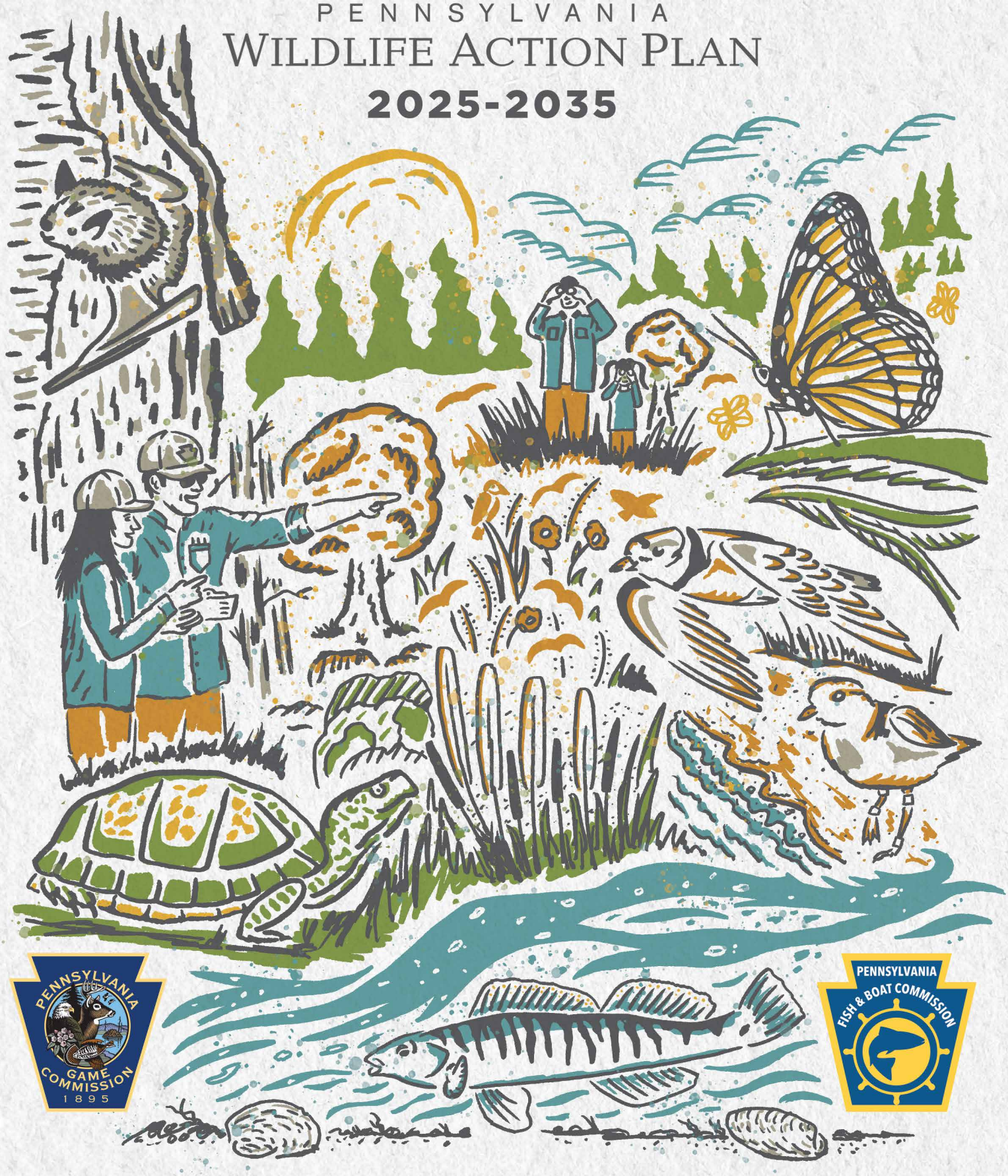
PENNSYLVANIA

WILDLIFE ACTION PLAN

2025-2035



PENNSYLVANIA WILDLIFE ACTION PLAN

2025–2035

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Introduction

2025-2035 Pennsylvania Wildlife Action Plan

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Executive Directors' Message

Dear Fellow Conservationist,

Thank you for taking the first step toward assisting at-risk fish and wildlife recovery efforts by opening this 2025-2035 Pennsylvania Wildlife Action Plan, the third iteration of its kind. With increasing stressors in this changing environment, we need all players on the field to collaboratively address the many needs identified in these pages.

Conservation wins when we team up for wildlife. Take, for example, the 26 threatened, endangered, or candidate species recovered, delisted or upgraded (i.e., from endangered to threatened) thanks to unrelenting on-the-ground actions and subsequent population monitoring - often by an army of volunteers - to document population gains over time. These state-level recovery successes contribute to preventing the need for federal protection under the Endangered Species Act, the foundational intention of the federal State and Tribal Wildlife Grants program underpinning Wildlife Action Plans in every state and U.S. territory.

Though many gains have been made, there is much yet to accomplish. Our staff experts have worked tirelessly with statewide conservation partners and the public to identify 858 species in greatest need of conservation attention (Species of Greatest Conservation Need) over the next decade, including aquatic and terrestrial invertebrates. Another 604 species lack sufficient information to evaluate their status (Data Deficient). Each species account (Appendix 1.4) describes over 500 impactful actions needed to address the highest risk threats.

We offer you a challenge - to review the chapters; become familiar with species accounts; register for a free, online Wildlife Action Map tool account; and adopt at least one action. This could be as simple as planting native plants around your home, in containers or an entire field; volunteering with local watershed groups to protect waterways from pollutants; reducing bird-window collisions by installing known solutions; keeping cats indoors or leashed outside; or sharing your voice with local, state, and national leaders to support decisions benefitting fish and wildlife conservation.

By opening this document, you are part of the Pennsylvania conservation team! This Pennsylvania Wildlife Action Plan is for all Pennsylvanians. As with any endeavor, by working together, everyone achieves more. Thank you for caring and, in advance, for joining the effort. We'll see you on the field.

Yours in conservation,

Stephen P. Smith, Executive Director
Pennsylvania Game Commission

Timothy D. Schaeffer, Executive Director
Pennsylvania Fish and Boat Commission

Foreword

Charles W. Bier

This third Pennsylvania Wildlife Action Plan (PA WAP) causes me to reflect upon decades of my own biodiversity study and conservation experience, and the evolution of fish and wildlife conservation. I recall sitting in a lecture hall at Carnegie Museum of Natural History, Pittsburgh, in March 1981, for a "Species of Special Concern in Pennsylvania" symposium. It was the culmination of the work of several phylogenetic technical committees assigned to assess plant (flora) and animal (fauna) conservation status. As a composite, these committees identified themselves as the PA Biological Survey (PABS), formed in 1979. Ultimately, PABS published *Species of Special Concern* (Genoways & Brenner, Editors, 1985, Special Publication No. 11, Carnegie Museum of Natural History), a baseline understanding of the slice of biodiversity that could be addressed at the time. Today, PABS continues to actively assess biodiversity and provides information and support to Pennsylvania's natural resource agencies (http://www.pabiologicalsurvey.org).

Our knowledge of Pennsylvania's biodiversity has grown immensely over time, and I have been involved in a bit of that effort having worked with many others who unraveled some mysteries. For example, attending that 1981 symposium I learned one amphibian, the Green Salamander (*Aneides aeneus*), was listed as a Pennsylvania Threatened species. Yet, strangely, no one knew where it was or, having been discovered in PA in 1951, if it even still existed in the state. I set out to resolve that knowledge gap, finding the salamander in 1983 and extending its recorded Pennsylvania range 43 kilometers (27 miles) north and at many sites over the next few years. Someone just needed to look! Since the 1980s, there are many other similar examples, per the efforts of other biologists, and these accomplishments have continued to expand our knowledge.

These discoveries, the symposium, and resulting book were the genesis of modern biodiversity conservation in the Commonwealth, although "biodiversity" was not yet a widely used term. These achievements represented the most comprehensive view of the state's biodiversity possible for the time and included vascular plants and several invertebrate groups, when information was available. The PABS's work represented scientific foresight in that it investigated as many taxonomic groups as possible, including those beyond the "popular" ones or recognized for management by jurisdictional agencies nearly 50 years ago. Since 2005, for most fish and wildlife species - both rare and common - the PA WAP, led by the Pennsylvania Fish and Boat Commission (PFBC) and Pennsylvania Game Commission (PGC), has taken conservation and our understanding of biodiversity to the next level.

Pennsylvania conservation advancements

Today, the most comprehensive list of animal "Species of Special Concern in Pennsylvania" is housed in the PA WAP, in which they are now referred to as Species of Greatest Conservation Need (SGCN). Every 10 years, the SGCN list is reviewed and adjusted based on new information. Those data feed species status assessments to determine if species remain, or have become, rare, extirpated, etc., or have recovered to secure status. Species for which there was previously insufficient information, or newly discovered in the state, are better understood over time through data collection efforts. At the

same time, tabs are kept on common native species that conservationists will endeavor to keep common through projects such as the PA Bird Atlas and the PA Amphibian and Reptile Survey.

As an example of changes in SGCN status, and to share a related personal experience, when I started birdwatching at 15-years old in 1968, there were but three Bald Eagle nests in Pennsylvania. These nests were all in western Crawford County and experiencing reproductive failure due to impacts from the DDT family of insecticides. Their reproduction was critically low. A fourth nest was established in 1984. Over the following years, I watched the Bald Eagle recover owing to enhanced environmental protections (e.g., banning DDT use) and population augmentation by the PGC. Today there are more than 300 nests in the state! This is a wonderful account of endangered species recovery.

Another notable example is enhanced aquatic biodiversity. Specifically, freshwater fish and mussel data indicate improved water quality in some rivers, contributing to improving and expanding mussel populations. This is true for the Ohio and lower Allegheny rivers near Pittsburgh, where mussels were absent through much of the 1900s. Water quality in the Clarion River and Kiskiminetas River has improved to the extent that several mussel species, where they had died out long ago, have been reintroduced or are recovering on their own. Monitoring efforts are now underway to assess the success of these projects.

Biodiversity study and management continue as evolving science and art. In the 1980s, 1990s and early 2000s, those efforts were changing, but in a less coordinated fashion. With the first PA WAP in 2005-15, a more organized and shared approach was available to guide conservation efforts. Subsequently, with the 2015-25 PA WAP, conservation aids such as the Conservation Opportunity Area (COA) Tool and Conservation Action Tracker (CAT), collectively known as the Wildlife Action Map (https://wildlifeactionmap.pa.gov/), were developed by the PGC and PFBC, with support from the Pennsylvania Natural Heritage Program and NatureServe. Collectively, these tools encourage protection and management for SGCN and their habitats.

Ongoing PA WAP evolution to advance Pennsylvania fish and wildlife conservation

An overarching need for the PA WAP to evolve is that fish, wildlife, and conservation practices are not constant. Environmental challenges are of critical concern. During the last century, the primary threats to fish and wildlife have been habitat conversion and degradation, as well as ecosystem stresses caused by invasive non-native plants and animals. By 2018, Pennsylvania had lost approximately 193,000 forested acres to development (U.S. Department of Agriculture Forest Inventory and Analysis 2018). From 2009 – 2014 Pennsylvania lost 175-acres of forest per day. Additionally, the types and number of habitat conversions have increased over time.

The threat invasive non-native species pose to native fish, wildlife, and their supporting habitats is similarly alarming. The list of invasive plant and animal species is large. For example, the Pennsylvania iMapInvasives project (https://www.paimapinvasives.org/) is tracking 412 invasive plant and animal species (at the time of this writing). Many of these invasive species have been documented to impact native fish and wildlife. The number of invasive species is only growing and is another reason each 10-year PA WAP revision incorporates current information.

Overlapping with habitat conversion and invasive species threats is the existential crisis of global and local climate variability. The influences of climate change on the health of fish and wildlife are too many to describe here; however, the drastic multi-factor alteration of environments upon which these species depend creates potentially intolerable conditions due to higher air and water temperatures, droughts, hydrologic extremes, lower dissolved oxygen, phenological shifts, and favored invasive species populations. In all their work, conservationists must also consider climate alteration currently underway.

As climate variability impacts what have been climate norms for the last few thousand years, a critical factor is the rapidity with which the parameters of our climate are changing. For fish and wildlife, a related issue is how species will react and attempt to immigrate to safer environments, as theirs is no longer within the safe abiotic and biotic limits supporting their life histories and ecologies. Furthermore, conservation biologists are beginning to discuss future "assisted migration", whereby humans assist other species in moving to suitable environments as their habitats become overly stressed. To the extent possible, the authors of PA WAP species accounts have addressed climate change mitigation and resilient landscape strategies.

A positive vision in the face of ongoing and new challenges

Although challenges in managing fish and wildlife remain, the 2025-35 PA WAP, which also continues to evolve, describes a positive vision. There are existing and emerging opportunities for governmental and private entities to take advantage of planning and on-the-ground management activities. Land and water protection continues through the actions of government agencies and non-profit organizations. Pennsylvania's roughly 5-million acres of conserved lands continues to grow, albeit with various levels of protection.

The PA WAP, along with the Wildlife Action Map and associated tools, can be used to guide voluntary acquisitions and management. Incorporated into this conservation work are critical concepts, such as local and regional habitat connectivity; partnerships, including with surrounding states; participation in SGCN range-wide conservation; monitoring SGCN over time; and engaging the public to review and implement the 2025-35 PA WAP. The sustainability perspective of "keeping common native species common" also continues in this new plan.

The PA WAP is exceedingly important for maintaining Pennsylvania's natural heritage and is part of the Commonwealth's public trust responsibility for fish and wildlife conservation. Each new Wildlife Action Plan incorporates an advanced maturity of vision and showcases an evolution in fish and wildlife management, demonstrating for conservation practitioners the importance of State Wildlife Action Plans in the shared task of fish and wildlife conservation. The 2025-35 PA WAP continues this history.

