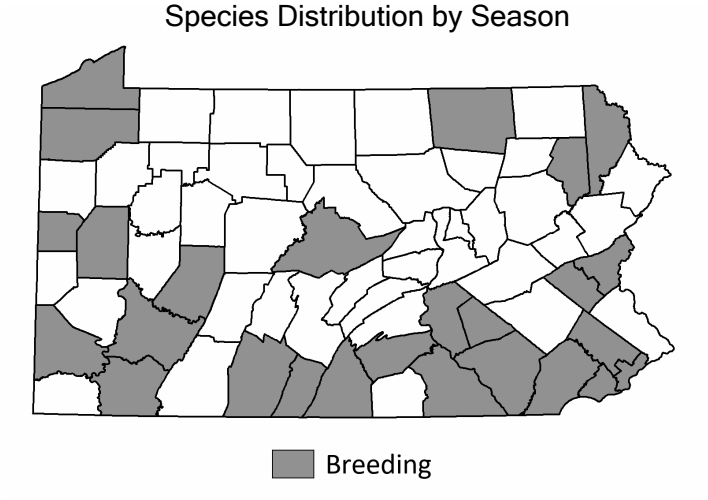
PENNSYLVANIA
WILDLIFE ACTION PLAN

Blue-winged Teal

Spatula discors

Molly M. Giles — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Stabilize the historically declining breeding population size and develop better estimates of the breeding distribution.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Wetlands, particularly emergent marshes, vernal wetlands, and lakes and ponds with emergent aquatic vegetation. Shallow wetlands are preferred, and teal are often associated with wetlands of high quality. Grasslands, including idle agricultural habitats or hayfields, that are adjacent to wetlands are used as nesting sites.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Medium

Specific Threat: Inadequate or poorly utilized water control structures.

Action Category: Manage non-living habitat components

Specific Action: Ensure proper annual flooding regimes in managed wetlands with water control structures.

Objective: Monitor water levels in managed wetlands for optimal conditions.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of wetland acres protected and under management.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged teal, American Coot, Common Gallinule

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss of quality wetland acreage and disruptions to natural wetland hydrology.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve priority wetlands and associated upland nesting areas.

Objective: Protect existing quality wetland habitats and associated upland nesting areas and reduce annual losses of wetlands within the state.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Annual assessments of wetland acres gain or lost.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged teal, American Coot, Common Gallinule

Season: Breeding

Priority	Need	Partners
1	Determine landscape-level impacts of Farm Bill conservation policy on habitat quality for Blue-winged Teal and other species reliant upon a mix of wetland and grassland habitats.	Non-governmental organizations, Pennsylvania Game Commission, Other state agency, U.S. Department of Agriculture-Natural Resources Conservation Service
2	Develop best management practices for nesting Blue-winged Teal and grassland birds in wetland and agricultural landscapes.	Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Other state agency

Season: Breeding

Priority	Survey	Partners
1	Development of a procedure to achieve regular and standardized compilation of data collected through non-species-specific monitoring programs (e.g., eBird) on numbers and locations of breeding Blue-winged Teal.	Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service
2	Conduct a comprehensive assessment of wetland and grassland habitats and their quality to support Blue-winged Teal and other wetland and grassland dependent Species of Greatest Conservation Need.	Non-governmental organizations, Other state agency, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Name: Atlantic Flyway Breeding Waterfowl Survey **Lead(s) :** U.S. Fish & Wildlife Service

Link: N/A

Description: This survey has been conducted annually since 1989 in Pennsylvania and other Atlantic Flyway states from Virginia to New Hampshire. It provides breeding population estimates for the major breeding waterfowl species. A total of 327 1-km2 plots are surveyed across six physiographic regions of Pennsylvania using a stratified random design.

Comments: Survey plots are monitored annually by Pennsylvania Game Commission personnel.

Monitoring Need:

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Preseason duck banding **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/bird-banding-conservation-tool-within-migratory-bird-program-ducks-geese-doves-and-more

Description: Banding occurs August-September, prior to the onset of the hunting season. Banding of birds at this time provides waterfowl population harvest and survival rate estimates.

Comments: Trapping and banding in Pennsylvania is performed by Pennsylvania Game Commission personnel.

Monitoring Need:

Name: U.S. Fish and Wildlife Service Harvest Information Program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need:

Baldassarre, G. 2014. Ducks, Geese, and Swans of North America. Volume 1. Johns Hopkins University Press, Baltimore, Maryland.

Hoyt, Amanda. 2024. Waterfowl population monitoring. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Jacobs, K. 2012. Blue-winged Teal. Pages 100-101 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Jacobs, K. J. 2014. Atlantic Flyway Breeding Waterfowl Survey Results in Pennsylvania. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Jacobs, K.J. and I.D. Gregg. 2013. Waterfowl population monitoring. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Raftovich, R. V., K. K. Fleming, S. C. Chandler, and C. M. Cain. 2024. Migratory Bird Hunting Activity and Harvest during the 2022–23 and 2023–24 Hunting Seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

USFWS (U.S. Fish and Wildlife Service) 2024. Waterfowl population status, 2024. U.S. Department of the Interior, Washington, D.C.

USFWS (U.S. Fish and Wildlife Service)2014. Waterfowl population status, 2014. U.S. Department of the Interior, Washington, D.C.

Zimpfer, N. L., W. E. Rhodes, E. D. Silverman, G. S. Zimmerman, and K. D. Richkus. 2014. Trends in Duck Breeding Populations, 1955-2014. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Laurel, Maryland.

PENNSYLVANIA
WILDLIFE ACTION PLAN

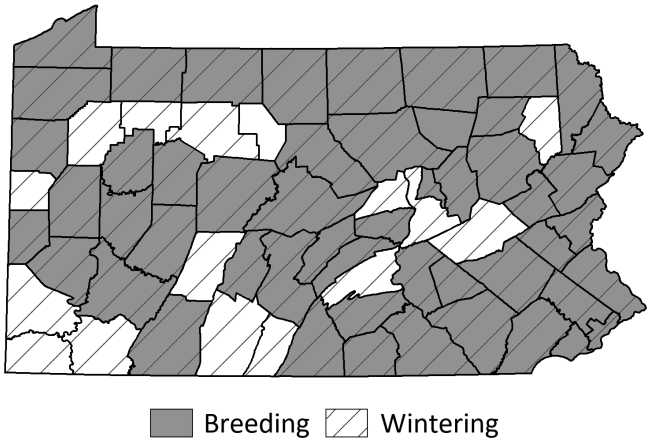
American Black Duck

Anas rubripes

Molly M. Giles and Amanda J. Hoyt *Pennsylvania Game Commission*

J. Kosack, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Restore or enhance 286,269 acres and protect 537,359 acres, while maintaining existing quality habitat supporting American Black Ducks and other wetland dependent Species of Greatest Conservation Need, to support 59,193 individuals (Hartley and Weldon 2020).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Black ducks use a variety of habitat types throughout the year, including palustrine shallow wetlands, scrub/shrub wetlands, forested wetlands, emergent marshes, beaver flowages, and ponds, lakes, streams, and rivers.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Habitat Comments: Guidance on how to employ these techniques can be found in the PA Game Commission Wildlife Habitat Manual or by consulting with PGC staff. Additionally, the ACJV American Black Duck Conservation Plan outlines the use of the Black Duck Decision Support Tool (DST) which provides a map of watershed conservation goals which can help managers identify where habitat may be insufficient to support the desired population levels. This can help direct restoration and enhancement efforts at county or watershed levels. Black Duck DST: https://experience.arcgis.com/experience/8b5888575e1c4f08bbbfa96c15450bb1/page/page_5/?views=view_1

Season: Wintering

Specific Habitat Requirements: Black ducks use a variety of habitat types throughout the year, including palustrine shallow wetlands, scrub/shrub wetlands, forested wetlands, emergent marshes, beaver flowages, and ponds, lakes, streams, and rivers. During the wintering period, habitat availability is limited by snow/ice conditions, and birds may more likely be found in lacustrine and riverine habitats that remain open.

Primary Habitat: Lacustrine

Primary Habitat Type: Lakes & Ponds

Habitat Comments: Guidance on how to employ these techniques can be found in the PA Game Commission Wildlife Habitat Manual or by consulting with PGC staff. Additionally. the ACJV American Black Duck Conservation Plan outlines the use of the Black Duck Decision Support Tool (DST) which provides a map of watershed conservation goals which can help managers identify where habitat may be insufficient to support the desired population levels. This can help direct restoration and enhancement efforts at county or watershed levels. Black Duck DST: https://experience.arcgis.com/experience/8b5888575e1c4f08bbbfa96c15450bb1/page/page_5/?views=view_1

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Medium

Specific Threat: Hybridization and competition for resources with the eastern Mallard population.

Action Category: Stewarding wild individuals

Specific Action: Monitor proportion of hybrids and genetic introgression of black ducks and mallards.

Objective: Identify the proportion of black duck X mallard hybrids in the waterfowl harvest and during annual waterfowl banding operations.

Action Priority: **Action Urgency:** Initiate immediately **Measure:** Proportion of hybrids harvested and banded

Potential Collaborators: Non-governmental organizations, Other state agency, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Universities & research institutions

Locations:

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** Low

Specific Threat: Loss of quality wetland acreage and disruptions to natural wetland hydrology.

Action Category: Conservation planning

Specific Action: Identify key breeding areas, work with landowners to protect and enhance existing habitat, and conserve or restore wetland buffers where development is limited.

Objective: Protect nesting habitat from development and disturbance.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Wetland acreage preserved.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Green-winged Teal, Blue-winged Teal, Mallard, Common Gallinule, American Coot

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss of quality wetland acreage and disruptions to natural wetland hydrology.

Action Category: Conservation planning

Specific Action: Identify key breeding areas, work with landowners to protect and enhance existing habitat, and conserve or restore wetland buffers where development is limited.

Objective: Protect nesting habitats from development and disturbance.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Wetland acres preserved.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Private Landowners, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Blue-winged Teal, Green-winged Teal, Mallard, Common Gallinule, American Coot

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Wetland quality and quantity degradation due to the establishment of invasive or undesirable plant species.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Identify key habitats and conduct wetland plant management annually using control methods and/or seasonal water level drawdowns and reflooding.

Objective: Mechanical, chemical, or biological control of invasive plants.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of wetlands managed for invasive species.

Potential Collaborators: Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Wetland species, including other wetland-dependent SGCN species.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Wetland quality and quantity degradation due to the establishment of invasive or undesirable plant species.

Action Category: Outreach, communication and distribution

Specific Action: Provide public guidance on the identification and control of non-native and invasive plant species.

Objective: Encourage landowners to foster native plants through invasive plant species control or eradication.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of people impacted.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Agriculture, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: All native wildlife species.

Season: Wintering

Threat Category: Commercial and Industrial Areas **Threat Impact:** Low

Specific Threat: Loss of quality wetland acreage and disruptions to natural wetland hydrology.

Action Category: Conservation planning

Specific Action: Identify key wintering areas, work with landowners to protect and enhance existing habitat, and conserve or restore wetland buffers where development is limited.

Objective: Protect wintering habitat from development and disturbance.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Wetland acreage preserved.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other state agency, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Township Zoning Boards, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Blue-winged Teal, Green-winged Teal, Mallard, Common Gallinule, American Coot, and other waterfowl and wetland birds.

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss of quality wetland acreage and disruptions to natural wetland hydrology.

Action Category: Conservation planning

Specific Action: Identify key wintering areas, work with landowners to protect and enhance existing habitat, and conserve or restore wetland buffers where development is limited.

Objective: Protect wintering habitats from development and disturbance.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Wetland acres preserved.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Township Zoning Boards, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Blue-winged Teal, Green- winged Teal, American coot, Common Gallinule, Mallard, other waterfowl and wetland birds.

Season: Wintering

Threat Category: Recreational Activities **Threat Impact:** Low

Specific Threat: Sensitivity to human disturbance can result in reduced fitness and survivorship.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Protect key wintering habitats from human disturbances, including recreational activities and those that directly contribute to habitat degradation, through regulation and public education.

Objective: Develop regulations limiting human disturbances in habitats utilized by wintering American Black Ducks. This may include the establishment of closed areas or refuges on state lands and educating wetland management staff. Additionally, outreach and educational programs could be provided to private landowners and other stakeholders on the importance of minimizing stress to American Black Ducks in winter.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of acres on wintering habitat protected.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other waterfowl and wintering wetland birds, including other SWAP and SGCN species.

Season: Wintering

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Wetland quality and quantity degradation due to the establishment of invasive or undesirable plant species.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Identify key habitats and conduct wetland plant management annually using control methods and/or seasonal water level drawdowns and reflooding.

Objective: Mechanical, chemical, or biological control of invasive plants.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of wetlands managed for invasive species.

Potential Collaborators: Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Wetland species, including other wetland-dependent SGNC species.

Season: Wintering

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Wetland quality and quantity degradation due to the establishment of invasive or undesirable plant species.

Action Category: Outreach, communication and distribution

Specific Action: Provide public guidance on the identification and control of non-native and invasive plant species.

Objective: Encourage landowners to foster native plants through invasive plant species control or eradication.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of people impacted.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Agriculture, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: All native wildlife species.

Season: Breeding

Priority	Need	Partners
1	Support research to develop more accurate population and habitat models for breeding American Black ducks at Atlantic Flyway and regional scales.	Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, U.S. Geological Survey
2	Is hybridization with Mallards impacting populations locally or range-wide?	Non-governmental organizations, U.S. Fish and Wildlife Service, Other state agency, Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Support research to develop more accurate population and habitat models for breeding American Black ducks at Atlantic Flyway and regional scales.	Non-governmental organizations, Other state agency, Pennsylvania Game Commission, U.S. Fish and Wildlife Service
2	To what extent are American Black Ducks using open water streams during harsh winters? What are their food sources?	U.S. Fish and Wildlife Service, Universities & research institutions, Pennsylvania Game Commission, Other state agency, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Conduct comprehensive wetland habitat assessments (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada), focusing on quality to support American Black Ducks and other wetland-associated Species of Greatest Conservation Need.	Non-governmental organizations, Other federal agency, U.S. Fish and Wildlife Service
2	Develop a process to regularly compile and archive, using standardized methods, breeding American Black Duck numbers and locations from community science databases (e.g., eBird).	Non-governmental organizations, Universities & research institutions, U.S. Fish and Wildlife Service, Interested Public

Season: Wintering

Priority	Survey	Partners
1	Refine Atlantic Flyway Midwinter Waterfowl Survey to allow for continued monitoring of regional and state trends in wintering American Black Ducks while obtaining data more efficiently and safely for higher-priority species in the survey.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
2	Develop a process to regularly compile and archive, using standardized methods, wintering American Black Duck numbers and locations from community science databases (e.g., eBird).	Non-governmental organizations, Universities & research institutions, U.S. Fish and Wildlife Service, Pennsylvania Game Commission, Interested Public

Name: Atlantic Flyway Breeding Waterfowl Survey **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://migbirdapps.fws.gov/mbdc/databases/afbws/afbws.asp?opt=afbws

Description: This survey has been conducted annually since 1989 in Pennsylvania and other AF states from Virginia to New Hampshire. It provides breeding population estimates for the major breeding waterfowl species. A total of 346 1-km2 plots are surveyed across six physiographic regions of Pennsylvania using a stratified random design.

Comments: Survey plots are monitored annually by Pennsylvania Game Commission personnel.

Monitoring Need: Provides breeding population estimates for the major breeding waterfowl species

---

Name: Atlantic Flyway Midwinter Waterfowl Survey **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://migbirdapps.fws.gov/mbdc/databases/mwi/mwidb.asp?opt=mwidb

Description: Annual (January) count of all waterfowl species on major wintering areas within the Atlantic Flyway.

Comments: Survey conducted in Pennsylvania by Pennsylvania Game Commission personnel.

Monitoring Need: Serves as a population survey for those species that aren't present during the annual breeding waterfowl surveys

---

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Allows for public input of bird presence, thereby increasing ability to collect year-round data compared to design-based studies carried out through independent research projects; valuable for management of both game and non-game bird species.

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Post-season American Black Duck banding program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/bird-banding-conservation-tool-within-migratory-bird-program-ducks-geese-doves-and-more

Description: Post-season (Jan. - March) and preseason (August- September) banding program in Pennsylvania provides harvest and survival rates for 2 periods.

Comments:

Monitoring Need: Provides harvest and survival rates to inform seasons and bag limits

Name: Pre-season American Black Duck banding program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/bird-banding-conservation-tool-within-migratory-bird-program-ducks-geese-doves-and-more

Description: Post-season (Jan. - March) and preseason (August- September) banding program in Pennsylvania provides harvest and survival rates for 2 periods.

Comments:

Monitoring Need: Provides harvest and survival rates to inform management of seasons and bag limits.

Name: U.S. Fish & Wildlife Service Harvest Information Program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need: Informs managers on hunter participation and harvest data for waterfowl and migratory webless game bird season and bag limits annually.

Name: U.S. Fish & Wildlife Service Parts Collection Survey **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-parts-collection-survey

Description: Classification by age and sex of American Black Ducks using wings submitted by successful hunters.

Comments:

Monitoring Need: Provides data on composition of waterfowl harvests and annual and long-term trends in recruitment ratios.

Atlantic Coast Joint Venture. 2022. Atlantic Coast Joint Venture's approach to conserving coastal marshes through flagship species. Hadley, Massachusetts.

Baldassarre, G. 2014. Ducks, Geese, and Swans of North America. Volume 1. Johns Hopkins University Press, Baltimore, Maryland.

Conomy, J.T., J.A. Collazo, J.A. Dubovsky, and W.J. Fleming. 1998. Dabbling duck behavior and aircraft activity in coastal. Journal of Wildlife Management 62:1127–1134.

Cramer, D. M., P. M. Castelli, T. Yerkes, and C. K. Williams. 2012. Food resource availability for American Black Ducks wintering in southern New Jersey. Journal of Wildlife Management 76:214-219.

Cramer, D.M. 2009. Estimating habitat carrying capacity for American Black Ducks wintering in southern New Jersey. Thesis, University of Delaware, Newark, USA.

Devers, P.K., and B. Collins. 2011. Conservation action plan for the American Black Duck, First Edition. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Laurel, Maryland.

Dunn, J. P. 2012. American Black Duck. Pages 96-97 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Hartley, M. J. and A.J. Weldon, eds. 2020. American Black Duck Conservation Plan. Atlantic Coast Joint Venture, Hadley, Massachusetts.

Huck, N. 2021. Waterfowl population monitoring. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Jacobs, K. J. and I. D. Gregg. 2013. Waterfowl population monitoring. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Jacobs, K. J. and J. Morgan. 2013. Waterfowl banding. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Kirby, R. E., G. A. Sargeant and D. Shutler. 2004. Haldane's rule and American Black Duck × Mallard hybridization. Canadian Journal of Zoology 82:1827-1831.

Longcore, J. R., D. G. McAuley, G. R. Hepp, and J. M. Rhymer. 2000. American Black Duck (Anas rubripes). Account 481 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc. Philadelphia, Pennsylvania.

Longcore, J.R., D.G. Mcauley, G.R. Hepp, and J.M. Rhymer. 2000. American Black Duck (Anas rubripes), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/481

Mank, J. E., J. E. Carlson, and M. C. Brittingham 2004. A century of hybridization: decreasing genetic distance between American Black Ducks and Mallards. Journal of Conservation Genetics 5:395-403.

Merendino, T. M., C. D. Ankney, and D. G. Dennis. 1993. Increasing Mallards, decreasing American Black Ducks: more evidence for cause and effect. Journal of Wildlife Management 57:199-208.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989a. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401–410.

Morton, J.M., R.L. Kirkpatrick, and M.R. Vaughan. 1990. Changes in body composition of American black ducks wintering at Chincoteague, Virginia. Condor 92:598–605.

Plattner, D. M., M. W. Eichholz, and T. Yerkes. 2010. Food resources for wintering and spring staging black ducks. Journal of Wildlife Management 74:1554-1558.

Tautin, J. 2010. American Black Duck. Pages 226-230 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

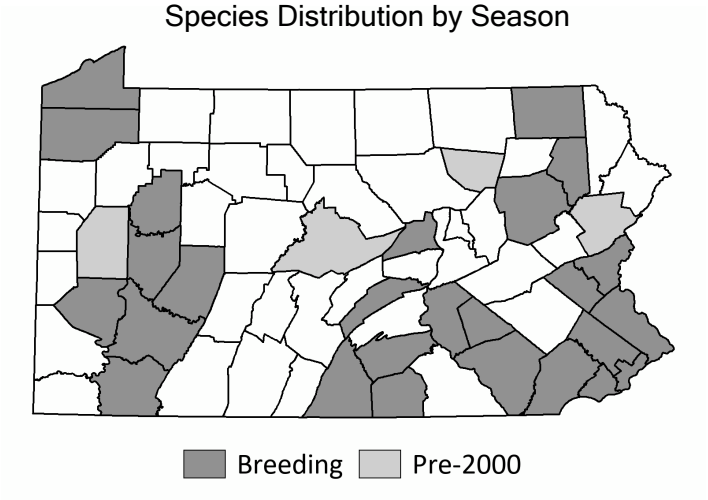
PENNSYLVANIA
WILDLIFE ACTION PLAN

Green-winged Teal

Anas crecca

Molly M. Giles *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain presence as a breeding species in Pennsylvania by sustaining current quality wetlands, or by acquiring and creating new habitat, especially in the northwestern portion of the state.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Wetlands, particularly dense emergent marshes and shrubby swamps; lakes and ponds with emergent aquatic vegetation. Shallow wetlands are preferred, and teal are often associated with wetlands of high quality.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Low

Specific Threat: Inadequate or poorly utilized water control structures.

Action Category: Manage non-living habitat components

Specific Action: Ensure proper annual flooding regimes in managed wetlands with water control structures.

Objective: Monitor water levels in managed wetlands for optimal conditions.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of wetland acres protected and under management.

Potential Collaborators: U.S. Fish and Wildlife Service, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Blue-winged teal, American Coot, Common Gallinule

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** Medium

Specific Threat: More frequent or severe spring rains could render nesting sites unusable or flood existing nests, causing failure.

Action Category: Conservation planning

Specific Action: Develop statewide climate change mitigation strategies for freshwater emergent wetlands and the species dependent on these habitats.

Objective: Create a plan for assessing current and future impacts of climate change on emergent marshes in Pennsylvania.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of wetlands assess via the plan in the next 5 years.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, American Coot, Common Gallinule

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** Medium

Specific Threat: More frequent or severe spring rains could render nesting sites unusable or flood existing nests, causing failure.

Action Category: Manage non-living habitat components

Specific Action: Ensure proper annual flooding and drawdown procedures in managed wetlands with water control structures.

Objective: Protect existing quality wetland habitats and reduce annual losses within the state.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Annual assessments of wetland acres gained or lost.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, American Coot, Common Gallinule

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** Medium

Specific Threat: Drought or low water levels could decrease presence or wetland use because tend permanently inundated emergent marshes are preferred.

Action Category: Manage non-living habitat components

Specific Action: Conserve existing wetlands, create additional wetland, and restore natural hydrological regimes.

Objective: Protect existing quality wetland habitats and reduce annual losses of wetlands within the state.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Annual assessments of wetland acres gained or lost.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, American Coot, Common Gallinule

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** Medium

Specific Threat: Drought or low water levels could decrease presence or wetland use because tend permanently inundated emergent marshes are preferred.

Action Category: Conservation planning

Specific Action: Develop statewide climate change mitigation strategies for freshwater emergent wetlands and the species dependent on these habitats.

Objective: Create a plan for assessing current and future impacts of climate change on emergent marshes in Pennsylvania.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of wetlands assessed via the plan in the next 5 years.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, American Coot, Common Gallinule

Season: Breeding

Priority	Need	Partners
1	No research needs identified at this time.	

Season: Breeding

Priority	Survey	Partners
1	Development of a procedure to achieve regular and standardized compilation of data collected through non-species-specific monitoring programs (e.g., eBird) on numbers and locations of breeding Green-winged Teal.	Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Non-governmental organizations

Name: Atlantic Flyway Breeding Waterfowl Survey **Lead(s) :** U.S. Fish & Wildlife Service

Link: N/A

Description: This survey has been conducted annually since 1989 in Pennsylvania and other Atlantic Flyway states from Virginia to New Hampshire. It provides breeding population estimates for the major breeding waterfowl species. A total of 327 1-km2 plots are surveyed across six physiographic regions of Pennsylvania using a stratified random design.

Comments: Survey plots are monitored annually by Pennsylvania Game Commission personnel.

Monitoring Need:

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Preseason duck banding **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/bird-banding-conservation-tool-within-migratory-bird-program-ducks-geese-doves-and-more

Description: Banding occurs August-September, prior to the onset of the hunting season. Banding of birds at this time provides waterfowl population harvest and survival rate estimates.

Comments: Trapping and banding in Pennsylvania is performed by Pennsylvania Game Commission personnel.

Monitoring Need:

Name: U.S. Fish and Wildlife Service Harvest Information Program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need:

Baldassarre, G. 2014. Ducks, Geese, and Swans of North America. Volume 1. Johns Hopkins University Press, Baltimore, Maryland.

Jacobs, K. 2012. Green-winged Teal. Pages 102-103 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Jacobs, K. J. 2014. Atlantic Flyway Breeding Waterfowl Survey Results in Pennsylvania. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Jacobs, K.J. and I.D. Gregg. 2013. Waterfowl population monitoring. Annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Raftovich, R. V., K. K. Fleming, S. C. Chandler, and C. M. Cain. 2024. Migratory Bird Hunting Activity and Harvest during the 2022–23 and 2023–24 Hunting Seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

USFWS (U.S. Fish and Wildlife Service)2014. Waterfowl population status, 2014. U.S. Department of the Interior, Washington, D.C.

Wilson, A. 2010. Green-winged teal. Pages 185-187 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Zimpfer, N. L., W. E. Rhodes, E. D. Silverman, G. S. Zimmerman, and K. D. Richkus. 2014. Trends in Duck Breeding Populations, 1955-2014. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Laurel, Maryland.

PENNSYLVANIA
WILDLIFE ACTION PLAN

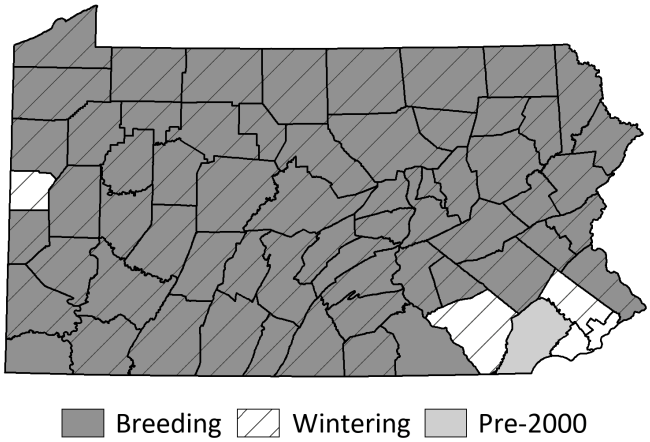
Ruffed Grouse

Bonasa umbellus

Reina M. Tyl *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Increase the 10-year average Grouse and Woodcock Hunter Cooperator flush rate to 1.25 grouse flushed per hour hunted.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 80-90%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: A mosaic of diverse forest age classes, with 10-15% of forested area in a young forest condition, within a connected forested landscape. Peak use by breeding males occurs in 5-to-20-year-old regenerating forest characterized by dense overhead cover but relative openness at ground-level to allow for easy movement by this ground-dwelling species. Females may place nests next to sawtimber sized trees or under sawtimber sized logs (downed woody material) in more mature forests adjacent to dense young forest cover. Low moist bottomlands with herbaceous cover, as well as coarse woody debris, are important as brood habitat.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Because grouse are space-limited (i.e., small home ranges, short natal dispersal distances), habitat management should focus on retaining diverse food cover within young forest stands to ensure year-round food availability. Additionally, habitat management should be prioritized in high elevation sites with well-drained soils which have lower incidence of West Nile Virus (WNV)-carrying mosquitoes. Managers should take care to avoid creation of ephemeral pools of water (i.e., tire ruts, poorly drained road ditches) that could artificially increase mosquito abundance in otherwise suitable areas. Natural wetlands, flowing streams, and spring-time vernal pools are not a WNV-risk because they support predator communities that feed on mosquito larvae (e.g., predatory aquatic invertebrates, tadpoles, fish).

Season: Wintering

Specific Habitat Requirements: A mosaic of diverse forest age classes, with 10-15% of forested area in a young forest condition, within a connected forested landscape. Diverse hard and soft mast producing trees and shrubs in proximity to one another to ensure food is available throughout the winter without having to travel long distances. Conifers, especially thickets of young conifers, and non-conifer evergreen shrubs provide important thermal cover from winter rain and ice.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Because grouse are space-limited (i.e., small home ranges, short natal dispersal distances), habitat management should focus on retaining diverse food cover within young forest stands to ensure year-round food availability. Additionally, habitat management should be prioritized in high elevation sites with well-drained soils which have lower incidence of West Nile Virus (WNV)-carrying mosquitoes. Managers should take care to avoid creation of ephemeral pools of water (i.e., tire ruts, poorly drained road ditches) that could artificially increase mosquito abundance in otherwise suitable areas. Natural wetlands, flowing streams, and spring-time vernal pools are not a WNV-risk because they support predator communities that feed on mosquito larvae (e.g., predatory aquatic invertebrates, tadpoles, fish).

Season: Breeding

Threat Category: Viral/Prion-induced Diseases **Threat Impact:** High

Specific Threat: West Nile virus (WNV) has been shown to be deleterious at the individual and population level. Severe WNV years have the potential to reduce recruitment into the breeding population, which can affect population abundance for several years.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Create and maintain grouse habitat in areas with lower incidence of West Nile virus-carrying mosquitoes.

Objective: Maintain young forest condition across 10-15% of Pennsylvania's forested landscape.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of habitat created or maintained.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Other young forest dependent wildlife species.

Season: Wintering

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** Low

Specific Threat: Direct reduction of population through hunter harvest may 1) lower total population numbers and 2) lose genetic connectivity - particularly in areas where forest is fragmented where populations are isolated.

Action Category: Stewarding wild individuals

Specific Action: Ensure hunter harvest is not an additive source of mortality.

Objective: Set seasons and bag limits that result in compensatory levels of hunter harvest.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Hunter harvest does not contribute to population declines.

Potential Collaborators: Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Assess the relative effects of various factors (i.e., weather, disease, harvest mortality) on grouse population dynamics (e.g., occupancy probability, density, colonization/extinction rates).	Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Universities & research institutions
2	Evaluate grouse response (i.e., habitat use or selection) to specific habitat management treatments (e.g., prescribed fire, coarse woody debris retention, invasive vegetation removal).	Pennsylvania Game Commission, Universities & research institutions
3	Evaluate West Nile virus (WNV) landscape epidemiology and effects of WNV on grouse populations.	Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Universities & research institutions
4	Conduct research to better understand how projected climate changes may affect grouse populations, including climate-induced range shifts, and how to mitigate negative effects of climate changes.	Pennsylvania Game Commission, Universities & research institutions
5	Assess grouse population genetic diversity and connectivity.	Pennsylvania Game Commission, Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Assess the relative effects of various factors (i.e., weather, disease, harvest mortality) on grouse population dynamics (e.g., occupancy probability, density, colonization/extinction rates).	Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Universities & research institutions
2	Evaluate grouse response (i.e., habitat use or selection) to specific habitat management treatments (e.g., prescribed fire, coarse woody debris retention, invasive vegetation removal).	Pennsylvania Game Commission, Universities & research institutions
3	Evaluate West Nile virus (WNV) landscape epidemiology and effects of WNV on grouse populations.	Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Universities & research institutions
4	Conduct research to better understand how projected climate changes may affect grouse populations, including climate-induced range shifts, and how to mitigate negative effects of climate changes.	Pennsylvania Game Commission, Universities & research institutions
5	Assess grouse population genetic diversity and connectivity.	Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Refine Pennsylvania Game Commission Grouse Summer Sighting Survey to provide more reliable data on productivity.	Other federal agency, Other state agency, Pennsylvania Department of Conservation and Natural Resources
2	Evaluate the possibility of implementing systematic autonomous recording unit (ARU)-led drumming surveys across the state to obtain a new population index of breeding population size.	Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources
3	Reevaluate grouse hunter opinions, attitudes, and preferences to inform potential future changes to hunting seasons and bag limits.	Pennsylvania Game Commission

Season: Wintering

Priority	Survey	Partners
1	Reevaluate grouse hunter opinions, attitudes, and preferences to inform potential future changes to hunting seasons and bag limits.	Pennsylvania Game Commission

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Monitor coarse trends in grouse presence.

Name: Grouse Hunter Cooperator Survey **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/become-a-grouse-woodcock-cooperator

Description: Cooperating hunters keep field diaries of hunting trips (county, # flushes, # bagged) annually.

Comments: Maintain enrollment in this program via active recruitment.

Monitoring Need: Monitor population trends in appropriate habitat.

Name: Grouse Summer Sighting Survey **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Pennsylvania Game Commission employees tally grouse broods and adults seen during normal work hours annually from June-August.

Comments:

Monitoring Need: Monitor trends in productivity.

Name: National Audubon Society Christmas Bird Count **Lead(s) :** National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need: Determine long-term population trends.

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Because the species is crepuscular, the BBS is not a very effective monitoring tool. Additionally, BBS surveys occur outside of the peak breeding display period for grouse.

Monitoring Need: Determine long-term trend in grouse presence.

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Determine coarse long-term trends in grouse occupancy.

Name: Pennsylvania Game Commission Game Take Survey

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Annual survey of hunting license buyers.

Comments:

Monitoring Need: Determine Wildlife Management Unit (WMU) of hunt, effort, and harvest figures for a random sample of grouse hunters.

Name: Pennsylvania Game Commission Grouse Drumming Survey

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Spring drumming surveys conducted at Pennsylvania Game Commission locations that have received active grouse management.

Comments:

Monitoring Need: Detect presence and population response pre- and post-management.

Dessecker, D. R., and D. G. McAuley. 2001. Importance of early-successional habitat to Ruffed Grouse and American Woodcock. Wildlife Society Bulletin 29:456-465.

Dessecker, D. R., G. W. Norman, and S. J. Williamson. 2006. Ruffed grouse conservation plan. Association of Fish & Wildlife Agencies, Resident Game Bird Working Group.

Geary, B., Williams, L., Long, C.R., Tyl, R.M. and Gagne, R.B., 2024. Christmas Bird Count data are a reliable harvest-independent index for Ruffed Grouse monitoring in the eastern United States. Ornithological Applications, 126(3), p.duae011.

Gregg, I. 2012. Ruffed Grouse. Pages 112-113 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, State College, Pennsylvania.

Kunkel, M.R., Brown, J.D., Williams, L., Niedringhaus, K.D., Fenton, H., Ruder, M.G. and Nemeth, N.M., 2022. Comparison of pathology and immunohistochemistry in natural and experimental West Nile virus infections in ruffed grouse (Bonasa umbellus). The Journal of Wildlife Diseases, 58(4), pp.919-925.

Kunkel, M.R., Mead, D.G., Ruder, M.G. and Nemeth, N.M., 2022. Our current understanding of West Nile virus in upland game birds. Wildlife Society Bulletin, 46(2), p.e1269.

Lapp, S., Larkin, J.L., Parker, H.A., Larkin, J.T., Shaffer, D.R., Tett, C., McNeil, D.J., Fiss, C.J. and Kitzes, J., 2023. Automated recognition of ruffed grouse drumming in field recordings. Wildlife Society Bulletin, 47(1), p.e1395.

Luna, L.W., Williams, L.M., Duren, K., Tyl, R., Toews, D.P. and Avery, J.D., 2023. Whole genome assessment of a declining game bird reveals cryptic genetic structure and insights for population management. Molecular ecology, 32 (20), pp.5498-5513.

Nemeth, N.M., Williams, L.M., Bosco-Lauth, A.M., Oesterle, P.T., Helwig, M., Bowen, R.A. and Brown, J.D., 2021. West Nile virus infection in ruffed grouse (Bonasa umbellus) in Pennsylvania, USA: A multi-year comparison of statewide serosurveys and vector indices. The Journal of Wildlife Diseases, 57(1), pp.51-59.

Porter, W. F., and M. A. Jarzyna. 2013. Effects of landscape-scale forest change on the range contraction of Ruffed Grouse in New York State, USA. Wildlife Society Bulletin 37:198-208.

Stauffer, D. F., editor. 2011. Ecology and Management of Appalachian Ruffed Grouse. Hancock House Publishers, Blaine, Washington.

Tyl, R. M., Z. Danks, M. Dye, J. Sloan, and J. Stiller. 2025. Eastern Ruffed Grouse Conservation Plan 2025-2034. Eastern Grouse Working Group.

Williams, L. 2014. PA Grouse and Woodcock News-research report to partners. PA Game Commission internal report. Harrisburg, Pennsylvania.

Williams, L., I. Gregg, and W. Palmer. 2011. Management Plan for Ruffed Grouse in Pennsylvania, 2011-2020. PA Game Commission species plan. Harrisburg, Pennsylvania.

Williams, L., M. DiBona, and A. Burnett. 2013. Potential effects of climate change on Northeast upland game bird populations. Sub-committee report to the Northeast Association of Wildlife Administrators. Albany, New York.

PENNSYLVANIA
WILDLIFE ACTION PLAN

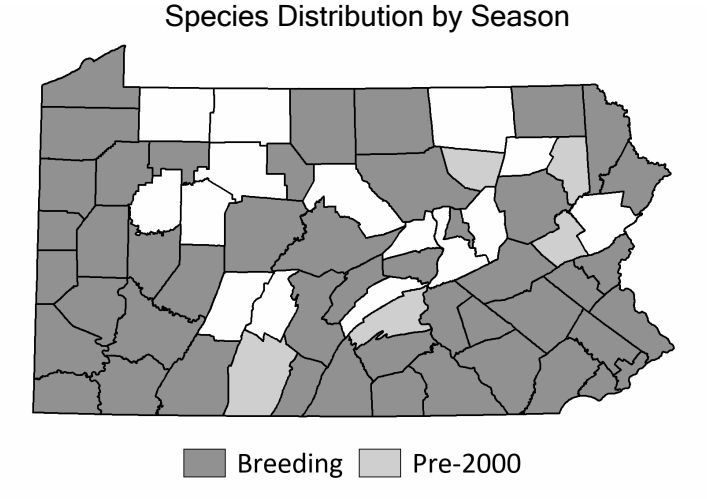
Pied-billed Grebe

Podilymbus podiceps

David Yeany II

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain at least 10-15 breeding pairs annually in Pennsylvania through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Emergent wetlands associated with ponds, lakes and palustrine systems. Abundant vegetation,70% cover (27-52 in/69-133 cm in height) and shallow water (9-22 in/24-56 cm in depth).

Primary Habitat: Lacustrine

Primary Habitat Type: Lakes & Ponds

Primary Specific Habitat: Mesotrophic, Low Alkalinity Lake

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Low

Specific Threat: Emergent wetland habitat loss due to draining, dredging, filling, leveling, and flooding.

Action Category: Manage non-living habitat components

Specific Action: Protect emergent wetland breeding sites from draining, dredging, and filling and maintain water depths of 9-22 inches (24-56 centimeters) for open water areas.

Objective: Implement active water level monitoring and management at all confirmed breeding locations during the next 10 years.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of breeding locations meeting necessary water depth and associated wetland habitat composition.

