹ <http://www.nps.gov/plants/alien/fact/hehe1.htm> accessed 4/9/2014

²² <http://www.toledogarden.org/the-truth-about-english-ivy/> accessed 4/9/2014

²³ <http://www.dcnr.state.pa.us/forestry/plants/nativeplants/> accessed 4/8/2014

Trees

Trees, and the forests they form, are the most obvious and readily-appreciated feature of our native plant communities. The Raccoon Creek Region is part of the oak-hickory forest which covers most of southwestern Pennsylvania and the Ohio River basin. When an oak-hickory forest reaches maturity, its dominant tree species are the oaks: white (*Quercus alba*), northern red (*Q. rubra*) and black (*Q. velutina*); and the hickories: shagbark (*Carya ovata*) and bitternut (*C. cordiformis*). In forests with adequate moisture, sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*) can be plentiful.

Growing to lesser heights than the oaks and hickories are the native trees of the sub-canopy: white flowering dogwood (*Cornus florida*), eastern redbud (*Cercis canadensis*), pawpaw (*Asimina triloba*), serviceberry (*Amelanchier arborea*) and eastern hophornbeam (*Ostrya virginiana*). In areas with steady moisture, spicebush (*Lindera benzoin*) can be common.²⁴

In the Raccoon Creek Region, the oak-hickory forest was once dominated by the American chestnut tree. This magnificent species reigned over 200 million acres of Appalachian woodlands until succumbing to a lethal fungus infestation known as the chestnut blight during the early 1900s. Chestnut blight wiped out an estimated 4 billion American chestnut trees – one-quarter of all the hardwoods in the eastern United States.²⁵

The American chestnut tree was an essential part of the entire eastern US ecosystem. Late-flowering, reliable and productive, it was unaffected by seasonal frosts. Chestnuts were the single most important food source for a wide variety of wildlife from bears to birds. Rural people depended upon the annual chestnut harvest as a cash crop. The chestnut lumber industry was vital to rural economies. Because chestnut wood is straight-grained, easily worked and highly rot-resistant, it was ideal for fence posts, railroad ties, barn beams, log cabins and all aspects of home construction.²⁶



Figure 5.16: Five people stand at the trunk of a perishing American chestnut tree, ca. 1925. Photo courtesy of State University of New York, College of Environmental Science and Forestry website.

²⁴ Leopold, Donald J., *Native Plants of the Northeast*, (2005), Timber Press, Inc., Portland, OR.

²⁵ The American Chestnut Foundation, available at <http://www.acf.org/history.php>, accessed 6/13/2014.

²⁶ *Ibid.*

Although blight reduced the American chestnut from the dominant tree species in the eastern forest to little more than an early-succession-stage shrub, hope still remains. American chestnuts have survived by sending up stump sprouts that grow vigorously but inevitably succumb to the blight and die back to the ground. USDA Forest Service surveys indicate that there are millions of sprout clumps in Appalachian forests, a rich gene pool for restoration efforts.²⁷

Despite the passage of time, chestnut wood products continue to serve us. Thousands of weathered fence posts remain on the job in farmers' fields; barn beams and house timbers still shelter livestock and people; reclaimed chestnut lumber fetches a steep price for upscale flooring in new homes; fine furniture and musical instruments made of chestnut are prized possessions yet today.

Grasses

It is doubtful that much, if any, acreage of native grassland has survived in an undisturbed state since European settlement began in the Raccoon Creek Region. Our original grasslands were fertile places well-suited to raising crops and livestock. Today, native grasses are being reintroduced for their value in saving soil and as wildlife forage and habitat. Programs such as the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) administered by the USDA Farm Service Agency can help landowners restore stands of these once-common native grasses.

Native grasses are tall, weedy-looking and grow in clumps. They provide excellent year round cover and forage for wildlife, yet retain enough bare ground for animals to move through in search of food. Native grass species include Indiangrass (*Sorghastrum* spp.), switchgrass (*Panicum virgatum*), big and little bluestems (*Andropogon* spp.), broom sedge (*Andropogon virginicus*), Canada wild rye (*Elymus canadensis*) and Virginia wild rye (*Elymus virginicus*). These species are warm season grasses, meaning they mature later in the growing season. They can be mown after the peak nesting times of birds and small animals. Mowing in late summer also allows these grasses to build up energy reserves for hearty regrowth in spring.

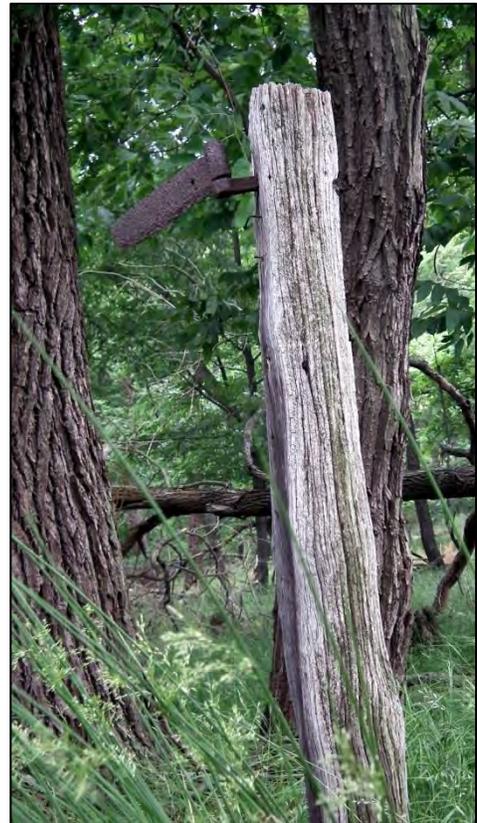


Figure 5.17: A chestnut gate post with a rusted hinge marks a farmers' property line. 6/13/2014.

²⁷ State University of New York: American Chestnut Research and Restoration Project, available at <http://www.esf.edu/chestnut/background.htm>, accessed 6/13/2014.

To maintain a stand of native grass, occasional disturbance by mowing, burning, spraying, or disking is needed. Without any disturbances, succession will take place, meaning the grassland will eventually be replaced by woody vegetation. As a result, wildlife requiring grassy or meadow habitat will attract more common woodland wildlife. Mowing or burning in cycles creates habitat with different-aged, diverse vegetation and deters the growth of trees and shrubs, thus preserving the native grassland.²⁸



Figure 5.18: Broom sedge (*Andropogon virginicus*) establishes itself in an unmown farm field. 6/13/2014.

Wetland Plants

Many native plant species can grow only in wetlands. Others are adapted to tolerate seasonally wet conditions. Common wetland plants in the Raccoon Creek Region are more than just cattails. They include trees, shrubs, vines, wildflowers, grasses and ferns. Notable species are American sycamore (*Plantanus occidentalis*), silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), highbush blueberry (*Vaccinium corymbosum*), spicebush (*Lindera benzoin*), silky dogwood (*Cornus amomum*), American wisteria (*Wisteria frutescens*), skunk cabbage (*Symplocarpus foetidus*), mayapple (*Podophyllum peltatum*), great blue lobelia (*Lobelia siphilitica*), cardinal flower (*Lobelia cardinalis*), purple Joe-pye weed (*Eupatorium purpureum*), cattail (*Typha* spp.), softrush (*Juncus effusus*), sweetflag (*Acorus calamus*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*) and scouring rush (*Equisetum hyemale*).²⁹ Wetland habitats are discussed in greater detail in the following section.

Natural Habitats

Natural habitats are the varied places that plants and animals normally occur. Habitats provide food, water and shelter, room to grow and reproduce. With the passage of time, different kinds of habitats evolve and change in response to climate, topography and soils formed by the decay of underlying bedrock. Bedrock geology of the Raccoon Creek Watershed is discussed in Section 3: Land Resources.

As mentioned in “Section 1: Project Area Characteristics,” the predominant land cover in the Raccoon Creek Region is deciduous forest at 64% and grasslands at 15% of the total acreage.

²⁸ Pennsylvania Game Commission, Mowing and Wildlife: Managing Open Space for Wildlife Species, available at <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=699845&mode=2>, accessed 6/13/2014.

²⁹ Leopold, Donald J., Native Plants of the Northeast, (2005), Timber Press, Inc., Portland, OR.

Table 5.1 details land cover of the Region as determined by the US Geological Survey using satellite imagery to create a National Land Cover Database (NLCD).

Table 5.1: 20D Raccoon Creek Region Land Cover by Acreage³⁰

Land Cover Type	Acreage	% of Total Land Cover
Developed, Open Space	16,083	7.7%
Developed, Low Intensity	3,818	1.7%
Developed, Medium Intensity	1,192	0.5%
Developed, High Intensity	667	0.2%
Forest, Deciduous	133,331	63.7%
Forest, Evergreen	1,597	0.8%
Forest, Mixed	88	< 1%
Scrub, Shrub	38	< 1%
Grassland, Herbaceous	4,415	< 1%
Pasture, Hay	30,872	14.8%
Cultivated Crops	15,064	7.2%
Woody Wetlands	27	< 1%
Emergent Herbaceous Wetlands	39	< 1%
Open Water	2,857	< 1%
Barren Land	1,421	< 1%

The Pennsylvania Natural Heritage Program’s interactive online map <http://www.gis.dcnr.state.pa.us/maps/index.html?nha=true> provides locations and detailed descriptions of significant habitats of all types in the Raccoon Creek Region. These and other areas of biological importance are detailed later in this section, beginning on page 21. Plate 5.3: Natural Heritage Inventories, also names and locates Biological Diversity Areas, or BDAs, as defined by the Pennsylvania Natural Heritage Program.

Forest Habitats

Forests are important regulators of global climate change and air quality. As plants “breathe,” they utilize carbon dioxide from the air and water from the soil, produce sugar to grow, store carbon in their tissues and return oxygen into the atmosphere. When plants die and decompose, their stored carbon is released to the soil. Preserving and restoring forests helps to maintain the natural balance of this carbon cycle by reducing levels of atmospheric carbon dioxide that contribute to global warming.

³⁰ GIS compiled from data collected by the Southwest Pennsylvania Commission and PASDA

It is particularly important to preserve forest tracts in the Raccoon Creek Region as industrial development and housing pressure increase with new energy extraction activities. Most of the large forest blocks in the Region are already fragmented by roads, utility lines, housing and agriculture. It is vital to protect what remains of our forest tracts and woodlots for the continued health, livability and community appeal of the area. Indeed, the characteristic local residents value most about the Region is “green and quiet.”

Trees and timber are a renewable resource of great value. Logging is often seen as a source of quick cash, but, if done improperly, can cause much harm to a forest ecosystem. Timber harvests should be planned with the aid of a certified forester who can ensure that good quality trees are left to re-seed an area and grow subsequent crops of marketable timber.

When a forest is disturbed by logging or by a natural event such as a fire or tornado, or when occupied areas are abandoned, a process called succession occurs. Succession is the gradual, natural process of forest regrowth. Succession has early, middle and late stages, leading finally to a mature forest. Succession can happen on a small scale, as when a large tree topples, leaving a gap in the forest canopy. Or it can take place on a much larger scale when farm fields are no longer cultivated or grazed.

Early successional habitat is characterized by grasses, shrubs, brambles and dense, twiggy growth. This type of habitat is home to a variety of wildlife such as rabbits, warblers, American woodcock and pheasant. Wildlife seek out these areas for the excellent cover and quality of food they provide. Songbirds, turkey, grouse, deer, rabbit, bear, fox, native bees and many species of small mammals, reptiles and insects are drawn to old fields, thickets, and young forest where food and prey are abundant. Even black bears can benefit from small fruits and berries found in an early successional plot.³¹



Figure 5.19: Betsy Woodling and Al Moran visit a massive, hollow sycamore tree near Ridge Road in Independence Township, Beaver Co. Notice the seedling buckeye tree at their feet. 4/22/2014.

³¹ Natural Resources Conservation Service, What is Early Successional Habitat?, available at [file:///C:/Users/User/Downloads/Early_Successional_Info_Sheet_2012%20\(1\).pdf](file:///C:/Users/User/Downloads/Early_Successional_Info_Sheet_2012%20(1).pdf), accessed 6/14/2014.

In the middle-successional stage of forest regeneration, small trees begin to dominate the habitat, competing with each other for light. Shade-tolerant shrubs and plants remain in the dense understory. In the Raccoon Creek Region, trees in this stage of forest may contain poplar, birch, sassafras, ash, locust or red maple, yielding later to the dominant oaks and hickories of the mature forest.

Mature forest habitat includes the dead snags of smaller, less competitive trees that could not survive the shade produced by faster-growing, longer-lived species. Cavities and perches on these snags offer nesting sites for owls, woodpeckers, raccoons and bats. Mature forests offer nuts, acorns and fruits that sustain white-tail deer, wild turkey, black-capped chickadee and eastern box turtles. One hundred years may pass before a forest habitat fully matures.³²

Grassland Habitats

According to the National Land Cover Database (NLCD), the Raccoon Creek Watershed Region is about 15% pasture and hay, about 7% cultivated crops and less than one percent non-agricultural grassland.

Fallow grasslands can be important nesting and hunting areas for many birds including the chipping sparrow, eastern meadowlark, ring-neck pheasant, great horned owl, red tailed hawk, and the state bird of Pennsylvania, the ruffed grouse. Grassland habitats are also home to the eastern garter snake, the meadow vole, red fox and white-tailed deer.³³

As mentioned earlier, warm-season native grasses are being reintroduced in many areas for soil conservation and wildlife habitat restoration. These bunch-forming grasses provide food, nesting sites and cover for many small mammals and birds.



Figure 5.20: The wide-open spaces of the Findlay Grasslands are a haven for native birds. However, much of this reclaimed strip mine is slated for development. Photo 4/5/2005.

³² Forest Succession and Wildlife, Pennsylvania Envirothon, available at <http://www.envirothonpa.org/documents/ForestSuccession.pdf>, accessed 6/14/2014.

³³ Ibid.

The most significant grassland habitat in the Raccoon Creek Region is the Findlay Grasslands (or Imperial Grasslands) west of the borough of Imperial in Findlay Township. This reclaimed strip mine features thousands of acres of native grasses, shallow ponds and very little human activity. It is a haven for shore birds, raptors, songbirds and a stop-over for many migratory species.

Wetland Habitats

Wetlands are habitats of great importance in any ecosystem because of the many important functions they provide. In the Raccoon Creek Region, wetlands:

- Remove sediment from surface waters
- Filter pollution from mine drainage, sewage and road run-off
- Produce oxygen
- Recycle nutrients
- Absorb floodwaters
- Recharge groundwater supplies
- Control erosion
- Provide aesthetic appeal
- Produce timber
- Offer opportunities for hunting, fishing, paddling and wildlife watching
- Provide habitat for a diverse array of aquatic, amphibian, terrestrial and avian wildlife.³⁴

Technically, wetlands have these characteristics: hydric (waterlogged) or anaerobic (without air) soils, wetland vegetation and wetland hydrology - meaning the area is flooded seasonally or continually. Biologically, wetlands are hotbeds of life, brimming with nesting waterfowl, wading birds and songbirds. They are rich with aquatic microorganisms that form the basis of the food chain for larger insects, fish, reptiles, amphibians and

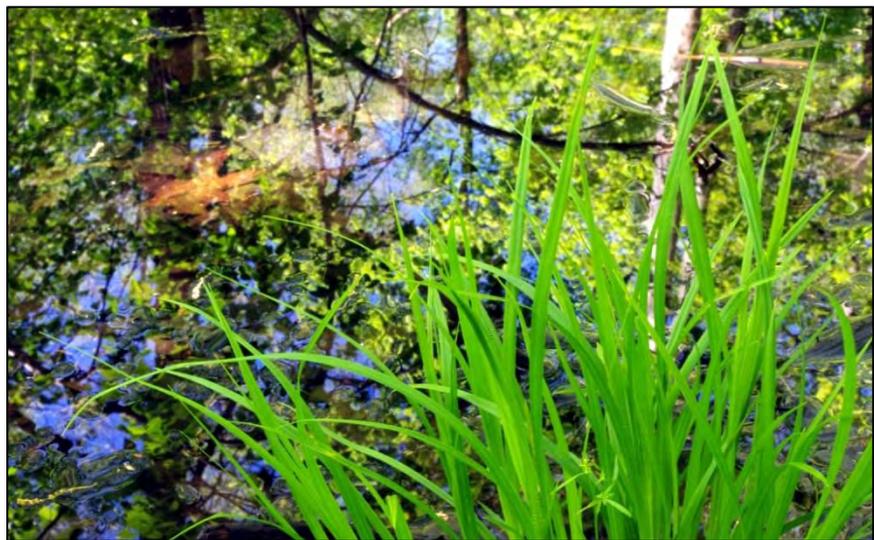


Figure 5.21: Color, shadow and reflection make vivid patterns in a vernal pool at the Wildflower Reserve. Photo 5/6/2010.

³⁴ US Fish & Wildlife Service, National Wetlands Inventory, available at <http://www.fws.gov/wetlands/>, accessed 6/14/2014.

mammals. Streams, lakes, ponds and wetlands are spawning grounds and nurseries for fish.

As important as wetlands are to the well-being of our natural world, most of the wetlands in the contiguous United States have been drained, filled in, paved over or otherwise destroyed in the past three hundred years. In the 1600s, an estimated 220 million acres of wetlands existed in the lower 48 states; by 2009 this acreage had been reduced to 110 million. Between the 1780s and 1980s, Pennsylvania lost 56% of its wetlands while bordering Ohio lost 90%.³⁵

“Plate 4.2: Water Resources” maps the emergent wetlands (i.e., cattail marshes) and the forested/scrub/shrub wetlands of the Raccoon Creek Region. Predominantly, these wetlands are found along stream banks and in headwaters of streams. Due to widespread coal mining activity, wetlands exist in many abandoned mine features and perform the valuable function of helping to treat acid mine drainage and returning nutrients to the soil.

Stream Habitats

Stream habitats are another important part of the ecology of the Raccoon Creek Region. According to the Pennsylvania Department of Environmental Protection’s designation for stream uses, the waters in the Region are considered Warm Water Fisheries, Cold Water Fisheries or High Quality Cold Water Fisheries. Please see “Plate 4.3: Designated Stream Use” for a detailed map of these streams and their watersheds.

Most of the streams in the 20D Region are Warm Water Fisheries, defined as waters which maintain and propagate fish species, flora and fauna that are native to a warm water habitat. The main stem of Raccoon Creek is a Warm Water Fishery.

King’s Creek and its tributaries are classed as Cold Water Fisheries, defined as “maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.”



Figure 5.22: Aluminum and iron lend surreal colors to a polluted headwater stream on Shades of Death Road near Avella. Photo 3/21/2005.

³⁵ US EPA, Wetlands – Status and Trends, available at http://water.epa.gov/type/wetlands/vital_status.cfm, accessed 6/14/2014.

High Quality Warm Water Fisheries in the 20D Region are Service Creek, Traverse Creek, Little Service Run, Little Traverse Creek, the South Fork of Cross Creek and the main stem of Cross Creek, ending just upstream of Avella and Browntown.³⁶

There are 126 miles of major streams (4th and 5th order) and 620 miles of smaller (1st, 2nd and 3rd order) perennial streams in the Region.³⁷ In addition, there are hundreds of miles of seasonal, intermittent streams. Healthy streams are important in the watershed not only for recreational pursuits such as fishing, paddling and swimming, but also for public water supplied to over 30,000 people by the Ambridge Water Authority's Service Creek Reservoir in Raccoon Township. (Refer to "Public Water Supplies" in Section 1).

Until recently, fish had not been seen in some of the Region's headwater streams during the lifetimes of residents in their 80s and 90s. Generations of people grew up knowing creeks to run nothing but orange. Fortunately, conditions have improved greatly over the past fifteen years as a result of building passive mine discharge treatment systems at five of the worst pollution sources. These systems treat over 2.5 billion gallons of abandoned coal mine drainage annually, removing over 2200 tons of iron, aluminum, manganese and acidity from the headwaters of Raccoon Creek in Washington and Allegheny Counties.³⁸ Nonetheless, the Raccoon Creek Region, like many other watersheds in PA, needs further work to address the legacy of historical mining. Please refer to Section 3: Land Resources for additional information about mining in the Region.

Backyard and Urban Habitats

The landscapes of suburban yards and city streets hold many opportunities to enhance habitat for wild creatures. The benefit is mutual: native trees, flowers and shrubs revive the food chain and attract songbirds, butterflies and other wildlife. These visitors reduce pests and are delightful to watch after a stressful workday. Choosing native plants for landscaping saves time, money and effort because natives are adapted to local soil and weather conditions, requiring less watering and maintenance.

Well-sited trees and shrubs can shelter homes from winter winds and give refreshing shade in summer, reducing both heating and cooling bills. Attractive landscapes increase property values and contribute to a sense of neighborhood pride. Street trees cool sidewalks, provide resting places for



Figure 5.23: Great Blue Lobelia (*Lobelia siphilitica*) is a sturdy native perennial wildflower suitable for shady spots in home landscaping. 8/10/2014.

³⁶ The Pennsylvania Code, Chapter 93, Water Quality Resources, available at <http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>, accessed 6/15/2014.

³⁷ GIS compiled from data collected by the Southwest Pennsylvania Commission and PASDA.

³⁸ Datashed, available at <http://www2.datashed.org/>, accessed 6/15/2014.

people and wildlife, and make our communities more livable and inviting.

Backyard forests of any size are healthy, safe places for youngsters to explore nature and learn about themselves in the process. Children who spend time outdoors, engaged in good-old-fashioned fun like building forts, moving dirt piles, splashing in puddles and climbing trees have better attention spans, are more creative and are less likely to be overweight. People of all ages are happier and feel more alive when they spend time in nature.

"I've been arguing for a while that connection to nature should be thought of as a human right."

Richard Louv, author of Last Child in the Woods (2005)

Homeowners can help reduce erosion and flooding by mowing less lawn, especially near the banks of streams. Removing woody plants up to the water's edge leaves no roots to hold the earth from washing away. Leaving a shady buffer of trees, bushes and streamside plants cools the water, stabilizes the soil, filters out pollutants and maintains green corridors for wild creatures' habitat.

The Ohio River and its Habitats

Shaped by advance and retreat of the Wisconsin Glacier, the Ohio River was once a pristine waterway inhabited by a great variety of aquatic species. In the early 1900s the Ohio, as well as the Allegheny and Monongahela Rivers that join to form it, became the lifeblood of American iron and steel manufacturing. Operated with little or no regard for the pollution they released into the air and water, the industries that built, powered and defended our nation wiped out nearly all aquatic life in the Ohio River. Untreated sewage from thousands of homes in towns built along the rivers contributed to the destruction.

Because the Ohio River was – and is – a major inland waterway, the system of navigation locks and dams built to enable barge transportation has altered the river's natural depths and slowed its currents. Many river associated habitats such as floodplains, riffle communities and islands were eliminated by raising the water level. Another activity that has greatly impacted the Ohio is dredging the bottom to remove sediment to ease transportation within the navigational channel, as well as to extract sand, gravel and cobblestone for commercial use. Dredging removes the natural riverbed. Additionally, the sediment that is stirred up inhibits feeding and complicates physiological functions in fish, mussels, and aquatic insects. Dredging also alters river hydrology, causes bank and shoal erosion, and creates deep, cold anoxic holes nearly devoid of life.

Recent decades have seen improvement in water quality in the Ohio River. The decline of the domestic steel industry, more stringent pollution regulations and better treatment of sewage have enabled some native fish and mussel species to return. Fish composition in the Ohio is

changing from predominantly pollution tolerant species such as carp (*Cyprinus carpio*) and gizzard shad (*Dorosoma cepedianum*), to more pollution-sensitive species such as walleye (*Stizostedion vitreum*), sauger (*Stizostedion canadense*), river redhorse (*Moxostoma carinatum*) and bass (*Micropterus spp.*).³⁹

Further evidence of the Ohio River's rebounding quality is the popularity and success of sport fishing. In July of 2005 the Bassmaster Classic, a professional fishing tournament, was held in Pittsburgh at the confluence of the Allegheny and Monongahela Rivers where the Ohio begins.

Several species of freshwater mussels classified as rare are now found in the Ohio River near the mouth of Raccoon Creek. These waters also hold threatened, endangered and rare species of fish. Please see "Section 4: Water Resources" for a listing of these species.

Along the banks of the Ohio River, the steep forested hillsides and deep secluded valleys are rich habitats, integral to the recovering river ecosystem. Forest communities on these slopes should be allowed to mature without timber harvesting or earth disturbance to aid in natural restoration and reintroduction of threatened, rare and endangered species.



Figure 5.24: An excavator between two barges dredges for gravel on the Montgomery Pool of the Ohio River, 8/5/2014. Note the crewman standing at the corner of the left barge.

³⁹ Pennsylvania Natural Heritage Program, the Ohio River, available at <http://www.naturalheritage.state.pa.us/cnhi/cnhi/Ohio%20River.pdf>, accessed 7/3/2014.

Important Mammal Areas

The Important Mammal Areas Project, or IMAP, was the first program of its kind in the United States. Modeled after the Important Bird Areas Project, or IBAP, IMAP was launched in 2001 to promote the conservation of mammals by identifying sites or regions that hold habitats critical to their survival. Both IMAP and IBAP originated in Pennsylvania as cooperative projects of PA's state agencies, conservationists and biologists.⁴⁰

The Important Mammal Area designation affords no legal protection, but it focuses public awareness on mammals and provides information to make land use decisions to better protect mammals and their habitats. There are no Important Mammal Areas in the 20D Raccoon Creek Region, but there are several to the north and east.

Important Bird Areas

An area that supports critical habitat for a diversity of bird species or species of special concern is designated as an Important Bird Area, or IBA, by the National Audubon Society's Pennsylvania Chapter. In 1996, Pennsylvania was the first US state to develop an IBA program.

Pennsylvania's Ornithological Technical Committee to date has identified 87 IBA sites encompassing over two million acres of the state's public and private lands.⁴¹ The areas include locations for prime breeding sites for land and water birds, winter roosts and migratory staging areas. Criteria used to select IBA sites are:

- Any site having exceptional concentration and/or diversity of bird life, defined as 2,000 waterfowl at one time (excluding resident Canada Geese), 100 shorebirds together at one time, 50 breeding pairs of wading birds, or 10,000 migrant raptors per season.
- Support a significant population of state or federally-listed threatened or endangered avian species.
- Support a significant population of one or more avian species on Pennsylvania's "special concern" list.
- Contain representative, rare, threatened, endangered, or unique habitats with birds characteristic of those habitats.
- Sites where long-term (i.e., years) avian research or monitoring is in progress.

Once a site is officially identified as an IBA, volunteer monitoring begins. During the nesting season, volunteers track the numbers and varieties of birds breeding in that particular habitat. But the monitoring also extends to the land itself, focusing attention on the main threats to Pennsylvania's IBA habitats: fragmentation, suburban sprawl and over-browsing by deer. Most of the 20D Raccoon Creek Region is defined as an Important Birding Area as illustrated in "Plate 5.2" found at the end of this section.

⁴⁰ The Pennsylvania Wildlife Federation, Important Mammal Areas, available at http://www.pawildlife.org/?page_id=38, accessed 6/15/2014.

⁴¹ Wilhelm, Dr. Gene, Bartramian Audubon Society Sanctuaries: Including Important Bird Areas in the Eco-Region (New Castle, PA: Commercial Printing Company, 2008), page 4.

County Natural Heritage Inventories

County-by-county Natural Heritage Inventories are a project of the Pennsylvania Natural Heritage Program (PNHP). According to its website, “County Natural Heritage Inventories are designed to inform the residents of a county about their living heritage and give them a tool to use in planning the future of their communities...Through detailed mapping and discussion these projects present important places within a county, prioritize them based upon their attributes, and provide recommendations regarding their management and protection.”

At the time of publication of this Plan, the Natural Heritage Inventories (NHIs) publicly available for Allegheny, Beaver and Washington Counties are bound paper documents dating from 1994, 1993 and 1994 respectively. Beaver’s updated NHI is due for release in 2015. To provide consistently-formatted information for all three counties in the 20D Raccoon Creek Region, the NHI descriptions and mapping presented herein follow the convention available on the PNHP website as of November 30, 2014.

The PNHP website, <http://www.naturalheritage.state.pa.us/>, offers a wealth of information about Biological Diversity Areas (BDAs), Landscape Conservation Areas (LCAs) and Dedicated Areas (DAs). The significance of these areas and the methods of ranking them are explained in this section of the 20D Plan

Biological Diversity Area (BDA)

- An area of land recognized as supporting populations of state, nationally, or globally significant species or natural communities.
- High-quality examples of natural communities or ecosystems; or communities with exceptional native diversity.
- Typically small areas containing a buffer that protects the natural community or habitat needed to support the site.

Landscape Conservation Area (LCA)

- An area of land larger than a Biological Diversity Area.
- Contains minimal human disturbance and allows ecosystems to function on a landscape level.
- LCAs often contain multiple BDAs.

Dedicated Area (DA)

- An area of land that is to be protected by the specific intentions of a property owner.
- May become a future BDA or a high-quality area within an already designated BDA.
- Numerous sites within the watershed could become DAs through landowner agreements, special programs, or other methods like conservation easements.

“Plate 5.3: Natural Heritage Inventory” maps the Biological Diversity Areas (BDAs) in the 20D Raccoon Creek Region, numbering each and color-coding them according to their significance ranking. “Table 5.2: Biological Diversity Areas of the Raccoon Creek Region” provides site-by-site details about specific values of these critical areas and threats to their well-being. Descriptions of the Ohioview Peninsula and the Fourmile Run Valley are included. Although these BDAs are located on the north shore of the Ohio River and technically are not within the boundaries of 20D, they are significant adjacent habitats, ecologically inseparable from the Raccoon Creek Region.

Table 5.2: Biological Diversity Areas of the 20D Raccoon Creek Region

Color-coding of each Biological Diversity Area in the following table corresponds to color-coding on “Plate 5.3: Natural Heritage Areas” found at the conclusion of Section 5.

Plate 5.3 ID#	Name of BDA & Watershed	Ranking	Acreage	Values	Threats & Stresses	Recommendations
1	Mill Creek (Mill Creek)	Notable	1798.0	Recovering floodplain forest natural community; high habitat diversity; diverse topography; diverse forest bird species	Gravel dredging; ATVs; Japanese knotweed	Needs further investigation; control knotweed
2	Georgetown Island (includes south shoreline of Ohio River; Site #3 of Ohio River Islands National Refuge)	Exceptional	437.8	Unique natural communities and aquatic habitat support three species of concern; 17 acre Georgetown Island recovering floodplain forest	Erosion at head of island; dense infestation of Japanese knotweed	Control knotweed; stabilize shorelines; restrict human activity
3	Ohio River (includes south shore)	High	1404.7	Recovering river system that provides habitat for numerous species of concern.	River alterations due to effluent discharges, point source discharges, navigational locks & dams, river bed dredging	Improve water quality; carefully monitor & enforce all regulated activities along river
4	Phillis Island (Site #2 of Ohio River Islands National Refuge)	Exceptional	344.6	Aquatic & riparian habitats support seven species of concern	Erosion of bank slopes on main channel side	Control knotweed; limit human activity; stabilize shorelines
5	Lower Raccoon Creek (Main stem of Raccoon Creek)	High	2994.0	Extensive area with high diversity of natural features & communities; habitat for species of concern	Timber harvesting; ATVs; destruction of wetlands; bank erosion; knotweed; residential & industrial dev't. pressure	Avoid timber harvesting; stabilize banks; control knotweed; restrict ATV traffic; plan development sensitively

Table 5.2: Biological Diversity Areas of the 20D Raccoon Creek Region (continued)

Plate 5.3 ID#	Name of BDA & Watershed	Ranking	Acreage	Values	Threats & Stresses	Recommendations
6	Ohioview Peninsula (north shore of Ohio River; Site #1 of Ohio River Islands National Refuge)	Exceptional	115.6	Unique natural community & habitat for terrestrial & aquatic species of concern; shallow water embayment & wetlands are among last such features on Ohio River	Off-road vehicles; land-clearing for camping; illegal dumping; development of any type; water pollution; changes in Montgomery pool elevation	Restrict vehicular traffic; limit human usage; avoid timber harvesting; remove debris; maintain Montgomery pool elevation & safety zone
7	Fourmile Run Valley (Fourmile Run)	Notable	1247.4	Roadless Ohio River tributary valley; relatively intact with disturbance near mouth; large contiguous forest; northern conifer forest at confluence of tributaries	Residential development pressure; gas pipeline siting; ATVs; timber harvesting; advent of invasive species on newly fragmented edges	Co-locate future pipelines & utilities in existing corridors; control invasive species; plan upland development sensitively; perform additional site investigation
8	Creek Bend Slopes (Main stem of Raccoon Creek)	Notable	464.4	Uncommon northern hardwoods natural community, recovering from timber harvest; tributary streams add to diversity	Timber harvesting; fragmentation; residential development pressure at top of slopes	Avoid timber harvesting; avoid clearing for utility rights-of way; increase buffer areas above & below slopes
9	School Road Slopes (Main stem of Raccoon Creek)	High	931.9	Northern hardwood-conifer forest community nearing maturity; habitat for plant species of concern	Gas pipeline siting; energy industry pressure; timber harvest; residential development pressure	Allow previously agricultural areas to revert to forest; avoid timber harvesting; co-locate future pipelines & utilities in existing corridors; plan upland development sensitively

Table 5.2: Biological Diversity Areas of the 20D Raccoon Creek Region (continued)

Plate 5.3 ID#	Name of BDA & Watershed	Ranking	Acreage	Values	Threats & Stresses	Recommendations
10	Clinton Wetlands (Potato Garden Run)	High	81.9 (mostly within Montour Run Watershed)	Robust emergent marsh community, one of few in Allegheny County; diverse wetland plants	Runoff of lawn chemicals & fertilizers; multiflora rose at disturbed edges; acid mine drainage; commercial development at Greater Pgh. In'tl Airport	Minimize disturbances to assure natural succession; increase buffer area in mown residential back yards
11	Imperial Mine Grassland (Potato Garden Run)	High	2.2 (mostly within Montour Run Watershed)	Large reclaimed strip mine w/ extensive grassland, ponds, wetlands & dense shrub habitat; attracts grassland sparrows, raptors, brush-loving birds, shorebirds & waterfowl. ⁴²	Development pressure along I-576; drainage of wet areas; road & highway construction; proposals to build industrial parks	Plan development to preserve ponds & varied habitat types; minimize disturbance of critical areas
12	Raccoon Creek Floodplain (Main stem of Raccoon Creek)	Exceptional	4745.8	Large, diverse floodplain areas containing floodplain forest & floodplain swamp communities; two plant & one animal species of special concern in Pennsylvania.	Residential development pressure; fragmentation by roads, pipelines & well pads; timber harvesting; erosion at roadway drainage pipes	No timber harvest; no further development; limit use of pesticides; consolidate energy disturbances
13	Raccoon Creek Floodplain Forest (Main stem of Raccoon Creek)	Exceptional	160.2	Large, diverse floodplain areas, floodplain forest, floodplain swamp communities; two plant & one animal species of concern	Residential development pressure; fragmentation by roads, pipelines & well pads; timber harvesting; erosion at roadways	No timber harvest; no further development; consolidate energy disturbances

⁴² Three Rivers Birding Club, Southwestern Pennsylvania, Imperial Grasslands, available at <http://www.3rbc.org/documents/imperial.html>, accessed 6/28/2014.