About the author

Credit: Charles W. Bier

Charles W. Bier worked 43 years at Western Pennsylvania Conservancy (WPC) and in retirement continues as Conservation Science-Emeritus. He is a naturalist and conservation biologist with broad interests and experience in regional flora, fauna, ecosystems and conservation issues. For 23 years he was part of the Pennsylvania Natural Heritage Program (PNHP) and studied birds, reptiles and amphibians, freshwater mussels, general invertebrate inventories, vascular plants and natural communities. Much of his focus has been on rare and endangered species, natural communities and biodiversity conservation. More recently he held the position of Senior Director of Conservation Science, and provided science, land protection, stewardship and educational support broadly across the WPC. Other involvements have included Pennsylvania Biological Survey committees (birds, amphibians & reptiles, invertebrates), Ecosystem Management Advisory Committee for the Pennsylvania Department of Conservation and Natural Resources (PA DCNR), Carnegie Museum of Natural History (Invertebrate Research Associate), and the Governor's Invasive Species Council.

Acknowledgments

Our Thanks!

This third Pennsylvania Wildlife Action Plan (PA WAP or Plan) builds upon 20 years of conservation action implementation and planning and, with this momentum and Plan as a guide, we are optimistic for additional, notable conservation successes. To complete this Plan required an amazing team of dedicated professionals and volunteers and, for their contributions, we gratefully acknowledge guidance, technical assistance and administrative support from Pennsylvania Game Commission (PGC) and Pennsylvania Fish and Boat Commission (PFBC) staff, partner agencies, conservation organizations, research institutions, and volunteers (Appendix A). As part of this conservation coalition, we received insightful public comments which greatly enhanced the Plan, further illustrating Pennsylvanian's knowledge and enduring commitment to the Commonwealth's fish and wildlife. In the years ahead, we encourage all Pennsylvanians to help conserve and recover our at-risk species.

We especially thank:

- **Nate Zalik** (PGC) for his extensive contributions to the Plan, especially Pennsylvania Wildlife Action Plan database support, data review, and drafting multiple sections.
- **Michelle Doble**, **Swarna Kondapaneni, Ravi Thamballa, and Amit Gaind** (PGC) for their tireless support and technical expertise in building a PA WAP SQL database and pdf species accounts.
- **Charles Bier** (WPC) helped set the stage for this third PA WAP by contributing the Foreword.

With gratitude,

Catherine D. Haffner

Catherine D. Haffner
Pennsylvania Game Commission

Nevin T. Welte

Nevin T. Welte
Pennsylvania Fish and Boat Commission

Note: We regret any oversight in the contributors to this document. Please notify us if an acknowledgment has been omitted.

Committees

We especially thank PA WAP Steering and Advisory Committee members for their enduring and critical review of draft materials and recommendations which greatly enhanced this Plan (Appendix A).

Pennsylvania Wildlife Action Plan Revision Funding

Congressionally appropriated State and Tribal Wildlife Grant Program grant funding, administered by U.S. Fish and Wildlife Service, Office of Conservation Investment (USFWS OCI) provided financial support to PGC and PFBC for this 2025-35 PA WAP.

- F22AF03174, F23AF03332, F24AF03064, F25AF02241 – PA Wildlife Recovery Conservation Program (PGC)
- F22AF03534 PA-Developing the 2025-2035 PA Wildlife Action Plan (PFBC)

Abbreviation and Terminology

Throughout this Plan, we attempt to minimize scientific terms and jargon though, as a science-based document use of such terms cannot be completely avoided. Additionally, for easier reading, we abbreviate frequently used terms (Appendix B).

Executive Summary

Highlights

The 2025-35 Pennsylvania Wildlife Action Plan (PA WAP) builds upon the more than 20-year conservation legacy achieved since the PGC and PFBC published the first Plan in 2005. With its Purpose *to conserve Pennsylvania's native fish and wildlife, maintain resilient habitat, and protect and enhance Species of Greatest Conservation Need (SGCN)*, this third PA WAP will continue to protect and recover Pennsylvania's vulnerable species. Of the **2,137 native species assessed**, we identified **858 SGCN**, along with **over 590 conservation actions**, often with multispecies benefit. Despite great strides, data deficiencies remain in understanding Pennsylvania's fish and wildlife, as reflected in the **604 Data Deficient** species - primarily invertebrates – determined to need more information to evaluate their conservation status (i.e., data deficient species).

Chapter 1 summarizes the primary Required Elements (e.g., Species, Habitat, Threats) and is accompanied by a species-specific emphasis in the Species Accounts (Chapter 1-Appendix 1.4). These documents succinctly summarize the status, threats, conservation actions, monitoring, survey and research needs for each SGCN.

Species of Greatest Conservation Need Box Score

	Total
Birds	86
Mammals	21
Fishes	47
Amphibians	19
Reptiles	18
Invertebrates	667
Grand Total	**858**

Environmental threats and stressors prominently impact fish and wildlife population sustainability, and through species threats assessments (Chapters 1, 3) we provide substantial attention to these factors. **57% of vertebrate SGCN threats** fall into **4** threat categories:

- *Residential and Commercial Development* (17%)
- *Invasive and Other Problematic Species, Genes and Diseases* (14%)
- *Energy Production and Mining* (13%)
- *Pollution* (13%)

64% of invertebrate SGCN threats are also associated with **4** threat categories:

- *Residential and Commercial Development* (20%)
- *Agriculture and Aquaculture* (16%)
- *Pollution* (14%)
- *Climate Change and Severe Weather* (14%)

Countering influence of this broad threat array requires expansive conservation actions. For all SGCNs, we identified a total of **590** conservation actions, with **80%** of vertebrate actions grouped into three categories:

1. *Design and Plan Conservation* (34%)
   (*e.g., development of best management practices or specific species plans*)
2. *Direct Habitat Management* (30%)
   (*e.g., forest structure management, dam removal, invasive species control*)
3. *Outreach* (15%)

Top aquatic and terrestrial invertebrate conservation actions are similar, with a greater emphasis on habitat:

1. *Direct Habitat Management (55%)*
2. *Design and Plan Conservation (25%)*
3. *Outreach (16%)*

These categorical classifications, coupled with prioritized conservation actions in this Plan, will guide SGCN recovery and habitat management. Environmental conditions are dynamic, however, and resource managers must remain vigilant for emerging threats and species needs. To maintain this adaptability, we will monitor species, their habitats, as well as our progress towards implementing this Plan (Chapter 5). This monitoring can provide early detection helpful to resource managers for discerning conservation actions to enhance resiliency and protect species and habitats in environmentally dynamic conditions.

Changing environmental conditions may not only pose threats to wildlife and their habitats but can contribute to knowledge gaps. The benefits of monitoring cannot be overstated, though some questions require in-depth analyses to more fully understand their implications, or to fill long-standing data deficiencies. For these information needs, taxonomic experts identified research and survey needs. Collectively, across all taxa, **707 research needs** and **631 survey priorities** were identified and prioritized (Chapter 1, Research, Survey and Monitoring Needs).

Authorities and Agency Missions

Pennsylvania's natural resources are foundational to our state's esthetic grandeur and cultural heritage and are enshrined in Article 1, Section 27 of the state constitution. Aligned with this constitutional statute, the 2025-35 PA WAP, a non-regulatory, proactive conservation blueprint, supports the availability of these natural resources for future generations. Millions of Pennsylvanians enjoy hunting, fishing and wildlife watching (U.S. DOI 2024) https://www.fws.gov/media/2022-economic-contributions-wildlife-watching-united-states-addendum , which brings quality to our lives while contributing to local economies (Southwick Associates 2018) https://www.trcp.org/wp-content/uploads/2018/12/TRCP-and-Southwick-PA-Economic-Analysis-12-6-18.pdf. The PGC and PFBC are the Commonwealth's leading wildlife and fisheries agencies, respectively, and are privileged to support these activities by managing fish and wildlife populations for all who enjoy the Commonwealth's natural resources.

Pennsylvania Constitution

Article 1, § 27

The people have a right to clean air, pure water and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

This management includes the PGC's responsibility for 480 wild birds and mammals, and PFBC's responsibility for aquatic life including nearly 200 fishes, 80 reptiles and amphibians, over 60 freshwater mussels, 14 crayfishes, and hundreds of other aquatic invertebrate species. Overall, aquatic and terrestrial invertebrates are estimated to include >11,000 species (Rawlins and Bier 1998; Rawlins 2007). Some wildlife, such as terrestrial invertebrates, have no state agency oversight. With the intent of "Keeping Common Native Species Common", the PA WAP guides at-risk species recovery by the PGC, PFBC, conservation partners and public, including species and habitat management, and ameliorating environmental threats and stressors.

The PGC and PFBC species responsibilities are based on legislative authority as well as each agency's mission which include recreation and educational opportunities that enhance user experiences of the Commonwealth's natural resources. These legal provisions and functions support and underpin PGC and PFBC oversight responsibility for Pennsylvania's Wildlife Action Plan.

Pennsylvania Game Commission

The PGC was established in 1895 and is an independent administrative agency of the Commonwealth of Pennsylvania mandated by law "… *to protect, propagate, manage and preserve the game or wildlife of this Commonwealth* …" with the mission to manage and protect wildlife and their habitats while promoting hunting and trapping for current and future generations.

Title 34 (http://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=34), (Pa. C.S.), § 103 of the Game and Wildlife Code, states that "*the ownership, jurisdiction over and control of game or wildlife is vested in the commission as an independent agency of the Commonwealth in its sovereign capacity to be controlled, regulated and disposed of in accordance with this title.*"
Included in this responsibility is the authority to:

- Regulate, protect, propagate, manage and preserve game or wildlife and game or wildlife habitat.
- Regulate the importation, possession and/or release of wildlife in the Commonwealth.
- Add to or change the classification of any wild bird or wild animal.
- Manage and develop its lands and waters and other government or private lands and waters under agreement with the owners as it considers advisable and enact and enforce regulations to ensure the prudent and proper use of these lands.
- Collect, classify and preserve statistics, data and information.
- Enter into cooperative agreements with the Secretary of the Interior, any government agency, individual, corporation or educational or research institution to further the programs of the commission. The Commonwealth assents to the provisions of the Federal Wildlife Restoration Act. Find more at PGC Strategic Plan (https://www.pa.gov/content/dam/copapwp-pagov/en/pgc/documents/about-us/mediareportssurveys/2023stratplan%20lr.pdf) (see About Us, then Strategic Plan).

Pennsylvania Fish and Boat Commission

Founded in 1866, the PFBC is also an independent agency of the Commonwealth of Pennsylvania, with the mission is "*to protect, conserve, and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities*". As a complement to the PGC wildlife resource management role, the PFBC mission reflects the statutory responsibilities in the Fish and Boat Code, Title 30 (http://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=30) Pa. C.S. §321, in which the Commission is vested with the authority to administer and enforce this title and other laws of the Commonwealth related to:

- Encouragement, promotion and development of the fishery interests.
- Protection, propagation and distribution of fish. Fish is defined in the statute as "all game fish, fish bait, bait fish, amphibians, reptiles and aquatic organisms."
- Management of boating and the operation of boats.
- Encouragement, promotion and development of recreational boating.

Inclusive in this authority, the PFBC has responsibility and authority to:

- Promulgate rules and regulations concerning fishing to aid in the better protection, preservation and management of fish.
- Publish bulletins, literature, posters and other printing as may be appropriate to the work of the Commission.
- Enter into cooperative agreements with federal, state and local agencies or any educational or research institution or any other person or entity to carry out or further the programs of the commission.
- Propagate, protect, manage and distribute fish and the stock waters within the Commonwealth.
- Conduct fieldwork, gather spawning fish and transfer fish.
- Promote public interest in recreational fishing in the Commonwealth.
- Purchase lands and waters to make them available for use by the citizens of the Commonwealth for fishing, boating and other recreational purposes.
- Promulgate regulations concerning the protection, preservation and management of fish and fish habitat, permitting and prohibiting fishing, the ways, manner, methods and means of fishing, and the health and safety of persons who fish or may be in the vicinity of such persons on, in or along the waters of the Commonwealth.
- Conduct and establish cooperative fish restoration projects.
- Conduct comprehensive studies of the migratory fish habits.
- Establish a Pennsylvania Threatened Species List and a Pennsylvania Endangered Species List.
- Promulgate rules and regulations governing the catching, taking, killing, importation, introduction, transportation, removal, possession, selling, offering for sale or purchasing of threatened and endangered species and, if deemed advisable, may issue permits for catching taking or possessing any of those species. Find more at: PFBC Strategic Plan (https://www.fishandboat.com/About-Us/Reports/Documents/StrategicPlans/StrategicPlan2023-2028.pdf).

Summary

The respective PGC and PFBC legal authorities, strategic plans and missions provide the basis for leading development and stewardship of the PA WAP. The Commissions, together with conservation partners, strive to provide fiscally responsible programs that conserve, enhance and protect Pennsylvania's fish and wildlife resources and habitats.

State Wildlife Action Plans

Vital to Guiding Pennsylvania's Conservation Initiatives

When enacted in 2000, the State and Tribal Wildlife Grants (SWG) program provided state fish and wildlife agencies, for the first time, with an opportunity to take stock of 'unmet needs' of all wildlife and associated habitats, including those not hunted or fished (Public Law 106-291) https://www.congress.gov/106/plaws/publ291/PLAW-106publ291.pdf. Indeed, over 80% of Pennsylvania's fish and wildlife species cannot be harvested. The emergence of the SWG program was a new opportunity to comprehensively evaluate all wildlife and habitats to proactively take action for

"nongame" species' benefit, thus broadening the conservation approach of state fish and wildlife agencies and their partners.