Potential Collaborators: Non-governmental organizations, Other state agency, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, American Bittern, Least Bittern

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Wetland water quality impairment from fertilizer and pesticide runoff, as well as sedimentation from agricultural fields.

Action Category: Basic research and status monitoring

Specific Action: Determine the impact of pesticide use and contaminant bio accumulation in Pennsylvania breeding Pied-billed Grebes.

Objective: Test Pied-billed Grebes from several breeding locations for levels of mercury and pesticides to better understand the impacts to reproductive success and survivorship.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of Pied-billed Grebe samples tested for pollutants.

Potential Collaborators: Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, Sora, King Rail

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Degradation of native wetland vegetation by invasive plants like Phragmites and purple loosestrife.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Survey breeding locations for impacted sites and remove/burn and/or chemically spot-treat invasive plants in wetlands where they are dominating native vegetation and degrading habitat.

Objective: Determine high priority breeding locations where invasive plants are an issue and implement treatment annually.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of breeding locations with reduced invasive vegetation cover.

Potential Collaborators: Non-governmental organizations, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: American Black Duck, Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, Sora, King Rail

Season: Breeding

Priority	Need	Partners
1	What are Pied-billed habitat requirements in Pennsylvania (nest site selection, minimum wetland size), what factors are affecting nesting success and density, and how important are water quality and disturbance to nesting success?	Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Universities & research institutions
2	How is toxic pollutant bioaccumulation affecting Pied-billed Grebe behavior, nesting success, and survival?	U.S. Environmental Protection Agency, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Non-governmental organizations
3	Is waterfowl habitat management affecting Pied-billed Grebe nesting success?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources

Season: Breeding

Priority	Survey	Partners
1	Continue statewide wetland surveys using the Pennsylvania Game Commission Marsh Bird Survey protocol adapted from North American Marsh Bird Monitoring Protocol.	Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions
2	Implement annual, standardized surveys of Crawford, Mercer, Lawrence, and Butler Counties, the historic stronghold for breeding Pied-billed Grebes (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources
3	Select 5 breeding locations as long-term (>3 years) monitoring sites to understand population stability across varying habitats.	Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations, Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Game Commission Marsh Bird Surveys **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas (Wilson et al. 2012). Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Kibbe. D. P. 2010. Pied-billed Grebe. Pages 232-234 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Muller, M. J. and R. W. Storer. 1999. Pied-billed Grebe (Podilymbus podiceps). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/410 (accessed July 2015).

New York Natural Heritage Program. 2013. Online Conservation Guide for Podilymbus podiceps. Available from http://www.acris.nynhp.org/guide.php?id=6723 (accessed January 2015).

Rehm, E. M. and G. A. Baldassarre. 2007. The influence of interspersion on marsh bird abundance in New York. The Wilson Journal of Ornithology 119:648-654.

Sargent, S., and J. Fidorra. 2013. Final Report for Grant Agreement WRCP-10387: Climate Change Vulnerability of Wetland and Water Birds in Pennsylvania.

Steen, V., S. K. Skagen, and B. R. Noon. 2014. Vulnerability of breeding waterbirds to climate change in the Prairie Pothole Region, U.S.A.. PLoS ONE 9:e96747. DOI:10.1371/journal.pone.0096747 (accessed July 2015).

Strassman, A. 2008. Pied-billed grebe CPP specifications. Unpublished data. Pennsylvania Game Commission, Bureau of Wildlife Management. Harrisburg, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Yeany, D., E. Zimmerman, L. Teixeira Viotti, M. Moore, and B. Georgic. 2023. Pennsylvania Natural Heritage Program. Assessing Secretive Marsh Bird Breeding Populations and Habitat Associations to Implement Conservation Actions at High Priority Wetlands in Northwestern Pennsylvania. 71 pgs.

PENNSYLVANIA
WILDLIFE ACTION PLAN

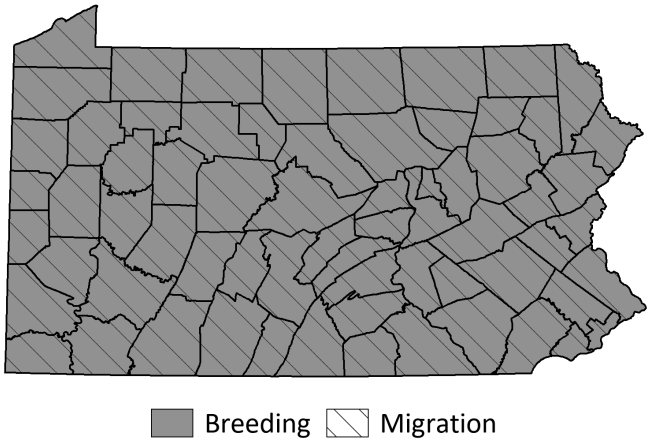
Black-billed Cuckoo

Coccyzus erythropthalmus

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Halt the population decline of Black-billed Cuckoos in Pennsylvania.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Primary breeding habitat includes mixed deciduous-coniferous forests and, in Pennsylvania, pine and hemlock woodlands. Breeding territories are often located along forest edges and contain dense hedgerows and thickets; however, the species is most abundant in Pennsylvania in areas of highest landscape-level forest cover (e.g., the northern tier counties of the Allegheny Plateau; Ickes 1992). Nests are often placed in groves of young deciduous trees, in thickets or tangles of vines, or along forest edges (Hughes 2001).

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: The black-billed cuckoo nests in shrublands and forest edges. Habitats include thickets, orchards, abandoned farmlands, brushy hillsides, and along forest edges, often near water.

Season: Migration

Specific Habitat Requirements: Black-billed Cuckoo habitat during migration is thought to be similar to breeding, shrublands and forest edges - include thickets, orchards, abandoned farmlands, brushy hillsides, and along forest edges, often near water.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Habitat Comments: Black-billed Cuckoo habitat during migration is thought to be similar to breeding, shrublands and forest edges - include thickets, orchards, abandoned farmlands, brushy hillsides, and along forest edges, often near water.

Season: Breeding

Threat Category: Agricultural and Forestry Effluents

Threat Impact: Medium

Specific Threat: Likely highly susceptible to pesticide-residue accumulation due to reliance on noxious caterpillars (Hughes 2020).

Action Category: Outreach, communication and distribution

Specific Action: Work with agencies (e.g., Department of Agriculture, Department of Conservation and Natural Resources, Pennsylvania Game Commission) to reduce or limit use of pesticides for Lepidoptera in core cuckoo habitat, especially during the nesting season (approximately 15 May through August).

Objective: Targeted spraying primarily occurs outside of nesting season.

Action Priority: 4-Low

Action Urgency: Initiate within 5-10 years

Measure: Area of forest habitat deferred from pesticide application during the nesting season.

Potential Collaborators: Avoid or minimize use of fertilizers, herbicides, pesticides and other toxins near waterways to protect water quality and Species of Greatest Conservation Need., Conduct outreach to inspire and promote Species of Greatest Conservation Need protection and habitat conservation.

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Other forest birds primarily feeding on Lepidoptera during the nesting season.

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Window collisions during migration.

Action Category: Outreach, communication and distribution

Specific Action: Develop a statewide campaign to educate and advocate for commercial and private building owners to incorporate bird-friendly practices, specifically during fall/spring migration.

Objective: Establish and implement a statewide bird-friendly buildings campaign that engages building owners, architects, developers, and policymakers; promotes adoption of bird-safe design and lighting practices; and results in measurable reductions in bird–building collisions through policy guidance, technical resources, and targeted outreach.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of municipalities participating in Lights Out programs; number of buildings, companies, private landowners enrolled in programs.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Fish and Wildlife Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Most migratory species (birds and bats).

Season: Breeding

Priority	Need	Partners
1	Quantification of breeding habitat use and breeding territory size (in multiple habitat types and multiple landscapes).	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
2	Estimation of key demographic parameters (e.g., productivity, survival) in multiple habitat and landscape types.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Assessment of effects of pesticides on food availability and on subsequent cuckoo productivity.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations

Season: Migration

Priority	Need	Partners
1	Investigate links between breeding demographics and non-breeding activities/migratory connectivity.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices focused in the Allegheny Plateaus and Ridge and Valley provinces.	Pennsylvania Game Commission, Non-governmental organizations

Season: Migration

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Hughes, J. M. 1999. Yellow-billed cuckoo (Coccyzus americanus). In A. Poole and F. Gill, editors. The birds of North America, 418. Birds of North America, Philadelphia, Pennsylvania, USA.

Hughes, J. M. 2020. Black-billed Cuckoo (Coccyzus erythropthalmus), version 1.0. In P. G. Rodewald, editor. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.bkbcuc.01

Ickes, I. 2012. Black-billed Cuckoo (Coccyzus erythropthalmus). Pages 200-201 in The Second Atlas of Breeding Birds in Pennsylvania. (A. M. Wilson, D. Brauning, R. S. Mulvihill, eds.) Penn State Press, University Park, Pennsylvania.

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

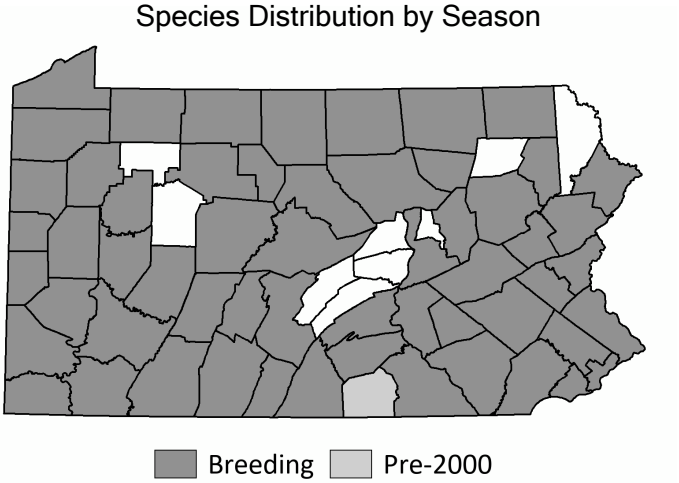
PENNSYLVANIA
WILDLIFE ACTION PLAN

Common Nighthawk

Chordeiles minor

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Halt the current population decline and maintain nesting presence in at least 250 Breeding Bird Atlas (Wilson et al. 2012) blocks by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Rock outcrops; gravel rooftops in cities and towns; barrens; former strip mines.

Primary Habitat: Developed

Primary Habitat Type: Developed Areas

Primary Specific Habitat: NA

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Reduce insecticide and herbicide application on large agricultural fields, and encourage 'green' methods of pesticide control, like cover crops and nurse crops.

Objective: Enroll farmers into the Integrated Pest Management Program to reduce the amount of pesticide used.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5-10 years **Measure:** Number of farms enrolled with an Intergrated Pest Management plan.

Potential Collaborators: Other state agency, Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Other birds nesting in agricultural areas.

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** Medium

Specific Threat: Tarred or rubberized roofs are replacing gravel roofs. These new roof tops overheat nighthawks and their eggs and are avoided by nighthawks.

Action Category: Manage non-living habitat components

Specific Action: Install gravel areas on rubberized roofs that historically supported nighthawks.

Objective: Install 50 gravel pads on rubberized roofs near historical nighthawk nest sites.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5-10 years **Measure:** Number of gravel pads installed.

Potential Collaborators: Local agencies & municipalities, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Tarred or rubberized roofs are replacing gravel roofs. These new roof tops overheat nighthawks and their eggs and are avoided by nighthawks.

Action Category: Manage non-living habitat components

Specific Action: Install gravel areas on rubberized roofs that historically supported nighthawks.

Objective: Install 50 gravel pads on rubberized roofs near historical nighthawk nest sites.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5-10 years **Measure:** Number of gravel pads installed.

Potential Collaborators: Local agencies & municipalities, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Research on migratory connectivity is needed to determine where Pennsylvania's Common Nighthawks overwinter. This would be a first step towards evaluating potential threats on the wintering grounds.	Universities & research institutions
2	Assess the threat of nest predation by crows to rooftop nesting nighthawks.	Universities & research institutions
3	Experiments with gravel-filled "nest patches" have been attempted with limited success. However, it is possible that nighthawks may use nest patches that are placed in close proximity to recently used nest sites (Marzilli 1989, New Hampshire Audubon 2013).	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Survey for nighthawks through annual nightjar surveys as part of the Nightjar Survey Network.	Pennsylvania Game Commission, Non-governmental organizations
2	Survey the availability of suitable gravel roofs. Identify areas that harbor large nighthawk populations.	Non-governmental organizations

Name: Nightjar Survey Network

Lead(s) : Maine Natural History Observatory, Birds Canada

Link: http://www.nightjars.org/

Description: Nationwide survey effort that uses volunteers to conduct night-time, roadside counts of all nightjars along fixed survey routes systematically distributed throughout Pennsylvania, and all other states.

Comments: Likely an effective way to monitor abundance and population changes. However, few survey routes have been run annually such that coverage remains poor in Pennsylvania. Surveys needs to be promoted.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Note that if population continues to decline, U.S. Geological Survey Breeding Bird Surveys will no longer adequately monitor populations of this species.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Brigham, R. M., J. Ng, R. G. Poulin and S. D. Grindal. 2011. Common Nighthawk (Chordeiles minor). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/213 (accessed July 2015).

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Goguen, C. B. 2010. Common Nighthawk. Pages 267-270 In M. A. Steele, M. C. Brittingham, T. J. Maret, J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Special Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Grove, G. 2012. Common Nighthawk. Pages 216-217 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Hallman, C. A., R. P. B. Foppen, C. A. M. van Turnhout, H. de Kroon, and E. Jongejans. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature DOI: 10.1038/nature13531 (accessed July 2015).

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

Marzilli, V. 1989. Up on the roof. Maine Fish and Wildlife Magazine 31(2):25-29.

Nebel, S. A., J. D. McCracken, and P.D. Taylor. 2010. Declines of aerial insectivores in North America follow a geographic gradient. Avian Conservation and Ecology 5:1. Available from http://www.ace-eco.org/vol5/iss2/art1/ (accessed July 2015).

New Hampshire Audubon. 2013. Project Nighthawk 2013 Summary. Available from http://nhbirdrecords.org/all-articles/2013-nighthawk-summary.pdf (accessed January 2015).

Orndorff, S., and T. Patten. 2007. Management Guidelines for Barrens Communities in Pennsylvania. Report prepared for the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission. The Nature Conservancy, Harrisburg. Pennsylvania.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

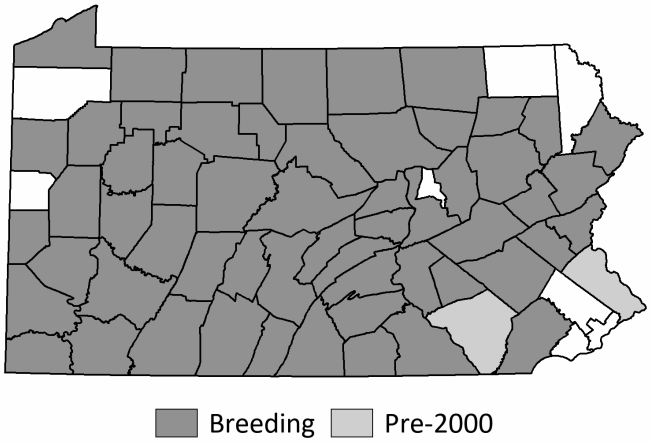
Eastern Whip-poor-will

Antrostomus vociferus

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Stabilize population size with a target of at least 7000 breeding pairs (Partners in Flight estimate, 2020) by 2035. Maintain fall migratory populations by managing appropriate stopover habitat.

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Early to mid successional and open, forested habitats near clearings.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Migration

Specific Habitat Requirements: Little information. In U.S., many occur in same types of open forests they breed in (Cink et al. 2020).

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Habitat Comments: Little information. In U.S., many occur in same types of open forests they breed in (Cink et al. 2020).

Season: Breeding

Threat Category: Fire and Fire Suppression **Threat Impact:** Medium

Specific Threat: Fire suppression encourages forest succession beyond ideal mid-successional habitat preferred by Eastern Whip-poor-will.

Action Category: Manage non-living habitat components

Specific Action: Increase prescribed burning on public lands to reduce understory cover.

Objective: Initiate prescribed burning or forest harvest management at a minimum of one new site each year.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of new forest sites at which management practices are performed.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: Wildlife dependent on habitats maintained by prescribed fire.

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High

Specific Threat: Housing development in rural forested regions fragments habitat.

Action Category: Conserve specific land or seascapes

Specific Action: In forested areas vulnerable to suburban sprawl, particularly southeastern and southwestern Pennsylvania, purchase unprotected forest habitats to maintain as many large (>100 ha (250 ac)) forest patches as possible. The largest forest patches should receive top priority for protection.

Objective: Protect at least 2500 additional acres (1012 ha) of currently unprotected forest habitats in areas vulnerable to sprawl by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of vulnerable forest protected.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Waynesburg Hills, Allegheny Mountain, Allegheny Front, Appalachian Mountain, High Plateau, Deep Valleys, Glaciated High Plateau, Susquehanna Lowland, Glaciated Low Plateau, Glaciated Pocono Plateau, Blue Mountain, Anthracite Upland

Other species likely to benefit from this action: Forest interior birds

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Forest loss and fragmentation from well pad (turbine and well) and infrastructure (roads and pipelines) development

Action Category: Conservation planning

Specific Action: Promote and implement land use planning strategies for shale gas and wind development which site projects outside significant areas of interior forest and coincide infrastructure with existing roads and pipelines.

Objective: Within 3 years, develop a comprehensive statewide strategy that addresses forest fragmentation issues and provides protection to forest interior habitat which can be implemented by municipal and county planning departments.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5-10 years **Measure:** Development of local level strategic plans for addressing forest fragmentation in areas with high energy production.

Potential Collaborators: Businesses, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Forest interior birds

Season: Migration

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Reduction of lepidopteran prey due to pesticide use, especially aerial spraying of forest habitats to control spongy moths.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Reduce aerial spraying of pesticides to control spongy moths by at least 25% by 2035.

Objective: Reduce aerial spraying of pesticides by focusing efforts in priority areas to control spongy moths by at least 25% by 2035.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Annual percent reduction of pesticide use acreage.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection

Locations: Statewide

Other species likely to benefit from this action: Other species dependent on lepidopteran prey.

Season: Breeding

Priority	Need	Partners
1	Determine the key features that constitute high quality Eastern Whip-poor-will habitat in Pennsylvania.	Non-governmental organizations, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions
2	Identify key factors that influence Eastern Whip-poor-will calling rate to maximize the effectiveness of population surveys.	Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations
3	Determine response of this species and others to silvicultural treatments especially for young forest / early succession habitats.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Season: Migration

Priority	Need	Partners
1	Investigate links between breeding demographics and non-breeding activities/migratory connectivity.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
2	Identify key components of important stopover habitats during migration and determine priority areas.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Survey for nighthawks annually as part of the Nightjar Survey Network.	Non-governmental organizations, Pennsylvania Game Commission
2	Conduct post-treatment surveys of silvicultural treatments to determine reaction of young forest and shrub species.	Universities & research institutions

Season: Migration

Priority	Survey	Partners

Name: Nightjar Survey Network

Lead(s) : Maine Natural History Observatory, Birds Canada

Link: http://www.nightjars.org/

Description: Nationwide survey effort that uses volunteers to conduct night-time, roadside counts of all nightjars along fixed survey routes systematically distributed throughout Pennsylvania, and all other states.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: May be poorly monitored by BBS surveys due to localized, habitat-specific occurrence and low densities

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bolgiano, N. C. 2012. Whip-poor-will. Pages 220-221 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Penn State Press, University Park, Pennsylvania.

Cink, Calvin L. 2002. Eastern Whip-poor-will (Antrostomus vociferus). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/620 (accessed July 2015).

Cooper, R. J. 1981. Relative abundance of Georgia caprimulgids based on call counts. Wilson Bulletin 93:363-371.

Hallman, C. A., R. P. B. Foppen, C. A. M. van Turnhout, H. de Kroon, and E. Jongejans. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature DOI: 10.1038/nature13531 (accessed July 2015).

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Mills, A. M. 1986. The influence of moonlight on the behavior of goatsuckers (Caprimulgidae). Auk 103:370-378.

Orndorff, S., and T. Patten. 2007. Management Guidelines for Barrens Communities in Pennsylvania. Report prepared for the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission. The Nature Conservancy, Harrisburg. Pennsylvania.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Santner, S. 1992. Whip-poor-will. Pages 172-173 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press. Pittsburgh, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

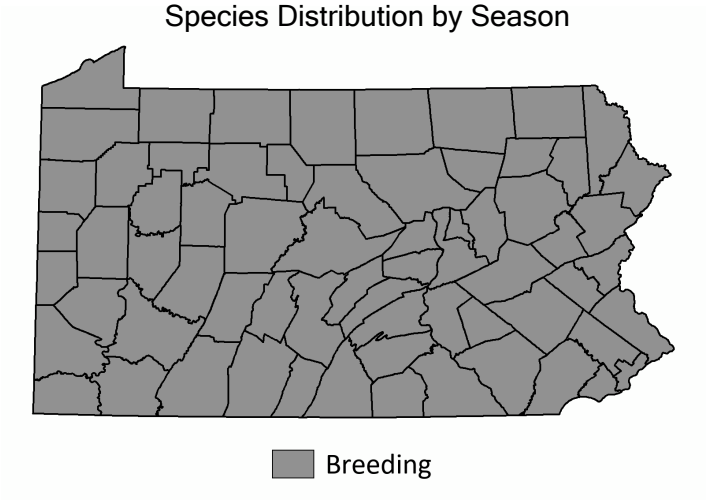
PENNSYLVANIA
WILDLIFE ACTION PLAN

Chimney Swift

Chaetura pelagica

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain species population at or above Second Breeding Bird Atlas (Wilson et al. 2012) levels of 430,000 birds through 2035, or a Breeding Bird Survey detection rate of 12 birds per route, on average, across 95% of all routes.

NatureServe Global Rank: G4G5

IUCN Red List Designation: Vulnerable

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Dark vertical hollow shafts, chimneys, hollow trees, silos and old barns.

Primary Habitat: Developed

Primary Habitat Type: Developed Areas

Primary Specific Habitat: NA

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** High

Specific Threat: Loss of open chimneys with rough-textured interiors for nesting or roosting.

Action Category: Outreach, communication and distribution

Specific Action: Remove chimney caps to allow swifts to access potential nesting sites.

Objective: Increase the proportion of uncapped chimneys by 30% by 2035.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of uncapped chimneys.

Potential Collaborators: Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High

Specific Threat: Loss of open chimneys with rough-textured interiors for nesting or roosting.

Action Category: Outreach, communication and distribution

Specific Action: Remove chimney caps to allow swifts to access potential nesting sites.

Objective: Increase the proportion of uncapped chimneys by 30% by 2035.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of uncapped chimneys.

Potential Collaborators: Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High

Specific Threat: Loss of open chimneys with rough-textured interiors for nesting or roosting.

Action Category: Stewarding wild individuals

Specific Action: Create artificial nesting structures for Chimney Swifts.

Objective: Create and deploy Chimney Swift towers statewide to create new swift nesting sites.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Deploy 35 nesting structures statewide.

Potential Collaborators: Local agencies & municipalities, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Work with Department of Agriculture to reduce or limit use of damaging pesticides and herbicides in grassland blocks surrounding suburban areas, particularly neonicotinoids.

Objective: Reduce use of neonicotinoids by 75-100% by 2035.

Action Priority: 4-Low **Action Urgency:** Initiate within 5-10 years **Measure:** Acres of Roundup Ready corn or soybeans and acres planted with neonicotinoid GMO seeds. Acres of grazing land deferred from sprays with neonicotinoids.

Potential Collaborators: Pennsylvania Game Commission, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Aerial insectivores and other birds associated with agriculture landscapes, as well as aquatic species impacted by pesticide runoff.

Season: Breeding

Priority	Need	Partners
1	Investigations into the relationships between pesticide use, flying insects, and aerial insectivores are needed.	Non-governmental organizations, Universities & research institutions
2	Evaluation of the effectiveness of Chimney Swift towers in attracting Chimney Swifts.	Pennsylvania Game Commission, Non-governmental organizations
3	Do any Chimney Swifts nest in large trees and old growth forests in the state?	Non-governmental organizations, Private Landowners

Season: Breeding

Priority	Survey	Partners
1	Annual monitoring of urban areas that harbor large populations of Chimney Swifts. A volunteer survey network could be developed to perform these surveys.	Pennsylvania Game Commission, Private Landowners
2	Identify communal roosts that contain large concentrations of Chimney Swifts prior to migration. This survey could be based on the Swift Night Out program conducted by the Chimney Swift Conservation Association (see Monitoring Programs).	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations

Name: A Swift Night Out

Lead(s) : Chimney Swift Conservation Association

Link: http://www.chimneyswifts.org

Description: An annual nationwide survey of swifts returning to roost. Volunteers count Chimney Swifts entering roosts in August and September.

Comments: There is potential for Pennsylvania Game Commission, Audubon Society, Pennsylvania Society for Ornithology, National Aviary, and birding organizations to promote this survey especially in urban areas.

Monitoring Need:

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Use eBird to detect large roosting sites during migration.

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bird Studies Canada. 2013. Ontario SwiftWatch 2012 Summary Report. Bird Studies Canada, Port Rowan, Ontario.

Byrnes, B. 2012. Chimney Swift. Pages 222-223 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Dionne, M., C. Maurice, J. Gauthier, and F. Shaffer. 2008. Impact of Hurricane Wilma on migrating birds: the case of the Chimney Swift. Wilson Journal of Ornithology 120:784-792.

Fitzgerald, T. M., E. van Stam, J. J. Nocera, D. S. Badzinski. 2014. Loss of nesting sites is not a primary factor limiting northern Chimney Swift populations. Population Ecology DOI:10.1007/s10144-014-0433-6.

Fraser, K. C., B. J. M. Stutchbury, C. Silverio, P. M. Kramer, J. Barrow, D. Newstead, N. Mickle, B. F. Cousens, J. C. Lee, and D. M. Morrison. 2012. Continent-wide tracking to determine migratory connectivity and tropical habitat associations of a declining aerial insectivore. Proceedings of the Royal Society B: Biological Sciences 279:4901-4906.

Hallman, C. A., R. P. B. Foppen, C. A. M. van Turnhout, H. de Kroon, and E. Jongejans. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature DOI: 10.1038/nature13531 (accessed July 2015).

Kyle, P. D. 2005. Chimney Swift towers: New Habitat for America's Mysterious Birds. Texas A&M University Press, College Station.

Kyle, P. D. and G. Z. Kyle. 1998. Providing and maintaining nesting habitat for Chimney Swifts: a guide for homeowners. PWD BR W7000-246. Driftwood Wildlife Association and Texas Parks Wildlife, Austin, Texas.

Kyle, P. D. and G. Z. Kyle. 2001. Professional chimney sweeps lend a hand with Chimney Swift conservation. Chaetura 6:5.

Mordecai, R. S. 2008. Chimney Watch: Providing a foundation for coordinated monitoring of urban aerial insectivores. Northeast Coordinated Bird Monitoring Partnership and the American Bird Conservancy.

Nebel, S. A., J. D. McCracken, and P.D. Taylor. 2010. Declines of aerial insectivores in North America follow a geographic gradient. Avian Conservation and Ecology 5:1. Available from http://www.ace-eco.org/vol5/iss2/art1/ (accessed July 2015).

Nocera, J. J., J. M. Blais, D. V. Beresford, L. K. Finity, C. Grooms, L. E. Kimpe, K. Kyser, N. Michelutti, M. W. Reudink, and J. P. Smol. 2012. Historical pesticide applications coincided with an altered diet of aerially foraging insectivorous Chimney Swifts. Proceedings of the Royal Society B DOI:10.1098/rspb.2012.0445 (accessed July 2015).

Steeves, T. K., S. B. Kearney-McGee, M. A. Rubega, C. L. Cink, and C. T. Collins. 2014. Chimney Swift (Chaetura pelagica). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/646 (accessed July 2015).

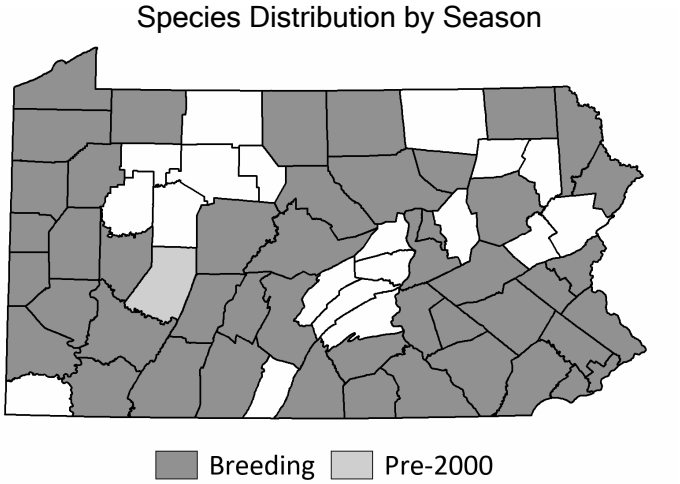
PENNSYLVANIA
WILDLIFE ACTION PLAN

Sora

Porzana carolina

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding season presence in at least 100 wetland sites statewide through 2025, as reflected in the Second Atlas of Breeding Birds (Wilson et al. 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Large shallow-intermediate depth emergent wetlands with a mosaic of open water, dense emergent vegetation, and mudflats.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Medium

Specific Threat: Poor impoundment water management leading to vegetation inundation.

Action Category: Manage non-living habitat components

Specific Action: Use water control structures where available to encourage diverse stands of both fine-leaved and robust emergents (e.g., sedges, bulrushes, and especially cattails) as well as moist-soil annuals around edges of wetlands.

Objective: Where appropriate, ensure water levels are below 30 cm (12 in) by late March.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Water levels on emergent freshwater marshes will be below 30 cm (12 in) by April.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other secretive marsh birds/waterbirds and dabbling ducks.

Season: Breeding

Threat Category: Droughts **Threat Impact:** Medium

Specific Threat: Increased drought frequency and severity during the breeding season and extreme weather events.

Action Category: Manage non-living habitat components

Specific Action: Encourage or maintain optimal water levels in freshwater wetlands during the breeding season and use controlled impoundments to make wetlands more resistant to severe weather.

Objective: Use water control structures to maintain water levels suitable for breeding Sora in freshwater wetlands, monitor water levels during times of severe weather (i.e., flooding or drought).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Presence of moist soils or low water levels during the breeding season; checked annually.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other secretive marsh birds/waterbirds and dabbling ducks.

Season: Breeding

Priority	Need	Partners
1	Continued research into best management practices for creating and maintaining mosaics of emergent vegetation and open water, including avian response to wetland management.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	For currently and formerly occupied marshes, conduct a retrospective analysis of changes in overall percentages and amount of interspersion of emergent vegetation and open water, to inform selection of target values for these parameters to be achieved through habitat management activities.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Continue Pennsylvania Game Commission marsh bird surveys annually and expand efforts to smaller wetlands when possible, especially those with history of this species, or that are newly created.	Pennsylvania Game Commission, Interested Public, Non-governmental organizations
2	Use eBird as an efficient way to gather information on Sora distribution, breeding locales, migratory stopover sites, and timing of migration.	Pennsylvania Game Commission, Interested Public, Non-governmental organizations
3	Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys in collaboration with U.S. Fish and Wildlife Service Harvest Information Program).	Pennsylvania Game Commission, Universities & research institutions, U.S. Fish and Wildlife Service

Name: Audubon Mid-Atlantic Important Bird Area Surveys **Lead(s) :** Audubon Mid-Atlantic

Link: N/A

Description: Marsh bird surveys at Important Bird Areas designated due to their importance to wetland birds. Standardized marsh bird protocols as described in Pennsylvania Game Commission Marsh Bird Surveys and volunteer surveys.

Comments: Potential to supplement and complement Pennsylvania Game Commission marsh bird surveys and involve volunteers interested in wetlands.

Monitoring Need: Prioritize target species and habitat management work in Important Bird Areas identified by the Audubon surveys.

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Name: U.S. Fish and Wildlife Service Harvest Information Program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need: Assess the number of current rail hunters and derive harvest estimates.

Brittingham, M.C. 2005. Sora species account in PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission). Pennsylvania's Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy, L. Williams, editor.) Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, revised 2008, Harrisburg, Pennsylvania.

Brittingham, M.C. 2010. Sora. Pages 247-249 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

Case, D. J., and D. D. McCool, editors. 2009. Priority information needs for rails and snipe: a funding strategy. Developed by the Association of Fish and Wildlife Agencies' Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_Rails_and_Snipe.pdf (accessed March 2015).

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Eddleman, W. R., F. L. Knopf, B. Meanley, F. A. Reid, and R. Zembal. 1988. Conservation of North American rallids. Wilson Bulletin 100:458-475.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Johnson, R. R. and J. J. Dinsmore. 1986. Habitat use by breeding Virginia Rails and Soras. Journal of Wildlife Management 50:387-392.

Melvin, S. M. and J. P. Gibbs. 1994. Sora. Pages 209-217 in T. C. Tacha and C. E. Braun, editors. Migratory shore and upland game bird management in North America. International Association of Fish & Wildlife Agencies, Washington, D.C.

Raftovich, R. V., S. Chandler, and K. A. Wilkins. 2014. Migratory bird hunting activity and harvest during the 2012-13 and 2013-14 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland. Available from http://www.fws.gov/migratorybirds/NewReportsPublications/HIP/HuntingStatistics/Migratory%20Bird%20Hunting%20Activity%20and%20Harvest%20for%20the%202012-13%20and%202013-14%20Hunting%20Seasons.pdf (accessed March 2015).

Rehm, E. M. and G. A. Baldassarre. 2007. The influence of interspersion on marsh bird abundance in New York. The Wilson Journal of Ornithology 119:648-654.

Reid, W. 1992. Sora. Pages 126-127 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Rundle, W. D., and L. H. Frederickson. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Society Bulletin 9:80-87.

Van Fleet, K. 2012. Sora. Pages 166-167 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

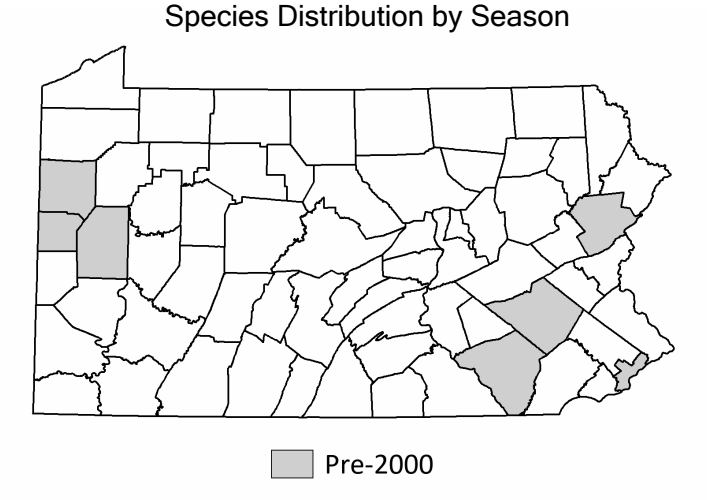
PENNSYLVANIA
WILDLIFE ACTION PLAN

King Rail

Rallus elegans

Patricia M. Barber *Pennsylvania Game Commission*

Jim Rathert, Missouri Department of Conservation



Conservation Profile

PA 10-Year Conservation Goal: Confirm 1-3 breeding pairs in each of three wetland complexes where King Rail were possible, probable or confirmed breeders in the Second Breeding Bird Atlas of Pennsylvania (Wilson et al. 2012).

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Freshwater marshes (tidal and non-tidal), brackish tidal marshes, shrub swamps, sedges, rushes and cattails.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Very High

Specific Threat: Improper water levels for nesting and brood rearing.

Action Category: Manage non-living habitat components

Specific Action: Utilize water control structures where available to encourage diverse stands of both fine-leaved and robust emergents (e.g., sedges, bulrushes, and especially cattails) as well as moist-soil annuals around edges of wetlands.

Objective: Where appropriate, ensure water levels are below 30 cm (12 in) by late March.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Water levels on emergent freshwater marshes will be below 30 cm (12 in) by April.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other secretive marsh birds/waterbirds and dabbling ducks.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Habitat degradation through loss of species diversity and quality.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove non-native plants from wetlands and provide growing conditions consistent with healthy native wetlands.

Objective: Encourage active removal and control of non-native species in wetlands.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction in the area of wetland covered in exotic vegetation.

Potential Collaborators: Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: All native species that utilize emergent wetlands.

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** High

Specific Threat: Extreme precipitation leads to decreased nesting success through flooding.

Action Category: Manage non-living habitat components

Specific Action: Control water levels during the nesting season in the marshes used for nesting, to minimize nest flooding.

Objective: Ten largest Pennsylvania wetlands with water levels appropriate for nesting during the nesting season.

Action Priority: 4-Low **Action Urgency:** Initiate immediately **Measure:** Acres of wetlands with water at appropriate levels throughout nesting season.

Potential Collaborators: Delaware River Basin Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other wetland nesting birds

Season: Breeding

Priority	Need	Partners
1	Determine current status and distribution using best available information and conducting additional surveys in areas of current and historic occurrences. Support research to examine where the northern migrating population overwinters.	Pennsylvania Game Commission, Non-governmental organizations, Private Landowners, Interested Public
2	Assess current marsh habitat quality and quantity as well as surrounding landscape that serves as a buffer area to determine if and where overall improvements can be made. Model potential impacts of extreme weather events associated with global climate change on existing habitats and develop sound mitigation scenarios for the future.	Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission
3	Beyond wetland losses, determine factors contributing to the decline of King Rail in Pennsylvania, including agricultural practices, runoff and sedimentation, methyl mercury pollution, potential sources of lead contamination, and mammalian predators.	Pennsylvania Game Commission, Pennsylvania Biological Survey, Universities & research institutions
4	There is a paucity of information on northern populations of King Rail that migrate to more southern regions to overwinter. Numerous undetermined natural and/or anthropogenic factors may have impacted this species' population over the past several decades, resulting in fewer numbers of birds returning to breeding grounds in more northern locations.	Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Universities & research institutions, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Other federal agency, Other state agency

Season: Breeding

Priority	Survey	Partners
1	Survey and assess habitat quality relative to ecological needs of King Rail in areas of current and historic locations. Focus on quality and quantity of vegetative cover (native, invasive and exotic plants), quality and quantity of water (sedimentation, pollution and water levels), abundance, and potential risk of disturbance.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Businesses
2	Water quality monitoring and invertebrate studies to examine factors contributing to prey availability and abundance.	Non-governmental organizations, Conservancies & Land Trusts, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Universities & research institutions, Pennsylvania Association of Conservation Districts
3	Determine presence/absence of known predators of King Rail and their nests.	Pennsylvania Game Commission, Universities & research institutions

Name: Annual follow up on endangered species reports **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Breeding season surveys in areas where birds were found during Bird Atlas efforts and/or reported in recent eBird observations during the nesting season and in historic locations to determine the number of breeding pairs within the state.

Comments:

Monitoring Need: Determine number of breeding pairs within the state.

Name: Pennsylvania Game Commission Marsh Bird Surveys **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Bolenbaugh, J. R., T. Cooper, R. S. Brady, K. L. Willard, and D. G. Krementz. 2012. Population status and habitat associations of the King Rail in the midwestern United States. Waterbirds 35:534-545.

