SECTION 4

4. BIOLOGICAL RESOURCES

4.1 BIODIVERSITY

The high diversity of biological resources in the Buffalo Creek Watershed has been noted and commented upon for over a century. This remarkable historical record is unique, and even if the biological resources of the Buffalo Creek region were by themselves not significant, this historical record would make them so.

Unusual vegetation communities first attracted notice during the early settlement period, when European settlers began to make forays into the "Buffalo Country" (Harbison 1941). The Buffalo Glades, one of the larger openings in the sea of forest (openings that were perhaps created and maintained by Native Americans), were well known for the relatively high numbers of woodland bison (*Bison bison*) that frequented the area. Later in the 19th century it was noted that the rugged and varied topography and a fortunate geographic position created a high degree of diversity in vegetation communities, and corresponding bird and mammal communities, in the Buffalo Creek drainage.

SIDEBAR:

The 1883 History of Butler County extols these natural qualities in its description of Buffalo Township

No part of Butler County has more picturesque natural beauty than Buffalo Township. The Little Buffalo, or rather that branch of this stream known as Smith's Creek, enters the township from the north, and, flowing southerly, is joined near Sarversville by Sarver's Branch from the northwest. The traveler following either of these streams downward will observe that his surroundings constantly grow wilder as he descends; while from their junction the Little Buffalo, as it winds its hasty course through its rocky barriers, becomes grandly impressive from the beauty of its environments. The creek bends gradually eastward, and about a mile from the county line joins the Big Buffalo. The latter stream enter this county from Armstrong, very near the northeastern corner of Buffalo Township, and emerges about midway of the line separating this township from Armstrong County. Many hemlock and pine trees derive support from the scanty soil of the banks of these creeks, and their dark green foliage adds beauty and attractiveness to the lovely scenery. The gore of land between the two Buffalos, especially its northern portion, contains a number of round-topped, mound-shaped hills some of them being of a sufficient height to command a view of a large expanse of country. He who climbs them may read from nature's own book and feast his sight upon pictures of surpassing loveliness."

By 1889, W.E. Clyde Todd had begun to focus a scientific perspective to the notable diversity of the region. Other noted naturalists would follow, drawn by the increasingly well-known community diversity. These biological explorers included such well-known names as Otto E. Jennings (plants), Arnold E. Ortmann (mussels and crayfish), and Leroy K. Henry (plants). Table 4-1 presents a summary of the known surveys and investigations that have included specific information on the watershed. Since the acquisition of Todd Sanctuary in 1942, ASWP has actively pursued the collection of ecological and natural history data for the watershed and can provide a variety of sources for those interested in further information.

SIDEBAR:

W.E. Clyde Todd on the biodiversity of the Buffalo Creek Region (1889)

Without a doubt the Buffalo Creek Region lies within that zone of debatable ground where the Carolinian and Alleghenian Faunas meet and struggle for the mastery – a contest where even a slight advantage turns the scale one way or the other. Or (dropping the figure) here, then, is an instance, one of the most interesting in western Pennsylvania, of the coming together of two life zones, their edges overlapping and interlocking as influenced by the conditions of forest growth, slope-exposure, and locally varying temperature.

Table 4-1
BIOLOGICAL SURVEYS INCORPORATING THE BUFFALO CREEK WATERSHED

Year	Survey
1889-1898	*Birds of the Buffalo Creek Region* (W.E. Clyde Todd)
1909	*Destruction of the Fresh Water Fauna in Western Pennsylvania* (A.E. Ortmann)
1940	*Birds of Western Pennsylvania* (W.E. Clyde Todd)
1969	*Tentative List of the Breeding Birds of Todd Sanctuary* (J.E. Grom)
1969	*The Fish of Todd Sanctuary* (R. Byrom)
1969	*Some Butterflies of Todd Sanctuary* (J.E. Grom)
1969	*Reptiles and Amphibians of Todd Sanctuary (J.E. Grom)*
1970	*A Survey of the Trees and Shrubs of Todd Sanctuary* (M. Dudley)
1970	*Ferns of Todd Sanctuary* (L.K. Henry)
1970	*Amphibians of Todd Sanctuary (K. Hufnagle)*
1970	*Mammals of Todd Sanctuary (K. Hufnagle)*
1971	*Flora of Butler County* (L.K. Henry)
1977	*Herbaceous Angiosperms of Todd Sanctuary* (C.W. Bier)
1978	*Mushrooms of Todd Sanctuary* (K. Watson)
1982	*Salamanders of Todd Sanctuary* (G.T. Reese)
1974-1982	Breeding Bird Census – various plots published in *American Birds*
1970-present	Buffalo Creek Valley Christmas Bird Count, published in *American Birds*
1991	Butler County Natural Heritage Inventory (Western Pennsylvania Conservancy).
1992	Atlas of Breeding Birds in Pennsylvania (D.W. Brauning, ed.)
2002	Reptiles and Amphibians of the Buffalo Creek Valley (T. Laux)
2004-present	2nd Atlas of Breeding Birds in Pennsylvania (D.W. Brauning, ed.) and Breeding Bird Survey (currently ongoing and in preparation for publication)
2005	*Western Armstrong Watershed Assessment* (Armstrong Conservation District)

The biodiversity of the region presents a regional legacy worthy of responsible stewardship, an important contribution to the quality of life to area residents, and an important economic element both as a natural resource and as a regional tourism resource. This section provides an overview of the natural communities occurring in the watershed and identifies areas and species of conservation concern.

4.1.1 Vegetation Communities

The watershed lies entirely within the Eastern Deciduous Forest Biome, and prior to European settlement was apparently almost entirely forested. Human disturbance, including the clearing of forest for agriculture and timber and the introduction of exotic pests such as chestnut blight (*Endothia parasitica*) and gypsy moth (*Lymantria dispar*), have substantially altered the original vegetation patterns. The original vegetation was characteristic of the Cumberland and Allegheny Plateaus Section of the Mixed Mesophytic Forest Region (Braun 1950). The Mixed Mesophytic association is the oldest and most complex of the deciduous forests of eastern North America. In this association, dominance is shared by a number of species, which vary from area to area. In the Pittsburgh region, the typical dominant species was white oak (*Quercus alba*), with varying numbers of mockernut hickory (*Carya ovata*), red maple (*Acer rubrum*), shingle oak (*Quercus imbricaria*), scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus prinus*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), American chestnut (*Castanea dentata*), and black cherry (*Prunus serotina*) as codominants (Jennings 1927).

Although originally the most common forest type of the region, Mixed Mesophytic forests are highly endangered with over 95 percent of the original forest either converted or highly downgraded due to human impacts (Ricketts *et al.* 1999). In fact, primary old-growth forests of any type are extremely rare within the region. Mixed Mesophytic forests are arguably the most biologically diverse temperate forest system in the world often containing over 30 species of trees in the canopy and generally support a relatively diverse community of understory plants, mammals, birds, reptiles, amphibians and invertebrates, as discussed later in this section.

Henry (1971) describes the current state of Butler County forests as including a white oak-hickory association occurring on upper slopes and hilltops. Valley and ravine slopes are dominated by red oak-basswood (*Tilia americana*)-white ash (*Fraxinus americana*) association, with beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple, black cherry, tulip tree (*Liriodendron tulipifera*), and hemlock (*Tsuga canadensis*) components.

