



NATURAL RESOURCES

WILDLIFE RESOURCES



WILDLIFE

"For if one link in nature's chain might be lost, another might be lost until the whole of things will vanish by piecemeal"

Thomas Jefferson

Wildlife Defined

Wildlife are the animals that live wild in a country. Animals include amphibians, reptiles, fish, mammals, birds, and invertebrates. Only animal's native to the Country are usually considered wildlife and domesticated animals that have become wild, or feral, are usually not included. Wildlife are the wild animals and vegetation, especially animals living in a natural undomesticated state.¹

Wildlife in Pennsylvania

The vertebrates² in Pennsylvania include fishes, amphibians, reptiles, birds, and mammals. Of these vertebrate species the mammal is the most highly evolved. Mammals are warm-blooded animals that have hair or fur, nurse their young, and have four-chambered hearts. All Pennsylvania mammals bear live young.



Young Red Fox, Commonly called a "Kit"

¹ Source: Webster's II New College Dictionary, Boston, NY 1999

² Vertebrates are a member of the subphylum Vertebrata, and phylum Chordata that include the fishes, amphibians, reptiles, birds, and mammals, all of which have a segmented bony or cartilaginous spinal column. (Source: Webster's II New College Dictionary, Houghton Mifflin Company, 1995)

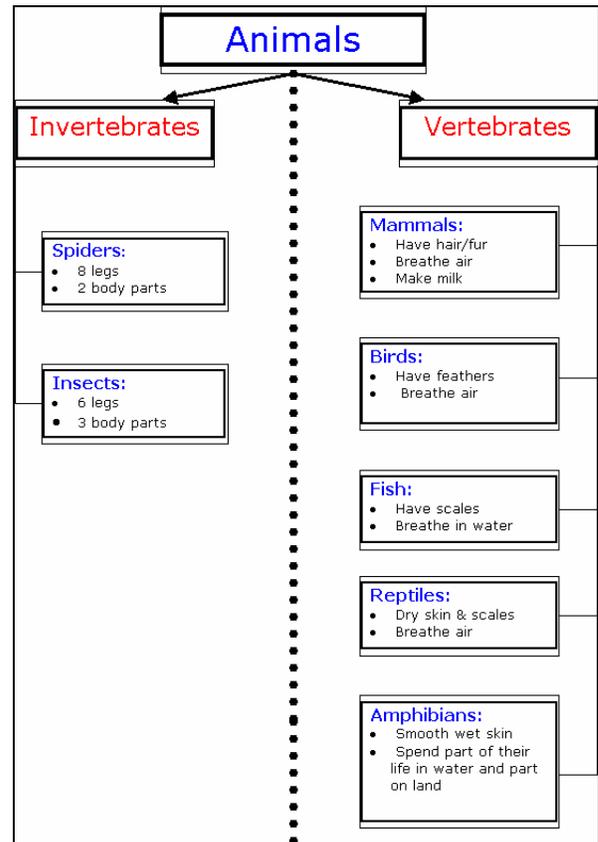


Figure 1: Animal Chart

A great amount of variation exists in a mammal's size and means of living. More than 60 mammal species are known to exist in Pennsylvania. Most mammals are nocturnal and therefore not as easily to observe as other wildlife. The most obvious forest mammals tend to be the nut-eaters such as squirrels and chipmunks while more abundant mammals are in a forest are the deer mouse and white-footed mouse.

Birds, though present at any time of the year, are most diverse and abundant during the spring, summer, and fall when migration and breeding are occurring. Pennsylvania has over 180 breeding species of birds and many others pass through the state when migrating during spring and fall. Like mammals, birds are warm-blooded, able to regulate their own internal temperature so they may remain active when it is hot or cold.

Reptiles have a body covering of dry scales, claws on their toes, and unlike birds and mammals, are not capable of producing sufficient heat to maintain a constant high body temperature. All reptiles are exothermic or

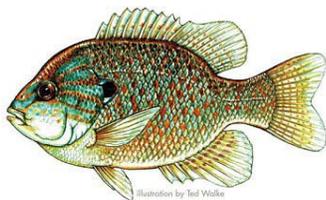
cold-blooded, meaning they depend on their environment for body heat. Snakes, lizards, and turtles are all reptiles, and each of these groups becomes less abundant from the warm to the cold climates.

Amphibians differ from reptiles in that they lack scales and claws and must remain moist. Like reptiles, amphibians are exothermic and often feel slimy and cold. Most amphibians are found in moist areas, not only because their skin requires moisture, but because they must reproduce in water. The amphibians include salamanders, frogs and toads.



**Eastern Wood Frog: Genus Species:
Rana sylvatica**

In Pennsylvania, with some 83,000 miles of streams and rivers and hundreds of lakes, there are over 160 species of fish in about 24 different families.³ There are many different types of fish because Pennsylvania offers many types of aquatic conditions. Fish habitats include; deep and shallow lakes, mountain streams, silty rivers, and swamps, and ponds. All fish share some body forms, functions and habitats. Most fish are ectothermic, have a bony backbone and skeleton and are grouped under the scientific class "Osteichthyes". Fish breathe by taking up oxygen that is dissolved in water through their gills, and their gills release carbon dioxide and ammonia. Most all fish reproduce by laying small, round jellylike eggs in the water.



**Pumpkinseed: Genus Species:
Lepomis gibbosus**

³ Source: PA Fishes Chapter 1, Fish Biology, PA Fish & Boat Commission Website, 2003

Significant Era's of Wildlife Conservation

Era of Abundance 1600-1849

- Native wildlife was abundant especially bison, grizzly bear, elk, pronghorn, waterfowl, and passenger pigeon
- Animals associated with early succession were far less common such as deer and quail
- Predator control began
- Closed season on wildlife (deer)



**Bison: Genus Species:
Bison Bison**

Era of Over Exploitation 1850-1899

- Coincided with accelerated human settlement of North America
- Telegraph allowed tracking of herds/flocks
- Railroads provided transport to local markets
- Improved firearms facilitated mass harvesting
- Loss of bison, prairie chicken, Eastern grizzly, wolves, and passenger pigeon
- Yellowstone National Park established
- First "bag limits" established
- Supreme Court case – Geer vs. Connecticut established public ownership of wildlife

Era of Protection 1900-1929

- Drastic declines of wildlife and other resources alarmed the public
- Lacey Act passed
- Response to overexploitation was legal protection

- Legal protection became the primary tool of wildlife conservation
- State fish and game programs emerge
- Still a negative view upon predators
- First National Wildlife Refuge established
- Federal control over migratory birds

Era of Game Management 1930-1965

- Realize a need for more study of biology and ecology of animals
- Wildlife conservation orientated toward game animals
- Increased public funding of conservation
- Aldo Leopold published game management book
- Duck stamps authorized by Congress to raise funds for wetland preservation
- First North American wildlife conference held
- Federal Government plays major role in wildlife conservation



2002-2003 Federal Migratory Duck Stamp featuring the Black Scoter

Era of Environmental Management 1966-Present

- Many landmark laws passed: EPA, NEPA, CEQ, and ESA
- Recognition that there is a need to look at the environment from a more holistic approach
- Emergence of Endangered Species conservation

- Endangered Species Act (ESA) – 3 versions – 1966, 1969 and 1973
- More interest in ecosystem approaches

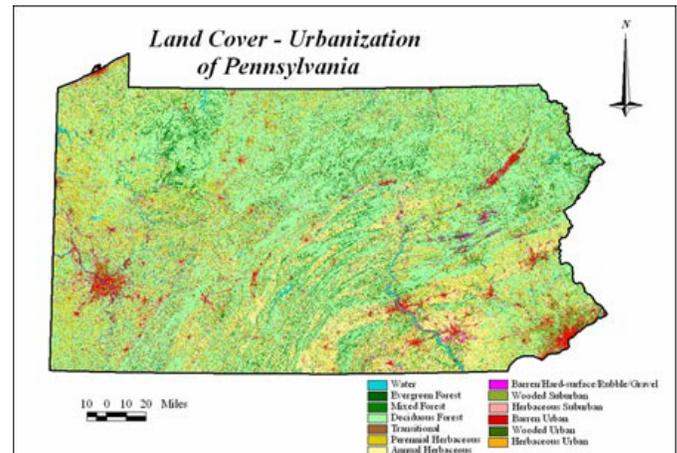


Figure (2): Land Cover in Pennsylvania: Source: DCNR Habitats Website, 2003.

Land Cover in Pennsylvania

Pennsylvania's land area can be classified into approximately 92.9% rural land cover (forest, fields, water), 7.1% suburban and urban land cover (includes all gravel or rubble) types.⁴ See Figure 2: Land Cover in Pennsylvania. Combining rural and suburban/urban types, forest comprise 62% of total land cover, herbaceous⁵ openings comprise 26%, and successional⁶ habitat comprise 7% of land cover. (See Figure 2)

⁴ Pennsylvania Habitats. Pennsylvania Department of Conservation and Natural Resources. Pennsylvania Habitats Website. 2003

⁵ Herbaceous is defined as relating to or typical of an herb distinguished from a woody plant, and green and leaflike in appearance. Source: Webster's II New College Dictionary. 1995, Houghton Mifflin Company.