Table 5.2: Biological Diversity Areas of the 20D Raccoon Creek Region (continued)

Plate 5.3 ID#	Name of BDA & Watershed	Ranking	Acreage	Values	Threats & Stresses	Recommendations
14	Valley Picnic Area (Traverse Creek)	Notable	186.9	Habitat for one plant species of special concern; maturing, second growth mesic central forest	Manipulation of picnic area field	Enlarge buffer zone to protect plants & encourage expansion of population
15	Aunt Clara Fork Floodplain (Aunt Clara Fork of King's Creek)	Notable	557.0	Recovering floodplain forest ; associated northern hardwood forest on adjacent slope	Residential development pressure; fragmentation by roads, pipelines & well pads; timber harvesting	Limit development; no timber harvest; consolidate energy disturbances

Aquatic Community Classifications⁴³

The Pennsylvania Natural Heritage Program's Aquatic Community Classification (ACC) project describes patterns in aquatic biodiversity to help conservation activities and aquatic resource management in the region. ACC was designed to systematically identify Pennsylvania's stream communities and habitat types for the freshwater mussels, macroinvertebrates and fish that live in our waters. ACC's data provides a baseline for conserving flowing water systems and can be used to help assess the status of streams and rivers, prioritize high quality aquatic habitats for preservation, and select low quality habitats for restoration.

Within the 20D Raccoon Creek Region, streams are classified by the ACC as either Watershed Restoration Areas or Watershed Enhancement Areas as illustrated in Figure 5.25 and defined below.

Watershed Enhancement Areas are watersheds that do not qualify as "Conservation" or "Restoration" priorities. Enhancement watersheds are likely not in pristine condition, but are prime candidates for light restoration efforts because they are not as severely degraded as Restoration watersheds.

Tier 1 Enhancement Watersheds are likely to be in good condition but face some threats to water quality.

Tier 2 Enhancement Watersheds have significant water quality issues and could benefit greatly from restoration action.

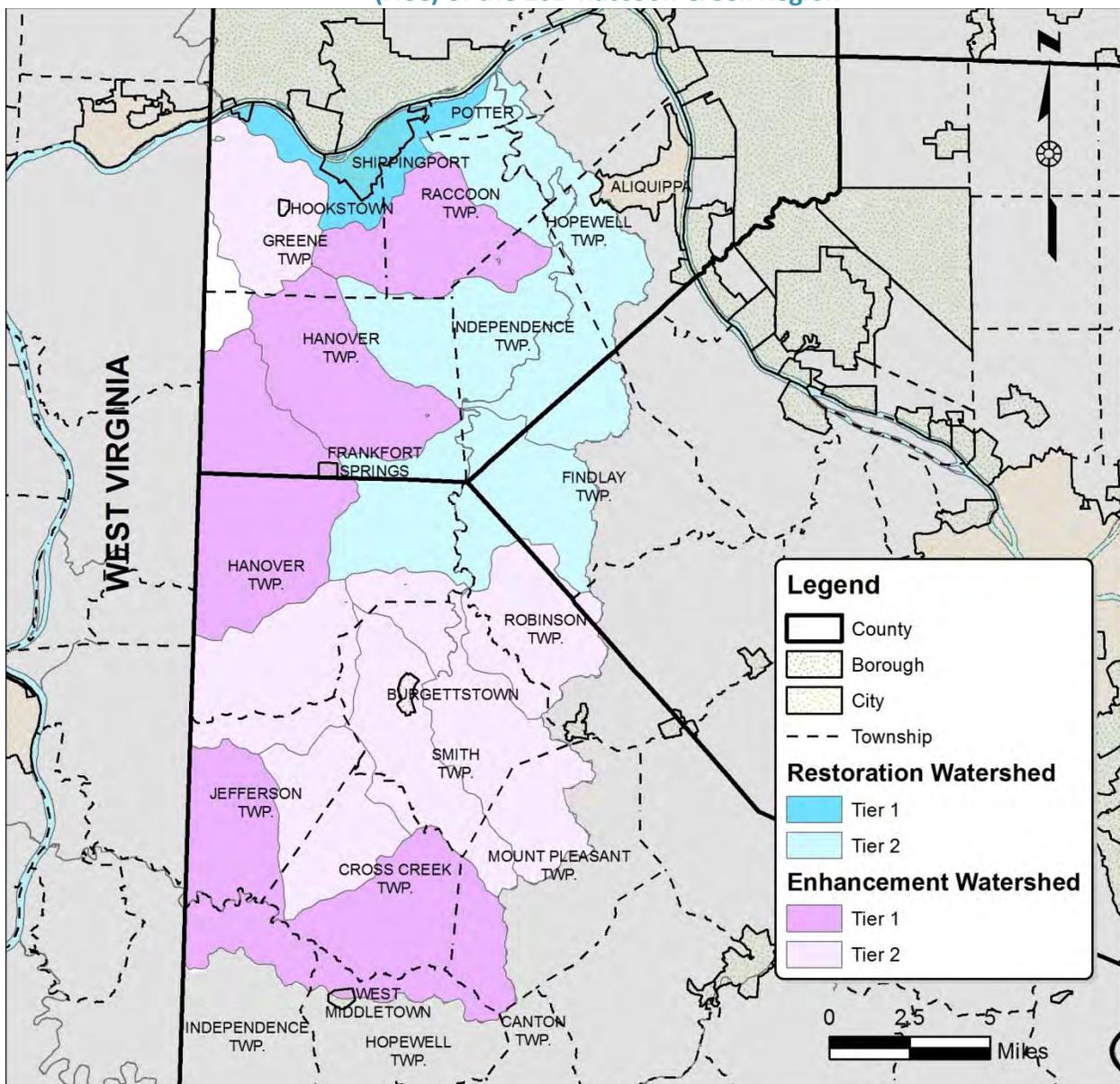
⁴³Pennsylvania Natural Heritage Program, Aquatic Community Classification, available at <http://www.naturalheritage.state.pa.us/aquaticsintro.aspx>; accessed 12/12/2014.

Watershed Restoration Areas are shown by ACC's analysis to be in the worst condition and are a priority for habitat restoration.

Tier 1 Restoration Watersheds are the most disturbed, with much physical alteration. Instream habitat supports only the most pollution-tolerant organisms.

Tier 2 Restoration Watersheds are also impaired, but the need for restoration action may not be as immediate as Tier 1.

Figure 5.25: Pennsylvania Natural Heritage Program Aquatic Community Classification (ACC) of the 20D Raccoon Creek Region



More information, including a complete set of downloadable GIS data that corresponds with all ACC information, is available statewide or by watershed through the GIS Data Download Page at http://www.naturalheritage.state.pa.us/Aquatic_GIS.aspx.⁴⁴

Greenways

A greenway is a corridor of open, undeveloped space. Greenways may be narrow ribbons that run through urban or suburban areas, or they may be wider bands that incorporate diverse natural, cultural and scenic features. They can incorporate both public and private property; they can be land-or water-based. Greenways may follow old railways, abandoned roads or canals; they may follow stream corridors, shorelines or wetlands.

Some greenways are recreational corridors or scenic byways that can accommodate motorized and non-motorized vehicles. They may even include “blueways” - water trails for paddlers and non-motorized craft. Other greenways function almost exclusively for environmental protection and are not designed or intended for human passage.

Greenways are an important conservation and recreational planning tool. By establishing greenways and blueways, communities can provide places for people to actively experience the outdoors, often close to home. Greenways can offer alternative transportation routes for bicyclists, walkers and hikers. Or, greenways may serve to preserve and restore important environmental assets like forests, wetlands and stream banks – and the plants and animals that live there.

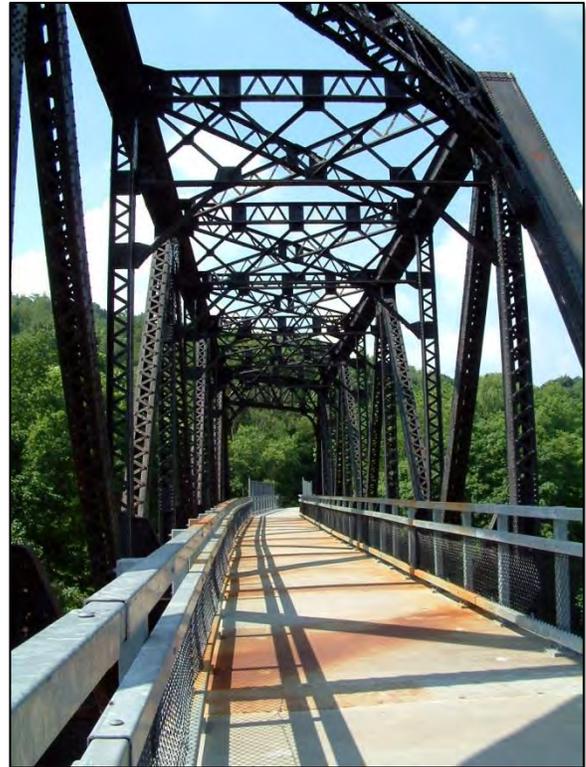


Figure 5.26: The refurbished Robinson Trestle carries the Montour Trail toward the Raccoon Creek Region. Photo 6/22/2005.

⁴⁴ Pennsylvania Natural Heritage Program, Aquatic Community Classification Map, available at <http://www.naturalheritage.state.pa.us/acc/acc.htm>; accessed 12/12/2014.

Washington County's Greenways Plan adopted in 2007 characterizes a variety of greenways by suggested and/or current usage and by conservation values:

- Primary recreation greenways
 - Montour Trail Corridor
 - Panhandle Trail Corridor
- Secondary Greenways
 - Natural Areas
 - Raccoon Creek Natural Area
 - Cross Creek Natural Area
 - Recreation Greenways
 - Cross Creek Water Corridor
 - Raccoon Creek Water Corridor
 - Conservation Greenways
 - King's Creek Greenway
 - Aunt Clara Fork Greenway⁴⁵

More information and detailed mapping of Washington County's greenways, corridors and natural areas is available at: <http://www.co.washington.pa.us/index.aspx?NID=175>.

Similarly, the motto of Beaver County's 2008 Greenways and Trails Plan is "Connecting Beaver County's People and Natural Assets through Greenways and Trails." This plan identifies the main stem of Raccoon Creek as well as the Ohio River, Mill Creek, Service Creek and Traverse Creek waterways as "exceptional priority potential conservation corridors."⁴⁶ More information and detailed mapping is available at http://files.beavercountypa.gov/PublicServices/PlanningCommission/PDFs/Greenway_trail_plan.pdf.

Species of Conservation Concern

Many native species of plants, mammals, birds, invertebrates, amphibians, reptiles, fish and mussels have become scarce or threatened by habitat loss or other human-induced pressure. To help document the status of species of concern, the Pennsylvania Natural Heritage Program (PNHP) was formed through the cooperative partnership of several state agencies which collect, store and share data about native biodiversity.

⁴⁵ Washington County Planning Commission, Greenways Plan (2007), available at <http://www.co.washington.pa.us/index.aspx?NID=175>; accessed 10/29/2014.

⁴⁶ Beaver County Greenways & Trails Plan, (2008), page 43, available at http://files.beavercountypa.gov/PublicServices/PlanningCommission/PDFs/Greenway_trail_plan.pdf, accessed 6/15/2014.

The PNHP website, <http://www.naturalheritage.state.pa.us/>, contains a wealth of information and interactive mapping accessible to the public. PNHP's purpose "...is to provide current, reliable, objective information to help inform environmental decisions."⁴⁷

The environmental review tool of the PNHP is the Pennsylvania Natural Diversity Index, or PNDI. The following tables show the results of PNDI queries for species of conservation concern to the PA Department of Conservation and Natural Resources (DCNR), the PA Fish & Boat Commission (PFBC) and the PA Game Commission in the Raccoon Creek Region. The Pennsylvania Natural Diversity Index (PNDI) uses abbreviations for the status of species. For simplicity's sake, only the acronyms used in this Plan are explained here.

DCNR Plant Status Codes and Definitions⁴⁸

Pennsylvania Endangered (PE) - Plant species which are in danger of extinction throughout most of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.

Pennsylvania Threatened (PT) - Plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent their future decline, or if the species is greatly exploited by man.

Pennsylvania Rare (PR) - Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct (separated or isolated from others), Endemic (habitat restricted to biologically isolated areas), Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Tentatively Undetermined (TU) - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.

No current legal status (N) - Plant species under review for future listing.

⁴⁷ Pennsylvania Natural Heritage Program, available at <http://www.naturalheritage.state.pa.us/>; accessed 7/1/2014.

⁴⁸ PA Natural Heritage Program, DCNR Plant Status Codes and Definitions, available at <http://www.naturalheritage.state.pa.us/RankStatusDef.aspx>; accessed 11/2/2014.

NatureServe Rankings⁴⁹

More thorough definitions and explanations of NatureServe's rankings of threatened species and ecosystems are available at <http://www.natureserve.org/conservation-tools/conservation-status-assessment>.

*Global Rank:

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100 sightings.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

†State Rank:

SU = Possibly in peril in state but status uncertain; need more information.

S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it vulnerable to extirpation from the state.

S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences).

PA Game Commission Wild Birds and Mammals Status Codes and Definitions⁵⁰

Pennsylvania Endangered (PE) - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate.

Pennsylvania Threatened (PT) - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated.

⁴⁹ PA Natural Heritage Program, NatureServe Rankings, available at <http://www.naturalheritage.state.pa.us/RankStatusDef.aspx>; accessed 11/2/2014.

⁵⁰ PA Natural Heritage Program, PA Game Commission Status Codes and Definitions, available at: <http://www.naturalheritage.state.pa.us/RankStatusDef.aspx>; accessed 11/2/2014.

PA Fish & Boat Commission Fish, Amphibians, Reptiles, and Aquatic Organisms Status Codes and Definitions⁵¹

Pennsylvania Endangered (PE) - All species declared by: 1) the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission, Executive Director to be threatened with extinction and appear on the Pennsylvania Endangered Species List published by the Pennsylvania Bulletin.

Pennsylvania Threatened (PT) - All species declared by: 1) the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens, and appear on a Threatened Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission Executive Director to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin.

PC - Animals that could become endangered or threatened in the future. All of these are uncommon, have restricted distribution or are at risk because of certain aspects of their biology.

N - No current legal status, but is under review for future listing.

Table 5.3: Butterfly and Moth Species of Concern in the 20D Raccoon Creek Region⁵²

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
Falcate Orangetip	<i>Anthocharis midea</i>	G4G5	S3			2010
Silvery Checkerspot	<i>Chlosyne nycteis</i>	G5	S3S4			2010
Royal Walnut Moth; Hickory Horned Devil	<i>Citheronia regalis</i>	G5	SU			2004
Harvester	<i>Feniseca tarquinius</i>	G4	S3			2006
Leonard's Skipper	<i>Hesperia leonardus</i>	G4	S3			2007
West Virginia White	<i>Pieris virginiensis</i>	G3?	S2S3			2013
Gray Comma	<i>Polygonia progne</i>	G4G5	S3			2011
Coral Hairstreak	<i>Satyrium titus</i>	G4G5	S3			2010
*Regal Fritillary	<i>Speyeria idalia</i>	G3	S1			1974

*Species listed in pale blue were at one time present in the Raccoon Creek Region but are now locally extinct (extirpated).

⁵¹ PA Natural Heritage Program, PA Fish & Boat Commission Codes, available at <http://www.naturalheritage.state.pa.us/RankStatusDef.aspx>; accessed 11/2/2014.

⁵² Pennsylvania Natural Heritage Program Database, accessed October 2014.

Table 5.4: Plant Species of Concern in the 20D Raccoon Creek Region⁵³

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
*Roundleaf Serviceberry	<i>Amelanchier sanguinea</i>	G5	S2	TU	PE	1924
Great Indian-plantain	<i>Arnoglossum reniforme</i>	G4	S1	N	PE	1946
Blue False-indigo	<i>Baptisia australis</i>	G5	S2	N	PT	1951
Sedge	<i>Carex shortiana</i>	G5	S3	N	PR	2012
Cattail Sedge	<i>Carex typhina</i>	G5	S2	PE	PT	1924
Vase-vine Leather-flower	<i>Clematis viorna</i>	G5	S1	PE	PE	2012
Smartweed Dodder	<i>Cuscuta polygonorum</i>	G5	S2	TU	PT	1962
Tall Larkspur	<i>Delphinium exaltatum</i>	G3	S1	PE	PE	1963
Tall Tick-trefoil	<i>Desmodium glabellum</i>	G5	S1	TU	PE	1974
Four-angled Spike-rush	<i>Eleocharis quadrangulata</i>	G4	S1	PE	PE	1951
White Trout-lily	<i>Erythronium albidum</i>	G5	S3	N	TU	2014
Purple Rocket	<i>Iodanthus pinnatifidus</i>	G5	S1	PE	PE	2013
Torrey's Rush	<i>Juncus torreyi</i>	G5	S3	PT	PR	1993
Oblique Milkvine	<i>Matelea obliqua</i>	G4?	S1	PE	PE	1933
Heartleaf Meehania	<i>Meehania cordata</i>	G5	S1	TU	PE	2006
Prickly-pear Cactus	<i>Opuntia humifusa</i>	G5	S3	PR	PR	1943
Beard-tongue	<i>Penstemon laevigatus</i>	G5	S3	N	TU	1954
Tennessee Pondweed	<i>Potamogeton tennesseensis</i>	G2	S1	PE	PE	1952
Yellow Water-crowfoot	<i>Ranunculus flabellaris</i>	G5	S2	N	PT	2013
Meadow Rose	<i>Rosa blanda</i>	G5	SU	N	TU	1952
Virginia Rose	<i>Rosa virginiana</i>	G5	S1	TU	TU	1951
Carolina Willow	<i>Salix caroliniana</i>	G5	S1	N	PE	1908
Stalked Bulrush	<i>Scirpus pedicellatus</i>	G4	S1	PT	PT	1993
Hairy Heart-leaved Aster	<i>Symphotrichum drummondii</i>	G5	S1	N	PE	2010
White Heath Aster	<i>Symphotrichum ericoides</i>	G5	S3	TU	PT	1924
Declined Trillium	<i>Trillium flexipes x erectum</i>	G5	S2	TU	PT	2012
Snow Trillium	<i>Trillium nivale</i>	G4	S3	PR	PR	2013

*Species listed in pale blue were at one time present in the Raccoon Creek Region but are now locally extinct (extirpated).

⁵³ Pennsylvania Natural Heritage Program Database, accessed October 2014.

Table 5.5: Bird Species of Conservation Concern in the 20D Raccoon Creek Region⁵⁴

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
Great Blue Heron	<i>Ardea herodias</i>	G5	S3S4B,S4N			2013
Short-eared Owl	<i>Asio flammeus</i>	G5	S1B,S3N	PE	PE	2001
Northern Harrier	<i>Circus cyaneus</i>	G5	S2B,S4N	PT	PT	2012
Bald Eagle	<i>Haliaeetus leucocephalus</i>	G5	S3B	DL	PT	2014
Osprey	<i>Pandion haliaetus</i>	G5	S3B	PT	PT	2011
Pied-billed Grebe	<i>Podilymbus podiceps</i>	G5	S3B,S4N		CR	2005
Sora	<i>Porzana carolina</i>	G5	S3B		CR	2012
*Appalachian Bewick's Wren	<i>Thryomanes bewickii altus</i>	G5T2Q	SH		PX	1924
Barn Owl	<i>Tyto alba</i>	G5	S2S3B,S2S3N		CA	1986

Table 5.6: Reptile Species of Conservation Concern in the 20D Raccoon Creek Region^{55 56}

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
Wood Turtle	<i>Glyptemys insculpta</i>	G3	S3S4			2013
Queen Snake	<i>Regina septemvittata</i>	G5	S3			2013

Table 5.7: Fish Species of Conservation Concern in the 20D Raccoon Creek Region^{57 58}

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
Black Bullhead	<i>Ameiurus melas</i>	G5	S1	PE	PE	1983
Bluebreast Darter	<i>Etheostoma camurum</i>	G4	S4	PT	PT	1997
Longear Sunfish	<i>Lepomis megalotis</i>	G5	S1	PE	PE	1984
Silver Chub	<i>Macrhybopsis storeriana</i>	G5	S3S4		DL	1986
River Redhorse	<i>Moxostoma carinatum</i>	G4	S3S4		DL	1984
Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>	G5	S1	PT	PT	2014

* Species listed in pale blue were at one time present in the Raccoon Creek Region but are now locally extinct (extirpated).

⁵⁴ Pennsylvania Natural Heritage Program Database, accessed October 2014.

⁵⁵ PAFBC Species Impact Review #42038, Christopher A. Urban, Chief, Natural Diversity Section; letter dated 2/26/2014.

⁵⁶ Pennsylvania Natural Heritage Program Database, accessed October 2014.

⁵⁷ PAFBC Species Impact Review #42038, Christopher A. Urban, Chief, Natural Diversity Section; letter dated 2/26/2014.

⁵⁸ Pennsylvania Natural Heritage Program Database, accessed October 2014.

Table 5.8: Mussel Species of Conservation Concern for the 20D Raccoon Creek Region^{59 60}

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
*Purple Wartyback	<i>Cyclonaias tuberculata</i>	G5	SX		PX	before 1919
Fanshell	<i>Cyprogenia stegaria</i>	G1Q	SX		PX	before 1919
Butterfly Mussel	<i>Ellipsaria lineolata</i>	G4G5	S1S2		CU	1908
Elephant Ear	<i>Elliptio crassidens</i>	G5	SX		CU	1908
Snuffbox	<i>Epioblasma triquetra</i>	G3	S1	PE	PE	before 1919
Wabash Pigtoe	<i>Fusconaia flava</i>	G5	S2		PE	1907
Long-solid	<i>Fusconaia subrotunda</i>	G3	S1		PE	before 1919
Pink Mucket	<i>Lampsilis abrupta</i>	G2	SX		PX	1908
Fragile Papershell	<i>Leptodea fragilis</i>	G5	S2		CR	2005
Threehorn Wartyback	<i>Obliquaria reflexa</i>	G5	SH		PX	2005
Hickorynut	<i>Obovaria olivaria</i>	G4	SX		PX	1908
Ring Pink	<i>Obovaria retusa</i>	G1	SX		PX	1908
Orange-foot Pimpleback	<i>Plethobasus cooperianus</i>	G1	SX		PX	1908
Sheepnose Mussel	<i>Plethobasus cyphus</i>	G3	S1	PT	PE	before 1919
Clubshell	<i>Pleurobema clava</i>	G1G2	S1S2	PE	PE	before 1919
Ohio Pigtoe	<i>Pleurobema cordatum</i>	G4	S1		PE	1908
Rough Pigtoe	<i>Pleurobema plenum</i>	G1	SX		PX	before 1919
Pyramid Pigtoe	<i>Pleurobema rubrum</i>	G2G3	SX		PX	before 1919
Pink Heelsplitter	<i>Potamilus alatus</i>	G5	S2		CR	2005
Rabbitsfoot	<i>Quadrula cylindrica</i>	G3G4	S1	PE	PE	before 1919
Monkeyface	<i>Quadrula metanevra</i>	G4	SX		PX	1908
Pimpleback	<i>Quadrula pustulosa</i>	G5	S1		PX	1908
Mapleleaf	<i>Quadrula quadrula</i>	G5	S1S2		PT	2005
Pistolgrip Mussel	<i>Quadrula verrucosa</i>	G4G5	S1	PE	PE	before 1919
Fawnsfoot	<i>Truncilla donaciformis</i>	G5	S1		CU	2005
Deertoe	<i>Truncilla truncata</i>	G5	S1		PX	1908
Paper Pondshell	<i>Utterbackia imbecillis</i>	G5	S3S4		CU	2005

* Species listed in pale blue were at one time present in the Raccoon Creek Region but are now locally extinct (extirpated).

⁵⁹ PAFBC Species Impact Review #42038, C. A. Urban, Chief, Natural Diversity Section; letter dated 2/26/2014.

⁶⁰ Pennsylvania Natural Heritage Program Database, accessed October 2014.

According to the PA Fish and Boat Commission (PFBC), freshwater mussels are the most imperiled taxonomic group in North America. Nearly 20% of the species historically known to occur in Pennsylvania are now extirpated (locally extinct). Additionally, 60% of Pennsylvania’s remaining mussel species are of conservation concern. According to mussel experts, many of the remaining mussel species are of such limited distribution and abundance that they too should be listed as threatened or endangered, at least at the state level. The status of freshwater mussel species of Pennsylvania is currently under review.

Table 5.9: Dragonfly, Damselfly, and Other Aquatic Invertebrate Species of Conservation Concern in the 20D Raccoon Creek Region⁶¹

Common Name	Scientific Name	Global Conservation Rank	State Conservation Rank	PA Legal Status	PA Proposed Status	Last Observed Date
Blue-tipped Dancer	<i>Argia tibialis</i>	G5	S2			2013
Dusky Dancer	<i>Argia translata</i>	G5	S3S4			2013
Arrowhead Spiketail	<i>Cordulegaster obliqua</i>	G4	S3			2013
Rapids Clubtail	<i>Gomphus quadricolor</i>	G3G4	S1S2			2012
Monongahela Blue Crayfish	<i>Cambarus monongalensis</i>	G5	S1S2			2013

Table 5.9: PA Game Commission Species PNDI for the 20D Raccoon Creek Region⁶²

Common Name	Scientific Name	Pennsylvania Status
Short-eared Owl	<i>Asio flammeus</i>	Endangered
Osprey	<i>Pandion haliaetus</i>	Threatened
Northern Harrier	<i>Circus Cyaneus</i>	Threatened
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Special Concern
Great Blue Heron	<i>Ardea herodias</i>	Special Concern
Prothonotary Warbler	<i>Protonotaria citrea</i>	Special Concern

Invasive (non-native) Plants, Animals and Microbes

Assistance with the following sections describing Invasive Plants, Invasive Animals and Invasive Microbes was contributed by Shane Miller, Environmental Education Specialist for Raccoon Creek State Park and Hillman State Park. References cited appear at the end of the discussion; others are footnoted.

Non-native species described in this text are labeled as invasive species “of concern to the Raccoon Creek Region.” Many are already present within the study area; some are likely to be

⁶¹ Pennsylvania Natural Heritage Program Database, accessed October 2014.

⁶² PAGC Large Project PNDI Review, Olivia N. Mowery, Environmental Planner, Bureau of Wildlife Habitat Management; letter dated 2/5/2014.

found here in the future; therefore, all are species of concern from a biological and economic standpoint.

Overview of Invasive Species

The movement of species by humans into new areas can be beneficial (good), benign (harmless), or detrimental (harmful). To understand invasive species, we will briefly discuss the definition, characteristics, detrimental attributes, transport routes and management of invasive species. The last section will discuss in detail noteworthy invasive species within and nearby the 20D Raccoon Creek Watershed Region.

Definition of Invasive Species

Invasive species are microbes, plants and animals that are non-native to an ecosystem, and their presence is detrimental to the environment, economy, or to human health. The key to understanding this definition is the word “non-native.” A non-native is any organism found outside of its original range and habitat. Importation of species in North America began at the time of European colonization. Today, we have nearly 50,000 non-native species within the U.S.⁶³ It is important to note that only a small fraction of those non-native species have become detrimental, but the damage they cause and the cost to control them are around \$120 billion per year in the U.S.⁶⁴



Figure 5.27: Brown Marmorated Stink Bug. Photo by Steven Jacobs, the Pennsylvania State University.

Characteristics of Invasive Species

Why do only a small fraction of non-native species become detrimental? It is because only a few are able to survive and even fewer are able to reproduce and spread. Additionally, the lack of significant natural controls (diseases, parasites, herbivores and/or predators) plays an important role in maximizing their survival, reproduction and spread.

Detrimental Attributes of Invasive Species

Invasive species have far-reaching influences in many aspects of our society. Their detrimental effects fall into three categories: environmental, economic and human.

Environmental problems occur when an invasive species degrades a natural area. Examples of this include Japanese Knotweed, Purple Loosestrife, and Tree-of-Heaven, Feral Pig, Hemlock

⁶³ Pimentel, D., L. Lach, R. Zuniga, and D. Morrison. 2000. Environmental and economic costs of nonindigenous species in the United States. *BioScience* 50:53-65.

⁶⁴ Pimentel, D., Zuniga, R., and D. Morrison. 2005. Update on the environmental and economic cost associated with alien-invasive species in the United States. *Ecological Economics* 52. pp 273-288.

Woolly Adelgid and Emerald Ash Borer. Each of these invasive species changes the natural area it invades, causing native microbes, plants, and/or animals to decrease in number and diversity, leading to changes in the food web. In some circumstances, native species may become extirpated from an area.

Economic problems arise when invasive species increase the cost of operating a business or maintaining property. For example, Zebra Mussel and Quagga Mussel raise the cost of operating water treatment plants and power plants by clogging up water intake pipes. Emerald Ash Borer and Dutch Elm Disease have cost home owners, municipal governments and power companies millions of dollars to remove dead Ash and Elm trees to prevent property damage and downed power lines.

Human health problems happen on a smaller scale than economic or environmental problems. Giant Hogweed and West Nile Virus are two invasive species that can affect human health. Giant Hogweed causes painful blisters when sap comes in contact with skin and possible blindness if sap comes in contact with eyes. West Nile Virus is a mosquito-borne viral disease that can cause encephalitis and meningitis.

Transport Routes

Invasive species have two transport routes: intentional and unintentional introductions. Many plant and animal species were intentionally transported for human survival or to improve everyday life while others were brought for aesthetic reasons or to remind settlers or immigrants of home. Historically, and even today, many invasive species are stowaways in items shipped to the United States and are unintentionally transported into new areas.

Management of Invasive Species

An Integrated Pest Management (IMP) approach is utilized to deal with the growing problem of invasive species. IPM selects the appropriate method or methods to deal with a specific invasive species in an area, and at the same time, it minimizes the cost and harmful effects to people and the environment. IPM control methods fall into four categories:

Physical Controls are any activity in which an invasive plant or animal is physically removed. Common methods are mowing, weed wrenching, hand pulling, cutting, digging, weed-whacking and trapping.

Chemical Controls are pesticides (fungicides, herbicides, insecticides, bactericides, etc.) that are applied to destroy invasive species.

Biological Controls are organisms such as a microbe, an herbivore (a plant-eating animal), or a predator found in the invasive species' original habitat. Introduction of these organisms can reduce the population of a specific invasive species. However, care must be taken to select biological controls that will not, in themselves, become a problem.

Cultural Management modifies an infested area so the survival rate or the spread of an invasive species is decreased. Examples of this include changing water levels, conducting controlled burns, rotating crops and/or selecting disease resistant crops.

How you can help control invasive species

Everyone can help to control the spread of invasive species! A few simple things are:

- Use native plants in landscaping
- Do not release exotic pets (fish, snakes, birds, turtles or other animals) into the wild
- Buy locally-harvested firewood
- Eliminate water from decoys, boats, motors & other equipment at the site rather than at home.
- Do not release live bait fish; do not move live fish from one water body to another

Invasive Animals, Terrestrial & Aquatic, of Concern to the Raccoon Creek Region

Table 5.10: Noteworthy Invasive Animals of Concern to the 20D Raccoon Creek Region

The letters in superscript, following each common name, denote the government agency or organization that recognizes specific invasive species. The superscript agency/organization codes used are as follows:

- U** for United State Department of Agriculture,
- F** for Pennsylvania Fish and Boat Commission,
- D** for Pennsylvania Department of Conservation and Natural Resources,
- N** for National Park Service & United States Fish and Wildlife,
- H** for Pennsylvania Natural Heritage Program, and
- P** for Pennsylvania Invasive Species Council.



Figure 5.28: Color variations of the Multicolored Asian Ladybird Beetle. Photo by Purdue University.



