PART 2 –HABITAT NARRATIVES AND WAP-PRIORITY SPECIES

SECTION 11 - PENNSYLVANIA HABITAT OVERVIEW

Part 2 of the WAP, comprising Sections 11-22, summarizes the condition of broadly defined wildlife habitat types currently found in Pennsylvania. Although Part 2 is organized by broad habitat or land cover types, it is important to recognize that within broad habitat designations each species has specific and unique requirements. Losing any one component of a species' habitat can threaten its survival. Additionally, these essential habitat components must be accessible and arranged in appropriate configurations and proportions. Therefore, defining a species' true habitat requirements is a complicated process. Targeted habitat assessments that identify the specific attributes required by a species are necessary before landscape measurements or indices can be used to determine the relative habitat quality of a site for the target species.

Without a complete understanding of habitat requirements, long-term threats to a species can be overlooked. For example, when essential habitats are fragmented or separated by barriers to movement, a species may decline over time even though its immediate habitat is preserved. The woodland salamander that must traverse a busy highway to reach its breeding pond, or the young Allegheny woodrat that must navigate through ridgetop development to get from one rock outcrop to another have had their habitat degraded even if their primary habitats remain pristine.

11.1 STATEWIDE HABITAT ASSESSMENT – APPENDIX 2

A thorough assessment of Pennsylvania habitats, providing information on the condition and location of key habitats, has been developed and is included in Appendix 2 of this WAP. The Appendix 2 document resulted from an inter-agency effort to compile the most up-to-date information on the quantity and quality of various habitat types in Pennsylvania. Such information is vitally needed to develop management objectives and goals relative to various habitat types and the species occurring therein.

In 2002, Pennsylvania's Natural Resources Workgroup, comprised of Executive staff of the Game Commission, Fish and Boat Commission, and Department of Conservation and Natural Resources, began a discussion of the state's varied habitats. This discussion led to an Interagency Boards and Commissions meeting focusing on habitat inventory needs and issues. As a result, agency staff and commissioners were appointed to frame the issues. Once agency personnel identified the issues and concerns common to the natural resource agencies, a full assessment of habitats was identified as a top priority. A Memorandum of Understanding was drafted in which the natural resource agencies shared in the cost of

development and the work of reviewing the product. Outside authorities, from Pennsylvania State University and Hawk Mountain Sanctuary, were hired to gather information and write the manuscript, Wildlife Habitat in Pennsylvania: Past, Present, and Future.

Readers and resource managers are urged to read Appendix 2 in detail, as the information contained therein provides significant insight into the management and conservation of species of greatest conservation need and their key habitats. Repeating the information found in this excellent habitat document would be redundant. Rather, this section of the WAP presents summary information adapted from that habitat assessment, as well as useful information from a working paper titled "Voluntary Conservation Tools and Programs," which was produced and distributed by Defenders of Wildlife (Hummon and Cochran 2005).

11.2 PA HABITAT OVERVIEW (adapted from Appendix 2)

Wildlife habitats in Pennsylvania today are dominated by forest with 62 percent of the state's 28,991,096 acres in forest cover. Herbaceous openings cover 26 percent of Pennsylvania, and wetlands cover at least 2.5 percent of the state. Rivers or streams extend over 83,000 miles with riparian habitat occurring over an estimated 172,067 acres. The state contains 146,813 acres of lake or pond habitat, much of it used for recreation and only 643 acres of estuaries. Coniferous forest, an important wildlife habitat, is found in 8 percent of Pennsylvania forests with clusters in northern regions (Figure 11.1).

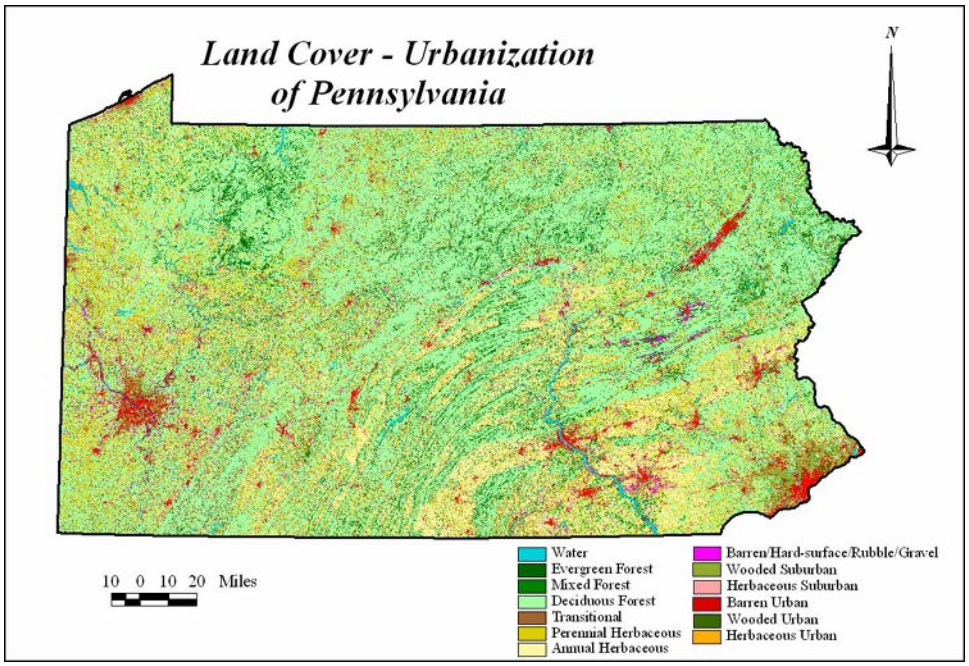

Figure 11.1. Pennsylvania Land Cover Map showing broad habitat types of Pennsylvania. (Myers and Bishop 1999). Map copied from Goodrich *et al.* 2002, page 56.

For each habitat type, Appendix 2 presents information on its present distribution and how it has changed historically, and provides an overview of characteristic species associated within this habitat type and how they have changed over time. The authors of Appendix 2 evaluate habitat quality based on data available on population trends and known information on survival and reproduction. Because there is more information on birds than other wildlife groups, they rely upon birds to illustrate patterns and trends associated with habitats. This emphasis is based on necessity, however patterns found in bird habitats are largely reflected in other biotic communities.

For detailed descriptions of the status of Pennsylvania's habitats, including their location and condition, key threats, associated species and population trends, as well as research and management needs, readers are referred to the sections of Appendix 2 referenced in Table 11.1. Information on specific habitat types associated with WAP-Priority species is presented in Sections 12-22 of this WAP. These sections include information on condition and location, conservation challenges and opportunities, and species- and habitat-specific conservation actions.

Table 11.1: Appendix 2 references for detailed information describing the location and condition of key habitats in Pennsylvania.

Habitat Type	WAP Section reference	Appendix 2 reference
Forests	Section 12, 13, 22	pp. 60-102
Farmlands, Grasslands, Thickets	Section 20, 21	pp. 128-142
Wetlands	Section 14	pp. 149-167
Streams and Rivers	Section 15	pp. 172-188
Rock Habitats	Section 16	pp. 192-194
Vernal Ponds	Section 17	pp. 198
Beaches	Section 18	pp. 197-198
Anthropogenic (Urban-Suburban)	Section 19	pp. 144-148

11.3 HABITAT LOSS – THE STATEWIDE THREAT TO FISH AND WILDLIFE

To maintain healthy, viable populations of native Pennsylvania wildlife, we need to maintain wildlife habitat, and vital habitat elements, in sufficient quality to meet the diverse needs of the state's wildlife species. Habitat is the key to animal abundance. *Habitat loss*, caused by development and sprawl, as well as direct and indirect *habitat degradation* are the primary causes of species declines in Pennsylvania and worldwide (Ehrlich and Ehrlich 1981, Ehrlich and Wilson 1991, Noss *et al.*1995).

The most serious type of habitat loss results from permanent, human-associated land use change. Habitat loss leads directly to the decline and loss of wildlife species. Worldwide, habitat loss has caused the extinction of 35 percent of all fish species lost, 20 percent of birds lost, and 19 percent of mammal extinctions (Reid and Miller 1989). Population viability analyses suggest that if the area of any habitat is reduced by 90 percent, at least 50 percent of the species present will be lost (Reid and Miller 1989). In the northeastern United States, 99 percent of grasslands and greater than 50 percent of pre-colonial wetlands have been lost – with serious implications for native wildlife.

Habitat loss in Pennsylvania today is due largely to the consumption of open space and wildlife habitats by sprawl development. Although the population of Pennsylvania has not increased substantially, the suburban and urban land being consumed continues to increase, with current open space loss occurring at a rate of more than 300 acres per day (NRCS).