⁶ "Successional" refers to the process of ecosystem development as brought about by changes in population of species that results in the creation of a geographic region with particular characteristics. Early successional refers to species that tend to more quickly give way to other species (weeds, non-native varieties, etc.), typically representing lower quality habitat. Late-successional refers to more persistent species, and tend to be associated with higher value habitat. Source: Washington State Department of Ecology Website, Definitions and Acronyms, 2003.

Wildlife Habitats in Pennsylvania

In the simplest terms an animal's habitat⁷ refers to the place where it lives. A livable habitat should offer a supportable climate, a diverse terrain, ample space, and a dependable supply of food and water. The amount and distribution of these will influence the types of wildlife that can survive in an area. Food sources might include insects, plants, seeds, or even other animals. Water sources may be as small as drops of dew found on grass or as large as a lake or river. Wildlife need cover for many life functions, including nesting, escaping from predators, seeking shelter from the elements, and resting. Animals also need space in which to perform necessary activities such as feeding or meeting mates. The space an animal requires is often referred to as its "home range". A habitat, in essence is the sum total of an animal's daily needs. These needs may change based on the individual species and may change throughout a year or throughout their lifetime. Even in the course of a day an animal may visit more than one habitat to fulfill all its needs. (See Figure 3: Species Diversity and Forest Succession)

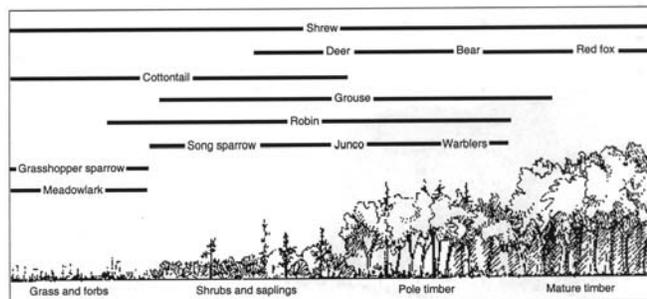
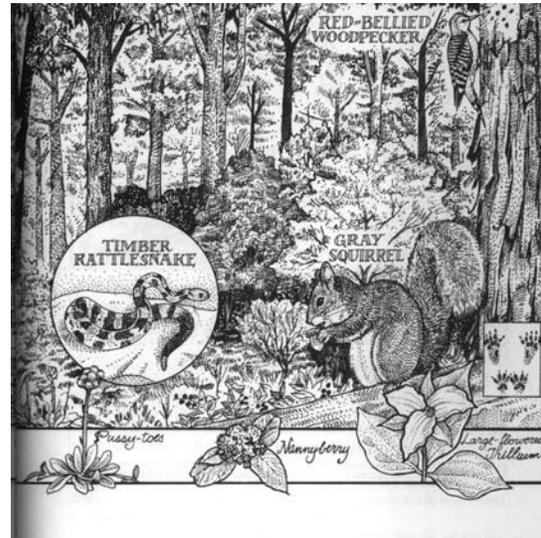


Figure (3): Species Diversity and Forest Succession

Animals are motivated by the desire to eat, pass on their genes, and avoid predators. Through many years of trial and error, the

⁷ Habitat is an area with the combination of resources like, food, cover, water, and environmental conditions (temperature, precipitation, presence or absence of predators and competitors) that promotes occupancy by individuals of a given species and allows those individuals to survive and reproduce. Source: Morrison et al. 1992. pg. 11, Wildlife-habitat Relationships

survivors have become more effective in their pursuit. Animals have developed physical traits and behaviors that help them get the most from their environment with the least amount of effort or risk.



Oak-Hickory Forest Habitat in Pennsylvania
Source: The Field Guide to Wildlife Habitats of the Eastern United States

Habitat Types in Pennsylvania

Terrestrial Habitats

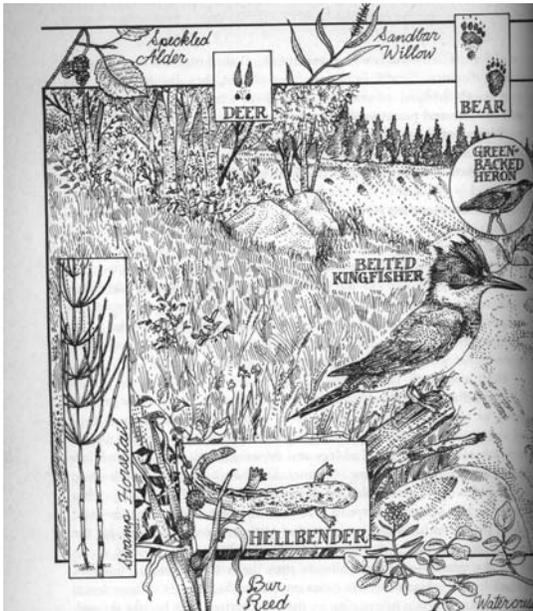
-   Forests
-   Farmlands, Grasslands, Open Habitat
-   Urban/Suburban Areas

Aquatic Habitats

-   Wetlands
-   Streams, Rivers

Special Habitats

-   Caves
-   Talus Slopes
-   Vernal Ponds



Stream-River Habitat in Pennsylvania
Source: The Field Guide to Wildlife Habitats of the Eastern United States

Forest Habitats

Forest covers about 62% of Pennsylvania and approximately nearly sixty percent of Pennsylvania's 28 million acres is forested. Seventy five percent of the forested land in the State is owned privately. *State forests account for approximately 12% of the land area and Game Lands account for about 9% in Pennsylvania.* Centre County encompasses 709,120 acres of land of which 535,100 acres are forested. Similar to the trend on the state level, while thirty-three percent of the County's land is owned publicly, and sixty seven percent of the land is held in private ownership.⁸ Forest type and species composition varies with elevation, moisture, and slope.

Early successional forest and early successional habitat types include; over-grown farmsteads, abandoned orchards, regenerating forests, and floodplain areas. Young forests, abandoned farms, and farms with thick shrubby areas are very important areas for wildlife. Field nesting species use these areas for cover and a diversity of mammals use these sites for nesting and cover. Overgrown

thickets are also important habitat for such species as wintering ring-neck pheasants and cottontails, and provide cover for white-tailed deer and black bear.

Second-growth forests are abundant in Pennsylvania and comprise of mostly oak-hickory and mixed hardwood. Some species of wildlife thrive in a maturing forest. White-tailed deer, black bear, and wild turkey have thrived in this preferred habitat. As Pennsylvania's forests grow older, some species continue to benefit. Many species of raptors increase as a healthy forest matures such as a red-shouldered hawk and northern goshawk.



Northern Goshawk: Genus Species: *Accipiter gentilis*

Old growth forests typically may take up to 100 years to develop depending on the soils and the trees in the area. Old growth forests can easily be recognized by four distinct characteristics; 1) large, live old trees, with hollow trunks or cavities, 2) large dead standing trees (referred to as snag trees), 3) large logs on the forest floor, and 4) varying heights of trees and shrubs. Large cavity trees provide habitat for many bird and mammal species such as the barred owl, raccoon, and pileated woodpecker. Eventually these trees will die and become snag trees supplying habitat for many bird species. When these snag trees fall to the forest floor they become home to an abundance of wildlife habitats including a place for cover, hibernation, and escape from predators.

⁸ *How Important is Forestry in Centre County?*, A Publication by Penn State, School of Forest Resources, 2002



**Pileated Woodpecker: Genus Species:
Dryocopus pileatus**

Urban Forests include all the trees and all other vegetation that are found where individuals live, work, and play. Urban forests occur in small rural communities to large metropolitan cities. Urban forests serve wildlife habitat, supplying food, water, and cover, for a variety of species such as deer, squirrels, reptiles, and many birds. These habits range from riparian buffers and detention ponds to backyards and community parks.

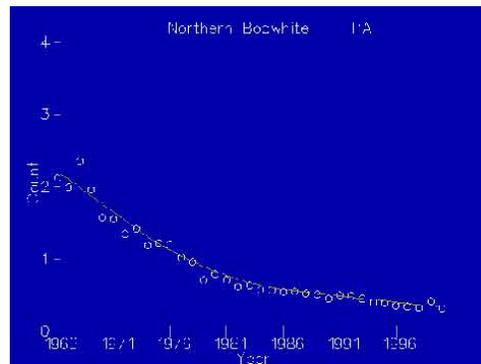
Riparian Forests are the forests typically along rivers and stream and are a critical wildlife habitat. This habitat is crucial to aquatic wildlife that depends on the shade that the forest cover provides. Other wildlife species prefer a riparian habitat for a part of their lifetime such as some snakes and other upland species that spend other seasons in another preferred habitat. Mature trees and wetland habitat attract hawks and nesting birds and frogs and salamanders lay their eggs in temporary pools, more commonly called vernal ponds.

Farmlands, Grasslands, and Open Habitats

Historically Pennsylvania had extensive forests but as land developed, farming became an important endeavor. Small family farms provided an abundant and diverse wildlife habitat.