Traditionally, vulnerable species conservation has been reactionary; focusing on species rarity – the ones on the brink of extirpation (i.e., no longer existing in a state) or extinction (i.e., no longer existing on the planet). Directing conservation initiatives towards species already seriously imperiled may have both economic and ecological implications. Economically, recovery actions for seriously imperiled species may require crucial, but expensive, conservation measures such as planning, captive breeding / artificial propagation, implementing special habitat management protocols, and expanded administrative oversight. Ecologically, species listed as threatened or endangered often have reduced populations or unique life histories that further complicate conservation measures and require extensive recovery time. Additionally, species endangerment and diminished fish and wildlife health can be a precursor to, or indicator of, environmental stressors on human health. Thus, proactively avoiding fish and wildlife endangerment has wide-ranging benefits for fish, wildlife and human population health, as well as reduced costs.

These reactionary factors were the impetus for emphasizing *proactive* conservation through State Wildlife Action Plans (SWAPs). The expanding list of federally listed threatened and endangered species that ensued from passage of the Endangered Species Act of 1973 (https://www.boem.gov/sites/default/files/documents/The%20Endangered%20Species%20Act%20of%201973.pdf) through the late 1990s, prompted the U.S. Congress to consider approaches for avoiding species endangerment. It was also during this period that many states began programs to identify and address threatened and endangered species within their borders. Thus, at both the federal and state levels there were increasing concerns regarding the expansion of threatened and endangered species lists. At the federal level, the SWG program required states to develop a Comprehensive Wildlife Conservation Strategy (predecessor term for SWAPs) not only to *avoid* federal listing, but also to guide threatened or endangered species recovery.

SWAPs are non-regulatory, proactive planning documents designed to avert fish and wildlife imperilment, and recover endangered and threatened species (i.e., listed species). U.S. Fish and Wildlife Service (USFWS) approval of these Plans provides a nexus to federal funds through the SWG program, the nation's core program for preventing species endangerment.

With SWG program legislation enactment in 2000, all states, the District of Columbia, and U.S. territories collected, compiled and analyzed information on their fish and wildlife and submitted a SWAP to USFWS by October 2005. Environmental conditions, species populations, and habitat conditions are dynamic, so Congress required that all SWAPs be comprehensively reviewed and revised at least once every 10 years. Pennsylvania fulfilled this obligation by submitting its second Wildlife Action Plan to USFWS in October 2015. In this context, with the vision of *healthy, sustainable, and resilient native fish and wildlife populations and habitats in Pennsylvania,* the 2025-35 PA WAP is the next component of this conservation compendium.

State and Tribal Wildlife Grant (SWG) Program: Crucial funding for conservation

The 2025-35 Pennsylvania Wildlife Action Plan is for all Pennsylvanians with an interest in taking action for fish and wildlife.

The SWG program is administered by the USFWS from annual congressional appropriations, and directs funding to states, the District of Columbia, and U.S. territories with an approved SWAP. These apportionments are based on a formula that includes human population and geographic area of the state. (Note: small states, the District of Columbia, and U.S. territories are provided base funding). Pennsylvania's apportionment is shared equally between the PGC and PFBC. For this Program, states are required to provide non-federal match with special rates for implementation (65% federal: 35% non-federal) and planning (75% federal: 25% non-federal). In Pennsylvania, non-federal match is provided by the PGC, PFBC and conservation partners, and has been crucial to implementing each PA WAP. More recently for the 2015-25 PA WAP, from FY15 through FY25 Pennsylvania received $16.27 million in SWG funds which leveraged ~ $9.6 million in non-federal match (e.g., matching funds, volunteer services, materials) for a total of ~$25.87 million supporting Pennsylvania projects benefitting at-risk fish and wildlife.

About this Plan

The 2025-35 Pennsylvania Wildlife Action Plan is for all Pennsylvanians with an interest in taking action for fish and wildlife and is structured according to *Eight Required Elements* to meet USFWS criteria for approval and are congressionally mandated organizational components of each SWAP. These Required Elements represent a comprehensive assessment of each state's species and designation as SGCNs, their associated habitats, threats, conservation actions and more. Several Required Elements are associated with each other (e.g., Required Element 1-Species is affected by Required Element 4-Actions) (Fig. 1).

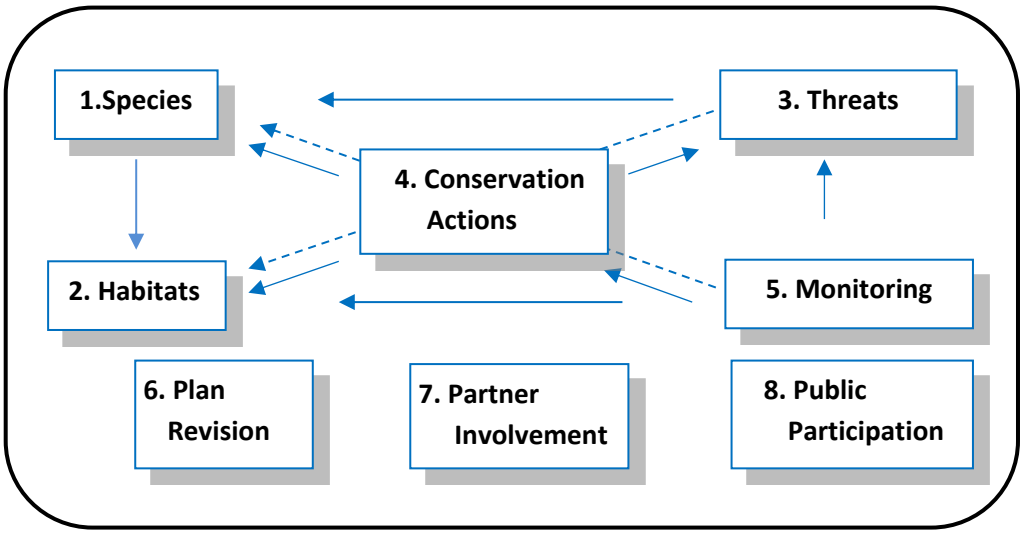

Fig. 1. Federally required State Wildlife Action Plan components (i.e., Required Elements). Arrows show primary relationships among Required Elements 1-5.

How can I use this plan?

The 2025-35 PA WAP is the most current, comprehensive at-risk species assessment in Pennsylvania! Thus, it serves as an invaluable resource for readers wanting more information about Pennsylvania's SGCN, their habitats, threats, and how to support their conservation. Because this plan is comprehensive, there is a *lot* of information to consider. So, to assist readers, we offer a few examples of where to find information in the plan (Table 1). For species, habitat, conservation actions and information on specific locations in Pennsylvania, we suggest using the web-based Wildlife Action Map https://wildlifeactionmap.pa.gov/.

Table 1. Where to find information in the 2025-35 PA WAP (examples).

Topic	***I want….***	***Where to find it….***
Species	**summary information** on conservation actions, threats, and habitats **by major SGCN group**	Graphs and tables in **Chapter 1** include this information.
	to learn about **actions to help SGCN**	See the Species Accounts in Chapter 1 Appendix 1.4.
Habitats	a comprehensive summary and description of **habitat types and associated area** in Pennsylvania	Graphs and tables in **Chapter 2** discuss Pennsylvania habitats.
	to learn of the **habitat types on property I own or manage.**	See the Wildlife Action Map https://wildlifeactionmap.pa.gov/ (Area of Interest report).
Planning	to **develop a conservation plan** for property I own or manage to learn more about SGCN known or likely to occur on your property and actions for their benefit.	See the Wildlife Action Map https://wildlifeactionmap.pa.gov/ (Area of Interest report).

Track Implementation	voluntarily **document my conservation efforts** and view other conservation actions in my area.	See the Wildlife Action Map https://wildlifeactionmap.pa.gov/ Conservation Action Tracker
Survey and Research	to learn about information needed on species, habitats, monitoring and more, so I can develop research or surveys projects to address these needs.	In **Species Accounts** (Chapter 1 Appendix 1.4)
Take Action, Get Involved	to learn more about **what I can do** to support SGCN and their habitats.	In **Chapter 1**, species accounts, **Chapter 4**, conservation actions; Wildlife Action Map https://wildlifeactionmap.pa.gov/ (Area of Interest report).

Revision Process Overview

Where feasible we adopted "Best Practices" identified for SWAPs by the Association of Fish and Wildlife Agencies (AFWA et al. 2012) and intended this PA WAP revision process to be "*explicit and transparent about which criteria are used so it will be clear and repeatable to any user of a plan how priorities were established*" (*sensu* Groves 2003).

Assembling the team (Partners): For this process, we developed a broad coalition of PGC and PFBC staff, an Advisory Committee of conservation partners including Pennsylvania Biological Survey (PABS) taxonomic experts, academicians, state and federal agencies, non-governmental organizations, and other technical experts (Appendix A). These participants shared their Pennsylvania natural resource knowledge and established a firm technical foundation for the revision process. Through the PA WAP Advisory Committee, we sought guidance on a broad range of topics including 2025-35 PA WAP foundational features (i.e., Vision, Purpose, Guiding Principles, Goals, Objectives, Strategies) and, during the 2024 Fish & Wildlife Diversity (FWD) Forum, we discussed partner perspectives on resource concerns and potential actions to address the concerns (Chapter 7). Partner input through the 2024 FWD Forum illustrates a collective understanding of important topics for consideration in the years ahead.

Species: Technical contributions by taxonomic experts included assessing all Pennsylvania native vertebrate and 1,499 priority invertebrate species using the NatureServe© Rank Calculator version 3.1932 (Master et al. 2012) and associated threats assessment, to characterize a species' state conservation status and determine preliminary subnational ranks (i.e., S-ranks). Then, taxonomic experts consulted with their respective PABS committees to assign final S-ranks. We adapted the 2015-2025 PA WAP SGCN determination flowchart (Chapter 1) for 2025-2035 to assess each animal's status for inclusion in this Plan. SWG program funds cannot be used to fund plant conservation unless an animal SGCN is dependent upon the plant for survival. Consequently, plant SGCN are not identified in this Plan, but we have established a plant SGCN determination process which can be implemented should permanent federal funding become available to support plant SGCN conservation (see Chapter 1 for details).

This Plan emphasizes species conservation, and species accounts guide species-level management and include: a conservation profile, habitat preferences, detailed threats and associated actions, monitoring, research and survey needs, and a list of partners who may be able to conduct this work. To facilitate species account development, taxonomic experts entered data into a SQL Pennsylvania Wildlife Action Plan database (PGC 2024; PGC and PFBC 2024) developed and administered by the PGC, Bureau of Automated Technological Services. Each species account constitutes a "species action plan" and, when multiple species accounts are compiled, can provide a landscape scale conservation perspective.

Habitats: Habitat assessments, as with species assessments, were guided by habitat specialists from state, federal and non-governmental organizations. To fulfill Required Element 2, this team developed an approach for determining habitat extent and condition for SGCN. As identified by taxonomic experts, we incorporated environmental threats and stressors (Chapter 3) and conservation actions (Chapter 4) at the species level, and more broadly using statewide and regional threats assessments and implementation guidance such as Best Management Practices (BMPs).

Threats: A standardized threats classification system (Salafsky et al. 2008), endorsed by the International Union for the Conservation of Nature (IUCN 2012), was adopted by Northeastern states to facilitate consistency between SWAPs (Crisfield and NEFWDTC 2022). Among many identified threats, climate change (Staudinger et al. 2024), fish and wildlife health (Ellis et al. 2025), and invasive species have overarching impacts on natural resources and are more thoroughly discussed in Chapter 3.

Actions: As developed for habitats and threats, common conservation action categories are incorporated into this Plan (Chapter 4) and for each categorical classification, taxonomic experts identified specific actions. A special section on prescribed fire highlights this important ecological restoration approach. As a Best Practice (AFWA 2012), this approach was to provide flexibility, but also enough specificity to measure performance and engage partners.

Monitoring: Monitoring is crucial for assessing conservation action effectiveness, trends, and subsequent actions to accommodate changing conditions. We discuss monitoring implementation progress for the next 10 years, and available monitoring programs to support this assessment (Chapter 5).

Public Participation: Public participation and support is instrumental to PA WAP development and implementation. Thus, understanding public concerns and interests can best direct resources, such as outreach initiatives, or affirm current implementation processes. To glean insights from all Pennsylvanians, Responsive Management (2024) conducted to gauge opinions on and attitudes toward nongame fish and wildlife (Introduction; Chapter 8). Additionally, prior to 2025-35 PA WAP submission to the USFWS, a 32-day public comment period (19 August through 19 September) garnered public perspectives on the draft. This input was incorporated into the Plan or documented as to why it was not feasible or appropriate (Chapter 8). To provide continued public engagement, Objectives and Strategies in Goal 6 will guide public participation.

Landscape Conservation & Regional Collaboration

It was shortly after the first SWAPs were published in 2005 when these comprehensive documents further galvanized landscape conservation initiatives in the Northeastern U.S. with each state's Plan serving as a touchstone for their respective species and habitat priorities. Throughout SWAP implementation, AFWA, nationally representing state fish and wildlife agencies, has endorsed this landscape scale conservation approach through resolutions and science-based reports (AFWA 2018, Mawdsley et al., 2020, AFWA 2021, AFWA 2021a). Other organizations also support this landscape perspective (Network for Landscape Conservation 2018). In the 2025-35 PA WAP, collective efforts to assess landscape and species-level conservation are supported in Regional Conservation Needs (RCN) program projects such as updated northeast natural resource condition (Anderson et al. 2023), a regional synthesis of conservation efforts (Terwilliger et al. 2023) and U.S. Geological Survey (USGS) funded regional climate change impacts by the Northeast Climate Adaptation Science Center (Staudinger et al. 2024).