Three hundred acres of terrestrial wildlife habitat is being lost every day, primarily to suburban sprawl (Goodrich *et al.* 2002). Some counties have seen an increase in housing units exceeding 20 percent in recent decades. Uncontrolled sprawl and the resulting habitat loss and degradation is now the number one threat to wildlife in the state. If the rate of loss of open space continues to increase as it did from 1992 to 1997, it is estimated that current acreage of wildlife habitat lost per day in Pennsylvania is now at 350 acres per day (Figure 11.2).

Sprawl and development primarily affect farmland and grassland habitats in Pennsylvania today. Grassland habitat has been drastically reduced in the last half-century with grassland species showing dramatic declines. In addition, residential development of forestland is a growing threat to wildlife in many areas. Once developed, terrestrial habitats can rarely be reclaimed or restored for wildlife.

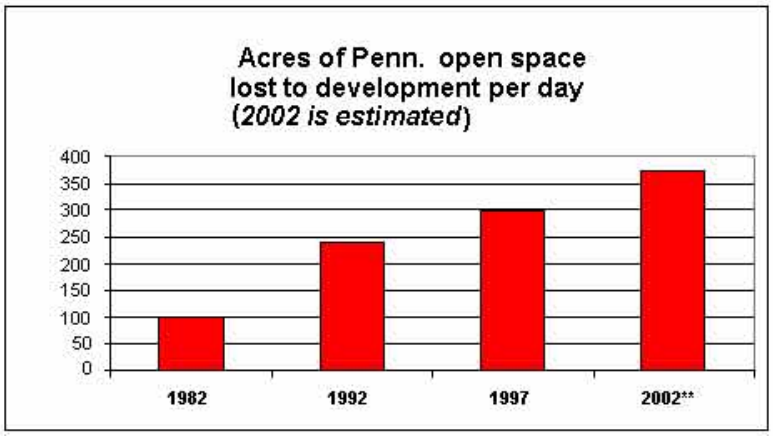

Figure 11.2. Acres of open space lost per day in Pennsylvania (estimated 2002 rate based on similar incremental increase: Appendix 2, page 202).

In addition to the loss of terrestrial habitats, half of the state's wetlands have been lost and much of what remains is severely degraded. Sprawl is shown to be a major contributor to wetland loss and degradation. Wetland habitats have been reduced by 90 percent in the southern counties. The range of some high-priority wetland-dependent wildlife species is restricted to this heavily impacted region, further endangering their survival. Wetland wildlife dominates the species of special concern list and remains the most imperiled wildlife group.

11.4 HABITAT DEGRADATION – AN ONGOING THREAT TO WILDLIFE

Perhaps as challenging as the direct habitat loss from sprawl is the indirect loss in quality of the remaining habitat due to sprawl. Serious threats to natural areas exist from road runoff, habitat fragmentation, invasive species pervading from edges, and the isolation of wildlife areas from each other by roads or development. Streams are degraded for miles by pollutants and sedimentation or runoff. The impact of sprawl on natural communities extends beyond the area of land developed. Key threatening processes affecting remaining wildlife habitat in Pennsylvania are summarized below:

Habitat Fragmentation

In addition to outright changes in habitat type, a process known as *fragmentation* can influence habitat quality (Morrison *et al.* 1992). Fragmentation affects wildlife when patches of undisturbed habitat are surrounded by human altered landscapes such as roads, cities or farms.

Numerous studies have shown that the landscape surrounding an isolated habitat patch can influence the quality of the patch by causing changes in temperature and moisture regimes within the patch or more commonly by influencing the abundance of competitors, predators,

and brood parasites within the patch (Morrison *et al.* 1992, Faaborg *et al.* 1995). Fragmented habitat is also particularly vulnerable to non-native invasive plants and animals, one of the more serious and widespread threats facing native species. Even linear aquatic habitats, such as streams and rivers, can be fragmented by the construction of dams and other barriers to movement.

Non-native species

A second significant threat to Pennsylvania habitats is the process of non-native invasive species establishing themselves in waterways and terrestrial habitats and out-competing native species. Alien species' competition with native species affects more than 50 percent of terrestrial species (Goodrich *et al.* 2002). More than one-third of all Pennsylvania plants are non-native, and 11 percent of all fish are exotics (Appendix 2). Introduced, invasive species threaten 19 percent of all endangered and rare species worldwide (Reid and Miller 1989). Non-native and invasive species threaten nearly all of the key habitats that WAP-Priority species rely upon. Invasion by aggressive species, both non-native and native, is affecting the regeneration and long-term habitat quality of forestlands, wetlands and grasslands across the Commonwealth.

The recent invasions of zebra mussels, hemlock wooly adelgid, gypsy moth, garlic mustard, stilt grass and numerous other species highlight the significant impact that non-native invasive species can have on Pennsylvania wildlife and habitats. New diseases and alien pests and other threats loom on the horizon. For waterways, the full impacts of some alien invasive species such as the rusty crayfish are not yet known, but the zebra mussel and others have shown the potential that exists for wide-ranging impacts on native habitats and species. As a result of the artificial nature of political boundaries, addressing invasive species threats will require greater attention to activities beyond the state's borders in the future. Early detection of invaders is key to preventing widespread outbreaks of most species.

Declining water quality

Because of ongoing success in controlling point source pollution discharges, the most significant pollution impacts on aquatic habitats comes from non-point source runoff. Whether originating from nutrient-rich runoff from agricultural lands or urban and suburban neighborhoods, sewage overflows from combination sewers in older communities or acid drainage from mine lands, non-point source pollution affects chemical composition and water quality. It also smothers the substrate in silt, reducing the quality of aquatic habitats and nursery areas for many species.

Stream quality is further threatened by ongoing point-source pollutants, sedimentation, acidic mine drainage, and a lack of adequate riparian buffers. PCBs (poly-chlorinated bi-phenyls) continue to impact fish and other aquatic species.

Declining water quantity
Because of its natural abundance, Pennsylvania has historically taken water supply for granted. However, as the state's population has grown and shifted, per capita water use has risen, causing increasing conflicts among water users (Seif and Glotfelty 1998). Water quantity may be an increasingly important issue for wetland and stream conservation as some species can survive only in cool, fast-flowing streams. Seasonal wetlands, such as venal pools, and other shallow wetlands are also highly susceptible to water quantity issues. Restoration of wetlands and protection of remaining wetlands and streams are especially critical given the severe decline this habitat type has endured. Of particular concern are the long-term impacts of groundwater withdrawals, which can be difficult to quantify and characterize.

Lack of forest regeneration
One of the most serious threats to Pennsylvania's forests is the lack of regeneration. When young trees are not being produced to replace older, or dead and dying, trees, the forest is fundamentally threatened. Factors that reduce forests' ability to regenerate include browsing by white-tailed deer, acid deposition, poor timber harvest practices, suppression of fire, non-native diseases and pests, and others. At high densities, white-tailed deer can have substantial impact; however, as deer densities decline many other factors can influence a forest's ability to regenerate.

Disturbance
Human-caused habitat disturbance occurs in a variety of ways and intensities from sporadic disturbance (humans entering a bat hibernaculum) to ongoing, but dispersed, disturbance (off-road vehicles entering habitat areas during the reproductive period), to ongoing large-scale impacts (early mowing of hayfields throughout the state during the nesting season). The impacts of habitat disturbance may vary based upon the frequency and intensity of the disturbance event(s). Many disturbance impacts are negligible. However, repeated disturbance of sensitive habitats, particularly during vulnerable periods, such as during nesting, migration, and hibernation, can have serious widespread impacts.

Indirect habitat degradation
Even habitats that are geographically remote from human development and sprawl may be jeopardized by lack of quality regeneration, increased roadway development and fragmentation effects, acid deposition and ozone damage, burgeoning non-native invasive species, and encroaching human impacts (such as wind turbine development).

11.5 THE EFFECT OF HABITAT LOSS AND DEGRADATION ON WILDLIFE

(adapted from Appendix 2, pages 38-41)
As quality habitats are lost or degraded, the cost is seen in declining wildlife numbers and variety. The status of Pennsylvania's wildlife reflects the degraded nature of much of the

Commonwealth's wildlife habitat. Presently, about 20 percent of the Commonwealth's wildlife species are listed on state species of special concern lists (Figure 11.3). Wetland species dominate the state list with 28 percent of all fishes listed as endangered or threatened. The most imperiled organisms on earth are the freshwater mussels (Wilcove *et al.*1998), with 34 percent of Pennsylvania's mussels endangered, threatened or extirpated. Fishes have been hard hit with 27 species considered extirpated and 18 endangered or threatened (Argent *et al.*1998). Only 60 of the 71 native mammal species still occur in the state, and another six species are listed as endangered or threatened (Wright 1998).