Farms devoted to farmland have decreased since the 1940's as settlers moved to other areas Midwest and some farms were left to revert back to forests. When farmlands are abandoned hedgerows may be removed and wetlands on the property drained, both of

which provided excellent wildlife habitat. Grassland birds and farmland wildlife have shown widespread declines mainly due to intensified farming, more frequent mowing, and increased use of pesticides and herbicides. (See Figure 4) The wildlife benefits of a native warm-season grassland for pheasants and quail are impressive. Along with the obvious benefits of nesting, roosting, and loafing cover, the warm-season grasses provide a degree of winter cover when little or no snow cover exists. Few if any other grasses have such a wide range of benefits, but the benefits do not stop there. From the landowner's viewpoint, the nearly maintenance and disease free characteristics of the native grasses are highly desirable by themselves, but when you add the drought resistance and aesthetic qualities that they possess, it's quite clear that a native warm-season grassland is hard to beat.



**Figure (4): Decline in Bobwhite Population:
Source: DCNR Habitat website**

Species depending on farmland and grassland habitat consist of songbirds like the bobolink, and meadowlark, the ring-necked pheasant and northern bobwhite, and small mammals like shrews that prefer this habitat.



**Least Shrew: Genus Species:
Cryptotis parva**

Aquatic Habitats

Wetlands

Wetlands are habitats that are wet for all or a portion of the year and include lakes, ponds, (both deep and shallow water wetlands) bogs, and wet meadows. Wetlands perform a wealth of functions including; flood prevention, filtering water, groundwater recharge, and providing critical habitat. Wetlands are vital to the health of a wide array of wildlife. Most of Pennsylvania's reptiles, amphibians, and waterfowl depend on wetlands or river type habitats for some aspect of their life cycle. Most salamanders rely on wetlands for breeding, and terrestrial wildlife such as white-tailed deer and black bear use wetlands for a source of water. Recovering bald eagle populations have been found in many wetland habitats along rivers in Pennsylvania. Wetland mammal species in Pennsylvania include: beaver, mink, muskrat, river otter, star-nosed mole, and the water shrew.



Common Snapping Turtle: Genus species: Chelydra serpentina

Rivers and Streams

Amphibian and fish species richness in Pennsylvania is strongly correlated to the river drainage system distribution in the state. The current status of fishes, as well as mussels, suggests that aquatic habitats are critically threatened. The Pennsylvania Fish and Boat Commission lists 28 species as endangered, 15 species as threatened, and 11 as candidate species, with the total tally representing 30% of the state fish species.⁹ Both reptiles and amphibians utilize rivers and streams and their associated riparian habitat. Common river and stream waterfowl include the mallard, common merganser, and wood duck. Headwater

⁹ Source: Pennsylvania Department of Conservation and Natural Resources, Stream and River Wildlife Trends,(and Myers et al. 2000).

streams are critical habitat to bird species dependent on riparian forest habitat.



Wood Duck Box

Special Habitats

Other special habitats would include caves, talus slopes, and vernal ponds. Each of these special habitats includes species that require that particular environment such as the timber rattlesnake (a state listed species) that inhabits talus slopes¹⁰ and cliffs and will use caves as winter dens.

The timber rattlesnake is found throughout Pennsylvania's Ridge and Valley Province and the northern Allegheny Plateau. Timber rattlesnakes prefer upland forest with rocky outcroppings and talus slopes. They are most commonly found in areas far removed from human activity, although they sometimes wander in search of water in the summer. The home range of the timber rattlesnake varies, with some moving as much as 1.2 miles. Timber rattlesnakes have been designated as a candidate species¹¹. It is thought that exploitation by snake hunters and habitat disturbance was the main cause for rattlesnake population scarcity.

¹⁰ Talus slopes, or boulder and rock strewn regions of mountains or mountain sides and ravines provide critical habitat for several small mammal species. Source: DCNR Website; Special Habitats, Talus Slopes.

¹¹ Candidate species are plants and animals native to the United States for which the Fish & Wildlife Service has sufficient information on biological vulnerability and threats to justify proposing to add them to the threatened and endangered species list, but cannot do so immediately because other species have a priority for listing.



**Timber Rattlesnake: Genus species:
Crotalus horridus**

One example of a unique community habitat in Centre County is the Scotia Barrens which is identified by the NHI as a Biological Diversity Area. The NHI has documented the area which encompasses parts of Patton, Ferguson, and Halfmoon Townships as containing a regionally rare community type that hosts species of state and global concern. The Barrens has a unique microclimate as a result of the iron rich soils, widespread fires, and deforestation of the forest for charcoal back in the 1800's. This community contains pine and scrub oak trees and because of its vegetation and topography remains one of the coldest areas in Pennsylvania. The Barrens is known as a hot spot for birders that have sited many unique and rare species that live in that particular habitat. Rare species often sited include passerines, owls, and large flocks of warblers. (See Appendix A1 and A2) The pond frequently has migrant waterfowl. This unique habitat supports a diversity of rare plants, animals and birds such as the American woodcock, wild turkey, ruffed grouse and song sparrow to name just a few.

Another example of a unique habitat in Centre County is the Bear Meadows Natural Area.¹² This habitat consists of a mountain bog, a boreal conifer swamp (consisting of balsam fir, black spruce, rhododendron, and hemlock), an open bog community, and a mesic central forest that grows on the edge of a bog. One animal species of special concern has been identified to use this site. The species does

¹² A Natural Area is an area within a state park of unique scenic, geologic or ecological value which will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. Source: Pennsylvania Department of Conservation and Natural Resources, Natural Areas, Website. 2003.

not have federal or state legal status but was recommended to be considered rare by the Pennsylvania Biological Survey. Common wildlife species are very abundant in the Bear Meadows habitat and birding enthusiasts find a wealth of sightings in this exceptional habitat. The Bear Meadows Natural Area has been designated as a National Landmark by the Department of Interior since 1966.



Bear Meadows, Natural bog

Another Natural Area in Centre County is the Black Moshannon Bog in Black Moshannon State Park. The bog is home to many rare plants associated with sphagnum bogs.

Benefits of Wildlife

Wildlife enhances our lives in many ways. There are important social and emotional reasons why humans experience nature and wildlife within their lifetime. For some individuals it may be maintaining a backyard habitat, hanging up a bird feeder, bird watching, hiking, hunting, or even wildlife watching and nature photography. Society over time has begun to understand that the health of our wildlife is an excellent indication of the health of our environment which we depend on.

Wildlife species themselves serve to help balance out other wildlife species. One example in Centre County is the coyote (*Canis latrans*). Once restricted to the open prairies of the Central United States the coyote now has adapted to all communities of plants and animals in the United States. Coyotes are territorial and the size of the territory is related to the quality of the habitat. Coyotes do humans more harm than good by keeping a natural balance between animals such as rabbits and rodents, inhabiting landscapes

such as agricultural fields that farmers seek to protect. The coyote is beneficial to the wildlife community, disposing of numerous carcasses and keeping rodent populations in check. Predators once included the grizzly and black bears, mountain lions and wolves, but due to their declining populations these are no longer a threat. Since coyote pelts have become increasingly valuable, man is the major enemy.



Coyote: Genus Species: Canis latrans

The Travel Industry Association of America has released findings of a national survey (The Adventure Travel Report, 1997) of 1,200 adults, which found that one-half of Americans, (98 million adults) have taken an adventure vacation in the last five years. The report classified adventure in two categories: soft adventure and hard adventure. The most prominent soft adventure activities were nature related, camping, hiking, and biking.¹³ Figure (5) shows the most rapidly growing types of soft adventure travel, according to the Travel Industry of America (1998).

Most Rapidly Growing Soft Adventure Travel Markets

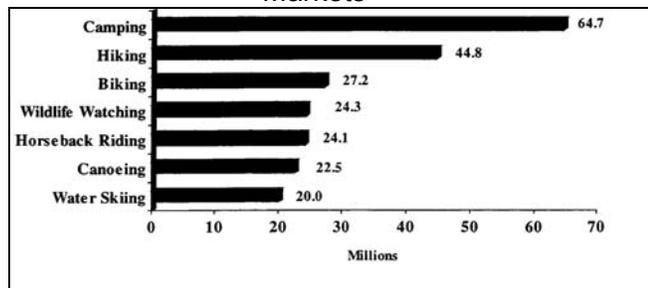


Figure (5): Source: Plan for Elk Watching and Nature Tourism in North Central Pennsylvania. FERMATA Inc., August 2002

¹³Source: Plan for Elk Watching and Nature Tourism in North Central Pennsylvania. FERMATA Inc. August, 2002

The Department of Conservation and Natural Resources conducted an Outdoor Travel Study by a consultant in 1999. This study looked at the top primary outdoor activities. (Figure 6)

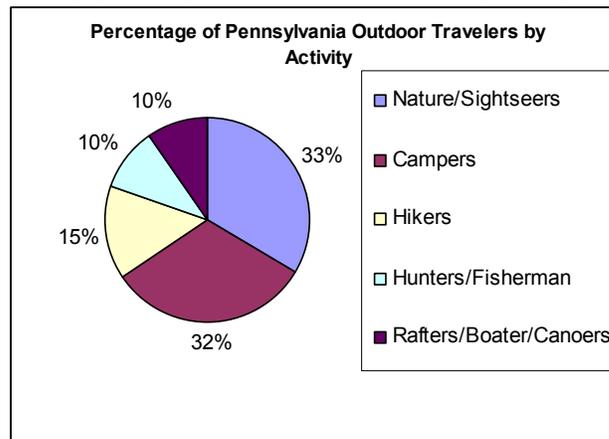


Figure (6): Source: DCNR Outdoor Travel Study, D.K. Shifflet & Associates, 1999.