Figure 5.29: Emerald Ash Borer galleries-tunnels carved by larvae through the ash tree's vascular system, resulting in death of the tree. 5/24/2012

Table 5.10: Noteworthy Invasive Animals of Concern to the 20D Raccoon Creek Region

Invasive Animal-Common Name	Species (scientific name)
Asian Carps (Bighead Carp, Black Carp, Grass Carp, & Silver Carp) ^{U,F,P}	<i>Hypophthalmichthys nobilis</i> , <i>Mylopharyngodon piceus</i> , <i>Ctenopharyngodon idella</i> and <i>Hypophthalmichthys molitrix</i>
Asian Clam ^{U,F,H,P}	<i>Corbicula fluminea</i>
Asian Long-Horned Beetle ^{U,P}	<i>Anoplophora glabripennis</i>
Brown Marmorated Stink Bug ^{U,P}	<i>Halyomorpha halys</i>
Common Pine Shoot Beetle ^{U,H,P}	<i>Tomicus piniperda</i>
Emerald Ash Borer ^{U,H,P}	<i>Agrilus planipennis</i>
European Rudd ^{F,P}	<i>Scardinius erythrophthalmus</i>
European Starling ^{U,H,P}	<i>Sturnus vulgaris</i>
Feral Cat ^H	<i>Felis catus</i>
Feral Swine ^{U,H,P}	<i>Sus scrofa</i>
Gypsy Moth ^{U,H,P}	<i>Lymantria dispar</i>
Hemlock Woolly Adelgid ^{U,H,P}	<i>Adelges tsugae</i>
House Mouse ^{H,P}	<i>Mus musculus</i>
House Sparrow ^{H,P}	<i>Passer domesticus</i>
Kudzu Bug ^U	<i>Megacopta cribraria</i>
Multicolored Asian Ladybird Beetle ^H	<i>Harmonia axyridis</i>
Mute Swan ^{H,P}	<i>Cygnus olor</i>
New Zealand Mudsnail ^U	<i>Potamopyrgus antipodarum</i>
Norway Rat ^{H,P}	<i>Rattus norvegicus</i>
Nutria ^{U,P}	<i>Myocastor coypus</i>
Quagga mussel ^{U,F,H,P}	<i>Dreissena bugensis</i>
Red-Eared Slider ^{F,P}	<i>Trachemys scripta elegans</i>
Rusty Crayfish ^{U,F,H,P}	<i>Orconectes rusticus</i>
Sirex Woodwasp ^{U,H,P}	<i>Sirex noctilio</i>
Spiny Waterflea ^{U,F,P}	<i>Bythotrephes longimanus</i>
Viburnum Leaf Beetle ^H	<i>Pyrrhalta viburni</i>
Zebra Mussel ^{U,F,H,P}	<i>Dreissena polymorpha</i>

Descriptions of Invasive Animals of Concern to the Raccoon Creek Region

Asian Carps

- **Bighead Carp (*Hypophthalmichthys nobilis*)**
Freshwater fish introduced in 1972 to improve water quality in fish production ponds in Arkansas. Originated China. More research is needed to determine the effects of this species. Bighead Carp feed on plankton; they may negatively affect native species of larval fish, native mussels and several species of adult fish who feed on plankton.
- **Black Carp (*Mylopharyngodon piceus*)**
Freshwater fish introduced accidentally in the 1970s in shipments of Grass Carp. Originated in China. In the 1980s it was produced intentionally as a food fish and biological control agent for Yellow Grub in aquaculture facilities. Black Carp feed on snails and mussels. They have the potential to reduce the abundance and biodiversity of native mussels and snails, many of which are already threatened and endangered.
- **Grass Carp (*Ctenopharyngodon idella*)**
Freshwater fish introduced as a biological control agent for vegetation at aquaculture facilities in Alabama and Arkansas during 1963. This species originated in China. Grass Carp decrease the abundance and biodiversity of aquatic plants, decrease refugia for fish, impede native fish reproduction, change the abundance of phytoplankton and invertebrates in aquatic communities, and compete with invertebrates and other fish for food.
- **Silver Carp (*Hypophthalmichthys molitrix*)**
Freshwater fish used as food; introduced to control phytoplankton in eutrophic water bodies (rich in organic and mineral nutrients; supporting abundant plant life). It was imported in 1973 to Arkansas. It originated from China. Silver Carp have the potential to decrease numbers and biodiversity of native fish species because they feed on plankton, which is the same food source for larval fish. They may also pose a threat to native mussels.

*Asian Clam (*Corbicula fluminea*)*

Freshwater clam introduced in 1924 as a food source by immigrants along the U.S. west coast; originated in southeast Asia and Africa. Asian Clams compete with native mussels, larval fish and other plankton-feeders. Consequently, abundance and biodiversity of these native species have started to decrease. Asian Clams damage boat motors and clog intake systems for power plants and water treatment plants.

*Asian Long-horned Beetle (*Anoplophora glabripennis*)*

Wood-boring beetle native to Asia; introduced accidentally from cargo shipped from Asia. In 1996, the first population of breeding individuals was documented in New York. Asian Long-horned Beetles feed on maples, birches, elms, buckeyes and willows, all of which play paramount roles with our native animal and fungus species. Their feeding habits kill infected

trees within a few years. This insect poses a significant threat to timber production, nursery trade and maple syrup production.

Brown Marmorated Stink Bug (*Halyomorpha halys*)

Insect introduced accidentally to U.S. via packing materials. First documented in Allentown, PA in 1996; originated in Asia. Brown Marmorated Stink Bugs feed on fruit and vegetable crops, causing major economic damage through unmarketable produce. They also become a nuisance by invading and reproducing in residential living spaces.

Common Pine Shoot Beetle (*Tomicus piniperda*)

Bark and wood-boring beetle introduced accidentally from packing materials. First documented in northern Ohio in 1992; originated in Eurasia and northern Africa. Common Pine Shoot Beetles are able to damage and kill pine trees in certain locations, but more research is needed to ascertain the destructive potential of this species.

Emerald Ash Borer (*Agrilus planipennis*)

Wood-boring insect introduced accidentally during 1992 from wood packing materials; originated in Asia. Emerald Ash Borer feeds on the sapwood of ash trees, generally killing infected trees within 3 to 4 years. This insect causes significant mortality among ash trees in street, landscape and woodland settings, resulting in costly removal of dead and dying trees to prevent damage to utility lines, structures and roadways. Ash is one of our most popular shade trees; ash wood is an important commercial lumber used to make baseball bats and tool handles.

European Grapevine Moth (*Lobesia botrana*)

Moth first documented in 2009 in California. Manner of introduction unknown; originated in Italy. European Grapevine Moth larvae feed on both flowers and fruit of grapes, leading to secondary infections which make the grapes unusable for fresh marketing or processing into raisins or wine.

European Rudd (*Scardinius erythrophthalmus*)

Freshwater fish introduced accidentally in the early 1990s from bait bucket releases. This species originated in Europe. European Rudd degrades habitat for muskellunge, yellow perch and northern pike by eating the aquatic plants near the shore, reducing available habitat for spawning and shelter for juvenile fish.

European Starling (*Sturnus vulgaris*)

Cavity-nesting bird imported in the 1890s by a New York City group who sought to introduce non-native birds that were mentioned in Shakespeare's writings. European Starlings originated in Eurasia. Compete with native birds for food and habitat; are known to destroy crops.

Feral and Free-range Cat (*Felis catus*)

Domesticated carnivorous mammal first introduced by European settlers as pets and to control rodent populations during early colonization of North America. This species originated in the Middle East. Feral and free-range cats pose a significant threat to native birds, reptiles,

amphibians and small mammals by their hunting habits. Even when feral and free-range cats are fed, they often continue to hunt wildlife.

Feral Swine (*Sus scrofa*)

Omnivorous mammal introduced as a source of food during the 1500s. Dominant individuals escaped. This species originated in Eurasia. Rooting and wallowing behaviors ruin crops and destroy native vegetation. Feral swine carry and transmit several significant diseases (swine brucellosis, E. coli, trichinosis, and pseudorabies) to livestock and/or humans.

Gypsy Moth (*Lymantria dispar*)

Moth introduced to aid U.S. silk production; escaped in 1869; originated in Europe. Gypsy Moths have killed millions of trees by defoliation. Prefers oak trees, but will also feed on aspen, basswood, birch, hemlock, larch, pine, spruce, alder and apple.

Hemlock Woolly Adelgid (*Adelges tsugae*)

Sap-sucking insect introduced accidentally on nursery stock in 1950s in Virginia; originated in Japan. Hemlock Woolly Adelgid sucks the sap from young branches, resulting in tree mortality. Within the past few decades, Hemlock Woolly Adelgid has killed millions of Eastern Hemlocks and has changed the forest structure of the eastern U.S.

House Mouse (*Mus musculus*)

Rodent introduced accidentally as Europeans began exploring and colonializing North America during the 1600s; originated in central Asia. House mice consume and contaminate stored human and livestock foods; damage crops such as grains, corn and legumes; damage home and automobile wiring; and transmit diseases such as leptospirosis, plague, salmonella, lymphocytic choriomeningitis and toxoplasmosis to humans, pets and livestock.

House Sparrow (*Passer domesticus*)

Small bird introduced in the 1850s to reduce insect pests and to remind European immigrants of home; originated in Eurasia and northern Africa. House Sparrows compete with native birds for nesting sites and food which may lead to reduced numbers of native birds.

Kudzu Bug (*Megacopta cribraria*)

Insect first documented in Georgia in 2009. Method of introduction is unknown; originated in Asia. Kudzu bugs eat kudzu, soybeans and other legumes produced in agriculture which may lead to large crop reductions in the near future.

Multicolored Asian Ladybird Beetle (*Harmonia axyridis*)

Beetle introduced in 1916 as a biological control for harmful insects in agricultural settings; however, the first documented population was not found in the U.S. until 1988; originated in Asia. Multicolored Asian Ladybird Beetles have become a nuisance by infesting our homes by the hundreds or thousands as winter approaches. On warm days during the winter and spring they emerge and make their presence known.

Mute Swan (*Cygnus olor*)

Swan introduced in the late 1800s to add beauty and elegance to an area; originated in Eurasia. Mute Swans displace native wildlife and destroy native aquatic and wetland vegetation.

New Zealand Mudsnail (*Potamopyrgus antipodarum*)

Snail first documented in 1987 in Idaho; may have been introduced via ballast water or on imported game fish; originated in New Zealand. May pose a risk to native invertebrates through displacement and resource competition; more research is needed to understand their detrimental aspects.

Norway Rat (*Rattus norvegicus*)

Rodent introduced accidentally during the 1700s on ships arriving to the colonies; originated in Asia. Norway rats contaminate food supplies and are vectors for several highly detrimental diseases of humans and livestock.

Nutria (*Myocastor coypus*)

Rodent introduced in 1899 for commercial fur production. Later, some escaped and others were released into the wild; originated in South America. Nutria are voracious herbivores that consume native vegetation, severely degrading wetland habitats.

Quagga mussel (*Dreissena bugensis*)

Mussel introduced accidentally through ballast water on ships in late 1980s; originated in the Ukraine. Quagga mussels clog intake pipes for water treatment plants, power plants and other industrial facilities. They also remove plankton and modify the foodweb. Species depending on plankton and plankton feeders are negatively affected.

Red-eared Slider (*Trachemys scripta elegans*)

Turtle introduced post-1930s by the pet trade; originated in central and south-central U.S. New populations developed outside the natural range after pet emancipations and escapes. In PA, Red-eared Slider is an aquatic invasive species that competes with native turtles for food, basking sites and nesting sites. More research is needed to determine how damaging this species may be.

Rusty Crayfish (*Orconectes rusticus*)

Crayfish introduced accidentally by bait bucket releases; was first documented outside of its range in the 1960s; originated in the lower Ohio River drainage basin of western Ohio, Indiana and Kentucky. Rusty Crayfish compete with native crayfish species, reducing their number and diversity.

Sirex Woodwasp (*Sirex noctilio*)

Insect introduced accidentally on wood products imported to the U.S. First documented in New York in 2004; originated in Eurasia. Is a serious threat to many species of pines. When the female Sirex Woodwasp lays eggs inside a pine tree, it also infects the tree with a fungus, *Amylostereum aveolatum*, which kills the tree. This species has the potential to cause economic loss on pine plantations and ecological harm in pine forests.

Spiny Waterflea (*Bythotrephes longimanus*)

Small crustacean introduced accidentally in 1984 to the Great Lakes from dumping of ballast water; originated in Europe. Spiny Waterflea decreases zooplankton populations. They may compete with perch and with other small crustaceans for resources.

Viburnum Leaf Beetle (*Pyrrhalta viburni*)

Beetle introduced accidentally to Canada in 1978; has recently spread to PA; originated in Eurasia. Viburnum Leaf Beetle feeds on several native and non-native species of viburnum. If multiple consecutive defoliations occur over a 2-3 year period, the viburnum will die. Viburnum decline may negatively affect birds and other wildlife that use the fruits as food.

Zebra Mussel (*Dreissena polymorpha*)

Mussel introduced accidentally in 1988 from dumping of ship ballast water; originated in Eurasia. Zebra Mussels cover boat hulls, clog intake pipes for industry, power plants and water treatment plants; decrease native populations of mussels and alter fisheries. The economic impact of Zebra Mussel damage in the near future will be considerable.

Invasive Plants of Concern to the Raccoon Creek Region

Table 5.11: Noteworthy Invasive Plants of Concern to the 20D Raccoon Creek Region

The letters in superscript, following the common name of each invasive plant, denote the government agency or organization that recognizes specific invasive species. The superscript agency/organization code is:

- U** for United State Department of Agriculture
- F** for Pennsylvania Fish and Boat Commission
- D** for Pennsylvania Department of Conservation and Natural Resources
- N** for National Park Service & United States Fish and Wildlife Service
- H** for Pennsylvania Natural Heritage Program and
- P** for Pennsylvania Invasive Species Council.

Invasive Plant - Common Name	Species (scientific name)
Autumn Olive ^{U,D,H,N}	<i>Elaeagnus umbellata</i>
Brazilian waterweed ^{U,P}	<i>Egeria densa</i>
Bull Thistles ^{D,H}	<i>Cirsium vulgare</i>
Bush Honeysuckles ^{D,H,N}	<i>Lonicera tatarica</i> , <i>L. morrowii</i> , <i>L. x bella</i> , and <i>L. maackii</i>
Callery Pear ^{D,N}	<i>Pyrus calleryana</i>
Canada Thistle ^{U,D,H,N,P}	<i>Cirsium arvense</i>
Cheatgrass ^{U,D}	<i>Bromus tectorum</i>

Invasive Plants of Concern to the Raccoon Creek Region (continued)	
Common Buckthorns ^{U,D}	<i>Rhamnus cathartica</i>
Common Daylily ^N	<i>Heemerocallis fulva</i>
Creeping Euonymus ^{D,N}	<i>Euonymus fortunei</i>
Curly Pondweed ^{D,H,P}	<i>Potamogeton crispus</i>
Dame's Rocket ^{D,N}	<i>Hesperis matronalis</i>
English Ivy ^{D,N}	<i>Hedera helix</i>
Eurasian Watermilfoil ^{U,F,D,H,N,P}	<i>Myriophyllum spicatum</i>
Garlic Mustard ^{U,D,H,N,P}	<i>Alliaria petiolata</i>
Giant Hogweed ^{U,D,P}	<i>Heracleum mantegazzianum</i>
Giant Knotweed ^{D,H,P}	<i>Polygonum sachalinense</i>
Glossy Buckthorn ^D	<i>Rhamnus frangula</i>
Goatsrue ^{D,P}	<i>Galega officinalis</i>
Hydrilla ^{U,F,D,N,P}	<i>Hydrilla verticillata</i>
Japanese Angelica Tree ^D	<i>Aralia elata</i>
Japanese Barberry ^{U,D,H,N}	<i>Berberis thunbergii</i>
Japanese Honeysuckle ^{U,D,H,N}	<i>Lonicera japonica</i>
Japanese Hop ^{D,N,P}	<i>Humulus japonicus</i>
Japanese Knotweed ^{U,D,H,N,P}	<i>Polygonum cuspidatum</i>
Japanese Spiraea ^{U,D,N}	<i>Spiraea japonica</i>
Japanese Stiltgrass ^{U,D,N}	<i>Microstegium vimineum</i>
Jetbead ^{D,H}	<i>Rhodotypos scandens</i>
Jimsonweed ^D	<i>Datura stramonium</i>
Kudzu ^{U,D,N,P}	<i>Pueraria lobata</i>
Lesser Celandine ^D	<i>Ranunculus ficaria</i>
Mile-a-minute ^{U,D,H,N,P}	<i>Polygonum perfoliatum</i>
Moneywort ^D	<i>Lysimachia nummularia</i>
Multiflora Rose ^{U,D,H,N,P}	<i>Rosa multiflora</i>
Narrow-Leaved Cattail ^{D,P}	<i>Typha angustifolia</i>
Nodding Musk Thistle ^{U,D,H}	<i>Carduus nutans</i>
Norway Maple ^{U,D,N}	<i>Acer platanoides</i>
Oriental Bittersweet ^{U,D,H,N,P}	<i>Celastrus orbiculatus</i>
Parrot Feather Watermilfoil ^{D,N,P}	<i>Myriophyllum aquaticum</i>
Phragmites or Common Reed ^{U,D,H,N,P}	<i>Phragmites australis</i>

Invasive Plants of Concern to the Raccoon Creek Region (continued)	
Poison Hemlock ^D	<i>Conium maculatum</i>
Porcelainberry ^{D,N}	<i>Ampelopsis brevipedunculata</i>
Poverty Brome ^D	<i>Bromus sterilis</i>
Privets ^{D,H,N}	<i>Ligustrum japonicum, L. obtusifolium, L. sinense, and L. vulgare.</i>
Purple Loosestrife ^{U,F,D,H,N,P}	<i>Lythrum salicaria</i>
Shrubby bushclover ^D	<i>Lespedeza bicolor</i>
Spotted Knapweed ^{U,D,H,N}	<i>Centaurea stoebe</i>
Star-of Bethlehem ^{D,N}	<i>Ornithogalum nutans/ O. umbellatum</i>
Tree-of-heaven ^{U,D,H,N,P}	<i>Ailanthus altissima</i>
Water Chestnut ^{U,D,N,P}	<i>Trapa natans</i>
Water Hyacinth ^U	<i>Eichhornia crassipes</i>
Water Lettuce ^U	<i>Pistia stratiotes</i>
Winged Burning Bush ^{D,H,N}	<i>Euonymus alatus</i>

Descriptions of Invasive Plants of Concern to the Raccoon Creek Region

Autumn Olive (*Elaeagnus umbellata*)

Deciduous shrub with highly fragrant flowers introduced in the 1830s. It was imported for landscaping and wildlife habitat enhancement. It originated in East Asia. Autumn Olive prevents succession by choking out native shrubs and smaller plants, preventing sapling germination.

Brazilian Waterweed (*Egeria densa*)

Aquatic plant likely introduced by the aquarium trade and research profession. First documented in 1893, but introduction was likely before this time. It originated in South America. It forms large masses in waterways that interfere with water recreation activities. Brazilian Waterweed also displaces native aquatic plants.

Bull Thistle (*Cirsium vulgare*)

Spiny biennial forb introduced during colonial times. It originated in Europe, western Asia and Northern Africa. Bull Thistle forms large stands that choke out native vegetation. It is unpalatable to wildlife and livestock.

Bush Honeysuckles (*Lonicera tatarica, L. morrowii, L. x bella, and L. maackii*)

Deciduous shrubs introduced for use in landscaping, to enhance wildlife habitat, and/or erosion control during the 1800s. They originated in Japan, Europe, and Asia. Bush Honeysuckles displace native shrubs and smaller vegetation. Their berries are a poor nutritional source for birds when compared to native shrubs' berries.

Callery Pear (*Pyrus calleryana*)

Deciduous tree introduced in 1909 for use in landscaping and as root stock for the common fruit-tree pear. It originated in China and Vietnam. Callery Pear forms dense stands that choke out native vegetation. A commonly planted street-tree cultivar is 'Bradford' Pear.

Canada Thistle (*Cirsium arvense*)

Herbaceous perennial forb introduced accidentally in the 1600s. It originated in Europe and Asia. Canada thistle now grows in about thirty-seven countries around the world and is widespread throughout the United States and Canada. This spiny agricultural weed is considered a noxious weed in 43 states. In natural settings, it forms large dense stands that displace native vegetation in sunny locations. The fine bristles of this plant can irritate the skin if handled or brushed against. Canada thistle's creeping roots can extend up to 17 feet horizontally and 20 feet deep.⁶⁵



Figure 5.30: Bradford Pear trees in a commercial landscape. 4/22/2014.

Cheatgrass (*Bromus tectorum*)

Annual grass introduced accidentally before 1860 from contaminated ship ballast soil and contaminated seeds. It originated in Europe. Cheatgrass forms dense stands that out-compete native vegetation.

Common Buckthorn (*Rhamnus cathartica*)

Deciduous shrub introduced around 1850 for landscaping, wildlife habitat enhancement and farm windbreaks. It originated in Eurasia. Common Buckthorns form dense thickets that choke out native vegetation, stop succession and increase bird predation. They also act as the alternate host of Oat Crown Rust, a disease which decreases quality and quantity of oat yields.

Common Daylily (*Hemerocallis fulva*)

Herbaceous forb originally from Asia, introduced for gardening and landscaping during the late 19th century, has become ubiquitous along PA's roadsides. Also known as Tiger Lily, Common Daylily or Ditch Lily. It produces stands that choke out native vegetation.

Creeping Euonymus (*Euonymus fortunei*)

Evergreen perennial vine introduced in 1907 as a groundcover for landscaping. It originated in Asia. Creeping Euonymus displaces native species along forest margins and at forest openings by growing over and shading out native vegetation. It can climb up to 70 feet, clinging by means of aerial roots.

⁶⁵ <http://extension.psu.edu/pests/weeds/weed-id/canada-thistle> accessed 4/17/2014

Curly Pondweed (*Potamogeton crispus*)

Aquatic plant introduced accidentally by the aquarium trade around 1850. It originated in Eurasia, Africa and Australia. Curly Pondweed forms thick mats that displace native aquatic plants and hinder recreational activities.

Dame's Rocket (*Hesperis matronalis*)

Biennial forb introduced for use in landscaping during European colonization of America. It originated in Europe. Dame's Rocket displaces native plants in open habitats.

English Ivy (*Hedera helix*)

Evergreen perennial vine introduced as a groundcover for landscaping in 1727. It originated in Europe, Western Asia and North Africa. English Ivy is detrimental from ground level to the canopy because it chokes out native vegetation from the shade produced as it climbs up other plants. It also carries Bacterial Leaf Scorch, a plant pathogen harmful to many tree species.

Eurasian Watermilfoil (*Myriophyllum spicatum*)

Aquatic plant introduced accidentally in the 1940s. It originated in Eurasia and Africa. In disturbed bodies of water, Eurasian Watermilfoil forms dense mats that impede native plants and hinder traffic on waterways.

Garlic Mustard (*Alliaria petiolata*)

Biennial forb introduced by settlers for food and medicine. It was first documented in 1868, but introduction was likely earlier. It originated in Europe. Garlic mustard has played a key role in displacement of native spring wildflowers and the butterfly species that feed on them. The rare West Virginia White Butterfly and Falcate Orange-Tip Butterfly have been harmed by the invasion of Garlic Mustard.



Figure 5.31: Garlic Mustard, *Alliaria petiolata*. White spots on the leaves are flower petals washed down by rain. 5/10/2014.

Giant Hogweed (*Heracleum mantegazzianum*)

Biennial forb introduced for use in landscaping in 1917. It originated in Europe and Asia. Giant Hogweed produces sap that is a health hazard. If the sap comes in contact with skin or eyes when sunlight is present, severe dermatitis and/or blindness can result. Seek medical attention promptly.

Giant Knotweed (*Polygonum sachalinense*)

Herbaceous perennial forb introduced for use in landscaping and erosion control during the late 1800s. It originated in Japan. Giant Knotweed forms dense stands that increase erosion, choke out native vegetation and clog small waterways.

Glossy Buckthorn (*Rhamnus frangula*)

Deciduous shrub introduced for use in landscaping and to enhance wildlife habitat during the 1850s. It originated in Eurasia. Glossy Buckthorn produces thickets that choke out shrubs and smaller native vegetation.

Goatsrue (*Galega officinalis*)

Herbaceous perennial forb introduced as a forage crop during the 1890s, but later determined to be toxic to goats, sheep, and cattle. It originated in Middle East, northern Africa and Europe.

Hydrilla (*Hydrilla verticillata*)

Aquatic plant introduced by the aquarium trade in the 1960s. It originated in central Africa. Hydrilla fills waterways quickly and chokes out native aquatic plants. It also reduces recreational use of waterways.

Japanese Angelica Tree (*Aralia elata*)

Deciduous tree introduced for use in landscaping in 1830. It originated in Japan, Korea and eastern Russia. Japanese Angelica Tree forms dense stands that choke out native vegetation smaller than itself.

Japanese Barberry (*Berberis thunbergii*)

Deciduous shrub native to Japan. It was introduced in 1875 for landscaping and to replace European Barberry which acted as an alternate host for Black Stem Rust, a fungal disease very destructive to wheat crops. This shrub forms dense thickets that choke out native shrubs and smaller vegetation.

Japanese Honeysuckle (*Lonicera japonica*)

Deciduous perennial vine introduced in 1806 for use in landscaping, to enhance wildlife habitat and provide erosion control. It originated in Eastern Asia. Japanese Honeysuckle covers native plants and smothers them in the shade produced. It can also girdle small trees. It is semi-evergreen or evergreen in the northeast U.S., giving it a constant advantage over native plants.



Figure 5.32: Giant knotweed overtaking Dam Road in Greene Township. 6/5/2014.



Figure 5.33: Invasive species such as this Japanese Barberry are easily spotted in early spring, as they bear the only green leaves in the woods. 4/17/2014

Japanese Hop (*Humulus japonicas*)

Annual vine introduced for landscaping and medical purposes in the latter half of the 1800s. It originated in Japan, Korea and eastern China. Japanese Hops covers native plants and smothers them in its shade.

Japanese Knotweed (*Polygonum cuspidatum*)

Herbaceous perennial forb introduced for landscaping and erosion control in the late 1800s. It originated in eastern Asia. Japanese Knotweed forms dense thickets that choke out native vegetation. It is particularly difficult to eradicate because new plants can grow from broken pieces of the rhizomes or winged seeds washed downstream. Japanese Knotweed is present in all but nine of the fifty United States.⁶⁶

Japanese Spiraea (*Spiraea japonica*)

Deciduous shrub introduced for landscaping from 1870 to 1890. It originated in Japan, Korea and China. Japanese Spiraea forms dense thickets that shade out native shrubs and smaller native vegetation. It aggressively invades disturbed areas and forms dense stands that out-compete native species. It often spreads locally when its hardy seeds are transported along watercourses or in fill dirt.

Japanese Stiltgrass (*Microstegium vimineum*)

Annual grass introduced accidentally from packing material in 1919. It originated in Japan, Korea, China and India. Japanese Stiltgrass forms dense stands in both shade and sun that choke out native summer and fall vegetation.

Jetbead (*Rhodotypos scandens*)

Deciduous shrub introduced in 1866 for landscaping. It originated in central China, Japan and Korea. Jetbead forms thickets that choke out native shrubs and smaller native vegetation.

Kudzu (*Pueraria lobata*)

Herbaceous perennial vine introduced in the late 1800s for landscaping, livestock feed and erosion control. It originated in Asia. Kudzu covers all vegetation and smothers trees, shrubs, and forbs in the shade produced. It can also girdle trees and shrubs.

Lesser Celandine (*Ranunculus ficaria*)

Herbaceous perennial forb introduced for use in landscaping. Date of introduction is unknown, but it originated in Eurasia. Lesser Celandine grows in thick stands in moist places. It starts growing before other native spring ephemerals which are unable to compete with it. The reduction of native spring ephemerals adversely affects pollinators that depend on these native plants as principle food source.

Mile-A-Minute (*Polygonum perfoliatum*)

Annual vine introduced accidentally as a weed in nursery stock during the late 1800s to 1930s. It originated in Philippines. Mile-a-minute covers and smothers native small trees, shrubs and

⁶⁶ <http://plants.usda.gov/core/profile?symbol=pocu6> accessed 4/17/2014

forbs in its shade. It also grows into trees, lessening light to the forest floor and decreasing plant biodiversity. This plant is a nuisance on tree farms and in crop fields that have limited tilling practices.

Moneywort (*Lysimachia nummularia*)

Annual vine introduced as a groundcover for landscaping. Date of introduction unknown. It originated in Europe and Southwest Asia. Moneywort decreases habitat for native vegetation in wetland areas.

Multiflora Rose (*Rosa multiflora*)

Deciduous shrub introduced in 1866 for use as rootstock. Later, it was widely used as an erosion control agent, living fences for livestock, habitat enhancement agent for wildlife and crash barrier along roadways. It originated in Japan. Multiflora Rose forms dense thickets smothering and choking out native shrubs and smaller vegetation. Leaf litter produced decreases quantity and quality of macro-invertebrates in streams.

Narrow-Leaved Cattail (*Typha angustifolia*)

Herbaceous perennial forb introduced accidentally from contaminated ship ballast soil. Date of introduction unknown. It originated in Europe. Narrow-Leaved Cattail spreads quickly in aquatic and wetland areas forming large stands that displace native vegetation almost completely.

Nodding Musk Thistle (*Carduus nutans*)

Biennial forb introduced accidentally in the early 1800s. It originated in Europe and Asia. Nodding Musk Thistle forms dense stands displacing native vegetation. The plant is unpalatable to wildlife and livestock.

Norway Maple (*Acer platanoides*)

Deciduous tree introduced for use in landscaping in 1756. It originated in Europe and is one of the most widely planted street and yard trees in the U.S. Norway Maples reduce biodiversity of native wildflowers and native maples.

Oriental Bittersweet (*Celastrus orbiculatus*)

Deciduous perennial vine introduced for use in landscaping and erosion control in the 1860s. It originated from eastern Asia. Oriental Bittersweet girdles trees, covers and smothers native vegetation



Figure 5.34: A young Oriental Bittersweet vine strangles a much older one; the entire mass is heavily entangled in a sassafras tree. 4/10/2014.

from shade produced. It also hybridizes with native bittersweet, polluting native genetic diversity.

Parrot Feather Watermilfoil (*Myriophyllum aquaticum*)

Aquatic plant introduced for aquarium and aquatic landscaping uses during the 1890s. It originated in South America. Parrot Feather Watermilfoil fills waterways quickly and chokes out native aquatic plants, reducing the recreational use of waterways.

Phragmites or Common Reed (*Phragmites australis subsp. australis*)

Perennial grass introduced accidentally in contaminated ballast material in the 1800s. It originated in Europe. Phragmites or Common Reed forms large stands in wetlands, destroying wildlife habitat and choking out native vegetation.

Poison Hemlock (*Conium maculatum*)

Biennial forb introduced for use in landscaping in the 1800s. It originated in Europe, West Asia and northern Africa. Poison Hemlock displaces native vegetation at recently disturbed sites. All parts of this plant are poisonous if ingested by humans or livestock.

Porcelainberry (*Ampelopsis brevipedunculata*)

Deciduous woody vine introduced for use in landscaping in the 1870s. It originated in Japan and northern China. Porcelainberry covers and smothers native vegetation from shade produced.

Poverty Brome (*Bromus sterilis*)

Annual grass introduced from Eurasia. Date of introduction unknown. Poverty Brome forms dense stands that out-compete native vegetation.

Privets (*Ligustrum japonicum*, *L. obtusifolium*, *L. sinense*, and *L. vulgare*)

Deciduous or semi-evergreen shrubs introduced for landscaping purposes in the 1860s. These originated in Asia, Japan and Europe. Privets commonly escape from yards and form dense thickets that shade out native shrubs and smaller vegetation in fields and woodlands.

Purple Loosestrife (*Lythrum salicaria*)

Perennial forb introduced intentionally for landscaping and accidentally from contaminated ship ballast during the 1800s. It originated in Eurasia. Purple Loosestrife forms dense stands that take over entire wetlands. While considered beautiful by many, this plant impedes nutrient cycling, reduces waterfowl habit, and significantly decreases native plant biodiversity.

Shrubby Bushclover (*Lespedeza bicolor*)

Deciduous shrub introduced to enhance wildlife habitat in the late 1800s. It originated in Asia. Shrubby Bushclover chokes out native shrubs and smaller vegetation in meadows and along forest edges.

Spotted Knapweed (*Centaurea stoebe*)

Herbaceous perennial forb accidentally introduced from contaminated ship ballast soil and contaminated alfalfa seeds and clover seeds during the late 1800s. It originated in Europe and western Asia. Spotted Knapweed invades open areas such as meadows, old farm fields and open forests. In these areas, it displaces native vegetation and reduces food for wildlife and foraging animals.

Star-of Bethlehem (*Ornithogalum nutans*/*O. umbellatum*)

Herbaceous perennial forb introduced for gardening. Date of introduction unknown. These species originated in north Africa, Europe and Asia. Star-of Bethlehem displaces native spring ephemerals in forested areas.

Tree-of-Heaven (*Ailanthus altissima*)

Deciduous tree introduced to the U.S. for landscaping in 1748. It originated in northeastern and central China. Tree-of-Heaven causes damage to sewer lines, forms stands that choke out native vegetation and releases chemicals from its roots that act like herbicide on surrounding vegetation. *Ailanthus* grows very rapidly to heights of 75 feet or more, and all parts of tree are foul-smelling. It colonizes disturbed areas before native vegetation can gain a foothold. Tree-of-Heaven was featured in the novel “A Tree Grows in Brooklyn.”



**Figure 5.35: A dirty duo of invasive plants:
tree of heaven and Japanese knotweed.
5/29/2014**

Water Chestnut (*Trapa natans*)

Floating aquatic plant introduced for water gardening during the 1800s. It originated in Eurasia and Africa. Water Chestnut forms thick mats that decrease light to aquatic plants, reducing native aquatic vegetation and oxygen production. The decrease in oxygen increases the potential for fish kills. The dense mats formed by Water Chestnut impede water recreation activities and the seeds can cause painful wounds in feet.

Water Hyacinth (*Eichhornia crassipes*)

Floating aquatic plant introduced for water gardening in 1884. It originated in South America. Water Hyacinth forms thick mats that decrease light to aquatic plants, reducing native aquatic vegetation. It also impedes water recreation activities.

Winged Burning Bush (*Euonymus alatus*)

Deciduous shrub introduced for landscaping during the 1860s. It originated in Japan, Central China and northeastern Asia. Winged Burning Bush forms dense thickets that shade out native shrubs and smaller vegetation.

Noxious Weeds of Pennsylvania

Plants listed on Pennsylvania’s Noxious Weed Control List are illegal to sell, transport, plant, or propagate within Pennsylvania, except when a permit is obtained from the Secretary of the Pennsylvania Department of Agriculture for research or horticultural use. Modifications to this list are done by members of the Noxious Weed Control Committee when a plant is determined to be injurious to public health, agricultural land, crops, livestock or other property.