Todd noted that a distinguishing characteristic of the region in 1898 was that the stream valleys and ravines were dominated by white pine (*Pinus strobus*), pitch pine (*Pinus rigida*), and hemlock. At that time, he recorded virgin conifer stands as present in the lower Little Buffalo Creek valley and in the Watson's Run valley. This community is still an important component of the landscape. Hemlock tends to be most abundant: white pine occurs locally as a subdominant species. Pitch pine is no longer present as an important component of local forests. Today these areas are representative of the hemlock-white pine-northern hardwood forest, where hardwoods and conifers each contribute from 25 to 75 percent of the canopy (Fisk 1999). Typical hardwood species include beech, sugar maple, red maple, black birch (*Betula nigra*), and yellow birch (*Betula alleghaniensis*). These typically occur on north-facing mesic slopes, which are often very steep and rocky. American yew (*Taxus canadensis*) occasionally forms a dense shrub layer in cliff areas in the lower Buffalo and Little Buffalo Creek valleys. A dry-mesic acid central forest community occurs on south facing slopes and on the adjacent

uplands that is dominated by oaks (*Quercus* spp.) and hickories (*Carya* spp.) (Western Pennsylvania Conservancy 1991).

Broader valley floodplains, including much of the Buffalo Creek floodplain, is representative of the mixed mesophytic forest as defined by Fike (1999). Dominant species include tulip tree, sugar maple, basswood, red oak, and white ash. In some areas substantial stands of sycamore (*Platanus occidentalis*) occur. These stands offer regional significance as they provide suitable habitat for birds such as Yellow-throated Warbler.

Agricultural landscapes are a major component of the watershed and include pasture lands, row crops, and hay.

Several intensive surveys of plants within the watershed have been conducted. These include the aforementioned work by Henry (1971) on the flora of Butler County. Todd Sanctuary in Buffalo Township has been the focus of several inventory efforts since the late 1960s. Henry investigated the ferns and clubmosses of Todd in 1970. Twenty-four species were recorded (Appendix D). Bier (1977) compiled a list of the herbaceous angiosperms. While recording 238 species, he estimated that he had included less than half of the species present. Dudley (1970) compiled a list of woody species present within the three major habitat types present on the Sanctuary at that time: hemlock forest, oak-hickory forest, and herbaceous and shrub rangeland. He recorded 58 species of trees and 60 shrubs (Appendix D). In 2001, the Western Pennsylvania Botanical Society logged over 300 species of plants on an adjacent 110-acre tract of Todd Nature Reserve. According to the Pennsylvania Flora Project of the Morris Arboretum, there are 945 plant species that potentially occur in the watershed. The complete listing can be viewed at www.paflora.org.

According to Pennsylvania Natural Heritage Program records, five plant species of concern are recorded from the watershed. Lobed Spleenwort (*Asplenium pinnatifidum*) is a Pennsylvania rare fern. This species occurs on sandstone outcrops and boulders with acidic characteristics. The historically recorded location has complete protection.

Featherbells (*Stenanthium gramineum*) and Beard-tongue (*Penstemon laevigatus*) are herbaceous species with no current legal status. Featherbells is a grasslike herb that occurs in forests. Beard-tongue occurs in woods and thickets. Chafy Willow Wort (*Paronychia fastigiata*) has a state status of tentatively undetermined. It is an herbaceous species that occurs in dry woods and thickets. Queen of the Prarie (*Filipendula rubra*) is an herb occuring in moist areas. It has a status of tentatively undetermined. The reported locations of these species do not appear to have protection.

4.1.2 Invertebrates

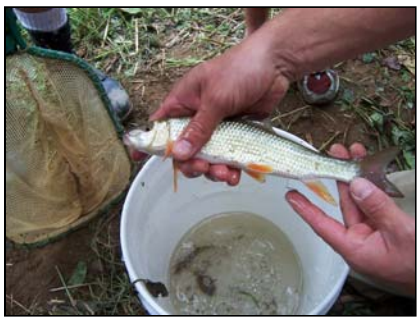
According to the Western Pennsylvania Conservancy (Bier 2008), "*Freshwater mussels (Unionidae) are considered to be the most imperiled faunal group in North America. Experts believe that at least 70 percent of the species are imperiled. The Allegheny and Ohio Rivers were historically the richest streams in PA for freshwater mussels, with over 50 species known to inhabit these rivers. Portions of the main-stem Allegheny River still maintain healthy populations of about 25 mussel species, however habitat disturbance and degradation have triggered the decline and loss of mussel communities in the navigational pools of the lower 70-miles. The lower Allegheny River still harbors low population levels of two federally endangered species, the clubshell (Pleurobema clava) and the northern riffleshell (Epioblasma torulosa*

rangiana), as well as a candidate species, rayed bean (Villosa fabalis). The lower river may also contain two species that have been proposed for federal listing, rabbitsfoot (Quadrula cylindrica) and snuffbox (Epioblasma triquetra). The lower river also supports species that Pennsylvania biologists consider to be rare or threatened in the state, such as the threeridge (Amblema plicata), salamander mussel (Simpsonaias ambigua) and round pigtoe (Pleurobema sintoxia). Many mussel populations in the lower Allegheny River are not healthy or of high quality, but some have improved as water quality and fish populations have improved during the past 20-years. "

Fourteen species of mussels have been reported from Buffalo and Little Buffalo Creeks as identified in Appendix D. Unfortunately, there is little or no detailed historical or current data on the status of mussel populations in Buffalo Creek or its major tributaries. In his pioneering 1909 work *The Destruction of the Fresh Water Fauna in Western Pennsylvania*, A.E. Ortmann touched briefly on Buffalo Creek. In this investigation he endeavored to assess the status of western Pennsylvania's streams and rivers, based chiefly on their mollusk and crayfish communities. In his summary of major lower Allegheny River tributaries, he notes "*Buffalo Creek, running along the boundary line of Butler and Armstrong Counties, is in very good condition and contains an abundance of life*." Ortmann's investigations in the early 20th century reported nine species from the watershed. More recent records have added five additional species.

Ortmann (1909) also conducted the first (and only) survey of crayfishes of western Pennsylvania. Based on this work, species expected to occur in the watershed include Common Crayfish (*Cambarus bartoni*), Blue Crayfish (*Cambarus monongalensis nova*), Mud Crayfish (*Cambarus diogenes*), and the River Crayfish (*Cambarus obscurus*).

Unlike most areas, some efforts have been made toward documenting occurrences of insects within the watershed. Grom (1970) reported 24 species of butterflies in the vicinity of Todd Sanctuary in Buffalo and Winfield Townships (Appendix D). The U.S. Geological Survey (2007) has compiled county-wide listings of dragonflies and damselflies for much of the United States. Forty-six species are recorded as potentially occurring in Butler County (Appendix D).



River Redhorse

Common Crayfish

4.1.3 Fish

Nearly 195 species of fish occur in Pennsylvania. About 63 of these potentially occur within the Buffalo Creek Watershed (Cooper 1983). Forty-one species have been recorded from Buffalo Creek in Pennsylvania Fish and Boat Commission surveys. The Ohio River basin, in which the Buffalo watershed lies, historically has one of the most diverse fish assemblages in North America.

However, fish communities throughout western Pennsylvania have been heavily influenced by human activities. Habitat alterations, degradation of water quality, changes in flooding regimes, and land use changes have all served to reduce populations of many native species. In addition, stocking and escapes of fish into areas in which they did not previously occur has substantially altered original community compositions. The Fish Technical Committee of the Pennsylvania Biological Survey estimates that of the 130 fish species occurring in the Ohio River drainage in Pennsylvania, 11 of these are exotics introduced from other areas. Some were purposely introduced, including rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and common carp (*Cyprinus carpio*). Other exotics were introduced accidentally or illegally.