Case, D. J., and D. D. McCool, editors. 2009. Priority information needs for rails and snipe: a funding strategy. Developed by the Association of Fish and Wildlife Agencies' Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_Rails_and_Snipe.pdf (accessed March 2015).

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Cooper, T. R. 2008. King Rail conservation plan, Version 1. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.

Cooper, T.R., editor. 2006. King Rail Conservation Action Plan Workshop Summary. Unpublished Report. Held November 14-15, 2006, Ducks Unlimited National Headquarters, Memphis, Tennessee.

COSEWIC. 2011. Assessment and status report on the King rail (Rallus elegans) in Canada. Committee on the Status of Endangered Wildlife in Canada Ottawa. Available from www.sararegistry.gc.ca/document/default_e.cfm?documentID=1149 (accessed July 2015).

Environment Canada. 2012. Recovery strategy for the King Rail (Rallus elegans) in Canada. Species at Risk Recovery Strategy Series. Environment Canada, Ottawa.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Haffner C. and D. Gross 2014. King Rail (Rallus elegans) fact sheet. Pennsylvania Game Commission, Harrisburg, Pennsylvania. Available from www.portal.state.pa.us/portal/server.pt?open=514&objID=913854&mode=2 (accessed January 2015).

Haffner, C., D. Gross, and K. Van Fleet. 2008. Wetland Nesting Bird Surveys. Report 72302. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

NatureServe. 2014. King Rail (Rallus elegans). NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available from http://explorer.natureserve.org (accessed December 2014).

Pain, D. J., I. J. Fisher, and V. G. Thomas. 2009. A global update of lead poisoning in terrestrial birds from ammunition sources. In R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt, editors. Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. The Peregrine Fund, Boise, Idaho. DOI:10.4080/ilsa.2009.0108 (accessed July 2015).

Rundle, W. D., and L. H. Frederickson. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Society Bulletin 9:80-87.

Seamans, M., J. Wheeler, K. Koch, T. Cooper, C. Conway, C. Dwyer, and G. Shriver. 2013. Monitoring marshbirds to inform sound conservation and management decisions at multiple scales: Briefings and recommendations one year after the 2011 marshbird summit.

Van Fleet, K. 2008. Marsh Bird Monitoring Conservation Project, January 2006 through December 2007. A report submitted to Pennsylvania Game Commission, Wildlife Diversity Section, State Wildlife Grant center, Harrisburg, Pennsylvania.

Whelan, C. J. 2000. Population viability assessment for King Rail (Rallus elegans). Illinois Natural History Survey, Wilmington, Illinois.

Wilhelm, G. 2012. King Rail (Rallus elegans). Pages 162-163 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wilson, M. D., B. D. Watts, and D. F. Brinker. 2007. Status review of Chesapeake Bay marsh lands and breeding marsh birds. Waterbirds 30:122-137.

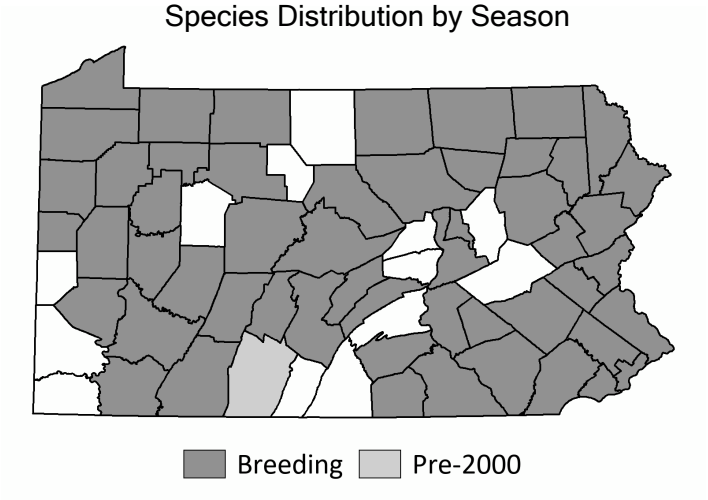
PENNSYLVANIA
WILDLIFE ACTION PLAN

Virginia Rail

Rallus limicola

Amanda J. Hoyt *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Breeding-season detection in at least 150 wetland sites statewide through 2035, as reflected in the Second Atlas of Breeding Birds (Wilson et al. 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3?B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1 - 1000 individuals

PA Short-term Trend (10-year): Increase of 10-25%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Freshwater wetlands: moist-soil emergent or seasonal/semi-permanent ponds with stands of robust emergent vegetation. Requires shallow water, emergent cover, and high invertebrate abundance.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Medium

Specific Threat: Conversion of wetlands to non-habitat and poor wetland management.

Action Category: Manage non-living habitat components

Specific Action: Manage for moist soils during the breeding season using water control structures, where available.

Objective: On appropriate wetlands, spring drawdowns of water levels should be timed so that water levels are below 30 cm (11.8 in) by the breeding season in late March.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Water levels on emergent freshwater marshes will be below 30 cm (11.8 in) by April.

Potential Collaborators: Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Dabbling ducks, other secretive marsh birds/waterbirds

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Loss of wetland habitat suitability and productivity due to non-native vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove and control non-native vegetation from wetlands.

Objective: Encourage active removal and control of non-native species in wetlands.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction in the area of wetland covered in exotic vegetation.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Fish and Boat Commission

Locations: Statewide

Other species likely to benefit from this action: All native species that utilize emergent wetlands.

Season: Breeding

Threat Category: Droughts **Threat Impact:** Medium

Specific Threat: Increased breeding season drought frequency and severity along with extreme weather events.

Action Category: Manage non-living habitat components

Specific Action: Maintain water levels optimal for nesting and foraging during the breeding season.

Objective: Utilize water control structures to maintain water levels suitable for breeding Virginia Rails in freshwater wetlands; monitor water levels during times of severe weather (i.e., flooding or drought).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Presence of moist soils or low water levels during the breeding season; checked annually.

Potential Collaborators: Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Dabbling ducks and other waterbirds

Season: Breeding

Threat Category: Airborne Pollutants **Threat Impact:** Medium

Specific Threat: Toxic bioaccumulation of methylmercury.

Action Category: Manage non-living habitat components

Specific Action: Ensure compliance with the U.S. Environmental Protection Agency's Mercury and Air Toxics Standards (MATS).

Objective: Reduction of multiple pollutants and sediment from point and non-point sources known to impact aquatic systems.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Measurable reduction of methylmercury pollution.

Potential Collaborators: Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, U.S. Environmental Protection Agency

Locations: Statewide

Other species likely to benefit from this action: Other waterbirds

Season: Breeding

Priority	Need	Partners
1	What factors affect adult and brood survival, nesting success, site fidelity, and recruitment? How do noise, ambient light, and other industrial/commercial disturbances affect nesting success?	Other state agency, Pennsylvania Game Commission, Universities & research institutions
2	Continued research into best management practices for creating and maintaining mosaics of emergent vegetation and open water, including avian response to wetland management.	Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Universities & research institutions
3	How effective are vocalization surveys for estimating population density or indexing population trends?	Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Continue Pennsylvania Game Commission marsh bird surveys annually and expand efforts to smaller wetlands when possible, especially those with history of this species, or that are newly created (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).	Non-governmental organizations, Pennsylvania Game Commission, Interested Public
2	Use eBird as an efficient way to gather information on Virginia Rail distribution, breeding locales, migratory stopover sites, and timing of migration.	Pennsylvania Game Commission, Interested Public, Non-governmental organizations
3	Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys in collaboration with U.S. Fish and Wildlife Service Harvest Information Program).	U.S. Fish and Wildlife Service, Pennsylvania Game Commission, Universities & research institutions

Name: Audubon Mid-Atlantic Important Bird Area Surveys

Lead(s) : Audubon Mid-Atlantic

Link: N/A

Description: Marsh bird surveys at Important Bird Areas designated due to their importance to wetland birds. Standardized marsh bird protocols as described in Pennsylvania Game Commission Marsh Bird Surveys and volunteer surveys.

Comments: Potential to supplement and complement Pennsylvania Game Commission marsh bird surveys and involve volunteers interested in wetlands.

Monitoring Need: Prioritize target species and habitat management work in Important Bird Areas identified by the Audubon surveys.

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need: Improve our understanding of Virginia rail abundance and distribution in Pennsylvania.

Name: U.S. Fish and Wildlife Service Harvest Information Program **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need: Assess the number of current rail hunters and derive harvest estimates.

Anderson, S.L., McGranahan, D.A., Hovick, T.J. et al. Passerine and secretive marsh bird responses to cattail management in temperate wetlands. Wetlands Ecol Manage 27, 283–293 (2019). https://doi.org/10.1007/s11273-019-09659-2

Case, D. J., and D. D. McCool, editors. 2009. Priority information needs for rails and snipe: a funding strategy. Developed by the Association of Fish and Wildlife Agencies' Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_Rails_and_Snipe.pdf (accessed March 2015).

Conway, C. J. 1995. Virginia Rail (Rallus limicola). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/173 (accessed July 2015).

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Eddleman, W. R., F. L. Knopf, B. Meanley, F. A. Reid, and R. Zembal. 1988. Conservation of North American rallids. Wilson Bulletin 100:458-475.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Johnson, R. R. and J. J. Dinsmore. 1986. Habitat use by breeding Virginia Rails and Soras. Journal of Wildlife Management 50:387-392.

Kibbe, D. P. 2010. Virginia rail. Pages 140-142 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

Raftovich, R. V., S. Chandler, and K. A. Wilkins. 2014. Migratory bird hunting activity and harvest during the 2012-13 and 2013-14 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland. Available from http://www.fws.gov/migratorybirds/NewReportsPublications/HIP/HuntingStatistics/Migratory%20Bird%20Hunting%20Activity%20and%20Harvest%20for%20the%202012-13%20and%202013-14%20Hunting%20Seasons.pdf (accessed March 2015).

Rehm, E. M. and G. A. Baldassarre. 2007. The influence of interspersion on marsh bird abundance in New York. The Wilson Journal of Ornithology 119:648-654.

Rundle, W. D., and L. H. Frederickson. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Society Bulletin 9:80-87.

Salafsky, N., D. Salzer, A. J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S. H. M. Butchart, B. Collen, N. Cox, L. L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. Conservation Biology 22:897-911.

Tozer, D.C., Stewart, R.L.M., Steele, O. and Gloutney, M. (2020), Species-Habitat Relationships and Priority Areas for Marsh-Breeding Birds in Ontario. Jour. Wild. Mgmt., 84: 786-801. https://doi.org/10.1002/jwmg.21840

Van Fleet, K. 2012. Virginia Rail. Pages 164-165 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

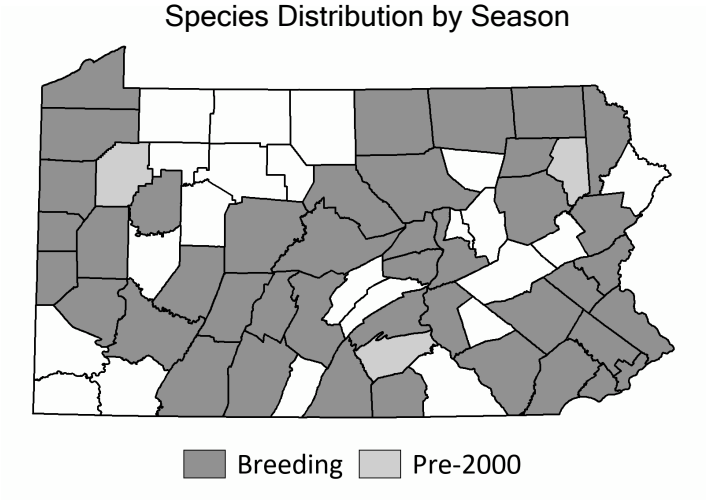
PENNSYLVANIA
WILDLIFE ACTION PLAN

Common Gallinule

Gallinula galeata

Amanda J. Hoyt — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Reliable detection of nesting birds at minimally three nest sites, as indicated in the Second Atlas of Breeding Birds (Wilson et al. 2012), through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Large, shallow-intermediate depth wetlands with a 1:1 ratio of open water and emergent vegetation and vegetated perimeter.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Storms and Flooding

Threat Impact: High

Specific Threat: Wetland filling or alterations leads to decreased nesting habitat and can cause flooding in surrounding wetlands during severe weather events.

Action Category: Manage non-living habitat components

Specific Action: Improve existing wetlands to better withstand severe weather events that may cause flooding.

Objective: Improve or install water control structures at 5 sites over the next 5 years to support wetland resiliency to severe weather that may cause nest flooding.

Action Priority: 3-Medium

Action Urgency: Initiate immediately

Measure: Number of water control structure installed or improved.

Potential Collaborators: Pennsylvania Game Commission, Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: Wetland-associated native flora and fauna

Season: Breeding

Priority	Need	Partners
1	Develop Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of invasive species issues.	Universities & research institutions, Private Landowners
2	Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.	Universities & research institutions
3	For currently and formerly occupied marshes, conduct a retrospective analysis of changes in overall percentages and amount of interspersion of emergent vegetation and open water, to inform selection of target values for these parameters.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Continue annual Pennsylvania Game Commission marshbird surveys, or surveys newly created (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada); expand these surveys to small wetlands when possible, particularly historic breeding locations.	U.S. Fish and Wildlife Service, Universities & research institutions
2	Use eBird (Cornell Lab of Ornithology) as an efficient way to gather information on Common Gallinule distribution and breeding locations.	Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Use status and trend data to determine a short-term population trend and distribution in Pennsylvania.

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas (Wilson et al. 2012). Survey results inform management of these wetlands.

Comments:

Monitoring Need: Increase frequency of these surveys to better understand the distribution of this species in Pennsylvania.

Name: U.S. Fish & Wildlife Service Harvest Information Program

Lead(s) : U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need: Continue to use federal Harvest Information Program data to understand harvest and hunter participation for this species.

Bannor, B.K. and E. Kiviat. 2002. Common Moorhen (Gallinula chloropus). Account number 697 in A. Poole and F. Gill, editors. The Birds of North America. The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The Auk, Washington, D.C.

Case, D. J. and Associates, editors. 2010. Priority information needs for American Coots, Purple Gallinules, and Common Moorhens: a funding strategy. Developed for the Association of Fish and Wildlife Agencies by the Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_American_Coots_Purple_Gallinules_Common_Moorhens_FINAL.pdf (accessed March 2015).

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Kibbe, D. P. 2005. Common Moorhen species account in PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission). Pennsylvania's Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy, L. Williams, editor.) Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, revised 2008, Harrisburg, Pennsylvania.

Kibbe, D.P. 2010. Common Moorhen. Pages 249-251 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

Leberman R. C. 1992. Common Moorhen. Pages 128-129 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Leberman, R. C. 2012. Common Gallinule. Pages 168-169 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, Universtiy Park, Pennsylvania.

Raftovich, R. V., S. Chandler, and K. A. Wilkins. 2014. Migratory bird hunting activity and harvest during the 2012-13 and 2013-14 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland. Available from http://www.fws.gov/migratorybirds/NewReportsPublications/HIP/HuntingStatistics/Migratory%20Bird%20Hunting%20Activity%20and%20Harvest%20for%20the%202012-13%20and%202013-14%20Hunting%20Seasons.pdf (accessed March 2015).

Rundle, W. D., and L. H. Frederickson. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Society Bulletin 9:80-87.

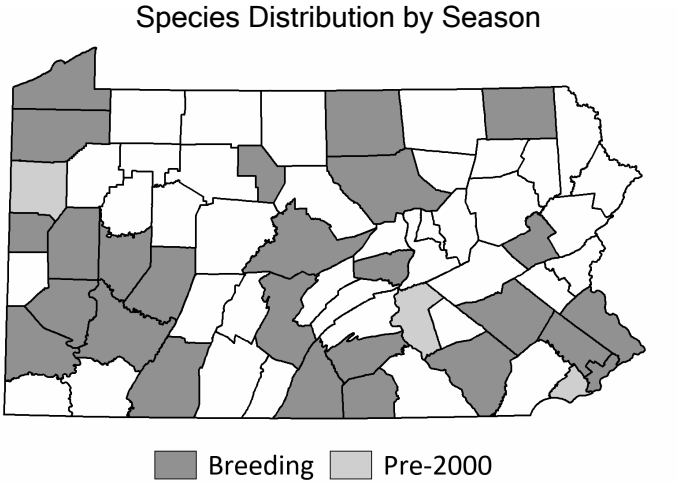
PENNSYLVANIA
WILDLIFE ACTION PLAN

American Coot

Fulica americana

Amanda J. Hoyt *Pennsylvania Game Commission*

J. Kosack, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase breeding population through habitat protection and active habitat management.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Large shallow-intermediate depth wetlands with a mosaic of open water and floating vegetation and vegetated fringes.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Wet Meadow-Shrub Swamp

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Invasive non-native vegetation (e.g., phragmites, purple loosestrife) can become too dense, crowding areas of open water.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove non-native or invasive vegetation.

Objective: Investigate and implement best management practices to maintain emergent/open water mosaics.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of acres restored and number of suitable acres maintained.

Potential Collaborators: Interested Public, Local agencies & municipalities, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, many waterfowl

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Low

Specific Threat: Water level modifications (e.g., flooding, extreme drawdown) can cause nest failure.

Action Category: Manage non-living habitat components

Specific Action: Manage impoundment water levels at moderate depth to maintain and enhance nesting success.

Objective: Provide appropriate wetland habitat with stable water levels to enhance nest success.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of successful breeding pairs.

Potential Collaborators: Non-governmental organizations, Private Landowners, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, many waterfowl

Season: Breeding

Priority	Need	Partners
1	Continued research into Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of invasive species issues.	U.S. Fish and Wildlife Service
2	Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.	U.S. Fish and Wildlife Service
3	For currently and formerly occupied marshes, conduct a retrospective analysis of changes in overall percentages and amount of interspersion of emergent vegetation and open water, to inform selection of target values for these parameters to be achieved	U.S. Fish and Wildlife Service

Season: Breeding

Priority	Survey	Partners
1	Continue annual Pennsylvania Game Commission marshbird surveys, or surveys newly created (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada); expand these surveys to small wetlands when possible, particularly historic breeding locations.	Non-governmental organizations, U.S. Fish and Wildlife Service
2	Use eBird (Cornell Lab of Ornithology) as an efficient way to gather information on American Coot distribution and breeding locations.	U.S. Fish and Wildlife Service, Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas (Wilson et al. 2012). Survey results inform management of these wetlands.

Comments:

Monitoring Need: Continue survey and compare results annually to historical data to better understand population changes in Pennsylvania.

Name: U.S. Fish & Wildlife Service Harvest Information Program

Lead(s) : U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need:

Aliskauskas, R. T. and T. W. Arnold. 1994. American Coot. Pages 126-143 in T. C. Tacha and C. E. Braun, editors. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies in Cooperation with Fish and Wildlife Service, U.S. Dept of Interior, Allen Press, Lawrence, Kansas.

Brisbin Jr., I. L. and T. B. Mowbray. 2020. American Coot (Fulica americana), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.y00475.01

Brisbin, I.L., Jr. and T.B. Mowbray. 2002. American Coot (Fulica americana). Account 697 in A. Poole and F. Gill, editors. The Birds of North America. The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The Auk, Washington, D.C.

Case, D. J. and Associates, editors. 2010. Priority information needs for American Coots, Purple Gallinules, and Common Moorhens: a funding strategy. Developed for the Association of Fish and Wildlife Agencies by the Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_American_Coots_Purple_Gallinules_Common_Moorhens_FINAL.pdf (accessed March 2015).

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Davidson, W. R., editor. 2006. Field Manual of Wildlife Diseases in the Southeastern United States, 3rd edition. Southeastern Cooperative Wildlife Disease Study. Athens, Georgia.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Jacobs, K. J., D. R. Diefenbach, and J. P. Dunn. 1997. Predictions of emergent vegetation establishment following drawdown in various State Game Lands wetlands. Final report for Project 06510, Job 51005. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Leberman R. C. 1992. American Coot. Pages 130-131 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Leberman, R. C. 2012. American Coot. Pages 170-171 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, Universtiy Park, Pennsylvania.

Olimpi, E. 2005. American Coot species account in PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission). Pennsylvania's Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy, L. Williams, editor.) Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, revised 2008, Harrisburg, Pennsylvania.

Olimpi, E. 2010. American Coot. Pages 251-254 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Raftovich, R. V., S. Chandler, and K. A. Wilkins. 2014. Migratory bird hunting activity and harvest during the 2012-13 and 2013-14 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland. Available from http://www.fws.gov/migratorybirds/NewReportsPublications/HIP/HuntingStatistics/Migratory%20Bird%20Hunting%20Activity%20and%20Harvest%20for%20the%202012-13%20and%202013-14%20Hunting%20Seasons.pdf (accessed March 2015).

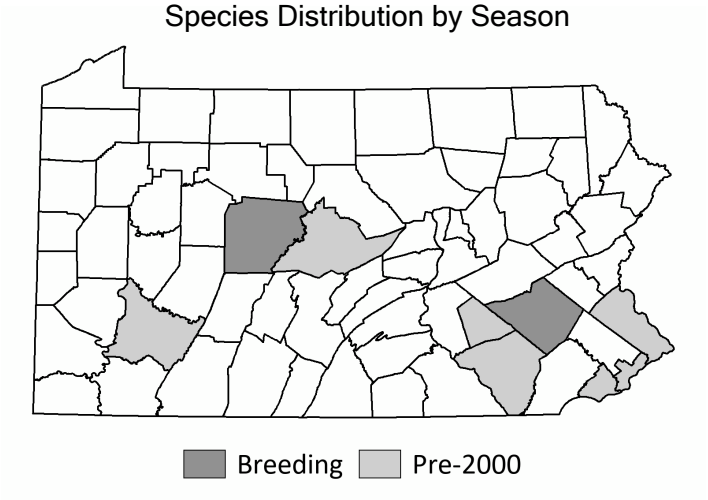
PENNSYLVANIA
WILDLIFE ACTION PLAN

Black Rail

Laterallus jamaicensis

Patricia M. Barber *Pennsylvania Game Commission*

Colorado Parks and Wildlife



Conservation Profile

PA 10-Year Conservation Goal: Maintain 1-5 nesting pairs annually.

NatureServe Global Rank: G3T1

IUCN Red List Designation: Endangered

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Very High Concern

Federal Listing Status: Threatened

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements:

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Season: Breeding

Threat Category: Dams and Water Management/Use

Threat Impact: Medium

Specific Threat: Improper water level for nesting and brood rearing.

Action Category: Manage non-living habitat components

Specific Action: Maintain water levels optimal for nesting and foraging during the breeding season.

Objective: Maintain sufficient acreage of marsh with appropriate water level for successful nesting and foraging in at least 5 locations.

Action Priority: 1-Highest

Action Urgency: Initiate immediately

Measure: Acres of marsh with appropriate water level for foraging and nesting.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Agriculture, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Gain a better understanding of the landscape composition and habitat characteristics required for Black Rail breeding habitat.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, U.S. Fish and Wildlife Service

Season: Breeding

Priority	Survey	Partners
1	Investigate and document all reports of Black Rails during nesting season. Enter sighting locations into Pennsylvania Natural Diversity Inventory (PNDI).	Pennsylvania Game Commission, Interested Public

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state, including Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Atlantic Coast Joint Venture. 2020. Eastern Black Rail conservation plan for the Atlantic Coast. www.acjv.org

Watts, B. D. 2022. Eastern black rail: management guidance. The Center for Conservation Biology Technical Report Series, CCBTR-22-08. William & Mary, Williamsburg, VA.

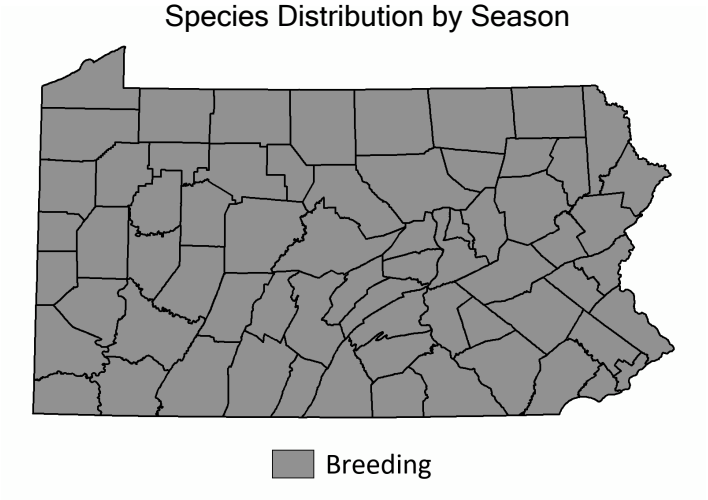
PENNSYLVANIA
WILDLIFE ACTION PLAN

Killdeer

Charadrius vociferus

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain species population at or above current levels of 3 birds per Breeding Bird Survey Route, statewide, through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Killdeer nest in open, dry to seasonally wet terrestrial systems, including natural (e.g., shoreline) and human-modified (e.g., driveways, gravel parking lots) environments. Open visibility, dry to seasonally wet soil, sparse/low vegetation, gravel, sand, or bare ground is preferred for camouflage

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: Killdeer typically nest in open, dry to seasonally wet terrestrial systems, including both natural and human-modified environments.

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Medium

Specific Threat: Loss of nests or young to mowing/harvesting operations.

Action Category: Outreach, communication and distribution

Specific Action: Promote bird-friendly mowing practices (e.g., delayed, rotational, and inside-out mowing techniques).

Objective: Reduce Killdeer egg and chick mortality.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Killdeer persistence along Breeding Bird Survey routes.

Potential Collaborators: Interested Public

Locations: Statewide

Other species likely to benefit from this action: Other openland-dependent wildlife species.

Season: Breeding

Threat Category: Viral/Prion-induced Diseases **Threat Impact:** Medium

Specific Threat: Two Pennsylvania-specific studies have linked West Nile virus intensity with decreasing Killdeer population trends.

Action Category: Manage non-living habitat components

Specific Action: Create and maintain grassland or old field habitat in areas with lower incidence of West Nile Virus-carrying mosquitoes.

Objective: Prioritize invasive species control efforts for toward highly competitive invasive vegetation (e.g., buckthorn, stilt grass, tree of heaven).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Acres of invasive vegetation removed.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other openland-dependent wildlife species.

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** Low

Specific Threat: Building development on open land habitat reduces nesting habitat and increases mortality risk from human disturbance.

Action Category: Outreach, communication and distribution

Specific Action: Promote bird-friendly mowing practices (e.g., delayed, rotational, and inside-out mowing techniques) and protection of a ground-nesting Species of Greatest Conservation Need that often intersects with human activities.

Objective: Reduce Killdeer egg and chick mortality.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of educational interactions.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other openland-dependent wildlife species.

Season: Breeding

Priority	Need	Partners
1	Because the cause of Killdeer declines is unknown, investigate critical life history characteristics (e.g., annual survival, reproductive success, fidelity) and how these vary between natural and human-disturbed sites.	Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission, Universities & research institutions
2	How is West Nile virus affecting Pennsylvania Killdeer populations?	Universities & research institutions, Pennsylvania Game Commission
3	Is there a connection between the breeding Killdeer population and individual Killdeer overwintering in Pennsylvania?	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Third Pennsylvania Bird Atlas (2024-2028)	Interested Public, Non-governmental organizations

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas.html

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments: The Atlas will provide a snapshot of the population status and distribution of birds in the Commonwealth. No other bird surveys are as comprehensive, and for that reason, the results are critical to the establishment of conservation priorities for Pennsylvania birds. The Atlas is open to all volunteer birders, regardless of skill level, primarily by using the popular "eBird" online database to record observations.

Monitoring Need:

Sanzenbacher, Peter M., and Susan M. Haig. 2001. Killdeer population trends in North America. Journal of Field Ornithology 72.1: 160-169.

PENNSYLVANIA
WILDLIFE ACTION PLAN

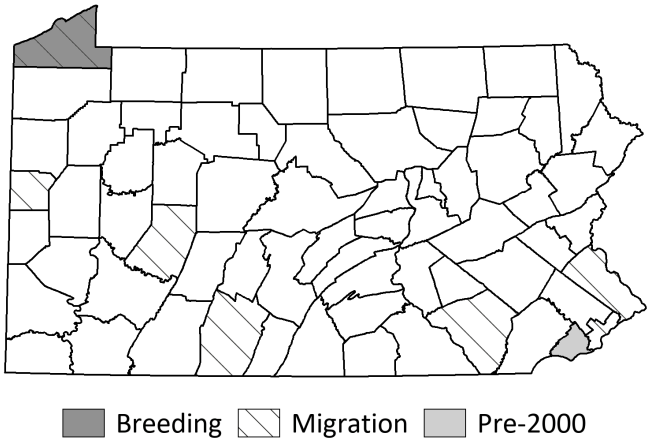
Piping Plover (Great Lakes pop.)

Charadrius melodus

Catherine D. Haffner — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain viable habitat, maximize breeding and migratory bird detections and unique identifications, minimize adult and chick loss to predation, and annually fledge at least 2.0 chicks per pair by 2035.

NatureServe Global Rank: G3

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Endangered

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: Very High

NatureServe Global Rank: G3

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Endangered

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S1M

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Sparsely vegetated Great Lakes beaches with wide distance to the treeline and mixture of sand and cobble (see USFWS 2003). Presque Isle State Park, Erie Co. is the only known suitable nesting habitat for breeding Piping Plovers (McWilliams and Brauning 2000; Price 2002; Haffner 2007).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Beaches & Dunes

Primary Specific Habitat: Great Lakes Wooded Dune and Swale

Habitat Comments: Presque Isle State Park hosts the only known piping plover nesting habitat in Pennsylvania.

Season: Migration

Specific Habitat Requirements: Lake Erie shoreline and inland riverine and lacustrine mud flats. Presque Isle State Park, Gull Point Natural Area, Erie Co. is the primary location for migrants; however, they have also been recorded along the lower Susquehanna River (e.g., Conejohela Flats, Lancaster Co.) (McWilliams and Brauning 2000).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Beaches & Dunes

Primary Specific Habitat: Great Lakes Wooded Dune and Swale

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Loss/alteration of dry sandplain/dune habitat by invasive giant reed, purple loosestrife, and other invasive vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove non-native and native invasive vegetation, particularly woody stems.

Objective: Annually evaluate and spot-treat 33 acres within the Gull Point Natural Area to continue control of non-native invasive and aggressive native species and maintain suitable habitat for piping plovers and other beach-nesting birds in the short-term, while promoting naturally occurring, native plant communities common to the area over the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Frequency of occurrence of invasive plant species as measured by spring and fall drone flights.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Red Knot, Common Tern, Killdeer, Spotted Sandpiper, all shorebirds, and obligate sandplain plant communities

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** High

Specific Threat: Nesting bird disturbance by people walking within the restricted area at Gull Point Natural Area (Presque Isle State Park, Erie), sometimes with dogs, arriving either on foot or by boat. General recreational beach activity between the Lighthouse and Beach 10 limits recolonization potential beyond the Gull Point Natural Area.

Action Category: Mitigate human environmental impact

Specific Action: Prevent human disturbance to breeding birds by promptly closing active nesting beaches with signs and twine (i.e., psychological fencing).

Objective: Install closed area signage to reduce the number of trespassers in the Gull Point Natural Area (April - September) by 2035.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of closed areas.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Central Lowlands. Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Common Tern, Spotted Sandpiper, Killdeer, all breeding and migratory shorebirds

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Very High

Specific Threat: Avian and mammalian predation of adults and young.

Action Category: Stewarding wild individuals

Specific Action: Install protective fencing around nests (exclosures) to prevent egg or adult predation and nest trampling by humans.

Objective: Protect piping plover eggs and hatchlings from natural and human disturbances.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of nests protected

Potential Collaborators: Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Not applicable.

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Very High

Specific Threat: Avian and mammalian predation of adults and young.

Action Category: Stewarding wild individuals

Specific Action: Strategic mammalian and avian predator management during the breeding season within the nesting areas, favoring non-lethal harassment.

Objective: Reduce mammal and avian predation risk to breeding piping plovers and their young.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of trap nights

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, U.S. Fish and Wildlife Service

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Common Tern, Spotted Sandpiper, Killdeer

Season: Breeding

Threat Category: Storms and Flooding

Threat Impact: Very High - Medium

Specific Threat: Nest washouts and newly hatched chick loss due to heavy rain events and lake seiches.

Action Category: Manage non-living habitat components

Specific Action: Prevent, or immediately respond to, nest washout from storm events or seiches.

Objective: Increase hatch success.

Action Priority: 2-High

Action Urgency: Initiate immediately

Measure: Number of responses to potential flooding.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Not applicable.

Season: Breeding

Threat Category: Recreational Activities

Threat Impact: High

Specific Threat: Nesting bird disturbance by people walking within the restricted area at Gull Point Natural Area (Presque Isle State Park, Erie), sometimes with dogs, arriving either on foot or by boat. General recreational beach activity between the Lighthouse and Beach 10 limits recolonization potential beyond the Gull Point Natural Area.

Action Category: Outreach, communication and distribution

Specific Action: Inform visitors about piping plover natural history and how they can help advance species recovery.

Objective: Increase piping plover awareness and beneficial human behaviors to aid their recovery (e.g., respecting closed areas, leashing dogs, packing out trash).

Action Priority: 3-Medium

Action Urgency: Initiate within 5 years

Measure: Number of public interactions

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Common Tern, Killdeer, Spotted Sandpiper

Season: Migration

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Very High

Specific Threat: Avian and mammalian predation of adults and juveniles.

Action Category: Stewarding wild individuals

Specific Action: Strategic active mammalian and avian predator management within foraging areas, favoring non-lethal harassment.

Objective: Reduce mammal and avian predation risk to migrant adult and juvenile piping plovers.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of trap nights.

Potential Collaborators: Remove trash when visiting a natural area to prevent unnaturally drawing predators or injuring wildlife.

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Common Tern, Spotted Sandpiper, Killdeer

Season: Migration

Threat Category: Recreational Activities **Threat Impact:** Medium

Specific Threat: Disturbance of foraging birds by human and unleased pets.

Action Category: Outreach, communication and distribution

Specific Action: Inform visitors about piping plover natural history and how they can help advance species recovery.

Objective: Increase piping plover awareness and beneficial human behaviors to aid their recovery (e.g., respecting closed areas, leashing dogs, packing out trash).

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of public interactions.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Central Lowlands. Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Shorebirds

Season: Breeding

Priority	Need	Partners
1	Contribute to long-term Great Lakes piping plover recovery research through color-banding adults and chicks and obtaining other biological samples as requested.	Universities & research institutions, U.S. Fish and Wildlife Service
2	Assessment of avian and/or mammalian predator abundance, distribution, and space use on the Presque Isle peninsula.	U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, U.S. Fish and Wildlife Service, Pennsylvania Game Commission
3	Shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.	Pennsylvania Department of Conservation and Natural Resources, Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission
4	Invertebrate abundance and biomass along the Presque Isle peninsula, specifically, Gull Point. See Nordstrom 1996.	Conservancies & Land Trusts, Universities & research institutions, Pennsylvania Biological Survey

Season: Migration

Priority	Need	Partners
1	Migratory shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources
2	Adult radio tracking (e.g., Motus) to assess risks during migration and over winter.	Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Universities & research institutions, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Routine monitoring of the Designated Critical Habitat Area at Presque Isle State Park six days per week, mid-April until chick fledging.	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, U.S. Fish and Wildlife Service, Non-governmental organizations
2	Encourage reporting piping plover and other shorebird observations through eBird, with photo documentation.	Non-governmental organizations, Pennsylvania Game Commission
3	Evaluate avian and mammalian predator presence within the Gull Point Natural Area, determine risk to piping plovers, and establish a risk mitigation plan.	U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations

Season: Migration

Priority	Survey	Partners
1	Encourage volunteer surveillance of Gull Point Natural Area from the platforms, mid-September to late October.	Non-governmental organizations
2	Encourage recording piping plover and shorebird species observations in eBird (preferred) or iNaturalist.	Non-governmental organizations
3	Continue the International Shorebird Survey and expand to more locations where shorebirds regularly stop.	Non-governmental organizations

Name: Great Lakes Piping Plover Recovery Effort

Lead(s) : U.S. Fish & Wildlife Service; University of Minnesota; Smithsonian Institution

Link: https://www.greatlakespipingplover.org/

Description: Great Lakes Piping Plover natural history, population information, and blog posts.

Comments:

Monitoring Need:

Name: International Shorebird Survey

Lead(s) : Manomet Center for Conservation Sciences

Link: https://www.manomet.org/project/international-shorebird-survey/

Description: A volunteer-based international shorebird survey conducted in spring and fall at focal sites to detect trends in migrant shorebirds

Comments: In Pennsylvania, survey is organized by Jerry McWilliams and conducted at Presque Isle State Park.

Monitoring Need:

Name: Presque Isle Shorebird Monitoring

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/discover-pa-wildlife/piping-plover

Description: Contracted Piping Plover, Common Tern, Red Knot, and other shorebird routine monitoring following established protocols.

Comments:

Monitoring Need:

Brudney, L.J., T. W. Arnold, S. P. Saunders, and F. J. Cuthbert. 2013. Survival of Piping Plover (Charadrius melodus) chicks in the Great Lakes region. The Auk 130: 150-160

Elliott-Smith, E. and S. M. Haig (2020). Piping Plover (Charadrius melodus), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY.

Ewert, D. N., J. B. Cole, and E. Grman. 2011. Wind energy: Great Lakes regional guidelines. Unpublished report. The Nature Conservancy, Lansing, Michigan.

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, C. Davis, M. Stokowski, P. Sharma, V. Pantoja, D. Burgin, P. Crowe, M. Bell, S. Ray, I. Davies, V. Ruiz-Gutierrez, C. Wood, A. Rodewald. 2024. eBird Status and Trends, Data Version: 2023; Released: 2025. Cornell Lab of Ornithology, Ithaca, New York.

Haffner, C. D. 2007. Great Lakes Piping Plover (Charadrius melodus) Recovery Assessment, Presque Isle State Park, Erie Co., Pennsylvania. Submitted to Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Haffner, C. D., F. J. Cuthbert, and T. W. Arnold. 2009. Space use by Great Lakes Piping Plovers during the breeding season. Journal of Field Ornithology 80:270-279.

Haffner, C. D., S. Sargent, and E. Zimmerman. 2014. If we build it, will they come? Habitat restoration for the federally endangered Great Lakes Piping Plover (Charadrius melodus) at Presque Isle State Park, Erie County, Pennsylvania. Pennsylvania Birds 28 (1): 2-6.

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Nordstrom, L. H., and M. R. Ryan. 1996. Invertebrate abundance at occupied and potential Piping Plover nesting beaches: Great Plains alkali wetlands vs. the Great Lakes. Wetlands 16:429-435.

Price, E. 2002. Piping Plover (Charadrius melodus) recolonization potential in the Great Lakes:

Assessment of historic habitat and dispersal events. M. S. Thesis. University of Minnesota, St. Paul, Minnesota.

U.S. Fish and Wildlife Service (USFWS). 2024. Piping Plover (Charadrius melodus) 5-Year Review: Summary and Evaluation. Hadley, Massachusetts and East Lansing, Michigan.

USFWS (U.S. Fish and Wildlife Service). 2003. Recovery plan for the Great Lakes Piping Plover (Charadrius melodus). Ft. Snelling, Minnesota.