Table 5.12: Pennsylvania’s Noxious Weed Control List

Noxious Weed-Common Name	Species (scientific name)
Marijuana	<i>Cannabis sativa</i>
Musk Thistle	<i>Carduus nutans</i>
Canada Thistle	<i>Cirsium arvense</i>
Bull Thistle	<i>Cirsium vulgare</i>
Jimsonweed	<i>Datura stramonium</i>
Goatsrue	<i>Galega officinalis</i>
Giant Hogweed	<i>Heracleum mantegazzianum</i>
Purple Loosestrife	<i>Lythrum salicaria*</i>
Mile-a-minute	<i>Polygonum perfoliatum</i>
Kudzu	<i>Pueraria montana</i>
Multiflora Rose	<i>Rosa multiflora</i>

* includes any non-native members of the genus *Lythrum*

Invasive Microbes of Concern to the Raccoon Creek Region

Table 5.13: Noteworthy Invasive Microbes of Concern to the 20D Raccoon Creek Region

The letters in superscript, following each common name, denote government agency or organization that recognizes specific invasive microbe species. The superscript agency/organization code is:

- U** for United State Department of Agriculture
- D** for Pennsylvania Department of Conservation and Natural Resources
- F** for Pennsylvania Fish and Boat Commission
- P** for Pennsylvania Invasive Species Council.

Table 5.13: Noteworthy Invasive Microbes of Concern to the 20D Raccoon Creek Region

Invasive Microbe - Common Name	Species (scientific name)
Beech Bark Disease ^{U,P}	<i>Nectria coccinea</i> var. <i>faginata</i> / <i>Cryptococcus fagisuga</i>
Butternut Canker Disease ^U	<i>Sirococcus clavigignenti-juglandacearum</i>
Chestnut Blight ^U	<i>Cryphonectria parasitica</i>
Didymo ^{U,F,D,P}	<i>Didymosphenia geminata</i>
Dutch Elm Disease ^{U,P}	<i>Ophiostoma ulmi</i> and <i>Ophiostoma novo-ulmi</i>
Oak Wilt [*]	<i>Ceratocystis fagacearum</i>
Sudden Oak Death ^{U,P}	<i>Phytophthora ramorum</i>
Thousand Cankers Black Walnut Disease ^U	<i>Geosmithia morbida</i>
Viral Hemorrhagic Septicemia ^{U,F,P}	<i>Novirhabdovirus</i> sp.
White-Nose Syndrome ^U	<i>Geomyces destructans</i>
West Nile Virus ^{U,P}	<i>Flavivirus</i>

*Recent research on Oak Wilt demonstrates that its likely origin was outside the United States (Juzwik et al., 2008), making it a new candidate for an invasive species because of its non-native origin and highly destructive effect on red oaks.

Descriptions of Invasive Microbes of Concern to the Raccoon Creek Region

Beech Bark Disease (*Cryptococcus fagisuga* + *Nectria* ssp.)

This disease was introduced during the late 1800s to Nova Scotia from Europe and spread to the United States by 1930. Beech Bark Disease is caused by an association between the Beech Scale (*Cryptococcus fagisuga*), a non-native sap sucking insect, and *Nectria* fungus (*Nectria coccinea* var. *faginata*, *N. ochroleuca*, or *N. galligena*). Once Beech Scale infests an American Beech, tiny holes are left open in the bark from the sap extraction. These holes allow *Nectria* fungus to invade, and the resulting infection kills the living tissue of the tree. Within a few years, the infected tree will die due to girdling, or it will break off in the wind. It is important to note that Beech Scale is the mechanism that allows the *Nectria* Fungus to invade, and only *Nectria coccinea* var. *faginata* is non-native. The impact of this disease will also affect the wildlife that use the American Beech as a food source.

Butternut Canker Disease (*Sirococcus clavigignenti-juglandacearum*)

A fungal disease first document in 1967 in Wisconsin has spread the entire range of the Butternut. The introduction route is unknown. Genetic research has demonstrated Butternut Canker Disease originated outside of the United States, but its exact origins are unknown. Once a Butternut tree becomes infected with this fungal disease, cankers form and destroy the living tissue of the tree and girdle it. It is spread by beetles that associate with Butternuts or by

spores entering trees through open wounds. Mortality may happen quickly or take up to 30 years. Prior to this disease, Butternuts were a prized food sources for humans and wildlife.

Chestnut Blight (*Cryphonectria parasitica*)

Fungal disease introduced accidentally on imported nursery stock in 1904. It originated in Asia. Within 50 years, four billion American Chestnut trees were killed. Once an American Chestnut is infected, the fungus destroys the living tissue above ground by forming cankers. Root tissue harbors the disease but is not killed by it. The roots send up new shoots which can reach several inches in diameter before succumbing to Chestnut Blight. Before this disease struck, American Chestnuts accounted for one in four trees in eastern forests.⁶⁷ They were a dominant climax forest species, a primary source of rot-resistant hardwood timber and an important food source for wildlife and humans.

Didymo (*Didymosphenia geminata*)

A freshwater diatom originally found in the northern hemisphere in cool waterways and cold alpine lakes. Also known as “Rock Snot,” Didymo has adapted to a wider range of water conditions than in the past, allowing it to spread to new areas and aquatic habitats. It can be easily transported areas via fishing equipment. Once it invades, it covers plants, rocks and other items in streams, rivers and lakes, forming a blanket up to eight inches thick.⁶⁸ Overtime, it will decrease aquatic invertebrate and plant biodiversity, reduce fish populations and impede recreational use of waterways.

Dutch Elm Disease (*Ophiostoma ulmi* and *Ophiostoma novo-ulmi*)

Fungal diseases introduced accidentally during the 1930s and then again in the 1940s. The first Dutch Elm Disease (*Ophiostoma ulmi*) arrived on elm logs imported from Europe. The second species of Dutch Elm Disease (*Ophiostoma novo-ulmi*) arrived in the 1940s, possibly from Asia or Europe. Dutch Elm Disease targets any species of elm found in the United States, especially American Elm. Both species of Dutch Elm Disease clog the vascular tissues that move water and nutrients up the trunk, which, over time, kills the tree. Most American Elms have been wiped out by these diseases which are spread by beetles that feed on elms. The fungus can also be introduced to a healthy tree by saws and pruning equipment. Historically, American Elms were an extremely important landscaping tree, lining streets in many cities. Today, you are lucky to find a few trees growing in a forested wetland.

Oak Wilt (*Ceratocystis fagacearum*)

Fungal disease first documented in Wisconsin in 1942. Its origins and mechanism for introduction are unknown, but recent genetic research suggests Oak Wilt is non-native. This fungal disease targets oaks, particularly red oaks; white oaks are more resistant. Oak wilt can be spread by contaminated tools, chewing animals or insects. It can also spread by root grafting, a process where the roots of nearby trees of related species grow together, allowing disease to transfer from one tree to many others. Oak Wilt clogs the vascular tissues, preventing the transport of water and nutrients. Infected trees will die from the top down within two growing

⁶⁷ <http://www.acf.org/> accessed 4/8/2014

⁶⁸ http://www.paseagrant.org/wp-content/uploads/2013/10/Didymo2013_reduced.pdf accessed 4/8/2014

seasons.⁶⁹ Large-scale oak die-off will hurt lumber production and decrease food sources for wildlife.

Thousand Cankers Black Walnut Disease (*Geosmithia morbida*)

Fungal disease first observed in western U.S. during the 1990s. Its origins and mechanism for introduction are unknown. Thousand Cankers Black Walnut Disease is spread by Walnut Twig Beetles (*Pityophthorus juglandis*) when they bore into a Black Walnut tree. The Walnut Twig Beetle is native to the western U.S. Once a Black Walnut is infected, within a couple of years, the fungus will girdle the tree and it will die. The impact of Thousand Canker Black Walnut Disease will be loss of an important food source for wildlife, high quality lumber and an important landscaping tree.

Viral Hemorrhagic Septicemia (*Novirhabdovirus sp.*)

Viral disease introduced to the U.S. from migrating fish or via ballast water from ships. Viral Hemorrhagic Septicemia was first documented in Europe in the 1930s. It was first found in the U.S. in 1988, then in the Great Lakes in 2005. This is a fish virus that can kill twenty-five different species, nineteen of which are sportfish. The virus enters through the gills, weakening blood vessels and causing hemorrhaging throughout the fish, usually leading to death. This virus will cause decreased fish populations, disrupt aquatic food webs and interfere with recreational fishing.

White-Nose Syndrome (*Geomyces destructans*)

Fungal disease introduced possibly by visitors to a cave in New York. It was noticed in 2006 in a cave near Albany. Presently, it is found in many locations in the eastern U.S. White-Nose Syndrome likely originated in Europe, but more research is needed. This disease is named for the white fungus that infects the skin of the muzzle, ears and wings of hibernating bats. Bats infected with this disease burn through energy reserves while hibernating and starve to death. Mortality rates in infected bat colonies average 80%. Since the winter of 2007-2008, millions of insect-eating bats have perished from White-Nose Syndrome.⁷⁰

West Nile Virus (*Flavivirus*)

Viral disease introduced accidentally in 1999 in New York City. Its origins are unknown, but West Nile Virus has been historically found in Africa, the Middle East, Eastern Europe and western Asia. West Nile Encephalitis is transmitted by mosquitos to humans, horses and birds. Most people infected with this disease show no symptoms, or may experience mild illness such as fever, headache, body aches, mild skin rash, or swollen lymph glands.⁷¹

⁶⁹ <http://extension.psu.edu/pests/plant-diseases/all-fact-sheets/oak-wilt> accessed 4/9/2014

⁷⁰ http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/ accessed 4/9/2014

⁷¹ Penn State Extension, Pesticide Education, West Nile Virus, available at <http://extension.psu.edu/pests/pesticide-education/applicators/pest-management/wnv/> accessed 4/9/2014.

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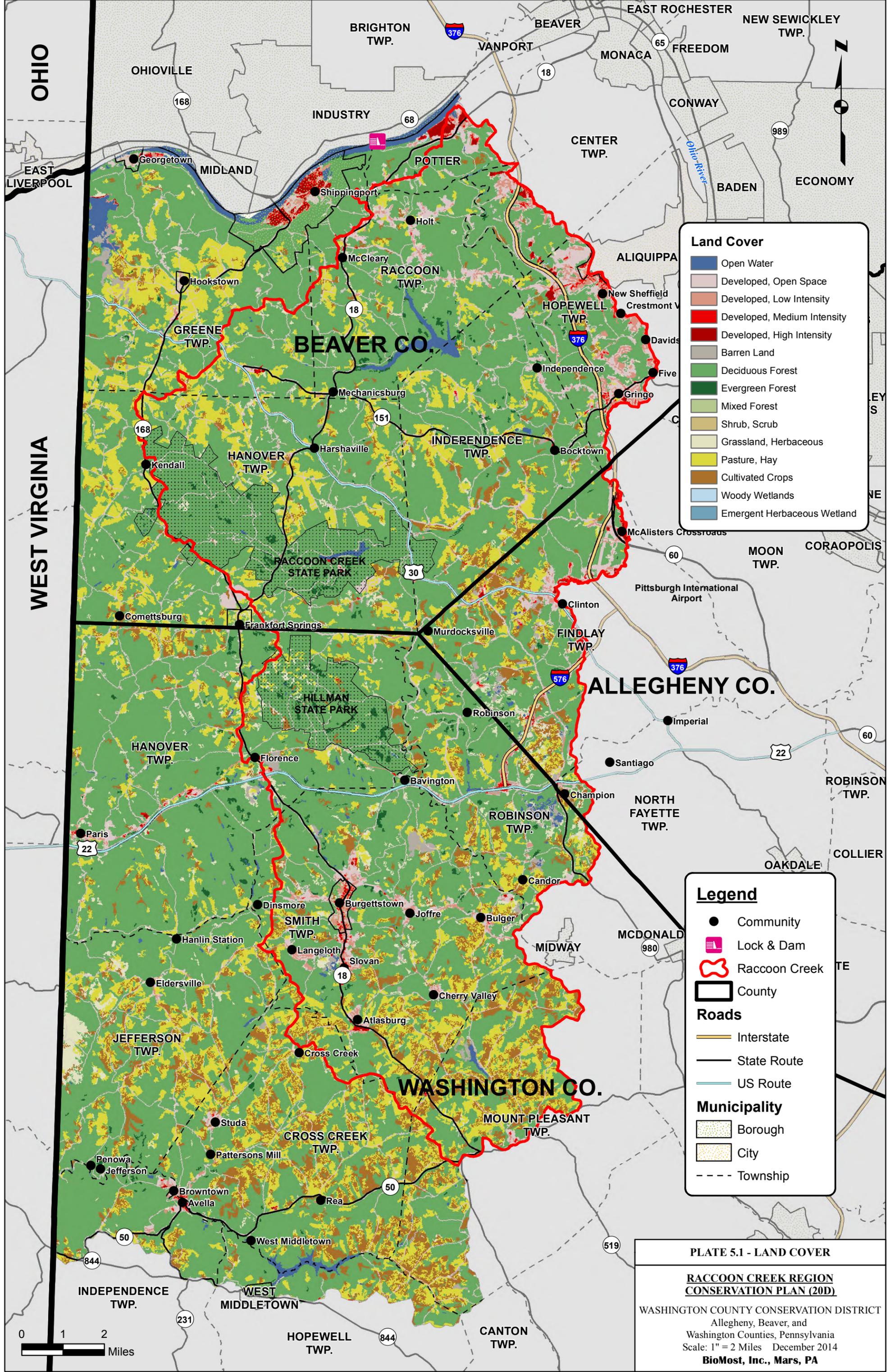
**Figure 5.36: Turk's cap lily, *Lilium superbum*, native woodland and wetland wildflower.
Photo by Alison Hofer-Richards.**

Section 5: PLATES

Plate 5.1: Land Cover Map of the 20D Raccoon Creek Region

Plate 5.2: Important Birding Areas of the 20D Raccoon Creek Region

Plate 5.3: Natural Heritage Inventory of the 20D Raccoon Creek Region



Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub, Scrub
- Grassland, Herbaceous
- Pasture, Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetland

Legend

- Community
- Lock & Dam
- Raccoon Creek
- County

Roads

- Interstate
- State Route
- US Route

Municipality

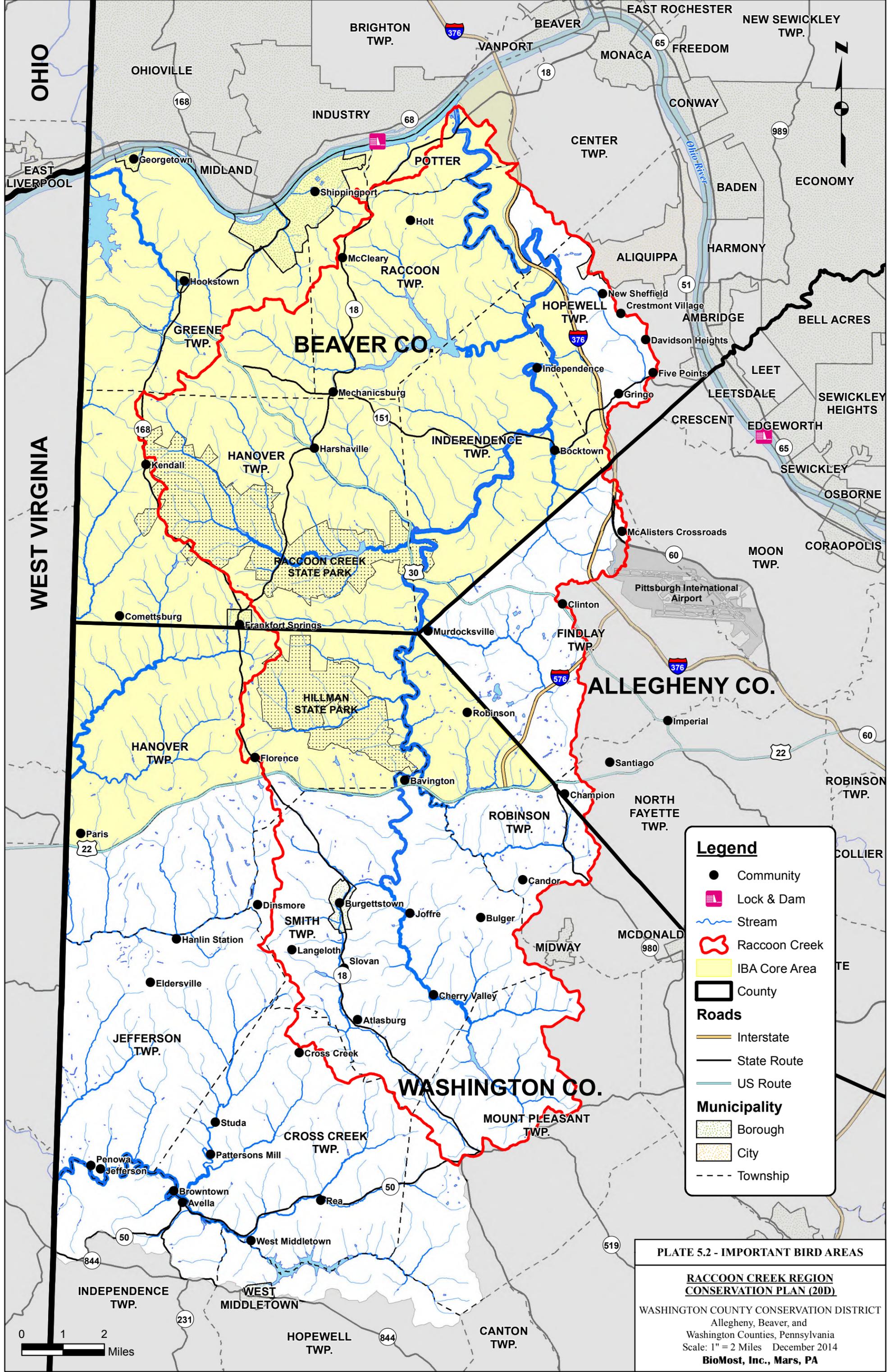
- Borough
- City
- Township

PLATE 5.1 - LAND COVER

RACCOON CREEK REGION
CONSERVATION PLAN (20D)

WASHINGTON COUNTY CONSERVATION DISTRICT
Allegheny, Beaver, and
Washington Counties, Pennsylvania
Scale: 1" = 2 Miles December 2014
BioMost, Inc., Mars, PA





OHIO

WEST VIRGINIA



Legend

- Community
- Lock & Dam
- ~ Stream
- ⬮ Raccoon Creek
- IBA Core Area
- ▭ County

Roads

- Interstate
- State Route
- US Route

Municipality

- ▨ Borough
- ▨ City
- - - Township

PLATE 5.2 - IMPORTANT BIRD AREAS

RACCOON CREEK REGION CONSERVATION PLAN (20D)

WASHINGTON COUNTY CONSERVATION DISTRICT
 Allegheny, Beaver, and
 Washington Counties, Pennsylvania
 Scale: 1" = 2 Miles December 2014
BioMost, Inc., Mars, PA

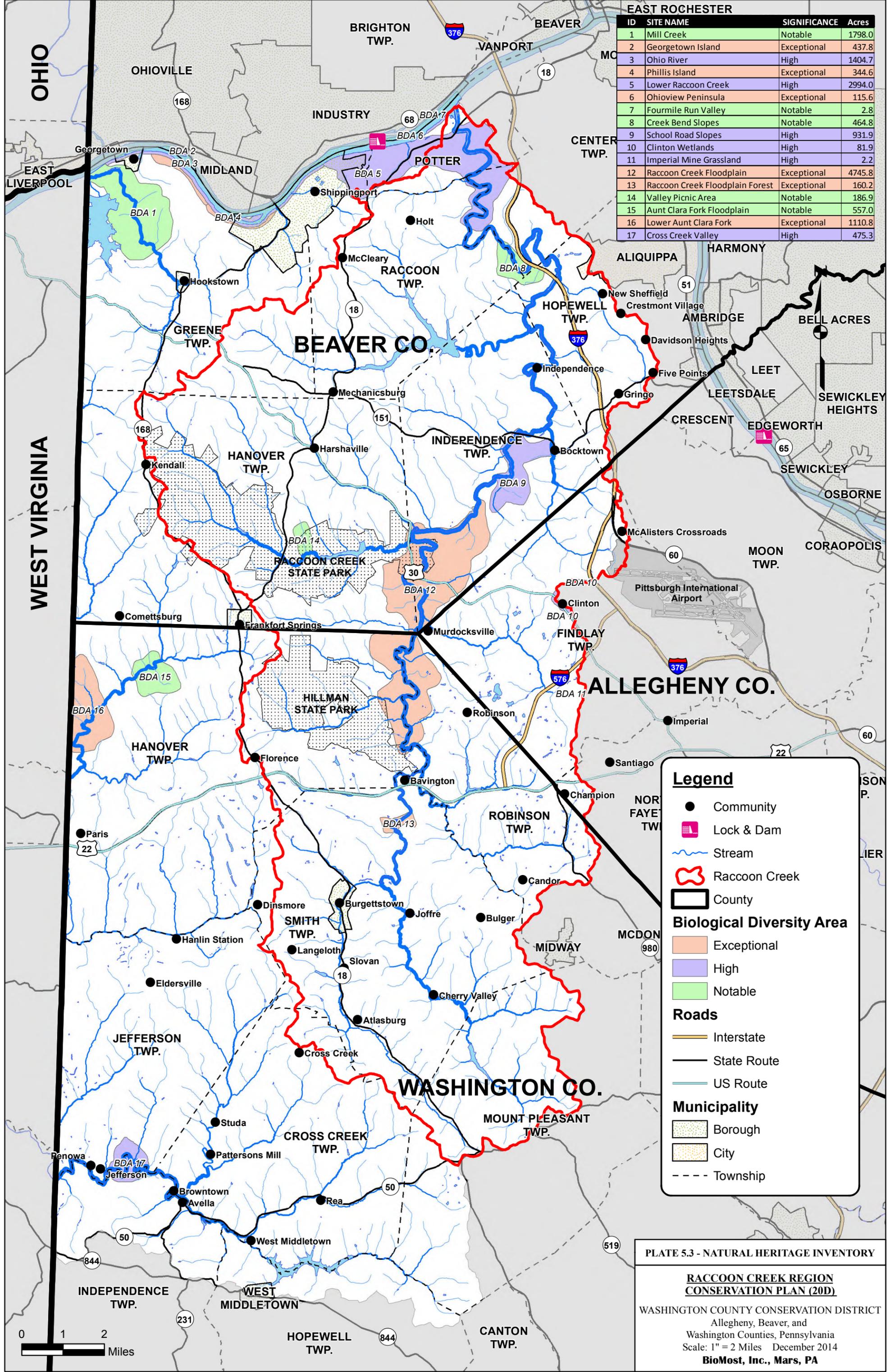


BEAVER CO.

ALLEGHENY CO.

WASHINGTON CO.

TOWNSHIPS: BRIGHTON TWP., VANPORT, BEAVER, EAST ROCHESTER, NEW SEWICKLEY TWP., MONACA, FREEDOM, CONWAY, INDUSTRY, POTTER, CENTER TWP., BADEN, ECONOMY, MIDLAND, SHIPPINGPORT, HOPEWELL TWP., ALIQUIPPA, HARMONY, AMBRIDGE, BELL ACRES, GREENE TWP., HOLT, MCCLEARY, RACCOON TWP., HOPEWELL TWP., NEW SHEFFIELD, CRESTMONT VILLAGE, DAVIDSON HEIGHTS, LEET, LEETSDALE, SEWICKLEY HEIGHTS, INDEPENDENCE, FIVE POINTS, GRINGO, CRESCENT, EDGEWORTH, SEWICKLEY, OSBORNE, HANOVER TWP., MECHANICSBURG, BOCKTOWN, MCALISTERS CROSSROADS, MOON TWP., CORAOPOLIS, RACCOON CREEK STATE PARK, HILLMAN STATE PARK, PITTSBURGH INTERNATIONAL AIRPORT, FINDLAY TWP., CLINTON, ROBINSON, IMPERIAL, HANOVER TWP., FLORENCE, BAVINGTON, CHAMPION, NORTH FAYETTE TWP., ROBINSON TWP., PARIS, DINSMORE, BURGETTSTOWN, JOFFRE, BULGER, CANDOR, MCDONALD, SMITH TWP., LANGELOTH, SLOVAN, CHERRY VALLEY, MIDWAY, HANLIN STATION, ELIDERSVILLE, ATLASBURG, MOUNT PLEASANT TWP., JEFFERSON TWP., STUDA, CROSS CREEK TWP., PENOWA, JEFFERSON, BROWNTOWN, AVELLA, REA, WEST MIDDLETOWN, WEST MIDDLETOWN, INDEPENDENCE TWP., HOPEWELL TWP., CANTON TWP.



ID	SITE NAME	SIGNIFICANCE	Acres
1	Mill Creek	Notable	1798.0
2	Georgetown Island	Exceptional	437.8
3	Ohio River	High	1404.7
4	Phillis Island	Exceptional	344.6
5	Lower Raccoon Creek	High	2994.0
6	Ohioview Peninsula	Exceptional	115.6
7	Fourmile Run Valley	Notable	2.8
8	Creek Bend Slopes	Notable	464.8
9	School Road Slopes	High	931.9
10	Clinton Wetlands	High	81.9
11	Imperial Mine Grassland	High	2.2
12	Raccoon Creek Floodplain	Exceptional	4745.8
13	Raccoon Creek Floodplain Forest	Exceptional	160.2
14	Valley Picnic Area	Notable	186.9
15	Aunt Clara Fork Floodplain	Notable	557.0
16	Lower Aunt Clara Fork	Exceptional	1110.8
17	Cross Creek Valley	High	475.3

Legend

- Community
- Lock & Dam
- ~ Stream
- ⬮ Raccoon Creek
- ▭ County

Biological Diversity Area

- Exceptional
- High
- Notable

Roads

- Interstate
- State Route
- US Route

Municipality

- ▨ Borough
- ▨ City
- - - Township

PLATE 5.3 - NATURAL HERITAGE INVENTORY

RACCOON CREEK REGION CONSERVATION PLAN (20D)
 WASHINGTON COUNTY CONSERVATION DISTRICT
 Allegheny, Beaver, and Washington Counties, Pennsylvania
 Scale: 1" = 2 Miles December 2014
BioMost, Inc., Mars, PA



Section 6: Cultural Resources

Introduction

Cultural resources contribute to the identity of a place. People in every culture identify with their communities through sense of place. The cultural landscape helps to define an area's heritage and create its distinctive nature. Cultural resources also serve as a catalyst for attracting outsiders to visit, which in turn can help fuel an area's economy. Tourism not only contributes to a community by providing employment, income and cultural benefits, it can also generate visibility, tax revenue and help to diversify the economic base.

For purposes of the 20D Raccoon Creek Region Conservation Plan, cultural resources will include the recreational opportunities and the archaeological and historic sites within the study area. This section will provide an inventory and analysis of the recreational resources by facilities and use, and the archaeological and historical resources by type and importance.

Recreation, Sports & Entertainment

Recreation is one of Pennsylvania's most important industries, generating substantial economic benefits. Raccoon Creek State Park alone accounted for over \$14 million in visitor spending in 2010.¹ The greater Raccoon Creek Region abounds with opportunities for residents and visitors to enjoy indoor and outdoor concerts, hunting and fishing, swimming, paddling, cycling, hiking, golfing, wildlife-watching, camping, festivals, fairs and a host of educational activities at museums, historic sites and interpretive areas.

Parks

According to the National Parks and Recreation Association, parks and recreation boost the local economy, increase property values, remove air pollutants, improve youth safety, reduce juvenile crime and enhance health, wellness and longevity among the local population.²

Although parks are often classified according to their size, service area radius and population served, for purposes of this Plan, parks will be classified by ownership as State (state parks and game lands), Municipal (county, township or borough) or Private. Privately-owned parks will be discussed later in this section. Recreational trails on land or water will be considered Linear Parks. Linear parks are substantially longer than they are wide. They may be composed of a combination of privately owned and publicly owned segments or sites. Within the 20D Raccoon Creek Region, parks may be summarized by ownership as follows:

¹ The Economic Significance and Impact of Pennsylvania State Parks: An Updated Assessment of 2010 Park Visitor Spending on the State and Local Economy PA Department of Conservation & Natural Resources, available at http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_007019.pdf; accessed 10/24/2014.

² National Parks & Recreation Association Fact Sheet, available at https://www.nrpa.org/uploadedFiles/nrpa.org/About_NRPA/Press_Room/Press_Kit/2012%20NRPA%20Parks%20%20Recreation%20Fact%20Sheet%202012.pdf; accessed 10/24/2014.

Table 6.1: 20D Region Public and Linear Parks Overview

Ownership/Type	Facility Name or Number	Location	County
State Parks (public)	Hillman State Park	Hanover Twp.	Washington
	Raccoon Creek State Park	Hanover Twp.	Beaver
State Game Lands (public)	SGL 117	Hanover Twp. & Smith Twp.	Washington
	SGL 189	Independence Twp. & Hanover Twp.	Beaver
	SGL 303	Jefferson Twp.	Washington
County Parks (public)	Cross Creek County Park	Cross Creek Twp. & Hopewell Twp.	Washington
Municipal Parks (public)	Clinton Community Park	Findlay Twp.	Allegheny
	Municipal Center Park	Findlay Twp.	Allegheny
	--	Frankfort Springs Borough	Beaver
	--	Georgetown Borough	Beaver
	Millcreek Community Park	Greene Twp.	Beaver
	Greenfields Complex	Greene Twp.	Beaver
	Ralph K. Davidson Park	Hanover Twp.	Beaver
	--	Hookstown Borough	Beaver
	Hopewell Township Community Park	Hopewell Twp.	Beaver
	Independence Township Community Park	Independence Twp.	Beaver
	Mowry Road Park	Potter Twp.	Beaver
	Tank Farm Park (future)	Potter Twp.	Beaver
	Raccoon Township Municipal Park	Raccoon Twp.	Beaver
	Shippingport Park	Shippingport Borough	Beaver
	Raccoon Valley Park	Burgettstown Borough	Washington
	Stottlemeyer Park	Burgettstown Borough	Washington
	Charlie's Park	Burgettstown Borough	Washington
	Cedar Grove Park	Cross Creek Twp.	Washington
	Hanover Township Park	Hanover Twp.	Washington
	--	Jefferson Twp.	Washington
	Cherry Valley Park	Smith Twp.	Washington
	Francis Mine Park	Smith Twp.	Washington
	Slovan Park	Smith Twp.	Washington
Linear Parks (combination of private and public segments)	Montour Trail	Findlay Twp. & Robinson Twp.	Allegheny & Washington
	Panhandle Trail	Robinson Twp., Smith Twp. & Burgettstown Borough	Washington
	Ohio River Water Trail	Potter, Raccoon, Shippingport, Greene & Georgetown	Beaver
	Raccoon Creek Canoe Trail (future)	Hanover, Independence, Hopewell, Center, Raccoon & Potter	Beaver

Table 6.2 below provides further detail about the features of the various municipal parks including buildings, special-purpose equipment, trails, ponds/lakes, etc. It also summarizes, where applicable, the upgrades or improvements needed in various municipal parks as identified through interviews with local officials as quoted herein.

Table 6.2: Municipal Parks: Features and Upgrades Needed

	Municipality	Parks and/or playgrounds in 20D Region	Features	In need of upgrades? What kind?
Allegheny County	Findlay Township	Clinton Community Park	<ul style="list-style-type: none"> • Pavilions (5) • Permanent restrooms • Playgrounds (2) • Walking trail • Ball fields • Amphitheater • Agriculture building 	Currently replanting 100 trees. Findlay's park system is up to date. More staff hours or an additional staffer would benefit operations. Emerging trend-- some younger park users want all features in one park location--not feasible.
		Municipal Center Park	<ul style="list-style-type: none"> • Pavilion • Permanent restroom • Playground • Walking trail • Ball field • Basketball court 	Up to date
Beaver County	City of Aliquippa	None w/in 20D		--
	Center Twp.	None w/in 20D		--
	Frankfort Springs Borough	Yes	<ul style="list-style-type: none"> • Playground 	--
	Georgetown Borough	Yes	<ul style="list-style-type: none"> • Playground 	--
	Greene Township	Millcreek Community Park	<ul style="list-style-type: none"> • Pavilions (2) • Permanent composting • Playground • Walking trail • Ball fields (3) • Batting cages 	Yes: applied for two grants to refurbish former road department garage for restrooms; also to build new pavilion.
		Greenfields Complex	<ul style="list-style-type: none"> • North Mile Trail 	No
	Hanover Township	Ralph K. Davidson Municipal Park	<ul style="list-style-type: none"> • Portable toilets • Playground • Ball field 	Yes: looking to apply for grants to upgrade playground, and possibly add a pavilion and restroom facility; Also fencing our aggregate stockpiles next to the park to prevent children from playing on these piles.
	Hookstown Borough	Yes	<ul style="list-style-type: none"> • Basketball court 	--
Hopewell Township	Hopewell Twp. Community Park (formerly Lakewood Park)	<ul style="list-style-type: none"> • Pavilions (4) • Permanent restrooms • Playgrounds (2) • Walking trails (5) incl. one sensory awareness & one fitness w/stations • Larry Blaney Nature Center • Concession stand • Two-acre stocked lake w/ accessible fishing pier & paddle boat rental 	Hopewell Twp. received a DCNR grant in 2012 to expand the park on 17 acres across Laird Road. Plans include more parking, another pavilion, an outdoor exercise area and a multi-sports court. Also need to repair lake shore near boat dock.	
Independence Township	Independence Township Community Park	<ul style="list-style-type: none"> • Pavilion • Portable toilet • Playground • Canoe access to Raccoon Creek 	Yes: Independence Twp. has a complete Township Community Park Master Plan. Due to limited funding, only a very small portion of the park has been completed.	