These factors and influences have surely affected the Buffalo Creek watershed, although the extent of change in the community composition is subject to conjecture as there are few historical data to base comparisons on. A few examples can be noted. The historical range of the brook trout (*Salvelinus fontinalis*) has been substantially reduced throughout the watershed due to land use changes, and the introduced brown trout (*Salmo trutta*) has replaced it as the dominant salmonid in the main stem. Creation of navigation dams on the Allegheny River in the early 20th century resulted in the permanent inundation of the lower mile of Buffalo Creek. This has lead to the probable occurrence of many river and deep water species within lower Buffalo Creek that did not occur prior to this time.

Appendix D provides a listing of fish species that may potentially occur within the watershed and that have been recorded from Buffalo Creek. As noted, there is little field data concerning fish populations in the Buffalo Creek watershed. One notable exception is for Watson's Run, a tributary of the central portion of the watershed. This stream flows through ASWP's Todd Sanctuary and incidental observations of species occurrences have been recorded here since the late 1960s. These observations provide an overview of the typical community composition in a relatively undisturbed perennial tributary of Buffalo Creek (Table 4-2).

Table 4-2
FISH RECORDED FROM WATSON'S RUN

Common Name	Scientific Name
Common Sucker	*Catastoma commersoni*
Creek Chub	*Semotilus atromaculatus*
Common Shiner	*Notropis cornutis*
Black nosed Dace	*Rhinichthys meleagris*
Blunt-nosed Minnow	*Pimephales notatus*
Green Sunfish	*Apomotis cyanellus*
Mottled Sculpin	*Cottus bairdii*
Johnny Darter	*Etheostoma nigrum*

Source: Byrom 1969.

Four species that occur or potentially occur within the watershed are of particular conservation concern. These include the Pennsylvania Endangered Gravel Chub (*Erimystax x-punctatus*) and three additional species of conservation concern identified by the Fish Technical Committee of the Pennsylvania Biological Survey. These are the Ghost Shiner (*Notropis buchanani*), the Black Bullhead (*Ameirus melas*), and Least Brook Lamprey (*Lampetra aeptyptera*).

The Gravel Chub is a slender minnow that is largely restricted to the Allegheny River drainage in Pennsylvania. It has very limited habitat requirements, including a fine sand-gravel substrate with no vegetation, usually in riffles, of large creeks and rivers. A recent record for the Gravel Chub exists for an adjacent watershed.

The Ghost Shiner is a translucent, milky white minnow that inhabits sandy pools and backwaters of small to large rivers. The Black Bullhead is a heavy-bodied catfish occurring in lower portions of low gradient, small to medium sized streams. Historical records exist from the vicinity of the mouth of the Kiskiminetas River.

The Least Brook Lamprey is an eel-like fish that occurs in clean, clear gravel riffles and runs.

Certain fish species are of important recreational (and in some cases economic) importance. The upper and central portions of the watershed are variously classified by PaDEP as High Quality Cold Water Fishery and High Quality Trout Stocked Fishery waters. Brook Trout, Brown Trout, and Rainbow Trout occur in the main stem and larger tributaries throughout this area. Native populations of Brook Trout occur in a number of smaller tributaries as well. The lower portion of the watershed is listed as a Trout Stocked Fishery water, but is currently not used for this purpose. Instead, the lower reach of the main stem and Little Buffalo Creek provide a notable Smallmouth Bass (*Micropterus dolomieu*) fishery. This area is considered to be one of the region's premier Smallmouth resources, but fishing opportunities are severely limited due to lack of public access. Channel Catfish (*Ictalurus punctatus*), Largemouth Bass (*Micropterus salmoides*) and a substantial population of Rock Bass (*Ambloplites rupestris*) provide an important recreational fishery resource in the inundated portions of Buffalo Creek, as do Walleye (*Stizostedion vitreum vitreum*). Walleye have been reported as far up the main stem as Worthington, with larger fish (over 20 inches) documented as far as Boggsville. There are also a relatively substantial number of migrants from the Allegheny River in the lower portions of the watershed.

4.1.4 Reptiles and Amphibians

The watershed has a rich herpetofauna including perhaps as many as 23 species of amphibians (salamanders, frogs, and toads) and 17 species or reptiles (turtles and snakes). Appendix D contains a listing of these species as determined from review of current and historic ranges (McCoy 1982, Hulse *et al*. 2001) and site-specific field records (ASWP 1980, Laux 2007).

SIDEBAR:

From the 1883 *History of Butler County*

Black and yellow rattlesnakes, copper-heads, black racers and other kind of snakes were very abundant among the rocks along Cornplanter Run and, in fact, on the lowlands in all parts of the township. While mowing, the settlers frequently wrapped quantities of hay around their legs to prevent being bitten.

Huge yellow rattlesnakes are frequently seen, and sometimes even found their way into houses, but now, like the wolves, bears and panthers, their day is past.

Eastern Garter Snake

Ten species that occur or potentially occur within the watershed are of particular conservation concern. These include one Pennsylvania Endangered species and nine additional species of conservation concern identified by the Amphibian and Reptile Technical Committee of the Pennsylvania Biological Survey. These species are listed in Table 4-3.

Pennsylvania Endangered species are protected under PA Code 58 Chapter 75 and are under the jurisdiction of the Pennsylvania Fish and Boat Commission. These are defined as species in imminent danger of extinction or extirpation throughout their range in Pennsylvania. The one endangered species occurring in the Buffalo Creek watershed is the Eastern Massasauga (*Sistrurus catenatus*).

Table 4-3
REPTILE AND AMPHIBIAN SPECIES OF CONCERN

Common Name	Scientific Name	Status	Reason for Concern
Eastern Hellbender	*Cryprobranchus alleganiensis*	SCC	Evidence of decline, sensitive to poor water quality.
Jefferson Salamander	*Ambystoma jeffersonianum*	SCC	Status poorly understood, evidence of decline, represents vital community element
Fowlers Toad	*Bufo woodhousii*	SCC	Recent declines in western Pennsylvania,
Northern Leopard Frog	*Rana pipiens*	SCC	Localized reduction in range significant decline in numbers.
Wood Turtle	*Clemmys insculpta*	SCC	Unknown status, collecting and (illegal) commercial trade, mortality from motor vehicles.
Eastern Box Turtle	*Terrapene carolina*	SCC	Habitat loss, collecting and (illegal) commercial trade, mortality from motor vehicles, status of recruitment unknown, evidence of decline
Smooth Green Snake	*Opheodrys vernalis*	SCC	Populations appear to be declining in numbers in Pennsylvania and throughout much of the species range
Queen Snake	*Regina septemvittata*	SCC	Pollution, limited distribution, status poorly understood, evidence of decline, native crayfish being replaced by more aggressive invasive crayfish.
Northern Copperhead	*Agkistrodon contortrix*	SCC	Evidence of decline, Pennsylvania may function as a stronghold for the continued survival of this species in the northeastern United States
Eastern Massasauga	*Sistrurus catenatus*	PE	Major decline in abundance, illegal collecting, global rarity, restricted habitat

Notes:

SCC = Pennsylvania Biological Survey Species of Conservation Concern

PE = Pennsylvania Endangered

Source: GAI 2007, Laux 2007

The Eastern Massasauga is also a prairie relict species. This reclusive rattlesnake is the smallest venomous species in Pennsylvania, with a typical length of about 24 inches. Massasaugas require relatively open old field and wet meadow habitat with low lying areas of saturated soil and higher, drier ground nearby (Pennsylvania Wild Resources Conservation Fund 1985). In Pennsylvania, this combination of wet and dry habitat was historically found only in relict prairie terrain in Crawford, Mercer, Venango, Clarion, Lawrence, Beaver, Armstrong,

Butler, and Allegheny Counties. Currently, the massasauga reaches the southeastern limit of its range in the upper Buffalo Creek Watershed. Recently documented populations occur in the north, although it may have occurred in suitable conditions throughout the watershed. Typical prey items include rodents, frogs, and crayfish. The massasauga now occurs in fewer than half of its historically known sites. Habitat loss is believed to be the primary cause of decline in Pennsylvania. Habitat loss has occurred through loss of wetlands, as well as through natural vegetation succession and changing agricultural practices that eliminate the open conditions required by this species. Collecting and eradication have also been factors in its disappearance. Appendix J contains further information on this species.