Note: 42% of visitors indicated their primary outdoor activity was an activity not specified in the outdoor activity list. Totals sum to multiple top activity responses by survey respondents.

Many residents value the hunting opportunities provided in the natural habitats within the state. Nationally, 39 percent of all Americans participate in hunting, fishing or bird-watching (U.S. Department of the Interior 2001 survey) and the numbers have increased by five million since 1996. A survey of hunters, anglers and trappers from all 67 counties, reported that hunters species of special concern and valued knowing a species existed in the state and how they valued being able to spend leisure time watching wildlife (Shafer et al. 2000).¹⁴

Americans spend \$18 billion a year to watch wildlife, triple what they spend on movies or sporting events. Birdwatchers alone spend \$5.2 billion a year according to studies by the U.S. Fish & Wildlife Service

Based on a two-year Pennsylvania State University (Penn State) study of the impact of Pennsylvania's elk herd, elk tourism averaged 62,000 visitor days per year. This study focused only on the Benezette/Winslow Hill Area of Elk County. Centre County (more

¹⁴ Source: Pennsylvania Department of Natural Resources, Economic Values of Wildlife Website, 2003.

particularly Northern Centre County) is included with four other counties as encompassing the elk range in Pennsylvania. See Figure (7).

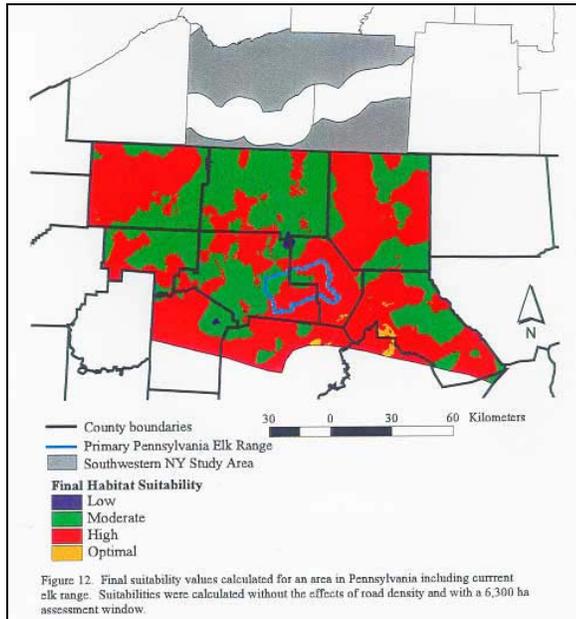


Figure (7): Elk Range in Pennsylvania, Source: Rocky Mountain Elk Foundation Website, 2003

Wildlife and wildlife habitat play a vital role in the biological course of everyday life. The functioning of the biosphere and the enrichment of human life critically depends on the countless interactions among, plants, animals, and microorganisms. These processes are vital for forestry, agriculture, fisheries, and other endeavors necessary to human life. These processes may include; germination, pollinization, seed dispersal, predation, waste breakdown, and pest control to name a few.

Many medicinal drugs and modern remedies depend on wildlife and wildlife habitat. Many pharmaceutical products were discovered or developed by the study of wild species.

Natural landscapes and habitats have many values for people outside of the wildlife they harbor. Spiritually, people seek out wild places for renewal and relief from stress of daily life. Taking a walk in the woods or sitting by a wild stream fishing or picnicking are popular forms of relaxation for residents. The personal value of wildlife and wildlife recreation can leave an image or a sound in an individual's mind that

can last a lifetime, such as the first time a bald-eagle was sighted or the sound of a barred owl hooting while camping at night.

Threats to Wildlife

Bluebirds and other native cavity-nesting birds were affected by the introduction of English sparrows and European starlings in New York City in the 1800s. The alien species¹⁵ competed aggressively to remove bluebirds from nesting cavities in trees and posts. The bluebird's population faced a downward population trend but survived because of a nesting box campaign started in the early 1900s. Two other examples of foreign species that have found Pennsylvania to their liking and have therefore become well established are zebra mussels and gypsy moths. Both alien pest species negatively affect many native species.

Invasive species¹⁶ are now one of the leading threats to species and ecosystems affecting our forests, grasslands, and waterways. Invasive species are plants and animals that are introduced into new areas in which they are not among the native flora and fauna, and because they no longer face the natural enemies or competition from their place of origin, they spread or reproduce prolifically. Invasive species can be a very, very big problem. Non-native species can cause significant changes to ecosystems, upset the ecological balance, and cause economic harm.

¹⁵ "Alien species" means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. Source: www.invasivespecies.gov

¹⁶ "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Source: www.invasivespecies.gov

Non-Native Invasive Species in PA

Terrestrial Animals

Africanized honeybee (*Apis mellifera scutellata*)
Asian long-horned beetle (*Anoplophora glabripennis*)
Asian tiger mosquito (*Aedes albopictus*)
Brown tree snake (*Boiga irregularis*)
Cane toad (*Bufo marinus*)
European gypsy moth (*Lymantria dispar*)
European starling (*Sturnus vulgaris*)
Glassy-winged sharpshooter (*Homalodisca coagulata*)
Hemlock Woolly adelgid (*Adelges tsugae*)
Red imported fire ant (*Solenopsis invicta*)
Wild Boar (*Sus scrofa*)

Aquatic & Wetlands Animals

Alewife (*Alosa pseudoharengus*)
Asian swamp eel (*Monopterus albus*)
Bullfrog (*Rana catesbeiana*)
Eurasian ruffe (*Gymnocephalus cernuus*)
European green crab (*Carcinus maenas*)
Northern Snakehead (*Channa argus*)
Nutria (*Myocastor coypus*)
Round goby (*Neogobius melanostomus*)
Sea lamprey (*Petromyzon marinus*)
Veined rapa whelk (*Rapana venosa*)
Zebra mussel (*Dreissena polymorpha*)

Example of Impact of Non-Native Species The zebra mussel is native to the Caspian Sea in Eastern Europe. These mussels were released into the United States around 1985 when ocean ships released infested ballast water into the Great Lakes Area.

- The colonization patterns of zebra mussels damage water intake structures such as power and municipal water treatment plants. It is estimated that the zebra mussel has cost the power industry \$3.1 billion since 1993.
- Attachment to boat motors, docks, buoys and pipes have affected recreation industries.
- Recreational beaches that become littered with the shells also are affected; the sharp-edged shells can harm bare feet.
- Zebra mussels are hearty filter-feeders that can significantly reduce the supply of microscopic zooplankton, which many forage fish depend upon.
- Zebra mussel control is costly!



Zebra Mussel: Genus Species:
Dreissena polymorpha

Wildlife species that over inhabit an area can do a wealth of damage over time. The abundance of deer in Pennsylvania have been a continued problem to address. The number of deer cause conflicts between society and have negative effects on the environment. Besides collisions with cars, deer cause agricultural damage and over browse shrubbery and forested lands. The over-browsing of deer affect grouse, turkey, and bear that depend on the shrub vegetation for survival and other non-game species utilizing the shrubbery for foraging and nesting. New hunting regulations are looking at addressing the over abundant population of deer in Pennsylvania. The U.S. Fish and Wildlife Service is proposing new regulations regarding the management of Canada Geese. In the early twentieth century, measures were taken to protect the migratory bird but sense then efforts to increase their population were more than successful. Canadian Geese can denude most grassy areas, including parks, lawn, trails, and golf courses. Excessive droppings by Canadian Geese can also pose a health problem especially near a drinking water intake. One step that can be taken other than steps by the federal government is to encourage individuals not to feed the birds in environmentally sensitive areas.



Canada Geese and young at Talleyrand Park in Bellefonte

Habitat loss and the lack of habitat are a threat to wildlife communities. Human activities, such as forest clear-cutting or the expansion of agricultural land, have aggravated the natural fragmentation of landscapes. For many species, new habitat patches are interspersed in an unfamiliar or hostile environment, which leads to the mixed distribution of populations at different scales. When habitat is lost from the landscape, the animals that are relocated may also be lost, producing a population decline. For example, habitat supports a large population of some animal and 50% of that habitat is removed, then one might expect a decline in animal abundance of 50%. However, it often has been found that species abundance declines beyond that predicted by habitat loss alone.

Utilization of natural land and degradation to habitat through suburban sprawl is one of the most serious threats facing Pennsylvania wildlife. These threats to habitats directly lead to the decline and loss of wildlife species. Once these natural lands and habitats are paved over they cannot be replaced. See Figure (8).