Municipality	Parks and/or playgrounds in 20D Region	Features	In need of upgrades? What kind?
Potter Township	Potter Township Municipal Park (Mowry Rd. Park)	<ul style="list-style-type: none"> • Pavilion rental includes use of municipal building restrooms • Playgrounds (2) • Basketball court 	No plans for upgrades. New park development efforts will focus on the Tank Farm.
	Tank Farm (as yet undeveloped)	<p>Tank Farm is planned as a low-impact recreation area featuring natural elements and historic artifacts – no playgrounds or ball fields planned. Pressing infrastructure needs include a new, secure entrance with security monitoring & gate; interior roadway for visitors and police patrols; parking; restrooms; electric service. Small stone cottage can be repurposed to interpret township and site history which is important to the Ohio River region’s heritage. Cottage is receiving a new roof and asbestos removal so that it may be remodeled for public use.</p> <p>Two steel-framed barns need extensive repairs and roofs to be repurposed as picnic shelters. Residents place high priority on establishment of walking trail to link Tank Farm with neighboring parcels along the creek for a coherent land use and conservation purpose. Canoe/kayak launch area and primitive camping sites would broaden passive recreation opportunities on site.</p> <p>Educational space for historic interpretation of site is desired and possible in existing structures once refurbished.</p>	
Raccoon Township	Raccoon Township Municipal Park	<ul style="list-style-type: none"> • Pavilions (5) • Permanent restrooms • Playgrounds (2) • Walking trail • Ball fields (6) • Volleyball court • Basketball court • Football field 	Walking trail needs major refurbishing of the surface, vegetation removal, signage, everything – but no grants applied for as yet. Raccoon Twp. has a parks plan.
Shippingport Borough	Shippingport Park	<ul style="list-style-type: none"> • Pavilions (2) • Permanent restrooms • Playground • Ball field • Tennis court 	Tennis courts need resurfacing
Burgettstown Borough	Raccoon Valley Park	<ul style="list-style-type: none"> • Pavilions (2) • Permanent restrooms • Playground • Basketball court • Gazebo 	Space is biggest limitation. We have cleaned off many vacant lots to build parks within past 12 years. Facilities are up-to-date. Lack of space is biggest limitation – never enough room!
	Stottlemeyer Pk. & Charlie’s Park	<ul style="list-style-type: none"> • Ornamental plantings 	These are small, ornamental parks
Cross Creek Township	Cedar Grove Park	<ul style="list-style-type: none"> • Portable toilets • Playground • ADA compliant perimeter pathway around park 	Phase 2 improvements going out to bid include pavilion, restrooms & concession stand. Multipurpose court was cut from Phase 2 due to insufficient funding. Cedar Grove Park property includes a beautiful spring and creek-it would be nice to have a walking trail and footbridge to these areas. Also, visitors to nearby Cross Creek Park lack a place to camp overnight.
Hanover Township	Hanover Township Park	<ul style="list-style-type: none"> • Pavilions (3) • Permanent restrooms (2) • Playground 	Sidewalks & specialty wooden play structures need repair; would like to add a 3rd playground area
Hopewell Twp.	None w/in 20D		--
Independence Township	None w/in 20D		--
Jefferson Township	Yes	<ul style="list-style-type: none"> • Playground on land leased from fire department 	--
Mt. Pleasant Township	None w/in 20D		--

Washington Co.

Municipality	Parks and/or playgrounds in 20D Region	Features	In need of upgrades? What kind?
Robinson Twp.	None w/in 20D		--
Smith Township	Cherry Valley	<ul style="list-style-type: none"> • Portable toilet • Soccer field • Tennis court • Basketball court 	Tennis and basketball courts need refinishing
	Slovan	<ul style="list-style-type: none"> • Pavilion • Basketball court 	Basketball court needs refinishing
	Francis Mine	<ul style="list-style-type: none"> • Basketball court 	Basketball court needs refinishing
W. Middletown Borough	None w/in 20D		--

Cross Creek County Park

Cross Creek County Park was constructed in the 1980s through the cooperative efforts of municipalities in the Cross Creek Watershed. One of three parks operated and maintained by Washington County Department of Parks and Recreation, the 3,500-acre Cross Creek County Park is a landmark in western Washington County. It is located in Hopewell Township between the village of Rea on PA Route 50 and the Borough of West Middletown on PA 844.

Open year-round, Cross Creek County Park has a multitude of outdoor recreational offerings. Picnic tables are available on a first come-first served basis; three shelters may be reserved by application. Near the park office is a playground, restrooms and a handicapped-accessible fishing pier. Hunting and fishing are offered according to requirements of the PA Game Commission and the PA Fish & Boat Commission, respectively.

A wide variety of guided nature interpretive programs are offered at Cross Creek County Park, including fall group hayrides, pond life investigations, hikes to hear owls and woodcock, spring wildlife appreciation, morel mushroom hunting, and canoeing and kayaking lessons with PA Fish & Boat Commission instructors.³

The heart of Cross Creek County Park is its 244-acre Cross Creek Lake, formed by impounding Cross Creek. Sixty feet deep near the dam, the lake was the very first water body in the Commonwealth of Pennsylvania to be managed with the PA Fish & Boat Commission's Conservation Regulations for creel limits and minimum fish size. A non-motorized boat launch is located at the east end of the lake on Lynn Portal Road. At County Park Road on the north side of the lake is a paved, motor-boat launch. Boaters are required to obtain a permit to use the

³ 2014 Washington County Parks & Recreation Calendar of Events, available at <http://www.co.washington.pa.us/DocumentCenter/View/1214>; accessed 11/8/2014.

launch. Motor boats are limited to 10 horsepower. Ample parking and docks are provided for launching and loading.⁴

According to the PA Fish & Boat Commission, Cross Creek Lake is fairly turbid (cloudy with suspended material), relatively deep and fertile which contributes to maintaining one of the densest largemouth bass populations in the Commonwealth. Numerous submerged stumps, large woody debris, as well as submerged and floating aquatic vegetation provides excellent habitat for warm water game fish and panfish species including saugeye, yellow perch, channel catfish, and brown and yellow bullheads.⁵

Cross Creek County Park is located in the midst of the region's burgeoning shale gas industry. Range Resources, which has Marcellus Shale wells within Cross Creek County Park, intends to construct a three-mile loop trail as part of the new Thompson Hill Boat Launch project which began in May, 2014. The new launch on the south shore of the lake will feature a textured-concrete ramp and adjacent fishing pier, playground, parking area, shelter and restroom facilities.⁶ Since 2009, Washington County has earned \$10 million since it permitted drilling at Cross Creek County Park.⁷ Oil and gas revenues from leases on county lands are helping to fund improvements at all three county parks and the Panhandle Trail which is also operated and maintained by Washington County Parks and Recreation.

Hillman State Park

By Kevin Kisow, Student at Indiana University of PA and member of the Board of Directors of Independence Conservancy. Works cited are listed at the end of the article.

Northern Washington County is home to thousands of acres of recreational land. From State Game Lands 117 to Hillman State Park, hunters, mountain bikers and model airplane enthusiasts enjoy these lands daily. This is because of the vision of the Harmon Creek Coal Company and its president, James F. Hillman, to restore and conserve the land they strip mined. Impressively, and almost unheard of at the time, Harmon Creek Coal Company conducted a massive reforestation and conservation effort over the decades they mined coal from Burgettstown to Bavington in possibly the largest strip mine in Western Pennsylvania. After the coal was removed, the strip cuts were used for disposal of waste materials. A company advertisement in 1966 sums up the reclamation process:

⁴ Washington County Parks & Recreation website, Cross Creek Park Map, available at <http://www.co.washington.pa.us/DocumentCenter/View/1195>; accessed 11/8/2014.

⁵ PA Fish & Game Commission Biologist Reports, Cross Creek Lake, April & May, 2007, available at http://fishandboat.com/images/fisheries/afm/2007/8x07_12cross.htm; accessed 11/8/2014.

⁶ Observer-Reporter.com, Work on Thompson Hill boat launch, playground at Cross Creek to begin soon, published April 2, 2014; available at <http://www.observer-reporter.com/article/20140402/NEWS01/140409882#.VF7cWPnF8g0>; accessed 11/8/2014.

⁷ Observer-Reporter.com, County negotiating Mingo Park gas leases, by Scott Beveridge, published March 4, 2014; available at <http://www.observer-reporter.com/article/20140304/NEWS01/140309767/1003#.VF7YavnF8g0>; accessed 11/8/2014.

A new concept in land reclamation holds significant opportunity for populous Pennsylvania and other coal producing states. We refer to the use of strip mine pits for the disposal of waste materials, a procedure which hastens the return of strip mined land to productive use and scenic appeal. This reclamation process uses potential blight to create beauty. It thus supplies a practical and substantial solution for two modern problems in one operation.

In 1937 one of the first articles was published about conservation efforts in Burgettstown. The local newspaper, the Washington Reporter, stated that a 2,300 acre Game Land designated 117 in Smith and Hanover Townships was nearing completion. The Commonwealth had purchased this land from Harmon Creek Coal Company in hopes of transforming the strip mines into an ideal hunting area improved with food plots and a game preserve annually stocked with pheasants. By 1937 more than 8,000 trees had been planted on the Game Lands.

A few years later on July 4th, 1945, James Hillman donated 72 acres of land for the Burgettstown Community Park. Located near the present day Burgettstown High School, the park included outdoor ovens, fire pits, picnic shelters, a swimming pool, swings, slides, shuffleboard courts, tennis courts, basketball courts and a baseball field with dugouts and a clubhouse.

In 1949, Mr. Hillman was approached by a University of Pittsburgh student who was in need of a place for his club to fly model airplanes. Mr. Hillman created a 20 acre fenced-in area with an asphalt runway, public address system and other amenities for the flyers. The field was called "Hillman's Model Wing Airport" and enthusiasts from all over the tri-state area came to test their skills on Burgettstown's new airfield.

By 1958, Harmon Creek Coal Company had reclaimed over 1,300 acres of strip-mined land, planted almost 2 million trees, created a community park, provided hunting areas, and stocked a lake for fishing (see "Harmon Creek Lake: A Hidden Treasure" in "Section 4: Water Resources") while actively mining 425,000 tons of coal per year. Harmon Creek and Mr. Hillman's efforts were recognized with several conservation and nursery awards over the years. Furthermore, Harmon Creek's Florence Mine, employing a 16 cubic yard dragline, won a safety award for producing 10,660,860 tons of coal without a fatal accident.

In January of 1969, James F. Hillman donated 3,654 acres to the Commonwealth for the creation of Hillman State Park. At the time, the land was valued at \$1 million and was believed to be one of the largest single land gifts for state park purposes in U.S. history. An article from the Washington Observer-Reporter relates:



Figure 6.1: A stand of pine trees planted by Harmon Creek Coal Company at Hillman State Park. Photo by Kevin Kisow, 12/19/2012.

Nearly all of the land involved in this gift to the State was stripped of its coal by Hillman. This would normally conjure up pictures of raw, open, scarred land of little use or value. Not so with this land. Hillman not only stripped it of its coal but he restored it. Hillman fought a long battle for a strong strip mine law in Pennsylvania from the unusual position of a coal operator.

Governor Raymond Shafer appointed the manager of Raccoon Creek State Park to oversee Hillman State Park so it could be immediately opened up to the public. On Sunday October 4, 1970, a new model airplane landing strip costing over \$80,000 was opened. With no other amenities in the 3,654 acre park, some residents were unhappy about the state catering to a select few model airplane enthusiasts.

On July 1, 1975, an acid mine drainage treatment project began in Hillman State Park. Strip mine waste areas were filled and graded, riprap erosion protection was installed, the soil was treated with fly ash and seedlings were planted.

In 1977 a new model airplane landing strip was built in the northern end of the park near the Beaver County line. The old airfield needed to be moved because of noise complaints and to make way for a proposed park headquarters. The new airfield was named after former State Representative K. Leroy Irvis, the first African-American speaker of the Pennsylvania House of Representatives, who helped obtain funding for the project.

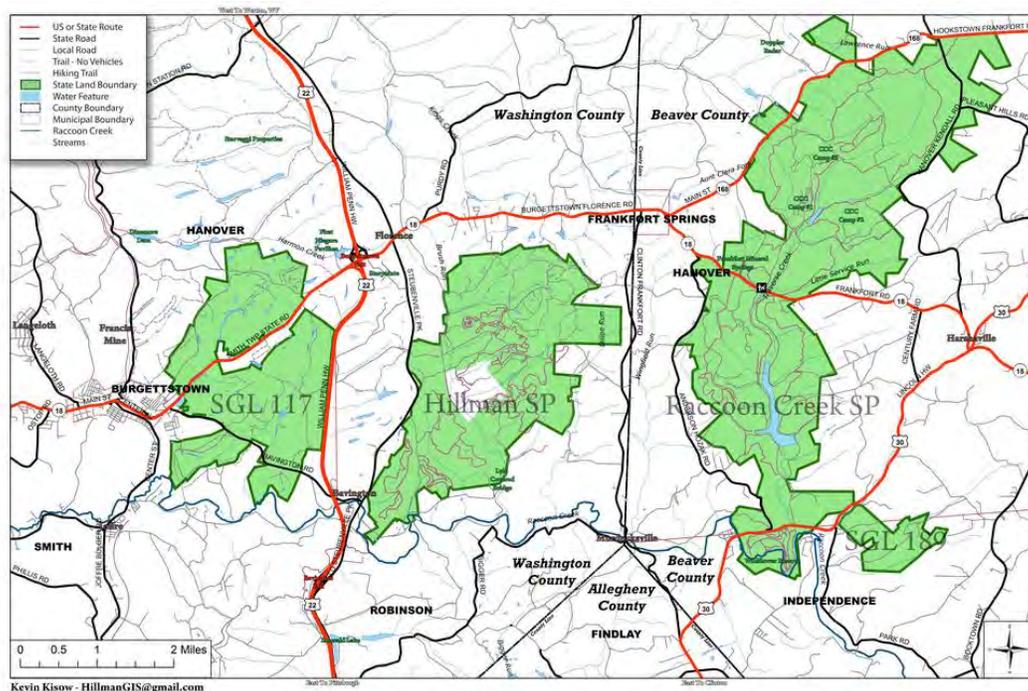


Figure 6.2: State parks and game lands in northern Washington and southern Beaver Counties. Map by Kevin Kisow, July 2014.

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Raccoon Creek State Park and Vicinity⁸

In 1935 the National Park Service created the Raccoon Creek National Recreation Demonstration Area. Men employed by the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA) built the Park's original lake, roadways, recreational areas and planted thousands of tree seedlings in former farm fields. Raccoon Creek State Park has evolved into one of the largest and most beautiful parks in the Commonwealth. It is one of Pennsylvania's twenty "must see" state parks as chosen by the Department of Conservation and Natural Resources.

The majority of Raccoon Creek State Park's 7,572 acres are situated in the Traverse Creek Watershed in Hanover and Independence Townships in Beaver County. Contrary to popular misconception, both of the Park's lakes were created by impounding the waters of Traverse

⁸ A Pennsylvania Recreational Guide for Raccoon Creek State Park, PA Department of Conservation and Natural Resources, 2010, printed brochure, one page.

Creek, not Raccoon Creek. The main stem of Raccoon Creek flows between the Park and its adjacent Wildflower Reserve located off US Route 30.

Raccoon Creek State Park features the 101-acre Raccoon Lake, open for year-round fishing. Common game fish are bullhead catfish, bluegill, yellow perch, crappie, walleye, muskellunge, and both large and smallmouth bass. Traverse Creek is stocked with brook and rainbow trout by the Pennsylvania Fish and Boat Commission. Raccoon Lake has a 500-foot sand and turf beach with a bathhouse and refreshment stand. Boating is permitted with electric motors. Canoes, rowboats, paddle boats and kayaks are available for rental. In winter, the lake is open for ice skating and ice fishing.

Overnight accommodations at Raccoon Creek State Park range from heated modern cabins available year-round (some with air conditioning), to modern or rustic camp sites, to Adirondack shelters and group tenting areas. Three group cabin camping areas are offered for rental to organized adult and youth groups. Lakeside Lodge is a three-bedroom cottage that sleeps ten people. The lodge can be rented by the week during the summer season and with a two-night minimum during the off-season. The lodge has a full kitchen, dining room, one and one-half bathrooms, living room with a fireplace, laundry facilities, and central heat and air conditioning. It also has a large patio area with an outdoor gas grill. Pets are prohibited in the lodge.



Figure 6.3: Boys being boys at Raccoon Lake, Columbus Day, 2008. Photo courtesy of the Beaver County Times.

Hunting, trapping and dog training is permitted on over 6,000 acres of Raccoon Creek State Park. Hunters are expected to follow the rules and regulations of the Pennsylvania Game Commission. The common game species are ruffed grouse, squirrels, turkey, pheasants, white-tailed deer and rabbits.

Raccoon Creek State Park offers miles of marked trails for hiking, cross-country skiing, backpacking and trail-biking. Equestrian trailhead parking is provided on PA Route 168 on the western boundary of the Park. These designated trails offer a variety of terrain and thousands of acres of wilderness experience. Park staff conduct many hands-on environmental education and interpretive programs including curriculum-based instruction for school groups and teacher workshops.



Figure 6.4: The Duncan Farm in Hanover Township, Beaver County, one of many farms acquired to build what would become Raccoon Creek State Park. Photo courtesy of Raccoon Creek State Park Archives.



Figure 6.5: The Mary Wolanski Farm, ca. 1935, acquired to build the Raccoon National Recreation Demonstration Area, later to become Raccoon Creek State Park. Note the lady and the little girl standing at the back porch, looking uphill. Photo courtesy of Raccoon Creek State Park Archives.



Figure 6.6: Teacher Clara Swearingen and her class pose on the porch of Doak School on April 23, 1917. Her students are, back row, left to right: Leopold Johnen, Herbert Lane, Raymond Fish and Louis Johnen; front row, left to right: Jonathan Vern Wilcoxon, Hughie McConnell and Earl Fish. The site of the school is now part of Raccoon Creek State Park. Photo courtesy of Raccoon Creek State Park Archives.

CCC Camps

Upon taking office in 1933, newly-elected President Franklin D. Roosevelt proposed a flurry of government programs designed to lift the country out of the Great Depression that followed the stock market crash of 1929. One of these programs was the Civilian Conservation Corps (CCC). The CCC offered young men employment, job training, clothing, housing, three meals a day, camaraderie and a sense of accomplishment.

Among the undertakings of the CCC was to provide labor for the National Park Service to build five Recreational Demonstration Areas (RDAs) in



Figure 6.7: Work entrance to Raccoon Creek State Park, looking east from PA Route 18, ca. 1935. Photo courtesy of Raccoon Creek State Park Archives.

Pennsylvania. Located near big cities to provide open-air recreation for urban dwellers, the RDAs were Blue Knob, Hickory Run, French Creek, Laurel Hill and Raccoon Creek. In 1945, these parks were given to the Commonwealth of Pennsylvania and became state parks.⁹

Raccoon Creek State Park's earliest buildings, constructed by the CCC in 1935, are split among four areas: three group camps and a headquarters/maintenance complex. Built in the National Park Service Rustic style, these buildings were added to the National Register of Historic Places in 1987 as a historic district. Besides their distinctive architecture and their origin in the National Recreational Demonstration Area, the buildings reflect the federal government's attempts to resolve the poverty of the Depression by putting people to work on projects of public benefit.¹⁰

Many CCC-constructed buildings are still in use at Raccoon Creek State Park today, including the large Recreation Hall between Group Camps One and Three. Group Camp One, Unit 1, offers a particularly rustic camping experience with its cozy log cabins, wash house and small recreation building arranged along a ridge-top lane.



Figure 6.8: Beginning construction of Raccoon Lake, ca. 1948-49. Photo courtesy of Raccoon Creek State Park Archives.

⁹ PA DCNR, the CCC Years, available at <http://www.dcnr.state.pa.us/stateparks/thingstoknow/history/cccyyears/index.htm>; accessed 11/5/2014.

¹⁰ Wikipedia, Raccoon Creek State Park, available at http://en.wikipedia.org/wiki/Raccoon_Creek_State_Park; accessed 11/5/2014.

Frankfort Mineral Springs and Resort Complex¹¹

The natural formation known as Frankfort Mineral Springs is located in the headwaters of Traverse Creek, just north of the village of Frankfort Springs in Hanover Township, Beaver County. The springs are located at the upper end of thickly wooded ravine within a U-shaped shale and sandstone grotto formation. The stream carved the small grotto out of the solid rock over thousands of years. This same stream now forms a picturesque waterfall as it spills over the rim of the ravine. The actual springs are located opposite the falls, emerging directly from the shale and sandstone formation. The waters of the stream and the waters of the springs are of two separate sources. The stream water originates from surface drainage, while the spring water comes from an underground reservoir. The stream may dry completely whereas the spring flows year-round.

The area around Frankfort Springs was settled by Levi Dungan of Philadelphia, first European homesteader of Beaver County. He claimed a thousand acres in 1772 and established his home, a crude log cabin, at the head of Kings Creek less than a mile southwest of the Springs. His land was near the present borough of Frankfort Springs, in the headwaters of Traverse Creek and the Mineral Springs.

In 1778, Isaac Stephens purchased four hundred acres from Dungan, which included the mineral springs, for a mere ten dollars! In 1827, Stephens sold the mineral springs as part of a 12-acre parcel to Edward McGinnis for three hundred dollars. McGinnis found the mineral waters 'healing to his ailment.' This appears to be the first mention of the reputed medicinal quality of the water. To capitalize upon his investment, McGinnis started construction of a hotel, later called the Frankfort Springs Hotel. This was the first of many structures built at the soon-to-be-famous health spa and resort. Popularity came rapidly to the area, and McGinnis had as many as two hundred guests at a time staying at his inn.

The Frankfort Springs Hotel was undoubtedly a magnificent structure for its time. It was three stories high with a cut stone foundation, four large brick chimneys and wood frame construction. Its design had many similarities to a boat, perhaps reflecting McGinnis's early occupation as a keelboat man. A large double-decker porch extended the length of the building. There were no interior hallways and all of the guest rooms opened onto the large porch. The first floor served as a combination dining hall, parlor and ballroom. The second floor contained the guest rooms. A double-roomed pantry and kitchen extended to the rear of the hotel.

In summer, the resort held parties, dances and other social functions. Even in later years, the hotel had reasonable rates and excellent meals. In the late 1800's, rooms were available at 25 cents per night with meals at an additional 25 cents per plate. Behind the hotel were vegetable

¹¹ Frankfort Mineral Springs printed pamphlet, 9 pages, published by the Department of Conservation & Natural Resources, Raccoon Creek State Park, 3000 State Route 18, Hookstown, PA 15050; Historical revisions and updates compiled December 2010 by Patrick Adams, Environmental Educator, Raccoon Creek State Park.

gardens, ball fields, two dirt tennis courts and croquet green. Swings, hammocks and lawn chairs adorned the grounds for the comfort of the guests.

The resort complex also included a dance pavilion with a boardwalk overlooking the springs and the ravine below, a large livery stable that sheltered horses and carriages of the resort and its guests, an icehouse with a cool, stonewalled cellar, and a three-story guest cottage. Of all the original resort buildings, only the first floor of the guest cottage remains. Built of native cut stone quarried nearby, the cottage served various purposes over the years - from manager's residence, store, bottling plant for the mineral water, to even a barbershop.

Since 1966 the Frankfort Mineral Springs historic area has been part of Raccoon Creek State Park. A scale model of the springs resort is on permanent display in the interpretive center at the Wildflower Reserve. Please see "Section 1: Project Area Characteristics" for a photo of the guest cottage in use as a museum in 1973.



Figure 6.9: Guests pose for a photographer in the heyday of the Frankfort Mineral Springs. Photo courtesy of Raccoon Creek State Park Archives.

King's Creek Cemetery

Located on Raccoon Creek State Park's southwestern boundary off PA Route 168, King's Creek Cemetery is owned and maintained by DCNR as part of the Park. This wooded burial ground is the final resting place of many pioneer families and contains the graves of several Revolutionary War veterans. Please refer to "Section One: Project Area Characteristics" for more details about King's Creek Cemetery.

Wildflower Reserve

The 314-acre Wildflower Reserve is home to one of the most diverse stands of native wildflowers in western Pennsylvania. This vicinity was acquired and preserved by the Hickory Club, a local outdoor organization, in the 1920s. Membership in the Hickory Club declined, leading to sale of the property to the Western Pennsylvania Conservancy (WPC) in the early 1960s. The WPC purchased adjacent property, added the trail system, restored the historic Botany House and Hungerford Cabin, and constructed a large pavilion for outdoor educational programming. In 1972, the wildflower area became part of Raccoon Creek State Park. Botany House is now the Park Manager's residence; the large pavilion is now the Interpretive Center. The Wildflower Reserve boasts over 700 species of flowering plants along five miles of designated trails. Because of the fragile nature of this area, the Reserve is closed to all activities other than hiking. The Reserve's Interpretive Center is the focal point for environmental education with hands-on instruction, exhibits and brochures on the cultural and natural history of the Park and surrounding area.



Figure 6.10: Hungerford Cabin at the Wildflower Reserve, ca. 1970. Photo courtesy of Raccoon Creek State Park Archives.

State Game Lands

State Game Lands are public lands managed by the Pennsylvania Game Commission to further its mission, "Managing wildlife and its habitat for current and future generations."¹² Recreational hunting, especially for white-tailed deer and wild turkey, are very popular pastimes in the Raccoon Creek Region. As hunting may be prohibited on private property, State Game Lands provide public hunting opportunities for those who obtain a license for the current season. A wealth of information about State Game Lands, hunting, safety and licensing is

¹² Pennsylvania Game Commission, available at <http://www.pgc.state.pa.us/portal/server.pt/community/pgc/9106>; accessed 10/24/2014.

available from the Pennsylvania Game Commission’s website at http://www.portal.state.pa.us/portal/server.pt/community/state_game_lands/11363.

Table 6.3: State Game Lands of the 20D Raccoon Creek Region¹³

SGL Number	Acres	Township/s	County	Sub-watershed/s
117	2892	Smith, Hanover	Washington	Main Stem of Raccoon Creek Burgetts Fork Harmon Creek
189	411	Independence, Hanover	Beaver	Main Stem of Raccoon Creek Little Traverse Creek
303	222	Jefferson	Washington	Cross Creek
Total acres	3525			

The U.S. Census Bureau has documented a significant trend in outdoor recreation activities with definite economic impact on Pennsylvania. As shown in Table 6.4 below, the number of people who venture outdoors to observe wildlife, and the money they spend in their pursuit, has eclipsed hunters and fishermen.

Table 6.4: Activities in Pennsylvania by Residents and Nonresidents¹⁴

Activity	# of Participants	Total Expenditures	Average Spent per Person	Average Trip Expenditure per Day
Fishing	1.1 million	\$485 million	\$409	\$23
Hunting	775 thousand	\$971 million	\$1207	\$9
Wildlife Watching	3.6 million	\$1.3 billion	\$308	\$28

Recreational Trails

The Raccoon Creek Region is fortunate to have several land and water trails in various stages of development. Relics and remnants along the Region’s rail-trails provide a fascinating look into our rich transportation and industrial history.

Montour Trail

The Montour Trail is a multi-use non-motorized recreational rail-trail that follows a portion of the old Montour Railroad. Both the trail and the railroad are named for the creek they parallel, Montour Run. The Montour Railroad was built between 1877 and 1914 to link the Pittsburgh

¹³ GIS compiled by the Southwest PA Commission and PASDA.

¹⁴ US Fish & Wildlife Service and US Census Bureau, 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation - Pennsylvania, available at <http://www.census.gov/prod/2013pubs/fhw11-pa.pdf>; accessed 7/22/2014.

and Lake Erie Railroad with the Raccoon Creek Region's many coal mines. The Montour Railroad also connected other railroads, including the Pennsylvania, the Pittsburgh & West Virginia, the Baltimore & Ohio, and the Union. When completed, the Montour Trail will ultimately extend 46 miles from Moon Township near Coraopolis to Clairton on the Monongahela River. The Montour Trail connects to the Great Allegheny Passage, a trail system that stretches over 330 miles from Pittsburgh to Washington, DC. Currently, multiple sections of the Montour Trail totaling over 40 miles are completed, though a few gaps remain in the southern portion. The Montour Trail forms a semi-circle around Pittsburgh.¹⁵ The Montour Trail is mapped through the 20D Raccoon Creek Region in "Plate 6.1: Recreation Map."



Panhandle Trail

The Panhandle Trail is named after the Panhandle Division of the Pennsylvania Railroad, the abandoned rail line upon which it is built. The Panhandle Trail stretches for 29 miles from Walkers Mill in Collier Township, PA to Colliers, WV. As of August 2008, the entire trail is complete.¹⁶ The Panhandle Trail connects to the Montour Trail between the village of Primrose and the town of McDonald and ultimately links to Washington, D.C., via the Great Allegheny Passage and C&O Canal Towpath. Recognized as a valuable resource and landmark for residents, the Panhandle Trail was the 100th successful rail-trail project in Pennsylvania. Officials from Washington and Allegheny counties, the West Virginia Rail Authority, PennDot, the U.S. Surface Transportation Board, the Pennsylvania Department of Conservation and Natural Resources and the Southwestern Pennsylvania Commission continue to work to preserve the historic corridor and develop the trail.¹⁷ The Panhandle Trail is mapped through the 20D Raccoon Creek Region in "Plate 6.1: Recreation Map." A detailed map of the Panhandle Trail, billed as "Washington County's 17-Mile Park," is available from Washington County Department of Parks and Recreation, or by following this link: <http://www.co.washington.pa.us/DocumentCenter/View/195>.

Ohio River Water Trail

The Ohio River Water Trail (ORWT) is stewarded by the Ohio River Trail Council. An official Pennsylvania State Water Trail, the 56-mile ORWT includes 33 miles of the river from Dashields Dam at milepost 13, downstream to Newell, WV at milepost 46.¹⁸ Four miles of Raccoon Creek are pending for inclusion in the ORWT, awaiting the completion of public access at Independence Conservancy's Rocky Bottom Natural Area. ORWT is a "blueway" or a "blue

¹⁵ Trail Link by Rails to Trails Conservancy, available at <http://www.trailink.com/trail/montour-trail.aspx>; accessed 10/23/2014.

¹⁶ Collier Friends of the Panhandle Trail, available at <http://www.panhandletrail.org/>; accessed 10/23/2014.

¹⁷ Trail Link by Rails to Trail Conservancy, available at <http://www.trailink.com/trail/panhandle-trail.aspx>; accessed 10/23/2014.

¹⁸ Ohio River Trail Council, Ohio River Water Trail, available at <http://water2.ohiorivertrail.org/index.php/en/>; accessed 10/23/2014.

trail.” Blueways connect communities through alternative transportation routes while providing healthy recreation and tourism opportunities. Active stewardship of blueways promotes clean water and wildlife habitat enhancement. More information about the Ohio River Water Trail is available at <http://water2.ohiorivertrail.org/index.php/en/>.



Raccoon Creek Canoe Trail

Raccoon Creek is normally canoe-able/floatable downstream of the Washington-Beaver County line. The Raccoon Creek Canoe Trail is a work in progress. Presently, it consists of very few access points in varying states of usability. Only one proper public access point is presently in service. This site is on Route 30 at the eastern entrance to Raccoon Creek State Park. Other access areas, although used by the public, currently lack one or more of the following critical elements: formal permission from the landowner, proper parking, signage, and/or ready access to the water's edge.¹⁹ Further development of the Raccoon Creek Canoe Trail is discussed in “Section 8: Management Recommendations.”

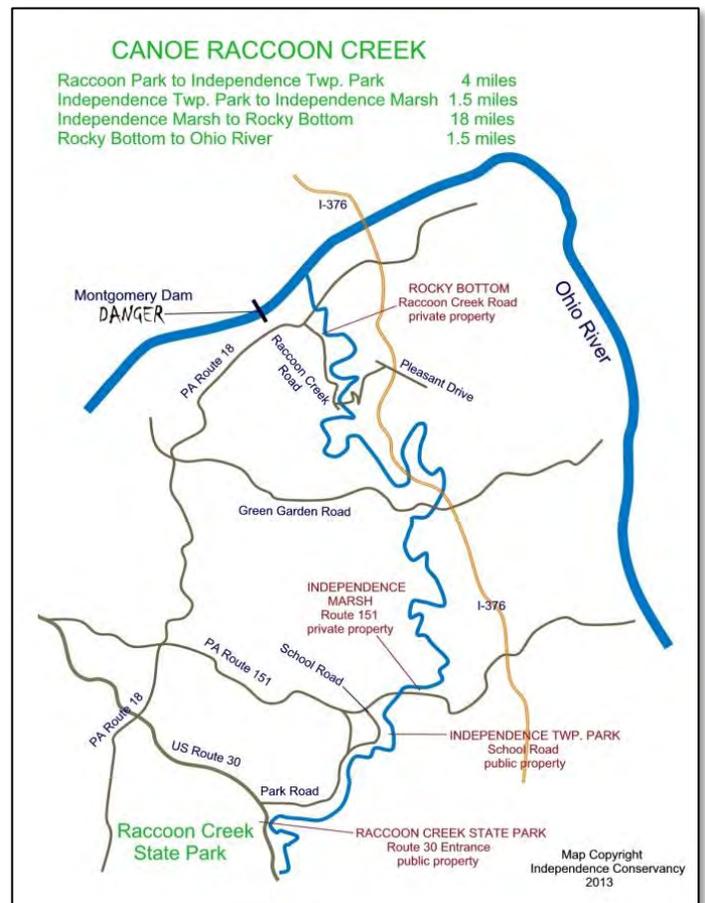


Figure 6.11: Canoe Raccoon Creek map courtesy of Independence Conservancy, © 2013.

¹⁹ Independence Conservancy, Canoe Raccoon Creek, available at <http://www.independenceconservancy.org/canoe-raccoon-creek>; accessed 10/23/2014.

Privately Owned Campgrounds and Recreational Facilities

Bennett Acres Campground

Bennett Acres Campground is a privately owned campground on the west side of PA Route 18 in the Brush Run Watershed in Hanover Township, Washington County, near Hillman State Park. Bennett Acres is the nearest campground to First Niagara Pavilion, only 2 miles distant on Route 18. The facility offers tent camping areas, full RV hookups, rental cabins, showers and stocked fishing lakes.²⁰ Bennett Acres is located in the King's Creek Watershed.