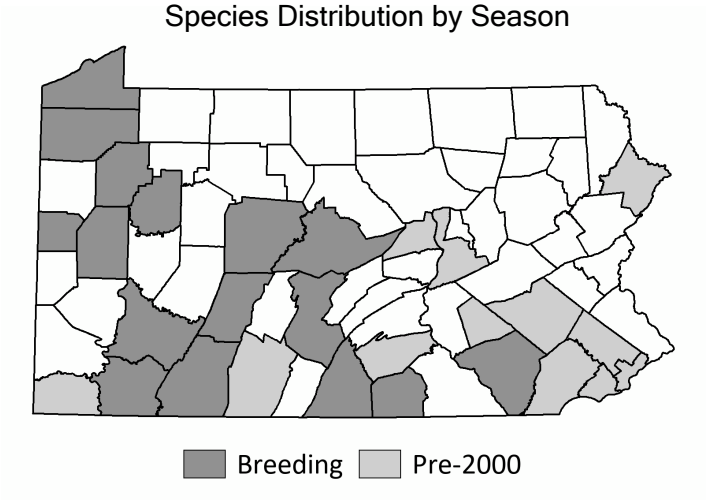
PENNSYLVANIA
WILDLIFE ACTION PLAN

Upland Sandpiper

Bartramia longicauda

Andrew M. Wilson *Gettysburg College*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding population of at least 20 pairs in suitable sites statewide annually through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Large tracts of contiguous grassland with mosaics of tall 6-12 inches (15-30 centimeters) stands of grass for nesting and short stands <4 inches (<10 centimeters), often in weed rich pasture, for foraging.

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of habitat due to increasing industrial solar arrays.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of habitat due to increasing industrial solar arrays.

Action Category: Create or amend policies, guidelines, or best practices

Specific Action: Avoid wind and solar energy development in areas around remnant Upland Sandpiper populations.

Objective: Avoid habitat loss.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** acers of breeding habitat at breeding areas

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: All other grassland birds

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of habitat due to increasing industrial solar arrays.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Elimination of breeding habitat through intensification of agricultural practices.

Action Category: Conservation planning

Specific Action: Maintain suitable habitat for known remnant populations.

Objective: Prevent the loss of remnant populations.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** number of active breeding sites

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: All other grassland birds

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** High

Specific Threat: Succession on reclaimed strip mines will lead to grassland loss.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Maintain open grasslands through

Objective: Maintain current acers of open grassland on sites with recent active breeding upland sandpipers

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** acers of upland sandpipers grasslands mowed/burned every 3 years

Potential Collaborators: Conservancies & Land Trusts, National Park Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: grassland nesting birds

Season: Breeding

Priority	Need	Partners
1	Are Pennsylvania populations self-sustaining, or do they rely on immigration / rescue effect?	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Can Upland Sandpipers be lured back to apparently well-managed habitats using nocturnal call broadcasting?	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	How can grassland habitats be managed to better support Upland Sandpipers?	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct a statewide survey. Sampling based on known recent locations and randomly selected quadrats of high habitat suitability. Survey could include volunteers and students.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
2	Monitoring of nesting success wherever there are breeding Upland Sandpipers.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
3	Use eBird to encourage volunteers to report any Upland Sandpiper observations and discover newly colonized sites including Important Bird Areas (IBAs).	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Interested Public

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bowen, B. S. and A. D. Kruse. 1993. Effects of grazing on nesting by Upland Sandpipers in Southcentral North Dakota. The Journal of Wildlife Management 57:291-301.

Brauning, D. W. 1992. Upland Sandpiper (Bartramia longicauda). Pages 138-139 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh.

Dechant, J. A., M. L. Sondreal, D. H. Johnson. L. D. Igl, C. M. Godale, M. P. Nenneman, and B. R. Euliss. 2002. Effects of management practices on grassland birds: Northern Harrier. Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

Griffis, E. K., H. Campa. 2023. Upland Sandpiper (Bartramia longicauda) breeding habitat ecology, home range, and nest site conservation guidelines. The Wilson Journal of Ornithology 135(4):502–511. doi: https://doi.org/10.1676/23-00011

Houston, C. S., and D. E. Bowen. 2001. Upland Sandpiper (Bartramia longicauda). Account 580 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Rischette, A. C., B. A. Geaumont, C. A. Duquette, T. J. Hovick. 2024. Upland Sandpipers select for later time since fire and experience high nest survival in grasslands managed with patch-burn grazing. Ornithological Applications 126 (2):duae001. https://doi.org/10.1093/ornithapp/duae001

Sandercock, B. K., M. Alfaro-Barrios, A. E. Casey et al. 2015. Effects of grazing and prescribed fire on resource selection and nest survival of upland sandpipers in an experimental landscape. Landscape Ecology 30:325–337. https://doi.org/10.1007/s10980-014-0133-9

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilhelm, G. 1995. Scenario of the Upland Sandpiper in western Pennsylvania. Pennsylvania Birds 8:204-205.

Wilhelm, G. 2012. Upland Sandpiper (Bartramia longicauda). In A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wilson, A. 2012. 2012 Survey of Breeding Upland Sandpipers in Pennsylvania. A report to the Pennsylvania Game Commission. Staff report. Gettysburg College, Gettysburg, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

Red Knot

Calidris canutus rufa

Catherine D. Haffner *Pennsylvania Game Commission*

Tara Dodge

Species Distribution by Season

UNKNOWN DISTRIBUTION

Conservation Profile

PA 10-Year Conservation Goal: Maintain high quality shorebird habitat in the Gull Point Natural Area at Presque Isle State Park as well as other managed mud flats; maximize statewide detections by 2035.

NatureServe Global Rank: G4T2

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Threatened

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S2M

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Migration

Specific Habitat Requirements: Great Lakes beaches and inland riverine and lacustrine mud flats (often reservoirs). Most sightings in Pennsylvania are from Gull Point, Erie Co., and Conejohela Flats, Lancaster Co. (McWilliams and Brauning 2000).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Beaches & Dunes

Primary Specific Habitat: Great Lakes Wooded Dune and Swale

Season: Migration

Threat Category: Renewable Energy **Threat Impact:** Unknown

Specific Threat: Collisions with offshore wind turbines in Lake Erie and potential degradation of onshore habitat.

Action Category: Complementary or alternative conservation measures

Specific Action: Provide avoidance and minimization measures to reduce impacts to species and habitats.

Objective: Minimize direct mortality and habitat loss to turbine development in Lake Erie.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of wind project review letters containing recommendations to avoid and minimize impacts to Red Knot.

Potential Collaborators: Participate in community science opportunities to contribute data for conservation decisions.

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Piping Plover, Red Bat, Hoary Bat

Season: Migration

Threat Category: Recreational Activities **Threat Impact:** Medium

Specific Threat: Disturbance from human recreational activities can limit foraging and resting during migration.

Action Category: Outreach, communication and distribution

Specific Action: Adapt and adopt existing shorebird safety talking points to limit impact by people and dogs.

Objective: Eliminate or reduce shorebird disturbances during spring and fall migration.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of interactions.

Potential Collaborators: Conduct outreach to inspire and promote Species of Greatest Conservation Need protection and habitat conservation.

Locations: Physiographic Section: Eastern Lake

Other species likely to benefit from this action: All migratory shorebirds

Season: Migration

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Very High

Specific Threat: Opportunistic predation of foraging and resting individuals.

Action Category: Conservation planning

Specific Action: Promote partnerships that can respond rapidly to persistent threats at a site.

Objective: Reduce predation to migratory Red Knots.

Action Priority: 4-Low **Action Urgency:** Initiate immediately **Measure:** Number of threats removed.

Potential Collaborators: U.S. Department of Agriculture-Animal and Plant Health Inspection Service, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Central Lowlands, Piedmont, Atlantic Coastal Plain. Physiographic Section: Eastern Lake, Piedmont Lowland, Lowland and Intermediate Upland

Other species likely to benefit from this action: Piping Plover, Spotted Sandpiper, Killdeer, other shorebirds

Season: Migration

Priority	Need	Partners
1	Shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission
2	Where are other stopover locations in Pennsylvania?	Non-governmental organizations, Pennsylvania Game Commission
3	How does Pennsylvania fit into Red Knot migration pattern, especially as coastal sites are lost to climate change, storms, and development?	Pennsylvania Game Commission, Non-governmental organizations

Season: Migration

Priority	Survey	Partners
1	Continue the International Shorebird Survey and expand to more locations where shorebirds regularly stopover.	Non-governmental organizations
2	Reporting of marked (color-banded) individuals through http://www.bandedbirds.org.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission
3	Encourage recording Red Knot and shorebird species observations in eBird.	Non-governmental organizations

Name: Bandedbirds.org

Lead(s) : Multiple

Link: http://www.bandedbirds.org

Description: Web-accessible database for reporting and retrieving information on color-banded shorebirds along the Atlantic Flyway.

Comments: Developed and supported by the States of New Jersey and Delaware. Pennsylvania should contribute to the annual maintenance cost of this collective database.

Monitoring Need:

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: International Shorebird Survey

Lead(s) : Manomet Center for Conservation Sciences

Link: https://www.manomet.org/project/international-shorebird-survey/

Description: A volunteer-based international shorebird survey conducted in spring and fall at focal sites to detect trends in migrant shorebirds.

Comments: In Pennsylvania, survey is organized by Erie Bird Observatory and conducted at Presque Isle State Park.

Monitoring Need:

Atlantic Flyway Shorebird Initiative Business Plan. 2015. Available at www.atlanticflywayshorebirds.org.

Baker, A., P. Gonzalez, R. I. G. Morrison, and B. A. Harrington (2020). Red Knot (Calidris canutus), version 1.0. In Birds of the World (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.

Ewert, D. N., J. B. Cole, and E. Grman. 2011. Wind energy: Great Lakes regional guidelines. Unpublished report. The Nature Conservancy, Lansing, Michigan.

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, C. Davis, M. Stokowski, P. Sharma, V. Pantoja, D. Burgin, P. Crowe, M. Bell, S. Ray, I. Davies, V. Ruiz-Gutierrez, C. Wood, A. Rodewald. 2024. eBird Status and Trends, Data Version: 2023; Released: 2025. Cornell Lab of Ornithology, Ithaca, New York.

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

USFWS (U.S. Fish and Wildlife Service). 2014. Endangered and threatened wildlife and plants; Threatened species status for the Rufa Red Knot. Federal Register 79:73706-73748.

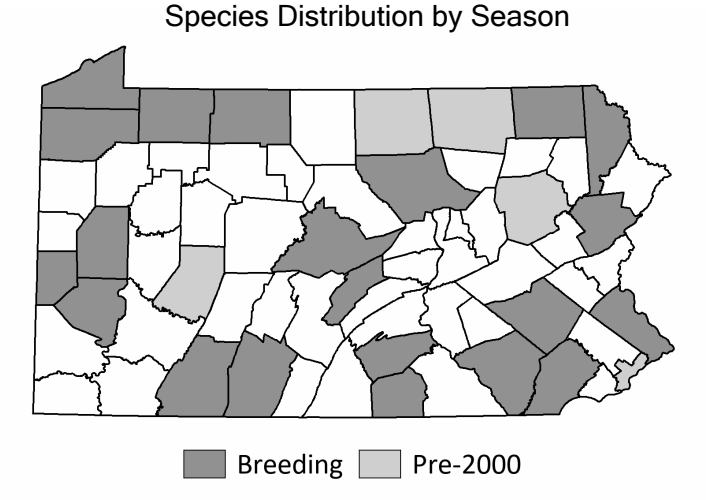
PENNSYLVANIA
WILDLIFE ACTION PLAN

Wilson's Snipe

Gallinago delicata

Amanda J. Hoyt *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain or increase population levels in PA through 2035 via active management and protection of breeding habitat.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Wet meadows and poorly drained pastures where moderate grazing maintains the vegetation in a cropped condition.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Appalachian Acidic Swamp

Habitat Comments: Four primary types of breeding habitat: sedge bogs, fens, swamps (willow or alder), and pond and river edges.

Season: Breeding

Threat Category: Dams and Water Management/Use

Threat Impact: Medium

Specific Threat: Emergent wetland conversion to open water wetlands, draining minor emergent wetland, and surrounding upland alteration and/or development.

Action Category: Training and individual skill development

Specific Action: Encourage landowners to increase or maintain emergent wetland cover and to avoid conversion to open water wetlands.

Objective: In the next 5 years, use water control structures to maintain emergent wetland cover including wet meadows during the breeding season.

Action Priority: 2-High

Action Urgency: Initiate within 5 years

Measure: Number of acres restored or number of suitable acres maintained.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Transportation, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Township Zoning Boards, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Secretive marsh birds, multiple waterfowl and other wetland-dependent species.

Season: Breeding

Priority	Need	Partners
1	What is the Wilson's Snipe Pennsylvania breeding population estimate and distribution?	Universities & research institutions, U.S. Fish and Wildlife Service
2	Develop Best Management Practices for maintaining mosaics of short grasslands within emergent marshes in light of invasive species issues.	Non-governmental organizations
3	Determine relationships between habitat factors (site- and landscape-level) and breeding site occupancy and demographic rates.	Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Continue Pennsylvania Game Commission Marsh Bird surveys annually and expand efforts to additional sites with suitable Wilson's Snipe habitat.	U.S. Fish and Wildlife Service
2	Use eBird as a time-effective way to gather information on Wilson's Snipe distribution, breeding locations (including new sites), migratory stopover sites, and migration timing. Encourage searches on private lands with cooperative landowners.	Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Use eBird to better understand species distribution during the breeding season in Pennsylvania.

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need:

Name: U.S. Fish & Wildlife Service Harvest Information Program

Lead(s) : U.S. Fish & Wildlife Service

Link: https://www.fws.gov/project/migratory-bird-hunter-survey-diary-survey

Description: Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.

Comments:

Monitoring Need: Continue to monitor harvest data for the species.

Banks, R. C. 1979. Human-related mortality of birds in the United States. Special Scientific Report-Wildlife no. 215. U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C.

Case, D. J., and D. D. McCool, editors. 2009. Priority information needs for rails and snipe: a funding strategy. Developed by the Association of Fish and Wildlife Agencies' Migratory Shore and Upland Game Bird Support Task Force. U.S. Fish and Wildlife Service, Washington, D.C. Available from http://www.fws.gov/migratorybirds/Newreportspublications/research/WMGBMR/Priority_Information_Needs_for_Rails_and_Snipe.pdf (accessed March 2015).

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Forest Bird Habitat Assessment: A Guide to Integrating Bird Habitat Data into a Vermont Forest Inventory. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Kibbe, D.P. 2010. Wilson's snipe. Pages 256-258 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

Mueller, H. 1999. Wilson's Snipe (Gallinago delicata). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/417 (accessed July 2015).

Raftovich, R. V., S. Chandler, and K. A. Wilkins. 2014. Migratory bird hunting activity and harvest during the 2012-13 and 2013-14 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland. Available from http://www.fws.gov/migratorybirds/NewReportsPublications/HIP/HuntingStatistics/Migratory%20Bird%20Hunting%20Activity%20and%20Harvest%20for%20the%202012-13%20and%202013-14%20Hunting%20Seasons.pdf (accessed March 2015).

Ross, R. M. 2012. Wilson's Snipe. Pages 180-181 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Rundle, W. D., and L. H. Frederickson. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Society Bulletin 9:80-87.

Sutton, G. M. 1981. On aerial and ground displays of the world's snipes. Wilson Bulletin 93:457-477.

Tuck, L. M. 1972. The snipes: a study of the genus Capella. Canadian Wildlife Service Monograph Series 5.

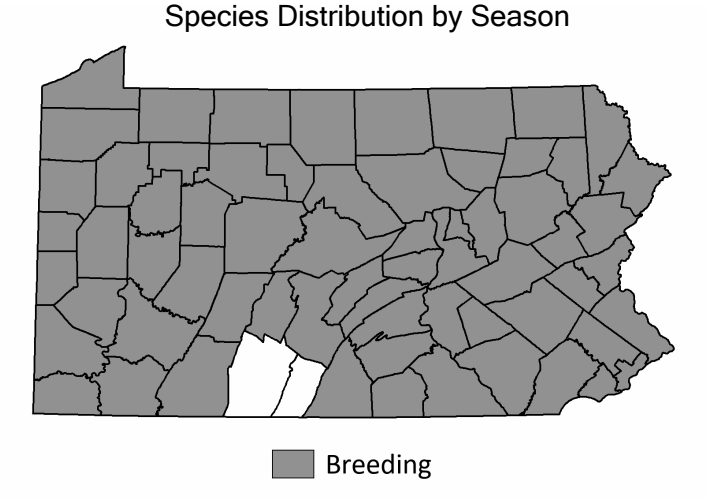
PENNSYLVANIA
WILDLIFE ACTION PLAN

Spotted Sandpiper

Actitis macularius

Matthew R. Marshall *National Park Service*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain species population in Pennsylvania at current levels through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Nests are always associated with water (river, lake, wetland, gravel pit, farm pond, etc.), typically within 328 feet (100 meters) of water's edge, but up to 984 feet (300 m). Shoreline is used for foraging, semi-open nesting habitat with patches of dense vegetation assists brood protection (Reed et al. 2013).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Shorelines

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Medium

Specific Threat: Nest disturbance, damage, or failure due to humans and unleashed pets.

Action Category: Outreach, communication and distribution

Specific Action: In areas with known nesting Spotted Sandpipers, encourage people and pet owners to avoid nesting areas during an appropriate time window.

Objective: Reduce negative recreational impacts in areas of known nesting through outreach and education.

Action Priority: 4-Low **Action Urgency:** Initiate within 5 years **Measure:** Document increased awareness of issue and changes in human behavior.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Is the apparent decline in breeding Spotted Sandpipers in Pennsylvania an artifact of sampling coverage/effort or indicative of direct or indirect threats to the breeding populations?	Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Encourage Pennsylvania Bird Atlas participants to confirm breeding Spotted Sandpipers.	Universities & research institutions, Non-governmental organizations, Pennsylvania Game Commission
2	Encourage eBird users to document Spotted Sandpiper and other riparian habitat species.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
3	Establish survey routes along major drainages and request local birding organizations to adopt these routes.	

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Partial survey for this species, but perhaps useful to locate places at edge of range.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need:

BirdLife International. 2024. Actitis macularius. The IUCN Red List of Threatened Species 2024: e.T22693277A262691229. https://dx.doi.org/10.2305/IUCN.UK.2024-2.RLTS.T22693277A262691229.en. Accessed on 01 April 2025.

Brauning, D. W. 1992. Spotted Sandpiper (Actitis macularius). Pages 136-137 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh.

Grove, G. 2012. Spotted Sandpiper (Actitis macularius). Pages 176-177 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Oring, L. W., D. B. Lank, and S. J. Maxson. 1983. Population studies of the polyandrous spotted sandpiper. Auk 100:272 -285.

Reed, J. M., L. W. Oring and E. M. Gray. 2013. Spotted Sandpiper (Actitis macularius). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/289 (accessed July 2015).

Stratford, J. A. 2010. The effects of environmental contaminants on avian populations. Pages 340-358 in S. K. Majumdar, T. L. Master, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. The Pennsylvania Academy of Sciences, Easton, Pennsylvania.

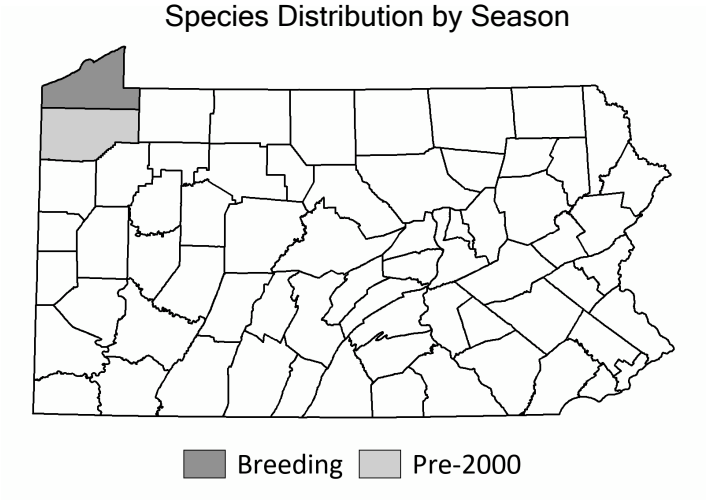
PENNSYLVANIA
WILDLIFE ACTION PLAN

Black Tern

Chlidonias niger

Patricia M. Barber *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Re-establish three nesting colonies, each containing at least 10 nesting pairs, by 2035.

NatureServe Global Rank: G4G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Open-water emergent marsh >49 acres (>20 hectares), or part of a larger complex, with stable water levels during nesting.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Very High

Specific Threat: Habitat loss or alteration by invasive vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove non-native vegetation.

Objective: Maintain appropriate native marsh vegetation for successful nesting.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number or acres of non-native vegetation treatment.

Potential Collaborators: Conservancies & Land Trusts, Private Landowners, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Eastern Lake, Northwestern Glaciated Plateau

Other species likely to benefit from this action: American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Very High

Specific Threat: Agricultural runoff resulting in fertilizer and pesticide contamination.

Action Category: Mitigate human environmental impact

Specific Action: Reduce contaminated runoff and sedimentation.

Objective: Maintain or improve wetland water quality.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of runoff mitigation projects implemented or installed.

Potential Collaborators: Delaware River Basin Commission, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Agriculture, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Private Landowners, Susquehanna River Basin Commission, Township Zoning Boards

Locations: Physiographic Province: Central Lowlands, Appalachian Plateaus, Atlantic Coastal Plain

Other species likely to benefit from this action: American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail

Season: Breeding

Threat Category: Domestic and Urban Waste Water **Threat Impact:** Very High

Specific Threat: Non-point source pollution degrading water quality.

Action Category: Mitigate human environmental impact

Specific Action: Reduce contaminated runoff and sedimentation.

Objective: Maintain or improve wetland water quality.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of runoff mitigation projects implemented or installed.

Potential Collaborators: Delaware River Basin Commission, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Agriculture, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Private Landowners, Susquehanna River Basin Commission, Township Zoning Boards

Locations: Physiographic Province: Central Lowlands, Appalachian Plateaus, Atlantic Coastal Plain

Other species likely to benefit from this action: American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Very High

Specific Threat: Water depth inconsistent with successful nesting.

Action Category: Manage non-living habitat components

Specific Action: Maintain water levels conducive to nesting and foraging.

Objective: Maintain water level in wetlands occupied by nesting black terns within 4 inches from April through June.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Water level remains within 4 inches (10 centimeters) from May through July.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Private Landowners, Pennsylvania Game Commission

Locations: Physiographic Province: Central Lowlands, Appalachian Plateaus. Physiographic Section: Eastern Lake, Northwestern Glaciated Plateau. HUC10 Watershed: Conneaut Cr., Sixmile Cr.-Frontal Lake Erie, Elk Cr. (Chautauqua-Conneaut)

Other species likely to benefit from this action: American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail, Wilson's Snipe, American Black Duck, Wood Duck.

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Very High

Specific Threat: Extremes in precipitation threatened nesting and foraging.

Action Category: Manage non-living habitat components

Specific Action: Conserve wetlands and manage water levels to provide optimal conditions for Species of Greatest Conservation Need.

Objective: Maintain water level in Pennsylvania's largest 10 wetlands, especially wetlands occupied by nesting black terns, within 4 inches from April through June.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Acers of wetlands with optimal water depth for successful nesting.

Potential Collaborators: Delaware River Basin Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Central Lowlands, Atlantic Coastal Plain, Appalachian Plateaus

Other species likely to benefit from this action: American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail, Wilson's Snipe, American Black Duck, Wood Duck

Season: Breeding

Priority	Need	Partners
1	Do emergent marshes in the Black Tern's range support the interspersion of habitats needed to sustain a nesting colony?	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission
2	What is the colonization potential for Black Terns in northwestern Pennsylvania?	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission
3	What is the wetland suitability in northwestern Pennsylvania for Black Tern recovery?	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Use eBird to encourage volunteers to report Black Tern observations to inform the Pennsylvania Game Commission of potential breeding sites.	Non-governmental organizations, Pennsylvania Game Commission
2	Pennsylvania Bird Atlas	Non-governmental organizations, Pennsylvania Game Commission

Name: Black Tern monitoring program **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Annual Pennsylvania Game Commission monitoring at historical and created Black Tern nesting sites to document breeding activity.

Comments:

Monitoring Need:

Name: Pennsylvania Game Commission Marsh Bird Surveys **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas (Wilson et al. 2012). Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Criswell, R. W. 2010. Black Tern, Pages 142-144 In M.A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The John Hopkins University Press, Baltimore, Maryland.

Dunn, E. H. and D. J. Agro. 1995. Black Tern (Chlidonias niger). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/147 (accessed July 2015).

Grimm, W. C. 1952. Birds of the Pymatuning region. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Leberman, R. C. 1992. Black Tern, Chlidonias nigra. Pages 144-145 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Leberman, R. C. 2012. Black Tern. Pages 190-191 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, Universtiy Park, Pennsylvania.

Novak, P. G. 1992. Black Tern (Chlidonias niger). Pages 149-169 in K. J. Schneider and D. M. Pence, editors. Migratory nongame birds of management concern in the Northeast. U.S. Department of the Interior, Fish and Wildlife Service. Newton Corner, Massachusetts.

Sandeen, J. L., D. M. Tollini, C. Skinner, and D. W. Brauning. 1999. Project annual job report: Black tern nesting ecology and wetland delineation. Unpublished report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Shealer, D. A., J. M. Buzzell, and J. P. Heiar. 2006. Effect of floating nest platforms on the breeding performance of Black Terns. Journal of Field Ornithology 77:184-194.

Sutton, G. M. 1928. The birds of Pymatuning Swamp and Conneaut Lake, Crawford County, Pennsylvania. Annals of the Carnegie Museum 18:19-19-239.

USFWS (U.S. Fish and Wildlife Service). 2008. Birds of Conservation Concern 2008. U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. Available from http://www.fws.gov/migratorybirds/ (accessed July 2015).

Zimmerman, A. L., J. A. Dechant, D. H. Johnson, C. M. Goldade, B. E. Jamison, and B. R. Euliss. 2002. Effects of Management Practices on Wetland Birds: Black Tern. Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

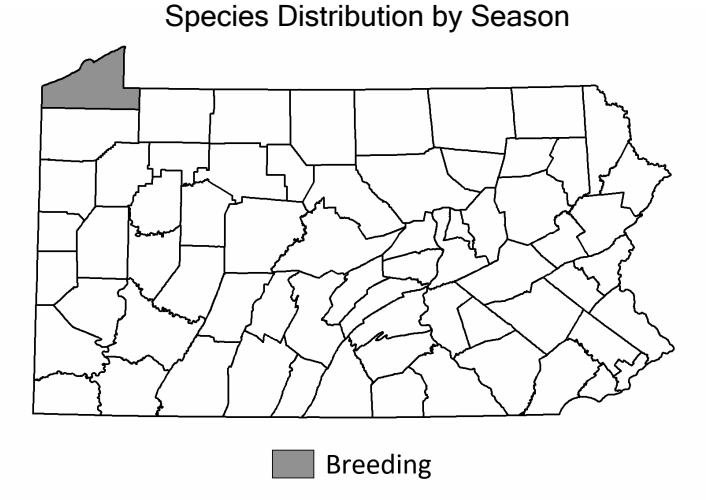
PENNSYLVANIA
WILDLIFE ACTION PLAN

Common Tern

Sterna hirundo

Patricia M. Barber *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Successful chick fledging from at least one nest per year by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Sandy beaches (Presque Isle State Park is only historic nesting location) and rocky maritime sites.

Primary Habitat: Land-Water Interface

Primary Habitat Type: Beaches & Dunes

Primary Specific Habitat: Great Lakes Wooded Dune and Swale

Habitat Comments: Sandy beaches (Presque Isle State Park is only historic nesting location) and rocky maritime sites.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Dry sandplain/dune habitat loss or alteration by invasive vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove non-native and native invasive vegetation, particularly woody stems.

Objective: Annually evaluate and spot-treat 33 acres within the Gull Point Natural Area to continue control of non-native invasive and aggressive native species and maintain suitable habitat for Common Terns and other beach-nesting birds in the short-term, while promoting naturally occurring, native plant communities common to the area over the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Invasive plant species occurrence as measured by spring and fall drone flights.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Universities & research institutions

Locations: Physiographic Province: Central Lowlands. Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Great Lakes Piping Plovers, Red Knot, Killdeer, Spotted Sandpiper, all shorebirds, and obligate sandplain plant communities

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Very High

Specific Threat: Nesting bird disturbance by people walking within the restricted area at Gull Point Natural Area (Presque Isle State Park, Erie), sometimes with dogs, arriving either on foot or by boat.

Action Category: Outreach, communication and distribution

Specific Action: Signage to inform public of conflict and delineate closed area.

Objective: Encourage humans to make appropriate decisions to avoid human/bird conflicts.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of closed area trespassers.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Central Lowlands. Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Piping Plover, Killdeer, Spotted Sandpiper, other shorebirds

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Very High

Specific Threat: Nesting bird disturbance by people walking within the restricted area at Gull Point Natural Area (Presque Isle State Park, Erie), sometimes with dogs, arriving either on foot or by boat.

Action Category: Detection and intervention

Specific Action: Intercept and deter individuals from entering closed area and disturbing nests.

Objective: Enhance nesting success by actively discouraging people from making poor decisions that risk ground nesting birds.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of citations or warnings given to trespassers.

Potential Collaborators: Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Central Lowlands. Physiographic Section: Eastern Lake

Other species likely to benefit from this action: Piping Plover, Killdeer, Spotted Sandpiper, other shorebirds

Season: Breeding

Priority	Need	Partners
1	What are the densities of predators at Gull Point and what are the best ways to reduce predation (e.g., best exclosure design and implementation)?	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Universities & research institutions
2	What are the illicit human disturbance levels near recent nest sites?	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Other federal agency
3	What is the feasibility of creating a man-made nest site near Gull Point that is better protected from predators and human disturbance?	Pennsylvania Game Commission, Other federal agency, Other state agency

Season: Breeding

Priority	Survey	Partners
1	Survey Presque Isle State Park nesting area at least twice per week from April through July, coordinated with Piping Plover surveys. Unobtrusive monitoring from the Gull Point observation platform is preferred.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission
2	Encourage surveys of additional possible breeding habitat in the state.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission
3	Use eBird to encourage volunteers to report any Common Tern observations that would inform Pennsylvania Game Commission of potential breeding populations.	Non-governmental organizations, Pennsylvania Game Commission

Name: Presque Isle Shorebird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Coordinated with Piping Plover monitoring during the breeding season.

Comments:

Monitoring Need:

Arnold, J. M., S. A. Oswald, D. J. Tyerman, and M. J. Barker. 2023. Predator exclusion grids protect Common Terns from avian nest predators at Presqu'ile Provincial Park, Lake Ontario. Ontario Birds December 2023, pp 119-142.

Brauning, D. W. 2010. Common Tern. Pages 209-211 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Courtney, P. A. and H. Blokpoel. 1983. Distribution and numbers of Common Terns on the lower Great Lakes during 1900-1980: a review. Colonial Waterbirds 6:107-112.

Culp, L. A., E. B. Cohen, A. L. Scarpignato, W. E. Thogmartin, and P. P. Marra. 2017. Full annual cycle climate change vulnerability assessment for migratory birds. Ecosphere 8 (3):1-22.

Kress, S. W., E. H. Weinstein, and I. C. T. Nisbet. 1983. The status of tern populations in northeastern United States and adjacent Canada. Colonial Waterbirds 6:84-106.

Nisbet, I. C. 2002. Common Tern (Sterna hirundo). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/618 (accessed July 2015).

Stull, J., J. A. Stull, and G. M. McWilliams. 1985. Birds of Erie County Pennsylvania, including Presque Isle. Allegheny Press, Eglin, Pennsylvania.

Todd, W. E. C. 1940. Birds of Western Pennsylvania. University of Pittsburgh, Pittsbugh, Pennsylvania.

USFWS (U.S. Fish and Wildlife Service). 2008. Birds of Conservation Concern 2008. U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. Available from http://www.fws.gov/migratorybirds/ (accessed July 2015).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill. 2012. Appendix A. Former Nesting Species. Pages 471-474 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Penn State Press, University Park, Pennsylvania.

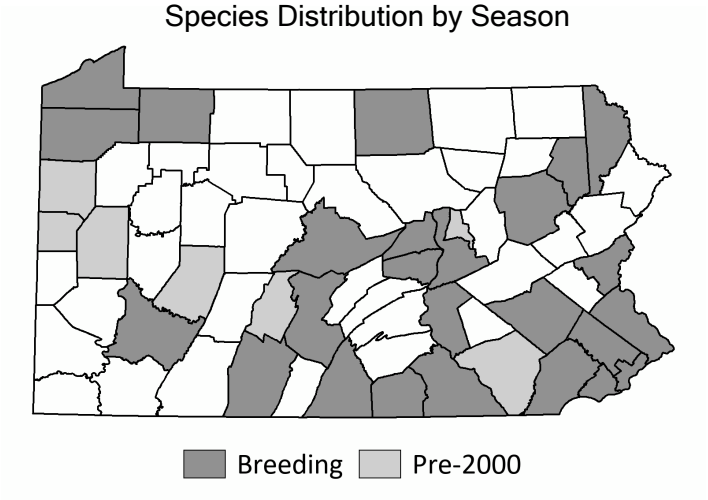
PENNSYLVANIA
WILDLIFE ACTION PLAN

Least Bittern

Botaurus exilis

Patricia M. Barber — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Minimize loss and degradation of emergent wetland habitat, particularly marshes > 5 ha (12.4 ac), and increase available habitat through restoration where possible. Identify where Least Bitterns are successfully breeding and develop site-specific conservation plans for these sites (Brittingham 2005, Brauning 2005).

NatureServe Global Rank: G4

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Palustrine emergent wetlands, dominated by tall emergents such as cattails interspersed with shrubs and open water.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** High

Specific Threat: Improper water levels for nesting and brood rearing.

Action Category: Manage non-living habitat components

Specific Action: Maintain water levels and time drawdowns to reduce non-native vegetation and maximize wetland quality.

Objective: Time water level changes to reduce non-native vegetation cover and provide water depth appropriate for nesting.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of wetland acres managed to minimize non-native vegetation and maximize wetland quality for nesting bitterns.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Wetland associated flora and fauna.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Loss of wetland habitat suitability and productivity due to non-native vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove and control non-native vegetation from wetlands.

Objective: Annually treat at least one third of non-native vegetation in the three largest wetland complexes.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of non-native vegetation removed or converted to native vegetation.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Wetland associated flora and fauna.

Season: Breeding

Priority	Need	Partners
1	Best management practices for creating and maintaining mosaics of emergent vegetation and open water, including avian response to wetland management.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	Factors affecting nesting success and mortality in adults, juveniles, nestlings, and eggs.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
3	Effects of industrial and agricultural landscapes on contaminant levels in Least Bitterns and their eggs.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	No survey needs identified at this time.	Pennsylvania Game Commission

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas (Wilson et al. 2012). Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Bogner, H. E. and G. A. Baldassarre. 2002. Home range, movement, and nesting of Least Bittern in western New York. Wilson Bulletin 114:297-308.

Bowyer, M. W., J. W. Walk, and T. L. Esker. 2002. Use of moist soil units at Carlyle Lake Wildlife Management Area by Least Bitterns and other threatened birds during the breeding season. Transactions of the Illinois State Academy of Science 95:59-64.

Brauning, D. W. 2010. Least Bittern. Pages 187-190 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Brauning, D. W. and K. Van Fleet. 2007. Wetland Nesting Bird Surveys. Annual Job Code 72302. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Gibbs, J. P. and S. M. Melvin. 1992. Least Bittern. In K. Schneider and D. Pence, editors. Migratory nongame birds of management concern in the northeastern United States. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Gross, D. A. and L. Mangel. 2006. Wetland nesting bird surveys in Conneaut and Pymatuning wetland complexes. Annual Job Code 72302. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Guillory, H. D. 1973. Motor vehicles and barbed wire fences as major mortality factors for the Least Bittern in southwestern Louisiana. Inland Bird Banding News 45:176-177.

Poole, A. F., P. Lowther, J. P. Gibbs, F. A. Reid, and S. M. Melvin. 2009. Least Bittern (Ixobrychus exilis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/017 (accessed July 2015).

Rehm, E. M. and G. A. Baldassarre. 2007. The influence of interspersion on marsh bird abundance in New York. The Wilson Journal of Ornithology 119:648-654.

Salafsky, N., D. Salzer, A. J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S. H. M. Butchart, B. Collen, N. Cox, L. L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. Conservation Biology 22:897-911.

Tiner Jr., R. W. 1984. Wetlands of the United States: current status and recent trends. U.S. Fish and Wildlife Service, National Wetlands Inventory, Washington, D.C.

Van Fleet, K. 2013. Least Bittern. Pages 122-123 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Winstead, N. A., and S. L. King. 2006. Least Bittern distribution among structurally different vegetation types in managed wetlands of northwest Tennessee, USA. Wetlands 26:619-623.

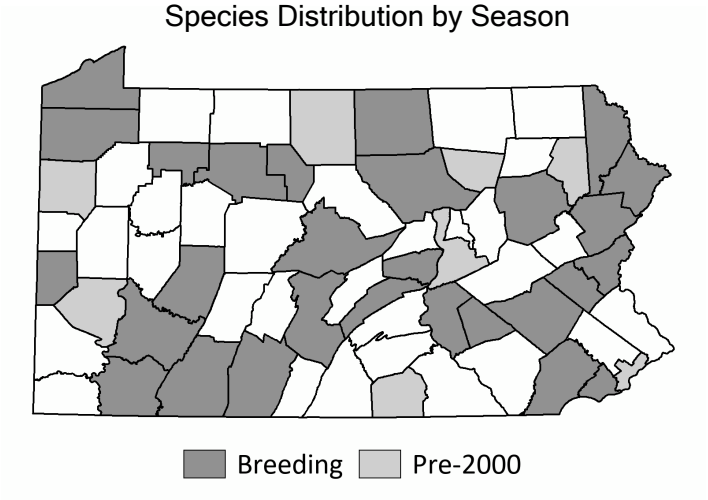
PENNSYLVANIA
WILDLIFE ACTION PLAN

American Bittern

Botaurus lentiginosus

Patricia M. Barber *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding population at the five sites identified in the Second Atlas of Breeding Birds in Pennsylvania (Wilson et al. 2012) while minimizing emergent wetland loss and degradation and restoring wetland habitat where possible.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Extensive freshwater wetlands with dense stands of cattails, spatterdock, bulrushes, sedges interspersed with open water.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Loss of wetland habitat suitability and productivity due to non-native vegetation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Remove and control non-native plants from wetlands.

Objective: Annually treat at least 33% of non-native vegetation in three largest wetland complexes.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of non-native vegetation removed or converted to native vegetation.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Wetland-associated flora and fauna.

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** High

Specific Threat: Flooding of nest sites and foraging areas, reducing nesting success and productivity.

Action Category: Manage non-living habitat components

Specific Action: Implement Pennsylvania Climate Action Plan.

Objective: Moderate water levels during breeding season.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of actions implemented.

Potential Collaborators: Pennsylvania Department of Environmental Protection

Locations: Statewide

Other species likely to benefit from this action: Wetland-associated flora and fauna.