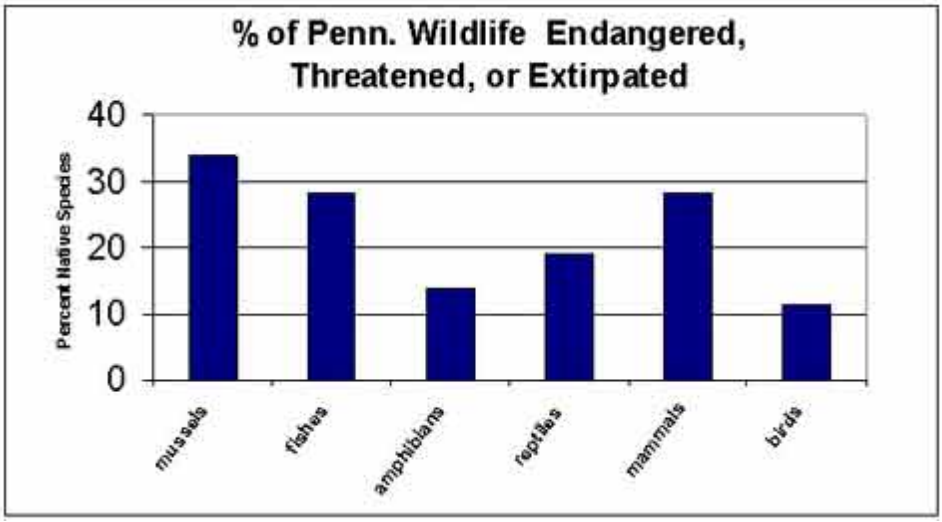

Figure 11.3. Status of Pennsylvania's wildlife: An indicator of habitat health. (Appendix 2, page 40).

Wildlife is still abundant in Pennsylvania because the current mosaics of habitats and relatively heavy forest cover have favored the recovery of many forest-associated species that thrive in second-growth forests or "generalist" species that occupy an interspersion of cover types. Second-growth forest associates such as eastern wild turkey, white-tailed deer and black bear are abundant, while habitat generalists, such as raccoons and opossums, may be occurring at some of the highest levels in history.

Species requiring "specialized" forest habitats are not doing as well; many species requiring large blocks of unfragmented forest, early successional forest, old growth forest, conifer or riparian forests are declining despite Pennsylvania's abundant forest cover. Less than 1 percent of old-growth forests remain. The amount of riparian forest that exists in Pennsylvania is unknown, but natural riparian communities comprise less than 2 percent of the land area across the country.

Species requiring open secure grassland habitats are also declining. In New England and parts of northern New York, Pennsylvania and West Virginia, early successional habitats and associated wildlife are either continuing to decline or are stabilized at all-time low levels. Based on Breeding Bird Survey data, grassland birds have declined more than any other suite of birds; northern bobwhite quail have declined by 95 percent, grasshopper sparrow (80 percent), eastern meadowlark (80 percent) and upland sandpiper (90 percent) over the past 30 years. If current trends continue, many grassland dependent species may be extirpated from the state within 10 years. Additionally, species requiring low-intensity agricultural habitats, such as mosaics of thickets and open land, are decreasing; e.g. woodcock have declined by 40 percent in the Northeast over the past 30 years, and bobwhite quail have nearly disappeared from Pennsylvania since 1966 (Kelly 2000, Sauer *et al.* 2001).

The presence of large tracts of older forests is declining throughout the Northeast, but nowhere is the decline more evident than in the Mid-Atlantic Region. These kinds of habitats are essential to the existence of an entire guild of forest interior dwelling birds, such as the scarlet tanager and wood thrush, both of which are declining in Pennsylvania. Wetland and riparian dependent species have shown significant declines primarily due to the impacts of agriculture and acid mine drainage on water quality. More than half of the species listed as endangered or threatened in Pennsylvania are associated with wetland or riparian systems.

Habitat fragmentation resulting from development and road construction, intensification of agricultural practices, water pollution, dams and introduction of exotic species have forced some native species to extinction, while others remain endangered in small isolated populations (Reif and Glotfelty 1998). Various programs and conservation partners, including Partners in Flight, PA Natural Heritage Program, The Nature Conservancy, and the Western Pennsylvania Conservancy, agree that the species most at risk in Pennsylvania are associated with wetlands, riparian areas, old field-shrub/grasslands, contiguous blocks of old growth forests and special habitats such as caves and vernal pools (Goodrich *et al.* 2002).

One problem that arises when considering the effect of habitat degradation on wildlife is a basic lack of knowledge. Resource managers do not yet fully understand specific habitat requirements for many declining species. Even Pennsylvania birds, a well-studied taxon, include state-listed species whose distribution and trends are barely known, such as the long-eared owl, least bittern, and sedge wren.

In addition to a basic lack of information, monitoring protocols have not been developed for many species of concern. Extensive monitoring programs exist only for birds and selected other species. New integrated and comprehensive inventory and monitoring initiatives are gravely needed. Such efforts will require extensive coordination among natural resource agencies and conservation stakeholders across the Commonwealth.

The lack of in-depth research knowledge, inventory and monitoring data, and the lack of coordination among monitoring programs and data sources inhibits the recovery of declining

species. One fortunate outcome of the federal WAP requirement is the compilation of Species Assessments for WAP-Priority species (Appendix 3). During the development of the WAP, technical experts summarized detailed species information for nearly 200 species of conservation concern. While this information needs to be translated into research, management, conservation, and recovery strategies that can be applied across the Commonwealth, this WAP document represents the first step in that process. Meaningful implementation of such activities, however, will be an ongoing process dependent upon adequate funds and personnel.

11.6 HABITAT CONSERVATION: CHALLENGES AND OPPORTUNITIES

(excerpted from Appendix 2)

Loss of wetlands, regeneration of forests, habitat fragmentation and ever-declining water quality seem like formidable challenges to overcome. Yet, habitat loss will continue and the challenges will only increase if Pennsylvanians do not act now. Hunting, fishing, bird-watching, and other forms of outdoor recreation are part of Pennsylvania's heritage and attract billions of dollars to local communities. Public support for wildlife conservation and wildlife-based recreation continues to grow. Yet, without change, in 20 years we may see hunting and fishing opportunities increasingly restricted as sprawl continues to claim farmland and forested areas.

Charting the path from here may seem daunting. Yet, the habitat conservation programs within the state are working; habitat is being conserved and habitat is being improved every year. Pennsylvania enjoys a "conservation head start" with a large base of protected lands and an active and engaged public. There is an estimated 13.5 percent of Pennsylvania in conservation status, mostly in the state's north-central regions. Public support and interest in wildlife and wildlife pursuits is widespread. Over 90 percent of the public values open space.

Public agencies manage about 4.6 million acres and spend an estimated $119 million dollars for habitat management or acquisition. Land trusts are estimated to conserve between 10,000 and 20,000 additional acres each year, over and above land donated to public agencies. Land conservation is occurring daily in Pennsylvania in both public and private initiatives.

The more we learn about wildlife communities, the more we realize that every "cog and wheel" is important to the function and health of the habitats. To keep healthy wild trout populations, we must conserve the aquatic invertebrates they feed on. To keep the invertebrate community viable, we must maintain riparian forest along streams and reduce runoff from roads and acidic mine drainage. To maintain rails and waterfowl in abundance, we need to conserve undisturbed wetland and pond habitats for nesting. The wild turkey and black bear flourish where mast-producing trees and cover are abundant, amid large forests that also provide habitat for songbirds, squirrels, and bobcat. The web of relationships among

species in each habitat type is complex, and still not well-understood. Keeping all the parts makes good sense.

Currently, the Commonwealth is conserving open space and farmland through state programs at a rate of about 151 acres per day. If we add the land conserved through private sources, we estimate roughly half of the Pennsylvania acres conserved by private land trusts are conserved with non-state funding at a rate of 15 acres a day. Thus, the total acres conserved per day by private and public sources is estimated to be about 170 acres a day.

However, at a pace of 300 acres of natural lands lost each day (in 1997), we are not keeping pace. The Commonwealth is losing open space at twice the rate it is being conserved (Figure 11.4). Acre by acre we are losing the battle. In addition, habitat improvement programs must be well-coordinated to ensure all habitats are being addressed.