The species of conservation concern that have been identified by the Amphibian and Reptile Technical Committee of the Pennsylvania Biological Survey were listed for a number of reasons. These variously include evidence of declining populations, restricted and/or patchy distribution, and susceptibility to threats such as habitat destruction or over collecting. An outgrowth of this listing was the implementation of the Pennsylvania Online Herpetological Atlas (www.webspace.ship.edu/tjmare/herp). This website was established to provide information on these species and to collect information from the public on current distributions. Reasons for concern are identified in Table 4-3.

The Timber Rattlesnake (*Crotalus horridus*) presumably occurred within the watershed historically, but it has been extirpated. Several historical records of its occurrence exist, but it was generally killed whenever encountered, as discussed in the 1883 History of Butler County.

4.1.5 Birds

As discussed earlier, the breeding bird populations of the watershed have been recognized as exemplary since the 1880s. Current breeding populations continue to reflect the presence of extensive areas of interior forest habitat as well as extensive area and variations in other high-quality habitat types. Breeding bird census plots have been conducted in the vicinity of Todd Sanctuary since the early 1970s. The results of these censuses have been published in *American Birds*. Todd Sanctuary also served as a monitoring location in the Monitoring Avian Productivity project, a national mark and recapture effort, during the 1990s. One Breeding Bird Survey (BBS) route (Route Number 72053 - Kaylor) is located in part within the watershed. As of 2006, 101 species have been recorded on this route. Further information on BBS data can be found at www.pwrc.usgs.gov/bbs.

It is estimated that about 119 species may presently breed within the watershed (Appendix D). The extensive tracts of forest are a prominent feature of the landscape in the watershed, and many bird species are associated with these habitats. A substantial subset of these species are forest interior species that are of particular conservation concern. Many studies have demonstrated that neotropical migrant bird species that breed in forest interior habitats require tracts of considerable size to maintain populations (i.e., Ambuel and Temple 1983; Freemark and Merriam 1986; Blake and Karr 1987; Bushman and Therres 1988). The minimal area requirement for these species is often more than 100 acres. Smaller forest tracts (i.e., less than 25 acres) typically support few, if any, forest interior species. Table 4-4 identifies forest interior species occurring in the watershed.

Table 4-4
FOREST INTERIOR BIRD SPECIES

Common Name	Scientific Name
Sharp-shinned Hawk	*Accipiter striatus*
Broad-winged Hawk	*Buteo lineatus*
Red-shouldered Hawk	*Buteo striatus*
Barred Owl	*Strix varia*
Whip-poor-will	*Caprimulgus vociferus*
Hairy Woodpecker	*Picoides villosus*
Pileated Woodpecker	*Dryocopus pileatus*
Acadian Flycatcher	*Empidonax virescens*
Brown Creeper	*Certhia familiaris*
Veery	*Catharus fuscescens*
Wood Thrush	*Hylocochla mustelina*
Yellow-throated Vireo	*Vireo flavifrons*
Red-eyed Vireo	*Vireo olivaceous*
Northern Parula	*Parula americana*
Black and White Warbler	*Mniotilta varia*
American Redstart	*Setophaga rusticilla*
Black-throated Green Warbler	*Vermivora chrysoptera*
Blackburnian Warbler	*Dendroica fusca*
Cerulean Warbler	*Dendroica cerulea*
Worm-eating Warbler	*Limnothlypis vermivorus*
Ovenbird	*Seiurus aurocapillus*
Canada Warbler	*Wilsonia canadensis*
Louisiana Waterthrush	*Seiurus motacilla*
Kentucky Warbler	*Oporornis formosus*
Hooded Warbler	*Wilsonia citrina*
Scarlet Tanager	*Piranga olivacea*

Source: GAI 2007.

The Buffalo Creek Valley has been recognized as one of Pennsylvania's Important Bird Areas (IBA #22) by the Ornithological Technical Committee of the Pennsylvania Biological Survey. The goals of the IBA program in Pennsylvania are to identify a network of sites throughout the state that are essential for sustaining wild bird populations, and to protect or manage these sites for long-term conservation purposes. The Buffalo Creek Valley IBA is recognized for its regionally significant populations of neotropical and resident forest interior species (see Appendix I). The IBA has officially been designated by the National Audubon Society. The next step in its stewardship is the preparation of stewardship plan for the IBA. Preliminary efforts have been initiated in developing this plan under the direction of ASWP.

A number of species that presently or potentially occur within the watershed are of conservation concern. These include species on the federal or state endangered species lists, species of conservation concern identified by the Pennsylvania Game Commission, species on the National Audubon Society Watch List, or Priority Species identified by the Partners in Flight program. These species are listed in Table 4-5.

The National Audubon Society has developed a Watch List identifying species facing population declines and/or threats such as habitat loss on their breeding and wintering grounds, or with limited geographic ranges. The Watch List is a science-based system that focuses

attention on at-risk bird species so that limited resources are spent where they are most needed. The Watch List recognizes two status categories. The red category includes all species identified by BirdLife International as Threatened or Near-threatened at the global level and all species identified by Partners In Flight (PIF) as Extremely High Priority at the national level. Species in the yellow category include the remaining species identified by PIF at the national level as of Moderately High Priority or Moderate Priority.

PIF is a cooperative effort among federal and state agencies, conservation and professional organizations, and private foundations that was formed to coordinate conservation of bird populations. One of PIF's initiatives is the continental synthesis of priorities and objectives to guide landbird conservation actions at national and international scales. This is being accomplished through preparation of international as well as regional plans for population conservation. PIF's long-term strategy for bird conservation has been developed through a series of scientifically based Landbird Conservation Plans. The Buffalo Creek Watershed is located within the area covered by the *Ohio Hills Landbird Conservation Plan* (Rosenberg and Dettmers 2004).

One element of these plans is the identification of species of priority concern for conservation action within the physiographic area. Species may be considered a priority for several reasons, including global threats to the species, high concern for regional or local populations, or responsibility for conserving large or important populations of the species. The PIF plan notes that the Ohio Hills is one of the highest priorities for conservation attention among northeastern physiographic areas due to its high concentration of high priority and declining species. Species of concern are largely associated with two major habitat groups: early successional areas and mature deciduous forest. It also notes that in regard to species in mature forest habitats, the populations of most of these birds in the Ohio Hills are large and relatively stable. Maintaining stable populations focusing on priority species would assure a continued source for many birds in this part of the world. The status of the Cerulean Warbler is an exception to this trend. The Ohio Hills is the core of the Cerulean Warbler range, and populations have been rapidly dropping. The Ohio Hills is also one of the few strongholds throughout the range of Henslow's Sparrow, and is the only physiographic area in the northeast in which the species is not declining. Conservation efforts in the Ohio Hills can contribute greatly to its long term survival.