Season: Breeding

Priority	Need	Partners
1	Identify management techniques to enhance manipulated wetlands or restore degraded wetlands, improving habitat suitability for American Bitterns and other Species of Greatest Conservation Need.	Non-governmental organizations, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Universities & research institutions
2	What factors affect American Bittern nesting success and mortality in Pennsylvania? Information is lacking for all stages, adults, juveniles, nestlings, and eggs, and should include contaminant load investigations.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
3	Basic American Bittern biology is poorly known (Lowther et al. 2009). Research on basic biology, mating systems, mortality sources (including contaminants) and rates, philopatry, migration routes and stopover sites is needed, even if part of a larger-scale project.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	No surveys identified at this time.	Pennsylvania Game Commission

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Endangered Species Monitoring

Lead(s) : Pennsylvania Game Commission

Link:

Description: PGC annually mines open community science databases such as eBird for geospatially designated locations of listed species to survey and document nesting activity.

Comments:

Monitoring Need:

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Brauning, D. W. and K. Van Fleet. 2007. Wetland Nesting Bird Surveys. Annual Job Code 72302. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Brittingham, M. C. 2010. American Bittern. Pages 128-130 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, A. L. Zimmerman, and B. R. Euliss. 2004. Effects of management practices on grassland birds: American Bittern. USGS Northern Prairie Wildlife Research Center. Paper 126. Available from http://digitalcommons.unl.edu/usgsnpwrc/126 (accessed July 2015).

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Gross, D. A. and L. Mangel. 2006. Wetland nesting bird surveys in Conneaut and Pymatuning wetland complexes. Annual Job Code 72302. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Lowther, P., A. F. Poole, J. P. Gibbs, S. Melvin, and F. A. Reid. 2009. American Bittern (Botaurus lentiginosus). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/018 (accessed July 2015).

Pennsylvania Department of Environmental Protection. 2025. Pennsylvania Climate Action Plan Update:Strategies for governments, businesses, industries, community leaders, and all Pennsylvanians. Doc. No. 7200-RE-DEP6045. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Rehm, E. M. and G. A. Baldassarre. 2007. The influence of interspersion on marsh bird abundance in New York. The Wilson Journal of Ornithology 119:648-654.

Salafsky, N., D. Salzer, A. J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S. H. M. Butchart, B. Collen, N. Cox, L. L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. Conservation Biology 22:897-911.

Tiner Jr., R. W. 1984. Wetlands of the United States: current status and recent trends. U.S. Fish and Wildlife Service, National Wetlands Inventory, Washington, D.C.

Wilhelm, G. 2013. American Bittern. Pages 120-121 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

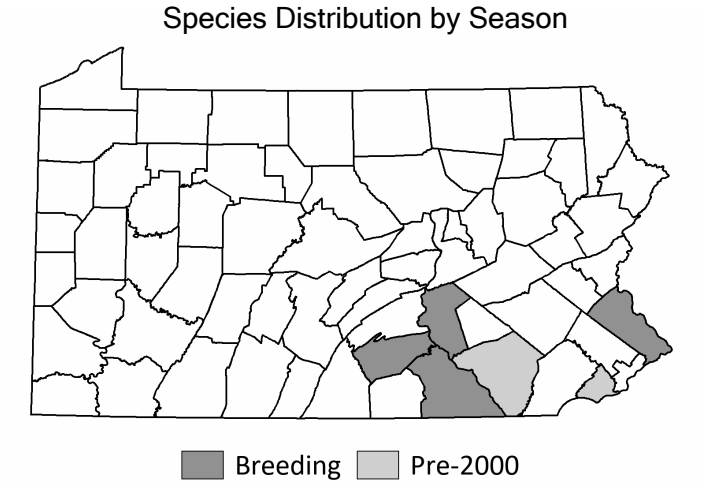
Yellow-crowned Night Heron

Nyctanassa violacea

Terry L. Master

Distinguished Professor of Biology, East Stroudsburg University of Pennsylvania

J. Kosack, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: 10-20 active nests located at one colony site with perhaps other isolated nests on tributaries of the lower Susquehanna..

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Riparian forest and urban settings. Nests located 30-80 feet (9-24 meters) on a horizontal branch in tall shade trees, such as American sycamore, with open understory.

Primary Habitat: Riverine

Primary Habitat Type: Rivers and Streams

Primary Specific Habitat: Low Gradient, Warm, Small River

Habitat Comments: People living in neighborhoods where they have nested (Bellveue Park, Harrisburg) or currently nest (downtown Harrisburg) tend to view having nesting birds favorably notwithstanding issues with droppings at nest sites.

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Agricultural runoff containing herbicides, pesticides, fertilizers.

Action Category: Mitigate human environmental impact

Specific Action: Implement beneficial practices to reduce harmful effluents.

Objective: Reduce point and non-point source pollution.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of beneficial practices implemented.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Susquehanna River Basin Commission, U.S. Environmental Protection Agency

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Black-crowned Night Heron, Great Egret

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** Medium

Specific Threat: Increase in severe flooding events.

Action Category: Mitigate human environmental impact

Specific Action: Stabilize water flow regimes in foraging streams.

Objective: Mitigate severe flooding events.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of severe flooding events during the breeding season.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, U.S. Geological Survey

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Black-crowned Night Herons, Great Egrets, Belted Kingfishers

Season: Breeding

Priority	Need	Partners
1	What strategies could be used to expand colonization to other streams/locations in the lower Susquehanna River watershed?	Pennsylvania Game Commission, Universities & research institutions
2	What is the diet composition, foraging behavior, distance traveled to foraging sites, productivity level and adult survival rate?	Pennsylvania Game Commission, Universities & research institutions, Private Landowners, Susquehanna River Basin Commission
3	What are the effects of flooding events on foraging behavior and survival?	Pennsylvania Game Commission, Universities & research institutions, Susquehanna River Basin Commission
4	How much do invasive Rusty Crayfish contribute to their diet?	Universities & research institutions, Pennsylvania Game Commission, Susquehanna River Basin Commission
5	What are the effects of microplastics and other bioaccumulating substances on productivity?	Pennsylvania Game Commission, Susquehanna River Basin Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Survey lower Susquehanna River watershed for additional isolated nesting sites.	Pennsylvania Game Commission, Universities & research institutions
2	Investigate the foraging behavior and range of nesting birds.	Pennsylvania Game Commission, Universities & research institutions
3	Compare normal foraging behavior with that during floods.	Pennsylvania Game Commission, Universities & research institutions
4	Determine effects of microplastics and other bioaccumulating substances on Yellow-crowned Night-Heron productivity.	Pennsylvania Game Commission, Universities & research institutions

Name: Annual count of nesting pairs in primary Harrisburg nesting colony.

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/heron-colony-observation-survey.html

Description: Periodic inspection of nesting colony.

Comments: Coordinate with more thorough survey of sycamore-lined streams in the Lower Susquehanna River Valley.

Monitoring Need: Important to determine the number of nesting pairs, contribute to existing population trend data and ultimately keep conservation status up to date.

Alan D. Maccarone, Rachel E. Renken, and Bayleigh L. Hamilton "Effect of Water Level and Time of day on Black-Crowned Night-Heron (Nycticorax nycticorax) Foraging Behavior at an Artificial Weir: 2013–2014," Transactions of the Kansas Academy of Science 118(1-2), 90-96, (1 April 2015).

Boal, C.W. 2010. Colonial nesting Yellow-crowned Night Herons on the San Antonio River Walk. Bulletin of the Texas Ornithological Society 43(1-2): 45-48.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Gross, D. and C. Haffner. 2011. Project Annual Job Report. Pennsylvania Game Commission Bureau of Wildlife Management. Harrisburg, Pennsylvania.

Kushlan, J. A. 1976. Feeding Behavior of North American Herons. The Auk 93(1): 86-94.

Laubhan, M. K., W. D. Rundle, B. I. Swartz and F. A. Reid. 1991. Diurnal Activity Patterns and Foraging Success of Yellow-Crowned Night-Herons in Seasonally Flooded Wetlands. Wilson Bullletin 103(2): 272-277.

Master, T. L. 2010. Yellow-crowned Night-heron. In A Steele, M. C. Brittingham, T. J. Maret and J. F. Merritt. Terrestrial Vertebrates of Pennsylvania. A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, MD.

NatureServe. 2014. Climate Change Vulnerability Index. NatureServe, Arlington, VA.

Ross, R. M. 2010. Colonially nesting waders. Pages 259-275 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Watts, B. D. 2011. Yellow-crowned Night-Heron (Nyctanassa violacea). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/161 (accessed January 2015).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

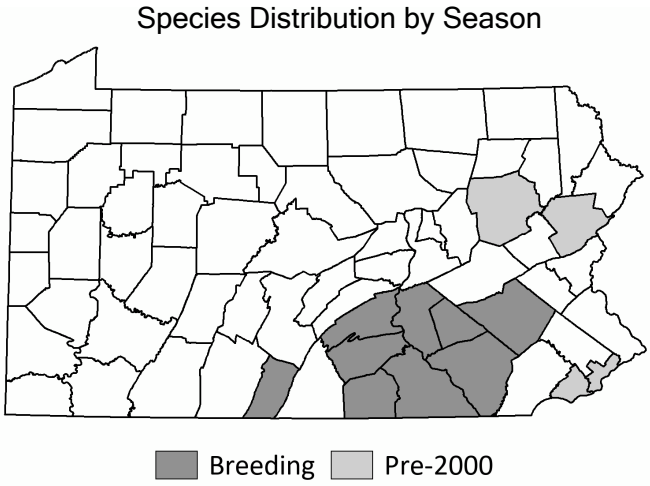
PENNSYLVANIA
WILDLIFE ACTION PLAN

Black-crowned Night Heron

Nycticorax nycticorax

Terry L. Master — *Distinguished Professor of Biology Emeritus, East Stroudsburg University of Pennsylvania*

J. Kosack, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: 300-400 nests distributed among 3-4 well protected main colony sites.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Decline of 80-90%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Shallow aquatic/terrestrial margins of freshwater rivers and ponds with sufficient protection from predators and availability of nesting shrubs/trees.

Primary Habitat: Riverine

Primary Habitat Type: Rivers and Streams

Primary Specific Habitat: Warm, Medium River

Habitat Comments: Colonies vulnerable to human disturbance, flooding, competition and soil acidification from nesting Double-crested Cormorants and reduced tree recruitment from Japanese Knotweed and Poison Ivy understory/ground cover (Detwiler 2008, Rush et al. 2011).

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Agricultural runoff containing herbicides, pesticides, and fertilizers.

Action Category: Manage non-living habitat components

Specific Action: Implement beneficial practices to reduce harmful effluents.

Objective: Reduce point and non-point pollution sources.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of beneficial practices implemented.

Potential Collaborators: Businesses, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Great Egret, Yellow-crowned Night-Heron

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** High

Specific Threat: Dense Japanese knotweed (Fallopia japonica) and poison ivy (Toxicodendron radicans) limits tree recruitment.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Reduce competing and invasive species impacts to increase available nesting habitat.

Objective: Protect existing colony sites with active habitat management and creating a network of new breeding sites spaced appropriately.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of sites actively managed.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: HUC6 Watershed: Lower Susquehanna, Lower Susquehanna, Lower Susquehanna. HUC8 Watershed: Lower Susquehanna-Swatara, Lower Susquehanna

Other species likely to benefit from this action: Great Egret

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** Medium

Specific Threat: Increase in severe flooding events.

Action Category: Manage non-living habitat components

Specific Action: Maintain and enhance forested buffers along watershed streams and rivers, employ green infrastructure and control runoff.

Objective: Reduce flooding on the Susquehanna River.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Water level gauge measurements.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Great Egrets, Yellow-crowned Night Herons

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Medium

Specific Threat: Dense Japanese knotweed (Fallopia japonica) and poison ivy (Toxicodendron radicans) limits tree recruitment.

Action Category: Manage non-living habitat components

Specific Action: Eliminate Japanese Knotweed from Wade Island ground cover.

Objective: Japanese Knotweed removal.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Quantity of knotweed removed.

Potential Collaborators: Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Great Egret

Season: Breeding

Priority	Need	Partners
1	What is the diet composition, foraging behavior, distance traveled to foraging sites, productivity level, and adult survival at colony sites other than Wade Island where these characteristics have been investigated (Detwiler 2008)?	Universities & research institutions, Pennsylvania Game Commission
2	What is the impact of Double-crested Cormorant competition on Black-crowned Night Heron productivity at Wade Island?	Universities & research institutions, Pennsylvania Game Commission
3	What is are the effects of flooding events on foraging behavior and survival?	Pennsylvania Game Commission, Universities & research institutions
4	Are there regular migratory stopover sites used in Pennsylvania?	Pennsylvania Game Commission, Universities & research institutions
5	What are the effects of microplastics and other bioaccumulating substances on productivity?	Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission, Delaware River Basin Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Determine the ongoing effects of Double-crested Cormorant competition on Black-crowned Night-Heron productivity.	Pennsylvania Game Commission, Universities & research institutions
2	Compare Black-crowned Night-Heron productivity on Wade Island under competition with Double-crested Cormorants with productivity in colonies without cormorants.	Pennsylvania Game Commission, Universities & research institutions
3	Survey state for additional isolated nesting sites.	Pennsylvania Game Commission, Universities & research institutions
4	Determine effects of microplastics and other bioaccumulating substances on Black-crowned Night-Heron productivity.	Universities & research institutions, Pennsylvania Game Commission

Name: Annual nest/pair count conducted by the Pennsylvania Game Commission at major colony sites.

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/heron-colony-observation-survey.html

Description: A single day count of pairs/nests at Wade island coordinated by the Pennsylvania Game Commission with volunteers from the PGC, DCNR and other organizations/NGOs depending upon the year.

Comments: Late May/early June surveys would be most accurate.

Monitoring Need: Important to determine the number of nesting pairs, contribute to existing population trend data and ultimately keep conservation status up to date.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Detwiler, D. 2008. Habitat use, foraging behavior and competitive interactions of Black-crowned Night-Herons (Nycticorax nycticorax) on the Susquehanna River at Wade Island in Harrisburg, Pennsylvania. M. S. Thesis. East Stroudsburg University of Pennsylvania, East Stroudsburg, Pennsylvania.

Gross, D. and C. Haffner. 2011. Project Annual Job Report. Pennsylvania Game Commission Bureau of Wildlife Management. Harrisburg, Pennsylvania.

Ishida, A. 1996. Changes of soil properties in the colonies of the Common Cormorant, Phalacrocorax carbo. Journal of Forest Research 1:31-35.

Master, T. L. 2010. Black-crowned Night-heron. In M. A. Steele, M. C. Brittingham, T. J. Maret and J. F Merritt. editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, MD.

Master, T. L. 2012. Black-crowned Night-Heron. Pages 130-131 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

McCrimmon Jr., D. A. 2008. Black-crowned Night-Heron (Nycticorax nycticorax). Pages 174-175 in K. J. McGowan and K. Corwin editors. Second Atlas of Breeding Birds in New York State. Cornell University Press, Ithaca, New York.

Nam, J., S. Geon and J. Kim. 2007. Breeding Site Preferences and the Effects of Breeding Black-crowned Night Herons (Nycticorax nycticorax) on Soil Characteristics at Bamsum Island in Seoul. Journal of Ecology and Environment 30: 341-346.

NatureServe. 2014. Climate Change Vulnerability Index. NatureServe, Arlington, VA.

Ross, R. M. 2010. Colonially nesting waders. Pages 259-275 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Rush, S. A., S. Verkoeyen, T. Dobbie, S. Dobbyn, C. E. Herbert, J. Gagnon and A. T. Fisk. 2011. Influence of increasing populations of Double-crested Cormorants on soil nutrient characteristics of nesting islands in western Lake Erie. Journal of Great Lakes Research 37:305-309.

Walsh, J. V., V. Elia, R. Kane and T. Halliwell. 1999. The Birds of New Jersey. New Jersey Audubon Society, Bernardsvile, New Jersey.

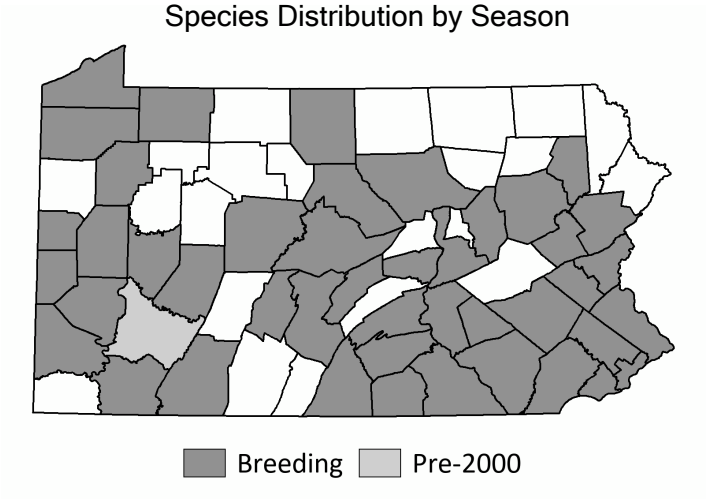
PENNSYLVANIA
WILDLIFE ACTION PLAN

Great Egret

Ardea alba

Terry L. Master — *Distinguished Professor of Biology Emeritus, East Stroudsburg University of Pennsylvania*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain nesting colony at Wade Island at mean historical levels (145 nests, range = 103-197) based on the annual Pennsylvania Game Commission Wade Island Survey estimates from 1992-2014, and 3-8 nests at Kiwanis Park in York, PA (Master 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Shallow aquatic/terrestrial margin of freshwater rivers and ponds with sufficient protection from predators and availability of nesting trees.

Primary Habitat: Riverine

Primary Habitat Type: Big Rivers

Primary Specific Habitat: Warm, Large River

Habitat Comments: Colony on Wade Island in the Susquehanna River vulnerable to human disturbance, flooding, competition and soil acidification from nesting Double-crested Cormorants and reduced tree recruitment from Japanese Knotweed and Poison Ivy understory/ground cover (Detwiler 2008, Rush et al. 2011).(Romano 2008, Rush et al. 2011).

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Agricultural runoff containing herbicides, pesticides, and fertilizers.

Action Category: Manage non-living habitat components

Specific Action: Implement beneficial practices to reduce harmful effluents.

Objective: Reduce point and non-point pollution.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of beneficial practices implemented.

Potential Collaborators: Businesses, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Black-crowned Night-Heron and Yellow-crowned Night-Heron

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** High

Specific Threat: Dense Japanese knotweed (Fallopia japonica) and poison ivy (Toxicodendron radicans) limits tree recruitment.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Reduce competing and invasive species impacts to increase available nesting habitat.

Objective: Protect existing colony sites with active habitat management and creating a network of new breeding sites spaced appropriately.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of sites actively managed.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: HUC6 Watershed: Lower Susquehanna, Lower Susquehanna

Other species likely to benefit from this action: Black-crowned Night Heron

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** Medium

Specific Threat: Increase in severe flooding events.

Action Category: Manage non-living habitat components

Specific Action: Maintain and enhance forested buffers along watershed streams and rivers, employ green infrastructure, and control runoff.

Objective: Reduce flooding on the Susquehanna River.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Water level gauge measurements

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: HUC6 Watershed: Lower Susquehanna

Other species likely to benefit from this action: Black-crowned Night Heron, Yellow-crowned Night Heron

Season: Breeding

Priority	Need	Partners
1	What is the impact of Double-crested Cormorant competition on Great Egret productivity at Wade Island?	Pennsylvania Game Commission, Universities & research institutions
2	What are the effects of flooding events on foraging behavior and survivial?	Pennsylvania Game Commission, Universities & research institutions
3	What are the effects of microplastics and other bioaccumulating substances on productivity?	Susquehanna River Basin Commission, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources

Season: Breeding

Priority	Survey	Partners
1	Determine the ongoing effects of Double-crested Cormorant competition on Great Egret productivity.	Pennsylvania Game Commission, Universities & research institutions
2	Determine the effects of microplastics and other bioaccumulating substances on Great Egret productivity.	Universities & research institutions, Pennsylvania Game Commission

Name: Annual nest/pair count conducted by the Pennsylvania Game Commission on Wade Island.

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/heron-colony-observation-survey.html

Description: A single day count of pairs/nests at Wade island coordinated by the Pennsylvania Game Commission with volunteers from the PGC, DCNR and other organizations/NGOs depending upon the year.

Comments: Late May/early June counts would be most effective.

Monitoring Need: Important to keep track of the number of individuals and nests of these rare birds to determine population trends.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

California Department of Fish and Game. 2015. California Bird Species of Special Concern, Climate Change Vulnerability Species Scores. Available from http://data.prbo.org/apps/bssc/index.php?page=climate-change-vulnerability (accessed January 2015).

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Unit, Tucson, Arizona.

Erwin, R. M. 1989. Responses to human intruders by birds in nesting colonies: experimental results and management guidelines. Colonial Waterbirds 12:104-108.

Frederiksen, M., J. D. Lebreton, and T. Bregnballe. 2001. The interplay between culling and density-dependence in the Great Cormorant: a modeling approach. Journal of Applied Ecology 38:617-627.

Ishida, A. 1996. Changes of soil properties in the colonies of the Common Cormorant, Phalacrocorax carbo. Journal of Forest Research 1:31-35.

Kelly, J. P., K. Etienne, C. Strong, M. McCaustland, and M. L. Parkes. 2007. Status, trends and implications for the conservation of heron and egret nesting colonies in the San Francisco Bay area. Waterbirds 30:455-478.

Master, T. L. 2010. Great Egret. Pages 190 -192 in M. A. Steele, M. C. Brittingham, T. J. Maret and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Master, T. L. 2012. Great Egret. Pages 126-127 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Middleton, D. A. J., R. M. Nisbet, and A. J. Kerr. 1993. A mathematical model of the effect of shooting Barnacle Geese wintering on Islay. Journal of Applied Ecology 30:1-12.

NatureServe. 2014. Climate Change Vulnerability Index. NatureServe, Arlington, VA.

Rogers Jr., J. A., and H. T. Smith. 1995. Set-back distances to protect nesting bird colonies from human disturbance in Florida. Conservation Biology 9:89-99.

Romano, W. B. 2008. Habitat selection and foraging behavior of Great Egrets (Ardea alba) in a riparian environment on the Susquehanna River in Harrisburg, Pennsylvania. M. S. Thesis. East Stroudsburg University of Pennsylvania, East Stroudsburg, Pennsylvania.

Rush, S. A., S. Verkoeyen, T. Dobbie, S. Dobbyn, C. E. Herbert, J. Gagnon and A. T. Fisk. 2011. Influence of increasing populations of Double-crested Cormorants on soil nutrient characteristics of nesting islands in western Lake Erie. Journal of Great Lakes Research 37:305-309.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

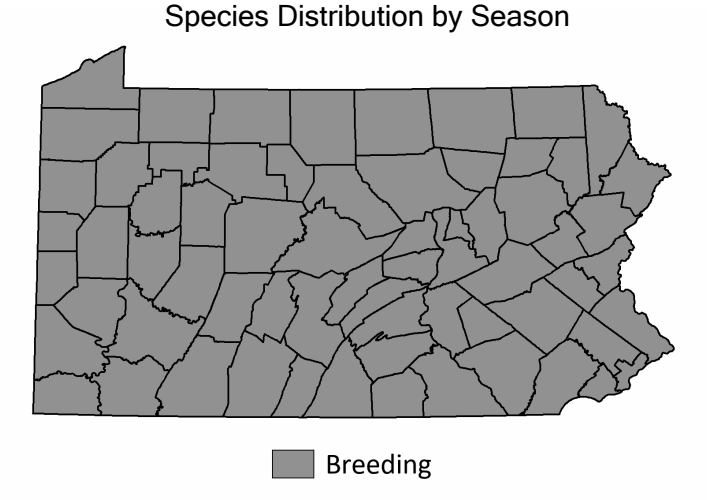
PENNSYLVANIA
WILDLIFE ACTION PLAN

Great Blue Heron

Ardea herodias

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Protect breeding colonies, especially with regard to heronries on private property.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Usually build nests in the tops of live or dead trees, often close to water. Primary factor in choosing a nesting site is its closeness to lakes and emergent wetlands. Colonies near key feeding grounds.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** Medium

Specific Threat: Habitat destruction and degradation and nesting colony disturbance, resulting in abandonment.

Action Category: Conserve specific land or seascapes

Specific Action: Preserve existing wetlands through land acquisition or conservation easements; restore degraded wetlands by improving water quality and natural vegetation; limit drainage or conversion of wetlands for development.

Objective: Protect and restore a defined amount of wetland habitat to ensure sufficient feeding grounds for Great Blue Heron populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** No net loss of wetland habitat across the state in 10 years.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission, U.S. Army Corps of Engineers

Locations: Statewide

Other species likely to benefit from this action: All wetland and marsh-dependent species including rails, ardeids, ducks, shorebirds, and others.

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Habitat destruction and degradation and nesting colony disturbance, resulting in abandonment.

Action Category: Conserve specific land or seascapes

Specific Action: Preserve existing wetlands through land acquisition or conservation easements; restore degraded wetlands by improving water quality and natural vegetation; limit drainage or conversion of wetlands for development

Objective: Protect and restore a defined amount of wetland habitat to ensure sufficient feeding grounds for Great Blue Heron populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** No net loss of wetland habitat across the state in 10 years.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission, U.S. Army Corps of Engineers

Locations: Statewide

Other species likely to benefit from this action: All wetland and marsh-dependent species including rails, ardeids, ducks, shorebirds, and others.

Season: Breeding

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** High

Specific Threat: Federally authorized lethal take of Great Blue Herons at commercial aquaculture facilities.

Action Category: Outreach, communication and distribution

Specific Action: Work with U.S. Fish and Wildlife Service to reduce allowable take levels while conveying to permittees the impact of lethal take, particularly during the nesting season.

Objective: Reduce permitted take to a level more consistent with state population estimates; likely to require facilities to construct overhead coverings when possible.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of permitted birds for lethal take.

Potential Collaborators: Businesses, Local agencies & municipalities, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Osprey, Green Heron, Belted Kingfisher

Season: Breeding

Priority	Need	Partners
1	Investigate the interaction between piscivorous fish and commercial aquaculture facilities (e.g., frequency of use, species present, distance to rookeries, seasonality).	U.S. Fish and Wildlife Service, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Pennsylvania Game Commission
2	Characterize differences between Great Blue Herons nesting in the Appalachian Mountains, Lower Great Lakes, and Piedmont Bird Conservation Regions.	Universities & research institutions, Pennsylvania Game Commission
3	Are there connections between Great Blue Herons nesting in Pennsylvania and those that winter in the state?	

Season: Breeding

Priority	Survey	Partners
1	Conduct pre- and post- activity surveys when a permitted activity has the potential to disturb a large rookery.	Businesses, Non-governmental organizations, Pennsylvania Game Commission

Name: eBird

Lead(s) : Cornell Laboratory of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need:

Name: Pennsylvania Game Commission Heron Colony Observation Survey

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/heron-colony-observation-survey.html

Description: The Pennsylvania Game Commission gathers heron colony observations to improve its ability to monitor heron populations and distribution throughout the state. The survey focuses chiefly on the Great Blue Heron, and the state endangered black-crowned night heron and yellow-crowned night heron.

Comments:

Monitoring Need:

Vennesland, R. G. and R. W. Butler (2020). Great Blue Heron (Ardea herodias), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.grbher3.01

PENNSYLVANIA
WILDLIFE ACTION PLAN

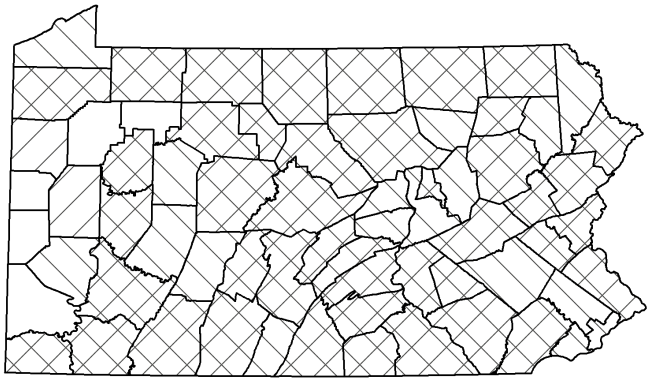
Golden Eagle (Eastern pop.)

Aquila chrysaetos

Nathan J. Zalik — *Pennsylvania Game Commission*

H. Korber, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Stable to increasing trends in migration and winter. At least 150 migrants in both spring and fall at 2 or more hawk migration count sites in Pennsylvania.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Migration

Specific Habitat Requirements: Inhabit rugged, mostly wooded terrain throughout the Allegheny Plateau and Valley and Ridge regions (Ombalski and Brandes 2010). Migration is strongly associated with landscapes that provide thermals or updrafts generated by topography (Katzner et al. 2020).

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Wintering

Specific Habitat Requirements: Eastern Golden Eagles use a variety of habitats in winter, but appear to be most abundant in large forested blocks with moderate to high topographic relief (Katzner et al. 2021; Miller et al. 2017 and McCabe et al. 2021, as cited in Katzner et al. 2023).

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Migration

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** High

Specific Threat: Lead poisoning by ingesting fragments of lead-based ammunition while scavenging on carcasses and gut piles of hunted or dispatched animals. Shooting of eagles and incidental by-catch from trapping of furbearers.

Action Category: Outreach, communication and distribution

Specific Action: Encourage hunters to use non-lead ammunition.

Objective: Reduce the use of lead ammunition within the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of Pennsylvania hunters using non-lead ammunition.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Bald Eagle

Season: Migration

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** High

Specific Threat: Lead poisoning by ingesting fragments of lead-based ammunition while scavenging on carcasses and gut piles of hunted or dispatched animals. Shooting of eagles and incidental by-catch from trapping of furbearers.

Action Category: Prosecution and conviction

Specific Action: Prosecute illegal shooting to the fullest extent of the law and publicize convicted offenses.

Objective: Decrease the number of known and suspected eagle shootings over the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of known and suspected shootings of eagles.

Potential Collaborators: High Allegheny Headwater Wetland

Locations: Statewide

Other species likely to benefit from this action: Bald Eagle

Season: Wintering

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** High

Specific Threat: Lead poisoning by ingesting fragments of lead-based ammunition while scavenging on carcasses and gut piles of hunted or dispatched animals. Shooting of eagles and incidental by-catch from trapping of furbearers.

Action Category: Outreach, communication and distribution

Specific Action: Encourage hunters to use non-lead ammunition.

Objective: Reduce the use of lead ammunition within the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of Pennsylvania hunters using non-lead ammunition.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Bald Eagle

Season: Wintering

Threat Category: Hunting and Collecting Terrestrial Animals **Threat Impact:** High

Specific Threat: Lead poisoning by ingesting fragments of lead-based ammunition while scavenging on carcasses and gut piles of hunted or dispatched animals. Shooting of eagles and incidental by-catch from trapping of furbearers.

Action Category: Prosecution and conviction

Specific Action: Prosecute illegal shooting of the species to the fullest extent of the law and publicize convicted offenses.

Objective: Decrease the number of known and suspected eagle shootings over the next 10 years.

Action Priority: 1-Highest **Action Urgency:** **Measure:** Number of known and suspected shootings of eagles.

Potential Collaborators: Conduct outreach to inspire and promote Species of Greatest Conservation Need protection and habitat conservation.

Locations: Statewide

Other species likely to benefit from this action: Bald Eagle

Season: Migration

Priority	Need	Partners
1	How does climate change impact Golden Eagle migration behavior?	Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	To what degree is lead toxicity, ingested through scavenging on hunter-killed carcasses, a threat to wintering Golden Eagles?	Pennsylvania Game Commission, Non-governmental organizations, Other state agency, Universities & research institutions
2	What are the most effective ways to communicate with hunters to reduce the effect of lead on wildlife and human health?	Universities & research institutions, Businesses, Pennsylvania Game Commission
3	With what frequency are Golden Eagles captured incidentally in leg-hold traps set for mammals?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Other state agency
4	What are the habitat characteristics of areas used by wintering Golden Eagles and what prey items are important?	Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners
5	How might climate change affect the distribution and survival of Golden Eagles in the winter?	Universities & research institutions

Season: Migration

Priority	Survey	Partners
1	Pre- and post-construction monitoring at potential and existing wind energy facilities.	Businesses, Pennsylvania Game Commission

Season: Wintering

Priority	Survey	Partners
1	Continue trail camera surveys especially in remote forested regions.	Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Private Landowners
2	Pre- and post-construction monitoring at potential and existing wind energy facilities.	Businesses, Pennsylvania Game Commission
3	Volunteer reporting of Golden Eagles observed at Game Commission carcass pits.	Pennsylvania Game Commission, Interested Public

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: National Audubon Society Christmas Bird Count **Lead(s) :** National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: Raptor Population Index **Lead(s) :** Hawk Migration Association

Link: https://www.rpi-project.org/

Description: Collaborative effort to evaluate trends in migrating raptors. Trends in sites south of Pennsylvania in part represent trends in the Pennsylvania migrating population.

Comments:

Monitoring Need:

Name: Winter Raptor Survey **Lead(s) :** Hawk Migration Association and Pennsylvania Society for Ornithology

Link: https://www.pabirds.org and https://www.hawkmigration.org

Description: The Winter Raptor Survey monitors winter raptor populations by conducting roadside surveys in mid-winter.

Comments:

Monitoring Need: To provide more detailed abundance data on raptors overwintering in Pennsylvania.

Dennhardt, A. J., A. E. Duerr, D. Brandes, and T. Katzner. 2015. Integrating citizen-science data with movement models to estimate the size of a migratory Golden Eagle population. Biological Conservation 184:68-78.

Dennhardt, A. J., A. E. Duerra, D. Brandes, and T. E. Katzner. 2015. Modeling autumn migration of a rare soaring raptor identifies new movement corridors in central Appalachia. Ecological Modelling 303:19-29.

Farmer, C. J., L. J. Goodrich, E. Ruelas Inzunza, and J. P. Smith. 2008. Conservation status of North America's birds of prey. Pages 303 to 420 in K. L. Bildstein, J.P. Smith, E. R. Inzunza, and R. R. Veit, editors. State of North America's Birds of Prey. Nuttall Ornithological Club, Cambridge, Massachusetts, and American Ornithologist's Union, Washington, D.C.

Katzner, T. E., et al. 2023. Conservation plan for golden eagles in eastern North America. Eastern Golden Eagle Working Group.

Katzner, T. E., M. N. Kochert, K. Steenhof, C. L. McIntyre, E. H. Craig, and T. A. Miller. 2020. Golden eagle (Aquila chrysaetos), version 2.0. In P. G. Rodewald and B. K. Keeney, editors. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA.

Katzner, T., et al. 2012. Status, biology, and conservation priorities for North America's eastern Golden Eagle (Aquila chrysaetos) population. The Auk 129:168-176.

Kochert, M. N., K. Steenhof, C. L. Mcintyre and E. H. Craig. 2002. Golden Eagle (Aquila chrysaetos). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/684 (accessed July 2015).

McCabe, J. D., J. D. Clare, T. A. Miller, T. E. Katzner, J. Cooper, S. Somershoe, D. Hanni, C. A. Kelly, R. Sargent, E. C. Soehren, C. Threadgill, M. Maddox, J. Stober, M. Martell, T. Salo, A. Berry, M. J. Lanzone, M. A. Braham, and C. J. W. McClure. 2021. Resource selection functions based on hierarchical generalized additive models provide new insights into individual animal variation and species distributions. Ecography 44:1756–1768.

Miller, T. A., R. P. Brooks, M. J. Lanzone, J. Cooper, K. O'Malley, D. Brandes, A. Duerr, and T. E. Katzner. 2017. Summer and winter space use and home range characteristics of Golden Eagles (Aquila chrysaetos) in eastern North America. Condor: Ornithological Applications 119:697–719.

Ombalski, D., and D. Brandes. 2010. Golden eagle. Pages 203-207 in M. A. Steele, M. C. Brittingham, T. J. Maret, J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania. The Johns Hopkins University Press, Baltimore, Maryland.

PENNSYLVANIA
WILDLIFE ACTION PLAN

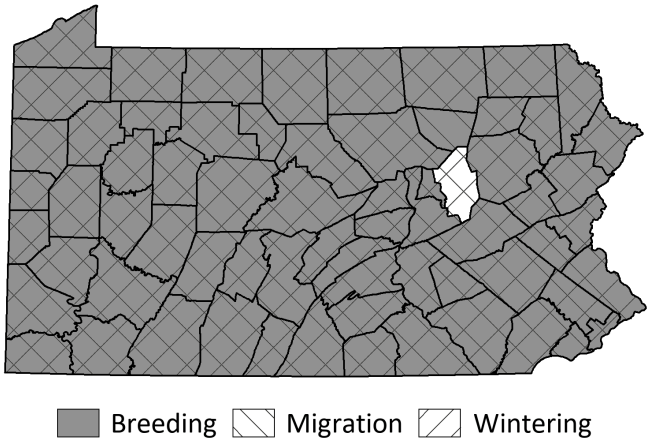
Sharp-shinned Hawk

Accipiter striatus

Laurie Goodrich — *Hawk Mountain Sanctuary Association*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain or increase breeding population to at least 950 Breeding Bird Atlas blocks (Wilson et al. 2012) by 2035. Maintain migratory population at current or higher levels, as measured by Pennsylvania's raptor counts, through 2035. Maintain and protect suitable winter forest habitats and prey availability to support stable populations.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

NatureServe Global Rank: G5	**SGCN Season: Migration**
IUCN Red List Designation: Least Concern	**State Rank (Season):** S4M
IUCN Red List Trend: Decreasing	**State Rank Year:** 2024
Identified Conservation Priority by Established Groups: Yes	**PA Legal Designation:** Not Listed (Protected)
Northeast U.S.RSGCN: Not RSGCN	**PA Abundance:** Unknown
Federal Listing Status: Not Listed	**PA Short-term Trend (10-year):** Relatively stable (<=10% change)
Feasiblity of Recovering or Sustaining the PA Population: High	**Cumulative Threat Impact:** Medium

NatureServe Global Rank: G5	**SGCN Season: Wintering**
IUCN Red List Designation: Least Concern	**State Rank (Season):** S4N
IUCN Red List Trend: Decreasing	**State Rank Year:** 2025
Identified Conservation Priority by Established Groups: Yes	**PA Legal Designation:** Not Listed (Protected)
Northeast U.S.RSGCN: Not RSGCN	**PA Abundance:** Unknown
Federal Listing Status: Not Listed	**PA Short-term Trend (10-year):** Relatively stable (<=10% change)
Feasiblity of Recovering or Sustaining the PA Population: High	**Cumulative Threat Impact:** Medium

Season: Breeding

Specific Habitat Requirements: Large, contiguous coniferous or mixed conifer/deciduous forests, away from suburban areas or areas of human consistent human activity. Dense forest stands of either conifers or younger forest stands average age 40 yrs are used for nesting. Nesting birds use forest openings, dirt roads or right of ways for foraging. Range estimated at 3-km radius but little data.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Cooper's Hawks which favor suburban or more open areas are at least a competitor and may be a predator for this species. Promote habitat for Sharp-shinned Hawk in large contiguous forest tracts to minimize conflicts. minimize large fragmentation events to dissuade Cooper's Hawk and Great Horned Owl, nest predators of this species.

Season: Migration

Specific Habitat Requirements: Large, contiguous coniferous or mixed conifer/deciduous forests, away from suburban areas or areas of human consistent human activity. Migrants select medium, large or contiguous forests >494 acres (>200 hectares) (Goodrich 2010) often near streams, rivers or wet thickets at lower elevation near migration corridors.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Habitat Comments: Sharpshins tend to forage within 1 to 4 miles of the migration corridor seeking out mesic forests with songbird concentrations. Moderate sized woodland patches are also used where cover can be found and prey might concentrate.