Camp Agape

Camp Agapé is an outdoor ministry of the Lutheran Church, located in Mount Pleasant Township in the Cross Creek Watershed. Camp Agapé provides summer camping programs and retreat facilities on a campus of 250-plus acres of rolling fields and forests. Activities include reading and math camps, as well as traditional outdoor offerings like swimming, hiking, cook-outs and crafts. Agape Retreat and Learning Center features a large indoor meeting space for up to 50 participants. Programs are open to everyone regardless of religious affiliation.²¹

Linsley Outdoor Center

Linsly Outdoor Center is a branch facility of the Linsly School, a private, independent college preparatory school for grades 5 through 12, founded in 1814 and located in Wheeling, West Virginia.²² Linsly students participate in at least one five-day program at Linsley during their school year. Linsly is located on PA Route 168 in Hanover Township, Beaver County in the Traverse Creek Watershed.

Saint Joe Boat Club

Saint Joe Boat Club was established in 1963 as a corporately-owned club for employees of St. Joseph Lead Company. Built on company land near the mouth of Raccoon Creek in Potter Township, the Boat Club was one of several recreational facilities including a shooting range and ball fields built by St. Joe for their workers. The club is now privately owned, and currently has over two hundred members. The club's location is Raccoon Creek's only access for deep-water motor boats. In addition to the paved boat launch and docks, members can also rent a pavilion and camp overnight with electric hookup provided. Membership information is available by calling 724-



²⁰ Bennett Acres, available at <http://www.bennettacres.com/>; accessed 10/16/2014.

²¹ Camp Agape, available at <http://www.campagape.org/>; accessed 10/21/2014.

²² Linsly Environmental Center's website available at <https://www.linsly.org/Page/About-Linsly/Welcome-to-Linsly>; accessed 4/18/2014.

622-3872 or 724-622-1895.²³

Tri-State Holiness Association

Clinton Camp Meeting is a ministry of the Tri-State Holiness Association. Clinton Camp Meeting is the grounds for an annual, old-fashioned, holiness camp meeting for spiritual renewal and revival. It is not a recreational campground. Clinton Camp Meeting begins the third Thursday of July each year and runs for ten days. In 2014, it celebrated its 90th year.²⁴ Clinton Camp Meeting is located on Route 30 in Findlay Township near Clinton in the Raredon Run Watershed.

Golf Courses and Driving Ranges

Highland Springs Golf Course

Highland Springs Golf Course spans the Pennsylvania-West Virginia state line near Wellsburg, WV, in the Cross Creek Watershed. Opened in 1961, Highland Springs Golf Course features 6,853 yards of golf from the longest tee for a par of 72. The course rating is 72.4 and has a slope rating of 118. Players “tee off in West Virginia and put out in Pennsylvania.”²⁵

Indian Run Golf Club

Indian Run Golf Club is located on Avella Road (PA Route 844) near Avella in the Cross Creek Watershed. Opened in 1998, this 18-hole course features 5,720 yards of golf from the longest tees for a par of 72. The course rating is 70.7 and it has a slope rating of 129.²⁶

Marada Golf Course

Marada Golf Course is located on US Route 30 in Findlay Township near Clinton in the Raredon Run and Potato Garden Run Watersheds. Marada is a public course featuring 9 holes over 3,090 yards with a par of 35. This family-friendly course “may be the biggest nine-hole golf course east of the Mississippi.”²⁷

Miller Golf Center

Miller Golf Center is a driving range with carpeted putting greens, a designated chipping area and grass tees. Only woods are allowed. The facility is located on PA Route 18 in Hanover Township, Washington County near Hillman State Park.²⁸

²³ Interview with Edwin H. Becker, owner/operator of Saint Joe Boat Club; 10/22.2014.

²⁴ Clinton Camp Meeting, available at <http://clintoncamp.org/>; accessed 10/21/2014.

²⁵ Highland Springs Golf Course, available at <http://www.highlandspringsgolf.com/index.php>; accessed 10/16/2014.

²⁶ GolfLink.com, available at <http://www.golflink.com/golf-courses/course.aspx?course=1613256>; accessed 10/16/2014.

²⁷ Marada, available at <http://maradagolf.com/>; accessed 10/16/2014.

²⁸ Frugal Man’s Golf, Miller Golf Center, available at <http://frugalmansgolf.wordpress.com/reviews/golf-course-reviews/miller-golf-center/>

Ponderosa Golf Course

Ponderosa Golf Course and Restaurant are located near the intersection of PA Routes 168 and 18 just north of Frankfort Springs in Hanover Township, Beaver County. The golf course spans the headwaters of the Aunt Clara Fork of Kings Creek and the Traverse Creek Watersheds. Ponderosa is a public course featuring 18 holes over 6,625 yards with a par of 71.²⁹

Quicksilver Golf Club

Quicksilver Golf Club is located on Quicksilver Road in Robinson Township north of Midway. The northern part of Quicksilver's course extends into Little Raccoon Run Watershed. Quicksilver is a public course with 18 holes over 7,083 yards and a par of 72. Its course rating is 74.6 and slope rating is 137.³⁰ Quicksilver has hosted the Senior PGA Tour and the Ben Hogan Tour. Its banquet and special events facilities can host up to 300 people.³¹

Shadow Lakes Golf Course

Shadow Lakes Golf Course and the Club at Shadow Lakes are located off Golf Course Road in Hopewell Township, Beaver County. The course is situated in a meandering bend of the main stem of Raccoon Creek. It features 18 holes over 6,550 yards with a par of 72. The site's original golf course and club house were built in the 1950s for management employees of the former Jones & Laughlin Steel Corporation's Aliquippa Works. Today, Shadow Lake's modern ballroom and restaurant can accommodate up to 400 guests for weddings and other special events.³²

Entertainment Venues

First Niagara Pavilion

The First Niagara Pavilion, originally known as the Coca-Cola Star Lake Amphitheater and then the Post-Gazette Pavilion, is an outdoor concert venue in Hanover Township, Washington County. It is located on reclaimed strip-mined land just south of the intersection of US Route 22 and PA Route 18. Owned and operated by LiveNation, First Niagara Pavilion has a maximum capacity of approximately 23,000 fans, with 7,100 in a reserved seated open-air pavilion and the remaining 16,000 on a general admission lawn. The first concert at the former Star Lake was sold-out, back-to-back performances by Billy Joel in June of 1990. Over the years, the facility has hosted many nationally-renowned country and rock acts as well as music festivals of various genres. Jimmy Buffett and the Coral Reefer Band have played nearly every summer

²⁹ GolfLink.com, available at <http://www.golflink.com/golf-courses/searchresults.aspx?coursekeyword=Ponderosa+&coursecity=&coursestate=PA&coursename=&coursezip=15021&within=20&p=1>; accessed 10/16/2014.

³⁰ Quicksilver Golf Club, available at <http://quicksilvergolf.com/QS/Quicksilver-Golf-Midway-PA.htm>; accessed 10/16/2014.

³¹ Quicksilver Golf Club, available at <http://quicksilvergolf.com/QS/Quicksilver-Golf-Midway-PA.htm>; accessed 10/16/2014.

³² The Club at Shadow Lakes, available at <http://www.clubatshadowlakes.com/>; accessed 10/16/2014.

since the amphitheater's opening.³³ More information is available at <http://www.firstniagarapavilion.net/>.

Pepsi-Cola Road House

Pepsi-Cola Roadhouse is an air-conditioned indoor dining and entertainment venue. Seating for about 1000 people is arranged in tables of four with no seat further than 65 feet from the stage. Not a dinner club, the Pepsi-Cola Roadhouse has a casual atmosphere with no need to dress up. Performances feature area favorites to national headliners including Willie Nelson, Keith Urban, Lonestar, Montgomery Gentry, Dwight Yoakam and many more. Private bookings and catering are available for weddings, corporate events, banquets and fundraisers. The Pepsi-Cola Roadhouse is located on PA Route 18 just south of US Route 22 in Hanover Township, Washington County. More information is available at <http://www.pepsiroadhouse.com/index.html> or by calling 724-947-1900.³⁴

Farm Markets and Notable Agri-businesses

Farming, agriculture, forestry and related enterprises are a major part of the economy of Pennsylvania, especially in the 20D Raccoon Creek Region. As mentioned in "Section 5: Land Resources," the Region's farmlands and forests are not only crucial to the local economy, but have defined the appealing rural character of the area for over two hundred years. Below are brief descriptions of several well-known agri-businesses of the 20D Region. The list is by no means inclusive of every agribusiness in the Raccoon Creek Region.

More information about farm-related businesses may be found at AgMap, an online searchable directory of America's agricultural businesses including producers, processors and service providers: <http://agmap.psu.edu/>. AgMap contains listings of not only traditional agricultural businesses, but also those in forestry, turf grass, landscaping, nursery, and much more. In Pennsylvania, AgMap is a cooperative project of Penn State University and the PA Department of Agriculture.³⁵

Avella Farmers Market

The Avella Farmers Market is a service project of the Avella Area Community Association. It is held on Sunday mornings from 10 AM to 1 PM from June through October at the parking lot of the Avella Fire Hall. Offerings include eggs, home baked goods, vegetables, fruit, bedding plants, perennials, herbs, hanging baskets, cut flowers, honey, jams and jellies, leather goods, alpaca crafts and herbal soaps.³⁶

³³ First Niagara Pavilion, available at <http://www.firstniagarapavilion.net/>; accessed on 10/22/2014.

³⁴ Pepsi-Cola Roadhouse, available at <http://www.pepsiroadhouse.com/index.html>; accessed 10/22/2014.

³⁵ AgMap, available at <http://agmap.psu.edu/>; accessed 10/24/2014.

³⁶ AgMap, Avella Farmer's Market, available at <http://agmap.psu.edu/businesses/index.cfm?fid=4078>; accessed 10/26/2014.

Bedillion Honey Farm

Bedillion Honey Farm is located on Burgettstown Road in Mt. Pleasant Township near Hickory. The family produces honey from hives on their farm and markets it year-round. From May through October, the Bedillions set up an observation bee hive in their roadside market. They also feature locally-grown fresh fruits & vegetables, milk, brown eggs, jams, hand-dipped ice cream cones, farm fresh freezer beef & pork, honey and beekeeping supplies for hobbyists.³⁷



Figure 6.12: Honeybees travel to and from their hives, all in a day's work at Bedillion Farm & Apiary. Photo Courtesy of Mark and Sara Bedillion.

Brunton's Dairy

Brunton's Dairy is a seventh-generation, 200-acre farm in Independence Township, Beaver County, established in 1832. Brunton's still delivers glass-bottled milk by truck to residential customers. Their dairy products, including ice cream, are also available at various retail outlets and at the farm store on Ridge Road. According to a 2007 review by Colleen VanTassell of the Pittsburgh City Paper, "Brunton Dairy Farm's chocolate milk can end the war, halt global warming, fend off the IRS, make dogs like cats, kids eat liverwurst and ward off an onslaught of ocelots. It's also delicious."³⁸

Douds-Floyd Farm

Douds-Floyd Farm is a 100-plus year old family farm located high on a hilltop above Raccoon Creek in Potter Township, Beaver County. The farm specializes in vegetables, featuring many varieties of peppers, squash, tomatoes as well as herbs, pumpkins, sweet corn and cut flowers.³⁹ The Floyds sell produce at local farm markets, and a visit to their Amish-restored roadside wagon shed market on Pleasant Drive is always very interesting and rewarding.



Figure 6.13: Customers at Hozak's Fall Festival load up on the hay wagon to leave the pumpkin patch, 10/26/2013. Photo courtesy of the Beaver County Times.

Hozak Farms

Hozak Farms and Christmas Barn are located on Anderson-Hozak Road in Hanover Township, Beaver County, near Raccoon Creek State Park. This family-owned business features many acres of cut-your-own Christmas trees of several species, as well as balled-and-burlapped live trees for after-Christmas planting. The Christmas

³⁷ Bedillion Honey Farm, available at <http://bedillionhoneyfarm.com/>; accessed 10/25/2014.

³⁸ Brunton's Dairy, available at <http://bruntondairy.com/>; accessed 10/24/2014.

³⁹ Doudsfloydfarm Blogspot, available at <http://doudsfloydfarm.blogspot.com/>; accessed 10/24/2014.

Barn offers gifts, ornaments, collectibles and antiques, hot cocoa and home-baked goodies. In the fall, the farm holds a fall festival with hayrides through the woods and to the pumpkin patch; refreshments, entertainment and plenty of pumpkins from which to choose.⁴⁰

Janetti's Garden Center

Janetti's Garden Center is a one-stop lawn & garden landscape improvement business located on Steubenville Pike (old US Route 22) in Hanover Township, Washington County. Janetti's sells shade trees and ornamental shrubs, annuals and perennials, herbs, power equipment, a wide variety of garden supplies and decorative mulches. Their services include lawn and landscape design, installation and maintenance.⁴¹

Inches Nursery

Inches Nursery is a family-owned business whose retail garden center is on McGovern Boulevard in Moon Township, Allegheny County. They are a full-service lawn, landscape, bulk materials and retaining-wall construction company whose slogan is "Yards by Inches."⁴² The Inches family has a large wholesale shade and ornamental tree nursery in the Raccoon Creek valley's rich bottom land along Independence Road in Hopewell Township, Beaver County.

Janoski's Farm, Greenhouse & Country Restaurant

Located on US Route 30 in Findlay Township since 1962, Janoski Farms, Inc. operates thirty-five greenhouses, a retail farm market, a farm bakery, a garden center, a gift shop and the Country Restaurant. Over 200 acres of vegetables are in production. Each October, Janoski's hosts Pumpkinland, a family-friendly, old-fashioned fun experience. In 2013, Janoski's launched their annual Harvest Wine Festival featuring samplings of local wines, a buffet, antique tractor display, and live entertainment. Staff includes eight family members and thirty seasonal employees.⁴³



Figure 6.14: Janoski's Garden Center in Findlay Township, 10/10/2013.

Kauffman Family Marketplace

The Kauffman Family Marketplace was launched by the several members of the extended Kauffman family in 2001. Located on Smith Township State Road (PA Route 18) just south of

⁴⁰ Hozak Farms, available at <http://www.hozakfarms.com/home.html>; accessed 10/24/2014.

⁴¹ Janetti's Garden Center, available at <http://www.iannettis.com/index.html>; accessed 10/24/2014.

⁴² Inches Nursery, available at <http://www.inchesnursery.com/index.htm>; accessed 10/25/2014.

⁴³ Janoski's Farm and Greenhouse, available at <http://www.janoskis.com/>; accessed 10/26/2014.

Burgettstown, the business has grown and expanded its offerings of Pennsylvania Dutch-style products. The Marketplace features a bulk food line including organics and natural foods, a deli with Amish meats and cheeses, and a wide selection of both wooden and recycled polyethylene outdoor furniture, swing sets and play sets made by Mennonite and Amish craftsmen.⁴⁴

McConnell's Orchard

McConnells' Farm, "Home of Sweet Peaches and Sour People," has been owned and operated by the McConnell family since 1787. It may be the oldest farm west of the Allegheny Mountains operated by a single family - worked by nine generations. Located on New Bethlehem Church Road in Independence Township, Beaver County, the original property was made in payment for service of Capt. John B. McConnell who commanded a militia outside Chambersburg during the Revolutionary War. The farm now comprises about 200 acres, much of which is planted in peaches: over 4,000 trees in fifty-plus varieties. Other offerings include apples, pick-your own berries, fresh-pressed cider, sweet corn and other vegetables.⁴⁵

Raccoon Creek Winery at Kramer's Greenhouse

Raccoon Creek Winery at Kramer's Greenhouse was opened in 2009, specializing in fresh fruit wines made from locally grown fruit. Located on Steubenville Pike in Smith Township, the family owned and operated winery and greenhouse also offer freshly-baked pies on hand or made-to-order.

Community Supported Agriculture Farms – CSAs

Community-supported agriculture (CSA) is a concept designed to encourage relationships between consumers and growers. Consumers benefit by having access to fresh, local food while becoming more knowledgeable about the way their food is grown. Farmers benefit by having arrangements with consumers who pay for a share of the farm's production prior to each growing season. Community Supported Agriculture addresses the concern that the average distance that food travels from farm to consumer in the United States is approximately 1,300 miles. Another advantage of obtaining food locally is that the money stays within the local community.⁴⁶

Within the Raccoon Creek Region, there are several CSA farm operations, all in Washington County. They are listed in Table 6.7.

⁴⁴ Kauffman Family Marketplace, available at <http://www.kauffmanmarketplace.com/about>; accessed 10/25/2014.

⁴⁵ McConnell's Farm, available at <http://mconnells-farm.com/>; accessed 10/26/2014.

⁴⁶ PA Retail Farm Market Association, available at <http://pafarm.com/csa.php>; accessed 10/26/2014.

Table 6.5: Community Supported Agriculture Farms in the Raccoon Creek Region⁴⁷

CSA Farm Name	Offerings	Location
<u>Cherry Valley Organics</u>	Fruit, Herbs, Vegetables, Pumpkins, Gourds, Flowers, Specialty Items	Number Three Hill Road, Burgettstown Smith Township
<u>Conover Organic Farm</u>	Fruit, Herbs, Vegetables, Pumpkins, Gourds, Specialty Items	Lee Road, Burgettstown Smith Township
<u>Left Bower Farm</u>	Herbs, Vegetables, Pumpkins, Gourds	Manchester Lane, Avella Cross Creek Township
<u>Oak Hill Farm, LLC</u>	Fruit, Herbs, Vegetables, Beef, Flowers	Old Trails Road, Avella

Other Notable Places

Andy's Candies

Located on Steubenville Pike (old US Route 22) near Bavington in Smith Township, Andy's Candies is a regional favorite for handmade chocolates and sweet treats. This old-fashioned candy store includes the chocolate factory and an ice cream counter. It is a popular stop for travelers and locals.

Bert's Hot Dog Shop

Founded and still operated by the Bertolotti Family of Burgettstown, Bert's Hot Dog Shop has been a local landmark along Route 18 in Atlasburg for over sixty years. The tiny roadside building with virtually no dining room is a favorite of truckers, bikers and travelers. Bert's special "World Famous" hot dog lives up to its name through a world-wide following among former residents and visitors to the Burgettstown area.

Local Groups-Environmental, Recreational, Historic, Cultural

Within the Raccoon Creek Region are many groups and individuals who have joined together to work on various causes for the betterment of their communities. These associations range from clubs, fraternal organizations, societies and friends groups to incorporated nonprofits. All share a common goal of making the Region a better place to live, work or play – and they rely on public participation and financial support for their accomplishments and success. The following section is a list of some of the environmental, recreational, historic and cultural organizations active in the Raccoon Creek Region.

⁴⁷PA Retail Farm Market Association, CSAs by County, available at http://www.pafarm.com/csa_county_lists/all_counties_csas_12-1-13.pdf; accessed 10/26/2014.

Sportsmen's Clubs

Wildlife has always been a key part of Pennsylvania's cultural heritage. The fields, streams and forests of the Raccoon Creek Region have yielded an abundance of wild game for the earliest human hunter-gatherers to today's sportsmen and women.

Sportsmen are often called the country's original conservationists, recognizing and acting on the need to protect wildlife and wild resources from deforestation, pollution and unregulated hunting and trapping. Pennsylvania's Game Commission and Fish & Boat Commission were established to protect and conserve the wildlife we treasure. These agencies rely on the partnership of local sportsmen's clubs and organizations to help manage the wild game populations that make our region a popular hunting destination.



Figure 6.15: A youngster tries skeet shooting at Five Points Hunting Club during the Beaver County Sportsmen's Conservation League Youth Camp, 7/18/2007.

Within the Raccoon Creek Region are numerous sportsmen's clubs. For purposes of this Plan, land owned by sportsmen's organizations within the study area are mapped on "Plate 6:1: Recreation Map" and are summarized briefly in Table 6.6.

Table 6.6: Sportsmen's Clubs of the 20D Raccoon Creek Region⁴⁸

County	Club	Acreage	Location	Watershed
Allegheny	Point Park Rod & Gun Club	182	Potato Garden Run Road in Findlay Township	Potato Garden Run
	<u>Imperial Beagle Club</u>	66	Beagle Club Road in North Fayette Township	Little Raccoon Run
Beaver	<u>Green Valley Sportsmans Club</u>	65	Fishpot Road in Potter and Raccoon Townships	Fishpot Run
	<u>Southside Sportsman's Club</u>	78	Temple Road in Hanover Township	Traverse Creek
	Chartiers City Rod & Gun Club	104	Chartiers Drive in Hanover Township	Aunt Clara Fork of Kings Creek
	<u>Coraopolis Beagle Club</u>	113	Bocktown Cork Road in Independence Township and Findlay Township	Raccoon Creek Main Stem and Raredon Run
	<u>Five Points Hunting Club</u>	104	Bocktown-Cork Road in Independence Township	Raredon Run

⁴⁸ GIS data summarized from PASDA and the Southwest Pennsylvania Commission.

Table 6.5: Sportsmen’s Clubs of the 20D Raccoon Creek Region (cont.)⁴⁹

Washington	Avella Sportsmens Club	12	Avella Road in Cross Creek Township	Cross Creek
	Indian Springs Rod & Gun Club	32	Cross Creek Road in Cross Creek Township	Cross Creek
	Cherry Valley Sportsmens Association	2	Joffre-Cherry Valley Road in Smith Township	Raccoon Creek
	Tri-Valley Sportsmens Association	83	Burgettstown Smith Township	Harmon Creek
	Goodwill Hill Fish & Hunt Club	70	Goodwill Hill Road in Hanover Township	Harmon Creek
	<u>Paris Sportsmens Club</u>	922	Devils Den Road in Hanover Township	Kings Creek
	Raccoon Valley Sportsman Association	130	Atlasburg Road Cross Creek Township	Cross Creek

Granges

The Grange, officially referred to as the National Grange of the Order of Patrons of Husbandry, is a nationwide fraternal organization that encourages families to band together to promote agriculture and the economic and political well-being of their communities. One of the major accomplishments attributed to Grange advocacy is the establishment of free rural mail delivery.⁵⁰

The Grange movement has its roots in the aftermath of the Civil War. In 1866, Oliver Hudson Kelley, regarded as the father of the Grange, was serving as a staff member of the Department of Agriculture in Washington, DC. Sent to the South to make a survey of farm conditions following the Civil War, Kelley conceived the idea that a fraternal organization, composed of farmers from all over the country, would help heal scars caused by the war while improving the economic and social position of the farm population. Upon returning to Washington, Kelley and several friends in government service framed an organization based on seven degrees and a constitution. Caroline Hall, Kelley’s niece, was the first to suggest that women be admitted to membership on an equal basis with men. The Pennsylvania State Grange was organized in 1873. Today there are 235 local granges with over 10,000 members in Pennsylvania.⁵¹



Grange halls are fixtures in the social fabric of rural communities, serving as polling places, centers for charitable functions, family gatherings and local events. During the third week of August each year, Hookstown Grange in Greene Township holds the Hookstown Fair, the only

⁴⁹ GIS data summarized from PASDA and the Southwest Pennsylvania Commission.

⁵⁰ Wikipedia, The National Grange of the Order of Patrons of Husbandry, available at http://en.wikipedia.org/wiki/The_National_Grange_of_the_Order_of_Patrons_of_Husbandry; accessed 10/16/2014.

⁵¹ Pennsylvania State Grange, available at <http://www.pagrang.org/default.asp>; accessed 10/16/2014.

agricultural fair within the boundaries of the Raccoon Creek Region. Hookstown Fair Grounds includes the Southside Historical Village; both the Fairgrounds and the Village are covered later in this section. FirstEnergy’s nearby Bruce Mansfield Plant has been a major supporter of Hookstown Fair and Southside Historical Village by donating pavilions, building materials and other assistance.

Table 6.7: Granges of the 20D Raccoon Creek Region⁵²

County	Grange Name	#	Location	Meeting
Allegheny	Montour Valley	2005	24 Clinton Park Drive Clinton, PA 15026 Findlay Township	2 nd Monday @ 7:30 PM
Beaver	Frankfort Springs	1989	1476 State Route 18 Burgettstown, PA 15021 Hanover Twp., Wash. Co.	2 nd Monday @ 7:30 PM
	Hookstown	1980	1198 State Route 18 Hookstown, PA 15050 Greene Township	2 nd Thursday @ 7:30 PM
Washington	Burgettstown (Bavington)	1502	643 Creek Road Bulger, PA 15019 Smith Township	Nov-Apr: 3 rd Tues 1 PM May-Oct: 3 rd Tues 7 PM
	Cross Creek	1751	Homes of Members	Last Thursday of month @ 12 Noon

Watershed Associations

Watershed associations are grassroots organizations of people who seek to better their communities by working to enhance the quality of the natural environment within a given watershed boundary. In the 20D Raccoon Creek Region there are currently two watershed associations, one umbrella organization and one watershed-based land trust. These entities are described below.

Cross Creek Watershed Association

Cross Creek Watershed Association serves the Cross Creek Watershed in west-central Washington County. Its most recently completed project was natural stream channel stabilization on the main stem of Cross Creek at the Meadowcroft Rockshelter. In keeping with the historic nature of the site, all new vegetation planted was authenticated to be native to the area 16,000 years ago when people first lived in the Rockshelter. Contact information for Cross Creek Watershed Association is phone: 724-263-4056; 386 Atlasburg Road, Burgettstown, PA 15021.



Figure 6.16: Volunteers plant native trees and shrubs near a newly-completed rock cross-vane below the Meadowcroft Rockshelter, winter 2005. Photo courtesy of Washington Co. Watershed Alliance.

⁵² Pennsylvania State Grange, available at <http://www.pagrang.org/default.asp>; accessed 10/16/2014.

Raccoon Creek Watershed Association

The Raccoon Creek Watershed Association serves the Raccoon Creek Watershed, home to 32,000 people in fifteen municipalities in Beaver, Washington and Allegheny Counties. Working in partnership with Independence Conservancy, the Washington County Conservation District and many other partners, the RCWA has focused on treating abandoned mine discharge at five sites in Raccoon Creek’s headwaters. Contact information is phone 724-947-3895; P.O. Box 251, Clinton, PA 15026.

Washington County Watershed Alliance

The Washington County Watershed Alliance is a 501c3 non-profit umbrella organization which serves as the fiscal agent for grants and coordinates the county-wide efforts of its member watershed associations. Member organizations within the 20D Region include the Washington County Conservation District, Cross Creek Watershed Association and Raccoon Creek Watershed Association. The Alliance seeks to give back to the community through educational outreach. It holds a display at the Washington County Fair, conducts special workshops and community presentations. Among the educational tools available are the Watershed Model, the Water Cycle Presentation and the Washington County Watershed Roadmap. Alliance meetings are held at the Conservation District office on the first Tuesday at 7:00pm in January, March, May, July, September and November.



Land Trusts

Land trusts are private, nonprofit organizations that work cooperatively with landowners to protect and conserve land for its natural, recreational, scenic, historic, or productive value – values that sustain life on earth. More information about land trusts and their work is available in “Section 5: Land Resources.”

Independence Conservancy

The Independence Conservancy is a 501c3 watershed-based land trust founded in 1999 in Aliquippa, PA. This all-volunteer group works for clean water and permanent preservation of beautiful vistas and special places in the Raccoon Creek Watershed. The Conservancy is a key partner in water quality improvement in Raccoon Creek. It owns, operates and maintains passive treatment systems at Solar Mine in the St. Patrick’s Run Watershed in Findlay Township and at JB2 near the main stem of Raccoon Creek in Smith Township. The Conservancy offers a variety of educational programs and watershed stewardship activities, most notably the Community Tire Collection Program, now in its eleventh year. The Conservancy’s Rocky Bottom Natural Area is the only frontage on Raccoon Creek open to the public aside from Raccoon Creek State Park. Independence Conservancy is



the only land trust based in the 20D Region. More information is available at <http://www.independenceconservancy.org/>.

Pine Creek Land Conservation Trust

The Pine Creek Land Conservation Trust is based in north-central Allegheny County. It encourages property owners and developers in the 14 municipalities of the 65-square mile Pine Creek Watershed to preserve undeveloped land as open space. All but one of PCLCT's conserved properties lie within the Pine Creek Watershed in Allegheny County. (*Pine Creek is not in the 20D Region.*) The sole exception is the Flight 427 Memorial Property near the main stem of Raccoon Creek in Hopewell Township, Beaver County. It is the site of the US Airways 427 plane crash on September 8, 1994. The Pine Creek Land Conservation Trust oversees the conservation of this hallowed property. More information about this historic incident and its far-reaching consequences is available in "Section 1: Project Area Characteristics."



Other Groups

Friends of Raccoon Creek State Park

The Friends of Raccoon Creek State Park is a 501c3 non-profit organization of dedicated volunteers whose purpose is to promote environmental education programs, outdoor recreation, maintenance of historical attributes and conservation of park assets. The Friends encourage people to use the Park for recreational activities. Volunteers perform trail maintenance, remove invasive plants, tend wildflower gardens, coordinate Eagle Scout projects and many other tasks. More information is available by calling 724-899-3611 or at <http://www.friendsofraccoon.org/>.⁵³

Meadowcroft Rockshelter and Historic Village Advisory Board

The mission statement of the Meadowcroft Advisory Board is *"Since prehistoric times, people have adapted to the land and shaped their environment in order to survive and build a better life. This story of human history in Western Pennsylvania is explored at Meadowcroft through archaeology, living history, and museum programs utilizing the unique resources of the site."* Meadowcroft Rockshelter near Avella is one of the Heinz History Center's network of regional museums.



⁵³ Friends of Raccoon Creek State Park, available at <http://www.friendsofraccoon.org/>; accessed 10/23/2014.

Montour Trail Council

The Montour Trail Council is a non-profit all-volunteer group which builds, operates and maintains the trail. It is a registered 501(c)3 charitable organization, relying on corporate, foundation and government grants as well as private donations for funding. Montour Trail Council also stewards the length of the Panhandle Trail located in Allegheny County. More information is available at <http://www.montourtrail.org/about/index.asp>.⁵⁴

Washington County Historical Society

Headquartered in the LeMoyne House in Washington, PA, the Washington County Historical Society is dedicated to the ongoing administration and operations of the F. Julius LeMoyne House, LeMoyne Crematory, Frontier History Center and the Norma K. Grimes Research Library. Outreach programs of the WCHS include presentations on 18th century trades, early Indians of Pennsylvania, early towns and frontier forts of Washington County, settling the Pennsylvania frontier and the Whiskey Rebellion.⁵⁵ More information is available at <http://www.wchspa.org/outreach.html>.

Archaeological & Historical Resources

Introduction

The Raccoon Creek Region is rich in human history. From the 16,000 year old artifacts of early life at the Meadowcroft Rockshelter, to the graves of Revolutionary War veterans in the secluded pioneer cemeteries, to the world's first peacetime use of nuclear power at Shippingport, an entire book could be written about the Raccoon Creek Region's significance in North American and world history.

The archaeological and historical resources of the Raccoon Creek Region narrate history and add to residents' sense of place by serving as visible reminders of their common cultural heritage. Historic sites are also an interesting draw for out-of-town visitors. People who travel to experience the places and activities that authentically represent the stories and people of the past and present are referred to as "heritage tourists." Heritage tourists tend to stay longer and spend more money than other types of travelers.⁵⁶ Investing in conservation and preservation of archaeological and historical resources not only advances pride of place but also boosts the Region's economy. For more information about heritage tourism in Pennsylvania, please contact the PA Historical and Museum Commission at <http://www.phmc.state.pa.us>.

⁵⁴ Montour Trail Council, available at <http://www.montourtrail.org/about/index.asp>; accessed 10/23/2014.

⁵⁵ Washington County Historical Society, available at <http://www.wchspa.org/outreach.html>; accessed 11/5/2014.

⁵⁶ Advisory Council on Historic Preservation Report of Proceedings, Washington, DC, November 14, 2002; available at <http://www.achp.gov/heritagetourismsummit.pdf>; accessed 10/30/2014.

Archaeological Resources

The Raccoon Creek Region is fortunate to hold a world-renowned archaeological site containing the oldest-known human habitation in North America! The following description of the history and significance of this treasure was provided by David Scofield, Director, Meadowcroft Rockshelter and Historic Village.

*Meadowcroft Rockshelter & Historic Village*⁵⁷

Meadowcroft Rockshelter and Historic Village is located on 275 acres west of Avella in Washington County in the Cross Creek Watershed. Meadowcroft operates in association with the Senator John Heinz History Center, an affiliate of the Smithsonian Institution and Pennsylvania's largest history museum. The John Heinz History Center's museum system also includes the Western Pennsylvania Sports Museum and the Fort Pitt Museum.

Meadowcroft was founded by Albert and Delvin Miller, two brothers dedicated to preserving the heritage of Western Pennsylvania's countryside. Delvin Miller (1913-1996), a breeder, trainer and driver of Standardbred horses, established himself as one of harness racing's most successful competitors in a career that spanned eight decades. Albert Miller (1911-1999) successfully worked the land that had been in the Miller family since 1795. In addition to his pursuits in agriculture and conservation, Albert held an avid interest in archaeology and local history. It was Albert who, in 1955, discovered the Meadowcroft Rockshelter in the cliffs above Cross Creek.

Figure 6.17: The enclosure protecting the archaeological excavation at the Meadowcroft Rockshelter National Historic Landmark, the oldest site of human use in North America. This cliff of Morgantown Connellsville sandstone was undercut by flood waters to create the overhang which provided a sheltered campsite for people over the course of 16,000 years. Photo copyright 2008 Ed Massery.



In 1969 the Millers established the Meadowcroft Foundation to steward the site and opened their new museum to the public as "Meadowcroft Village". Four years later, Albert's archaeological discovery was professionally excavated during a University of Pittsburgh field school under the direction of Dr. James Adovasio. The site gained international attention as

⁵⁷ Heinz History Center, Meadowcroft, available at <http://www.heinzhistorycenter.org/meadowcroft.aspx>; accessed 10/30/2014.