Rose-breasted Grosbeak

Great Blue Heron

Great-horned Owls

Table 4-5
BIRD SPECIES OF CONSERVATION CONCERN
BUFFALO CREEK WATERSHED

Common Name	Scientific Name	Legal Status[1]	PGC Concern	Audubon Watch List[2]	PIF Tier I or II[3]
Great Blue Heron	*Ardea herodias*	--	Yes	--	--
Bald Eagle	*Haliaeetus leucocephalus*	PT	Yes	--	--
Northern Harrier	*Circus cyaneus*	--	Yes	--	--
Sharp-shinned Hawk	*Accipiter striatus*	--	Yes	--	--
Red-shouldered Hawk	*Buteo lineatus*	--	Yes	--	--
Virginia Rail	*Rallus limicola*	--	Yes	--	--
Upland Sandpiper	*Bartramia longicauda*	PT	Yes	--	IB
American Woodcock	*Scolopax monor*	--	Yes	Yellow	IA
Black-billed Cuckoo	*Coccyzus erythrophthalmus*	--	Yes	--	IIA
Barn Owl	*Tyto alba*	--	Yes	--	--
Common Nighthawk	*Chordeiles minor*	--	Yes	--	--
Whip-poor-will	*Caprimulgus vociferus*	--	Yes	--	--
Chimney Swift	*Chaetura pelagica*	--	Yes	--	IIB
Red-headed Woodpecker	*Melanerpes erythrocephalus*	--	Yes	Yellow	IB
Acadian Flycatcher	*Empidonax virescens*	--	Yes	--	IIA
Willow Flycatcher	*Empidonax trailii*	--	Yes	Yellow	IA
Yellow-throated Vireo	*Vireo flavifrons*	--	Yes	--	IIB
Blue-headed Vireo	*Vireo solitarius*	--	Yes	--	--
Bank Swallow	*Riparia riparia*	--	Yes	--	--
Wood Thrush	*Hylocochla mustelina*	--	Yes	Yellow	IA
Brown Thrasher	*Toxostoma rufum*	--	Yes	--	--
Blue-winged Warbler	*Vermivora pinus*	--	Yes	Yellow	IA
Golden-winged Warbler	*Vermivora chrysoptera*	--	Yes	Red	IB
Black-throated Green Warbler	*Dendroica virens*	--	Yes	--	--
Blackburnian Warbler	*Dendroica fusca*	--	Yes	--	--
Prairie Warbler	*Dendroica discolor*	--	Yes	Yellow	IA
Cerulean Warbler	*Dendroica cerulea*	--	Yes	Red	IA
Worm-eating Warbler	*Limnothlypis vermivorus*	--	Yes	Yellow	IA
Louisiana Waterthrush	*Seiurus motacilla*	--	Yes	--	IIA
Kentucky Warbler	*Oporornis formosus*	--	Yes	Yellow	IA
Hooded Warbler	*Wilsonia citrina*	--		--	IIB
Canada Warbler	*Wilsonia canadensis*	--	Yes	Yellow	--
Yellow-throated Warbler	*Dendroica dominica*	--	No	--	IIB
Yellow-breasted Chat	*Icteria virens*	--	Yes	--	IIA
Scarlet Tanager	*Piranga olivacea*	--	Yes	--	IIB
Field Sparrow	*Spizella pusilla*	--	No	--	IIA
Grasshopper Sparrow	*Ammodramus savannarum*	--	Yes	--	IIC
Henslow's Sparrow	*Ammodramus henslowii*	--	Yes	Red	IA
Eastern Meadowlark	*Sturnella magna*	--	Yes	--	--
Eastern Towhee	*Pipilo erythrophthalmus*	--	No	--	IIA
Indigo Bunting	*Passerina cyanea*	--	No	--	IIA

Notes:

[1] FT = Federal Threatened; and PT = Pennsylvania Threatened.

[2] Red= Threatened or Near-threatened at the global level and/or Extremely High Priority at the national level.
Yellow = Moderately High Priority or Moderate Priority at the national level. See text for description.

[3] Partners In Flight Ohio Hills Priority Species: Tier IA. *High Continental Concern + High Regional Responsibility*.
Tier IB. *High Continental Concern + Low Regional Responsibility*.
Tier IIA. *High Regional Concern*.
Tier IIB. *High Regional Responsibility*.
Tier IIC. *High Regional Threats*.

Source: GAI 2007.

4.1.6 Mammals

Forty-seven species of mammals potentially occur in the watershed. This represents a relatively large proportion (77 percent) of the 60 species that are believed to presently occur in Pennsylvania (Pennsylvania Biological Survey 2007). This number illustrates the ability of many species to adapt and even thrive in close proximity to humans. However, mammals as a group also illustrate examples of susceptibility and incompatibility with human populations. Seven species that likely occurred in the Buffalo Creek Watershed have been extirpated since the time of European settlement. These include:

- Allegheny Woodrat (*Neotoma floridana*)
- Gray Wolf (*Canis lupus*)
- Fisher (*Martes pennanti*)
- River Otter (*Lutra canadensis*)
- Mountain Lion (*Felis concolor*)
- Elk (*Cervus elaphus*)
- Bison (*Bison bison*)

SIDEBAR:

The *1883 History of Butler County Pennsylvania* provides some descriptions of the conflicts that arose between early settlers and the larger or predatory mammals:

The early settlers had some unpleasant neighbors in panthers, which haunted the Little Buffalo and the runs entering it. One day Hugh Smith and several other boys who had been to a raising in the southern part of the county, were returning home, when they discovered a half-grown panther, but did not know what it was. They set their dogs upon it and the panther climbed a tree. One of the boys ventured to climb the tree and essayed to seize the animal's tail and throw him down. The panther, however, jumped to the earth and was killed by the boys and the dogs. The old one was heard howling near by, but did not appear, luckily for the boys.

A large wolf, said to have made tracks larger than a man's hand, frequented the Little Buffalo and Cornplanter Run. He was known as the "brindled wolf," and seemed capable of a great deal of mischief. In 1829, he killed five sheep belonging to Thomas Bickett and committed numerous other depredations. A reward of $50 was at length offered for his scalp, and Eckis, the hunter, succeeded in obtaining it.

A den of panthers was discovered by someone in the Smith neighborhood, was near the Little Buffalo. The entire community of men and boys, with Billy Hazlett at the head, determined upon their destruction. First, they tried smoking them; then, procuring poles, they prodded in the den, but for a long time no panther would issue forth. At last, they succeeded in getting one of the young ones out; but the old panther was too wary for them, and was not secured.

Seven species that presently or potentially occur within the watershed are of conservation concern. These include one federally-listed endangered species, one state-listed endangered species, one state-listed threatened species, and four additional species of conservation concern identified by the Mammal Technical Committee of the Pennsylvania Biological Survey. These species are listed in Table 4-6.

Table 4-6
MAMMAL SPECIES OF CONSERVATION CONCERN

Common Name	Scientific Name	Status
Least Shrew	*Cryptotis parva*	Pennsylvania Endangered
Keen's Myotis	*Myotis keenii*	PBS Rare
Small-footed Myotis	*Myotis leibii*	Pennsylvania Threatened
Indiana Bat	*Myotis sodalis*	Federal Endangered, Pennsylvania Endangered
Red Bat	*Lasiurus borealis*	PBS Undetermined
Hoary Bat	*Lasiurus cinereus*	PBS Undetermined
Silver-haired Bat	*Lasionycteris noctivagans*	PBS Rare

Notes:

PBS Rare = Species found in either a few restricted areas or over a broad area at low numbers.