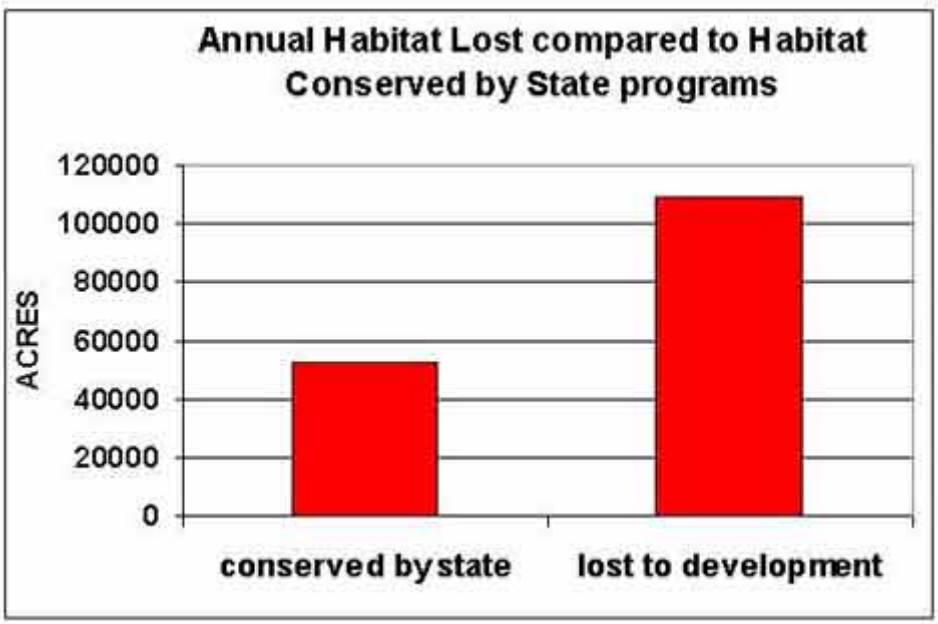

Figure 11.4. Acres conserved by public agencies compared to acres lost annually in Pennsylvania. (acres conserved based on year 2000, average acres conserved has often been much lower). (Appendix 2, page 220).

Although habitat is conserved annually under state and private programs and public-private partnerships, Pennsylvania is still recording a net loss of 35,000 acres of wildlife habitat annually. This total does not include the additional acres degraded through the increase in sprawl and resulting habitat fragmentation. Without any change in our approach, further wildlife loss is certain. We can expect less opportunity for hunting, fishing, and wildlife-watching, and further declines in wildlife.

Key adjustments are needed to stem the losses and reverse the trend such that **more** acres of wildlife habitat are conserved or restored daily than are lost. New programs and incentives may be needed, particularly to address regional habitat conservation planning. Recent passage of a conservation funding referendum at the state level provides some hope, though there is still much to be done. Because a large proportion of state wildlife habitat occurs on private lands, programs or incentives for private landowners to restore or conserve wildlife habitat are vitally important.

11.7 THE IMPORTANCE OF PRIVATE LANDS IN WILDLIFE CONSERVATION

Pennsylvania comprises more than 28,000,000 acres of land, with in excess of 85 percent in private ownership. About 8 million acres are in farmland, with nearly 5 million acres in cropland and more than 2 million acres in pasture. About 16 million acres are forested, the majority of which is in private ownership, with more than 500,000 landowners controlling 70 percent of Pennsylvania's forestlands (12.4 million acres). About 1 million Pennsylvania acres are represented by wetlands and streams. Developed land currently is 3 million acres and growing. The current population exceeds 12,000,000 people.

The management of private lands in Pennsylvania has a profound impact on the economy and quality of life for all of citizens. Agriculture and the forest products industry are big business in Pennsylvania. Nearly 50,000 farms averaging 160 acres generate more than $4 billion dollars in agricultural product sales annually. Pennsylvania is the nation's leader in hardwood timber production.

Ultimately, private land-use decisions have more influence on wildlife populations than any other activity in the state. Most fish and wildlife species use habitats on private land, and some species are dependent on habitats found only on private land. The private landowners in Pennsylvania hold the future of our wildlife resources, and, indeed, our economic potential in their hands.

Non-regulatory or voluntary conservation tools for privately-owned land and landowner outreach efforts need to be major objectives of wildlife conservation activities. Creation of such programs has been a significant priority of the PGC and PFBC Diversity programs since the creation of the State Wildlife Grants Program.

Private Landowner Assistance Program

In recognition of the importance of private lands to wildlife conservation, the Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission applied for and received federal Landowner Incentive Program (LIP) and SWG funding for landowner outreach and voluntary conservation easements. With LIP Tier 1 funding, the PGC has created the Private Landowner Assistance Program (PLAP). Under this program, a network of Regional Wildlife

Diversity Biologists (RWDB) work with private landowners to secure conservation practices on thousands of acres targeting species of concern. Prior to the establishment of the program, the PGC provided limited private land habitat assistance programs for species of concern. The development of PLAP and the RWDB network is an important outcome of the WAP development process and will help the PGC meet many of the WAP strategic and operational objectives.

The continuation of the Private Landowner Assistance Program is critical to stem the tide of declining species in Pennsylvania. Since the program's creation a little more than a year ago, RDWB's have consulted with private landowners owning more than 25,000 acres. Site-specific management plans focused on forest, wetland, riparian, and grassland habitats have been written for many of these priority properties. The RWDBs also have delivered numerous public presentations related to species of concern management and have assisted in ongoing PGC field projects relating to WAP-priority species: ospreys, northern flying squirrels, bats, Allegheny woodrats, bog turtles, and freshwater mussels.

Management of public lands also will benefit from PLAP as site evaluation tools and best management practices for species/habitats of concern are developed for this program. Conservation partners also benefit as RWDBs provide technical assistance to organizations such as conservancies, other government agencies, and watershed groups interested in managing their lands for species of concern. With further development of PLAP, there is great potential to enhance management of species of concern, thereby limiting the likelihood of these species being listed as endangered and threatened.

Landowner Incentive Program

Funding from the federal Landowner Incentive Program Tier 2 is being used by the PFBC to partner with land trusts and private entities to secure long-term conservation easements on private lands to protect and enhance important habitats for at-risk species. The program's purpose is to support on-the-ground projects that enhance, protect, or restore habitats that benefit at-risk species on private lands. The PFBC provides technical assistance to interested landowners, and evaluates and ranks proposals. High-priority projects benefit multiple at-risk species, have permanent benefits, and involve multiple project partners (Table 11.2).

11.8 TOOLS FOR CONSERVING AND IMPROVING HABITAT ON PRIVATE LANDS (adapted in part from Hummon and Cochran 2005)

Voluntary tools are critically important for encouraging landowners to make meaningful contributions to species and habitat conservation that also benefit landowners. Most landowners prefer to collaborate in voluntary conservation efforts, rather than have additional regulations or programs imposed. For many landowners, financial and practical assistance provides the needed incentive to undertake conservation activities. In return for receiving publicly-funded financial incentives or other benefits, landowners conserve publicly-valued

habitats and species on their property. In addition, these proactive conservation efforts can help avoid the need for future listings under the Endangered Species Act and help meet other conservation goals.

There are many types of voluntary conservation tools available to assist with species and habitat conservation on private and public lands. Several tools are available only on private land (e.g., income and property tax benefits, acquisition of land as fee title or conservation easement, and market-based approaches). Additional tools are available on private and public lands (e.g., regulatory assurances, regulatory and administrative streamlining, cost-sharing or grants, land exchanges, technical assistance, information and training, and landowner recognition). Most of these efforts involve cooperative partnerships between public agencies, private landowners or landowner groups, conservation groups, community groups, and/or land trusts.

For more information on the various types of voluntary conservation tools available to private landowners, as well as the basic requirement for successful private lands programs, the reader is referred to "Voluntary Conservation Tools and Programs," a working paper produced and distributed by Defenders of Wildlife. Specific state and federal initiatives with potential to improve wildlife habitat are presented in Table 11.3.

Wildlife conservation for the future may depend on cooperation of willing private landowners and public agencies. Pennsylvania has several state and federal programs in place that improve habitat for wildlife and augment efforts on public lands. Although these programs are not meeting the entire need (e.g., we are still losing 35,000 acres a year), they offer a range of opportunities to pursue wildlife habitat conservation. With extra emphasis, funding and coordination, so that specific priorities for wildlife could be targeted, such programs could be important tools in addressing the current crisis in wildlife habitat loss (Appendix 11.1). Continued support, refinement, and coordination among such programs is a long-term WAP priority.

11.9 STATEWIDE GOALS AND OBJECTIVES – HABITAT CONSERVATION

It is human nature not to realize the true value of something until it is gone. To reverse the current net habitat loss, we need to more than double the annual amount of wildlife habitat conserved within existing programs. Citizens, public agencies, municipal authorities, non-profits and industries must join together to conserve open space and wildlife habitat and to begin recovery of degraded waterways and landscapes. Water quality and riparian habitats need to be improved and restored to spur recovery. Deer populations must be managed to ensure forest regeneration or recovery. And, to address a serious lack of information, new monitoring programs and a new emphasis on coordinated inventory and monitoring statewide for all wildlife -- from mammals to mussels -- are critically needed.

Changing the course -- reversing the increasing loss of wildlife habitats, ensuring that the next generation of Pennsylvanians have abundant wildlife, and the opportunity to hunt, fish, or watch wildlife – is still within our grasp. The critical next step is before us.