Season: Wintering

Specific Habitat Requirements: research needed by see Roth 2005

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Medium

Specific Threat: Species is predicted to lose most of its range in Pennsylvania due to warmer temperatures.

Action Category: Basic research and status monitoring

Specific Action: Conduct collaborative research on nest success, fledgling survival, and prey abundance.

Objective: Better understand how climate variability may impact this species, and others, in Pennsylvania across its range.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Nest success and prey delivery rates; songbird abundance.

Potential Collaborators: Non-governmental organizations, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: American Goshawk, other boreal forest mammals and birds

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Low

Specific Threat: Nest failure from human harassment.

Action Category: Mitigate human environmental impact

Specific Action: Birds will nest near trails and openings with conifer stands. Manage access to State Game Lands and State Forests to restrict some areas to only low intensity recreation such as hunting, fishing, hiking; limit volume of use, or provide many conifer stands away from high use areas (i.e., half mile or more from road).

Objective: Low human disturbance at nesting stands.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Sustained nesting at sites with high human use.

Potential Collaborators: Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Other nesting species including game species such as Wild Turkey, raptors such as American Goshawk, and others will benefit from lower disturbance during nesting.

Season: Breeding

Threat Category: Roads and Railroads **Threat Impact:** Low

Specific Threat: Possible collisions with vehicles (and other artificial structures).

Action Category: Create or amend policies, guidelines, or best practices

Specific Action: Improve management of transportation corridors to reduce strikes by low-flying raptors (use of diversion poles, low fences, monitoring efforts, etc.).

Objective: Reduce mortality from collisions.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Reduced mortality along transportation corridors.

Potential Collaborators: Businesses, Other federal agency, Other state agency

Locations: Statewide

Other species likely to benefit from this action: Raptors

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Low

Specific Threat: Nest failure from human harassment.

Action Category: Conservation planning

Specific Action: Promote large, contiguous landscape conservation, such as State Game Lands and PA DCNR Conservation Landscapes, with forest connectivity restoration a priority in heavily populated areas, such as southeastern Pennsylvania.

Objective: Continuous forest conservation or restoration.

Action Priority: 4-Low **Action Urgency:** Initiate within 5 years **Measure:** Forest patch size by region and increase in natural habitat connectivity via corridor planning.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Forest-associated fauna and flora.

Season: Migration

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Bioaccumulation of organochlorine pesticides, from prey to raptors.

Action Category: Outreach, communication and distribution

Specific Action: Reduce pesticide use to the greatest extent practicable. If used, closely adhere to application specifications.

Objective: Reduced pesticide exposure.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Sustained or increased migratory Sharp-shinned Hawk population in Pennsylvania.

Potential Collaborators: Non-governmental organizations, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: All insects and birds

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Window collisions by foraging individuals. Forested habitat reduction, loss, and fragmentation or large forest block disturbance.

Action Category: Conservation planning

Specific Action: Identify key migration corridors for autumn and spring migration in Pennsylvania (ridges and coastlines) and create management planning objectives to prioritize forest conservation for songbirds and raptors (songbird prey concentrations important to conserve as well).

Objective: Landscape plans developed for migration corridors to prioritize conservation of forest and natural habitats along and near routes.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of acres of habitat along migration corridors, ridges and coasts, with habitat connectivity a priority.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Township Zoning Boards, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: All migrating songbirds and forest raptors

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Window collisions by foraging individuals. Forested habitat reduction, loss, and fragmentation or large forest block disturbance.

Action Category: Outreach, communication and distribution

Specific Action: Reduce bird-window collisions by promoting and implementing bird collision reduction strategies.

Objective: Widespread promotion of use of bird-friendly glass in new building and retrofitting (e.g., Collidescape, Feather Friendly) on private and public buildings especially in migration corridors.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of houses with window protections within migration corridors and outreach programs and contacts made.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: All migrating songbirds and forest raptors

Season: Migration

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Wind turbine collisions.

Action Category: Economic incentives and disincentives

Specific Action: Discourage industrial wind turbine development on the Lake Erie shoreline or on ridges in the Ridge and Valley and Allegheny Front physiographic regions. Consider turning off turbines during peak bird migration.

Objective: Establish moratoriums on additional wind turbines or on larger turbines on ridges and coastlines.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of wind turbines in key migration corridors (e.g., ridges and coastlines).

Potential Collaborators: Local agencies & municipalities, Other federal agency, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Township Zoning Boards, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Migratory species (e.g., songbirds, bats, butterflies)

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Forested habitat reduction, loss, and fragmentation or large forest block disturbance.

Action Category: Outreach, communication and distribution

Specific Action: Promote forest patch protection, including conifers, in suburban areas.

Objective: Create Sharp-shinned Hawk educational materials about winter habitat and behavior.

Action Priority: 4-Low **Action Urgency:** Initiate within 5 years **Measure:** Number of outreach materials developed and shared.

Potential Collaborators: Pennsylvania Game Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources

Locations: Statewide

Other species likely to benefit from this action: Cooper's Hawk

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Forested habitat reduction, loss, and fragmentation or large forest block disturbance from solar and wind development.

Action Category: Conservation planning

Specific Action: Local zoning to avoid development in contiguous forest, suburban parks, and neighborhoods, or cluster development to minimize impact.

Objective: Conserve wintering habitat in Pennsylvania.

Action Priority: 4-Low **Action Urgency:** Initiate within 5 years **Measure:** Number of zoning ordinances updated.

Potential Collaborators: Local agencies & municipalities, Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: All birds and bats

Season: Wintering

Threat Category: Recreational Activities **Threat Impact:** Low

Specific Threat: Displacement by human activity.

Action Category: Outreach, communication and distribution

Specific Action: Provide information to township planning commissions on value of greenspace to wildlife and need for conifer stands in suburban areas.

Objective: Educational outreach to municipal leaders.

Action Priority: 5-Lowest **Action Urgency:** Initiate within 5 years **Measure:** Number of township planners and commissions contacted.

Potential Collaborators: Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action:

Season: Wintering

Threat Category: Roads and Railroads **Threat Impact:** Low

Specific Threat: Vehicle collisions while hunting.

Action Category: Outreach, communication and distribution

Specific Action: Limit roads in rural and suburban greenspace and reduce speed limits in parks.

Objective: Public education about wildlife and collision risks.

Action Priority: 5-Lowest **Action Urgency:** Can wait 10 years to initiate **Measure:** Number of outreach events or materials produced.

Potential Collaborators: Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Military and Veterans Affairs, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Birds and mammals

Season: Breeding

Priority	Need	Partners
1	Determine population densities by region or forest type and develop a long-term monitoring system, possibly a volunteer-based call playback survey for breeding forest raptors in Pennsylvania. Also consider use of autonomous recording units in traditional sites identified in the Pennsylvania Bird Atlas.	Non-governmental organizations, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, Pennsylvania Biological Survey
2	Gain better understanding of year-round habitat use and movement patterns of Pennsylvania nesting birds. Determine if birds switch to more suburban habitats in winter, move out of Pennsylvania or if sex or age classes use different habitats; and if suburban wintering birds use different habitats than non-suburban wintering birds during nesting.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Develop a better understanding of potential impacts of contaminants on reproductive success, including evaluation of metals, organochlorine, organophosphates, pfas, neonics or other forest control agents. Evaluate adult survival, nest success, juvenile survival.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations, U.S. Fish and Wildlife Service
4	Assess habitat use patterns of nesting Sharp-shinned Hawks and their sensitivity to human disturbance. Use telemetry or nest location data to define primary use areas and primary habitats used for foraging and roosting.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Migration

Priority	Need	Partners
1	Use banding data to define nesting and wintering range of Pennsylvania migrants, i.e., define source populations and connectivity. Similarly, use banding data to map wintering and migration areas for Pennsylvania nesting birds. Migration count data suggest two key source regions for Pennsylvania migrants in eastern and western Appalachian ridges. Defining these source populations through band recovery mapping or stable isotope work may improve population trend assessment using counts.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Evaluate health and contaminant load of Pennsylvania migrants by partnering with banding stations to conduct blood and fat analyses for heavy metals and contaminants. Because birds prey on songbirds, their contaminant load may be relevant to track exposure in small birds as well.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
3	Use ongoing Pennsylvania migration counts to evaluate trends in Pennsylvania migrant populations (www.rpi-project.org); tap birders to help refine and improve our knowledge of other migration corridors in the ridge and valley region, Appalachians. Use eBird data to ensure migration routes are well-covered. Use band recovery data to define key wintering areas for Pennsylvania nesting birds.	Pennsylvania Game Commission, Non-governmental organizations, U.S. Fish and Wildlife Service

Season: Wintering

Priority	Need	Partners
1	Conduct research on wintering habitat use using telemetry; examine survival in winter and proximity to feeders as well as foraging time at feeders versus natural areas. Determine need for large forests versus suburban and other habitat types.	Non-governmental organizations, Universities & research institutions
2	Examine trends in wintering birds over time with updates every few years, particularly smaller songbirds, as proxy for prey availability for wintering Sharp-shinned Hawks.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Develop useful survey technique for nesting population stratified by forest type, and a frequency (every 3-5 years) that might monitor population trends effectively. Implement survey within next five years, and include other forest-raptors not well surveyed by other methods.	
2	Gain better understanding of year-round habitat use and movement patterns of Pennsylvania nesting birds. Determine if birds switch to more suburban habitats in winter, move out of Pennsylvania or if sex or age classes use different habitats; and if suburban wintering birds use different habitats than non-suburban wintering birds during nesting.	
3	Determine which migration counts analyzed by the Raptor Population Index best sample populations in Pennsylvania by examining catchment areas using band recovery data (e.g., Goodrich and Smith 2008). Gather long term migration trend data for these sites every three years to assess PA population trends.	Non-governmental organizations, U.S. Geological Survey, Pennsylvania Game Commission

Season: Migration

Priority	Survey	Partners
1	Conduct 1-2 year counts of numbers of birds using key ridges in the Appalachian chain and along the Lake Erie shoreline or other potential concentration areas in the spring and fall seasons. Although much is known about birds using Blue Mountain, less is known about volume using other ridge systems. Counts from Waggoner's Gap suggest some key corridors may occur north of that point. Such data are critical to conservation planning.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	Encourage additional banding stations on western Appalachians or Allegheny Front region to monitor migrants using those areas for health and to provide additional information on nesting and wintering population extent. Request banders in eastern and western ridges collect and report weight, sex/age ratios, and fat levels on migrants to provide index to migrant health annually.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
3	Encourage consistent migration counts at hawk count sites immediately south of Pennsylvania and during spring in Pennsylvania. Partner with Hawk Migration Association to identify sites, possibly provide small grants to sustain operation and get each site's historical hourly data entered and part of the current long-term migration monitoring program, particularly for Pennsylvania spring migration sites (e.g., Raptor Population Index).	Non-governmental organizations

Season: Wintering

Priority	Survey	Partners
1	Analyze existing winter raptor surveys and Christmas Bird Counts to monitor distribution and trends.	Non-governmental organizations
2	Examine Project Feederwatch and eBird data to further enhance knowledge of key winter areas for the species in Pennsylvania and assess ability to use data for monitoring.	Non-governmental organizations

3	Use winter data from 3rd Pennsylvania Bird Atlas to assess distribution and illuminate key abundance areas in winter. Once wintering region is defined, use Christmas Bird Count data from current through historical to examine trends in wintering populations.	Non-governmental organizations, Pennsylvania Game Commission

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: eBird data can be used for population trends at least at a coarse level.

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need: CBC data is useful to track winter populations. Once band recovery data shows where PA nesting birds winter, the CBC trends for these regions can reflect PA trends.

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Not well monitored by BBS.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Tracks change in breeding range across the state.

Name: Raptor Population Index

Lead(s) : Hawk Migration Association

Link: https://www.rpi-project.org

Description: Collaborative effort to evaluate trends in migrating raptors. Trends in sites south of Pennsylvania in part represent trends in the Pennsylvania migrating population.

Comments:

Monitoring Need: Because Sharp-shinned Hawk is hard to monitor during the breeding season, migration and wintering data are the best monitoring tools.

Name: Winter Raptor Survey

Lead(s) : Hawk Migration Association and Pennsylvania Society for Ornithology

Link: http://www.pabirds.org; www.hawkmigration.org https://pabirds.org/wrs/

Description: The Winter Raptor Survey monitors winter raptor populations by conducting roadside surveys in mid-winter.

Comments: Winter raptor surveys may be useful in monitoring PA migrants on their wintering grounds or destination areas; once we define where PA nesting birds spend winter, they may be useful in monitoring PA nesting birds.

Monitoring Need:

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Bildstein, K. L., K. D. Meyer, C. M. White, J. S. Marks, and G. M. Kirwan. 2020. Sharp-shinned Hawk (Accipiter striatus), version 1.0. In S. M. Billerman, B. K. Keeney, P. G. Rodewald, and T. S. Schulenberg, Editors. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.shshaw.01

Bildstein, K., and K. Meyer. 2000. Sharp-shinned Hawk (Accipiter striatus). Account 482 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc. Philadelphia, Pennsylvania.

Bolgiano, N. 2019. Evidence for West Nile virus-related avian declines in Pennsylvania. Pennsylvania Birds, 33(1):2-11.

Evans, D. L., and R. N. Rosenfield. 1985. Migration and mortality of Sharp-shinned Hawks ringed at Duluth, Minnesota, USA. ICBP Technical Publication 5:311-316.

Farmer, C. J., L. J. Goodrich, E. Ruelas Inzunza, and J. P. Smith. 2008. Conservation status of North America's birds of prey. Pages 303 to 420 in K. L. Bildstein, J.P. Smith, E. R. Inzunza, and R. R. Veit, editors. State of North America's Birds of Prey. Nuttall Ornithological Club, Cambridge, Massachusetts, and American Ornithologist's Union, Washington, D.C.

Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022

Goodrich, L. 2010. Sharp-shinned Hawk. Pages 237-241. in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Goodrich, L. and J. Smith. 2008. Raptor Migration in the Americas, in: State of North America's Birds of Prey.

Goodrich, L. J. 2010. Migration ecology of autumn-migrating raptors in Central Appalachians. Dissertation. Penn State University, University Park, Pennsylvania.

Keran, D. 1981. The incidence of man-caused and natural mortalities to raptors. Journal of Raptor Research 15:108-112.

Majumdar, S. K., T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman. 2010. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Sciences, Easton, Pennsylvania.

Meehan, T.D., LeBaron, G.S., Dale, K., Krump, A., Michel, N.L., Wilsey, C.B. 2022. Trends in relative abundance for birds wintering in the continental USA and Canada: Audubon Christmas Bird Counts, 1966-2021, version 4.0. National Audubon Society, New York, New York, USA.

Oleyar, D., L. Goodrich, D. Eithier, D. Brandes, J. Sodergren and J. Brown. 2021. Raptor Population Index results,

Raptor Population Index Project. 2015. Available from http://www.rpi-project.org/2013/maps.php?rspecies=2840&rseason=fall (accessed July 2015).

Reynolds, R. T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. General Technical Report RM-102. USDA Forest Service Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. Available from http://www.fs.fed.us/rm/pubs_rm/rm_gtr102.pdf (accessed July 2015).

Rosenberg, K. V., A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, M. Parr, and P. P. Marra. 2019. Decline of the North American avifauna. Science 366(6461):120–124. https://doi.org/10.1126/science.aaw1313

Roth, T. C., S. L. Lima, W. E. Vetter. 2005. Survival and causes of mortality in wintering Sharp-shinned Hawks and Cooper's Hawks. Wilson Bulletin 117:237–244.

Saunders, M. R., and J. E. Arseneault. 2013. Potential yields and economic returns of natural disturbance-based silviculture: a case study from the Acadian Forest Ecosystem Research Program. Journal of Forestry 111:175-185.

Steele, M. A., M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. 2010. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wood, P. B., C. Viverette, L. Goodrich, M. Pokras, and C. Tibbott. 1996. Environmental contaminant levels in Sharp-shinned Hawks from the eastern United States. Journal of Raptor Research 30(3):136-144.

Wurzbacher, S. J. 2013. Late successional oak forest characterization to guide landscape diversification practices in Pennsylvania. M.S. Thesis. The Pennsylvania State University, State College, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

American Goshawk

Astur atricapillus

Patricia M. Barber *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season

UNKNOWN DISTRIBUTION

Conservation Profile

PA 10-Year Conservation Goal: Recover the nesting population to at least 75 nesting pairs statewide with a 75% annual nesting success rate. Maintain and protect large blocks of mature forest that provide winter hunting habitat and adequate prey populations, particularly focused in forests known to be used by goshawks (e.g., breeding home ranges, migratory corridors).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2020

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Very High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Wintering

State Rank (Season): S2N

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Large tracts of old growth / mature mixed (hardwood/hemlock) forests with dense canopy for nesting, open understory, near water.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Wintering

Specific Habitat Requirements: Extensive forests; not well known.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** High - Low

Specific Threat: Loss of contiguous forest.

Action Category: Basic research and status monitoring

Specific Action: Submit occurrences to Pennsylvania Natural Diversity Inventory (PNDI) in a timely manner.

Objective: Update PNDI records annually to include all new nest locations by September each year.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Are all records of active territories updated? (yes/no).

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Other forest interior species

Season: Breeding

Threat Category: Logging and Wood Harvesting **Threat Impact:** High - Low

Specific Threat: Forest fragmentation and degradation due to logging and wood harvesting.

Action Category: Basic research and status monitoring

Specific Action: Submit occurrences to Pennsylvania Natural Diversity Inventory (PNDI) in a timely manner.

Objective: Update PNDI records annually to include all new nest locations by September each year.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Are all records of active territories update? (yes/no)

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Forest interior/mature forest species

Season: Breeding

Threat Category: Oil and Gas Drilling

Threat Impact: Very High - Medium

Specific Threat: Forest fragmentation from any gas, coal, or oil development in forested settings.

Action Category: Basic research and status monitoring

Specific Action: Submit occurrences to Pennsylvania Natural Diversity Inventory (PNDI) in a timely manner.

Objective: Update PNDI records annually to include all new nest locations by September each year.

Action Priority: 1-Highest

Action Urgency: Initiate immediately

Measure: Are all records of active territories update? (yes/no)

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: Forest interior/mature forest species

Season: Breeding

Threat Category: Renewable Energy

Threat Impact: High - Medium

Specific Threat: Forest fragmentation from any wind or renewable energy development in forested settings.

Action Category: Basic research and status monitoring

Specific Action: Submit occurrences to Pennsylvania Natural Diversity Inventory (PNDI) in a timely manner.

Objective: Update PNDI records annually to include all new nest locations by September each year.

Action Priority: 1-Highest

Action Urgency: Initiate immediately

Measure: Are all records of active territories updated? (yes/no)

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Other forest interior species/mature forest species

Season: Breeding

Threat Category: Roads and Railroads **Threat Impact:** High - Low

Specific Threat: Forest fragmentation due to roads and railroads.

Action Category: Basic research and status monitoring

Specific Action: Submit occurrences to Pennsylvania Natural Diversity Inventory (PNDI) in a timely manner.

Objective: Update PNDI records annually to include all new nest locations by September each year.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Are all records of active territories updated? (yes/no)

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: Other forest interior/ mature forest species

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** High - Low

Specific Threat: Loss of contiguous forest.

Action Category: Stewarding wild individuals

Specific Action: Cluster development, utilities, and associated infrastructure to reduce impacts to species.

Objective: Develop guidance for infilling development rather than increasing sprawl.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Best management practices (BMPs) to share with all parties related to development, utilities and associated infrastructure siting, operation and maintenance.

Potential Collaborators: Interested Public, Local agencies & municipalities, Pennsylvania Department of Community & Economic Development, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: All forest interior/mature forest species

Season: Breeding

Threat Category: Logging and Wood Harvesting **Threat Impact:** High - Low

Specific Threat: Forest fragmentation and degradation due to logging and wood harvesting.

Action Category: Stewarding wild individuals

Specific Action: Cluster development, utilities, and associated infrastructure to reduce impacts to species.

Objective: Develop guidance for infilling development rather than increasing sprawl.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Best management practices (BMPs) to share with all parties related to development, utilities and associated infrastructure siting, operation and maintenance.

Potential Collaborators: Interested Public, Local agencies & municipalities, Pennsylvania Department of Community & Economic Development, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Other forest interior species

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Very High - Medium

Specific Threat: Forest fragmentation from any gas, coal, or oil development in forested settings.

Action Category: Stewarding wild individuals

Specific Action: Cluster development, utilities, and associated infrastructure to reduce impacts to species.

Objective: Develop guidance for infilling development rather than increasing sprawl.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Best management practices (BMPs) to share with all parties related to development, utilities and associated infrastructure siting, operation and maintenance.

Potential Collaborators: Interested Public, Local agencies & municipalities, Pennsylvania Department of Community & Economic Development, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: All forest interior/mature forest species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** High - Medium

Specific Threat: Forest fragmentation from any wind or renewable energy development in forested settings.

Action Category: Stewarding wild individuals

Specific Action: Cluster development, utilities, and associated infrastructure to reduce impacts to species.

Objective: Develop guidance for infilling development rather than increasing sprawl.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Best management practices (BMPs) to share with all parties related to development, utilities and associated infrastructure siting, operation and maintenance.

Potential Collaborators: Interested Public, Local agencies & municipalities, Pennsylvania Department of Community & Economic Development, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: All forest interior/mature forest species

Season: Breeding

Threat Category: Roads and Railroads **Threat Impact:** High - Low

Specific Threat: Forest fragmentation due to roads and railroads.

Action Category: Stewarding wild individuals

Specific Action: Cluster development, utilities, and associated infrastructure to reduce impacts to species.

Objective: Develop guidance for infilling development rather than increasing sprawl.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Best management practices (BMPs) to share with all parties related to development, utilities and associated infrastructure siting, operation and maintenance.

Potential Collaborators: Interested Public, Local agencies & municipalities, Pennsylvania Department of Community & Economic Development, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: All forest interior/mature forest species

Season: Breeding

Threat Category: Temperature Extremes

Threat Impact: Very High - High

Specific Threat: Weather extremes may make marginal portions of the range no longer able to sustain breeding, vulnerable eggs and nestlings less likely to survive.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Inform habit management decisions to emphasize northern forest components needed to support American Goshawk in their appropriate habitat.

Objective: Provide land managers with guidelines to emphasize northern forest properties.

Action Priority: 3-Medium

Action Urgency: Initiate immediately

Measure: Best management practices (BMPs) for use in management plans.

Potential Collaborators: National Park Service, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Forest Service

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Forest birds

Season: Wintering

Threat Category: Temperature Extremes

Threat Impact: Medium

Specific Threat: Weather extremes may make marginal portions of the range no longer able to sustain breeding, vulnerable eggs and nestlings less likely to survive.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Inform habit management decisions to emphasize northern forest components needed to support goshawk in their appropriate habitat.

Objective: Provide land managers with guidelines to emphasize northern forest properties.

Action Priority: 3-Medium

Action Urgency: Initiate immediately

Measure: Best management practices (BMPs) for use in management plans.

Potential Collaborators: National Park Service, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Forest Service

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Mature forest species of all taxa

Season: Breeding

Priority	Need	Partners
1	Determine population size and distribution in Pennsylvania to better determine its status, rarity, range, and vulnerability to various human-caused population effects. As part of this, model forest requirements for nesting goshawks.	U.S. Department of Agriculture-Farm Service Agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Biological Survey
2	Determine population density by region and forest type and develop a long-term monitoring system. This project could be part of a multi-state effort in the historic range in the northeastern U.S.	Other state agency
3	Determine limiting factors for goshawk breeding population, including response of nesting pairs to residential and energy-based development effects. Forest block size, goshawk territory persistence, and other limiting factors should be evaluated.	U.S. Forest Service, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Biological Survey

Season: Wintering

Priority	Need	Partners
1	Are there connections between breeding and wintering populations?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, U.S. Forest Service

Season: Breeding

Priority	Survey	Partners
1	Bioregional monitoring of appropriate habitat in the northeastern states, Maine to Virginia.	U.S. Department of Agriculture-Farm Service Agency, Non-governmental organizations, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Season: Wintering

Priority	Survey	Partners
1	Assess the connection between breeding and wintering populations through marked birds.	Pennsylvania Game Commission, U.S. Forest Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Biological Survey, Universities & research institutions

Name: Annual American Goshawk nest monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Evaluation of nesting success, to determine population viability and limiting factors for nesting goshawk populations.

Comments:

Monitoring Need: Track all active territories for nesting activity, productivity and West Nile virus vaccinations.

Name: Annual Autonomous Recording Unit (ARU) surveys **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: ARUs are used to identify goshawk territorial vocalizations. When pair vocalizations are detected, follow up surveys are used to find and monitor nests.

Comments:

Monitoring Need:

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: National Audubon Society Christmas Bird Count **Lead(s) :** National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Not well monitored in patchy habitats where it is most commonly found in Pennsylvania.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Species of Special Concern Monitoring and Pennsylvania Natural Diversity Inventory (PNDI)

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Reports of American Goshawk breeding pairs, territories, and nests are pursued to verify species presence and find nests.

Comments: On-going project with partners and associates.

Monitoring Need:

Name: Raptor Population Index

Lead(s) : Hawk Migration Association

Link: https://www.rpi-project.org/

Description: Collaborative effort to evaluate trends in migrating raptors. Trends in sites south of Pennsylvania in part represent trends in the Pennsylvania migrating population.

Comments:

Monitoring Need:

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Bendarz, J. and T. Kimmel. 1992. Northern Goshawk (Accipiter gentilis). Pages 100-101 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Bosakowski, T. and R. Speiser. 1994. Macrohabitat selection by nesting Northern Goshawks: implications for managing eastern forests. Studies in Avian Biology 16:46-49.

Bosakowski, T., D. G. Smith, and M. L. Morrison. 2006. Ecology of the Northern Goshawk in the New York-New Jersey Highlands. Pages 109-118 in M. L. Morrison, editor. The Northern Goshawk: a technical assessment of its status, ecology, and management. Studies in Avian Biology 31.

Brinker, D. F. 2012. Northern Goshawk (Accipiter gentilis). Pages 148-149 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, University Park, Pennsylvania.

Bruggman, J. E., D. E. Anderson, and J. E. Woodford. 2011. Northern Goshawk monitoring in the western Great Lakes bioregion. Journal of Raptor Research 45:290-303.

D. Oleyar, D. Ethier, L. Goodrich, D. Brandes, R. Smith, J. Brown, and J. Sodergren. 2021. The Raptor Population Index: 2019 Analyses and Assessments.rpi-project.org.

Farmer, C. J., L. J. Goodrich, E. Ruelas Inzunza, and J. P. Smith. 2008. Conservation status of North America's birds of prey. Pages 303 to 420 in K. L. Bildstein, J.P. Smith, E. R. Inzunza, and R. R. Veit, editors. State of North America's Birds of Prey. Nuttall Ornithological Club, Cambridge, Massachusetts, and American Ornithologist's Union, Washington, D.C.

Gardner, I. and D. A. Miller. 2013. Final Report: Northern Goshawk Habitat Suitability and Monitoring Plan. Pennsylvania State University, Center for Environmental Systems Institute and Management. University Park, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Kimmel, J. T. and R. H. Yahner. 1994. The Northern Goshawk in Pennsylvania: habitat use, survey protocols, and status (Final Report). School of Forest Resources, Pennsylvania State University, University Park, Pennsylvania.

Reynolds, R. T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. General Technical Report RM-102. USDA Forest Service Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. Available from http://www.fs.fed.us/rm/pubs_rm/rm_gtr102.pdf (accessed July 2015).

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Saunders, M. R., and J. E. Arseneault. 2013. Potential yields and economic returns of natural disturbance-based silviculture: a case study from the Acadian Forest Ecosystem Research Program. Journal of Forestry 111:175-185.

Squires, J. R. and P. L. Kennedy. 2006. Northern Goshawk Ecology: An assessment of current knowledge and information needs for conservation and management. Pages 8-62 in M. L. Morrison, editor. The Northern Goshawk: A Technical Assessment of its Status, Ecology, and Management. Studies in Avian Biology 31. Cooper Ornithological Society, Lawrence, Kansas.

Squires, J. R., and R. T. Reynolds. 1997. Northern Goshawk (Accipiter gentilis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/298 (accessed July 2015).

Terwilliger Consulting, Inc. and the Northeast Fish and Wildlife Diversity Technical Committee. 2023. Northeast Regional Conservation Synthesis for 2025 State Wildlife Action Plans. Northeast Association of Fish and Wildlife Agencies,
Washington, D.C.

Wilson, A., and S. Rensel. 2010. Northern Goshawk. Pages 200-203 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Woodbridge, B., and C. D. Hargis. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. General Technical Report WO-71. USDA Forest Service Washington Office, Washington, D.C.

PENNSYLVANIA
WILDLIFE ACTION PLAN

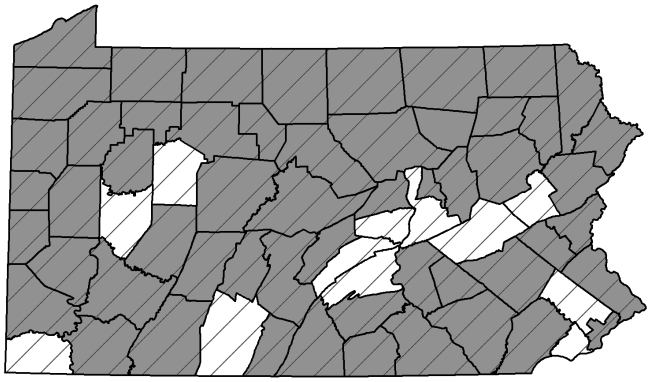
Northern Harrier

Circus hudsonius

Kim Van Fleet *Dickinson College*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Reverse declines in number of breeding Northern Harriers and maintain nesting pairs in at least 100 Breeding Bird Atlas blocks by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: 250 - 1,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Very High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S5N

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: Low

Season: Breeding

Specific Habitat Requirements: Large open grasslands (reclaimed strip mines); marshy meadows, wet lightly grazed pastures, open bogs, freshwater and brackish marshes, and riparian woodland.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Wintering

Specific Habitat Requirements: Large open grasslands (reclaimed strip mines); marshy meadows, lightly grazed pastures, old fields, marshes, and open floodplains.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Conversion of fallow fields and meadows to row crops or seasonal crop rotation

Action Category: Economic incentives and disincentives

Specific Action: Promote and engage landowners in CREP and WHP programs. Educate landowners about the importance and function of hedgerows and encourage the use of IPM strategies in controlling pest species.

Objective: Create additional habitats for breeding populations and reducing the use of synthetically produced pesticides and fertilizers

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of landowners enrolled in CREP and WHP

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: wetland and upland grassland birds including upland Sandpiper and Short-eared Owl

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium - Low

Specific Threat: Commercial and residential development of former agricultural/pasture/grasslands especially has increased significantly over the past 10-15 years especially in areas of south-central and south-eastern Pennsylvania. This has resulted in an observable decline in over-wintering habitats once utilized by Norther Harrier in the past as well as availability of potential breeding habitats.

Action Category: Conserve via zoning or informal designations

Specific Action: Examine zoning or comprehensive plans especially in areas where breeding pairs regularly occur. Provide input when variances are requested and acquire undeveloped lands in the vicinity of known breeding season occupancy.

Objective: Examine zoning or comprehensive plans especially in areas where known breeding pairs regularly occur. Provide input when variances are requested and acquire undeveloped lands in the vicinity of known breeding season occupancy.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Prevent further development in good to high quality habitat areas. Continued use of area by birds

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: wetland and upland grassland species including Upland Sandpiper and Short-eared Owl

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Habitat encroachment, loss of native plant species that provide cover, nesting sites and prevent nest predation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Employ IPM strategies and actions to remove invasives and revegetate with appropriate native plants in both lowland (wet meadow) and upland (dry grassland) sites

Objective: Removal of 90-95% of all invasive plant species

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Measureable amounts of available resources (nest sites, food, water, cover) capable of supporting several pairs of Northern Harriers locally and larger breeding poulations regionally throughout the breeding season

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: wetland and upland grassland species including Upland Sandpiper and Short-eared Owl.

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Low

Specific Threat: Gas drilling activities in or near grassland habitats could damage habitats and disrupt birds during breeding season causing them to abandon sites

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by oil and gas extraction activities.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional wellheads in sensitive habitats frequented by Northern Harriers.

Potential Collaborators: Township Zoning Boards, Local agencies & municipalities, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley, Piedmont

Other species likely to benefit from this action: Wetland and upland grassland birds including Upland Sandpiper and Short-eared Owl.

Season: Breeding

Threat Category: Pollution **Threat Impact:** Low

Specific Threat: Bioaccumulation of mercury in body tissues as a result of mercury getting into waterways via agricultural runoff (mercury containing pesticides) and air pollution (burning of fossil fuels, municipal wastes, and medical wastes).

Action Category:

Specific Action: Monitor and assess all fossil fuel (coal and oil) fired plants to ensure compliance with EPA's Mercury and Air Toxics Standards (MATS). Monitor and assess mercury emissions from concrete production facilities, municipal wastes, and medical wastes incinerators. Identify local and regional sources of non-point pollution including sedimentation of waterways and wetlands from agricultural, suburban, and urban areas where storm water runoff has become an increasing issue.

Objective: Reduction of multiple pollutants and sediment from point and non-point sources known to impact aquatic systems.

Action Priority: 2-High

Action Urgency: Initiate immediately

Measure: Measurable reduction of specific pollutants [e.g., methyl mercury, lead, fertilizers (nitrogen and phosphorus), residual pesticides, and sediment loads]. Reduced eutrophication and clearer water column, increased nesting success.

Potential Collaborators: Delaware River Basin Commission, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Association of Conservation Districts, Private Landowners, Susquehanna River Basin Commission, Universities & research institutions

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley, Piedmont

Other species likely to benefit from this action: Wetland and upland grassland birds including Upland Sandpiper and Short-eared Owl.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** High

Specific Threat: There are currently 54 large-scale solar facilities in operation in PA with an additional 76 projects in various stages of planning/approval/development in the NYISO and PJM queues since January of 2023. All 76 projects are proposed for construction in 29 different counties in all regions of the state. Installed capacities of these solar arrays range from 0-10 MW (smaller projects) up to 300-400 MW. According to the NREL solar arrays constructed on ground require on average 31.347 acres/MW. If all projects are approved and constructed it's likely that additional habitat losses could result in areas where the Northern Harrier is found in PA.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** High

Specific Threat: There are currently 54 large-scale solar facilities in operation in PA with an additional 76 projects in various stages of planning/approval/development in the NYISO and PJM queues since January of 2023. All 76 projects are proposed for construction in 29 different counties in all regions of the state. Installed capacities of these solar arrays range from 0-10 MW (smaller projects) up to 300-400 MW. According to the NREL solar arrays constructed on ground require on average 31.347 acres/MW. If all projects are approved and constructed it's likely that additional habitat losses could result in areas where the Northern Harrier is found in PA.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** High

Specific Threat: There are currently 54 large-scale solar facilities in operation in PA with an additional 76 projects in various stages of planning/approval/development in the NYISO and PJM queues since January of 2023. All 76 projects are proposed for construction in 29 different counties in all regions of the state. Installed capacities of these solar arrays range from 0-10 MW (smaller projects) up to 300-400 MW. According to the NREL solar arrays constructed on ground require on average 31.347 acres/MW. If all projects are approved and constructed it's likely that additional habitat losses could result in areas where the Northern Harrier is found in PA.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented by Northern Harriers.

Potential Collaborators: Township Zoning Boards, Local agencies & municipalities, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley, Piedmont

Other species likely to benefit from this action: Wetland and upland grassland birds including Upland Sandpiper and Short-eared Owl.

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Low

Specific Threat: Extreme precipitation (rainfall) events associated with climate change could result in flood damage to habitats, change in plant community structure and site abandonment

Action Category: Mitigate human environmental impact

Specific Action: A combination of wetland and upland mitigation projects that would facilitate buffering the impacts of extreme weather events (e.g. creation of additional wetlands/wet meadows and uplands in appropriate areas surrounding core habitat; install mechanism that facilitate raising and lowering water levels during excessive precipitation events or periods of drought.

Objective: Increase opportunities for nesting success during periods of excessive rainfall or drought events.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Nesting success and higher fecundity per breeding pair

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, U.S. Army Corps of Engineers, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: wetland bird species including rails, herons, and egrets

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Natural succession, reforestation practices, agricultural practices

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Continue mine reclamation projects focused on creating higher quality grassland habitat and maintaining it as such through periodic manipulations.

Objective: Habitat restoration projects.

Action Priority: 3-Medium **Action Urgency:** **Measure:** Gradual increase in numbers of Northern Harrier and measurable nesting success.

Potential Collaborators: Actively manage habitat using best practices to promote favorable habitat conditions., Create or maintain grassland habitat, particularly warm season grasses., Enroll private lands in voluntary conservation programs or establish voluntary conservation easesments to provide fish and wildlife habitat for future generations., Monitor species abundance and distribution over time to assess population trends.

Locations: Statewide

Other species likely to benefit from this action: Wetland and upland grassland birds including Upland Sandpiper and Short-eared Owl.

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Habitat loss and human disturbance of overwintering birds.

Action Category: Conserve via zoning or informal designations

Specific Action: Examine zoning or comprehensive plans especially in areas where overwintering birds regularly occur.

Objective: Examine zoning or comprehensive plans especially in areas where overwintering birds regularly occur. Provide input when variances are requested and acquire undeveloped lands in the vicinity of known wintering season occupancy.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Prevent further development in good to high quality winter habitat areas.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: American Kestrel, overwintering Northern Rough-legged Hawk, and Short-eared Owl

Season: Wintering

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Indirect exposure risk to pesticides used in forestry and agricultural practices.

Action Category: Other legal actions

Specific Action: Monitor and assess all fossil fuel (coal and oil) fired plants to ensure compliance with EPA's Mercury and Air Toxics Standards (MATS). Monitor and assess mercury emissions from concrete production facilities, municipal wastes, and medical wastes incinerators. Identify local and regional sources of non-point pollution including sedimentation of waterways and wetlands from agricultural, suburban, and urban areas where storm water runoff has become an increasing issue.

Objective: Reduction of multiple pollutants and sediment from point and non-point sources known to impact aquatic systems.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Measurable reduction of specific pollutants [e.g., methyl mercury, lead, fertilizers (nitrogen and phosphorus), residual pesticides, and sediment loads]. Reduced eutrophication and clearer water column, increased nesting success.

Potential Collaborators: Delaware River Basin Commission, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Susquehanna River Basin Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: American Kestrel, overwintering Northern Rough-legged Hawk, Short-eared Owl, Great Blue Heron

Season: Wintering

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Low

Specific Threat: Conversion of fallow fields and meadows to row crops can result in reduced winter cover and increased predation by feral/domestic cats.

Action Category: Economic incentives and disincentives

Specific Action: Promote and engage landowners in Conservation Reserve Enhancement Program (CREP) and Environmental Quality Incentives Program (EQIP) programs. Educate landowners about the importance and function of winter cover crops.