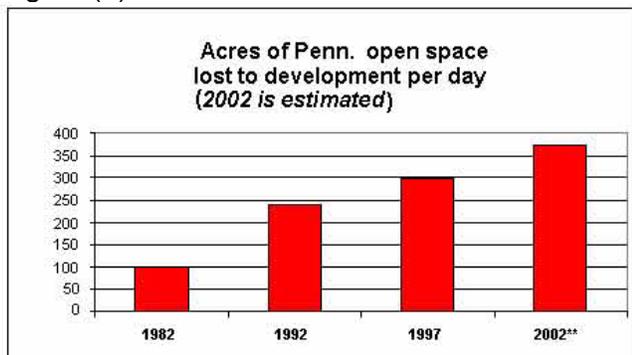


Figure (8): Source: Natural Resource Conservation Service, Data Collected from 1992-1997

Drought, acidic deposition, alien species, and forest pests can all be treats to wildlife. (See Appendix A-3) Regeneration of forests can be affected by all the above which in turn affect the deer, wild turkey, bear, and other nut eaters that depend on a food source. Deer alone also contribute to habitat loss by over browsing. When this over browsing occurs, the under story of the forest is reduced for species that depend on that habitat for food and cover. Increases in deer species and over browsing can directly affect the number of

under-story nesting birds such as the Eastern Rufous-sided Towhee.



Eastern Rufous-sided Towhee: Genus Species: Pipilo erythrophthalmus

Facts about Habitat Loss and Birds:

More than 85% of forest habitats have been permanently destroyed or logged in the United States.

More than 75% of riparian woodlands in the West have been destroyed, and this loss has caused several bird species to be placed on the federal Endangered Species List.

95% of the original 400,000 acres of tall grass prairie in the United States have been permanently destroyed or converted to agriculture.

More than 50% of all wetlands in the contiguous United States have been drained or filled since the time of European settlement.

Source: Point Reyes Bird Observatory PRBO Conservation Science, 2003.

Pennsylvania ranks as one of highest recipients of acid rain deposition. The Pennsylvania DEP and the U.S. EPA estimate that about 10 percent of all Pennsylvania stream miles are degraded by acid drainage from abandoned or active coal mines. Acid rain is a global problem and has affected a tremendous amount of lake and stream habitats. According to many scientists, acid rain causes problems in almost every aspect of the environment. When acids enter lakes and streams, the effects on aquatic life can be devastating. Organisms ranging from fish and frogs down to microscopic plankton cannot survive in highly acidic waters.¹⁷

¹⁷ Source: Department of Environmental Protection, DEP Fact Sheet, Acid Rain in Pennsylvania, 2002

Pennsylvania Extinct, Endangered, and Threatened Species

Pennsylvania also has lost some species to extirpation¹⁸ and exploitation. (See Appendix A- 4) Two examples are the timber wolf and the mountain lion. These large predators were hunted, trapped and hounded from the early 1600s until they disappeared in the late 1800s.

Large Mammals Formerly Found in PA

Elk or Wapiti – The last Elk in Monroe and Pike Counties was shot between 1840 and 1845.

Bison – Bison bone and teeth were found in a cave near Stroudsburg, suggesting food used by American Indians. The last wild Bison was killed in 1801 in Union County, Pennsylvania.

Gray Wolf – In pre-colonial Pennsylvania, Grey Wolves were important predators on White-tailed deer. There were exterminated along the Kittatinny Ridge in the mid-1850's.

Mountain Lion – Mountain Lions became extinct in Pennsylvania in about 1871, after having bounties paid on them for decades. Recent claims that Mountain Lions exist in Pennsylvania are not verified.¹⁹

There may have been as many as 2.2 billion passenger pigeons in North America and by 1900 they were extinct as a wild species. American bison once numbered over 60 million in North America and by 1890 there were only about 300 left. Reintroduction efforts have proven to be successful but a full recovery and range of this species is not likely ever to occur.

During the '90s, the state's elk herd experienced significant annual growth. In 2000, the herd was an estimated 566, more than doubling its early 1990s numbers. The population gains were the product of myriad factors including: increased use of deterrent

¹⁸ Extirpated Species are species that have disappeared from Pennsylvania but still exist elsewhere.

¹⁹ Source: The Kittatinny Raptor Corridor Report, "Large Mammals Formerly Found In The Kittatinny Raptor Corridor", Wildlife Bulletin No. 12, Internet Source, 2003

fencing; specialized habitat management to accommodate elk; heightened public awareness about elk; and increased human presence in the elk range. Source: PA Game Commission Website, History of Pennsylvania Elk Herd

The gray wolf has been hunted to eliminate losses of domesticated animals for centuries. A change of attitude made restoration possible in Yellowstone National Park. A success remains to be seen with this species mostly depending on human attitudes.

Pennsylvania is home to more than 25,000 species of known organisms. Over 150 species of plants and animals have been lost in from Pennsylvania and 130 species are considered to be globally endangered or threatened. Animals, plants, and their unique habitats are being lost every year in Pennsylvania due to natural forces, human activities, neglect, and lack of coordination between landowners, agencies and organizations.²⁰

"Endangered Species" are species that are in danger of extinction or extirpation within their range in Pennsylvania.

Endangered Species/Mammals

Bald Eagle	Black Tern	Least Shrew	Indiana Bat
King Rail	Least Bittern	Loggerhead Shrike	Peregrine Falcon
Short-eared Owl	Common Tern	American Bittern	Great Egret
Yellow-crowned Night Heron	Delmarva Fox Squirrel		

Endangered Species/Reptiles & Amphibians

Bog Turtle	Coastal Plain Leopard Frog	Eastern Massasauga	Eastern Mud Salamander
Gravel Chub	Kirtland's Snake	Lake Sturgeon	Longhead Darter
Longnose Sucker	New Jersey Chorus Frog	Northern Brook Lamprey	Shortnose Sturgeon

²⁰ Source: Snapshot 2002, Biodiversity in Pennsylvania, Executive Summary, Pennsylvania Biodiversity Partnership, 2002

Spotted Tippecanoe
Darter Darter

“Threatened Species” are species that may become endangered within the foreseeable future throughout their range in Pennsylvania



Small Footed Myotis: Genus Species: Myotis leibii

Threatened Species/Mammals

Eastern Woodrat	Dickcissel	Osprey	Sedge Wren
Upland Sandpiper	Small-footed Myotis	West Virginia Water Shrew	Yellow-bellied Flycatcher

Threatened Species/Reptiles & Amphibians

Atlantic Sturgeon	Blue breast Darter	Turbot	Channel Darter
Eastern Sand Darter	Gilt Darter	Green Salamander	Mountain Brook Lamprey
Mountain Mad tom	Northern Mad tom	Ohio Lamprey	Red-Bellied Turtle

Rough Green Snake

Successes in Wildlife Conservation

Habitat restoration and control of hunting has resulted in many recovered populations. There are some examples of successes in wildlife conservation worthwhile to mention. Some species have not fallen to the point of extinction through efforts of wildlife agencies and better hunting practices. The wood duck once a common species, but because of over harvesting and loss of tree cavity nest sites became rare. Through efforts of providing artificial nest boxes and protection they are

now common again. The wild turkey is a very large bird that suffered from over harvesting and loss of habitat. The trumpeter swan also a very large bird suffered as well from over harvesting and is recovering in the same way as the wild turkey. The elk (wapiti) suffered from over harvesting and loss of habitat. Better protection and habitat restoration has resulted in many recovered populations.

Recently the fisher has been recognized as an important part of the wildlife food chain, as it is one of the few predators to control the porcupine population. The Pennsylvania Fisher Reintroduction Project was initiated in 1994 as a cooperative venture between the Pennsylvania State University and the Pennsylvania Game Commission in attempts to restore this mammal to it’s previous habitat in Pennsylvania. In 1995, biologists released 189 fishers into several northern Pennsylvania locations over several years. Current indications are that the program has been a great success.

The River Otter in Pennsylvania

- 1982 – River Otter reintroductions began
- 1989 – 39 Otters were released in Kettle, Pine, and Loyalsock Creeks in PA.
- 1990 – Reintroductions began in NorthWest PA with release of 4 in Tionesta Creek
- 1993 – More than 70 Otters were released by 1993²¹

Wildlife Agencies, Organizations and Better Management Practices to Protect Wildlife

State, Federal, County, and local governments all have a role in managing the lands, waters, and biological resources of the Commonwealth. Responsibility for monitoring plants, birds, mammals, fish, reptiles, amphibians, mussels, and aquatic insects is divided among the agencies. Coordination among all the above governments and individuals is crucial as critical habitats, plants, and animals are lost every year in the

²¹ Source: Internet Video, Greenworks TV by the Wild Resources Conservation Fund, “The Homecoming: Pennsylvania’s River Otters, 2003

Commonwealth due to lack of care, development, and lack of coordination.