As described in Section IX of this document, conservation partners from across the Commonwealth identified five broad goals for the WAP. Agency staff then developed a hierarchy of strategic and operational objectives to support the broad conservation goals. Many of these goals and objectives have relevance to the conservation and management of Pennsylvania's habitats. The goals and objectives *most* relevant to statewide habitat conservation efforts are listed in this section. Progress toward each operational objective is summarized below, and SWG-funded projects that target habitat conservation needs are presented in Table 11.2.

GOAL 1: IMPROVE THE SCIENTIFIC BASIS FOR MAKING CONSERVATION DECISIONS FOR WILDLIFE, WITH SPECIAL EMPHASIS ON SPECIES OF GREATEST CONSERVATION NEED

Strategic Objective 1.2: Support (in the form of SWG funding and/or staffing, as appropriate) research projects that will provide information needed for improved conservation decision-making.

Operational Objectives:

1.2.1: Prioritize research/information needs by developing an objective prioritization process and applying the process to a comprehensive list of research needs.
Progress: This is an ongoing function of the WAP. The Mammal Technical Committee of the PABS is in the process of identifying statewide research needs and will provide those to the PGC Bureau of Wildlife Management. Other Technical Committees may follow that example.

1.2.2: Identify habitats that are critical to the conservation and recovery of species of greatest conservation concern.
Progress: As an outcome of the WAP process, the PGC and PFBC will place enhanced emphasis on "responsibility" habitats; those habitats for which Pennsylvania plays an important regional, national, and/or global role in their occurrence and conservation. Responsibility habitats that also are imperiled in Pennsylvania will be considered the highest priority of the SWG program. In addition, "special" habitats that are generally small-patch, isolated sites supporting species of conservation concern, including rocky habitats, sandy beaches and vernal pools, will be priority habitats for SWG attention. Appendix 3 identifies critical habitats for species of greatest conservation concern.

1.2.3. Define and identify core habitats, connecting habitats, fragmentation effects, and "sink" habitats.
Progress: Efforts to develop a standardized habitat classification and mapping system will continue to be a priority of the SWG program. Specific information on habitat effects at a population level will continue to be identified as priority species are addressed through the SWG program.

1.2.4: Assess the status of habitats that are critical to the conservation and recovery of species of greatest conservation concern.
Progress: Efforts to develop a standardized habitat classification and mapping system will continue to be a priority of the SWG program. Basic information on habitat condition is presented in Appendix 3 of the WAP.

1.2.5: Identify key threats affecting species of conservation concern and their critical habitats.
Progress: This information is compiled in Appendix 3: WAP Species Accounts.

1.2.6: Increase our understanding of the effects of resource extraction, habitat management practices, and other human-induced habitat affects on target and non-target species.
Progress: PGC has initiated a study, supported with SWG funding, to investigate the effects of wind generation development on bats and birds.

1.2.7: Increase our understanding of the effects of conservation practices on target and non-target species.
Progress:

1.2.8: Understand the effects of multi-dimensional threats that are currently not well understood (e.g. encroachment, fragmentation, exotic species, etc.)
Progress:

1.2.9: Use adaptive management strategies to refine cause and effect relationships vis a vis habitat use, key threats, and conservation activities.
Progress:

1.2.10: Ground-truth predictive modeling/inventory tools.
Progress: Efforts to develop a standardized habitat classification and mapping system will continue to be a priority of the SWG program.

Strategic Objective 1.3: Support information management efforts that distribute new research findings and avoid redundancies.

Operational Objectives:
1.3.1: Assess the need for, and the feasibility of, developing a centralized electronic database/bibliography of past wildlife research conducted in the Commonwealth (Example: the annotated bibliography: Forestry, Wildlife, and Habitat in the East 1986-1990).
Progress: This objective is not considered feasible at this time. The need for such a product will continue to be investigated.

1.3.2. In cooperation with conservation stakeholders across the Commonwealth, develop/adopt a standard classification system for ecosystems, communities and critical habitats.
Progress: This priority need is being discussed in consultation with the Pennsylvania Habitat Alliance, a group of conservation stakeholders with special interest in habitat, as well as other agency and NGO partners.

1.3.3: Develop a standardized information platform for reporting location information, habitat use, and other results of SWG-funded research.
Progress: The PGC Diversity Section is encouraging the Mammal Technical Committee to consider assembling this type of information, as well as routine collection and trapping results, into a standardized Access database. The MTC has requested additional information/clarification from the PGC and is considering the proposal. Other Technical Committees may follow this example.

1.3.4: Develop and maintain an electronic habitat/species information system to assure the continuous recording, analysis, storage, retrieval and reporting system for all species.
Progress: An Access data form has been developed by the Wildlife Diversity section inputting SWG-funded location information, but so far this is not a mandatory requirement for SWG-funded projects.

1.3.5: Assess data needs on a continuous basis.
Progress: This is an ongoing function of the WAP. Priority data needs/research efforts are identified as SWG priorities when the PGC/PFBC announce the annual availability of SWG funds for competitive proposals.

GOAL 2: PLAN, PRIORITIZE, AND IMPLEMENT ACTIONS THAT WILL CONSERVE PENNSYLVANIA'S DIVERSITY OF WILDLIFE AND ITS HABITATS

Strategic Objective 2.1: Program Planning
Maintain an active planning and evaluation process to keep the Pennsylvania *Wildlife Action Plan* current and effective.

Operational Objectives:
2.1.1. Review, revise, and distribute Pennsylvania's *Wildlife Action Plan*, with agency and public input, at intervals of not more than 10 years.
Progress: This will be ongoing process of the WAP, contingent upon continued federal funding of the SWG program.

2.1.2. Develop an operational schedule and begin Strategy implementation within five years of initial Strategy approval.
Progress: Many WAP objectives are already being incorporated into agency annual work objectives as well as SWG project selection and funding. Continued federal funding of the SWG program should enable continued implementation of WAP objectives.

2.1.3. Develop a system of coordination and cooperation with state, federal and local governments and conservation stakeholders in program planning and implementation.
Progress: This will be an ongoing effort under the WAP. The PGC Diversity Section is currently in communication with the National Park Service to coordinate monitoring efforts and data handling, as well as the Allegheny National Forest and other NGO stakeholders on the identification and prioritization of WAP-Priority species.

2.1.4. Re-assess public needs, values and expectations on a regular basis.
Progress: Public input will continue to be a priority of the WAP.

2.1.5. Monitor implementation of the Operational Plan and assess progress on a semi-annual basis.
Progress: The WAP will be reviewed and updated at an interval not to exceed 10 years.

2.1.6. Establish long-term (100-year) goals and benchmarks for priority habitats and species.
Progress:

Strategic Objective 2.2: Habitat Inventory and Monitoring
Identify, inventory, and monitor habitats critical to maintaining Pennsylvania's wildlife diversity.

Operational Objectives:

2.2.1. Develop a standardized community/habitat classification system that works at both vertebrate and invertebrate scales.
Progress: This priority need is being discussed in consultation with the Pennsylvania Habitat Alliance, a group of conservation stakeholders with special interest in habitat, as well as other agency and NGO partners.

2.2.2. Determine quantity, distribution and condition of major habitat elements on a statewide and ecoregional basis.
Progress: Efforts to develop a standardized habitat classification and mapping system will continue to be a priority of the SWG program. Basic information on habitat condition is presented in Appendix 3 of the WAP. An ecoregional/physiographic area approach will be the focus of Phase 2 of the WAP.

2.2.3. Identify priority habitats of concern and their ecological relationships to native species.
Progress: A preliminary attempt to identify priority habitats of concern and their ecological relationships to native species is presented in Sections 12-22 of the WAP. While this represents a preliminary effort, it should be recognized that establishing habitat priorities requires significant additional stakeholder involvement. For SWG '05, the PGC Diversity Section has identified barrens habitats as priority habitats for developing management guidance.

2.2.4. Monitor changes and trends in priority habitats on a basin, ecoregional and statewide basis.
Progress: Efforts to develop a standardized habitat classification and mapping system will continue to be a priority of the SWG program. Habitat monitoring priorities are presented in this Section under Prioritized Conservation Actions.

2.2.5. Develop and maintain an electronic habitat/species information system available to staff, cooperators, and the public.
Progress:

2.2.6. Develop a comprehensive conservation planning tool: a mapped, GIS-based approach to classifying and mapping habitats (such as GAP, TNC Ecoregional Plans, BioMap)
Progress: It is recognized that this objective will require significant planning, funding, and cooperation among the diversity of conservation stakeholders in the Commonwealth.

Strategic Objective 2.3: Habitat Conservation and Management
Identify and implement habitat conservation and management actions needed to maintain Pennsylvania's wildlife diversity.