PBS Undetermined = Species of concern for which insufficient data are available for adequate assessment.

Source: GAI 2007.

The Indiana Bat *(Myotis sodalis*) is listed as endangered by both the U.S. Fish and Wildlife Service and the Pennsylvania Game Commission. The Indiana Bat occurs in the midwest and eastern United States. Current population estimates indicate that there are about 500,000 individuals of this species in total throughout its range. Indiana Bats use distinctly different habitats during summer and winter. In winter, bats congregate in a few large caves and mines for hibernation. Hibernation sites are usually cold with temperatures ranging between 42 to 45 degrees Fahrenheit and generally have some standing or flowing water in them. About 85 percent of the known population winters in only seven hibernacula in the midwest. In spring, females disperse from their hibernacula and form maternity colonies. These colonies normally roost during the day under the exfoliating bark of dead, dying, and living trees in a variety of habitat types, including both upland and riparian areas. Roost trees are often ephemeral, and may only be inhabitable for one or two years. Maternity colonies typically consist of 25 to 325 adult females, and colonies often use several roost trees during the summer. Females in the maternity colony forage in a variety of woodland habitats, including both upland and floodplain forest. Forest edges, small openings, and areas with patchy trees provide more foraging opportunities than do dense forests. It is likely that a combination of loss of summer habitat and disturbance during hibernation have contributed to the overall decline of the species. As noted by the Pennsylvania Game Commission, within Pennsylvania, the Indiana Bat was known historically from only eight sites, all of which were natural caves. Recent surveys have found the Indiana Bat at two caves, five limestone mines and two coal mines. Although the trend for finding new locations has improved, this may be because more complete surveys have been done and not that the Indiana Bat population is increasing. The Pennsylvania Game Commission indicates that protection from disturbance of hibernation sites is the most important factor in the conservation of this species. However, it is important to note that loss of maternity roost trees during the summer can also be catastrophic to local populations. There are currently two known hibernacula and one maternity colony within the Buffalo Creek Watershed. Appendix J contains additional information on this species.

The Small-footed Myotis (*Myotis leibii*) is listed as threatened by the Pennsylvania Game Commission. Although historically known from only a few sites across the state, recent discoveries have substantially increased the number of sites at which it occurs. However, the

known populations are very low, with only one or two bats in many cases. Little is known about the ecology of the Small-footed Myotis. During the summer it forms maternity colonies. A number of these have been found in buildings and have ranged from 12 to 20 adults. It is also thought that they may form small maternity roosts in crevices along rock outcrops. This remains unconfirmed. Foraging frequently occurs over ponds and streams. It hibernates in caves and mines in winter. It is thought that loss of hibernacula and disturbance of hibernating individuals is the primary cause of decline and low populations of this species. Consequently, the Pennsylvania Game Commission indicates that protection from disturbance of hibernation sites is the most important factor in the conservation of this species.

The species of conservation concern that have been identified by the Mammal Technical Committee of the Pennsylvania Biological Survey were listed for a number of reasons. These variously include evidence of declining populations, restricted and/or patchy distribution, and susceptibility to threats such as habitat destruction or disturbance.

The presently high population levels of the White-tailed deer (*Odocoileus virginianus*) pose a threat to the ecological health of the watershed ecosystem. Native to Pennsylvania, White-tailed deer historically occurred at approximate densities of 10 to 15 deer per square mile (Dr. Alejandro Royo, U.S. Forest Service, pers. comm.). Over the past century numerous factors with long-lasting interactive effects have created a dangerously large regional deer population. Current deer population densities within the watershed are estimated at 30 to 45 deer per square mile (PA DCNR 2005). This recent explosion of deer is due to several factors. The extirpation of predators such as the Mountain Lion and Gray Wolf has allowed the deer population in Pennsylvania to grow unchecked. Simultaneously, land use practices throughout the last century drastically increased the food supply. Agricultural crops increased the amount of readily available fodder. In addition, agriculture, development and forest fragmentation increased edge habitat, which also increased the abundance of natural food sources. Furthermore, hunting pressure decreased during a period when official policies favored managing for large deer herds. These factors, in combination, have provided the prefect environment for White-tailed Deer to reach population densities three times the ambient historical levels.

Problems associated with high deer population levels within Pennsylvania are many faceted. Deer have high negative socioeconomic impacts. Deer not only damage crops, but also impact the timber industry by selectively feeding on high dollar value tree species. Deer overpopulation has also affected transportation and insurance costs due to extremely high rates of deer-motor vehicle collisions. Over the past ten years Pennsylvania has had one of the highest deer-motor vehicle collision rates, and motorist mortality rates due to deer collisions, in the country.

Socioeconomic problems aside, deer overpopulation has caused a dramatic negative impact to natural plant and animal communities through all of Pennsylvania. Browsing preferences by deer have drastically reduced understory plant and tree diversity (Banta *et. al*. 2005, Long *et. al*. 1998, Marquis and Brenneman 1981, and citations therein). Forest understories are commonly a depauparate death zone for most species. Nearly all of the palatable forest herbs, shrubs and trees are heavily browsed, leaving only unpalatable species behind (PA DCNR 2005). These unpalatable species are released from competition and capable of rapidly increasing in population. In recent years there has been a dramatic shift in understory patterns of relative abundance among trees and herbs. For example, a healthy overstory of beech, maple and cherry will have few seedlings survive to later size classes, ultimately leading to the death of the forest. The remaining understory, dominated by species

with limited wildlife, aesthetic and economic value [such as striped maple (*Acer pensylvanicum*)], will soon come to dominate the forest as the canopy species die out and fail to regenerate. This failure to regenerate will trickle down to effect other dependent plant, invertebrate, fish and wildlife communities included in the system (DeCalesta 1994, Wardel *et. al.* 2001). If left unchecked, deer will have lasting and irreversible effects on the state of the ecology and diversity within the watershed and beyond.

4.1.7 Invasive Species

Invasive species are an increasingly serious threat to natural ecosystems. This threat is so severe, that in 1999 President William Clinton signed Executive Order 13112 to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. As defined in the Executive Order, an invasive species or an invasive alien species is defined as a plant, animal or pathogen that is not native to an area, and "whose introduction does or is likely to cause economic or environmental harm or harm to human health".

Table 4-7 identifies the current major invasive species concerns in the watershed. This list includes species that are already present in the watershed, or that are present within the region and represent a substantial near-term threat to natural communities in the watershed.

Appendix E contains fact sheets with information concerning identification, biology, threats, and management for a number of these species. Japanese Knotweed (*Polygonum cuspidatum*) presently represents the most serious and immediate threat to the watershed. Knotweed has become extensively established along the mainstem downstream of the Route 28 bridge. Throughout this area it dominates the riparian and lower slope zones and largely excludes all native vegetation. Immediate and long-term action is required to prevent its spread upstream.

4.1.8 Unique Habitats

A number of unique or uncommon habitats occur within the watershed. The largest of these are the extensive areas of deciduous forest habitat that occur in much of the watershed. The largest of these has been roughly defined by the Rough Run–Buffalo Creek forest as shown on Figure 4-1. This area includes approximately 11,200 acres in the central portion of the watershed.

As noted previously, the steep and narrow ravines of a number of tributary streams support outstanding examples of northern hardwoods-conifer forest communities. Among these are lower Little Buffalo Creek, Bell's Run, Pine Run, Sipes Run, Cornplanter Run, Patterson Run, a number unnamed tributaries on the west bank between Rough Run and Route 422, and tributaries leading to Rough Run.