Objective: Enhance existing habitat and creation of additional winter habitat.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Gradual increase in number of Northern Harriers detected during winter season.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: American Kestrel, overwintering Northern Rough-legged Hawk, and Short-eared Owl

Season: Breeding

Priority	Need	Partners
1	Determine current status and distribution of breeding population of Northern Harrier in PA using best available information PA Breeding Bird Atlases (2nd and 3rd), eBird reports, state agencies, land trusts and conservancies, PSO membership. Reach out to academic institutions to see if any NOHA research is being conducted.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, Universities & research institutions, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers
2	Assess quality and quantity of core and supporting habitats relative to vegetative structure and resource needs of Northern Harrier in areas where successful breeding continues to occur and compare to areas where regional and local breeding populations have declined or disappeared.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Private Landowners, Pennsylvania Game Commission, Universities & research institutions, Conservancies & Land Trusts, Pennsylvania Association of Conservation Districts
3	Examine and fully assess other factors besides habitat loss that potentially contribute, directly or indirectly, to the decline of breeding and over wintering Northern Harrier populations in PA and surrounding states [e.g. pesticides, water pollution (chemical and sediment), noise and light pollution, predators, energy development, human disturbances, parasites and disease).	Universities & research institutions, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Department of Defense, Pennsylvania Department of Environmental Protection
4	Identify other suitable habitat areas throughout the state to include areas of historic nesting and conduct surveys in those locations to determine presence/absence during breeding and non-breeding seasons.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Association of Conservation Districts, Private Landowners

Season: Wintering

Priority	Need	Partners
1	Determine current status and distribution of overwintering populations of Northern Harrier using best available information including, but not limited to, Pennsylvania Society for Ornithology Winter Raptor Survey, Audubon Christmas Bird Count, eBird reports, state agencies, state Audubon chapters, academic and independent researchers.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

2	Assess quality and quantity of core and supporting habitats relative to vegetative structure and resource availability in areas where Northern Harrier tend to gather during the winter season.	Pennsylvania Game Commission, Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations, Universities & research institutions
3	Examine and fully assess other factors besides habitat loss that directly or indirectly contribute to the decline of overwintering Northern Harrier populations in Pennsylvania and surrounding states.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Breeding season surveys in core and supporting areas where harriers have been confirmed or probable during the breeding season over the last five years. Determine reproductive status and success, nest survivorship and fledgling success. Others to involve in addition to listed partners: 2nd and 3rd PABBAs, eBird reports, raptor ecologists, personal communications with birders and the PA Society for Ornithology (PSO).	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions, U.S. Geological Survey
2	Conduct habitat surveys to examine and compare habitat quality (vegetative composition, resources availability, water level, live trapping small mammals etc.) and quantity (# acres/hectares) in core and surrounding areas where Northern Harriers continue to successfully breed to sites where numbers have declined or where birds historically occurred to determine what, if possible, could be done to reverse declines and abandonment previously inhabited sites. Include professional botanists in addition to listed partners	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service
3	Conduct small mammal surveys to determine local and regional abundance of prey species necessary for long term reproductive success of Northern Harrier. Others to include in addition to listed partners: small mammal ecologists	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Season: Wintering

Priority	Survey	Partners

Name: Hawk Migration Association Raptor Migration Monitoring **Lead(s) :** Hawk Migration Association

Link: https://www.hawkmigration.org/hawk-migration-studies/ and https://www.hawkmigration.org/data-submission/

Description: Promotes the use of a standard data collection protocol for raptor migration monitoring. The count protocol has been adjusted over time and a data collection form and a brief set of instructions have been made widely available to monitoring sites across North, Central and South America.

Comments: The Raptor Population Index, a collaborative effort between Hawk Migration Association, HawkWatch International, Hawk Mountain Sanctuary Association, and Birds Canada, evolved from this long-term monitoring project. Analysis of data collected via standardized protocols has produced population trends species assessments, identified raptors at risk (declining) and raptor populations that are increasing.

Monitoring Need: Ongoing migration monitoring in fall and spring across the Americas including numerous sites in Pennsylvania.

Name: Surveys during breeding and wintering seasons **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Conduct annual or biennial statewide surveys focused specifically on breeding Northern Harrier populations to determine what changes have occurred since the completion of the most recent Bird Atlas. Take corrective actions to reverse trends when possible.

Comments: This project should involve numerous partners including other state and federal agencies such as Pennsylvania Department of Conservation and Natural Resources, U.S. Fish and Wildlife Service, qualified birders, academic institutions, bird clubs, local Audubon chapters. If and when confirmed breeding or additional breeding pairs are confirmed conduct breeding bird surveys every 5 years thereafter.

Monitoring Need:

Name: Winter Raptor Survey **Lead(s) :** Hawk Migration Association and Pennsylvania Society for Ornithology

Link: http://www.pabirds.org; www.hawkmigration.org

Description: The Winter Raptor Survey monitors winter raptor populations by conducting roadside surveys in mid-winter.

Comments: Long term data set that has detected trends in species populations.

Monitoring Need: Statewide annual surveys of winter raptors including Northern Harrier.

Anteau, M. J., K. S. Ellis, G. J. MacDonald, L. D. Igl, N. D. Nemuth, and J. L. Vest. 2023. Climate induced shifts in grassland bird phenology have implications for grassland management. Global Ecology and Conservation: Vol. 48 Accessed 20 February 2025: https://www.sciencedirect.com/science/article/pii/S2351989423003359

Dechant, J. A., M. L. Sondreal, D. H. Johnson. L. D. Igl, C. M. Godale, M. P. Nenneman, and B. R. Euliss. 2002. Effects of management practices on grassland birds: Northern Harrier. Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

Great Plains Institute. True land footprint of solar energy https://betterenergy.org/blog/the-true-land-footprint-of-solar-energy/

Gross, D. 2014. Northern Harrier (Circus cyaneus) fact sheet. Pennsylvania Game Commission Bureau of Wildlife Management. Harrisburg, Pennsylvania.

Gross, D. A. and C. D. Haffner. 2009. Wetland bird communities: boreal bogs to open water. In S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Hammerstrom, F. 1969. A Harrier population study in Peregrine Falcon populations; their biology and decline. Hickey, J. (ed.) pages 367-383

Haufler, J. B. and A. C. Ganguli. 2007. Benefits of farm bill grassland conservation practices to wildlife. Pages 57-69 in Fish and Wildlife Response to Farm Bill Conservation Practices. The Wildlife Society Technical Review 07-1.

Interconnection.fyi. Tracking U.S. ISO & Utility connection queues. https://www.interconnection.fyi/?market=PJM&type=Solar&status=Active&state=PA&year=2025

Jones-Farrand, D. T., L. W. Burger Jr., D. H. Johnson, and M. R. Ryan. 2007. Grassland establishment for wildlife conservation. Pages 25-43 in Fish and Wildlife Response to Farm Bill Conservation Practices. The Wildlife Society Technical Review 07-1.

Lituma, C. M., J. J. Cox, S. F. Spear, J. W. Edwards, J. L. De La Cruz, L. I. Muller, and W. M. Ford. 2012. Terrestrial wildlife in the post-mined Appalachian landscape: Status and opportunities in Appalachia's Coal-Mined Landscapes (pp.135-166). Accessed 22 February 2025: https://link.springer.com/chapter/10.1007/978-3-030-57780-3_6

McClure, C. J. W., B.W. Rolek, G.W.Grove, T. E. Katzner. 2021. Yearly temperature fluctuations and survey speed influence road counts of wintering raptors. Ibis 163:593-606.

McCracken, J. D. 2005. Where the Bobolinks roam: The plight of North American grassland birds. Biodiversity 6:20-29.

Michigan State University Extension. 2004. Circus cyaneus Northern Harrier. Michigan Natural Features Inventory. Lansing, Michigan.

NatureServe. 2014. Circus cyaneus-Northern Harrier. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available from http://explorer.natureserve.org (accessed January 2015).

Pain, D. J., I. J. Fisher, and V. G. Thomas. 2009. A global update of lead poisoning in terrestrial birds from ammunition sources. In R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt, editors. Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. The Peregrine Fund, Boise, Idaho. DOI:10.4080/ilsa.2009.0108 (accessed July 2015).

PNHP (Pennsylvania Natural Heritage Program). 2007. Northern Harrier (Circus cyaneus) fact sheet. Available from www.naturalheritage.state.pa.us/factsheets/10940.pdf (accessed January 2015).

Ribic, C. A., R. R. Koford, J. R. Herkert, D. A. Johnson, N. D. Niemuth, D. E. Naugle, K. K. Bakker, D. W. Sample, and R. B. Renfrew. 2009. Area sensitivity of North American grassland birds: Patterns and processes. Auk 126:233-244.

Rothley, K. D., C. N. Berger, C. Gonzalez, E. M. Webster, and D. I. Rubenstein. 2004. Combining strategies to select reserves in fragmented landscapes. Conservation Biology 18:1121-1131.

Shaffer, J. A., L.D. Igl, D. H. Johnson, M. L. Sondreal, C. M. Goldade, M. P. Nenneman, J. P. Thiele, and B. R. Euliss. 2019. The effects of management practices on grassland birds—Northern Harrier (Circus Hudsonius) in The effects of management practices of grassland birds (D.H Johnson, L.D Igl, J.A. Shaffer and J.P DeLong eds.). U.S. Department of interior and U.S. Geological Survey

Slater, G. L., and C. Rock. 2005. Northern Harrier (Circus cyaneus): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available from http://www.fs.fed.us/r2/projects/scp/assessments/northernharrier.pdf (accessed July 2015).

Solar Energy Industries Association
https://seia.org/initiatives/land-use-solar-development/#:~:text=A%20utility%2Dscale%20solar%20power,land%20and%20clearing%20of%20vegetation.

U.S. Energy information Administration. Pennsylvania State Profile and energy estimates overview. https://www.eia.gov/state/?sid=PA

Vukovich, M., and G. Ritchison. 2006. Nesting success and behavior of Northern Harriers on a reclaimed surface mine grassland in Kentucky. Journal of Raptor Research 40:210-216.

Wilhelm, G. 2012. Northern Harrier. Pages 142-143 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wilson, A., M. C. Brittingham, and G. Grove. 2010. Association of wintering raptors with Conservation Reserve Enhancement Program grasslands in Pennsylvania. Journal of Field Ornithology 81:361-372.

Wilson, M. D., B. D. Watts, and D. F. Brinker. 2007. Status review of Chesapeake Bay marsh lands and breeding marsh birds. Waterbirds 30:122-137.

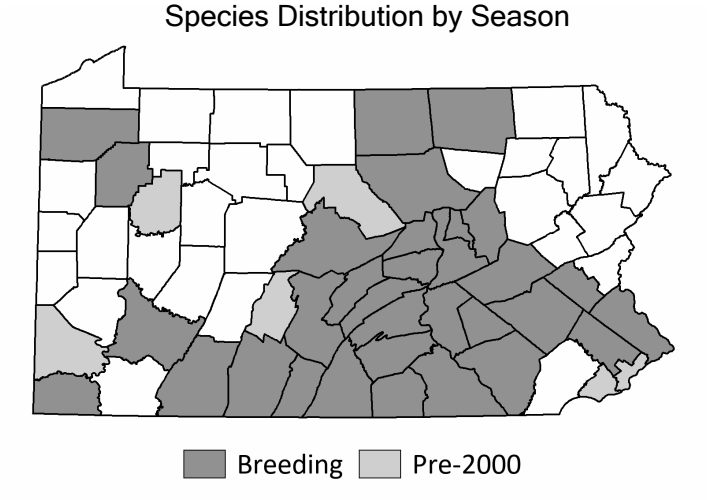
PENNSYLVANIA
WILDLIFE ACTION PLAN

American Barn Owl

Tyto furcata

Mercy Melo *Pennsylvania Game Commission*

H. Korber, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Documentation of at least 100 active nest sites within a minimum of 15 counties by 2035. Increase winter survival of barn owls by ensuring adequate food supply, safe roosting sites, and reduced disturbance in key habitats.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 250 - 1,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Unknown

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2025

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Generally open habitat with short vegetation (< 35cm (14 in)) to allow for effective foraging. Some trees or shrubs may be helpful in providing perch opportunities and cover to bolster small mammal populations. A nest cavity is required, either natural (a hole in a snag) or artificial (nest-box or other access to shelf inside of a barn or related building).

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Wintering

Specific Habitat Requirements: Overwintering habitat requirements mirror that of breeding season habitat as foraging and potential nesting occur throughout all seasons of the year. Barn owls are known to initiate breeding based on food availability rather than time of year, and clutches have been discovered numerous times during the winter months in Pennsylvania.

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Anticoagulant rodenticides are prevalent across human-dominated landscapes and likely produce secondary wildlife poisoning effects in barn owls that ingest poisoned prey.

Action Category: Outreach, communication and distribution

Specific Action: Inform public of risks associated with secondary wildlife poisoning effects due to anticoagulant rodenticide usage.

Objective: To reduce usage of anticoagulant rodenticides.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Usage rates of anticoagulant rodenticides

Potential Collaborators: Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Small mammals and other wildlife that rely on small mammal populations

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Habitat loss from agriculture and degradation has led to severely fragmented and isolated grasslands in the East.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid developing high-quality habitat into agricultural fields.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: While some structures are beneficial for nesting opportunities, the development of open land into human-dominated landscapes reduces habitat availability.

Action Category: Outreach, communication and distribution

Specific Action: Inform landowners of the importance of preserving open habitat for American Barn Owls and other wildlife.

Objective: To increase awareness of American Barn Owl habitat requirements and encourage landowners to preserve these habitats for wildlife usage.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of landowners adopting wildlife-centric land management.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: All other grassland birds and mammals will benefit from the preservation of open habitats on private lands.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of open landscapes into solar fields reduces habitat availability for barn owl foraging.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of open landscapes into solar fields reduces habitat availability for barn owl foraging.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of open landscapes into solar fields reduces habitat availability for barn owl foraging.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Interested Public, Local agencies & municipalities, Non-governmental organizations, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Work and Other Activities **Threat Impact:** Medium

Specific Threat: Nesting structures are needed in locations where they will not be disturbed by humans (i.e. not in barns or silos with sporadic use throughout the nesting season) to ensure safe nesting conditions that allow for successful sympatry between barn owls and people.

Action Category: Outreach, communication and distribution

Specific Action: Encourage agricultural landowners to deploy nest-boxes in/on structures that are not used throughout the barn owl breeding season.

Objective: To increase nesting opportunities for barn owls that will not be disturbed due to human use of a structure.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of nest-boxes successfully deployed and safely managed in sympatry with landowners

Potential Collaborators: Non-governmental organizations, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: American kestrels, purple martins, eastern bluebirds, other cavity-nesting birds

Season: Wintering

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Rodenticides reduce small mammal abundance and may cause secondary wildlife poisoning effects if poisoned prey are ingested.

Action Category: Outreach, communication and distribution

Specific Action: Inform public of risks associated with secondary wildlife poisoning effects due to anticoagulant rodenticide usage.

Objective: To reduce usage of anticoagulant rodenticides.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Usage rates of anticoagulant rodenticides.

Potential Collaborators: Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Small mammals and other wildlife that rely on small mammal populations.

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of solar fields in previously open habitat reduces amount of suitable habitat available for barn owls

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of solar fields in previously open habitat reduces amount of suitable habitat available for barn owls

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Interested Public, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Development of solar fields in previously open habitat reduces amount of suitable habitat available for barn owls

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Priority	Need	Partners
1	Quantify concentrations of anticoagulant rodenticides in tissues (blood, liver, eggs) of both healthy barn owls and symptomatic barn owls to develop baseline values and assess conditions related to elevated contaminant values.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
2	Assess the influence of nest-box programs on abundance and reproductive output of barn owls, particularly in areas where nesting cavities may be a limiting factor (i.e. grasslands).	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
3	Increase knowledge of barn owl abundance and distribution throughout the state and its relationship to habitat quality and human disturbance.	Non-governmental organizations, Private Landowners

Season: Wintering

Priority	Need	Partners
1	Use telemetry to assess known-fate survival estimates for barn owls year-round and to identify causes of mortality.	Non-governmental organizations, Universities & research institutions
2	Improve understanding of winter habitat selection, distribution, and abundance for barn owls across Pennsylvania.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners

Season: Wintering

Priority	Survey	Partners
1	Nest sites should be monitored during the winter to learn more about habitat usage, winter occupancy, and migration patterns.	Pennsylvania Game Commission, Private Landowners

Name: Barn Owl Conservation Initiative **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/habitat-management/landowner-assistance/barn-owl-conservative-initiative

Description: Pennsylvania Game Commission biologists annually monitor potential nest sites statewide to determine nesting success and band nestlings.

Comments:

Monitoring Need:

Boves, T.J., and J.R. Belthoff. 2012. Roadway mortality of barn owls in Idaho, USA. Journal of Wildlife Management 76 (7): 1381-1392.

Flickinger, J. and D. P. Mummert. 2012. Barn Owl. in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Penn State University Press.

Marti, C. D. 1992. Barn owl (Tyto alba). Account in A. Poole, P. Stettenheim, and F. Gill, editors. The Birds of North America. Academy of Natural Sciences, Philadelphia, Pennsylvania, and American Ornithologists' Union, Washington, D.C.

Martinez, J.A. and I. Zuberogoitia. 2004. Habitat preferences and causes of population decline for barn owl Tyto alba: A multi-scale approach. Ardeola 51(2): 303-317

Milliet E., Schalcher, K., Grangier-Bijou, A., Almasi, B., Butera, F., and A. Roulin. 2025. Barn owl site occupancy and breeding success in relation to land use and nest box characteristics. Journal of Wildlife Management 89: e22678.

Santner, S. 1992. Barn Owl (Tyto alba). Pages 154-155 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press. Pittsburgh, Pennsylvania.

Taylor, I. 1994. Barn owls: Predator-prey relationships and conservation. Cambridge University Press, Cambridge, United Kingdom.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilson, A. 2010. Barn Owl. Pages 264-267 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Zuberogoitia, I. and L. F. Campos. 1998. Censusing owls in large areas: a comparison between methods. Ardeola 45:47-53.

PENNSYLVANIA
WILDLIFE ACTION PLAN

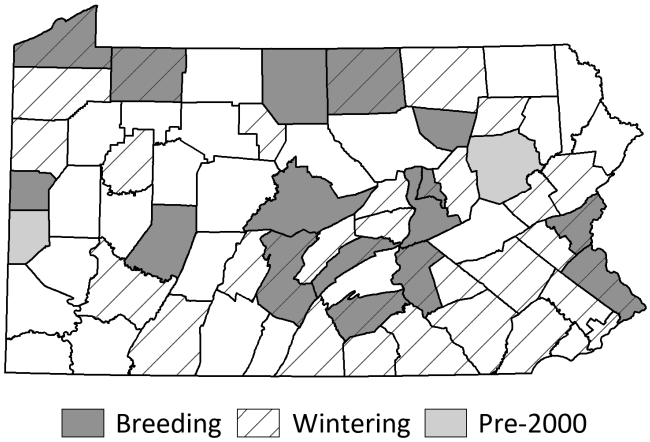
Long-eared Owl

Asio otus

Patricia M. Barber — *Pennsylvania Game Commission*

J. Kosack, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Ten successful nest sites statewide, annually.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: 1 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Low

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2024

PA Legal Designation: Threatened

PA Abundance: Unknown

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: Low

Season: Breeding

Specific Habitat Requirements: Conifer woods, often plantations, intermingled with field and meadows. Few breeding sites and widespread apparent potential makes characterization difficult.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: species forages in open grassland/shrubland areas and nests in dense forest stands, often of conifers including dense stands of overgrown Christmas trees

Season: Wintering

Specific Habitat Requirements: Uses a variety of conifer forests, including exotic and native species (naturally occurring or planted configurations), and a habitat mosaic of conifer woods closely associate with field, meadow, and wetland.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: Species forages in open grassland/shrubland areas and roosts in dense forest stands, often of conifers including dense stands of overgrown Christmas trees. Often communal winter roost sites may become nesting sites.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Loss of dense stands of evergreens in an open grassland or agricultural matrix, whether to industrial, commercial, housing or energy development.

Action Category: Manage non-living habitat components

Specific Action: Ban placement of wind turbines or solar arrays in large grasslands used by this species and other endangered or threatened birds and mammals.

Objective: Reduce or prohibit placement of wind turbines and solar arrays in large grasslands used by this species.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction or prohibition of structures.

Potential Collaborators: U.S. Environmental Protection Agency, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland birds, mammals, and insects

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss of dense stands of evergreens in an open grassland or agricultural matrix, whether to industrial, commercial, housing or energy development.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve large grassland areas (especially with an adjacent conifer component) within Long-eared Owl nesting range for special protection.

Objective: Conserve large grasslands of >100 ha (247 ac) with nearby conifer stands and shorter grass for foraging.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Numbers of separate large parcels of grassland in the state.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Other grassland dependent species such as Upland Sandpiper, Bobolink, Northern Harrier, Short-eared Owl.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Loss of dense stands of evergreens in an open grassland or agricultural matrix, whether to industrial, commercial, housing or energy development.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind; maintain adjacent conifer stands.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Wintering areas of proper size targeted for development.

Action Category: Conserve specific land or seascapes

Specific Action: Enact conservation easement program to protect and restore conifer stands (roosting habitat) and meadows (foraging habitat).

Objective: Provide overwinter habitat for owls and other grassland species.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Acres per county or region and size of fields protected.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations:

Other species likely to benefit from this action: Grassland birds, mammals and insects

Season: Breeding

Priority	Need	Partners
1	Develop a reliable long-eared owl nesting survey to determine the population in Pennsylvania. Perhaps utilizing or modifying a protocol developed else ware.	Pennsylvania Game Commission, Universities & research institutions
2	Determine landscape and site characteristics that support nesting long-eared owls. Use as a model to predict unknown locations of nesting pairs in Pennsylvania.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
3	Study persistence of Long-eared Owl at winter roosts, when they are easier to find, into the breeding season. Does this enable us to determine if unoccupied sites are available?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Are winter roost sites potential breeding locations?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	What are site and landscape characteristics that have supported Long-eared Owl winter roosts?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
3	Are unoccupied sites available?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct a statewide Long-eared Owl survey using a methodology proven to be successful elsewhere.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Utilize results from other survey efforts that may incidentally document long-eared owls, such as Northern Saw-whet Owl breeding surveys.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Wintering

Priority	Survey	Partners
1	Locate winter roosts which often are sites of breeding birds later in season.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Name: Endangered species report follow up **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Annually evaluate Long-eared Owl reports and visit sites with sufficient evidence to indicate presence during the nesting season or large numbers at winter roosts.

Comments:

Monitoring Need: Identify and evaluate records to document current range and population.

Name: Long-eared Owl monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Systematic searching for Long-eared Owl nests in areas with reported occurrences during the nesting season.

Comments: Since the species is so rare, difficult to detect, and sensitive to disturbance, searches are limited to locations where there are reliable reports, including winter roosts where owls may linger into the breeding season.

Monitoring Need:

Bosakowski, T., R. Kane, and D. G. Smith. 1989. Decline of the Long-eared Owl in New Jersey. Wilson Bulletin 101:481-485.

Francis, C. M., and M. S. W. Bradstreet. 1997. Monitoring boreal forest owls in Ontario using tape playback surveys with volunteers. Pages 175-184 in J. R. Duncan, D. H. Johnson, and T. H. Nicholls, editors. Biology and conservation of owls of the Northern Hemisphere: 2nd International symposium. General Technical Report NC-190. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Gross, D. A. 2010. Long-eared Owl (Asio otus). Pages 144-148. In M.A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The John Hopkins University Press, Baltimore, Maryland.

Gross, D. A. 2012. Long-eared owl (Asio otus). Pages 310-311 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Marks, J. S., D. L. Evan, and D. W. Holt. 1994. Long-eared Owl (Asio otus). Account 133 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Savard, M., B. Dumont, and C. Girard. 1995. L'insaisissable Hibou moyen-duc au grand jour (The elusive Long-eared Owl in broad daylight). QuébecOiseaux 6:12-15.

Sperring, C. 2000. Long-eared Owl (Asio otus). Mendip Biodiversity Action Plan. Environmental Action Fund.

Takats, D. L., C. M. Francis, G. L. Holroyd, J. R. Duncan, K. M. Mazur, R. J. Cannings, W. Harris, and D. Holt. 2001. Guidelines for Nocturnal Owl Monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta.

Zuberogoitia, I. and L. F. Campos. 1998. Censusing owls in large areas: a comparison between methods. Ardeola 45:47-53.

PENNSYLVANIA
WILDLIFE ACTION PLAN

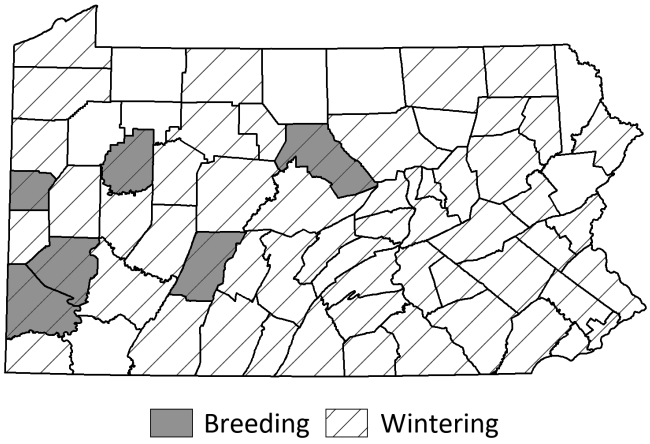
Short-eared Owl

Asio flammeus

Laurie Goodrich — *Hawk Mountain Sanctuary Association*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain species population in Pennsylvania at current levels through 2035. Within 10 years, increase the amount of suitable breeding and overwintering habitat by 5-10 % through protecting and enhancing grassland and wetland habitats currently used by breeding and wintering Short-eared Owls. In conjunction, identify key properties adjacent to those known sites, collaborate with partners (e.g., private landowners, land trusts/conservancies, NGOs, and state/federal agencies to increase the amount of suitable habitat in the state though best management practices and current habitat improvement programs (e.g., CRP, WHIP, PGCs Private Landowner Assistance Program).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S4N

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: Unknown

PA Short-term Trend (10-year): Increase of 10-25%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Large expansive grassy fields or grassy open marshes with few trees or shrubs. Will use shrubby intrusion areas for night roosts.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: Will use reclaimed strip mines.

Season: Wintering

Specific Habitat Requirements: Large unmowed fields or wetlands.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Establishment of wind turbines or solar arrays can usurp necessary breeding and wintering sites for this rare species.

Action Category: Manage non-living habitat components

Specific Action: Ban placement of wind turbines or solar arrays in large grasslands used by this species and other endangered or threatened birds and mammals.

Objective: Reduce or prohibit placement of wind turbines and solar arrays in large grasslands used by this species.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction or prohibition of structures.

Potential Collaborators: Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Township Zoning Boards, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey

Locations: Statewide

Other species likely to benefit from this action: Grassland birds and insects

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Owls may be affected by agricultural pesticides, particularly those used in grass or hay crops.

Action Category: Market-based incentives

Specific Action: Discourage use of rodenticides, pesticides and herbicides in nesting areas.

Objective: Conduct outreach to landowners in areas used by owls; create statewide awareness.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Measure reduction in use of rodenticides and pesticides; reward landowners with certification of clean habitats.

Potential Collaborators: Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey

Locations: Statewide

Other species likely to benefit from this action: Grassland birds and mammals, people, aerial insectivores

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Expansion of row crops into pasture lands. Pasture can be habitat if it is extensive.

Action Category: Conservation planning

Specific Action: Promote pasture or grassland habitat on farmland with a focus on wildlife benefits.

Objective: Create incentive for private landowners to set aside pasture or grasslands.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area of large contiguous grassland habitat.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland birds, mammals and insects, aerial insectivores

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Owls need unbroken fields with low disturbance or use by humans. Most remaining nest sites are in northern counties of low human densities.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve large grassland areas within Short-eared Owl nesting range for special protection.

Objective: Conserve large grasslands of >100 ha (247 ac) and create areas with tall dense grass for nesting and shorter grass for foraging.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Numbers of separate large parcels of grassland in the state.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Other grassland dependent species such as Upland Sandpiper, Bobolink, Northern Harrier.

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Owls need unbroken fields with low disturbance or use by humans. Most remaining nest sites are in northern counties of low human densities.

Action Category: Conservation planning

Specific Action: In key large grassland areas historically used by nesting birds, promote conservation with townships and landowners with U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) or other incentives.

Objective: Conservation of large fields for nesting.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of large fields conserved.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland birds and mammals

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Intrusions from gas fracking operations on remaining nesting areas.

Action Category: Create or amend policies, guidelines, or best practices

Specific Action: Reduce oil and gas drilling in traditional nesting areas or restrict to areas not used by owls.

Objective: Protect nesting sites for endangered nesting birds.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of undisturbed grasslands.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland birds and mammals

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Establishment of wind turbines or solar arrays can usurp necessary breeding and wintering sites for this rare species.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Establishment of wind turbines or solar arrays can usurp necessary breeding and wintering sites for this rare species.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Low

Specific Threat: This species may already be showing signs of widespread declines (Booms et al. 2014), indicating conservation concern and possible climate induced changes.

Action Category: Basic research and status monitoring

Specific Action: Conduct research and collaborate with owl researchers nationwide to understand habitat changes wrought by climate change and how Pennsylvania might fit into providing future habitat.

Objective: Monitoring research on climate change and bird survival and behavior.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Research summary of current state of knowledge.

Potential Collaborators: Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Unknown

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** High

Specific Threat: Large grasslands may need to be managed to remain without shrub layer or tree intrusions.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Manage large fields to maintain them in an early successional (2-7 yr old) stage.

Objective: Mowing or woody stem management on large fields used by owls. Manage in winter.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5-10 years **Measure:** Area of old field habitat.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland birds and mammals

Season: Wintering

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: loss of old field habitat to crops reduces winter habitat

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Provide incentive to convert cropland to grassland using Conservation Reserve Enhancement Program (CREP) or other incentives.

Objective: Develop incentive program or revise current CREP or Conservation Reserve Program (CRP) to promote restoration of meadow and grasslands in larger fields statewide.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of grassland restored in previously used cropland.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: All grassland mammals, birds and insects

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: wintering areas of proper size targeted for development

Action Category: Conserve specific land or seascapes

Specific Action: Enact conservation easement program to restore meadows and protect them from development.

Objective: Provide overwinter habitat for owls and other grassland species.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Acres per county or region and size of fields protected.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland birds, mammals and insects

Season: Wintering

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: grassland habitats may need to be maintained with mowing or spraying to remove woody intrusions. Mowing every few years

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Mowing of grassland fields to maintain early successional habitat.

Objective: Provide guidelines to landowners on mowing or spray regime to maintain key habitat for this species, including timing of action to avoid winter and breeding season.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Production of management best practices document and dispersal via conservation districts, land trusts and Game Commission biologists.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Other species wintering in grassland habitat, sparrows, and Northern Harrier, etc.

Season: Breeding

Priority	Need	Partners
1	Conduct study of nesting Short-eared Owls to assess productivity, home range, habitat use and threats for remaining nesting pairs. Assess conservation status of range for existing pairs.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
2	Assess potential threat of Marcellus Shale and other energy production or extraction activities on nesting owls, disturbance distances, impacts on productivity, etc. Identify key areas to protect.	Universities & research institutions
3	Research prey abundance on key grasslands hosting owls to inform management and conservation planning.	Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Use banding recoveries and telemetry to identify source population for Pennsylvania wintering birds, winter range and timing or duration within the state.	Non-governmental organizations, Universities & research institutions
2	Determine habitat use and range size of wintering birds using telemetry. Compare to breeding habitat and evaluate availability of suitable habitat across state.	Universities & research institutions
3	Evaluate Conservation Reserve Enhancement Program (CREP) fields, and Wild Pheasant Recovery Areas as suitable owl habitat. Determine if species habitat management goals might overlap.	Pennsylvania Game Commission, Universities & research institutions, Pennsylvania Association of Conservation Districts, Pennsylvania Biological Survey
4	Assess status of wintering Short-eared Owls in Pennsylvania and nearby states and identify key wintering sites for heightened conservation.	Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Develop appropriate survey technique and conduct breeding season surveys to determine number and location of remaining nesting pairs in large grassland habitats across the state.	Non-governmental organizations, Pennsylvania Biological Survey, Universities & research institutions
2	Survey and map potential grassland or marshland habitats greater than 100 ha (247 ac). Use ownership analyses and GIS land cover to determine potential to reclaim grassland or wetland habitats.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
3	Monitor use of agricultural pesticides, herbicides and rodenticides across the state and particularly in regions used by wintering birds.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations

Season: Wintering

Priority	Survey	Partners
1	Conduct survey of wintering Short-eared Owls and Northern Harriers across the state to determine key wintering sites for the two species (possibly incorporate citizen scientist outreach).	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Interested Public
2	Use Winter Raptor Surveys and Christmas Bird Counts to identify possible wintering hotspots for the species.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
3	Monitor use of agricultural pesticides, herbicides and rodenticides across the state and particularly in regions used by wintering birds.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Farmland Raptor Project

Lead(s) : Hawk Mountain Sanctuary

Link: https://www.hawkmountain.org

Description: Hawk Mountain network of private landowners combined with eBird provides data on wintering Short-eared Owls and numbers per site.

Comments:

Monitoring Need: Provides distribution data and identifies sites with multiple birds.

Name: Winter Raptor Survey

Lead(s) : Hawk Migration Association and Pennsylvania Society for Ornithology

Link: http://www.pabirds.org; www.hawkmigration.org

Description: The Winter Raptor Survey monitors winter raptor populations by conducting roadside surveys in mid-winter.

Comments: Winter raptor surveys may be useful in monitoring Pennsylvania migrants on their wintering grounds or destination areas; once we define where Pennsylvania nesting birds spend winter, they may be useful in monitoring Pennsylvania nesting birds.

Monitoring Need: To provide more detailed abundance data on raptors overwintering in Pennsylvania.

Booms, T. L., G. L. Holroyd, M. A. Gahbauer, H. E. Trefry, D. A. Wiggins, D. W. Holt, J. A. Johnson, S. B. Lewis, M. D. Larson, K. L. Keyes, et al. 2014. Assessing the status and conservation priorities of the short-eared owl in North America. Journal of Wildlife Management 78:772–778

Brauning, D. W. 2010. Short-eared Owl. Pages 116-119 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Calladine, J., H. Crick, and C. Wernham. 2005. Development of methods for surveying and estimating population size of short-eared owls. A report to Scottish Natural Heritage, BTO Research Report No. 394. University of Stirling, Stirling, Scotland,

Douglas, David J. T., Jessica Waldinger, Zoya Buckmire, Kathryn Gibb, Juan P. Medina, Lee Sutcliffe, Christa Beckmann, Nigel J. Collar, Raymond Jansen, Johannes Kamp, Ian Little. 2023. A global review identifies agriculture as the main threat to declining grassland birds. Ibis 165(4):1107-1128

Holt, D. W., and S. M. Leasure. 2006. Short-eared Owl. In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/062 (accessed July 2015).

Master, Terry L. 1992. Short-eared Owl. Pages 164-165 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Miller, R. A., J. B. Buchanan, T. L. Pope, J. D. Carlisle, C. E. Moulton, and T. L. Booms. 2022. Short-eared owl land-use associations during the breeding season in the western United States. Journal of Raptor Research 56(3):273-286.

Mineau, P., and M. Whiteside. 2013. Pesticide Acute Toxicity Is a Better Correlate of U.S. Grassland Bird Declines than Agricultural Intensification. PLoS ONE 8: e57457. DOI:10.1371/journal.pone.0057457 (accessed July 2015).

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Weidensaul, S. 2012. Short-eared Owl (Asio flammeus). Pages 212-213 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wiggins, D. A., D. W. Holt, and S. M. Leasure. 2020. Short-eared Owl (Asio flammeus), version 1.0. In S. M. Billerman, editor. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA.

Wiggins, D., D. Holt, and S. M. Leasure. 2006. Short-eared Owl (Asio flammeus). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.irds.cornell.edu/na/species/062 (accessed July 2015).

PENNSYLVANIA
WILDLIFE ACTION PLAN

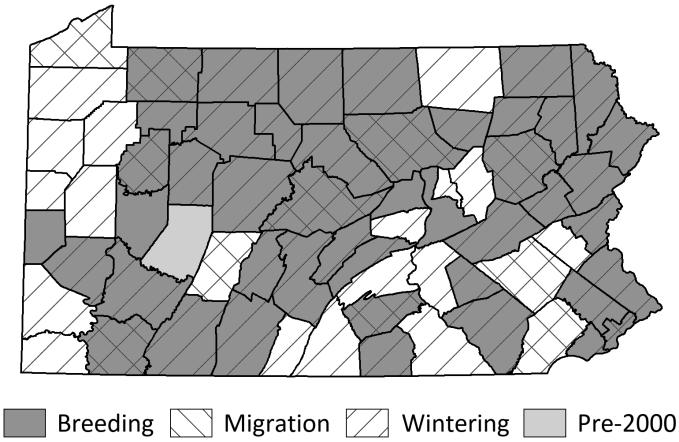
Northern Saw-whet Owl

Aegolius acadicus

Daniel W. Brauning — *Pennsylvania Game Commission (retired)*

J. Kosack, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Determine breeding, passage migrant, and wintering population sizes, distributions, and trends by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

NatureServe Global Rank: G5	**SGCN Season: Migration**
IUCN Red List Designation: Least Concern	**State Rank (Season):** S4M
IUCN Red List Trend: Increasing	**State Rank Year:** 2024
Identified Conservation Priority by Established Groups: Yes	**PA Legal Designation:** Not Listed (Protected)
Northeast U.S.RSGCN: Not RSGCN	**PA Abundance:** Unknown
Federal Listing Status: Not Listed	**PA Short-term Trend (10-year):** Unknown
Feasiblity of Recovering or Sustaining the PA Population: Medium	**Cumulative Threat Impact:** Medium

NatureServe Global Rank: G5	**SGCN Season: Wintering**
IUCN Red List Designation: Least Concern	**State Rank (Season):** S4N
IUCN Red List Trend: Increasing	**State Rank Year:** 2024
Identified Conservation Priority by Established Groups: Yes	**PA Legal Designation:** Not Listed (Protected)
Northeast U.S.RSGCN: Not RSGCN	**PA Abundance:** Unknown
Federal Listing Status: Not Listed	**PA Short-term Trend (10-year):** Decline of 30-50%
Feasiblity of Recovering or Sustaining the PA Population: Medium	**Cumulative Threat Impact:** Medium

Season: Breeding

Specific Habitat Requirements: Dense shrubby understory, including ericaceous shrubs, and young conifers. Studies have found this species in a wide range of forested environments. The best overall understanding is from the Birds of the World account: "Generally seem to breed in mixed forest habitats that have dense conifers for roosting and deciduous trees for nesting and foraging."

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Habitat Comments: As a predator of small mammals, a healthy population of forest rodents would be expected. Similarly, as a small nocturnal species, we presume that it would require good cover to provide protection from other predators (screech-owl, barred owl).

Season: Migration

Specific Habitat Requirements: Any forested habitat, including edges and ruderal forests, presumably. The Birds of the World account says: "In general, the presence of dense vegetation for roosting and perches for foraging is apparently critical."

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Habitat Comments: It is associated with forested areas and is recovered at banding stations in a diversity of habitat conditions.

Season: Wintering

Specific Habitat Requirements: Saw-whets winter in a range of forested habitats across their broad range. The studies listed at the Birds of the World website are not applicable to much of Pennsylvania. But to cite that source: "In general, the presence of dense vegetation for roosting and perches for foraging is apparently critical."