The United States Fish & Wildlife Service

This agency is a bureau within the U.S. Department of the Interior. Their mission is “working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.” Their key functions include:

- Enforce federal wildlife laws
- Protect endangered species
- Manage migratory birds
- Wetlands permitting
- Restores significant fisheries
- Restores wildlife habitat

Many federally listed species occur partially, and in some cases exclusively on private lands, thus these private lands are often essential in protecting and recovering endangered species. The U. S. Fish and Wildlife offers endangered species programs, private stewardship grants, tools and assistance for landowners, candidate conservation agreements for private property owners, and safe harbor agreements for private property owners.

The Natural Resource Conservation Service

This federal agency has put nearly 70 years of experience to work to assist private landowners with conserving their natural resources, soil, and water. One of their programs – Wildlife Habitat Incentives Program (WHIP), is a voluntary program offered to landowners that encourages high quality wildlife habitats that support wildlife populations of National, State, Tribal and local significance. Assistance is provided to landowners and others to create upland, wetland, riparian, and aquatic habitat environments. In Pennsylvania priority projects include:

- Riparian areas on dairy and beef farms
- Steam corridors are fenced
- Cool season hayfields are converted to warm season grasses for habitat

U. S. Species Benefiting from WHIP includes:

- Grasshopper sparrow
- Bobwhite quail
- Swift fox
- Short-eared owl
- Ovenbird
- Acorn Woodpecker

NRCS also administers the Conservation Reserve Program (CRP), which is a large scale land retirement program that offers an annual rental payment plus cost-share for landowners to convert environmentally high quality cropland and pasture to suitable grassland and/or tree cover for 10-15 years. The Conservation Reserve Enhancement Program (CREP) is state/federal partnership that enrolls eligible cropland and pasture land into conservation cover plantings. This program is expected to have significant water quality and wildlife habitat benefits. When fully implemented, this CREP is expected to substantially reduce the nitrogen and sediment deposition due to agricultural activities to the Chesapeake Bay watershed as well as protect other nutrient sensitive waterways in Pennsylvania.



Short-eared Owl

National Wildlife Federation's – Backyard Wildlife Habitat Program

Since 1973, the Backyard Wildlife Habitat program has been helping people garden for wildlife. The program encourages everyone - homeowner, teacher, community leader - to plan their landscape with the needs of wildlife in mind, and gives them the tools they need to make it happen. Today, thousands of habitats have been certified all over the U.S. and Canada, and more are being certified every

day. As of January 2002, Pennsylvania has 1,869 Backyard Wildlife Habitat Sites.²² (See Figure 9)

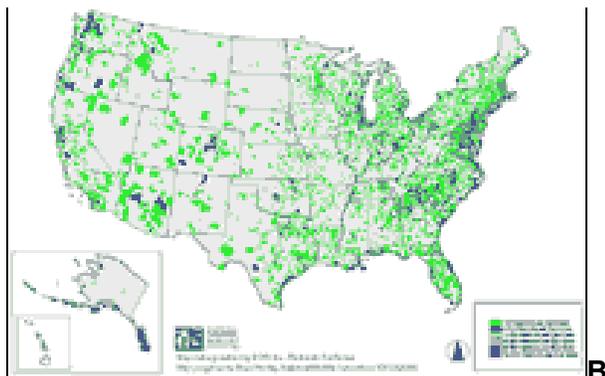


Figure (9): Backyard Wildlife Habitat Sites: 2002

The Nature Conservancy

Since 1951 this non-profit organization has been working to preserve plants, animals and natural communities. The Conservancy has protected nearly 15 million acres of land in the United States. This agency finds the most harmful threats to wildlife include; habitat degradation/loss, invasive species, pollution, overexploitation, and disease.

Wild Resources Conservation Fund

The Wild Resources Conservation Fund (WRCF) directs their resources toward endangered and threatened species. They educate all ages on how to recognize and preserve our most sensitive plants and animals. WRCF is the sole agency that supports research and protection efforts for the state's natural resources heritage. The WRCF is funded entirely by publications, public contributions, and the direct donations or purchase of the new wild resources license plate. The fund awards resource conservation grants every year toward projects that protect or study mammals, birds, fish, reptile, amphibians, and other species.

²² National Wildlife Federation Website, Backyard Wildlife Habitat Program Homepage, 2003

WRCF has reintroduced seven generations of osprey to Pennsylvania

WRCF has reintroduced 125 river otters to Pennsylvania's waterways



Northern River Otter: Genus Species: Lutra Canadensis

Department of Conservation and Natural Resources Office of Biodiversity

DCNR has formed an office of biodiversity as natural diversity and the foundation of our existence has become a very visible topic. This office will serve as a leader in biodiversity conservation by proper management of the state park and state forests. They will work with other partners in the Commonwealth to educate and inform others on the newfound importance of biodiversity conservation.

The Pennsylvania Game Commission

For more than 100 years, the Game Commission has managed the Commonwealth's wildlife resources for all Pennsylvanians. The Commission is responsible for managing all of Pennsylvania's wild birds and mammals. Other responsibilities include informing and educating the public; and assessing public expectations and satisfaction.²³

The Commonwealth's white-tailed deer, black bear and wild turkey populations serve as excellent examples of successful wildlife management. Although each species is hunted, today they inhabit the state in record numbers as a result of Commission programs involving trap-and-transfer work, habitat

²³ Pennsylvania Game Commission Website, www.pgc.state.pa.us, Wildlife, 2003

improvement, research and regulated seasons and bag limits. Pennsylvania currently is home to more deer, bear and turkeys than when colonists first arrived. Elk also are doing incredibly well. Pennsylvania's elk population is larger now than any time in the past 150 years. Its success has been a direct result of modern wildlife management. One of the agency's more visible examples of wildlife management is species reintroductions. The Commission successfully has reintroduced beavers, river otters, elk, bald eagles, fishers, ospreys and peregrine falcons. Other examples include managing endangered and threatened species; constructing and placing nest structures for bluebirds, peregrine falcons and wood ducks; gating caves to protect important bat colonies (See Figure(), performing field studies on wildlife; and conducting wildlife censuses and surveys. Recent field studies have centered on endangered Indiana bats and the prolific white-tailed deer. Some of the wildlife research being conducted by the Game Commission is garnering national attention in the field of wildlife management.²⁴

Pennsylvania Fish & Boat Commission

The Pennsylvania Fish Commission was established in 1866 due to declining shad runs. Known today as the Pennsylvania Fish & Boat Commission, this agency is responsible to ensure the protection, propagation, and distribution of game fish, fish bait, amphibians, reptiles, and aquatic organisms. A board of 10 commissioners, appointed by the Governor provide policy and board-level direction to the agency. As stewards of Pennsylvania's waters the Commission's mission is to: "provide fishing and boating opportunities through the protection and management of aquatic resources". Programs the agency promotes include; aquatic stewardship, sustaining Pennsylvania's nongame aquatic resources, migratory fish restoration, public education, and enhancing fishing and boating access. This agency is entirely funded by fishing license revenues, boater registration fees, an reimbursement of federal excise taxes on fishing equipment and motorboat fuels.

Pennsylvania Wildlife Federation

The Pennsylvania Wildlife Federation's mission is to educate Pennsylvania's citizens about environmental issues, and to conserve and protect our natural resources. The Pennsylvania Wildlife Federation works in collaboration with the PA Federation of Sportsman's Clubs, The National Wildlife Federation, and The Important Mammals Areas Project.

Important Mammals Areas Project

The Important Mammals Area Project (IMAP) is voluntary and grass roots. The main purpose is to designate areas in Pennsylvania that are critical for mammal conservation and to help educate people to learn more about mammals and their habitats. The project is coordinated by sportsman, biologists, organizations, professionals, and individuals. IMAP also closely partners with many federal and state organizations and universities.

Pennsylvania Important Bird Area (IBA) Program

Pennsylvania's Important Bird Area (IBA) Program is part of a dynamic worldwide effort to identify and protect outstanding habitats for birds and all wildlife. Pennsylvania was the first state to develop an IBA program in the United States. Based on strict scientific criteria a group of scientific advisors (known as the *Ornithological Technical Committee*) selected 73 IBA sites encompassing over one million acres of public and private lands. These areas include migratory staging areas, winter feeding and roost sites, and prime breeding areas for songbirds, wading birds and other species. They also include critical habitats, such as spruce-fir bogs, tidal saltmarsh, bottomland hardwood swamps, and open grasslands. Additional IBA sites in Pennsylvania will be selected by the technical committee on an ongoing basis.

Ducks Unlimited

Ducks Unlimited conserves, restores, and manages wetlands and associated habitats for North America's waterfowl. Every species of duck, goose, and swan in North America depends on wetland habitat throughout their

²⁴ Ibid

life cycle. Half of the U.S endangered and threatened animals are wetland dependant. These habitats also benefit other wildlife and people. Duck's Unlimited's Habitat Stewardship Program offers financial assistance for wetlands and riparian buffer restoration.