Smithsonian Institution radiocarbon dating placed human occupation of Meadowcroft at least 16,000 years ago, changing the long-held scientific understanding of when people arrived in North America.

In 1993 the Meadowcroft Foundation approached the Historical Society of Western Pennsylvania (HSWP) for technical and financial assistance. HSWP conducted an assessment of Meadowcroft's resources, collections, programs and finances with a team of staff and consultants lead by Dr. Thomas Schlereth, Professor of American Studies at the University of Notre Dame. Based upon the recommendations of this team, HSWP and the Meadowcroft Foundation agreed to work jointly to develop exhibits and programs utilizing all of Meadowcroft's resources and collections. This relationship led to merger of the two organizations in 2000.

In 2005 Meadowcroft Rockshelter was designated a National Historic Landmark by the U.S. Secretary of the Interior. Today visitors can explore the oldest site of human use in North America from inside a new enclosure which provides a perspective of the excavation that was



Figure 6.18: J.M. Adovasio, principal investigator of the Meadowcroft Rockshelter excavation that began in 1973, explains the stratigraphy of the site and how he uncovered evidence of prehistoric people dating back 16,000 years. Photo copyright 2008 Ed Massery.

not previously possible. Visitors stand at the spot where the first Americans gathered around a campfire 16,000 years ago. Museum guests may also explore a recreated 16th century Monongahela Indian village to get a glimpse of life in the Raccoon Creek Region before the arrival of European settlers; visit an 18th century frontier area and see some of the changes that came with the arrival of European settlers; and stroll through the recreated 19th century rural village with its covered bridge, one-room schoolhouse, blacksmith shop, church, and two log houses.

Meadowcroft also provides educational programs to thousands of school children from the Pennsylvania, Ohio and West Virginia tri-state area annually. The museum is open from May through October, attracting visitors from all over the globe.

The People of the Raccoon Creek Watershed: From Prehistory to the Frontier

By David Scofield, Director, Meadowcroft Rockshelter and Historic Village

For at least the past 16,000 years, people have lived in the region around the Raccoon Creek Watershed. From the Paleoindians who first ventured into the upper Ohio Valley to make use of the region's natural resources for their survival; to the 18th century Indians, pushed westward by European expansion; to the European settlers who cleared the virgin forests and opened up the land for extensive agriculture; all were attracted by the rich, abundant natural resources found here.

Based on archaeological evidence from the Meadowcroft Rockshelter, the first people arrived in the region at least 16,000 years ago. It is not known who these ancient people were or how they got to this part of the continent. However, without question, the so-called Paleoindians were here and they left behind evidence of their presence.

Living a hunter-gatherer type of existence, the Paleoindians were constantly on the move through the dark and unending virgin forests. Making temporary camps at places like Meadowcroft, along the banks of Cross Creek in present day Washington County, they stayed up to a couple of weeks in one locale until the supply of food was exhausted and then they moved on. Food remains recovered at Meadowcroft indicate the diet of these prehistoric people included game animals such as elk, white-tailed deer, turkey, ruffed grouse, and the now extinct passenger pigeon. They also ate fish, fresh water mussels, snails, and the very large (up to 20 inches long) aquatic salamander known as the hellbender (*Cryptobranchus alleganiensis*). Other sources of food included walnuts, hickory nuts, and acorns as well as blackberries, raspberries, cherries, hackberries, grapes and paw paw.

For over four-hundred generations, these prehistoric people continued this hunter-gatherer lifestyle until, about 5,000 years ago, when a revolutionary idea began the long, slow process that eventually changed the way future generations would live. Intentionally planting seeds with the idea of returning to the same location for harvest was the genesis of agriculture, a simple act which eventually led to selecting the best seeds to plant and ultimately to domesticated varieties of plants. Around A.D. 900 a global warming trend known as the Medieval Optimum provided a boost to native agriculture. Corn, beans, and squash became

staples in the diet of Eastern Woodland Indians. This agricultural revolution brought about the ability for native people to renew their own food supply and to settle in villages year-round, storing crops for the long winter months. The oldest known evidence of corn in the eastern United States was recovered at Meadowcroft. The earliest of these carbonized cob fragments are approximately 2,500 years old.

From the time of the Medieval Optimum until about 1635, the prehistoric cultural group now referred to as the Monongahela culture, were predominant in western Pennsylvania. With the first evidence of this people group being found along the banks of the Monongahela River, archaeologists have ever since referred to them by that name. No written documents were left by these prehistoric people and no one knows what they called themselves but, the extensive archaeological evidence from the region, including the Raccoon Creek Watershed, has revealed much about this people group.

The Monongahela culture disappeared from Western Pennsylvania before the arrival of Europeans. While there is an element of mystery about what happened to these people, well-reasoned theories suggest that disease, introduced by contact with Indians from the east, may have taken a heavy toll on the Monongahela. Warfare with other Indians, specifically the Seneca from present day New York State, over trade and territory was likely their death knell and by 1635 they were gone.

For nearly a century following the demise of the Monongahela culture, the dense forests of Western Pennsylvania were virtually empty of human inhabitants. It wasn't until the early 18th century that other Indians from the east began migrating further west toward the Ohio River. By the 1720s, groups of Lenape and Shawnee from eastern Pennsylvania started to arrive west of the Allegheny Mountains. A few decades later, by the middle of the 18th century, European settlers and fur traders, as well as military personnel occupying the forks of the Ohio River, began interacting with these Indians who were now calling Western Pennsylvania their home.

While some of the interaction between the Indians and the Europeans was beneficial to both cultures, some inevitable conflict also took place. This conflict was exacerbated by the global dispute for territory between the French and the British with both sides vying for the allegiance of the various Indian nations. Even after the resolution of the British, French and Indian war in 1763, tension and periodic eruptions of violence continued between the European settlers and the Indians.

The 1768 treaty of Ft. Stanwix, between the British and the Iroquois, opened up the land east and south of the Ohio River for settlement by Virginia. Some native people in the region, including the Delaware, Seneca-Cayuga, and Shawnee, were disagreeable to the terms of the treaty and made attempts to drive British colonists from the area. The resulting military response in 1774 by the royal governor of Virginia, known as Lord Dunmore's War, sought to bring an end to the conflict. Following the major battle near Point Pleasant, West Virginia, the native warriors were pushed back across the Ohio by the British and agreed to terms ceding lands and captives, with promises not to attack travelers on the river.

In 1842, English settler Spencer Records penned the recollection of his experience and hardship on the 18th century Western Pennsylvania frontier. His father built a grist mill on Raccoon Creek in 1776. According to Records, in the summer of 1777 when Indian hostilities commenced: “[a] few families fortified at the mill”. Due to more danger of attack in 1778, Records father “obtained a guard of men, to be stationed at his mill; and men would go in companies armed, and get grinding done.” The practice of “forting” was a necessity among area settlers. Like Records, Joseph Doddridge was a boy living in the region during the 1770s. Doddridge also later recalled how his father’s farm, near present-day Avella in Washington County, served as a fort during threat of Indian attack. It was common practice among settlers even to go work in the fields with some of the work party designated as guards during times of potential hostilities. Among several examples of Indian raids, Records relates the details of a 1779 Indian attack on a Raccoon Creek camp near the mouth of Raredon Run where maple sugar was being processed. Five young men were killed with five young women and a boy taken captive.

The frontier period in western Pennsylvania finally came to a close by 1794 following the Battle of Fallen Timbers in Ohio. The Indians were defeated in this conflict and, with the Treaty of Greenville the following year, the long struggle between the Europeans and the Indians for control of the upper Ohio Valley effectively came to an end. The abundant natural resources that made this region attractive to people since the Paleoindians first arrived, would now be used to support expanding settlement by primarily English and Scots-Irish immigrants.

For further reading:

J.M. Adovasio and Jake Page, The First Americans: In Pursuit of Archaeology’s Greatest Mystery (New York: Modern Library, 2003)

John Boback, “The First Western Pennsylvanians” in Western Pennsylvania History, Vol. 96, No.1 (Pittsburgh: Senator John Heinz History Center, 2013) 36-47.

John Boback, “Forting on the Western Pennsylvania Frontier” in Western Pennsylvania History, Vol. 94, No.1 (Pittsburgh: Senator John Heinz History Center, 2011) 6-7.

Joseph Doddridge, Notes on the Settlement and Indian Wars (Parsons, WV: Reprint of 1912 edition, McClain Printing Company, 2010)

Naomi Mullendore Hougham, Edited by Donald F. Carmony, “Spencer Records’ Memoir of the Ohio Valley Frontier, 1766-1795” in Indiana Magazine of History, Vol. LV, No. 4 (Bloomington, Indiana: Indiana University, 1959)

Daniel K. Richter, Native American’s Pennsylvania, Pennsylvania History Studies Series, No. 28 (University Park, PA: The Pennsylvania Historical Association, 2005)

David Scofield, “The Peopling of America” in Western Pennsylvania History, Vol. 94, No.2 (Pittsburgh: Senator John Heinz History Center, 2011) 6-7.

David Scofield, “The Real Paleo Diet: What’s for Prehistoric Dinner” in Western Pennsylvania History, Vol. 96, No.4 (Pittsburgh: Senator John Heinz History Center, 2013) 4-5.

R.S. Stephenson, Clash of Empires: The British, French & Indian War 1754-1763, a special edition of Western Pennsylvania History, Vol. 88, No. 1&2 (Pittsburgh: Senator John Heinz History Center, 2005)

Historical Resources

The Raccoon Creek Region has played many important roles on the stage of U.S. and world history. Within its boundaries is the oldest known human habitation in North America at Meadowcroft Rockshelter, dating back 16,000 years; the world's first peace-time atomic energy project, generating electricity at the Shippingport Atomic Power Station; the world's largest welded steel tanks at the former Department of Defense Monaca Tank Farm in Potter Township; the crash site of US Air Flight 427 in Hopewell Township which led to the 1996 Federal Family Assistance Plan for Aviation Disasters; and many other notable places of historic, cultural, natural, industrial or military importance.

Glimpses into the Past

In the early to mid-1700s, Native Americans of the Shawnee tribe inhabited villages along the banks of the Ohio River. As European settlers pushed westward from the East in the late 1700's, the Delaware (or Lenape) people moved into Western Pennsylvania. When the French and English began to explore the Ohio Valley, rivalries and conflicts resulted. These sparked the French and Indian War of 1754-1763 in which the French were defeated. After the British overcame the allied Native American tribes in Pontiac's Rebellion of 1763, the lands south of the Ohio River became relatively free of conflict. Settlers began homesteading this area, including the Raccoon Creek Region, in the early 1770s.

As European settlers mass-migrated west in the late 1700s, they often headed cross-country from Pittsburgh toward Wheeling by following the creek valleys at times when the Ohio River was too low for boat travel. In the process, many families found the lands south of the Ohio to their liking and put down deep roots. These settlers were of predominantly English, Scottish or Irish descent. Even today, many places in the Raccoon Creek Region bear the familiar names of these pioneers and their descendants.

Figure 6.20 is a detail from a larger map contained in the "Warrantee Atlas of Allegheny County, Pennsylvania" which was constructed from records on file and surveys made on the ground during 1909, 1910, 1912. The image in Figure 6.20 is taken from "Plate no. 28 – Findlay Township" – the western half of which lies within the Raccoon Creek Watershed. Note the family names of many late 1700s landowners, recognizable today in place names of Meeks Run, Raredon Run, Bigger Run, Ewings Mill Road, Beers School Road and Tomlinson Run, among others.

Also note the colorful titles of the properties given to them by their owners – "Brotherhood," "Rose Gills," "Bachelor's Hall," "Pear Point," "Horse Neck," "Bear's Forest," "A Summer Retreat," "Pumpton" and "Delay." It also bears mentioning that, within the confines of the image in Figure 6.20, only one parcel is deeded to a woman, "Fruitfield," belonging to Elizabeth McCandless. The balance of this map may be viewed at the University of Pittsburgh's Digital Library, available at <http://images.library.pitt.edu/cgi-bin/i/image/image-idx?view=entry&cc=maps&entryid=x-14warp28>.

Picturesque property names notwithstanding, 18th Century life in the Raccoon Creek Region was not for the faint of heart. In his 1882 “History of Washington County, Pennsylvania with Biographical Sketches of Many of Its Pioneers and Prominent Men,” Boyd Crumrine writes about one of Cross Creek’s early settlers, John Marques:

John Marques, the third son of Thomas and Mary Marques, was born June 10, 1750...was the first of his family to emigrate west of the mountains, settling on Cross Creek about 1774, on a tract of land for which he obtained a warrant Feb. 23, 1786, and afterwards received a patent. This tract was called "Marquesata," and contained four hundred and twenty-one acres... For some time, on account of the Indian raids, he was obliged to keep his family in Vance's Fort, while he went back and forward to his farm. On one of these trips, while in his cabin, he heard the report of a rifle close at hand, and going out he saw a party of Indians killing his hogs. On seeing him they immediately gave chase. It was a race for life, and although the Indians were so close at the start he could hear the sound of their footsteps as they ran in the trail behind him, he soon distanced them and succeeded in getting safely into Vance's Fort.

He was noted among the scouts' and backwoodsmen as a fleet runner, an accomplishment which was a good deal cultivated, as a man's life not unfrequently depended upon his speed. He was a man of strong and decided character, and was for many years an elder in Cross Creek Church. He died Feb. 25, 1822, He raised a family of nine children, all of whom grew to man and womanhood, married and raised families.⁵⁸

Another poignant excerpt from Boyd Crumrine’s “History of Washington County:”

Grace Fuller, a female slave, who was the property of Thomas Armor, lived to be one hundred and seventeen years of age. She remembered being in Dillow's Fort when about seventeen years of age, at the time of an attack by the Indians, about the year 1778. She later was owned by a man of the name of Pierce. A daughter was born to her on Raccoon Creek, who was sold when about ten years of age to Daniel Swearingen, who lived about four miles from Paris. She lived to be upwards of eighty years of age. Her mother had been married to three different husbands, all slaves, two of whom were sold and sent South and one died. She was the mother of eight children.⁵⁹

Circumstances may have improved in the Raccoon Creek Region by the 19th and early 20th Centuries, but rural life was, nonetheless, fraught with challenges and difficulties. Donald Bryan Smith relates memories of life on “Southside” Beaver County in his May, 1975 interview with

⁵⁸ Boyd Crumrine, "History of Washington County, Pennsylvania with Biographical Sketches of Many of Its Pioneers and Prominent Men" (Philadelphia: L. H. Leverts & Co., 1882).

Transcribed by John E. Mellick of [TBD] in April 1998. Published in May 1998 on the Washington County, PA USGenWeb pages at <http://www.chartiers.com>; accessed 11/8/2014.

⁵⁹ Ibid.

his father, the Rev. Harold C. Smith, as published in the Spring 1984 edition of Milestones, the Journal of Beaver County History:

...even the most fortunate inhabitants of the Southside accepted without question deprivations which seem quite shocking. There was no such thing as continuous medical care; a doctor was called in only when someone was seriously ill; and often not then. For years, the whole area was dependent on two physicians, old Dr. Shane and young Dr. Ewing who had to shoulder an increasing burden as the years went by and literally worked himself to death, jouncing on the dusty or muddy, rutted country roads from crisis to crisis. Two of my father's siblings died in infancy and there were many families similarly afflicted; Service Church cemetery was, he said, "awfully full of little gravestones." Diphtheria was the great killer of children, typhoid of adults while smallpox was no longer the scourge it had once been, though pock-marked faces were not uncommon.

It doesn't require great insight to recognize that this was a society whose consumption of material goods (no indoor plumbing, electricity, rapid private transportation) and services (limited educational opportunity, minimal health care and mass entertainment) was at a much lower level than ours. Less obvious but of equal importance was its limited consumption of information, its detachment from what we now consider to have been the main currents of history in the early 20th century. Rural isolation, in this context, doesn't seem to apply to a situation within the community but describes the relation of the community to the "outside" world.⁶⁰



Figure 6.19: At one time the best option, the outhouse now serves as a picturesque reminder of the "good old days." 5/3/2013.

⁶⁰ "Farming Life on the Southside" 1900-1920, by Donald Bryan Smith, published in Milestones, the Journal of Beaver County History Vol. 9, No. 2--Spring 1984, available at <http://www.bchistory.org/beavercounty/BeaverCountyTopical/Agriculture/SouthsideFarming/SouthsideFarmingMSP84.html>; accessed 11/8/2014.

National Register Properties

The National Register of Historic Places was established by the National Historic Preservation Act of 1966, and is maintained by the National Park Service. In Pennsylvania, the Bureau for Historic Preservation manages the National Register program. Properties listed in the National Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering and culture. Listing in the National Register often changes the way communities perceive their historic resources, lending credibility to efforts to preserve these resources as irreplaceable parts of our communities.⁶¹

“Plate 6.2: Historic Resources” maps the locations of National Register listed properties as well as sites that are eligible for listing.

Table 6.8: National Register of Historic Places within the 20D Raccoon Creek Region^{62 63}

Municipality	Description	Year Built	Location
Jefferson Twp., Washington Co.	Pine Bank Covered Bridge	1871	Moved from Greene County to Meadowcroft Museum of Rural Life in 1962
Hanover Twp., Washington Co.	Lyle Covered Bridge	1887	Kramer Road over Brush Run
Mt. Pleasant Twp., Wash. Co.	Krepps Covered Bridge	Unknown	Covered Bridge Road over Cherry Run
Hanover Twp., Washington Co.	Ralston Freeman Covered Bridge	1915	Ralston Road over Aunt Clara Fork of Kings Creek
Hanover Twp., Washington Co.	Jackson's Mill Covered Bridge	Rebuilt 2003	King's Creek Road over King's Creek
Hanover Twp., Washington Co.	McClurg/Devil's Den Covered Bridge	1880 Restored 1987	Relocated south of Steubenville Pike in 1987
Multiple Municipalities, Washington Co.	Wilson's Mill Covered Bridge	1887 Damaged by arson 2002	Oak Leaf Road over Cross Creek
W. Middletown Boro., Wash. Co.	West Middletown Historic District	Oldest known structure 1798	Main Street, PA 844, West Middletown Borough
Independence Twp., Wash. Co.	Isaac Manchester Farmstead	Farm 1797 House 1815	6 structures at 52 Manchester Lane, Avella
Hanover Twp., Beaver Co.	David Littell House	1851	PA Route 18 just south of PA 151
Hanover Twp., Beaver Co.	Raccoon Creek Recreational Demonstration Area	ca. 1935	140 structures within Raccoon Creek State Park

⁶¹ PA Historical and Museum Commission, National Register of Historic Places in PA, available at http://www.portal.state.pa.us/portal/server.pt/community/national_register_of_historic_places_in_pennsylvania/3780; accessed 11/4/2014.

⁶² GIS data provided by PASDA and the Southwest PA Commission

⁶³ Bridgehunter.com available at <http://bridgehunter.com/>; accessed 11/3/2014



Figure 6.21: Krepps Covered Bridge over Cherry Run in Mount Pleasant Township, a National Register Historic Place, 6/18/2014.



Figure 6.22: The shadow of Keys Road Bridge falls on polluted Raccoon Creek, 1/5/2002. Keys Bridge is a National Register eligible structure.

National Register Eligible Properties

To be considered for listing in the National Register of Historic Places, a property must meet a set of criteria defined by the National Park Service and set forth on their website.⁶⁴ Sites listed in Table 6.9 are identified by the PA Historical and Museum Commission as eligible for listing in the National Register.

Table 6.9: Properties Eligible for the National Register of Historic Places within the 20D Raccoon Creek Region^{65 66 67 68 69 70}

Municipality	Description	Year Built	Location
Washington Co.	Pittsburgh & Steubenville Railroad (the Panhandle Railway) (Pittsburgh to WV line)	Completed 1865	Northern Washington Co. & western Allegheny Co.
Washington Co.	Wabash-Pittsburgh Terminal Railway (Pittsburgh to West Virginia state line)	Opened 1904	Northern Washington Co. & western Allegheny Co.
Potter Twp. & Industry Boro., Beaver Co.	Montgomery Locks and Dam	1932-1936	100 Montgomery Dam Rd.
Independence Twp., Wash. Co.	Plantation Plenty Boundary Increase (Isaac Manchester Farmstead)		52 Manchester Lane
Robinson Twp., Washington Co.	Geary Farm Property	1895	1421 Beech Hollow Road
Washington Co.	Montour Railroad (Champion to Primose)	Opened 1877	Robinson & Hanover Twps.
Robinson Twp., Washington Co.	Hugh McCandless/Edward Doborowolski Farmstead		53 Ridge Road
Findlay Twp., Allegheny Co.	Clinton United Presbyterian Church & Cemetery	1797	Wilson Drive near Clinton
Findlay Twp., Allegheny Co.	David Moody Farmstead		US Route 30 near Clinton
Findlay Twp. Allegheny Co.	John Burns/James Hamilton Farmstead	1841 Demolished 2012	Washington Road near Clinton
Washington Co.	Montour Railroad (Coraopolis to Snowden)	Opened 1877	

⁶⁴ PA Historical and Museum Commission, the National Register Process in Pennsylvania, available at http://www.portal.state.pa.us/portal/server.pt/community/national_register_of_historic_places_in_pennsylvania/3780/process/417976; accessed 11/4/2014.

⁶⁵ GIS data compiled from PASDA and the Southwest PA Commission.

⁶⁶ Wikipedia, Pittsburgh, Cincinnati, Chicago and St. Louis Railroad, available at http://en.wikipedia.org/wiki/Pittsburgh,_Cincinnati,_Chicago_and_St._Louis_Railroad, accessed 11/4/2014

⁶⁷ Brookline Connection, the Wabash-Pittsburgh Terminal Railway, available at <http://www.brooklineconnection.com/history/Facts/WabashBridge.html>, accessed 11/4/2014.

⁶⁸ Wikipedia, Montour Railroad, available at http://en.wikipedia.org/wiki/Montour_Railroad, accessed 11/4/2014.

⁶⁹ US Army Corps of Engineers, Montgomery Locks and Dam, available at <http://www.lrp.usace.army.mil/Missions/Navigation/LocksandDams/MontgomeryLocksDam.aspx>, accessed 11/4/2014.

⁷⁰ Historic Bridges.org, Bridge Browser, available at http://www.historicbridges.org/b_a_county.php?county=Washington%20County,%20Pennsylvania, accessed 11/4/2014.

Table 6.9: Properties Eligible for the National Register of Historic Places within the 20D Raccoon Creek Region (cont.)

Hanover Twp., Washington Co.	McClaren Bridge		Kramer Road over Raccoon Creek in Bavington
Hanover Twp., Washington Co.	Witherspoon Bridge	1894	Witherspoon Road over Raccoon Creek
Smith Twp., Washington Co.	Keys Bridge	1903	Keys Road over Raccoon Creek
Smith Twp., Washington Co.	Dunbar Bridge	1889	Harmon Creek Road over Raccoon Creek
Independence Twp., Washington Co.	Pittsburgh & West Virginia Railway: Avella Station		Seneca Place, Avella



Figure 6.23: Ruins of the John Burns Farmstead, "Hopewell," deeded in 1786; later known as the Hamilton Farm. The elegant cut stone, brick and timber frame house, built in 1841, was demolished in 2012. Photo taken 9/9/2003.

Pennsylvania Historical Marker Program

The Pennsylvania Historical and Museum Commission (PHMC) administers the historical marker program to commemorate important people, places and events that have shaped Pennsylvania’s history. Citizens may nominate a person, place or thing to the PHMC for consideration. More information about the nomination and selection process is available at the PHMC website:

http://www.votespa.com/portal/server.pt/community/national_register_of_historic_places_in_pennsylvania/3780.

Table 6.10: Pennsylvania Historical Markers of the 20D Raccoon Creek Region⁷¹

Name	County	Location	Date Dedicated	Marker Text
Pennsylvania	Beaver	US 30, .4 miles from state line (missing)	3/25/1949	Founded 1681 by William Penn as a Quaker Commonwealth. Birthplace of THE DECLARATION OF INDEPENDENCE and THE CONSTITUTION OF THE UNITED STATES.
Cross Creek Church	Washington	SR 4029 at Cross Creek, E of Pa. 18	10/16/1950	Founded by Scotch-Irish Presbyterians who began to hold services in 1775 at Vance's Fort, 1 mile north. Original church built here and first pastor called in 1779. The present church building was erected 1864.
David Reed	Washington	Pa. 50, 3 miles west of Pa. 980, near Venice	5/9/1950	Opposite was the log home of David Reed, leader of the Covenanter squatters on lands owned by George Washington. Here 13 of the Scotch-Irish pioneers met with him on Sept. 20, 1784, defying his effort to remove them.
Elisha McCurdy	Washington	SR 4004 (old U.S. 22) near Pa. 18, Florence	5/28/1947	The great Presbyterian revivalist is buried here where he served as pastor 46 years. At Cross Roads and Upper Buffalo he led, in Nov., 1802, the Great Revival meetings attended by many thousands from near and far.
Meadowcroft Rockshelter	Washington	401 Meadowcroft Rd., Avella	9/19/1999	A deeply stratified archaeological site, its deposits span nearly 16,000 years. Discovered in 1973 by Albert Miller and excavated by University of Pittsburgh archaeologists. Meadowcroft revealed North America's earliest known evidence of human presence and the the New World's longest sequence of human occupation. All of eastern North America's major cultural stages appear in its remarkably complete archaeological record.
Ralston Thresher	Washington	Pa. 844 at West Middletown	5/28/1947	Nearby was the site of the Robert McClure factory of pre-Civil War days. It pioneered in making Andrew Ralston's machine cleaning and threshing grain in a single operation, patented in 1842.

⁷¹ GIS data compiled from data collected by PASDA and the Southwest PA Commission.

Regional History Museums

Here are but a few of the many fascinating places where the rich history of the Raccoon Creek Region is showcased.

Meadowcroft Historic Villages⁷²

As mentioned earlier in the Archaeological Resources section of this Plan, the Meadowcroft Historic Villages are part of the Heinz History Center's Meadowcroft Rockshelter museum complex.

The 19th Century Village allows visitors to take a trip back in time to experience everyday life in a western Pennsylvania village. A blacksmith's shop, a one-room school, a post office and a covered bridge are but a few of the 19th century structures relocated to Meadowcroft and restored to illustrate rural life in the Raccoon Creek Region.

The 16th Century Indian Village is based on archaeological evidence from the Region. Inside the walled village, visitors can explore the inside of a wigwam, see carefully recreated historic artifacts and try their hand at using an atlatl, a type of prehistoric spear thrower. The 16th Century Village also includes a traditional garden and a hunting camp filled with furs, hunting tools and fishing equipment. A self-guided trail provides visitors with a new walking trail loop through the woods surrounding Meadowcroft. The trail teaches how the forest served as the supermarket, pharmacy, clothing store and much more to the First Americans.



Figure 6.24: The 1871 Pine Bank Covered Bridge is a tangible connection to our rural past preserved and accessible to the public at Meadowcroft Rockshelter and Historic Village. Photo courtesy of Meadowcroft Rockshelter and Historic Village.

Southside Historical Village and Association

Southside Historical Village is located along PA Route 168 at the Hookstown Fair Grounds in Greene Township, just south of Hookstown. Established in 1995, the purpose of the Village and the mission of its supporting Association are to collect, preserve and interpret early American life, including the story of the local First Americans. The Village continues to grow with buildings donated, relocated and restored by the Association's volunteers. The Village features the Mercer One Room School House, the 1880's J.L. Porter Blacksmithing Shop, a walk-through

⁷² Heinz History Center, Meadowcroft Rockshelter and Museum of Rural Life, available at <http://www.heinzhistorycenter.org/meadowcroft.aspx>; accessed 11/5/2014.

covered bridge that was originally a corn crib, the Chapman Oil Derrick, the Nelson’s Doctor’s Office, the Johnson Log Cabin and the FirstEnergy-Glenn Barn. Relocated from the nearby Glenn Farm, this 1858 hewn-timber frame barn was restored with the help of Amish craftsmen, many volunteers and local businesses. Generous donations from FirstEnergy’s Bruce Mansfield Plant made a new foundation, roof, siding and windows possible. The Southside Historical Village Association is dedicated to tourism, education and community by bringing early American History to life.⁷³ More information is available at <http://www.sshva.iwarp.com/video.html> or by calling 724-573-4569.



Figure 6.25: The FirstEnergy/Glenn Barn is the jewel of Southside Historical Village at Hookstown Fair Grounds. Photo courtesy of Southside Historical Village Association.

Industrial Heritage Sites

Historic Coal Companies

The bituminous coal industry played a predominant role in the socioeconomic and environmental history of the Raccoon Creek Region and the greater Pittsburgh area. Coal extraction, abandoned mines and the legacy of unregulated mining are covered extensively in multiple sections of this Plan, particularly “Section 3: Land Resources,” “Section 4: Water Resources” and “Section 8: Management Recommendations.”

Among the many companies who had strip mine and drift mine operations in the 20D Raccoon Creek Region are Midway Coal Company, Aloe Coal Company, Bologna Coal Company, Pennweir Construction Company, Mulligan Mining, Rosebud Mining Company, Pegg’s Run Coal Company, Robinson Coal Company, Pittsburgh Coal Company, Pennbalt and Harmon Creek Coal Company (covered in Section 6 under Hillman State Park.)

Kobuta⁷⁴

As mentioned in “Section 1: Project Area Characteristics,” the Raccoon Creek Region and its factories played a crucial role in the U.S. war effort during World War II. In 1941 and 1942 the Japanese invaded Indonesia and gained control of 90% of the world’s supply of natural rubber.

⁷³ Southside Historical Village Association, available at <http://www.sshva.iwarp.com/index.html>; accessed 10/23/2014.

⁷⁴ Kobuta--A History of the Land by Alpine MacArthur, published in Milestones Vol. 3 No 2. Spring, 1977, Beaver County Historical Research and Landmarks Foundation, available at <http://www.bchistory.org/beavercounty/BeaverCountyTopical/CommunitiesandTowns/KobutaMSS1977/KobutaMSSp77.html>; accessed 11/10/2014.

In 1942 the U.S. Government's Defense Plant Corporation contracted with the Koppers Company of Pittsburgh to build a synthetic rubber manufacturing plant on the Ohio River near the mouth of Raccoon Creek. The name of the plant and the worker housing built around it was "Kobuta," a name derived from butadiene and styrene, two main ingredients in synthetic rubber. Kobuta produced butadiene and styrene by 'cracking' them from ethyl alcohol through catalytic conversion. The plant was built under extremely challenging circumstances over an 18 month period in 1942 and 1943, and reportedly supplied 75% of the entire nation's butadiene in 1944. Kobuta's powerhouse was built to be bombproof (see discussion of Kobuta in "Section 1: Project Area Characteristics"). Synthetic rubber production was so successful that the Allied war effort never suffered a shortage during the combat years.

A former wartime worker at Kobuta, Evelyn Michaels of Monaca, recounts her experience at the plant:

When I started with Koppers Engineering at Kobuta in 1942, I left a job at a red brick office building in Ambridge to encounter a wooden barracks-type building in the boonies just off the Raccoon Bridge in Potter Township - like taking a step back in time. Due to lack of space for parking, or for security reasons, I drove from my home in Beaver to a pickup point in Monaca where a station wagon driver would transport a group of us along the scenic Rag Run through Bellowsville to a gravel driveway through a thicket.

It seemed like everybody was from out of town. Few of the people were locals. I settled into working in a dead-air vault with a key to the adjoining washroom – may I repeat, security was tight. I filed precious papers in the vault. Everybody was always in a hurry. It wasn't a very cheerful place to work and I certainly didn't care for the dead air in the vault. We were not supposed to talk with each other about what we did. Or talk with anyone else about it.

Rust Engineering had their office boat tied up close by alongside the high rock cliff at the mouth of Raccoon Creek. Where did their bathrooms go? In the creek?

Kobuta produced Butadiene and Styrene, so naturally the two Rottweiler pups we had at the office were so named – office mascots or potential protection, perhaps.

I didn't work at Kobuta for very long. On my last day, the Ohio River rose precariously high. Bridgewater was flooded from the deck of the Beaver Bridge to the steps of the Presbyterian Church near the railroad underpass into Beaver. After leaving my '39 Plymouth, "Betsy," at Conway's Corners in Rochester, I stepped into a two-man row boat as we paddled past second-floor windows buffeted by strong side-street currents. I walked twelve blocks home thanking my lucky stars for terra firma.

Three days later I was employed out East learning the four million parts that go into making an airplane that was – so the joke went – put together by the lowest bidder. Life is good.