Operational Objectives:
2.3.1. Identify habitat conservation, restoration and management needs and opportunities for priority habitats and species.
Progress: The information available to date on habitat conservation, restoration and management needs and opportunities for priority habitats and species is presented in Appendix 3 of the WAP. Refining this information will be an ongoing objective of the WAP.

2.3.2. Take actions to conserve, restore, enhance or acquire important habitat areas.
Progress: The Wildlife Diversity Section of the PGC has identified barrens and rock habitats as priority habitats for the development of multi-species/habitat management guidance in order to conserve and restore these priority areas. In addition, SWG funds have been used by the PGC to acquire a high-priority grassland site.

2.3.3. Promote land-use patterns and intensities, and management practices that conserve, restore and enhance habitats needed to maintain wildlife diversity.
Progress: The Wildlife Diversity Section of the PGC has identified barrens and rock habitats as priority habitats for the development of multi-species/habitat management guidance to conserve and restore these priority areas.

2.3.4. Evaluate effectiveness of conservation, restoration and enhancement programs, and modify those programs as needed using adaptive management principles.
Progress:

GOAL 3: DEVELOP A KNOWLEDGEABLE CITIZENRY THAT SUPPORTS AND PARTICIPATES IN WILDLIFE CONSERVATION

Strategic Objective 3.5: Ensure that private landowners are engaged in the conservation of PA's wildlife and habitats.

Operational Objectives:

3.5.1. Provide technical information and support to landowners, land managers and local governmental agencies regarding habitat protection, restoration, and enhancement.

Progress:

- In recognition of the important role private lands play in the conservation of WAP-priority species, the PGC has developed a Private Landowners Assistance Program, in which biologists across the Commonwealth provide technical assistance to property owners targeting species of special concern.
- A web-based registry, representing a statewide inventory and mapping effort of seasonal pools in Pennsylvania, was selected as a SWG'04 project. This effort will work to develop a method of outreach to stimulate and facilitate public involvement so that trained volunteers and informed publics can provide data on seasonal pool occurrences across the Commonwealth.

3.5.2. Develop incentives and recognition programs to assist in the conservation, restoration and enhancement of habitats on private lands.

Progress: The SWG-funded Important Bird Areas and Important Mammal Areas Program include privately-owned lands. Project cooperators (PA Audubon and PA Wildlife Federation, respectively) are developing outreach efforts for landowners as part of these programs.

11.10 STATEWIDE PRIORITY CONSERVATION ACTIONS – WAP-PRIORITY HABITATS

Level 1 – highest priority over the next 1-5 years

- **Identify High-Quality Habitats**

Desired Outcome: Use GIS in conjunction with field studies to produce a standardized, more fine-scale definition of Pennsylvania's habitats, identify regional habitat differences, map exemplary habitats, and assess temporal changes in habitat availability.
Progress:

- This is a PGC SWG Program '05 Priority. A project to develop models for hemlock forest and mixed coniferous forest distribution and Gap analysis models for a WAP-Priority conifer forest obligate species (northern flying squirrel) was selected as a SWG'04 project.
- A web-based registry, representing a statewide inventory and mapping effort of seasonal pools in Pennsylvania, was selected as a SWG'04 project.
- The PFBC announced the development of an Important Herptile Areas (IHA) List (that identifies biologically significant sites for reptile and amphibian diversity) as a SWG Program '05 Priority. No proposals were received.

- **Support the Protection of Exemplary Sites**

Desired Outcome: Long-term protection of key habitat sites for Immediate Concern and High-Level Concern species or suites of WAP-Priority species, as feasible and appropriate. For high-priority/exemplary habitat sites, review and incorporate the acquisition and protection targets, goals and objectives of partner planning efforts, as feasible (e.g., TNC Ecoregional Planning, IBA, IMA, IHA, ACJV Waterfowl Management Focal Areas, etc) into ongoing WAP revisions and implementation and seek adequate funding to meet management objectives. Pursue permanent easements on priority wetlands, old-growth forests, and grasslands using LIP Tier 2 funding and other state and federal funding mechanisms. Make use of Coastal Zone Management funding and other relevant funding mechanisms for protecting/managing priority aquatic sites. Support the reauthorization and expansion of USDA Farm Bill conservation programs.
Progress:

- See Table 11.2 Key/Exemplary Sites for information on SWG/LIP-funded progress in protecting high-priority sites.

- **Develop Multi-species Management Guidance**

Desired Outcome: Provide guidance that would assist conservation partners, public land managers, and private landowners in selecting land-use and management activities to benefit species of great concern within a specific habitat type.
Progress: This is a PGC SWG Program '05 Priority. Developing Multi-Species Management Guidelines for Priority Barrens Habitats in Pennsylvania has been selected as a SWG'05 competitive project. Rock habitats have been selected tentatively as the priority habitat for SWG '06 multi-species management guidance proposals.

- **Targeted Attention on Unique/Isolated Habitat Types**

Desired Outcome: To minimize loss and degradation of unique/isolated habitat types in Pennsylvania and to improve habitat quality through habitat restoration where possible. Components of such an effort would include: identifying and mapping WAP-Priority habitat sites; conducting research into species-habitat associations, particularly WAP-Priority species, represented within unique/isolated habitat types; developing best management practices/multi-species management guidance for unique/isolated habitat types and associated species; developing monitoring protocols for priority habitats, and; working cooperatively with conservation partners and local officials to acquire, restore, manage and/or protect priority sites.

Progress: Barrens and rock habitats have been tentatively identified to receive focused SWG attention during FY '05-06.

Level 2 – priority over the next 5-10 years

- **Support Habitat Restoration Efforts for Immediate/High Level Concern Species**

Desired Outcome: Identification, restoration, and/or enhancement of key habitat sites for Immediate Concern and High Level Concern species, where feasible and appropriate. For high-priority/exemplary habitat sites, review and incorporate the goals and management recommendations of partner planning efforts, as feasible, (e.g., TNC Ecoregional Planning, IBA, IMA, IHA, ACJV Waterfowl Management Focal Areas, etc) into ongoing WAP revisions and implementation.

Progress:

- Habitat restoration for bog turtles and Massasauga rattlesnakes was posted as a PFBC SWG Program '05 Priority. Competitive proposals were not received.
- Coordination with partner organizations is recognized as an important and ongoing effort and will be emphasized in Phase 2 of the WAP.

Table 11.2 SWG-funded progress in habitat research, protection, and management.

TERRESTRIAL HABITATS	SWG-FUNDED PROGRESS
Forests and Woodlands Deciduous Mixed Conifer Riparian/Floodplain	• Identification of Critical Migratory Stopover Sites for birds – SWG'02 • Multi-Species Habitat Profiles of Four Major Terrestrial Forest Types in PA – SWG'05 • Eastern Hemlock and Mixed Coniferous Forested Ecosystems: Distribution and Use – SWG'04
Human-Associated Habitats Farmlands/Grassland Habitats Urban/Suburban Habitats	
Open Habitats/Barrens	• Multi-Species Management Guidance for Barrens – SWG '05
AQUATIC HABITATS **Wetlands** **Lakes/Ponds**** Emergent Wetlands/Marsh Shrub-scrub Swamps Forested Wetlands and Bogs	• Bog Turtle Use of Late-Successional Wetlands – SWG'03
Rivers and Streams**	• Fish Biodiversity of Selected Tributaries of the Mon – SWG'02 • Freshwater Mussel and Fish Assemblage Habitat Use and Spatial Distributions in the French Creek Watershed – SWG '02 • Freshwater Mussel (Bivalvia: Unionidae) Spatial Distributions and Habitat Use in the Navigational Pools of the Allegheny River; A Comparative Study of Two Protocols – SWG '04 • Fish Fauna Database Development for Riverine Environments of Western Pennsylvania – SWG '04

SPECIAL HABITATS **Rock Habitats** (Caves, Rock outcrops, Mines, Talus slopes)	• Cave Gating – SWG '02, '05
Beaches	
Seasonal Wetlands	• Statewide Inventory/Registry of Seasonal Wetlands – SWG'04
KEY/EXEMPLARY SITES	
MUHLENBERG WETLAND PROJECT	• Landowner Incentive Program (LIP) – '03
SWATARA WATERSHED CRITICAL HABITAT PROTECTION PROJECT	• Landowner Incentive Program (LIP) – '03
PROTECTION OF CRITICAL RIPARIAN BUFFERS IN NORTHWESTERN PA	• Landowner Incentive Program (LIP) – '03
FRENCH CREEK CONSERVATION CORRIDOR: ROCKDALE TOWNSHIP CONSERVATION EASEMENT I	• Landowner Incentive Program (LIP) – '03
FRENCH CREEK CONSERVATION CORRIDOR: ROCKDALE TOWNSHIP CONSERVATION EASEMENT II	• Landowner Incentive Program (LIP) – '03
FRENCH CREEK CONSERVATION CORRIDOR: ROCKDALE TOWNSHIP CONSERVATION EASEMENT III	• Landowner Incentive Program (LIP) – '03 • Landowner Incentive Program (LIP) – '03
UPPER OYSTERVILLE CREEK	• SWG '04-05
PINEY TRACT GRASSLANDS	