Trout Unlimited

There are 57 Trout Unlimited Chapters across the Commonwealth with one common goal, "the conservation and enhancement of Pennsylvania's cold water streams and fisheries and specifically our wild trout resources. These groups work to restore streams by habitat improvement projects, and conduct educational seminars on water quality and fisheries management. The local chapter in Centre County is **Wood Duck Trout Unlimited, #235.**

The Ruffed Grouse Society and Pheasants Forever

These two non-profit organizations participate in improving habitat and habitat programs that assist landowners in establishing healthy wildlife habitat for grouse, woodcock, pheasants, and other upland wildlife. Local chapters encourage and support habitat preservation and restoration projects.

County Initiatives

County Conservation Districts

Each County in Pennsylvania has a Conservation District Office. The District's mission statement is:

"The Centre County Conservation District (CCCD) is a committed, professional agency functioning as the primary local source of assistance to all individuals and organizations who benefit from the county's natural resources that we collectively strive to sustain and improve."

The Conservation District assists landowners with stream bank fencing and riparian buffer

projects. The goal of this program is to provide incentives for landowners to create forested buffers along their streams and to fence livestock out of streams and wetlands. Landowners are able to earn cost-share credits by installing wider than the minimum (15 ft) buffer. Landowners can use the cost-share credits to pay for other best management practices such as barnyard paving/curbs, roof gutters/down spouts, and diversions.

In March of 2002, Consultant A. D. Marble & Company Inc. completed a "Corridor O Habitat Assessment Technique (COHAT) for The Pennsylvania Department of Transportation, Engineering District 2-0 Clearfield, Pennsylvania. This draft report classified habitat types in that study area which included:

- Threatened and endangered species
- Ecological habitats protected
- Species-specific habitat features
- Interior forest
- Grassland
- Wildlife movement areas
- Early successional habitat
- Mature forest

Examples from the assessment technique include habitats for bat hibernacula and vernal pools that provide breeding habitat for certain species of amphibians, including woodland salamanders.²⁵

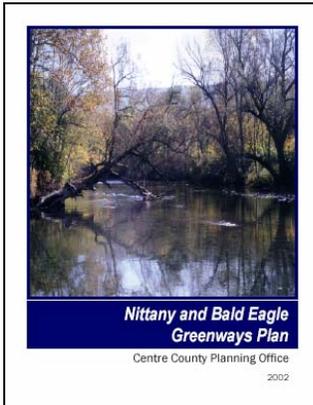
Each of these County Initiatives that are also mentioned in the Forest Resources Element of the Comprehensive Plan in one way or another work to benefit and help preserve the natural wildlife of Centre County and our resources

The Nittany and Bald Eagle Valleys Greenway Plan

The Nittany and Bald Eagle Valleys Greenway/Bikeway Plan which was recently completed for the Spring Creek Watershed Commission by the County Planning Office recognizes the importance of a network of

²⁵ Corridor O Habitat Assessment Technique, Centre and Clearfield Counties Pennsylvania, Pennsylvania Department of Transportation, Engineering District 2-0 Clearfield Pennsylvania, March 2002 Draft

open space managed specifically for conservation and/or recreation. Creating a green network of protected corridors can have a positive effect on water quality, air quality, habitat, biodiversity, ecological integrity, and provide environmental benefits.²⁶ Greenways serve to connect fragmented forested landscapes and promote the health of a natural system through connectivity.



Spring Creek Rivers Conservation Plan

ClearWater Conservancy has completed in two phases the Spring Creek Rivers Conservation Plan. Though this plan was intended for the fourteen municipalities of the Spring Creek Watershed its content is invaluable county-wide. The plan recommends protection of forested buffers for their role in water quality, removing contaminants, moderating stream temperatures, and enhancing wildlife. A continuous buffer could exist connecting streamside parks, including the Milesburg Community Park, Talleyrand Park, Spring Creek Park, and Millbrook Marsh into a riparian recreational network throughout the watershed.²⁷ The plan also recommends conserving forested slopes which are currently threatened by residential development and clear-cutting. Stewardship practices can help conserve the forested mountains for future generations.

Centre County Natural Heritage Inventory

The Centre County *Natural Heritage Inventory* is a list of identified sites in Centre County that

²⁶ Nittany and Bald Eagle Greenway Plan, Centre County Planning Office, January 2003

²⁷ Spring Creek Study: Phase II, A Rivers Conservation Plan, ClearWater Conservancy, 2000

are key to the maintenance of biological diversity and ecological integrity. The Inventory includes some of the County's significant natural communities. This information is to be used as a tool in planning for the protection of these resources.

The November 1991 report includes general recommendation for Natural Heritage Sites. In 2002, this Inventory was updated to include new and edited sites. In addition to preservation and complete protection of natural areas, recommendations specific to forested areas include:

- Maintaining the contiguity and connectivity of natural land
- Maintaining natural corridors between forest patches
- Recognition of forested ridgelines as significant migration routes for migrant bird species

Lumber Heritage Region of Pennsylvania

As Pennsylvania's 11th Heritage Region, the Lumber Heritage Region of Pennsylvania encompasses 15 counties including Centre County.

Lumber Heritage Region Mission Statement

The Lumber Heritage Region is an internationally recognized forest community with a sense of pride in our people, our quality of life, and the traditions of our rural heritage. Our sustainable forest is a destination that continues to provide unique opportunities for forest products manufacturing, education, research, and recreation. Linking forests, parks, historic resources, and communities allows residents and visitors to explore our vibrant culture and contribute to a vital economy.²⁸

The Lumber Heritage Region will focus its marketing, interpretive education, historical preservation, and economic development around the evolution of timbering - from the early days of timber rafting and railroad

²⁸ Lumber Heritage Region of Pennsylvania, Management Action Plan, Pre-Final CD-Rom Version, Executive Summary, May 2001

logging, to the recovery of the forests and modern-day forest management. Grant monies from the Heritage Parks Program, administered by the Department of Conservation and Natural Resources made available to the Lumber Heritage Region will enhance visitor's opportunities to experience Centre County's industrial history of railroads, mills, coal mines, canals, and scenic highways and wildlife watching .



Logo for Pennsylvania Lumber Heritage Region, Source: NorthCentral Regional Planning and Development Commission Website

"Pennsylvania's northcentral and northwest regions consist of the state's most densely forested counties, areas known for supplying the timber that helped our Commonwealth and the nation grow." "Among the amazing stands of hardwoods, one is reminded of a time when transient lumber camps followed the path of timber, rivers were jammed with floating logs, and Pennsylvania was the "Lumber Capital of the World."²⁹

Best Management Practices for Landowners

- Attract more wildlife through timber management
- Attract wildlife through backyard habitats
- Use conservation ethics on small acreage lots
- Develop forest management plans on private owned forest lands
- Practice wise watershed management
- Plant grasses to improve riparian buffers and habitat improvement
- Manage pastures and hayfields for wildlife

- Establish and maintain forested riparian buffers
- Plant trees and shrubs that benefit wildlife
- Landscape with native vegetation

Conclusion

In Pennsylvania, and as citizens of Centre County have an abundance of wildlife to enjoy for our generations to come. Sprawl, acid mine drainage, and species decline seem to be the most dangerous threats to our precious resource and with better management practices and coordination with the right individuals our children and their children will be able to enjoy them for generations to come.

²⁹ Quote from Lt. Governor Mark Schweiker, September 27, 2001

NATURAL RESOURCES GOAL

Identify, preserve, and monitor Centre County's environmental natural wildlife resources for the benefit of present and future generations.

OBJECTIVES-WILDLIFE

Promote the wise use and management of the County's wildlife.

Protect watershed features such as surface and underground water supplies, stream, floodplains, forested riparian areas, wetlands, fish and wildlife habitats, and aquifer recharge areas.

Promote and preserve the County's natural areas for hiking, bird watching, natural habitat, and wildlife watching and photography.

Encourage owners of private lands to work with the proper agencies to protect habitats containing threatened and endangered species.

Develop strategies that provide for growth while maintaining a balance with the County's natural resources: forest lands, ag lands, sensitive environmental areas steep slopes, floodplains, scenic views, natural areas, and all unique habitats.

Reduce air, water, land, noise, and visual pollution.

RECOMMENDATIONS

Protect unique and special habitats in Centre County from development pressures and degradation by guiding land development activities.

Encourage through incentives the protection, preservation, and management of wildlife resources for their economic, environmental, and aesthetic benefits.

Support protection and wise land use management of mountain ridges to protect sensitive features, i.e., groundwater recharge areas, wildlife habitats, and scenic vistas

Protect and encourage development of riparian buffers for improving water quality and preserving biological diversity

Coordinate with conservancies and land-trust organizations to encourage the purchase of conservation easements on lands that provide quality habitat.

Encourage and educate landowners to use "best management practices" on their private lands and adjacent lands for economic and environmental benefits

Limit land development activities in areas identified as containing endangered and threatened animal and plant species

APPENDICES

A-1

IMPORTANT BIRD AREAS



For information on the Pennsylvania Important Bird Areas Program, please contact:

Pennsylvania Audubon Society
1104 Fessenden Avenue, #900
Camp Hill, PA 17011
717-765-0965 voice
717-765-0961 fax
kmetzbun@audubon.org

For information on the National Audubon Society's National Important Bird Areas Program, please contact:

Fred Baumgarten
National Coordinator, Important Bird Areas
c/o Miller Wildlife Sanctuary
99 W. Cornwall Road
Shaw, CT 06089
860-364-0048 voice
860-364-1921 fax
fbaumgarten@audubon.org

This IBA map is for illustration purposes only. The Pennsylvania Audubon Society reserves the right to make changes to the Pa. IBA list.