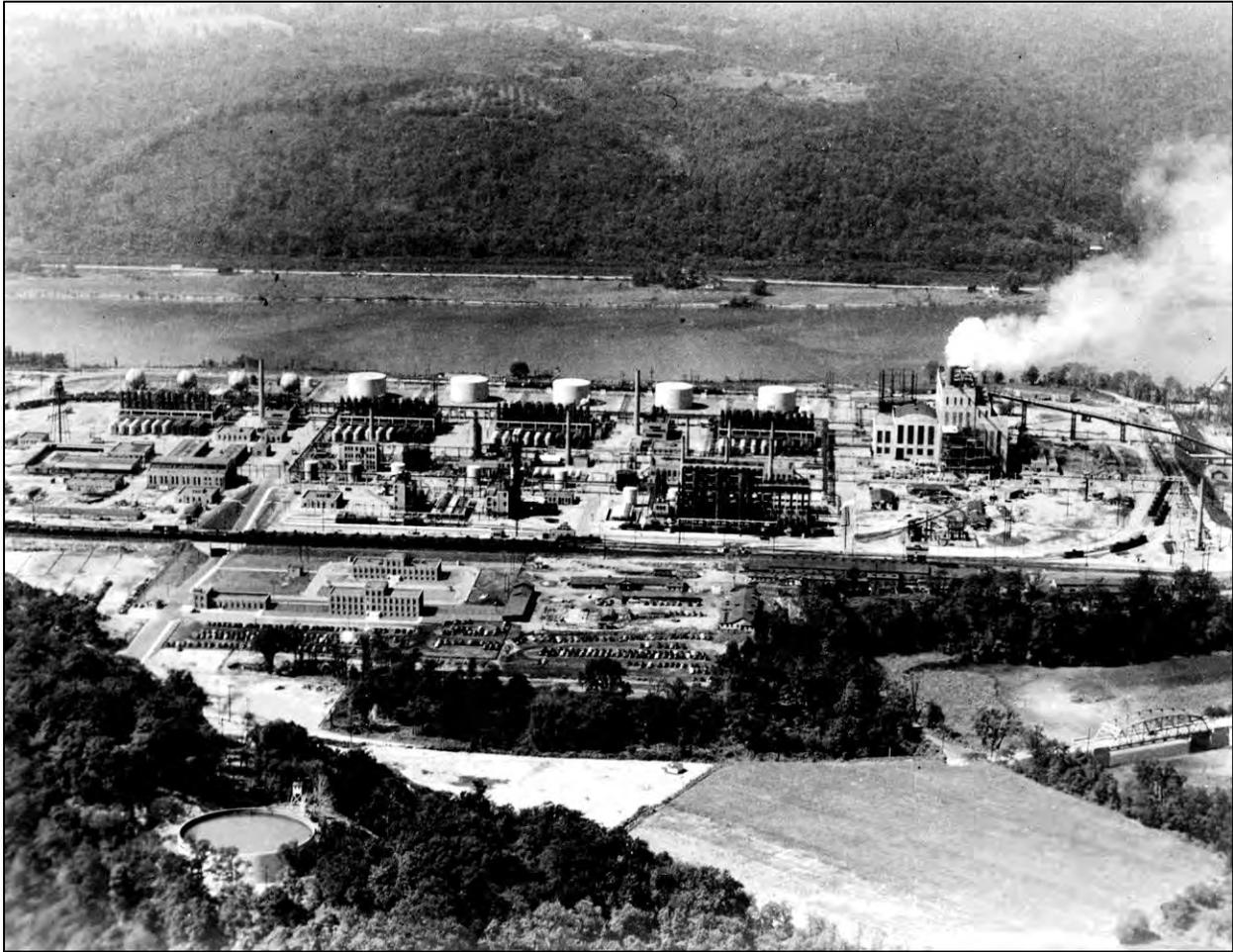


Figure 6.26: The Kobuta Complex, 10/16/1952, looking north across the Ohio River. At lower left is the Route 18 Bridge over Raccoon Creek. Photo courtesy of University of Pittsburgh Archives Center.

Shipbuilding in Georgetown

River commerce, shipbuilding and repairing have been the lifeblood of this small Ohio River village for over two hundred years. Once a bustling center of river trade, the Georgetown area still has several maritime businesses located along its shores, including Campbell Transportation, Georgetown Sand & Gravel, C&C Marine Maintenance and Phil's Towing Company.

A marker placed in town by the Beaver County Historical Research and Landmarks Foundation reads, "Georgetown. Most residents of the village of Georgetown worked on the riverboats. In 1803 Meriweather Lewis and the Corps of Discovery stopped here to buy a canoe to replace a leaky boat. Lewis later discovered the canoe also leaked. The visit was celebrated in 2003."

Shippingport Atomic Power Station^{75 76}

The Shippingport Atomic Power Station was the world's first full-scale atomic electric power plant devoted exclusively to peacetime uses. Located on the banks of the Ohio River in the village of Shippingport, it was built on the site of what is now FirstEnergy's Beaver Valley Power Stations #1 and #2.

Shippingport's construction and operation was guided by Admiral Hyman G. Rickover and the U.S. Atomic Energy Commission. Groundbreaking began on September 6, 1954; the reactor reached criticality on December 2, 1957, and remained operational until October of 1982. The first electrical power was sent through Duquesne Light's distribution grid on December 18, 1957.

Shippingport Atomic Power Station was notable for its experimental thermal breeder reactor and its ability to transmute inexpensive thorium fuel to uranium-233, the fissile material that fueled the reaction within the reactor core. It was capable of an output of 60 megawatts of electricity. The reactor was designed with two purposes in mind - for powering military ships and serving as a prototype for other commercial electrical power generation facilities. Over its 25-year service life, the Shippingport Atomic Power Station operated for more than 80,000 hours, producing over 7 billion kilowatt hours of electricity.

More information about the Shippingport Atomic Power Station is presented in "Section 1: Project Area Characteristics."

Military History Sites

Forts⁷⁷

"Forting" was a necessary practice for the welfare of the Raccoon Creek Region's European settlers in the late 18th century. A community of families would live in a fort consisting of cabins, blockhouses and stockades. A range of cabins, separated by log partitions, commonly formed at least one side of the fort. Outside walls were ten to twelve feet high with inward-sloping roofs. Walls were furnished with port-holes at proper heights and distances, and were made completely bullet-proof. All components were assembled without nails or spikes because such things were not to be had. Sometimes a fort would consist of one large, strong, fortified residence. Compared to military garrisons, the settler forts were very uncomfortable and seemed not very formidable but they served their purpose well. Because the Indians had no artillery they seldom attacked the forts successfully and few were ever taken.

⁷⁵ A guide to Historic Landmarks in Beaver County Pennsylvania, compiled and edited by Charles W. Townsend III, Bob Bauder and Denver Walton, Published 2002 by the Beaver County Historical Research and Landmarks Foundation, 111 pp., print.

⁷⁶ Wikipedia, Shippingport Atomic Power Station, available at http://en.wikipedia.org/wiki/Shippingport_Atomic_Power_Station; accessed 11/9/2014.

⁷⁷ Report of the Commission to Locate the Site of the Frontier Forts of Pennsylvania, Volume Two, by Clarence M. Busch, State Printer of Pennsylvania, 1896, pages 399-436; available at <http://www.usgwarchives.net/pa/1pa/1picts/frontierforts/ff33.html>; accessed 11/11/2014.

The following is a list of some of the forts of the southern Raccoon Creek Region:

- **Allen's Fort**, located on the Smith-Robinson Township line
- **Bayon's Blockhouse, Marshall's Blockhouse, Reynold's Blockhouse , Wells Fort and Vance's Fort**, all in Cross Creek Township
- **Burgett's Fort** in Burgettstown
- **Dillow's Fort** in Hanover Township
- **Beeler's (or Beelor's) Fort** in Robinson Township at Candor
- **Hoagland's Fort** in Smith Township. According to tradition, the women of Hoagland's Fort repulsed an attack by pouring boiling water from the stockade onto the Indians below.

Monaca Tank Farm⁷⁸

Throughout 1941, the United States' entry into the Second World War became increasingly inevitable. Seeking to create a large, strategically located, well-concealed aviation fuel depot, the United States Department of Defense purchased the William and Ida Jeffreys farm on Raccoon Creek in Potter Township to build such a facility. By 1942, six 1.75 million-gallon welded-steel storage tanks had been fabricated on-site and were connected by a series of pipe networks and pump houses to depots located on Route 18 and the Ohio River.

The land around the tanks was re-graded to surround them and cover them with seven feet of earth, rendering them bomb-proof against the weapons of the era. Above ground, all supporting structures (generator station, wash house, gasoline-blending plants, pump and valve houses, etc.) were built to appear from aerial surveillance as farm buildings in the same configuration as the Jeffreys Farm originals (see Figures 6.27 and 6.28).

Known during its operational years as the Monaca Tank Farm, the site remained an operational U.S. military installation after the end of World War II and well into the Cold War era. During its time as a military facility, the Tank Farm was never used to store fuel. Once military operations ceased on the site, the Tank Farm was deactivated in 1963, and the entire 300-acre property was sold as surplus. After passing through various government and industrial ownerships and numerous subdivisions, Potter Township gained ownership of the 63-acre Tank Farm parcel through eminent domain, removing it from the bankrupt estate of Horsehead Industries in 2007. From the inception of these actions, Potter Township has intended to ultimately transform the Tank Farm into a community recreational asset.

In 2012 and 2013 the US Army Corps of Engineers removed five of the six 1.75 million-gallon underground storage tanks on the Tank Farm through their FUDS (Formerly Used Defense Site) Program. Because Tank #5 had been used briefly during the 1970s to store fuel oil for non-military purposes, the Department of Defense was not obligated to remove it under the FUDS Program. Tank #5 is empty and remains fully covered under approximately seven feet of earth. It is the largest welded steel tank on earth.

⁷⁸ KU Resources, Inc., Tank Farm Site Analysis and Recommendations, Potter Township, June 2014.



Figure 6.27: Aerial view of Jeffrey's farm, May 24, 1939; detail of USDA agricultural Adjustment Administration photo by Abrams Aerial Survey Corporation; 1:20,000 scale. Photo courtesy of www.pennpilot.psu.edu.



Figure 6.28: Aerial view of the "Monaca Tank Farm," the US military site name. Note similar location of structures. USDA Commodity Stabilization Service photo by Wolz Studios, June 3, 1958. Photo courtesy of www.pennpilot.psu.edu.



Figure 6.29: The Monaca Tank Farm's Blending Barn #1 awaits a new purpose; 3/11/2011.

Transportation History Sites

Cook's Ferry (Shippingport Ferry)

Established by George Washington Cook in 1859, the ferry was operated by the Cook family until 1919. It provided a crossing of the Ohio River near the site of the present Shippingport Bridge. The ferry made its last trip in 1964, and was the last ferry to operate in Beaver County. The south shore landing is still visible at the bottom of Ferry Street in Shippingport.⁷⁹ [*Author's note: As a small child I distinctly remember making trips across the Ohio River on Cook's Ferry, standing on the deck as we crossed the murky green water with waves sometimes lapping up by my feet; too young to be afraid of how low the loaded vessel rode in the water.*]

Georgetown to Catfish Camp Trail⁸⁰

Along the general path of present-day PA Routes 168 and 18 was the Georgetown to Catfish Camp Trail. Catfish Camp, named for the Indian chief Catfish (Tingooqua) is better known today as Washington, PA, the county seat. At times when the Ohio River was too low or too dangerous for boat travel, a well-used alternate route between Pittsburgh and Wheeling was upstream on Chartiers Creek, then downstream on Cross Creek, Buffalo Creek or Wheeling Creek. Catfish Camp was a frequent stop on the overland route, connected to the northern frontier by the Indian trail to the Ohio River port of Georgetown.

Flight 427 Crash Site

On Thursday, September 8, 1994, one of the worst disasters in U.S. aviation history occurred when USAir Flight 427 from Chicago to Pittsburgh crashed into a wooded hillside above PA Route 60 (now I-376) instantly killing all 132 on board, narrowly missing the busy highway and Green Garden Shopping Center along Raccoon Creek in Hopewell Township.⁸¹ After the most extensive investigation in its history, the National Transportation Safety Board (NTSB) determined that the probable cause of the accident was a malfunction of the main rudder power control unit.⁸²

⁷⁹ "A Guide to Historic Landmarks in Beaver County, Pennsylvania" compiled & edited by Charles W. Townsend III, Bob Bauder and Denver Walton; published 2002 by the Beaver County Historical Research and Landmarks Foundation, 111 pages, print.

⁸⁰ Beaver County Historical Research and Landmarks Foundation, Beaver County Landmarks Map No. 7A and 7B, published in Milestones Vol. 2 No. 2-Spring 1976 by Denver Walton, Gladys Hoover and Ruth Ann Smith; available at <http://www.bchistory.org/beavercounty/BeaverCountyTopical/Maps/LandmarksMap7.html/LandmarksMap7M1976.html>; accessed 11/10/2014.

⁸¹ Wikipedia, available at http://en.wikipedia.org/wiki/USAir_Flight_427 accessed 4/18/2014

⁸² Airsafe.com website – US Air Flight 427 Accident Investigation, available at <http://www.airsafe.com/events/flt427.htm>; accessed 4/18/2014

Despite the terrible loss of life, Flight 427's greatest legacy may be the revelation of a flaw in the rudder mechanism of the Boeing 737. Investigators discovered that a servo valve in the rudder control unit, about the size of a soup can, sometimes jammed. The NTSB theorized that such a servo valve jam caused Flight 427 to roll left and spiral to the ground on approach to Pittsburgh International Airport.⁸³

In 1996, President Clinton signed into law the Federal Family Assistance Plan for Aviation Disasters. The "Families Bill" established within the NTSB a Family Advocate, a third party, not connected with the airline, to notify family members in a timely fashion in the event of a crash and to assist in the subsequent handling of sensitive family issues.⁸⁴

The Flight 427 crash site is permanently protected from disturbance by the Pine Creek Land Conservation Trust and the Flight 427 Air Disaster Support League.



Figure 6.30: Flight 427 Crash Site Memorial on private property above Raccoon Creek in Hopewell Township, Beaver County. Photo courtesy of Pine Creek Land Conservation Trust website.

Link's Bridge⁸⁵

Link's Bridge is actually the tale of two bridges – Link's Bridge in Independence Township and the Potter Bridge in Potter Township. Link's Bridge carries Hookstown Grade Road over the main stem of Raccoon Creek in Independence Township near the Allegheny County line at a place once known as "Link's Ford." The first Link's Bridge was a bow string arch bridge, a covered wooden structure built in 1887 and pictured in Figure 6.31. In 1938, Beaver County replaced the wooden bridge with a steel bridge by dismantling and reassembling the Potter Bridge, another county structure located twenty meandering miles downstream.

The first Potter Bridge, pictured in Figure 6.33, was a covered wooden span carrying the Frankfort Road (PA Route 18) over Raccoon Creek at what is now the Saint Joe Boat Club. It was built in 1865 for a cost of \$7,000 and served until its collapse on August 5, 1923. In 1924, at a cost of \$17,000, the county built a metal through truss bridge on the same cut-stone abutments as the wooden bridge. These sturdy abutments still stand and can be seen at the Saint Joe Boat Club.

⁸³ International Aviation Safety Association, available at http://www.iasa.com.au/folders/Safety_Issues/FAA_Inaction/usair427.html accessed 4/18/2014

⁸⁴ Flight 427 Air Disaster Support League – Family Assistance Act, available at <http://flight427adsl.wordpress.com/family-assistance-act/> accessed 4/18/2014

⁸⁵ Interview with James G. Camp III, Director, Beaver County Department of Public Works; conducted 11/13/2014.

In the late 1930s, as manufacturing industries expanded near the mouth of Raccoon Creek, the present-day Route 18 Bridge was built to carry the heavier and more frequent traffic. The road we travel today was re-routed to climb the Frankfort slopes more directly, paralleling the Ohio River above Kobuta. In 1938 the outmoded through truss bridge pictured in Figure 6.32 was disassembled and rebuilt twenty miles upstream to replace the Link's covered bridge. In 2007, Beaver County replaced the recycled Potter-Link's Bridge with a modern steel and concrete structure.

Figure 6.31: Link's Bridge over Raccoon Creek in Independence Township, Beaver County, built in 1887. This wooden structure was replaced in 1938 by relocating the metal Potter Bridge from twenty miles downstream. Photo courtesy of Raccoon Creek State Park Archives.



Figure 6.32: Potter Bridge in Potter Twp. pre-1936; moved in 1938 to Independence Twp. to serve as Link's Bridge until 2006. Note the "new" car on the bridge and the photographer's vantage point, now under several feet of water due to the higher pool of Montgomery Dam. Photo courtesy of James G. Camp III, Director, Beaver County Department of Public Works.



Figure 6.33: The Potter Bridge, a covered wooden span built in 1865, carrying the Frankfort Road over Raccoon Creek near its mouth; collapsed on Sunday, August 5, 1923. Photo courtesy of James G. Camp III, Director, Beaver County Department of Public Works.

Lock 6 and Lock 7, Ohio River⁸⁶

Before dams were built on the Ohio River it was often possible to walk from shore to shore in periods of dry weather. Boat travel on the river was often impossible. In 1824 the Federal Government became involved in managing the Ohio for commercial navigation by ordering the Corps of Engineers to remove sandbars and snags. To accommodate coal barge traffic, the River and Harbor Act of 1910 authorized a 9-foot slack-water navigation project for the Ohio River, consisting of forty-nine movable wicket dams, each with a single lock chamber 600 feet by 100 feet.



Figure 6.34: Buildings of the former Lock 7, south shore of the Ohio River in Greene Township, 6/10/2014.

At the northern boundary of the 20D Raccoon Creek Region, two wicket dams were constructed. Lock 6 was located at Merrill, immediately downstream of the mouth of Raccoon Creek. Completed in 1904, Merrill Dam raised the navigational pool of the Ohio River by several feet, and that of Raccoon Creek as well. Farther

⁸⁶ East Liverpool Historical Society, Wicket Dams, available at <http://www.eastliverpoolhistoricalsociety.org/wicketdams.htm>; accessed 11/4/2014.

downstream, Lock 7 was built below Phillis Island about seven miles distant from Lock 6. Lock 7 opened to navigation in 1914. As heavy industry developed on the Ohio River, the wicket dams and their locks soon became outmoded. In 1936 Montgomery Dam was built between old Locks 6 and 7. Today the wicket dams are only history, but their sturdy lock houses remain, well worthy of restoration and constructive re-use.

Montgomery Locks and Dam

At about 2:30 AM on January 9, 2005, the towboat "Elizabeth M" was swept over Montgomery Dam by raging floodwaters. Three of her seven crewmen drowned in the worst accident in the history of the twenty-three locks and dams of the Army Corps of Engineers' Pittsburgh District.⁸⁷ Rescue and recovery efforts were deeply traumatic for everyone involved and for the people of the surrounding communities.



Figure 6.35: Towboat "Elizabeth M" remains trapped in the icy Ohio River at Montgomery Dam three weeks after being swept over backwards by floodwaters on January 9, 2005. Photo taken 1/28/2005.

A Sampling of Notable Historic Places

These are but a very few of the hundreds of fascinating places that contribute to the long history of the Raccoon Creek Region. Many others are mentioned in various sections of this Plan. The reader is encouraged to get out and explore the waterways and byways where these and other places await rediscovery and renewed appreciation.

Frankfort Springs Presbyterian Church

Originally called King's Creek Church, this congregation was organized in 1790 by the Rev. John Anderson. The brick church pictured here was built in 1876 and is the third house of worship for

⁸⁷ Pittsburgh Post-Gazette.com, January 10, 2005, available at <http://www.post-gazette.com/frontpage/2005/01/10/3-dead-1-missing-as-towboat-goes-over-dam-sinks-in-Ohio-River/stories/200501100163> accessed 4/13/2014

this congregation.⁸⁸ The bell in the foreground was cast by A. Fulton's Son and Company, Pittsburgh, PA, A.D. 1871. Very shortly after this photo was taken, the bell was stolen.



Figure 6.36: Frankfort Springs Presbyterian Church, PA Rt. 18, Frankfort Springs, 5/11/2013.

Miles Standish Houses

On the Beaver-Washington County line, not far from West Virginia, the Aunt Clara Fork of the King's Creek Watershed remains very rural, quiet, sparsely populated and rich in rural agricultural history. In the Commettsburg area there are reputed to be three houses built by descendants of the famed Pilgrim, Miles Standish. One such house was featured in an April 30, 1963 article in the Beaver County Times, which cited numerous 'Standishes' in the property's deed records. The owners interviewed in 1963, Mr. and Mrs. Clair McCurdy, "...are not quite sure whether they fell in love with the house and got the surrounding woodland and historical value as a bonus, or whether they simply must live in this woodland area. Mrs. McCurdy says "To be away more than one night is out of the question with us."⁸⁹ Fifty-odd years later the appeal of this place remains, as does the beautiful cut-stone 'Standish' house on Johnan Road near the county line.



Figure 6.37: The Alfred and Joy Plance Farmhouse on Johnan Road near Commettsburg, built ca. 1823, reputedly by a descendent of Miles Standish. 7/4/2013.

⁸⁸ "A Guide to Historic Landmarks in Beaver County, Pennsylvania" compiled and edited by Charles W. Townsend III, Bob Bauder and Denver Walton; published 2002 by the Beaver County Historical Research and Landmarks Foundation, 111 pages, print.

⁸⁹ Beaver County Times, "A Miles Standish Built This House," April 30, 1963, available at <http://news.google.com/newspapers?nid=2002&dat=19630430&id=cvQuAAAAIBAJ&sjid=UdsFAAAAIBAJ&pg=2256,5439434>; accessed 11/6/2014.

Robinson Church (Robinson United Presbyterian Church)⁹⁰



Figure 6.38: Robinson United Presbyterian Church, Washington Road, Robinson Township, 4/5/2005.

Located near the Allegheny-Washington County line, Robinson Church was founded in the early 1830s by Presbyterian families of Findlay and Robinson Townships who felt the need to establish a congregation more local than the nearest churches in Clinton or Burgettstown. Robinson Church was built on land donated by Alexander McBride, Matthew Bigger, and William McBride. The land for the cemetery was donated by Matthew Bigger. A child, Maria Wilson, was the first person buried there on May 22, 1833. The first sermon was preached by the Rev. Joseph Banks, from a carpenter's bench, before the original church was completed. The present building was erected in 1874.

Robinson Church is significant in that it survived the depopulation of the surrounding area when much of the countryside was stripped of its coal in the mid-twentieth century. It stands almost alone amid thousands of acres. Many of Robinson Church's congregants still bear the names of the old pioneer families. The cemetery is surrounded by an ornate wrought iron fence along Washington Road.



Figure 6.39: River Hotel in Georgetown, 6/5/2014.

River Hotel

Located at Market and Water Streets in Georgetown, the River Hotel is believed to be the oldest public building in Beaver County. It was built in 1802 by Thomas Foster who received a license to run a tavern here in 1805. Smith's

⁹⁰ Boyd Crumrine, "History of Washington County, Pennsylvania with Biographical Sketches of Many of Its Pioneers and Prominent Men" (Philadelphia: L. H. Leverts & Co., 1882); available at <http://www.chartiers.com/crumrine/twp-robinson.html>; accessed 11/11/2014.

Ferry, established as Dawson's Ferry in 1817, crossed the Ohio River nearby. The building is now a private residence.⁹¹

Seventy-Six Post Office

Demolished not long after this photo was taken, the former Reed House near Raccoon Creek on Independence Road in the village of Independence once served as the "76" Post Office for rural residents of Hopewell Township, Beaver County, until Independence Township was formed in 1848. The last covered bridge in Beaver County was located nearby until it collapsed in 1948.⁹²



Figure 6.40: The "76" Post Office on Independence Road in Independence Twp., Beaver Co., not long before its demolition. Photo taken 10/10/2013.

St. Luke's Episcopal Church

Located on Market Street in Georgetown, the oldest Episcopal Church in Beaver County stands on the site of an earlier log structure. The marker placed by the Beaver County Historical Research and Landmarks Foundation reads, "St. Luke's Episcopal Church. First services held on a flat boat on the Ohio River around 1800. Admitted into union with the Diocese of Pennsylvania in 1825. Present structure built 1833."⁹³



Figure 6.41: St. Luke's Anglican Church, Georgetown, 6/5/2014.

⁹¹ "A Guide to Historic Landmarks in Beaver County, Pennsylvania" compiled & edited by Charles W. Townsend III, Bob Bauder and Denver Walton; published 2002 by the Beaver County Historical Research and Landmarks Foundation, 111 pages, print.

⁹² Ibid.

⁹³ Ibid.

Fairs, Festival and Cultural Events

The Raccoon Creek Region offers many opportunities to experience local color and learn about the rich history of the area. Listed herein are but a few of the fairs, festivals and cultural events of the Region. More information is available from the tourist promotion agencies in Allegheny, Beaver and Washington Counties.

American Indian Heritage Weekend at Meadowcroft Rockshelter

Discover what traditional life was like for native people of the upper Ohio Valley, watch demonstrations of everyday survival skills and explore Meadowcroft's Rockshelter, the oldest-known human habitation in North America, dating back 16,000 years. Held in late September, the American Indian Heritage Weekend will be in its seventh year in 2015.⁹⁴ More information is available at the Meadowcroft Museum's website:

<http://www.heinzhistorycenter.org/meadowcroft.aspx>. Also, Meadowcroft Rockshelter and Museum are covered in detail in the Archaeological Resources discussion, earlier in this section of the Raccoon Creek Region Conservation Plan.

Clinton Park Light-Up Celebration

The Christmas Light Up Celebration at Clinton Park in Findlay Township is billed as "the best kept holiday secret in Pittsburgh." The grounds feature over a mile of lights and displays in a beautiful woodland setting. On special days, only walking traffic is permitted. Visitors can also enjoy hayrides and strolling carolers.⁹⁵ More information is available at:

<http://www.christmaslightup.com/>.

Covered Bridge Festival

Held the third weekend of September each year, the Washington-Greene County Covered Bridge Festival will be in its 45th year in 2015. Each of 10 festival locations offers a country atmosphere and an array of family-friendly activities including hand-made arts & crafts, home-style food, historic re-enactments, demonstrations, children's activities and live entertainment.⁹⁶ More information is available from Visit Washington County PA at:

<http://visitwashingtoncountypa.com/CustomPage.aspx?Name=44thcoveredbridgefestival.aspx>.

Eldersville Christmas in the Village

Eldersville Christmas in the Village Craft Festival is an annual holiday celebration in the quaint village of Eldersville, west of Burgettstown in the Cross Creek Watershed. This festival, now in its 27th year, features the work of dozens of local artisans. Activities also include a light-up night service at the Eldersville Methodist Church, horse and carriage rides, breakfast with Santa and a

⁹⁴ Heinz History Center, Meadowcroft Rockshelter, available at <http://www.heinzhistorycenter.org/meadowcroft.aspx>; accessed 11/3/2014.

⁹⁵ Christmas Light-up Celebration, available at <http://www.christmaslightup.com/>; accessed 11/3/2014.

⁹⁶ Visit Washington County PA, Covered Bridge Festival, available at <http://visitwashingtoncountypa.com/CustomPage.aspx?Name=44thcoveredbridgefestival.aspx>; accessed 11/3/2014.

Christmas parade, stopping at the war memorial to honor local veterans.⁹⁷ More information is available at the Festival’s website, <http://www.christmasinthevillagepa.com/index2.html>.

Hookstown Fair

Hookstown Fair, sponsored by Hookstown Grange #1980, is the only agricultural fair held within the 20D Raccoon Creek Region. Usually taking place during the third week of August, Hookstown Fair features plenty of classic attractions – tractor and truck pulls, demolition derby, carnival rides, a wide variety of food, commercial exhibits, 4-H livestock exhibits and judging, etc. Camping is available on-site.⁹⁸ The Fairgrounds also include the Southside Historical Village, covered earlier in this section under “Historical Resources.” More information is available at Hookstown Fair’s website: <http://www.hookstownfair.com/index.shtml>.



Figure 6.42: The grandstand is packed at the Hookstown Fair on August 22, 2013. Photo courtesy of the Beaver County Times.

Hopewell Parkfest

Usually held the second week of July, Hopewell Community Park’s Parkfest features games, food, entertainment, music, fireworks and fun for the entire family.⁹⁹ More information is available at Hopewell Township Parks & Recreation website: <http://www.hopewelltpw.com/parks-recreation/>.

Hickory Apple Festival

The Hickory Apple Festival is the largest fundraiser for the Mt. Pleasant Fire Department. Held every fall at harvest season, the Festival features homemade apple butter demonstrations, antique tractor and farm machinery exhibits, a pie-eating contest, musical entertainment and a worship service. In 2015, the Hickory Apple Festival will be in its 45th year.¹⁰⁰ More information is available at: <http://hickoryapplefest.com/>.

Meadowcroft Atlatl Competition

Held at Meadowcroft Rockshelter and Museum near Avella in Cross Creek Township, the annual Meadowcroft Atlatl Competition poses the question, “Would you survive in pre-history?” Visitors can try using the atlatl, a spear-thrower used by prehistoric hunters, and/or watch

⁹⁷ Eldersville Christmas in the Village, available at <http://www.christmasinthevillagepa.com/index2.html>; accessed 10/22/2014.

⁹⁸ Hookstown Fair, available at <http://www.hookstownfair.com/index.shtml>; accessed 11/3/2014.

⁹⁹ Hopewell Township Parks & Recreation Department, available at <http://www.hopewelltpw.com/parks-recreation/>; accessed 11/3/2014.

¹⁰⁰ Hickory Apple Festival, available at <http://hickoryapplefest.com/>; accessed 11/3/2014.

skilled experts compete in the world Atlatl Association competition.¹⁰¹ More information is available at: <http://www.heinzhistorycenter.org/meadowcroft.aspx>.

Tour the Montour

Held annually on the Montour Trail, this event features bike rides of 6-62 miles, including rest stops with food and drinks and a hot lunch upon return.¹⁰² More information is available from the Montour Trail Council's website: <http://www.montourtrail.org/>.

VersiTech Christmas Light Show

VersiTech, located on Frankfort Road in Potter Township, is a light industrial facility providing services in insulation, heat tracing, painting and fireproofing. Since 2010, VersiTech has set up a computer-controlled Christmas light show along Frankfort Road as one of its many involvements in the local community. Over the years the show has expanded to include an FM radio broadcast of Christmas music synchronized to the ever-growing light show.¹⁰³ More information is available at VersiTech's website: <http://www.versitech.com/community.htm>.

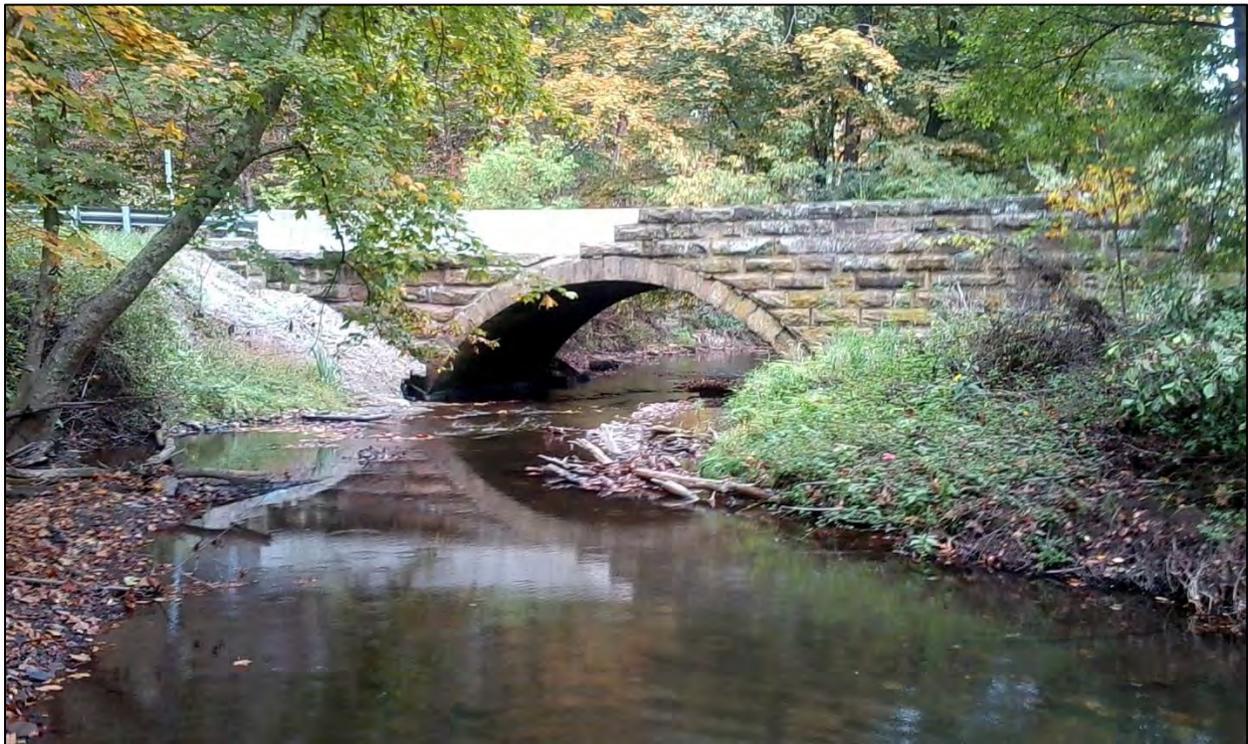


Figure 6.43: A stone arch bridge built in 1936 carries Clinton-Frankfort Road over Potato Garden Run in Independence Township near the Beaver-Allegheny-Washington County lines. Photo 10/3/2013, courtesy of Washington County Conservation District.

¹⁰¹ Heinz History Center, available at <http://www.heinzhistorycenter.org/meadowcroft.aspx>; accessed 11/3/2014.

¹⁰² Montour Trail Council, available at <http://www.montourtrail.org/>; accessed 11/3/2014.

¹⁰³ VersiTech, available at <http://www.versitech.com/community.htm>; accessed 11/3/2014.



Figure 6.44: Beaver County Bridge Docket for the “New Little Blue Bridge,” built in 1908 to carry the Hookstown to Chester Road over Little Blue Run about two miles west of Hookstown. Remarks from 1918 note the “stream OK.” Images courtesy of James G. Camp III, Director, Beaver County Department of Public Works.

NAME Little Blue No. 2. ¹⁰⁹

LOCAL NAME “New Bridge over Little Blue”

TOWNSHIP Greene Sp. ROAD Hookstown to Chester

X LOCATION ON STREAM FROM MOUTH UP _____

* CRONOLOGICAL

X No.	PLACE	KIND	LENGTH	ROAD CLEARANCE	WATER CLEARANCE	WHEN BUILT	*No.
2.	About 2 miles from Hookstown	Reinforced Concrete girders	29 feet center of road	16 feet	26 feet wide 8 feet 6 high	1908.	2.

COURT RECORD
 No. 7
 TERM March 8,
 YEAR 1908.

Contract let
 SEE MINUTES
 DATE June 5 1908.
 Vol. 3
 PAGE 220

Concrete 3.87 per cu yd.
 Stone work 4.48 " " "
 I Beams 1.40 per lineal foot
 Railing 1.35 " " "

Oct 3-1916.

REMARKS Side steel girders or I Beams need painting.
Bridge has galvanized iron guard rails

STREAM OK

ABUTMENTS (Stone) OK

Section 6: PLATES

Plate 6.1: Recreational Resources Map of the 20D Raccoon Creek Region

Plate 6.2: Historic Resources Map of the 20D Raccoon Creek Region