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Appendix 11.1. State and Federal Programs for Conserving Private Property

Farm Bill – Federal

For a summary of all federal conservation incentives go to
<www.biodiversitypartners.org/incentives/programfed.shtml>

The U.S. Farm Bill is the largest federal funding source for resource conservation. The 2002 Farm Bill authorized more than $5 billion a year for resource conservation that primarily focuses on traditional soil and water conservation programs, which may have secondary benefits for species and habitat conservation. The Farm Bill will be up for reauthorization in 2007. Programs specialized for habitat conservation are relatively recent, and include the Conservation Reserve Program, Grassland Reserve Program, the Wetlands Reserve Program, the Environmental Quality Incentives Program, and the Wildlife Habitat Incentives Program. The U.S. Fish and Wildlife Service also provides several conservation programs for landowners interested in habitat conservation. There is little federal funding for family forest owners, even forest lands support significant biodiversity and compose a large proportion of habitat acreage. The only remaining family forest program in the Farm Bill, the Forest Land Enhancement Program, was eliminated in 2003. Continuation of resource conservation programs such as the Wetlands Reserve Program and Grasslands Reserve Program, the reauthorization of CRP/GRP, Continuous CRP and CREP, and the further refining and development of programs such as the Conservation Security Program and Environmental Quality Incentives Program are priorities from a natural resource perspective.

Clean and Green Program - State

Pennsylvania's Clean and Green Act of 1974 was established to preserve farmland, forest land and open space by taxing land according to its use rather than its market value. Land enrolled endures reduced taxes, however it can be taken out of the program. Land taken out of the permitted use became subject to a rollback tax, imposed for up to seven years, and an interest penalty.

Conservation Reserve Program (CRP) - Federal

www.fsa.usda.gov/dafp/cepd/crp.htm

The Conservation Reserve Program allows farmers to retire highly erodible cropland or other environmentally sensitive areas to vegetative cover. The program improves water quality, restores floodplains, reduces soil erosion and sedimentation, and establishes or enhances wildlife habitat. The program provides technical assistance, cost-sharing for up to 50 percent of the cost of conservation practices, and annual rental payments over the 10- to 15-year contract.

In 2003, $1.8 billion in payments were made for more than 34 million acres. The largest concentrations of lands enrolled in this program occur in the Midwest. Starting in 2007, many of the 10- to 15-year contracts will be ending, creating an opportunity for landowners and state Natural Resource Conservation Service offices to strategically discuss how or

whether to re-enroll these lands, which largely occur on marginal agricultural lands. In 2004, eligibility for the program was expanded to include rare and declining habitats. This change broadens the scope of eligible landowners and adds a specific habitat emphasis that is well aligned with the WAP.

Conservation Reserve Enhancement Program (CREP) – Federal

www.fsa.usda.gov/dafp/cepd/crep.htm

The Conservation Reserve Enhancement Program (CREP) is a federally-funded program of the United States Department of Agriculture (USDA) that offers farmers the opportunity to take highly erodible and environmentally sensitive lands out of production, thereby improving water quality, reducing soil erosion and increasing grassland, wetland and riparian habitat for wildlife. The program seeks significant increases in the rental rates farmers are currently offered through the Conservation Reserve Program (CRP) making it more economically feasible for Pennsylvania farmland owners to participate.

Program goals are to reduce water temperature to natural levels, reduce sediment and nutrient pollution, stabilize streambanks, and restore natural hydraulic and stream channel conditions. Eligible riparian areas must be in a condition that benefits from restoration or not providing normal riparian functions. CREP participation in Pennsylvania has the potential to greatly benefit many WAP-Priority species that are closely associated with grasslands, such as the northern bobwhite quail, eastern meadowlark and grasshopper sparrow. Reauthorization of this program, along with CRP and Continuous CRP, should remain a priority.

Conservation Security Program – Federal

www.nrcs.usda.gov/programs/csp/

This program, new in 2004, rewards farmers for ongoing and planned conservation activities on working private and tribal lands. Activities include improving soil, water, air, energy, plant, and wildlife resources. Farmers like the program because it rewards good stewardship of their land. The program also encourages landowners to improve their practices to qualify for a higher level of the program.

The Conservation Security Program provides equal access to all producers in participating watersheds, regardless of size of operation, crops produced, or geographic location. See **<www.nrcs.usda.gov/programs/csp/2005_CSP_WS/index.html>** for a map of 2005 participating watersheds. Eligibility and priority for individual landowners are based on a high level of current and planned conservation activities. A self-assessment allows landowners to determine if they are eligible. Stewardship payments are based on a complex formula that considers existing, new and enhanced conservation practices. The application process is complex, but Natural Resources Conservation Service staff provide technical assistance to meet landowner needs.

For 2005, 202 priority watersheds were chosen to participate in the United States, with at least one watershed in each state. Program expenditures are capped at $6 billion from 2005-

2014. Over the next eight years, the program will rotate through watersheds, giving every qualified producer an opportunity to participate.

Environmental Quality Incentives Program - Federal

www.nrcs.usda.gov/programs/eqip/

This program, administered by the Natural Resources Conservation Service, provides direct funding and technical assistance to promote agricultural production and environmental quality as compatible goals. The program has four national priorities: reducing non-point source water pollution, reducing air emissions, reducing soil erosion, and promoting habitat for at-risk species. Nationally, 60 percent of the program's funding is invested in improvements for livestock operations. Each state develops more specific statewide and local priorities. Private land in agricultural production is eligible for this program, with an approved plan, and a contract for one to ten years. The program provides cost-share and incentive payments to assists landowners in implementing structural and management changes.

Forestry Incentives Program - Federal

Forestry Incentives Program (FIP) offers non-industrial private landowners an incentive to plant and maintain forests. It helps defray costs of managing the land. It can help conduct a Forest Stewardship Plan, or help fund forest stand improvement with forester advice, and promote regeneration. Federal funds will pay up to 75 percent of the expenses with maximum of $10,000 per year per owner. In return, the landowner must agree to maintain forest practices for 10 years.

Forest Legacy Program – Federal and State

www.fs.fed.us/spf/coop/programs/loa/flp.shtml

The Forest Legacy Program protects private forestlands from conversion to non-forest uses, to ensure that both economic uses of private forestlands and the public benefits they provide are protected for future generations. Forestland can be conserved through purchase of a conservation easement, which acquires the land's development rights and allows the land to remain in private ownership, or through purchase in fee simple. Each state develops a forest conservation plan and identifies high-priority private forestlands to protect. To receive federal funding, states submit an application package to the U.S. Forest Service, which uses a competitive process in distributing grant funds. The program funds up to 75 percent of project costs. The total FY2005 budget for the Forest Legacy Program is about $64 million.

Forest Stewardship Program – Federal and State

The Pennsylvania Department of Conservation and Natural Resources' Bureau of Forestry's Forest Stewardship program is supplemented with federal funding to reach out to private landowners and encourage forest health and proper management. The private landowner's goals for the property are used to draft a plan for long-term management of the forest. Since 1994, foresters trained under this program have written 1,189 forest plans for private

landowners covering 181,771 acres of forest habitat in the state, a total of 1.07 percent of Pennsylvania's forest cover. The acres per year have declined in recent years.

Important Bird Areas Program – Private

http://pa.audubon.org/Ibamain.htm

Pennsylvania was the first state to develop an Important Bird Areas (IBA) program in the United States. Based on strict scientific criteria (given below), a group of scientific advisors (known as the *Ornithological Technical Committee*) selected 78 IBA sites encompassing more than 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 salt-marshes, bottomland hardwood swamps, and open grasslands. Additional IBA sites in Pennsylvania will be selected by the technical committee on an ongoing basis.

Conserving Pennsylvania's 78 IBA sites will not only have direct benefits to birds, but also will help preserve the state's biodiversity. By focusing attention on the most essential and vulnerable areas the IBA Program helps to promote proactive habitat conservation, benefiting birds and biodiversity. IBAs are a natural focal point for volunteer monitoring projects, which lead to local stewardship and advocacy. IBA designations can be a tool for assisting private landowners and public land managers, providing a science-based rationale for habitat conservation.

The Pennsylvania Audubon Society, through its Director of Bird Conservation, is taking a leadership role in coordinating the Important Bird Area Program statewide. Conservation planning for these Important Bird Areas has begun and includes implementation of PIF plan objectives for high-priority land-birds. IBAs also have become a priority of the Department of Conservation and Natural Resources, which may make funding available to protect designated IMAs.