Several large wetland areas occur in the central and upper mainstem watersheds and along the floodplain of Little Buffalo Run. These were formerly emergent wetlands but through succession are largely scrub-shrub and forested wetlands at present.

A large limestone spring containing an extensive growth of Watercress (*Nastutium officinale*) is located on Armstrong County Conservancy's Minteer Limestone Spring Reserve along Patterson's Run. This is the foremost example of this wetland type in the watershed.

Table 4-7
MAJOR INVASIVE SPECIES CONCERNS

Common Name	Scientific Name	Threat and Status
Garlic Mustard	*Alliaria petiolata*	Garlic mustard poses a severe threat to native plants and animals in forest communities. Once introduced to an area, garlic mustard out competes native plants by aggressively monopolizing light, moisture, nutrients, soil and space. Currently established throughout the watershed.
Canada Thistle	*Cirsium arvense*	This highly invasive thistle prevents the coexistence of other plant species through shading, competition for soil resources and possibly through the release of chemical toxins poisonous to other plants. Currently established throughout the watershed.
Purple Loosestrife	*Lythrum salicaria*	Adapts readily to natural and disturbed wetlands. As it establishes and expands, it out competes and replaces native grasses, sedges, and other flowering plants that provide a higher quality source of nutrition for wildlife. Not currently well established in the watershed.
Common Reed	*Phragmites australis*	Giant reed chokes riversides and stream channels, crowds out native plants, interferes with flood control, increases fire potential, and reduces habitat for wildlife. Not currently well established in the watershed.
Japanese Knotweed	*Polygonum cuspidatum*	Spreads quickly to form dense thickets that exclude native vegetation and greatly alter natural ecosystems. It poses a highly significant threat to riparian areas. Natural communities on the floodplain and slopes of the lower mainstem (south of the Route 28 bridge) have been devastated by this species.
Autumn Olive	*Elaeagus umbellata*	Threatens native ecosystems by out-competing and displacing native plant species, creating dense shade and interfering with natural plant succession and nutrient cycling. Currently locally established throughout the watershed.
Amur Honeysuckle and others	*Lonicera maackii*	Exotic bush honeysuckles rapidly invade and overtake a site, forming a dense shrub layer that crowds and shades out native plant species. Currently locally established throughout the watershed.
Multiflora Rose	*Rosa multiflora*	Extremely prolific and can form impenetrable thickets that exclude native plant species. Widely established throughout the watershed.
Tree of Heaven	*Alianthus altissima*	Prolific seed producer spreads rapidly overrunning local vegetation leading to the formation of dense impenetrable thickets. Thought to also prevent establishment of competing species through allelopathy.
Asiatic Clam	*Corbicula fluminea*	Alters benthic substrates and competes with native mussel species for food and space. Known from the lower mainstem (south of Route 28 bridge).
Hemlock Woolly Adelgid	*Adelges tsugae*	Causes extensive mortality of Eastern Hemlock (Tsuga Canadensis). Currently 47 counties in the eastern two-thirds of PA are infested. Not yet reported from the watershed.
Gypsy Moth	*Lymantria dispar*,	Causes extensive forest defoliation. Currently established throughout the watershed.
Emerald Ash Borer	*Agrilus planipennis*	Causes extensive mortality of ash (Fraxinus) trees. Recently established in southwestern Butler County.
Japanese Stiltgrass	*Microstigeum, vimineum*	Spreads to form extensive patches that displace native species. Especially well adapted to low light conditions. Becoming well established in the watershed.
Feral Swine	*Sus scrofa*	Butler County one of five PA Counties with confirmed reproduction. Causes extensive damage to vegetation, stream impacts, and other wildlife species.

Source: GAI 2007.

Several areas of limestone and sandstone cliffs and outcroppings occur along the main stem of Buffalo Creek and along lower Little Buffalo Creek. Several of the larger occurrences of this habitat type include Forty Foot Cliffs and West Winfield Limestone Ledge as shown on Figure 4-1. Depending upon topographic exposure these sites have widely divergent plant communities. Those on north facing slopes often have a dense understory of American Yew (*Taxus canadensis*). Many sites also support populations of Walking Fern (*Camptosorus rhizophyllus*), a species limited to occurrence on rock faces.

The Buffalo Creek Cave is the only recorded naturally occurring limestone cave in the watershed (White 1976). This cave is small (approximately 50 feet in length) and contains a stream discharging to Buffalo Creek.

4.2 AREAS OF CONSERVATION INTEREST

The Butler County Natural Heritage Inventory was developed in 1991 to identify the most significant natural areas in the county; prioritize them based upon their attributes; and provide recommendations regarding their management and protection. The inventory was a cooperative effort of the Western Pennsylvania Conservancy, the Pennsylvania Department of Community Affairs, and the Butler County Planning Commission. This inventory is currently being updated, with the effort continuing through 2008. The Natural Heritage Inventory project for Armstrong County was initiated in 2007. Interested citizens can contribute data and information to these efforts through the Western Pennsylvania Conservancy.

Sites identified within the inventory are classified as either natural areas, biological diversity and ecosystem conservation areas, or as landscape conservation, scientific and educational areas. Sites may qualify for listing under several classifications and are ranked in terms of their county significance:

- High - Sites of outstanding county significance that represent areas of great importance for the biological diversity and ecological integrity of the county, state, and/or region. These sites merit quick, strong and complete protection.

- Moderate - Sites of important county significance that represent vital areas of the county's biological and ecosystem resources. These sites merit complete protection in the near future.

- Low - Sites of general county significance that harbor many of the flora, fauna and natural resources in the county. These sites merit attention so that their current condition can be maintained.

Sites within the watershed are identified in Table 4-8.

As discussed previously, the watershed has been identified as the Buffalo Creek Valley Important Bird Area by the National Audubon Society. In addition, locations in the Upper Buffalo Creek subwatershed have been identified as Important Mammal Areas 6 and 7 by the Mammal Technical Committee of the Pennsylvania Biological Survey.

Based upon the information discussed in this section, 17 specific areas of conservation interest have been identified within the watershed. These are identified by subwatershed in Table 4-9.

N

BUFFALO CREEK HEADWATERS CONSERVATION AREA

HICKEY BOTTOM BIODIVERSITY AREA

STATE GAMELAND 304

FENELTON BIODIVERSITY AREA

STATE GAMELAND 164

FENELTON BIODIVERSITY AREA

FENELTON BIODIVERSITY AREA

ROUGH RUN - BUFFALO VALLEY FOREST

BUFFALO AND LITTLE BUFFALO CREEK BIODIVERSITY AREA

ALLEGHENY COUNTY

BUTLER COUNTY

ARMSTRONG COUNTY

STATE GAMELAND 259

WORTHINGTON FOSSIL SITE

MINTEER LIMESTONE SPRING PRESERVE

Worthington

WORTHINGTON FARMLANDS

FORTY-FOOT CLIFFS

LIMESTONE LEDGE

LITTLE BUFFALO CREEK

BUFFALO CREEK

Saxonburg

Sarver

TODD SANCTUARY

BUFFALO AND LITTLE BUFFALO CREEK BIODIVERSITY AREA

HORRIGAN TRACT

BUFFALO BASIN CONSERVATION AREA

Freeport

HARRISON HILLS PARK

1023 68 268 422 356 228 28 128

LEGEND

- BUFFALO CREEK WATERSHED BOUNDARY
- MAJOR TOWNS
- MAJOR STREAMS
- MAJOR ROADS
- BIODIVERSITY AREA
- CONSERVATION AREA
- MANAGED AREA
- OTHER AREA OF INTEREST