As a state-level document, the 2025-35 PA WAP focuses on Pennsylvania fish and wildlife SGCN priorities. However, many Pennsylvania species have ranges that extend into other states, Canadian provinces, and even the southern hemisphere during certain seasons. Like many other states, we support species population-level, or range-wide, conservation. Northeast state and federal fish and wildlife agencies have an enduring and notable history of collaborative conservation through organizations such as the Northeast Fish and Wildlife Association Fish and Wildlife Diversity Technical Committee. Additionally, Pennsylvania has extensively collaborated with state conservation partners in the Midwestern U.S. and Southeastern U.S. to recover state and federally endangered fish and mussel populations.

Foundational Features

During the comprehensive review and revision process, we received crucial input from the PA WAP Steering Committee, Advisory Committee, agency staff, and other conservation partners who reviewed foundational features (e.g., Vision, Guiding Principles) to determine current relevance and review updated modifications. These features reflect the Plan's intent and characteristics specific to Pennsylvania and are thus crucial components of the revision process and a completed 2025-35 PA WAP. Goals are further framed with increasing specificity through objectives and strategies. With Steering Committee guidance, the 2025-35 PA WAP has been refreshed to meet new challenges (Table 2).

Table 2. PA WAP Steering Committee overarching guidance for the 2025-35 PA WAP.

- 10-year planning horizon
- Relevant to all Pennsylvanians
- Foster partnerships
- Keep common native species common
- Realistic actions to recover/ restore species
- Current information with identified data gaps
- Track implementation
- Be accountable
- Identify opportunities to improve species status
- A plan to secure and leverage funding
- Expand PA WAP outreach and marketing

The *Eight Required Elements* and associated sub-elements provide a framework for organizing essential conservation information within each state's Wildlife Action Plan. However, these Required Element topics do not sufficiently or specifically express the intent or role of this material relevant to Pennsylvania's needs and interests. Thus, these foundational features illustrate and offer perspective on this Plan's significance to Pennsylvania's vulnerable fish and wildlife.

Vision

As implied, the "Vision" establishes a broad conceptual outline of desired natural resource conditions to be attained. Though exceptionally aspirational within the Plan's 10-year duration, this statement illustrates the conditions we strive to achieve. A vision statement addresses "what" we hope to accomplish.

Purpose

Within context of the Vision, the Purpose more explicitly describes the role of the PA WAP and targets for conservation implementation. Framing the Plan with these constraints is important to maintain focus on critical features to be accomplished. The Purpose shares "why" we have the Plan.

Guiding Principles

The "Guiding Principles" are pillars upon which the PA WAP is framed. During development, all aspects of the Plan are measured against these core concepts. Providing direction and focus, they represent the values imbued in this document.

Keep common native species common is an effort to maintain native species populations (e.g., insectivores, herbivores) upon which broad ecological functions rely. Although they may currently be abundant, substantive loss of these common species could be detrimental to imperiled or declining species, as well as currently healthy species.

2025-35 Pennsylvania Wildlife Action Plan

Foundational Features

VISION

Healthy, sustainable, and resilient native fish and wildlife populations and habitats in Pennsylvania.

PURPOSE

To conserve Pennsylvania's native fish and wildlife, maintain resilient habitat, and protect and enhance Species of Greatest Conservation Need.

Support Pennsylvania's regionally important roles in conserving species and habitats expresses that Pennsylvania is located at the intersection of several ecological regions (e.g., Appalachian Mountains) or river basins (e.g., Ohio River Basin, Susquehanna River Basin, Great Lakes, Delaware River) important to a broad range of species. Many species rely on Pennsylvania's management and protection of core habitats and corridors. As a member of the Northeast Association of Fish and Wildlife Agencies (NEAFWA) Pennsylvania has worked with states throughout the northeast on conservation priorities for many decades.

Encourage and foster diverse public and private partnerships to advance conservation recognizes that Pennsylvania fish and wildlife conservation requires a broad coalition of agencies at all levels of government, conservation organizations, and public to succeed. The resource needs are too great to be addressed by any single entity and necessitate a collective response.

Habitat fragmentation is a major threat to all fish and wildlife in Pennsylvania. Roads, utility rights-of-way, urban and industrial development, dams and much more directly impact habitat quality and species movement and thus are the foundation for the guiding principle to ***promote habitat connectivity to support healthy ecosystems***.

GUIDING PRINCIPLES

- *Use best available science to conserve Pennsylvania's imperiled native species and their habitats.*
- *Keep common native species common.*
- *Support Pennsylvania's regionally important roles in conserving species and habitats.*
- *Encourage and foster diverse public and private partnerships to advance conservation.*
- *Promote habitat connectivity to support healthy ecosystems.*

Goals

Building on the Guiding Principles, six goals offer broad action concepts, with Objectives and Strategies providing increasing specificity within each goal, contributing guidance rather than prescriptive measures. It is the *specific actions* within each species account developed by taxonomic experts that offer on-the-ground or guide activity to address a specified threat. Since 2005, as each PA WAP is comprehensively reviewed and revised, we have built upon and adapted these Goals, Objectives, and Strategies to meet new challenges.

GOALS

1. *Actively conserve Pennsylvania's native fish, wildlife, and their habitat.*
2. *Acquire and apply best available science to recover and sustain Species of Greatest Conservation Need, and their habitats.*
3. *Contribute to range-wide conservation of Species of Greatest Conservation Need.*
4. *Strengthen the state's capacity to conserve Pennsylvania's native wildlife.*
5. *Foster collaboration within and among public agencies and partners to advance fish and wildlife conservation planning and implementation.*
6. *Inspire active public participation in Wildlife Action Plan development and implementation.*

Objectives and Strategies

Goal	Objective	Strategy	Narrative
1			***Actively conserve Pennsylvania's native fish, wildlife, and their habitat.***
	1.1		**Protect, recover, enhance, and maintain Species of Greatest Conservation Need by mitigating threats to populations or habitats.**
		1.1.1	Implement at least one priority conservation action for each Species of Greatest Conservation Need, taxonomic group, or habitat, focusing on actions benefiting multiple species.
		1.1.2	Re-establish or augment Species of Greatest Conservation Need populations, as appropriate and where feasible, ecologically valid, and success is likely.
		1.1.3	Facilitate fish and wildlife adaptation to changing environmental conditions by conserving genetic variability across the full range of species occurrences.
		1.1.4	Develop and apply decision support tools to manage the highest risks to Species of Greatest Conservation Need posed by aquatic and terrestrial invasive species, genes, and diseases.
		1.1.5	Provide resources and training to support proactive law enforcement protection for vulnerable Species of Greatest Conservation Need.
		1.1.6	Work with relevant partners to reduce point and non-point source pollution that impairs habitats and Species of Greatest Conservation Need life history requirements.
		1.1.7	Implement beneficial management practices to address climate variability and associated environmental conditions.
	1.2		**Maximize land protection benefits and habitat management decisions for Species of Greatest Conservation Need.**
		1.2.1	Identify where conservation actions should be implemented to maximize benefits to Species of Greatest Conservation Need and their habitats.
		1.2.2	Strategically implement conservation actions in priority areas to avert declines in Species of Greatest Conservation Need and their habitats.
		1.2.3	Enhance habitat connectivity, including small, disconnected parcels (stepping stones), to facilitate fish, wildlife, and plant migration, range shifts, and other transitions.
		1.2.4	Work with resource managers to integrate Species of Greatest Conservation Need life history and habitat requirements into resource management planning and implementation.
		1.2.5	Collaborate with agricultural producers, land use planners and developers, municipal and local governments, and residents to implement wildlife-friendly practices.
	1.3		**Leverage financial and technical resources for land protection and habitat management decisions.**
		1.3.1	Implement beneficial practices for Species of Greatest Conservation Need and native plants in habitat management projects.
		1.3.2	Incentivize private land conservation for Species of Greatest Conservation Need and their habitats through voluntary conservation easements, state and federal grant or cost-share programs, and land protection measures.

	1.3.3	Develop and promote publicly accessible beneficial management practices for Species of Greatest Conservation Need habitat restoration and enhancement.
	1.3.4	Collaborate with partner agencies and organizations to leverage financial and technical resources for priority habitats and Species of Greatest Conservation Need.
2		***Acquire and apply best available science to recover and sustain Species of Greatest Conservation Need and their habitats.***
2.1		**Improve fish and wildlife population data acquisition, management, and reporting systems.**
	2.1.1	Use standardized survey protocols to assess Species of Greatest Conservation Need and deficient species' population, distribution, genetic diversity, and associated habitat data.
	2.1.2	Document Species of Greatest Conservation Need, data deficient species, and ecological community observations in geospatial databases.
	2.1.3	Evaluate and adapt decision support tools and models to increase conservation action effectiveness.
	2.1.4	Develop or update species management (action) plans to guide conservation decisions for priority Species of Greatest Conservation Need.
	2.1.5	Contribute to data collection, geospatial frameworks, and analytical support tools for Species of Greatest Conservation Need.
	2.1.6	Develop and maintain secure information systems for all Pennsylvania and Northeastern U.S. Species of Greatest Conservation Need, data deficient species, and their attributes.
	2.1.7	Maintain relevancy of ecological community/habitat classification systems for planning and implementation initiatives.
2.2		**Assess population and distribution trends for Species of Greatest Conservation Need and data deficient species.**
	2.2.1	Establish and maintain long-term, standardized data collection with an emphasis on multispecies benefits.
	2.2.2	Identify, prioritize, and monitor limiting factors for Species of Greatest Conservation Need with sufficient precision and accuracy to guide management actions.
	2.2.3	Monitor conservation, restoration, and enhancement projects to adaptively manage implementation.
2.3		**Evaluate quantity, quality, and trends in habitats and ecological features.**
	2.3.1	Develop (or revise) and use standardized survey protocols to characterize current habitat condition and identify conservation actions supporting Species of Greatest Conservation Need.
	2.3.2	Identify habitat data deficiencies that limit conservation action decision-making.
	2.3.3	Incorporate habitat resiliency models into conservation planning and land use decisions to support Species of Greatest Conservation Need populations under alternative future climatic conditions.
	2.3.4	Incorporate living and non-living soil health components in conservation planning and habitat management decisions.

		2.3.5	Use standardized habitat monitoring protocols to adaptively manage conservation actions for Species of Greatest Conservation Need.
		2.3.6	Monitor quantity, distribution, and condition of major habitat components at ecologically appropriate spatial and temporal scales.
	2.4		**Evaluate threats to Species of Greatest Conservation Need and their habitats.**
		2.4.1	Identify and fill knowledge gaps for known and anticipated threats to Species of Greatest Conservation Need and their habitats.
		2.4.2	Identify, prioritize, and monitor threats and stressors to understand impacts, including cumulative effects of multiple threats, to Species of Greatest Conservation Need and their habitats.
		2.4.3	Consider future climate scenarios in conservation decisions.
	2.5		**Develop, evaluate, and adapt targeted conservation strategies by advancing applied research.**
		2.5.1	Conduct targeted, coordinated applied research to inform fish and wildlife management decisions.
		2.5.2	Monitor Pennsylvania Wildlife Action Plan implementation to adaptively manage conservation actions.
		2.5.3	Evaluate Pennsylvania Wildlife Action Plan social, ecological, and economic impacts.
3			***Contribute to range-wide conservation of Species of Greatest Conservation Need.***
	3.1		**Advance regional, national, and global species protection and management.**
		3.1.1	Consider Pennsylvania's role within U.S. regional, national, and global perspectives when identifying species and ecological communities for conservation action.
		3.1.2	Actively contribute to U.S. regional, national, and global conservation initiatives supporting Pennsylvania's Species of Greatest Conservation Need and their habitats.
		3.1.3	Encourage and engage in data sharing, compilation and analysis to foster range-wide conservation of Pennsylvania's Species of Greatest Conservation Need.
		3.1.4	Collaborate with regional research institutions to develop models and tools to support Pennsylvania's Species of Greatest Conservation Need, habitat management planning, and implementation.
		3.1.5	Address priority fish and wildlife health needs through staff and facility capacity building, prevention, surveillance, and rapid-response plans.
4			***Strengthen the state's capacity to conserve Pennsylvania's native fish and wildlife.***
	4.1		**Maintain and broaden fish and wildlife diversity conservation networks.**
		4.1.1	Foster public support for sustainable conservation funding by communicating Pennsylvania Wildlife Action Plan economic benefits.
		4.1.2	Use human dimensions research to assess Pennsylvanian's views on nongame fish and wildlife management, Pennsylvania Wildlife Action Plan, and funding.