Important Mammal Areas Program – Private

www.pawildlife.org/imap.htm

The Important Mammal Areas Project, an international pilot project modeled after the IBA program, was created by the Mammal Technical Committee of the Pennsylvania Biological Survey (PABS) and is being carried out in Pennsylvania by a broad-based alliance of sportsmen, conservation organizations, wildlife professionals, and scientists.
IMAP is a joint partnership of the National Wildlife Federation, PA Wildlife Federation, PA Federation of Sportsmen's Clubs, Mammal Technical Committee/PA Biological Survey, and the Carnegie Museum of Natural History.

To date, 77 sites have been selected as IMAs across the Commonwealth. Initial site assessments have been completed for all sites, and detailed conservation plans will be developed for the highest priority sites. Once the initial IMAP conservation plan is completed for Pennsylvania, it is anticipated that the Important Mammal Areas Program will be rolled

out nationally as a model to protect critical mammal habitat throughout North America. Many, though not all, IMAs overlap IBAs – providing an additive force for conservation of high-priority habitats.

Funding has come primarily through the State Wildlife Grants program, which is a federally-funded program administered in Pennsylvania by the PGC. The Pennsylvania Department of Conservation and Natural Resources is now giving properties that are designated as Important Mammal Areas more eligibility points on DCNR grant applications, thereby elevating the probability of grant acceptance.

Partners for Fish and Wildlife - U.S. Fish and Wildlife Service
<partners.fws.gov>
This program provides direct funding and/or technical assistance for voluntary restoration of wetlands and other fish and wildlife habitats on private land (including non-state and non-federal land). Projects are designed to restore native habitat to function as naturally as possible, preferably resulting in a self-sustaining system. Projects focus on habitats that benefit migratory birds, migratory fish, or federally threatened and endangered species, or on habitats that are designated as globally or nationally imperiled. High priority projects also complement habitat functions on National Wildlife Refuges, occur in areas identified by state fish and wildlife agencies and other partners, or reduce habitat fragmentation.

There is no formal application process. Instead, an interested landowner contacts the state program coordinator and they work together, along with public and private conservation partners, to develop the project. Program funds are used for cost-sharing of restoration projects and are not available to lease, rent, or purchase property. Landowners commit to retain the restoration project for at least 10 years. Funding for this program is allocated for all states, with $33 million available nationally in 2004 and $17 million projected for 2005.

Pennsylvania Community Conservation Partnerships – Federal and State
The community conservation partnership grants are provided for several conservation and recreational opportunities and include administration of funding from federal and state sources. These grants include grants for recreational trails and land acquisition. Community Conservation funds include funding from the Land and Water Conservation Fund (LWCF) which must also comply with the criteria of that program and provide reports to the National Park Service. Other sources include Key 93 funds, Growing Greener, and the TEA-21 grants for recreational trails from federal transportation agency. All grants require a 50 percent match of funds or in-hand contributions.

Land and Water Conservation Fund grants can only be given to political subdivisions including school districts with focus on public parks, recreation and conservation projects. Land and Water Conservation Fund grants funded 1,320 projects for $145 million since its inception in 1965. Land trust grants administered through this program provide 50

percent of funds and lands must be open to public use. Priority is given to conserving habitat for threatened species, although recent projects were oriented toward s public parks.

Pennsylvania Farm Preservation Program - State

This program was initiated in 1989 to reduce the loss of farmland to development. Development rights are purchased from the farmer instead of the land itself. Farmers are paid the difference between the value of the land if sold for development and the value if sold for agriculture. Pennsylvania is the leading state in the nation for agricultural preservation with 11,194,619 acres preserved in 45 counties (Pennsylvania Department of Agriculture, Statistics as of 11-15-01).

Funding constraints limit this program. Sources of revenue include state, county and, in some cases, township funds. There is a long waiting list of farmers wanting to preserve farmland, but there are not sufficient funds to protect it all. This obviously impacts the potential value of the program. With adequate funding, the farmland preservation program is an excellent tool for keeping farmland from being developed. Currently, this program has somewhat limited value for fish and wildlife because it does not address the issue of how the land is managed. Programs like CREP with a focus on creating, improving and maintaining habitat also are required.

Pennsylvania Fish and Boat Commission's Consultation and Grant Program for Fish Passage and Habitat Restoration – State

Established in 1994, the program provides technical and financial assistance to owners of dams and other impediments in providing fish passage and stream habitat restoration. The program has advanced the removal of more than 80 dams and the construction of more than a dozen fishways across the Commonwealth. It also has obtained in excess of $5 million dollars to support the implementation of dam removal and fishway construction projects.

Pennsylvania Fish and Boat Commission's Adopt-a-Lake and Adopt-a-Stream Programs – State

The program provides technical and financial assistance to conservation groups and/or landowners in the planning and construction of lake and stream habitat enhancement structures. Over the past 10 years, the program has constructed hundreds of habitat structures.

Pennsylvania Fish and Boat Commission's Natural Diversity Section's Consultation Program for Rare Species – State

This program provides technical assistance to consultants, developers, other state agencies, and private landowners that want to conserve and enhance rare species and their habitats.

Pennsylvania Natural Area Program - State

This program, a part of the Pennsylvania Bureau of State Parks, attempts to maintain certain areas within the state park system at a higher level of ecological integrity. 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. These areas are set aside to provide locations for scientific observation of natural systems, to protect examples of typical and unique plant and animal communities and to protect outstanding examples of natural interest and beauty. In areas of high recreational activity and in otherwise hostile or degraded landscapes these areas may provide significant benefits for priority species by improving habitat quality and reducing disturbance.

Private Stewardship Grants Program - U.S. Fish and Wildlife Service
<endangered.fws.gov/grants/private_stewardship>
This program provides federal grants on a competitive basis to landowners engaged in voluntary conservation efforts on private lands. Individuals, groups, or local governments also can apply for funding if they have identified specific private landowners to participate. Projects benefit imperiled species including federally-listed endangered or threatened species as well as proposed, candidate, and other at-risk species. This program supports on-the-ground conservation efforts on private lands, but does not fund the acquisition of real property, either through real property or fee title or easements. About $6.5 million is available in 2005 for this program, with proposals competing at a regional level. In 2004, $7 million funded 97 projects nationally.

State Wildlife Grants - U.S. Fish and Wildlife Service and states
<federalaid.fws.gov/swg/swg.html>
The State Wildlife Grant Program provides annual grants to states, territories, and tribes to support cost effective conservation aimed at keeping wildlife from becoming endangered. In 2004, there were $70 million available for states and $6 million for tribes. The funding is allocated based on land area and population. Currently, these funds are used to support planning and implementation of key fish and wildlife conservation efforts. In Pennsylvania, this funding is being used, in part, to support the Private Landowners Assistance Program, to fund statewide competitive projects, and to support staff within the PGC and PFBC Diversity sections.

Wetlands Reserve Program - Farm Bill
<www.nrcs.usda.gov/programs/wrp/>
The Wetlands Reserve Program allows landowners to voluntarily retire current and former wetlands from agricultural production and protect, restore, and enhance the land for fish and wildlife habitat. The program uses conservation easements to ensure long-term protection of the land, while retaining it in private ownership. The land can be used for hunting, fishing, and other uses that are compatible with providing wetland functions. The program provides three options: 10-year technical and cost-share assistance for activities identified in a wildlife habitat plan, 30-year conservation easements, and permanent easements. For landowners with a permanent conservation easement, the program covers the easement price and restoration costs. Most of the lands occur on marginal, flood-prone, restorable agricultural

lands. As of 2003, almost 8,000 projects have been enrolled on 1.5 million acres. Congress currently caps enrollment at 2.3 million acres. In 2004, more than $275 million was allocated for Wetlands Reserve Program projects.

Wildlife Habitat Incentive Program -Farm Bill

<www.nrcs.usda.gov/programs/whip>

The Wildlife Habitat Incentive Program assists non-federal landowners who want to establish and improve fish and wildlife habitat, including landowners who are unable to meet eligibility requirements of other Farm Bill conservation programs. Participants usually enroll for 5-10 years. Most efforts to date have focused on upland habitat (especially native prairie), but each state develops an implementation plan for their state. Some states provide grants to partners, such as soil and water conservation districts or other groups to work directly with landowners. In 2004, $30 million was allocated for Wildlife Habitat Incentive Program projects.

Other Programs and Sources of Information

Several wildlife habitat programs are available to homeowners and other urban and suburban landowners on ways to enhance habitat for wildlife. These include national programs such as the National Wildlife Federation's "Backyard Habitat Program." In Pennsylvania, the Urban and Community Forestry Program is designed to enhance urban habitats by planting trees. The Pennsylvania Wildlife Factsheet Series, available through cooperative extension offices and conservation districts, provides practical information on enhancing wildlife habitat. In addition, many communities are working on zoning guidelines for new development to improve aesthetics, conserve trees and wildlife habitat.