1. Presque Isle SP
2. Redbank Wildlife Preserve - SGL 314
3. Pymatuning, Hartwood Complex
4. Casapago Bottoms
5. Hemlock Hill Research Area
6. Erie National Wildlife Refuge
7. Connaught Marsh - Greene Marsh
8. Barrow Heronry & Bruder Sanctuary
9. Shenango Reservoir
10. Perry, Black & Casey Swamps - SGL 284
11. The Glades - SGL 95
12. Malone SP & Jennings EBC
13. Raccoon Creek Valley & SP
14. Enlow Fork - SGL 302
15. Atakey Swamp - SGL 282
16. Tannock Swamp & Research NA
17. History Creek / Heers Content NA
18. OI Creek SP
19. Cook Forest SP

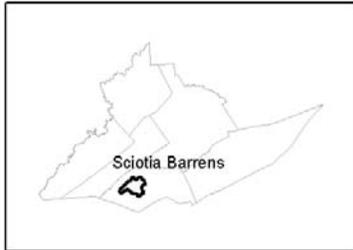
20. Celen Run Research Area
21. Mount Zion (Pine Tract)
22. Buffalo Creek Valley
23. Yellow Creek SP
24. Powellmill Narrows Reserve
25. Lake Somerset
26. Younghighly Valley, Ohioyle SP
27. Mouth Creek Wetlands - "The Muck"
28. Pine Creek Gorge Natural Area
29. Tannock Swamps
30. Southern Spruce SP
31. Quabanna Wetland Area
32. Ball Eagle Ridge
33. Back Mountain SP and SP
34. The Barrens at Scotia
35. Redrock SP & Stone Mt.
36. Tuscarora Ridge, The Pulit
37. The Hacci Natural Area
38. Tall Timbers, Snyder Middlesex Natural Area

39. Waggoner's Gap - Kittittiny Ridge
40. South Mountain, Caladonia, Michaels SP
41. Freedom Township Grasslands
42. Wyoming State Forest, World's End SP
43. St. Anthony's Wilderness - SGL 211
44. Second Mountain Corridor
45. Hershey Special Habitat
46. Shero's Island Archipelago
47. Collins SP
48. Dutch Mountain Wetlands Complex - SGL 57
49. Adaketa Glen SP, Creeling Lake Area
50. Susquehanna Forestlands
51. Frank Mountain Sanctuary, Kittittiny Ridge
52. Lake Orléans
53. Blue Marsh Lake
54. Middle Creek Wildlife Management Area
55. Creek Road Area
56. Conestoga Falls
57. Conestoga Reservoir, Muddy Run

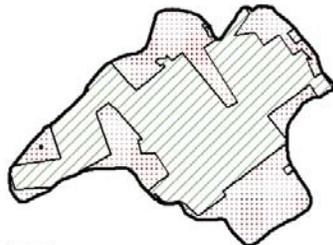
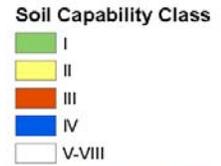
58. Octopus Reservoir
59. State Line Barrens
60. Upper Delaware Scenic River
61. Shoshone Waterford Management Area - SGL 180
62. Fronswood Land SP, Bruce Lake Natural Area
63. Pocomo Lake Preserve
64. Long Pond Preserve
65. Hildory Run State Park
66. Quakerstown Swamp - SGL 138
67. Pease Valley Park
68. Uppard Creek Valley
69. Green Lane Reservoir
70. Glen Morgan Lake
71. Great Marsh
72. Ridley Creek SP - Tyler Arboretum
73. John Heinz MWR at Tricum and Mud Island

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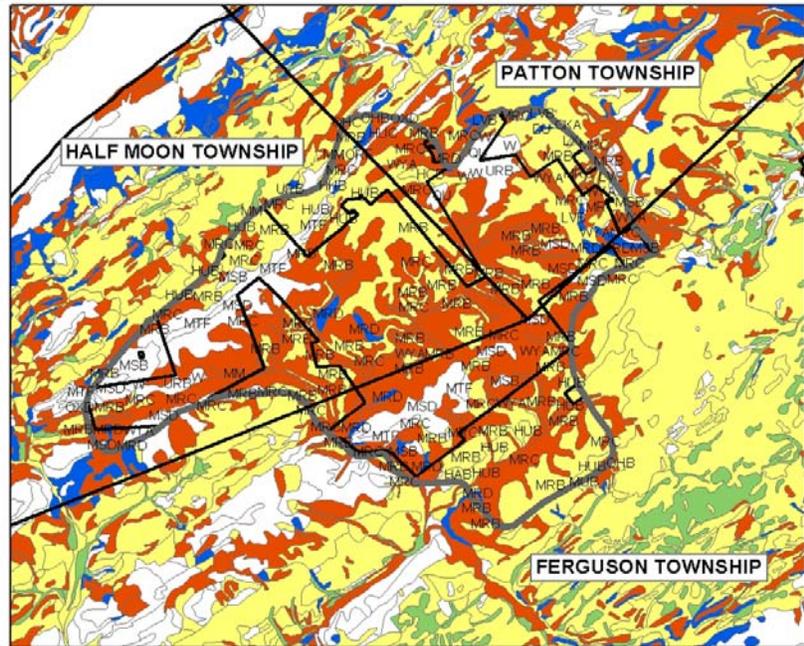
A-2



Scioto Barrens Biological Diversity Area
 A Regionally Rare Community Type That Hosts
 Many Species of State and Global Concern
 Ferguson, Half Moon, and Patton Townships
 Centre County, Pennsylvania

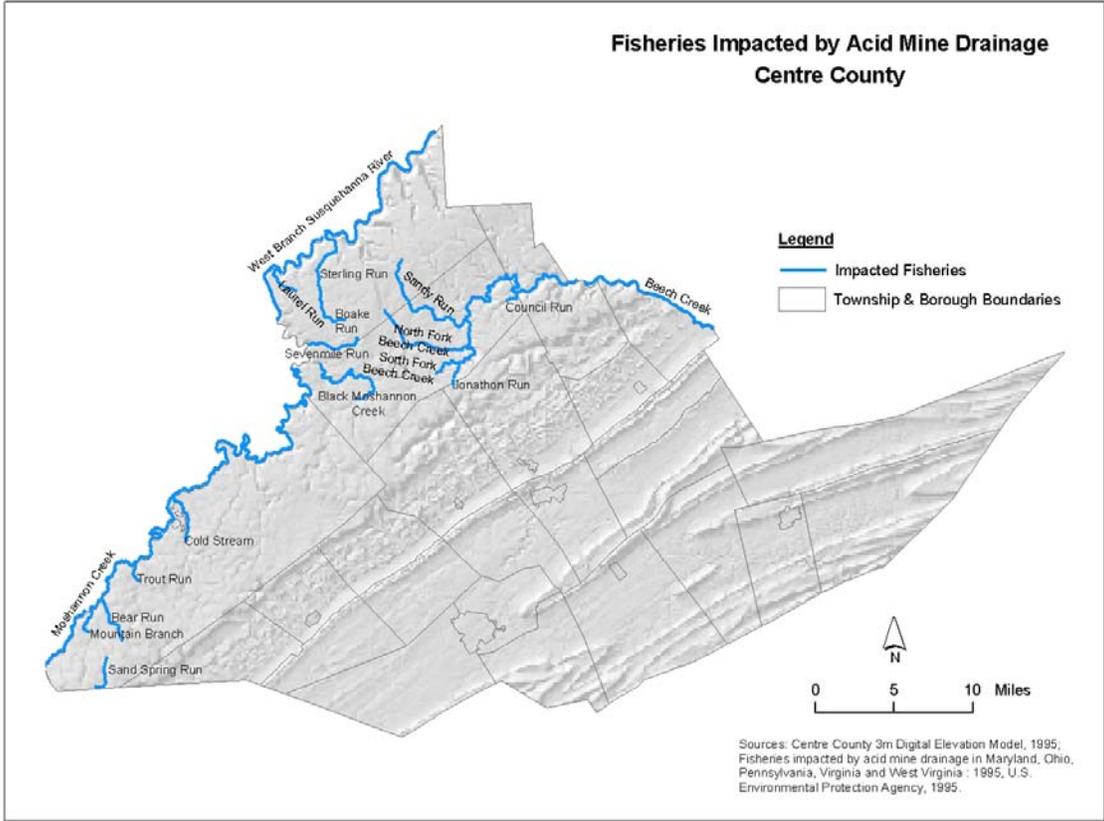


Public Lands (5,482 Acres)
 Private Lands (3,524 Acres)



A-3

**Fisheries Impacted by Acid Mine Drainage
Centre County**



A-4

Extinctions by State