	4.1.3	Engage Pennsylvania, U.S. regional, and national organizations and businesses to foster grassroots support of State Wildlife Action Plans and funding.
	4.1.4	Engage historic, federally recognized Pennsylvania tribal governments and members to apply traditional ecological knowledge for Species of Conservation Need recovery and habitat enhancement.
	4.1.5	Inform public leaders about Pennsylvania Wildlife Action Plan relevance to constituents and importance of stable, long-term funding for implementation.
	4.1.6	Proactively collaborate with land-use developers and the energy sector to identify conservation opportunities.
	4.1.7	Identify and engage underrepresented communities in Pennsylvania Wildlife Action Plan development and implementation.
4.2		**Bolster staff and volunteer recruitment and technical skills.**
	4.2.1	Maintain active volunteer and community science programs to support Pennsylvania's Wildlife Action Plan.
	4.2.2	Recruit and maintain well-qualified, trained, and equipped staff and volunteers in the Pennsylvania Fish and Boat Commission and Pennsylvania Game Commission.
	4.2.3	Provide staff with continuing education opportunities to support decisions based on current science and technologies.
	4.2.4	Recruit and maintain sufficient staff complement to efficiently and effectively implement programs supporting Pennsylvania's Wildlife Action Plan.
4.3		**Leverage funding to implement Pennsylvania Wildlife Action Plan priorities.**
	4.3.1	Maintain and enhance partner collaborations to maximize Pennsylvania Wildlife Action Plan implementation.
	4.3.2	Cooperatively seek funding with federal and state agency partners to support Pennsylvania Wildlife Action Plan implementation.
	4.3.3	Seek support from private foundations, individuals, corporations, and institutions for implementing Pennsylvania's Wildlife Action Plan.
5		***Foster collaboration within and among public agencies and partners to advance fish and wildlife conservation planning and implementation.***
5.1		**Champion Pennsylvania's Wildlife Action Plan as a unifying conservation blueprint.**
	5.1.1	Convene conservation partners at a frequency sufficient to assess knowledge gaps, document implementation progress**,** and ensure a relevant Pennsylvania Wildlife Action Plan.
	5.1.2	Convene and foster local and regional multidisciplinary teams to implement priorities, address emerging resource concerns, and track conservation actions.
	5.1.3	Encourage local, state, and federal governments, private landowners and other conservation partners to align conservation initiatives with Pennsylvania Wildlife Action Plan priorities.
	5.1.4	Update Pennsylvania's Wildlife Action Plan, as needed, to maintain technical and administrative relevance and complete a comprehensive review and revision by October 1, 2035.
5.2		**Engage technical experts in planning and implementation.**

	5.2.1	Coordinate with agencies, research institutions, and non-governmental organizations, especially the Pennsylvania Biological Survey, to maintain a technically current Pennsylvania Wildlife Action Plan.
	5.2.2	Encourage conservation partners to document Pennsylvania Wildlife Action Plan conservation actions in the Wildlife Action Map Conservation Action Tracker.
	5.2.3	Seek input from researchers and practitioners on implementation strategies and alternative approaches for more effective conservation actions.
5.3		**Foster partner coordination and collaboration.**
	5.3.1	Through multimedia formats, provide updates to partners on Pennsylvania Wildlife Action Plan activities and accomplishments.
	5.3.2	Maintain an active Pennsylvania Wildlife Action Advisory Committee, and other forums as needed, to foster conservation partner participation.
	5.3.3	In areas of mutual interest and activity**,** work with partner agencies and organizations to minimize duplicative efforts and foster efficiency.
5.4		**Strengthen Pennsylvania Wildlife Action Plan application within each Commission.**
	5.4.1	Develop Pennsylvania Wildlife Action Plan implementation tools and operationalize within workflows of each Commission.
	5.4.2	Increase Commission staff awareness of, and institutional support for, Pennsylvania Wildlife Action Plan content and successes using internal training and multimedia formats.
5.5		**Encourage Pennsylvania Wildlife Action Plan priority integration into local, state, and federal planning and policy development.**
	5.5.1	Support integrating Wildlife Action Plan priority species, habitats, and conservation actions into partner watershed management and work plans.
	5.5.2	Associate Pennsylvania Wildlife Action Plan priorities with relevant statewide plans.
	5.5.3	Coordinate with transportation, energy, agriculture, and environmental resource agencies to integrate wildlife conservation into infrastructure planning and permitting processes.
	5.5.4	Support policies that reduce habitat loss and incentivize private land conservation.
6		***Inspire active public participation in Pennsylvania Wildlife Action Plan development and implementation.***
6.1		**Enhance coordination among conservation partners to foster a well-informed citizenry.**
	6.1.1	Foster coordination and communication between natural resource managers, social scientists, and outreach specialists for a well-informed citizenry.
	6.1.2	Develop and disseminate Species of Greatest Conservation Need and associated habitat information through engaging formats and media.
	6.1.3	Evaluate effectiveness of public outreach efforts through statistically valid surveys and other methods.
	6.1.4	Increase outreach to current partners and engage new partners to support all aspects of the Pennsylvania Wildlife Action Plan.

	6.1.5	Regularly reassess public needs, values and expectations to identify outreach needs.
	6.1.6	Increase public awareness and understanding of natural resources, ecosystem services, and associated threats and risks to Species of Greatest Conservation Need and their habitats.
6.2		**Encourage public input and participation in wildlife management decisions and activities.**
	6.2.1	Develop and distribute beneficial management practice information to landowners, land managers, and local governmental agencies to support Pennsylvania Wildlife Action Plan implementation.
	6.2.2	Encourage open and active exchange of Pennsylvania Wildlife Action Plan information and ideas through social media, public meetings or other effective communication sources.
	6.2.3	Actively engage and inspire public participation in Pennsylvania Wildlife Action Plan planning and implementation using focused outreach and stewardship opportunities.
6.3		**Effectively convey Species of Greatest Conservation Need information.**
	6.3.1	Develop and implement a Pennsylvania Wildlife Action Plan communications strategy that includes strategic conservation messaging.
	6.3.2	Identify public nongame fish and wildlife information needs and approaches for their effective fulfillment.
	6.3.3	Provide wildlife-oriented educational experiences to public leaders, agencies, organizations, businesses, communities, and landowners.
6.4		**Connect Pennsylvania Wildlife Action Plan relevance to Pennsylvanian's quality of life.**
	6.4.1	Illustrate through multimedia formats the relationship between environmental and human health.
	6.4.2	Engage and inspire private landowners to recover Pennsylvania's Species of Greatest Conservation Need.
	6.4.3	Collaborate with traditional and non-traditional partners in public and private sectors to increase awareness of Species of Greatest Conservation Need, their habitats, and threats to these species and habitats.

State Wildlife Grants Program Achievements

20 Years of Pennsylvania Wildlife Action Plan Implementation

Recovering at-risk species and avoiding species endangerment is a long-term process, often overcoming impediments such as degraded habitats, diminished target species populations, inadequate funding, data deficiencies, and more. Fulfilling needs posed by these challenges is further burdened by extensive time often required for recovery. For example, from its federal listing in 1978, the Bald Eagle (*Haliaeetus leucocephalus*) required 29 years to be removed from the federal endangered species list (2007) (U.S. DOI 2021). Similarly, in 1978 the timber rattlesnake (*Crotalus horridus*), was listed as a Pennsylvania Candidate and required 48 years (2016) to be delisted. Though arduous and time-consuming, these successes clearly demonstrate that with sufficient resources and time, recovery is possible. Thus, when faced with hundreds of species to recover or manage, as in this plan, the tasks are truly monumental.

Credit: Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission

In 2020, in recognition of the SWG program's 20th anniversary, we compiled numerous conservation achievements program highlights (https://www.pa.gov/content/dam/copapwp-pagov/en/pgc/documents/wildlife/wildlifeactionplan/state%20wildlife%20grants%20program%2020%20years%20retrospective.pdf). In this summary, many Pennsylvania accomplishments were noted, including state delisting of 22 species. In the subsequent five years since this summary was developed, these successes have continued as an additional three species have been state-delisted (Appendix C). Yet, with these successes, vigilance is required as these species may be subject to dynamic environmental conditions which can increase their imperilment and once again become at-risk. Delisting is the primary measure of success, though it is often smaller interim successes through which recovery is eventually accomplished.

These delisting outcomes address the primary tenet of the SWG program - to avoid species endangerment, particularly at the federal level. Importantly though, the delisting pathway is complex and contingent on multiple factors including the causes of species' listing (Fig. 2). Unquestionably, SWG program funding has been instrumental in Pennsylvania's successes. The number and scope of SWG program-funded projects reflect the concerted efforts to implement the 2015-25 PA WAP. For this

summary, a comprehensive review of each project is not feasible, rather we provide an overview illustrating the progress to-date with addressing key components of this Plan.

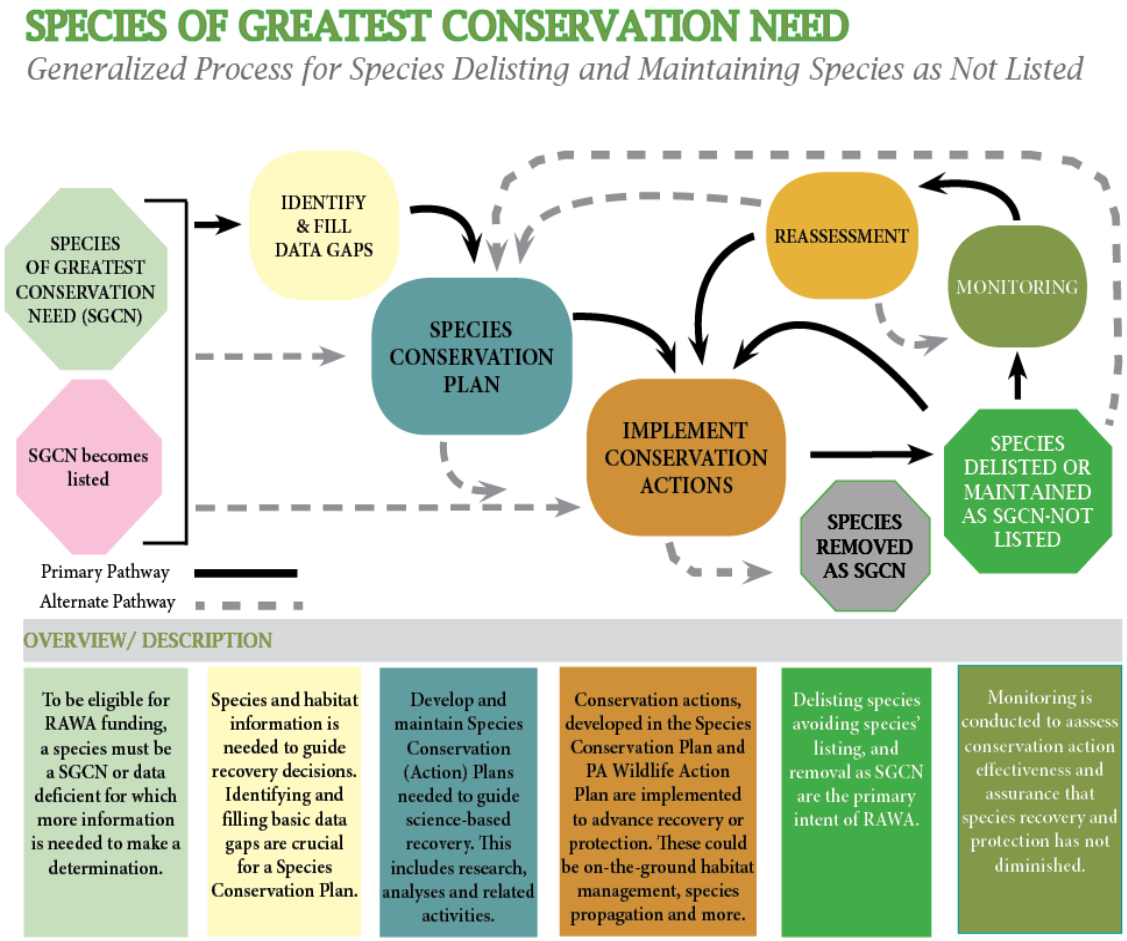

Fig. 2. Generalized process for delisting species or maintaining a species' delisted status (PFBC). Initial SGCN recovery approach contingent on data availability. Top (solid line)-data gaps need to be filled; Middle (dashed line)-Sufficient data available, Species Conservation Plan needed; Bottom (dashed line)-Species Conservation Plan available, go to Implement Conservation Actions.

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2015-25 Pennsylvania Wildlife Action Plan Implementation Recap

Overview

As a primary organizational feature, we use the 2015-2025 PA WAP Goals for this brief overview of implementation during the past 10 years. PGC and PFBC projects emphasized SGCN and habitat conservation and have been largely directed to Objectives and Strategies in Goals 1 and 2. This focus carries over from the early years of PA WAP implementation (i.e., 2005-15), when data gaps in basic information (e.g., species distribution, habitat condition) were major obstacles to developing species action plans and guiding recovery. Indeed, SWG-funded projects were instrumental for evaluating and fulfilling data needs for several priority species. So, as we progressed into the 2015-2025 PA WAP, expanded data availability offered an important opportunity to plan and implement conservation actions for SGCN recovery and long-term viability. Despite progress in filling data gaps, substantial needs remain for many species and continue to be supported through Goal 2 Objectives and Strategies and include acquiring basic SGCN data (e.g., distribution, abundance, migration) especially for higher-priority species. As we begin implementing the 2025-35 PA WAP, addressing these needs will continue to be crucial for informed management decisions.

In Pennsylvania, our historical emphasis on Goals 1 and 2 reflects greater information and implementation urgency to address vital SGCN and habitat needs. Yet, tasks were also directed to Goals 3, 4, 5, and 6, as discussed below.

Conservation Actions for Species and Habitats

Goal 1: Actively conserve Pennsylvania's native fish, wildlife, and their habitat.

Implementation Overview

Enhanced data availability was crucial for 2015-25 PA WAP implementation priorities. With targets of key habitats and critically imperiled species, extensive efforts were directed to protecting and restoring a broad range of habitats such as grasslands, forest, barrens, caves, wetlands, and rivers and streams. Allied with this work, diverse actions were taken such as manipulating bat hibernaculum temperatures to mitigate White-nose Syndrome, installing gates at cave entrances to prevent bat disturbances during hibernation, dam removal and fish passage projects to enhance aquatic habitat connectivity, recovering three raptor species, and continued forest management practices to improve bird habitat (e.g., Golden-winged Warbler *Vermivora chrysoptera*). SWG funding, leveraged with Commission and partner contributions, enabled these implementation projects.