0 10,000 20,000 Feet

FIGURE 4-1
AREAS OF CONSERVATION INTEREST
BUFFALO CREEK WATERSHED

Audubon Society of Western Pennsylvania

gai consultants

DRAWN BY: AML
CHECKED: AJB

DATE: 07/10/2007
APPROVED: GTR

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Table 4-8
BUTLER COUNTY NATURAL HERITAGE INVENTORY SITES

Site	Type	Significance	Description
Buffalo Creek Headwaters Landscape Conservation Area	Landscape Conservation	High	High gradient clearwater creek community. Also contains large forested area significant for recreation and wildlife.
Hickey Bottom Biodiversity Area	Biological Diversity	High	Population of species of concern
Fennelton Biodiversity Area	Biological Diversity	High	Population of species of concern
State Game Land 304	Managed Area	N/A	Provides buffer for Buffalo Creek
Buffalo Basin Landscape Conservation Area	Landscape Conservation	Moderate	Provides habitat and recreation and contains significant natural features. Contains vulnerable natural communities.
Buffalo and Little Buffalo Creek Biodiversity Area	Biological Diversity	High	Area of high biodiversity. Five natural forest and stream communities range from imperiled to vulnerable.
Todd Nature Reserve	Scientific and Educational Area	High	Managed area used for education and research that contains several significant communities and species of concern.

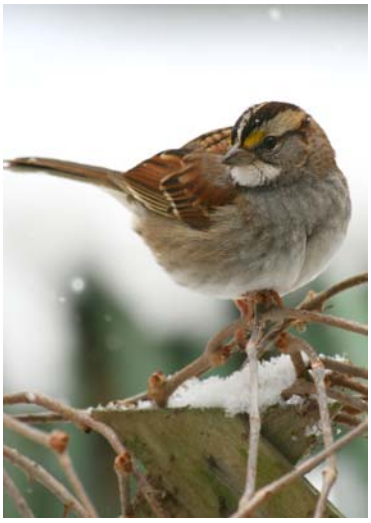
Source: Western Pennsylvania Conservancy 1991.

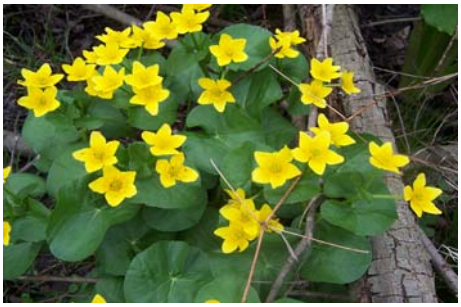
Table 4-9
AREAS OF CONSERVATION INTEREST

Site	Significance	Reference	Description
Upper Buffalo Creek			
Fenelton Biodiversity Area	High	Western Pennsylvania Conservancy 1991	Wetland, Animal of concern
Buffalo Creek Headwaters Landscape Conservation Area	Moderate	Western Pennsylvania Conservancy 1991	Wetland, Animal of concern
Hickey Bottom Biodiversity Area	High	Western Pennsylvania Conservancy 1991	Large deciduous forest community, Wetland, Animal of concern
Important Mammal Areas 6 and 7	High	Pennsylvania Biological Survey 2007	
Central Buffalo Creek			
Buffalo Creek Cave	Low		Only limestone cavern in watershed
Worthington Farmlands	Moderate	GAI 2007	Extensive farmlands provide breeding habitat for several species of grassland birds
Worthington Fossil Site	Low	Erdman and Wiegman 1971	Exposed Vanport Limestone site containing excellent brachiopod, gastropod, coelenterate, crinoid, coral, and echinoid fossils.
Forty-Foot Cliffs	Moderate	GAI 2007	Substantial limestone cliffs with potential for plant species of concern.
Rough Run - Buffalo Creek Forest	Moderate	GAI 2007	Largest forest tract in watershed.
Patterson Creek			
Minteer Limestone Spring Preserve	High	Armstrong County Conservancy 2007	Variety of forest communities, Patterson Creek aquatic communities, and limestone spring wetland
Little Buffalo Run			
Fenelton Biodiversity Area	High	Western Pennsylvania Conservancy 1991	Extensive wetland, Animal of concern
Rough Run			
Rough Run - Buffalo Creek Forest	Moderate	GAI 2007	Largest forest tract in watershed.
Lower Buffalo Creek			
Buffalo Basin Landscape Conservation Area	Moderate	Western Pennsylvania Conservancy 1991	Open space, natural features.
Buffalo and Little Buffalo Creek Valleys Biodiversity Area	High	Western Pennsylvania Conservancy 1991	Stream communities, northern hardwood-conifer community, dry-mesic acidic central forest community, mesic central forest community
Todd Nature Reserve	High	Western Pennsylvania Conservancy 1991	Northern hardwood-conifer community, dry-mesic acidic central forest community, mesic central forest community
Horrigan Tract - Todd Nature Reserve	High	GAI 2007	Northern hardwood-conifer community, dry-mesic acidic central forest community, mesic central forest community, sycamore-basswood floodplain forest, Buffalo Creek
Buffalo Creek Valley IBA	High	National Audubon Society 2007	Important Bird Area 22. Established for exceptional forest habitat present.

Table 4-9 (Continued)

Site	Significance	Reference	Description
Little Buffalo Creek			
Buffalo Basin Conservation Area	Moderate	Western Pennsylvania Conservancy 1991	Open space, natural features
Buffalo and Little Buffalo Creek Valleys Biodiversity Area	High	Western Pennsylvania Conservancy 1991	Stream communities, northern hardwood-conifer community, dry-mesic acidic central forest community, mesic central forest community
Buffalo Creek Valley IBA	High	National Audubon Society 2007	Regionally significant populations of neotropical and resident forest interior species.





SIDEBAR:

The Eastern Massasauga (Sistrurus catenatus)

Pennsylvania's smallest venomous snake, often described as "docile" or "sluggish".

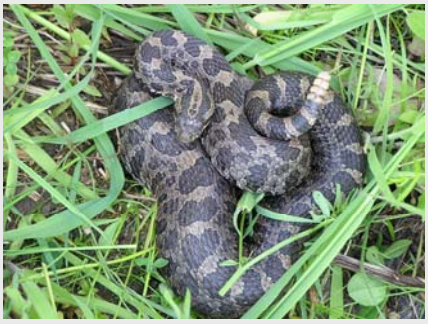
Description: Average adult size 20 inches. Light gray color with a series of dark mid-dorsal blotches and 2-3 rows of lateral blotches. Rattle sounds like the buzz of a cicada, rarely audible beyond 15 feet.

Habitat: In spring and fall occurs in low, poorly drained soils that are saturated in spring. Hibernates in crayfish and mammal burrows in wetland areas. In summer ranges into dry open fields with sparse vegetation.

Food: Rodents, primarily voles.

Distribution: Southern Ontario to Wisconsin, northern Missouri to western Pennsylvania. In Pennsylvania now occurs in Butler, Mercer, Venango Counties. A wet prairie species that originally extended its range into Pennsylvania following the last glaciation. Populations were subsequently fragmented due to loss of prairie habitat due to climate change.

Status: Pennsylvania Endangered. Of 22 historical locations in Pennsylvania, only 6 now known to support the species.



Photograph courtesy of Western Pennsylvania Conservancy