Basic survey and inventory activities in the 2005-2015 PA WAP have become more integrated into ecosystem scale efforts such as understanding the effects of important habitat management practices (e.g., fire management) on amphibians and reptiles. Supporting species' populations not only include traditional habitat management activities but, where habitats have improved and are now suitable for species survival, "head-starting" (i.e., propagating and stocking) and translocating (i.e., stocking species from other locations) are becoming effective methods to jump-start population recovery. Head-starting and species translocation are especially beneficial for slow-growing species requiring multiple years to reach reproductive maturity (e.g., freshwater mussels- Family Unionidae, Bog Turtle *Glyptemys*

muhlenbergii), or where source populations are unlikely to naturally repopulate areas. In later years of 2015-25 PA WAP implementation, these activities became especially prominent where suitable habitats are available for supplementing or re-establishing populations (e.g., Allegheny woodrat *Neotoma magister*, Chesapeake Logperch *Percina maculata,* freshwater mussels).

Examples

- *Third Pennsylvania Bird Atlas, 2024-29 (in progress)(Case Study)*
- *2024 Pennsylvania Nongame Public Opinion Survey (Responsive Management 2024)*
- *Pennsylvania Allegheny woodrat recovery (Film; Case Study* [Chapter 9-Case Studies]*)*
- *Pennsylvania Piping Plover (Charadrius melodus) and Common Tern (Sterna hirundo) recovery*
- *Recovery of the Chesapeake Logperch, Percina bimaculata (Haldeman)*
- *SGCN Freshwater Mussel Propagation at the Union City Aquatic Conservation Center, Pennsylvania*
- *Effects of Fire-based Management Activities on Amphibians and Reptiles in Pennsylvania's State Game Lands*

Bridging Knowledge Gaps

Goal 2: Acquire and apply best available science to recover and sustain Species of Greatest Conservation Need and their habitats.

Implementation Overview

Numerous species across an environmentally dynamic landscape motivate the urgency to acquire current, comprehensive data on the SGCN distribution, abundance, population structure and other demographics. These data are especially important for guiding management decisions. Using established species listing criteria, the Commissions applied recently acquired data to evaluate the status of several state threatened and endangered species (Table 3; Appendix C). With 2005 as the baseline year, these evaluations have resulted in an improved species status that includes delisting (25) and upgrading (1) Pennsylvania Threatened, Endangered and Candidate species. Removing a species from a state threatened and endangered species list due to improved population status reduces the likelihood for federal listing. Therefore, **data acquired through SWG-funded projects are integral to congressional intent of avoiding species endangerment**. Delisting species also reduces administrative burdens and expenses associated with their protection and management and demonstrates that a threatened or endangered species designation is not permanent. With sufficient resources and safeguards, recovery can be achieved.

> *…. data acquired through SWG-funded projects are integral to congressional intent of avoiding species endangerment.*

Numerous environmental stressors, coupled with more current data reflecting increased imperilment, also contribute to the PGC and PFBC designation of 30 species at greater risk. Downgraded or diminished listings are not a positive reflection of a species' conservation status yet, early detection, along with increased understanding of factors contributing to their decline, is crucial for prompt

intervention of recovery actions for these species. Unfortunately, our work has also found six species to be “extirpated or unrecoverable” in Pennsylvania. These losses have been underway for decades prior to availability of specific funds (e.g., SWG) to address these species’ needs. Often these extirpations were due to diminished suitable habitat; exemplifying the critical need for ongoing funding to avoid future losses which diminish species richness.

We have conducted targeted species surveys (e.g., Western Pennsylvania Crayfish Survey) to support species management decisions and, with ongoing collection and analysis, these data can extend our understanding of conservation actions at the ecosystem-scale, as well as effects on non-target species. To advance this ecosystem assessment we are continuing data acquisition such as multi-species monitoring (e.g., Motus Wildlife Tracking) and further considering landscape-level assessment for sound cost/benefit analyses of conservation actions. These data can also help discern implications of multi-dimensional threats (e.g., encroachment, habitat fragmentation, invasive species, climate change). Allied with these data, we have developed mechanisms to share non-sensitive information in web-accessible and concise formats (e.g., Conservation Opportunity Area Tool, Species Action Plans) to support an engaged conservation public.

<u>Examples</u>

- *Western PA Crayfish Inventory and Conservation Assessments*
- *Species Action Plans -Southeastern Mud Turtle (Kinosternon subrubrum subrubrum), Pistolgrip (Tritogonia verrucosa), Salamander Mussel (Simpsonaias ambigua), Longnose Sucker (Catostomus catostomus)*
- *Developing the Wildlife Action Map (WAM) which includes the publicly accessible, web-based tools- the Conservation Opportunity Area (COA) and Conservation Action Tracker.*
- *American Goshawk (Astur atricapillus) regional monitoring*
- *Motus Wildlife Tracking (Case Study)*
- *Small mammal SGCN surveys*

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Table 3. Summary of state regulatory status (endangered, threatened, candidate) for Pennsylvania SGCN during the period 2005-15 and subsequent changes in the period 2015-25. See **Appendix C** for detailed list of species and status changes.

	Status (2005-15)				**Status (2015-25)**				
	Endangered	Threatened	Candidate	Not listed	Endangered	Threatened	Candidate	De-listed, Recovered	De-listed Unrecoverable)
Birds	1	3		5	3	4		3	
Mammals	1			4	4				1
Fishes	5	11	10	4	4	1	0	21	5
Amphibians	1			2	2	1			
Reptiles		1	1	1	2			1	
Mussels				9	7	2			
Crayfishes				1	1				

Multi-state Conservation

Goal 3: Contribute to range-wide conservation of Species of Greatest Conservation Need.

Implementation Overview

In each northeast state's 2025-35 WAP is a conservation action to address regional needs. Regional conservation actions are, in part, implemented through the Regional Conservation Needs (RCN) Program which formalizes cooperative efforts to address SGCN among northeast states and aligns with national guidance (AFWA 2021). This program develops, coordinates, and implements regional/sub-regional conservation actions, using a funding mechanism equitable to all Northeast states and District of Columbia to fund regional projects, of which over 50 projects have been selected since 2007.

Credit: Association of Fish and Wildlife Agencies (AFWA).

Shortly after they were published, the 2005-15 SWAPs catalyzed multi-state collaboration in the Northeast with regional monitoring framework development (Foundations of Success 2008) and classifications for terrestrial (Gawler 2008) and aquatic (Olivero and Anderson 2008) habitats. It was through these early projects that multi-state

administrative hurdles (e.g., distribution of funds among states) were identified and eventually addressed through the RCN program.

In 2007, the RCN program was established yielding regional habitat maps with consistent regional habitat terminology, and metrics for measuring SWAP based effectiveness and project specific outcomes and strategies. At the conclusion of this initial phase (i.e., RCN 1), RCN 2 began in 2018 and included special projects to:

- Conserve five priority Regional Species of Greatest Conservation Need turtles (i.e., Blanding's, Eastern Box, Wood, Spotted Turtles, and Northern Diamondback Terrapins).
- Restore and enhance habitats, with emphasis on early successional habitats, to benefit native pollinators.
- Add new information to the Northeast Regional SWAP Database, to support ongoing collaborative work by states, the USFWS, and partners.
- Implement conservation for Regional SGCN (RSGCN)while influencing regional and national conservation by developing technical tools and communication products that clearly define Northeast regional conservation needs and priorities.
- Conduct three investigations necessary to develop the 2025 WAPs (i.e., 2022 Northeast Lexicon project, 2023 Northeast Conservation Synthesis, and 2023 Conservation Status of Fish, Wildlife, and Natural Habitats in the Northeast).

In 2023, as RCN 2 concluded, RCN 3 started and, with this plan's publication, includes projects noted below. Substantial administrative and logistical hurdles are often encountered in multi-state projects, yet the work is essential for range-wide species recovery and management and further supports congressional intent of the SWG program to avoid species imperilment.

Other funding sources, such as Competitive SWG, also support multi-state initiatives. Pennsylvania has participated in these projects which importantly advance range-wide species conservation and coordination.

Additionally, to support hemispheric conservation of migratory birds, the Pennsylvania Game Commission has contributed to AFWA's Southern Wings program annually. Pennsylvania's SGCN songbirds spend up to 8 months of the year on the wintering grounds in Central and South America. Southern Wings, created in 2009 and coordinated by AFWA, "connects state agencies with partners working towards habitat conservation, management, and research on priority migratory birds."

<u>Examples</u>

- *PGC and PFBC Participation in the Regional Conservation Needs (RCN 3) Grant Program with projects including:* 1-Overall Grant Administration; 2-Invertebrate Coordination; 3-Tiger Beetle status assessment and survey methods; 4- Stonefly status assessment; 5- Northern diamondback terrapin; 6-Renewable Energy White Paper/Impact Analysis; 7-Technical Support Services.

- *Competitive SWG: Northeast Motus Collaboration, Bog Turtle Conservation Planning, Population Inventory & Monitoring Regional Data Assimilation and Population and Habitat Management Actions, Modernizing the Northeast Wildlife Action Plan Database (NEAFWA)*
- *Northeast Regional Fish and Wildlife Conservation Hub. Competitive SWG hosted by Northeast Association of Fish and Wildlife Agencies (NEAFWA).*

Supporting Conservation Needs

Goal 4: Strengthen the state's capacity to conserve Pennsylvania's native wildlife.

Implementation Overview

The Commissions have enhanced their capacity to protect the commonwealth's SGCN and habitats by expanding fish and wildlife diversity program staffing for environmental reviews, taxonomic studies, and technical assistance to landowners. The PGC fosters private land stewardship with regional wildlife diversity biologists who support and guide private landowners toward the most appropriate habitat management practices for their property. The PFBC also supports private landowner initiatives to enhance instream and riparian buffers and recently increased staff capacity to propagate mussels, Blanding's Turtles, and Chesapeake Logperch at the Union City Aquatic Conservation Center. As funding becomes available, the PFBC anticipates expanding propagation activities to other nongame fishes, turtles, and crayfishes.

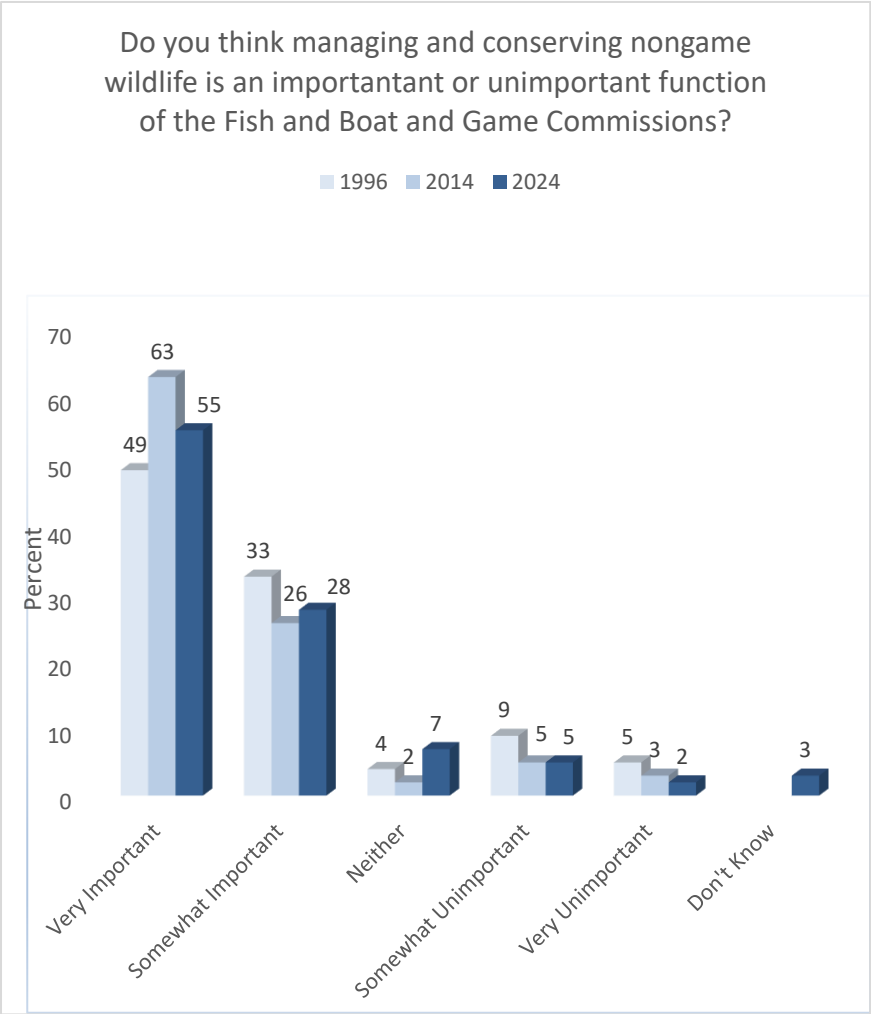

Fig. 3. Change in public opinion, 1996-2024, for nongame wildlife conservation and management by the Fish and Boat Commission and Game Commission (Responsive Management 1996, 2014, 2024).

It is also through public opinion surveys that we find strong support for nongame species work by the Commissions. Since 1996, Pennsylvanians have recognized managing and conserving nongame fish and wildlife to be important

work, with 82 to 89% (combined "very important" and "somewhat important" categories) favoring the efforts (Fig. 3). Further support of nongame work was observed in 2024, when survey respondents were asked about their sentiments for dedicated nongame funding. Overwhelmingly, (78%) strongly or moderately supported dedicated funding for this purpose (Fig. 4) (Responsive Management 2024; see Chapter 8-Public Participation). This positive sentiment regarding nongame wildlife has endured for decades (Responsive Management 1996, 2014, 2024).

Pennsylvanians support nongame conservation and management and favor funding this work, and an engaged and informed public is essential for successful PA WAP implementation. Additionally, it is important to keep public leaders well-informed about this work. We have worked to advance this information sharing by providing technical information on conservation work supporting the PA WAP. (See Chapter 8, Public Participation for more outreach information).

Leveraging federal funds with non-federal sources could not be possible without a shared vision and common goals with Pennsylvania's conservation community. For example, each year PA DCNR enlists input from the PGC and PFBC to identify funding priorities through Pennsylvania's Wild Resources Conservation program grants (https://www.pa.gov/agencies/dcnr/conservation/wildlife-biodiversity/wild-resources-conservation-program). By annually identifying common project

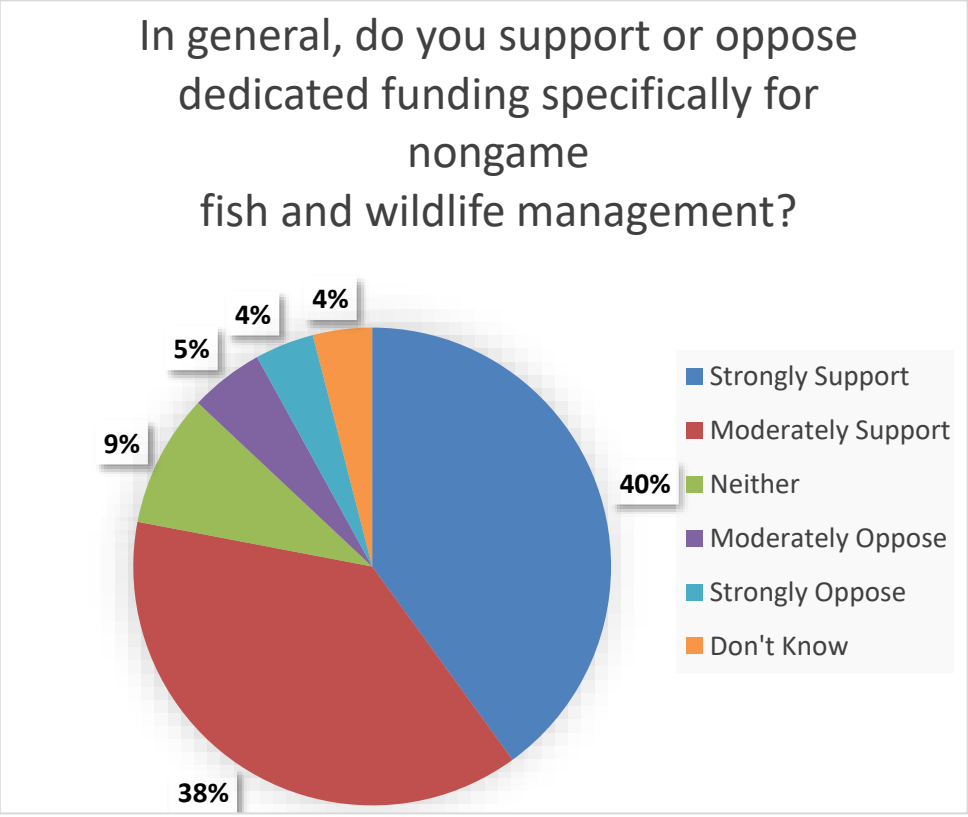

Fig. 4. Survey respondent sentiments regarding support for dedicated nongame fish and wildlife funding (Responsive Management 2024).

requirements, crucial non-federal matching funds have been available for compatible SWG projects. Further, working closely with federal partners, such as the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS)-Pennsylvania Office and USFWS, Pennsylvania Field Office, has allowed federal funding beyond SWG to be directed to PA WAP priority species, such as Golden-winged Warbler and bog turtle (USDA-NRCS Golden-winged Warbler Conservation (https://www.nrcs.usda.gov/state-offices/pennsylvania/golden-winged-warbler-conservation); Bog Turtle (https://www.nrcs.usda.gov/programs-initiatives/working-lands-for-wildlife/bog-turtle) and Chesapeake Logperch (USFWS, Science Applications). The Commissions greatly value our partnerships and remain steadfast in fostering current and new collaborative initiatives.

The Commissions and conservation partners continue to seek opportunities that go beyond current funding support for the PA WAP, to establish dedicated federal funding and stable non-federal funding sources with amounts and availability commensurate with the need.

Coordination and Collaboration

Goal 5: Foster collaboration among public agencies and other partners in wildlife conservation planning and implementation.

Implementation Overview

Pennsylvania hosts a broad, active coalition of governmental agencies (i.e., federal, state, county, local), non-governmental organizations, research and educational institutions, private foundations, corporations and private landowners with common interests to ensure the long-term viability of Pennsylvania's natural heritage. Partnerships can take many forms including participating in the PA WAP Advisory Committee or taxonomic experts collaborating by bringing together data and materials expanding the wealth and understanding of Pennsylvania's species and habitats. In 2024, the PGC and PFBC jointly hosted the Fish & Wildlife Diversity Forum which brought together 82 participants from federal and state agencies, research institutions, and non-governmental organizations to provide a collective view of resource concerns across Pennsylvania and potential actions to address the concerns (see Chapter 7-Partner Coordination).

Examples:

- *2024 Fish & Wildlife Diversity Forum*

Information Sharing to Advance Conservation Knowledge

Goal 6: Support and inspire a knowledgeable citizenry that participates in wildlife conservation.

Implementation Overview

Since 2005, the PGC, through its Private Landowner Assistance Program (PLAP) (https://www.pa.gov/agencies/pgc/habitat-management/landowner-assistance/private-landowner-assistance-program), has been providing technical assistance to private landowners interested in promoting SGCN on their property. This work supports good land stewardship and species' habitat needs. Between October 2015 and October 2025, PGC regional biologists completed 871 site visits and wrote 784 private land plans covering 151,739 acres.

Unfortunately, immediate needs of data acquisition, species protection, and habitat management, coupled with insufficient funding, have limited capacity to implement Goal 6. Though few SWG-funded projects have addressed this Goal, information from these projects has proven valuable and vital. Throughout the 2015-25 PA WAP, we used an array of media (e.g., presentations, fact sheets), and later in the Plan, social media, to expand outreach on SGCN, habitats, tools to support public use of the PA WAP (e.g., COA and CAT) and more. Interestingly, during this time, public awareness and familiarity of the PA WAP increased from 12% (Responsive Management 2014) to 53% (Responsive Management 2024) (includes combined categories of "very familiar", "somewhat familiar", "not at all familiar with it but heard of it"). Continuing and expanding outreach in the 2025-35 PA WAP will be crucial to inspire public participation.

Reflecting the Commissions outreach efforts during the 2015-25 PA WAP, Pennsylvanians also consider it important (> 86% for "Very Important" and "Somewhat important" combined) for the Commission's to keep them apprised about nongame wildlife (Fig. 5) (Responsive Management 2024).

For the 2025-35 PA WAP, the 2024 Nongame Survey (Responsive Management 2024) is providing statistically valid data to guide outreach on issues and opportunities pertaining to Pennsylvania's SGCN and their habitats.

Examples

- *2024 Pennsylvania Residents' Nongame Public Opinion Survey*
- *PGC Private Landowners Assistance Program (PLAP)*
- *Implementing & Coordinating the 2015 Pennsylvania Wildlife Action Plan: Pennsylvania Fish and Boat Commission*
- *Developing the 2025-2035 PA Wildlife Action Plan-Pennsylvania Fish and Boat Commission*

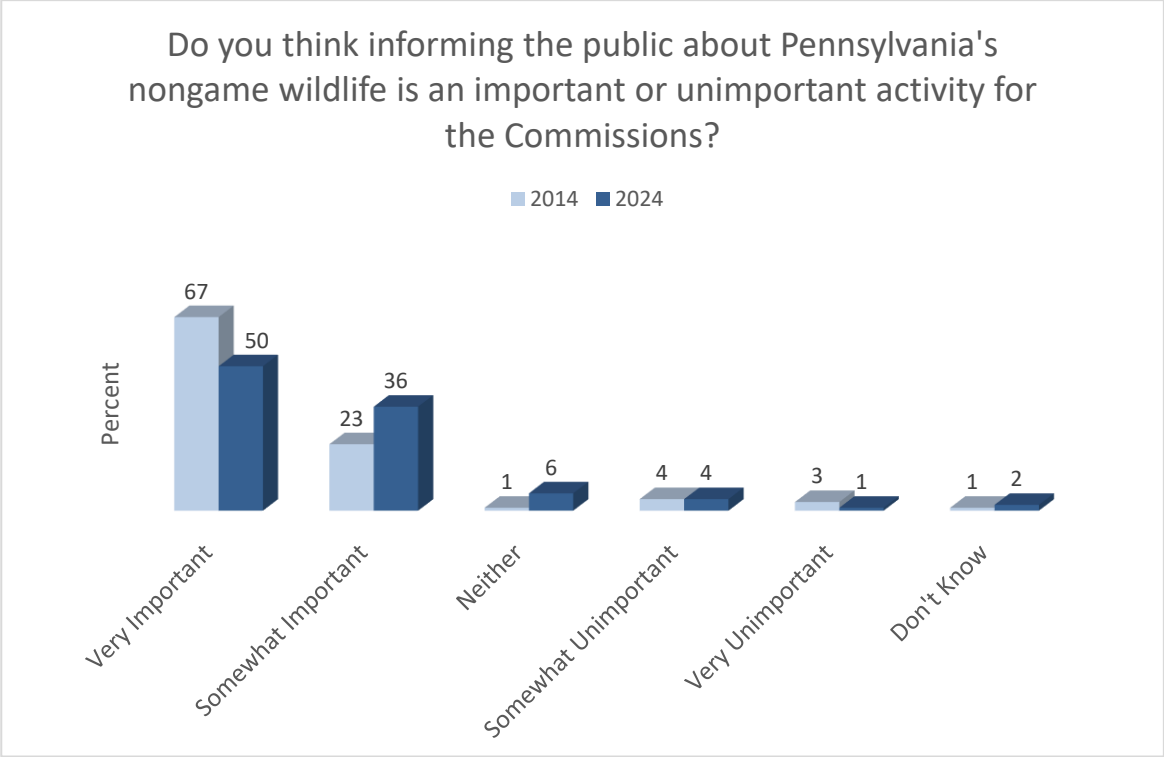

Fig. 5. Public attitudes on the importance of the Commissions informing the public about Pennsylvania's nongame wildlife (Responsive Management 2014, 2024). Note: The 2014 survey used the term "educating" instead of "informing".

Summary and Opportunities

The 2025-35 PA WAP is an investment in the Commonwealth's natural heritage with benefits extending well beyond the next decade and is thus pivotal for long-term SGCN recovery and habitat protection. Reflecting on the past 10 years, the 2015-25 PA WAP exemplifies a dedicated and ongoing commitment to science-based conservation and fostering partnerships to protect vulnerable species and their habitats while avoiding long-term species decline and potential extirpation.

Pennsylvanians are knowledgeable and enthusiastic about protecting the Commonwealth's fish, wildlife, and habitats upon which they depend (Responsive Management 1996, 2014, 2024) and, through its extensive information, the 2025-35 PA WAP assists community conservation and partner initiatives. Among this information is the SGCN list and associated species accounts, extent and condition of their habitats, threats to SGCN and habitats, conservation actions to address threats, monitoring information, public and partner participation, and more. With these crucial components, the 2025-35 PA WAP highlights the need to monitor species and habitats and, to remain a viable conservation tool, the need for comprehensive review and revision at least once every 10 years. The 2025-35 PA WAP also identifies who will be working to address these needs (in species accounts), and how conservation partners and the public can engage in plan implementation. Seizing these prospects, we will use this Plan to inform and inspire both long-term partners and new constituencies.

Over the next 10 years, we anticipate new technologies will enhance data-sharing capabilities and further support partner and public engagement. In Pennsylvania, this data collaboration is occurring through various community projects (e.g., Pennsylvania Amphibian and Reptile Survey-PARS, https://www.paherpsurvey.org/, Pennsylvania eBird, https://ebird.org/region/US-PA, 3rd Pennsylvania Breeding Bird Atlas, https://www.hawkmountain.org/conservation-science/third-pa-bird-atlas) that allow web-based access by volunteers to document observations and share digital images. In 2015 we wrote about the need to track substantive PA WAP implementation, beyond achievements specifically conducted through the Commission's SWG-funded projects. Supported by the 2015-25 PA WAP Steering and Advisory Committees we subsequently developed the PA WAP Conservation Opportunity Area (COA) Tool and Conservation Action Tracker (CAT) within the Wildlife Action Map (WAM). As conservation partners voluntarily share their data through this tool, we anticipate this collaboration will further enhance conservation action implementation. Expanding and improving coordination among public agencies and other conservation partners will energize ongoing plan implementation with critical support for Pennsylvania's SGCN. Through this plan, let's continue the journey to *advance Pennsylvania's at-risk fish and wildlife conservation into the next decade.*

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Appendix A

2025-35 Pennsylvania Wildlife Action Plan Contributors

APPENDIX A. 2025-2035 Pennsylvania Wildlife Action Plan contributors.

Name	Affiliation	Steering Committee	Advisory Committee	Species Assessment, Accounts & Data Management	Habitat Work Group	Special Assessments (Wildlife Health, Invasive Species, Fire Management)	Case Study Author	Communications (e.g., web development, news releases)	Other Contributors (Internal or External) FWD Participants, Facilitators, Recorders	Administrative & Technical Assistance
KRISTOPHER ABELL, PH.D.	Pennsylvania Department of Agriculture						●			
WENDY ANDERSEN	U.S. Department of Agriculture, Forest Service, Allegheny National Forest								●	
BOB ANDERSON	U.S. Fish and Wildlife Service, Pennsylvania Field Office *(retired)*								●	
HARLEY ARNOLD	Pennsylvania Game Commission									●
DAVE AURAND	Pennsylvania Game Commission									●
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ELLYN CAMPBELL	Susquehanna River Basin Commission		●							

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LAUREN FERRERI	Pennsylvania Game Commission									
STEVE FERRERI	Pennsylvania Game Commission									●
ALISON FETTERMAN	Willistown Conservation Trust						●			

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JEREMY JONES	Pennsylvania Game Commission									●
STEFAN KARKUFF	Pennsylvania Game Commission			●					●	
BRANDON KARLHEIM	Pennsylvania Game Commission									●
PHILIP KASPER	Pennsylvania Game Commission									●
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RODNEY MEE	Pennsylvania Game Commission									●
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Appendix B

Terms and Abbreviations

Appendix B. Terms and Abbreviations.

AFWA	Association of Fish and Wildlife Agencies
AIS	Aquatic Invasive Species
AML	Abandoned Mine Lands
ASMFC	Atlantic States Marine Fisheries Commission
BBS	Breeding Bird Survey
BMP	Best Management Practice
BWHM	Bureau of Wildlife Habitat Management
BWM	Bureau of Wildlife Management
CAT	Conservation Action Tracker
CCVA	Climate Change Vulnerability Assessment
CCVI	Climate Change Vulnerability Index
CMP	Conservation Measures Partnership
COA Tool	Conservation Opportunity Area Tool
CRA	Chiapas Regional Alliance
EPCAMR	Eastern Pennsylvania Abandoned Mine Reclamation
FIA	Forest Inventory Analysis (U.S. Forest Service)
FSA	Farm Service Agency
HABS	Harmful Algal Blooms
HWA	Hemlock Woolly Adelgid
GCM	General Circulation Model
IPCC	International Panel on Climate Change
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature
LCI	Landscape Condition Index (synonymous with Landscape Context Index)
MW	MegaWatt
NAAT	National Advisory Acceptance Team
NABCI	North American Bird Conservation Initiative
NEAFWA	Northeast Association of Fish and Wildlife Agencies
NECASC	Northeast Climate Adaptation Science Center
NEFWDTC	Northeast Fish and Wildlife Diversity Technical Committee
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NGO	Non-governmental organization
NOAA	National Oceanographic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
NWI	National Wetland Inventory
Pa.B	Pennsylvania Bulletin
PABS	Pennsylvania Biological Survey
PA DCNR	Pennsylvania Department of Conservation and Natural Resources
PA DEP	Pennsylvania Department of Environmental Protection
PARS	Pennsylvania Amphibian and Reptile Survey

PA WAP	Pennsylvania Wildlife Action Plan
PDA	Pennsylvania Department of Agriculture
PennDOT	Pennsylvania Department of Transportation
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PGISC	Pennsylvania Governor's Invasive Species Council
PLAP	Private Landowner Assistance Program
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
RCN	Regional Conservation Needs
RRT	Regional Review Team
RSGCN	Regional Species of Greatest Conservation Need
SGCN	Species of Greatest Conservation Need
SGL	State Game Land
SLR	Sea-Level Rise
SMCRA	Surface Mining Control and Reclamation Act
SRBC	Susquehanna River Basin Commission
SWAP	State Wildlife Action Plan
SWG	State & Tribal Wildlife Grants Program
T&E	Threatened & Endangered (species)
TNC	The Nature Conservancy
USACOE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDA-FS	U.S. Department of Agriculture-Forest Service
USDA-FSA	U.S. Department of Agriculture-Farm Service Agency
USDA-NRCS	U.S. Department of Agriculture-Natural Resources Conservation Service
USDOI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
USFWS-OCI	U.S. Fish and Wildlife Service-Office of Conservation Investment
USGS	U.S. Geological Survey
WAM	Wildlife Action Map (web-based tool consisting of the COA Tool and CAT)
WBSRWC	West Branch Susquehanna River Watershed Coalition
WNS	White-nose syndrome
WPC	Western Pennsylvania Conservancy
WPCAMR	Western Pennsylvania Coalition for Abandoned Mine Reclamation
WSFR	Wildlife and Sport Fish Restoration (now Office of Conservation Investment)

Appendix C. Status changes and current list of Pennsylvania endangered, threatened, and candidate species as of publication date.

			Prior status					Current Status				TOTALS				
												6	26	30		
Taxonomic Group	**Common Name**	**Scientific Name**	**Endangered**	**Threatened**	**Candidate**	**Not listed**		**Endangered**	**Threatened**	**Candidate**	**De-listed**	**Unrecoverable**	**Delisted, Upgraded, Recovered**	**Newly Listed, Downgraded**	**RULEMAKING DATE**	**PA BULLETIN ISSUE**
Bird	Peregrine Falcon	*Falco peregrinus anataum*		X							X[p]		**1**		10/23/21	51 Pa.B. 6609
Bird	Peregrine Falcon	*Falco peregrinus anataum*	X						X[o]				See row above		03/23/19	49 Pa.B. 1362
Bird	Piping Plover	*Charadrius melodus*				X		X[i]						**1**	03/23/19	49 Pa.B. 1362
Bird	Red Knot	*Calidris canutus rufa*				X			X					**1**	03/23/19	49 Pa.B. 1362
Bird	Osprey	*Pandion haliaetus*									X[n]		**1**		03/11/17	47 Pa.B. 1467
Bird	Bald Eagle	*Haliaeetus leucocephalus*		X							X[h]		**1**		03/15/14	44 Pa.B. 1429
Bird	Upland Sandpiper	*Batramia longicauda*		X				X[i]						**1**	11/17/12	42 Pa.B. 7106
Bird	Long-eared Owl	*Asio otus*				X			X[i]					**1**	11/17/12	42 Pa.B. 7106
Bird	Northern Harrier	*Circus cyaneus*				X			X[i]					**1**	11/17/12	42 Pa.B. 7106
Bird	Black Rail	*Laterallus jamaicensis*				X			X					**1**	03/16/24	49 PA.B. 1362

Appendix C

Status Changes in Pennsylvania Endangered, Threatened, and Candidate Species since 2005

Bird	American Goshawk	*Accipiter gentilis*				X		X[p]						**1**	10/23/21	51 Pa.B. 6609
Mammal	Delmarva fox squirrel	*Sciurus niger niger*	X								X[m]	**1**			11/07/15	45 Pa.B. 6501
Mammal	Northern flying squirrel	*Glaucomys sabrinus macrotis*				X		X[j]						**1**	12/22/07	37 Pa.B. 6748
Mammal	Northern Long-eared bat	*Myotis septentrionalis*				X		X						**1**	03/23/19	49 Pa.B. 1362
Mammal	Tricolored bat	*Perimyotis subflavus*				X		X						**1**	03/23/19	49 Pa.B. 1362
Mammal	Little Brown Bat	*Myotis lucifugus*				X		X						**1**	03/23/19	49 Pa.B. 1362
Fish	Black Bullhead	*Ameiuris melas*	X								X[q]	**1**			03/02/24	54 Pa.B. 1054
Fish	Threespine Stickleback	*Gasterosteus aculeatus*	X								X[q]	**1**			03/02/24	54 Pa.B. 1054
Fish	Least Brook Lamprey	*Lampetra aepyptera*			X						X[q]		**1**		03/02/24	54 Pa.B. 1054
Fish	Brook Stickleback	Culaea inconstans			X						X[q]		**1**		03/02/24	54 Pa.B. 1054
Fish	Pugnose Minnow	*Opsopoeodus emiliae*				X[o]		X[o]						**1**	03/16/19	49.Pa.B.1323
Fish	Blacknose Shiner	*Notropis heterolepis*				X[o]		X[o]						**1**	03/16/19	49.Pa.B.1323
Fish	Banded Sunfish	*Enneacanthus obesus*	X								X[o]	**1**			03/16/19	49.Pa.B.1323

Fish	Gravel Chub	*Erimystax x-punctatus*	X								X[o]	**1**			03/16/19	49.Pa.B.1323
Fish	Central Mudminnow	*Umbra limi*			X						X[o]		**1**		03/16/19	49.Pa.B.1323
Fish	Eastern Mudminnow	*Umbra pygmaea*			X						X[o]		**1**		03/16/19	49.Pa.B.1323
Fish	Hornyhead Chub	*Nocomis biguttatus*			X			X[l]						**1**	09/03/16	46 Pa.B. 5731
Fish	Mountain Brook Lamprey	*Ichthyomyzon greeleyi*		X							X[l]		**1**		09/03/16	46 Pa.B. 5731
Fish	Ohio Lamprey	*Ichthyomyzon bdellium*			X						X[l]		**1**		09/03/16	46 Pa.B. 5731
Fish	Bowfin	*Amia calva*			X						X[l]		**1**		09/03/16	46 Pa.B. 5731
Fish	Bluebreast Darter	*Etheostoma camrum*		X							X[k]		**1**		07/18/15	45 Pa.B. 3841
Fish	Spotted Darter	*Etheostoma maculatum*		X							X[k]		**1**		07/18/15	45 Pa.B. 3841
Fish	Tippecanoe Darter	*Etheostoma tippecanoe*		X							X[k]		**1**		07/18/15	45 Pa.B. 3841
Fish	Gilt Darter	*Percina evides*		X							X[k]		**1**		07/18/15	45 Pa.B. 3841
Fish	American Brook Lamprey	*Lampetra appendix*			X						X[c]		**1**		12/22/12	42 Pa.B. 7684
Fish	Chesapeake Logperch	*Percina bimaculata*				X			X[c]					**1**	12/22/12	42 Pa.B. 7684
Fish	Silver Chub	*Macrhybopsis storeriana*	X								X[b]		**1**		07/03/10	40 Pa.B. 3664
Fish	Goldeye	*Hiodon alosoides*		X							X[b]	**1**			07/03/10	40 Pa.B. 3664

Fish	Mooneye	*Hiodon tergisus*		X							X[b]		**1**		07/03/10	40 Pa.B. 3664
Fish	Skipjack Herring	*Alosa chrysochloris*		X							X[b]		**1**		07/03/10	40 Pa.B. 3664
Fish	Brook Silverside	*Labidesthes sicculus*			X						X[b]		**1**		07/03/10	40 Pa.B. 3664
Fish	Northern redbelly dace	*Phoxinus eos*				X		X[b]						**1**	07/03/10	40 Pa.B. 3664
Fish	Smallmouth Buffalo	*Ictiobus bubalus*		X							X[a]		**1**		03/07/09	39 Pa.B. 1202
Fish	Longhead Darter	*Percina macrocephala*		X							X[a]		**1**		03/07/09	39 Pa.B. 1202
Fish	Channel Darter	*Percina copelandi*		X							X[a]		**1**		03/07/09	39 Pa.B. 1202
Fish	River Redhorse	*Moxostoma carinatum*			X						X[a]		**1**		03/07/09	39 Pa.B. 1202
Fish	Longnose Gar	*Lepisteous osseus*			X						X[a]		**1**		03/07/09	39 Pa.B. 1202
Amphibian	Northern Cricket Frog	*Acris crepitans*				X		X[b]						**1**	07/03/10	40 Pa.B. 3664
Amphibian	Blue-spotted Salamander	*Ambystoma laterale*				X		X[b]						**1**	07/03/10	40 Pa.B. 3664
Amphibian	Eastern Spadefoot Toad	*Scaphiopus holbrookii holbrookii*	X[d] (2005)						X[e]				**1**		12/07/13	43 Pa.B. 7085
Reptile	Timber Rattlesnake	*Crotalus horridus*			X						X[l]		**1**		09/03/16	46 Pa.B. 5731
Reptile	Eastern Mud Turtle	*Kinosternon subrubrum subrubrum*				X		X[c]						**1**	12/22/12	42 Pa.B. 7684
Reptile	Rough Green Snake	*Opheodrys aestivus*		X				X[d]						**1**	09/10/05	35 Pa.B. 5010

Invertebrate -Crayfishes	Digger Crayfish	*Creaserinus fodiens*				X		X[q]						**1**	03/02/24	54 Pa.B. 1054
Invertebrate -Mussel	Longsolid	*Fusconaia subrotunda*				X			X[q]					**1**	03/02/24	54 Pa.B. 1054
Invertebrate -Mussel	Round hickorynut mussel	*Obovaria subrotunda*				X		X[c]						**1**	12/22/12	42 Pa.B. 7684
Invertebrate -Mussel	Pistolgrip mussel	*Quadrula verrucosa*				X		X[c]						**1**	12/22/12	42 Pa.B. 7684
Invertebrate -Mussel	Rayed bean mussel	*Villosa fabalis*				X		X[c]						**1**	12/22/12	42 Pa.B. 7684
Invertebrate -Mussel	Salamander mussel	*Simpsonaias ambigua*				X		X[g]						**1**	01/30/10	40 Pa.B. 620
Invertebrate -Mussel	Rabbitsfoot mussel	*Quadrula cylindrica cylindrica*				X		X[f]						**1**	07/11/09	39 Pa.B. 3442
Invertebrate -Mussel	Snuffbox mussel	*Epioblasma triquetra*				X		X[f]						**1**	07/11/09	39 Pa.B. 3442
Invertebrate -Mussel	Sheepnose mussel	*Plethobasus cyphyus*				X			X[f]					**1**	07/11/09	39 Pa.B. 3442
Invertebrate -Mussel	Eastern pearlshell mussel	*Margaritifera margaritifera*				X		X[d]						**1**	09/10/05	35 Pa.B. 5010