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Direct impacts of habitat loss and indirect effects of changing predator communities in fragmented woodlands.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Restore impacted areas to a mixed conifer forest.

Objective: Restore forest canopy within the landscape to greater than 75% containing at least 25% conifer species.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Forest cover

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: All other forest birds.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Hemlock woolly adelgid severely impacts birds by increasing tree mortality and reducing tree diversity, leading to declines in nesting, foraging, and roosting habitats.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Implement statewide Eastern hemlock conservation plan across multiple agencies and private partners to treat hemlock woolly adelgid (Adelges tsugae).

Objective: Reduce advancement of hemlock woolly adelgid via integrated pest management (IPM) strategies.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Area of hemlock stands treated via IPM and health condition of hemlock trees in treated stands.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Forest Service

Locations: Statewide

Other species likely to benefit from this action: Other native forest fauna; Northern Flying Squirrel, Red Crossbill, Swainson's Thrush, Golden-crowned Kinglet, Black-throated Green Warbler, Blackburnian Warbler.

Season: Migration

Threat Category: Logging and Wood Harvesting **Threat Impact:** Low

Specific Threat: Conversion of coniferous forest to deciduous forest.

Action Category: Basic research and status monitoring

Specific Action: Support migratory bird population monitoring programs (e.g., Project Owlnet, Motus).

Objective: Maintain at least 20 active owl banding stations during migration each year.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of owls banded or tracked annually.

Potential Collaborators: Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action:

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Conversion of forests into solar farms and wind turbine arrays.

Action Category: Basic research and status monitoring

Specific Action: Support wintering bird population monitoring programs and report encounters to the Pennsylvania Game Commission, including carcasses.

Objective: Estimate if collision mortality is a significant limiting factor to the winter population.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of owls banded or tracked annually; number of mortality reports received.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: None.

Season: Wintering

Threat Category: Roads and Railroads **Threat Impact:** Low

Specific Threat: Road mortality from collisions may impact winter populations.

Action Category: Basic research and status monitoring

Specific Action: Support wintering bird population monitoring programs and report encounters to the Pennsylvania Game Commission, including carcasses.

Objective: Estimate if collision mortality is a significant limiting factor to the winter population.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of owls banded or tracked annually; number of mortality reports received.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: None.

Season: Breeding

Priority	Need	Partners
1	What is the annual population and distribution of nesting Northern Saw-whet Owls?	Interested Public, Pennsylvania Game Commission, U.S. Forest Service, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions, Non-governmental organizations
2	Are Northern Saw-whet Owls philopatric in Pennsylvania or in certain areas of the state?	Universities & research institutions, U.S. Forest Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Non-governmental organizations
3	How do Northern Saw-whet Owls respond to loss of hemlocks and understory where those changes occur?	Pennsylvania Game Commission, U.S. Forest Service, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations, Universities & research institutions

Season: Migration

Priority	Need	Partners
1	Expand Project OwlNet and include the breeding population.	Non-governmental organizations, Interested Public

Season: Wintering

Priority	Need	Partners

Season: Breeding

Priority	Survey	Partners
1	Northern Saw-whet Owl nesting populations are poorly known. Determine extent of breeding population through volunteer surveys.	Interested Public, Pennsylvania Game Commission, Non-governmental organizations
2	Conduct nest-box surveys to determine Northern Saw-whet Owl occupancy and persistence at known breeding grounds.	Pennsylvania Game Commission, Interested Public, Non-governmental organizations
3	Conduct banding studies to determine where Pennsylvania nesting Northern Saw-whet Owls migrate in the winter.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Migration

Priority	Survey	Partners
1	Expand Project OwlNet to include more locations.	Non-governmental organizations, Interested Public
2	Band breeding birds to make Project OwlNet more effective at studying migration patterns of the Pennsylvania breeding population.	Non-governmental organizations

Season: Wintering

Priority	Survey	Partners
1	Basic monitoring, at an interval of every 5 to 10 years, is needed to determine population status and trends, coupled with long-term monitoring efforts.	Pennsylvania Game Commission, Non-governmental organizations

Name: National Audubon Society Christmas Bird Count **Lead(s) :** National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments: Some standardization of owling effort would enhance the value of monitoring.

Monitoring Need:

Name: Northern Saw-whet Owl banding **Lead(s) :** Project Owlnet

Link: https://www.projectowlnet.org/

Description: Primarily focused on banding migratory birds.

Comments: Project Owlnet has provided the best information on the migration of Northern Saw-whet Owls. Ongoing implementation is needed, with additional statistical considerations to provide better monitoring data.

Monitoring Need: Structured implementation of this effort, including a more stratified distribution and standardized operation of stations.

Name: Northern Saw-whet Owl monitoring (Project Toot-Route) **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Standardized roadside playback survey involving 8 stops in suitable habitat.

Comments: This survey will provide the best breeding season population estimates.

Monitoring Need: Replication of this survey, at 5 to 10-year intervals.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Becket, S. R. and G. A. Proudfoot. 2011. Large-scale movement and migration of Northern Saw-whet Owls in eastern North America. The Wilson Journal of Ornithology 123:521-535.

Bowman, J., D. S. Badzinski and R. J. Brooks. 2009. The numerical response of breeding Northern Saw-whet Owls (Aegolius acadicus) suggests nomadism. Journal of Ornithology 51:499-506.

Cannings, R. J. 1987. The breeding biology of Northern Saw-whet Owls in southern British Columbia. U. S. Forest Service General Technical Report RM:193-198.

Churchill, J. B., P. B. Wood, and D. F. Brinker. 2000. Diurnal roost site characteristics of Northern Saw-whet Owls wintering at Assateague Island, Maryland. Wilson Bulletin 112:332-336.

Gross, D. A. 2000. Pennsylvania Breeding Survey of Northern Saw-whet Owl (Aegolius acadicus), A Candidate-Undetermined Species: "Project Toot Route". A Report for the Pennsylvania Game Commission. Ecology III, Inc., Berwick, Pennsylvania.

Gross, D. A. 2001. Project Toot Route data for 2001 field season. A Report for the Pennsylvania Game Commission. Ecology III, Inc., Berwick, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Hayward, G. D., P. Hayward, K. Roeder, and E. O. Garton. 1984. Roost habitat selection by 3 small forest owls. Wilson Bulletin 96:690-692.

Huy, S. 2010. Project Owlnet. Available from http://www.projectowlnet.org (accessed July 2015).

Kolos, K. A. 2014. Examining the breeding ecology of Northern Saw-whet Owl (Aegolius acadicus) in three state regions of Pennsylvania. M. S. Thesis. Shippensburg University, Shippensburg, Pennsylvania.

Marks, J. S. and J. H. Doremus. 2000. Are Northern Saw-whet Owls, nomadic? Journal of Raptor Research 34:299-304.

Milling, T. C., M. P. Rowe, B. L. Cockerel, T. A. Dellinger, J. B. Gailes, C. E. Hill. 1997. Population densities of Northern Saw-whet Owls (Aegolius acadicus) in degraded boreal forests of the Southern Appalachians. Pages 272-285 in J. R. Duncan, D. H. Johnson, and T. H. Nicholls, editors. Biology and Conservation of Owls of the Northern Hemisphere: 2nd International Symposium. General Technical Report NC-190. USDA Forest Service North Central Forest Experiment Station, St. Paul, Minnesota.

Rasmussen, J. L., S. G. Sealy, and R. J. Cannings. 2008. Northern Saw-whet Owl (Aegolius acadicus). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/042 (accessed July 2015).

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Swengel, S. R. and A. B. Swengel. 1992. Roosts of Northern Saw-whet Owls in southern Wisconsin. Condor 94:699-706.

Swengel, S. R., and A. B. Swengel. 1987. Study of a Northern Saw-whet Owl population in Sauk County, Wisconsin. Pages 199-208 in R. W. Nero, R. J. Clark, R. J. Knapton, and R. H. Hamre, editors. Biology and conservation of northern forest owls: symposium proceedings. U S Forest Service General Technical Report RM-142.

Takats, D. L., C. M. Francis, G. L. Holroyd, J. R. Duncan, K. M. Mazur, R. J. Cannings, W. Harris, and D. Holt. 2001. Guidelines for Nocturnal Owl Monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta.

Weidensaul, C. S. 2010. Migration and wintering ecology of Northern Saw-whet Owls. Pages 137-147 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Weidensaul, S. 2012. Northern Saw-whet Owl (Aegolius acadicus). Pages 214-215 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Whalen, D. M., and B. D. Watts. 2002. Annual migration density and stopover patterns of Northern Saw-whet Owls (Aegolius acadicus). Auk 119:1154-1161.

PENNSYLVANIA
WILDLIFE ACTION PLAN

Red-headed Woodpecker

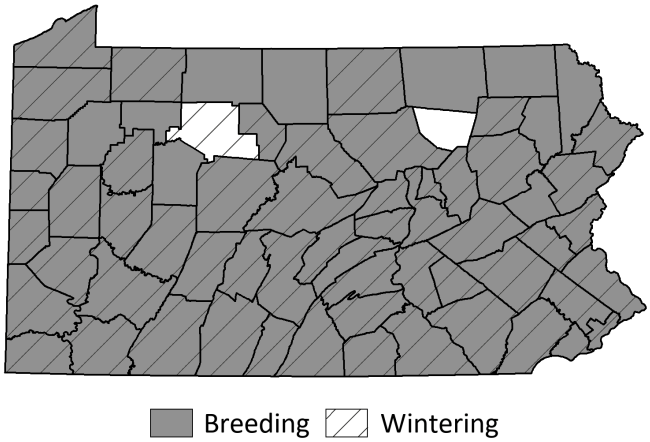
Melanerpes erythrocephalus

Richard S. Fritsky

Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Within 10 years, expand range from current 54% of historical range to 80% of historical range in Pennsylvania, or at least 500 blocks, as indicated by Second Breeding Bird Atlas (Wilson et al. 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Wintering

State Rank (Season): S4N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Woodlots at least 2 ha (5 ac) in size with snags near open pasture. Savannah-like forests, parks, river bottoms, and wooded swamps.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Wintering

Specific Habitat Requirements: In the winter, Red-headed Woodpeckers move from their breeding habitat along forest edges into the forest interior. In the northern part of their winter range, they live in mature stands of forest, especially oak, oak-hickory, maple, ash, and beech. In the southern part, they live in pine and pine-oak.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Logging and Wood Harvesting **Threat Impact:** Medium

Specific Threat: Loss of cavity trees, especially snags.

Action Category: Outreach, communication and distribution

Specific Action: Make foresters, loggers, and landowners aware of the importance of cavity trees, especially snags, for nesting success. Avoid timber cutting during breeding season.

Objective: Maintain cavity trees for nesting.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Percent of surveyed foresters, loggers, and landowners who retained cavity trees and avoided timber cutting during breeding season.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Little brown bat, Northern Saw-whet Owl, American Kestrel, Barred Owl, Pileated Woodpecker

Season: Wintering

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Pesticide use can decrease insect populations, reducing food availability. Woodpeckers may ingest pesticide-contaminated insects, leading to potential health issues, reproductive problems, or mortality.

Action Category: Training and individual skill development

Specific Action: Promote Integrated Pest Management and provide technical assistance to farmers and forest owners to reduce the use of insecticides and pesticides.

Objective: Maintain insect food availability and prevent bioaccumulation of toxins.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Percentage reduction in annual insecticide and pesticide use.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Department of Environmental Protection, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Environmental Protection Agency

Locations: Statewide

Other species likely to benefit from this action: Pileated Woodpecker, Downy Woodpecker, Hairy Woodpecker, Eastern Wood-pewee, Acadian Flycatcher

Season: Breeding

Priority	Need	Partners
1	Breeding success and habitat condition throughout the state, especially southwestern, northcentral, and northeastern Pennsylvania.	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Private Landowners, Universities & research institutions, Non-governmental organizations
2	Response of Red-headed Woodpecker to silviculture treatments including salvage cuttings of diseased trees.	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions

Season: Wintering

Priority	Need	Partners

Season: Breeding

Priority	Survey	Partners

Season: Wintering

Priority	Survey	Partners

Name: National Wetlands Inventory **Lead(s) :** U.S. Fish & Wildlife Service

Link: https://www.fws.gov/program/national-wetlands-inventory

Description: A nationwide inventory of wetlands providing maps and other geospatial data on wetlands.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Belson, M. S. 1998. Red-headed Woodpecker (Melanerpes erythrocephalus) use of habitat at Wekiwa Springs State Park, Florida. M.S. Thesis. University of Central Florida, Orlando, Florida.

Ingold, D. J. 1994. Influence of nest-site competition between European Starlings and woodpeckers. Wilson Bulletin 106:227-241.

Jackson, J. A. 1976. A comparison of some aspects of the breeding ecology of Red-headed and Red-bellied Woodpeckers in Kansas. Condor 78:67-76.

Kellam, J. 2012. Red-headed Woodpecker. Pages 228-229 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Kibbe, D. P. 2010. Red-headed Woodpecker. In M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. Johns Hopkins University Press, Baltimore, Maryland.

Venables, A., and M. W. Collopy. 1989. Seasonal foraging and habitat requirements of Red-headed Woodpeckers in north-central Florida. Nongame Wildlife Program Final Report, Project Number GFC-84-006. Florida Game and Fresh Water Fish Commission.

PENNSYLVANIA
WILDLIFE ACTION PLAN

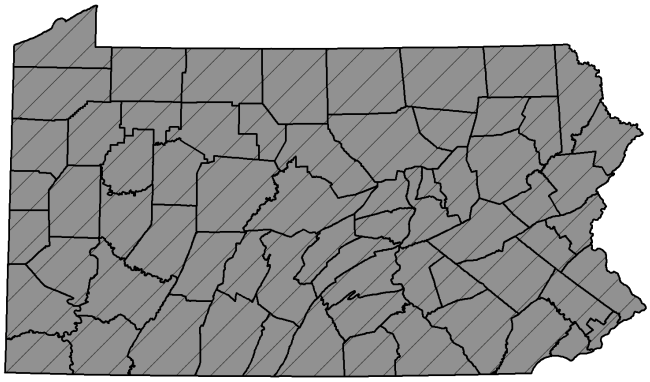
American Kestrel

Falco sparverius

Mercy Melo *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding and overwintering populations throughout Pennsylvania with expansion into new territories based on creation of additional grassland and herbaceous opening habitats by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Wintering

State Rank (Season): S4N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Habitat preferences variable based on availability but short herbaceous vegetation for foraging and sparse interspersed trees or posts for perching are generally necessary. Nesting cavities required for successful breeding and can be natural (cavity in tree) or artificial (nest-box). Typical breeding habitats in Pennsylvania include meadows with remnant snags for perching and nesting; active agricultural fields planted in hay, soybeans, or other short crops with perching and nest-box opportunities on fenceposts or utility poles; or old reverting agricultural fields with either snags or posts/poles for perching and nesting. Prime habitat includes > 61 acres (> 25 hectares) of contiguous grassland. Areas used consistently include greater than 65 percent open habitat in 2.5 acres (1 hectare) around nest site and distances from woodland > 1148 feet (>350 meters) (Smallwood and Bird 2002).

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Wintering

Specific Habitat Requirements: In winter, kestrels rely on small mammal and songbird prey and thus require habitat that supports these species. Open habitats (grasslands, pastures, agricultural fields, fallow fields) with height-limited vegetation (<35cm (14 in)) are ideal for foraging. As small mammals and shrubland songbirds are associated with shrub cover, kestrels may accommodate greater densities of shrubs within these herbaceous openings. Where snow cover is prevalent, kestrels may use developed areas (roadsides, lawns, etc.) where snow may be removed, and small mammal prey may be more accessible. While nest-boxes are not used for breeding activities in the winter months, some kestrels still utilize natural and artificial cavities to protect themselves from harsh weather.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: While agricultural fields may provide high-quality open habitat, they may also serve as ecological traps due to 1) tall crops growing to un-huntable heights (i.e. corn), 2) crop species being harvested or switched mid-way through the kestrel breeding season causing alterations to prey abundance/availability, 3) excessive human disturbance due to tilling, planting, mowing, etc. during the kestrel breeding season, and/or 4) pesticide application leading to decreased prey abundance or secondary wildlife poisoning effects.

Action Category: Outreach, communication and distribution

Specific Action: Educate farmers about coordinating timing of crop manipulations with grassland bird breeding seasons (i.e. delaying mowing, early tilling/planting, reducing intensity/frequency of agricultural interventions).

Objective: To reduce disturbance and prey abundance manipulation during the kestrel breeding season.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Increased nest success of kestrels.

Potential Collaborators: Non-governmental organizations, Other state agency, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: All grassland bird species, including Bobolink, Henslow's Sparrows, Northern Harrier, etc.

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Medium

Specific Threat: Reforestation and afforestation of areas reduces amount of suitable open habitat for kestrels and favors populations of cooper's hawks, a known predator of kestrels.

Action Category: Conserve specific land or seascapes

Specific Action: Create and maintain large herbaceous openings (grasslands, meadows, etc.) that have large interior core areas.

Objective: To increase the abundance and quality of suitable kestrel habitat.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area of herbaceous openings/grassland habitat.

Potential Collaborators: 2. Agriculture and Aquaculture, 3. Energy Production and Mining, Great Lakes Dune and Swale, 4. Transportation and Service Corridors, 7. Natural Systems Modifications, High Allegheny Headwater Wetland, 9. Pollution, 10. Geological Events, 11. Climate Change and Severe Weather, Laurentian-Acadian Northern Hardwood Forest

Locations: Statewide

Other species likely to benefit from this action: Many grassland bird species (depending on patch size), birds that require habitat diversity that includes open areas (turkey, grouse, woodcock), pollinators, small mammals

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Solar farm development precludes kestrels from using formerly suitable open habitats.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Solar farm development precludes kestrels from using formerly suitable open habitats.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Local agencies & municipalities, Non-governmental organizations, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Medium

Specific Threat: Agricultural contaminants reduce abundance of prey populations and can impose secondary wildlife poisoning effects including declines in cognitive function, alterations to breeding behaviors, and mortality due to chronic and acute exposures.

Action Category: Outreach, communication and distribution

Specific Action: Reduce pesticide (specifically rodenticide and insecticide) usage in agricultural and residential landscapes.

Objective: To reduce prevalence of agricultural environmental contaminants.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Reduction in pesticide use, reduced prevalence/concentration of contaminants in biological samples.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Department of Environmental Protection, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Rodents, insects, and any other species that interact within ecosystems where rodents and insects play a key role.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Solar farm development precludes kestrels from using formerly suitable open habitats.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Urbanization of overwintering grounds may negatively impact perceived habitat quality and subsequent kestrel abundance and sex ratios.

Action Category: Conserve specific land or seascapes

Specific Action: Preserve high-quality habitat by not developing those open lands.

Objective: Reduce grassland habitat loss.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Stabilize or increase habitat acreage.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	Known-fate survival studies across numerous spatial and temporal scales to identify variation in survival and causes of mortality in adult kestrels	Non-governmental organizations, Universities & research institutions
2	Investigate environmental contaminant (both agricultural and residential pesticides) prevalence and concentration in biological tissue samples of prey species and kestrels.	Non-governmental organizations, Universities & research institutions
3	Assess the impacts of modern agricultural pesticides on prey diversity and abundance in kestrel nesting areas	Universities & research institutions, Non-governmental organizations
4	GPS/satellite telemetry-based investigations of juvenile survival, movements, and recruitment after natal dispersal.	Non-governmental organizations, Universities & research institutions
5	Investigate temporal shifts in prey abundance (and subsequent changes in kestrel breeding phenology) due to climate change.	Universities & research institutions, Non-governmental organizations

Season: Wintering

Priority	Need	Partners
1	Known-fate survival studies across numerous spatial and temporal scales to identify variation in survival and causes of mortality.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	Investigations of environmental contaminant prevalence/concentration within prey species and kestrel biological tissues.	Non-governmental organizations, Universities & research institutions
3	Evaluate sympatry of kestrels with Cooper's Hawks utilizing Christmas Bird Count data and/or telemetry to gauge potential for intraguild predation/non-consumptive effects of sympatry.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Survey landowners (residential and agricultural) regarding use of agricultural pesticides (specifically rodenticides and insecticides) across the state to gauge their potential impact	Non-governmental organizations, Pennsylvania Department of Environmental Protection, Private Landowners, Other state agency
2	Survey city environments (Philadelphia and Pittsburgh) for evidence and abundance of urban kestrel populations.	Pennsylvania Game Commission, Non-governmental organizations

Season: Wintering

Priority	Survey	Partners
1	Encourage or continue winter raptor surveys to assess winter range by sex and to provide additional monitoring tool for the Pennsylvania population.	Non-governmental organizations, Private Landowners

Name: American Kestrel Nest-box Programs

Lead(s) : Hawk Mountain Sanctuary Association, private banders

Link: N/A

Description: Establishing and maintaining nest-boxes to assess occupancy, clutch size, hatch rate, fledge rate, and overall nest success. Around 14-22 days post-hatch, most nestlings are sexed and banded for future population estimates based on band-recovery models. Nest-boxes can also be used to access eggs/nestlings for research purposes (collecting measurements, blood sampling, etc.).

Comments: Data used to be aggregated nation-wide by American Kestrel Partnership (AKP), which was run by the Peregrine Fund, but now all kestrel nest data is encouraged to be shared through Cornell's NestWatch database.

Monitoring Need: To monitor nest occupancy and success long-term and to band young for future population estimation via band-recovery models

---

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need: Provides standardized abundance data on an annual basis to assess population trends of overwintering birds.

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: The Breeding Bird Survey helped to identify and quantify American Kestrel declines and continues to help monitor their population trends.

Monitoring Need: To maintain standardized survey protocols for identifying population trends of breeding birds.

Name: Raptor Population Index

Lead(s) : Hawk Migration Association

Link: https://www.rpi-project.org

Description: Collaborative effort to evaluate trends in migrating raptors. Trends in sites to south of Pennsylvania in part represent trends in the Pennsylvania migrating population.

Comments:

Monitoring Need: To aggregate migration count data and analyze trends in abundance of kestrels migrating annually

---

Name: Winter Raptor Survey

Lead(s) : Hawk Migration Association and Pennsylvania Society for Ornithology

Link: http://www.pabirds.org; www.hawkmigration.org

Description: The Winter Raptor Survey monitors winter raptor populations by conducting roadside surveys in mid-winter.

Comments:

Monitoring Need: To provide more detailed abundance data on raptors overwintering in Pennsylvania.

Bednarz, J.C. and J.-F. Therrien. 2023. The full annual cycle of the American Kestrel: State of the knowledge, information gaps, and conservation needs. Journal of Raptor Research 57(2): 125-130.

Farmer, C. J. and K. L. Bildstein. 2012. American Kestrel. Pages 156-157 in A. D. Wilson, D. W. Brauning, and R. Mulvihill, editors. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Farmer, C. J., L. J. Goodrich, E. Ruelas Inzunza, and J. P. Smith. 2008. Conservation status of North America's birds of prey. Pages 303 to 420 in K. L. Bildstein, J.P. Smith, E. R. Inzunza, and R. R. Veit, editors. State of North America's Birds of Prey. Nuttall Ornithological Club, Cambridge, Massachusetts, and American Ornithologist's Union, Washington, D.C.

Kolowski, J., Morrow, L., and J. Morrow. 2023. Factors associated with American Kestrel (Falco sparverius) nest box occupancy and reproductive success in an agricultural landscape. Journal of Raptor Research 57(2):000-000.

Melo, M., Fuller, K., Robertson, S., Robertson, B., Goodrich, J., King, D., and J.-F. Therrien. 2023. Rapid urbanization alters overwintering abundance and sex ratio of the American Kestrel. Journal of Raptor Research 57(4):571-580.

Melo, M., Kolowski, J.M., McCabe, R.A., Smallwood, J.A., Cornell, A., King, D., and J.-F. Therrien. 2025. Juvenile and adult survival estimates of American Kestrels throughout the full annual cycle in Eastern North America. Journal of Raptor Research 59(2):000

Mineau, P., and M. Whiteside. 2013. Pesticide Acute Toxicity Is a Better Correlate of U.S. Grassland Bird Declines than Agricultural Intensification. PLoS ONE 8: e57457. DOI:10.1371/journal.pone.0057457 (accessed July 2015).

Rohrbaugh, R. W., and R. H. Yahner. 1997. Effects of macrohabitat and microhabitat on nest-box use and nesting success of American Kestrels. The Wilson Bulletin 109:410-428.

Smallwood, J. A., and D. M. Bird. 2002. American Kestrel (Falco sparverius). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://na.birds.cornell.edu/bna/species/602 (accessed July 2015).

Smallwood, J. A., et al. 2009. Why are American Kestrel (Falco sparverius) populations declining in North America? Evidence from nest-box programs. Journal of Raptor Research 43:274-282.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilson, A., M. C. Brittingham, and G. Grove. 2010. Association of wintering raptors with Conservation Reserve Enhancement Program grasslands in Pennsylvania. Journal of Field Ornithology 81:361-372.

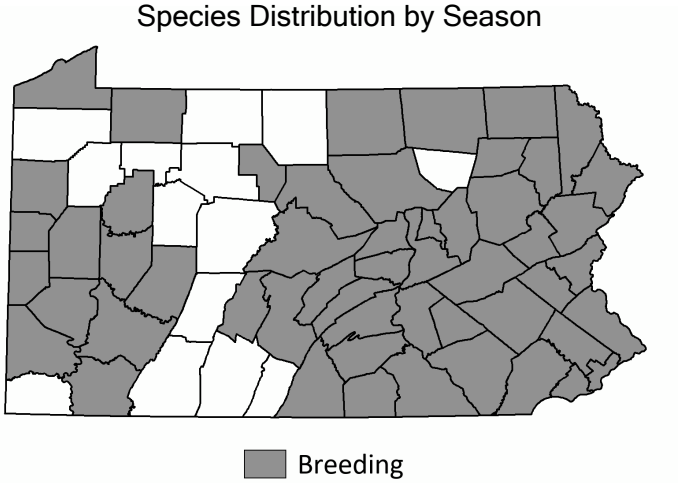
PENNSYLVANIA
WILDLIFE ACTION PLAN

Peregrine Falcon

Falco peregrinus

Patricia M. Barber *Pennsylvania Game Commission*

J. Kosack, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain a stable or increasing population (Brauning et al. 2013).

NatureServe Global Rank: G4

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed (Recovered)

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Recovered)

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Nesting requires tall structures to provide nest security and open areas for foraging. Large cliffs across the state, most often associated with rivers, were formerly (pre-DDT) the predominant habitat for nesting; now used to a more limited extent. At present, most nests are on tall man-made structures: large and medium-sized bridges, tall buildings, and other tall structures (e.g., smokestacks, water towers). Open areas distant from nest site are used for hunting during the non-nesting season; these include agricultural areas and areas hosting large concentrations of avian prey (e.g., wintering waterfowl).

Primary Habitat: Developed

Primary Habitat Type: Developed Areas

Primary Specific Habitat: NA

Habitat Comments: Historically nested on cliff faces. Post-DDT recovery has seen a switch to tall human made structures, bridged, building, smokestacks

Season: Breeding

Threat Category: Airborne Pollutants **Threat Impact:** Low

Specific Threat: Adults and young are exposed to a huge array of pollutants that are pervasive in the environment. Although use of DDT has ceased in the U.S., it continues to be used in many parts of the Peregrine Falcon range.

Action Category: Manage non-living habitat components

Specific Action: Stop the release of detrimental chemicals into the atmosphere.

Objective: Improve the quality of the atmosphere by reducing the release of toxins.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Amount of toxic chemicals released into the atmosphere annually.

Potential Collaborators: Interested Public, National Park Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Transportation, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: All species susceptible to the influence of the chemicals, including humans.

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Nesting on human-made structures directly creates human-bird conflicts. Maintenance, inspection, and repair of structures during the breeding season may result in nest failure, abandonment, or loss of nest site. Young are at risk of death from human hazards, including collision with buildings, especially glass, vehicle traffic, and electrocution.

Action Category: Alliance and partnership development

Specific Action: Convince project managers to avoid and minimize conflicts by conducting work outside the breeding season or adjusting project specifics to minimize disturbance.

Objective: Share guidance documents and further consultation with project managers through the Environmental Review process.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of projects that are able to move forward while nesting is successful on the structure.

Potential Collaborators: Businesses, Interested Public, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Community & Economic Development, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Transportation, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Private Landowners, U.S. Army Corps of Engineers, U.S. Department of Defense

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Recreational Activities **Threat Impact:** Low

Specific Threat: Disturbance by recreational climbers during the nesting season can eliminate nesting success or reduce productivity.

Action Category: Outreach, communication and distribution

Specific Action: Educate climbers on risk to climbers and the needs of birds for successful nesting. Coordinate with climbers and landowners to close cliffs to climbing during the breeding season.

Objective: Reduce disturbance to cliff-nesting birds.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of nests undisturbed.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley, Piedmont

Other species likely to benefit from this action: Other cliff specialists, primarily plants.

Season: Breeding

Priority	Need	Partners
1	Determine why cliff recolonization for nesting is proceeding slowly.	Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission
2	Evaluate contaminant load in population by conducting chemical analyses on unhatched eggs and, where appropriate, feather samples.	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Annually inventory nesting population and monitor all nesting peregrines statewide.	Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Name: Peregrine Falcon Nest Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/discover-pa-wildlife/peregrine-falcon/banding-and-management

Description: Nesting activity and productivity are monitored throughout the nesting season at known sites and potential new sites are investigated.

Comments:

Monitoring Need:

Barber, P. M. and S. P. Murphy. 2024. Peregrine falcon research/management annual report. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Brauning, D. W. 2010. Peregrine falcon. Pages 136-140 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Brauning, D. W., and F. A. McMorris. 2012. Peregrine Falcon. Pages 160-161 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, University Park, Pennsylvania.

Brauning, D. W., P. Barber, and F. A. McMorris. 2013. Management and Biology of the Peregrine Falcon (Falco peregrinus) in Pennsylvania. Bureau of Wildlife Management, PA Game Commission, Harrisburg, Pennsylvania.

Cade, T. J., J. H. Enderson, C. G. Thelander, and C. M. White, editors. 1988. Peregrine falcon populations: their management and recovery. Peregrine Fund, Boise, Idaho.

McMorris, F. A., P. Barber, and D. W. Brauning. 2013. Peregrine falcon research/management annual report. Pennsylvania Game Commission, Harrisburg, USA. Available from http://www.portal.state.pa.us/portal/server.pt?open=514&objID=563677&contentid=http://pubcontent.state.pa.us/publishedcontent/publish/marketingsites/game_commission/content/resources/reportsandminutes/annualwildlifemanagementreports/2013_diversity_71501_ci.html&mode=2 (accessed July 2015).

PENNSYLVANIA
WILDLIFE ACTION PLAN

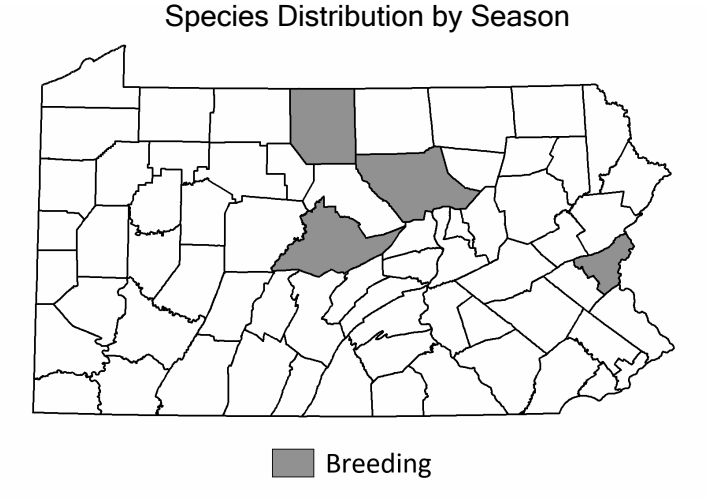
Olive-sided Flycatcher

Contopus cooperi

Douglas A. Gross

Pennsylvania Biological Survey Ornithological Technical Committee

James R. Hill III



Conservation Profile

PA 10-Year Conservation Goal: Reestablish a Pennsylvania breeding population by 2035 and maintain the passage migrant population.

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Most strongly associated with the northern conifer forests that extend into Pennsylvania and down the Appalachian Mountains at higher elevations. Nests in both mature forests and forest edge or burned over areas. Often found in bogs, semi-open forest, and the edges of wetlands, ponds, and forest. Territories include conifers such as spruces, tamaracks, hemlocks, and firs, but also deciduous trees such as maples, aspens, and mountain ash.

Primary Habitat: Forested Upland

Primary Habitat Type: High Elevation Forests

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Fire and Fire Suppression

Threat Impact: Low

Specific Threat: Lack of fire in coniferous and mixed forests.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Create forest openings within coniferous and mixed deciduous forests with prescribed fire.

Objective: Mimic natural disturbance by creating forest openings in areas with extensive coniferous or mixed deciduous forest cover.

Action Priority: 3-Medium

Action Urgency: Initiate within 5-10 years

Measure: Number of forest openings with snags and live trees.

Potential Collaborators: Actively manage habitat using best practices to promote favorable habitat conditions., Encourage complex forest structure, including conifers, to support diverse wildlife populations.

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: High Plateau, Deep Valleys, Glaciated High Plateau, Glaciated Low Plateau, Glaciated Pocono Plateau

Other species likely to benefit from this action: Canada Warbler, Northern Saw-whet Owl, Swainson's Thrush, Nashville Warbler, Magnolia Warbler, Veery, snowshoe hare

Season: Breeding

Threat Category: Logging and Wood Harvesting

Threat Impact: Low

Specific Threat: Lack of boreal forest conservation and beneficial management practices.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize boreal conifer forest management in appropriate areas; conserve mature spruce, hemlock, fir forest, release spruce seedlings and saplings, plant spruce and fir seedlings to fill conifer forest gaps and increase conifer component in appropriate locations.

Objective: Increase spruce, hemlock, and fir forest acreage and number of blocks.

Action Priority: 3-Medium

Action Urgency: Initiate within 5-10 years

Measure: Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Section: High Plateau, Deep Valleys, Glaciated Low Plateau, Glaciated High Plateau, Glaciated Pocono Plateau

Other species likely to benefit from this action: Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare.

Season: Breeding

Priority	Need	Partners
1	What are the limiting factors across this species' range leading to its long-term decline?	Universities & research institutions
2	Are there forest conditions in this region or nearby that prevent this species from breeding in the Appalachian Mountains, including Pennsylvania, despite the potential for a rescue effect?	Universities & research institutions
3	What are the linkages between eastern populations of Olive-sided Flycatchers and wintering grounds in South and Central America?	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Locate any breeding populations in the state (Now considered Extirpated, no confirmed records since 1930's). Includes active searches at best potential sites. Explore the use of autonomous recording units to increase detectability in historical sites.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project at some locations with a history of breeding Olive-sided Flycatchers.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Mountain Bird Watch

Lead(s) : Vermont Center for Ecostudies

Link: http://vtecostudies.org/projects/mountains/mountain-birdwatch/

Description: Mountain Birdwatch (MBW) monitors songbirds that breed in the montane fir and spruce forests of the Northeast. MBW data provide the only region-wide source of population information on these high-elevation breeding birds. MBW's primary focus is Bicknell's Thrush, but this project also tracks nine other high-elevation avian breeders, red squirrels, and the conifer seeds that these avian nest predators eat. A Pennsylvania version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for Pennsylvania and the Appalachian Mountains.

Comments: The Pennsylvania Game Commission is working with Mountain Birdwatch to develop a version of this project that is appropriate for Pennsylvania and the Appalachian Mountains. There will be a series of point count trails in appropriate habitat (conifer forests) monitored by some staff, partners, and volunteers.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Likely to be undercounted by BBS.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Rare Mountain Forest Bird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments:

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Altman, B., and R. Sallabanks. 2012. Olive-sided Flycatcher (Contopus cooperi). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/502 (accessed July 2015).

Bailey, Richard S., Casey R. Rucker. (eds.). The Pennsylvania State University Press, University Park, Pennsylvania. 2021: 554 pages, several hundred color photographs, and several hundred occurrence maps. ISBN: 978-0-271-08980-5.

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Cope, T. M. 1936. Observations of the vertebrate ecology of some Pennsylvania virgin forests. Dissertation. Cornell University, Ithaca, New York.

D. Stralberg, S. M. Matsuoka, A. Hamann, E. M. Bayne, P. Sólymos, F. K. A. Schmiegelow, X. Wang, S. G. Cumming, S. J. Song. 2015. Projecting boreal bird responses to climate change: the signal exceeds the noise. Ecological Applications 25:52–69. http://dx.doi.org/10.1890/13-2289.1

Environment Canada. 2015. Recovery Strategy for Olive-sided Flycatcher (Contopus cooperi) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vi + 51 pp.

Fitzpatrick, J. W. 1980. Wintering of North American Tyrant Flycatchers in the Neotropics. Pages 67-78 in A. Keast and E. S. Morton, editors. Migrant birds in the Neotropics: ecology, behavior, behavior, distribution, and conservation. Smithsonian Institute Press, Washington, D.C.

Gross, D. A. 1992. Olive-sided Flycatcher (Contopus borealis). Pages 194-195 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Gross, D. A. 2010. Olive-sided Flycatcher (Contopus cooperi). Pages 119-123 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Haney, J. C. and C. P. Schaadt. 1996. Functional roles of eastern old growth in promoting forest bird diversity. Chapter 6 in M. B. Davis, editor. Eastern Old Growth Forests: Prospects for Rediscovery and Recovery. Island Press, Washington D.C.

Hart, J. A. and J. D. Lambert, editors. 2010. Mountain Birdwatch: Protocol and Standard Operating Procedures for Monitoring High-Elevation Landbirds in the Northern Appalachian and Laurentian Regions. Version 2.0. Vermont Center for Ecostudies and American Bird Conservancy, Norwich, Vermont. Available from http://vtecostudies.org/projects/mountains/mountain-birdwatch/ (accessed July 2015).

King, D. I., J. D. Lambert, J. P. Bunnaccord, and L. S. Prout. 2008. Avian population trends in the vulnerable montane forests of the Northern Appalachians, USA. Biodiversity Conservation 17:2691-2700.

Matsuoka, S. M., E. M. Bayne, P. Solymos, P. C. Fontaine, S. G. Cumming, F. K. A. Schmiegelow, and S. J. Song. 2012. Using binomial distance-sampling models to estimate the effective detection radius of point-count surveys across boreal Canada. Auk 129:268-282.

Rentch, J. S., T. M. Schuler, W. M. Ford, and G. J. Nowacki. 2007. Red spruce stand dynamics, simulations, and restoration opportunities in the Central Appalachians. Restoration Ecology 15:440-452.

Rimmer, C. C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubrey, D. Busbey, and R. J. Taylor. 2005. Mercury concentrations in Bicknell's Thrush and other insectivorous passerines in montane forests of Northeastern North America. Ecotoxicology 14:223-240.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Stone, W. 1900. The summer birds of the higher parts of Sullivan and Wyoming Counties, Pennsylvania. Abstract. Proceedings of the Delaware Valley Ornithological Club 3:20-23.

Young, R. T. 1896. Summer birds of the anthracite coal regions of Pennsylvania. Auk 13:278-285.

PENNSYLVANIA
WILDLIFE ACTION PLAN

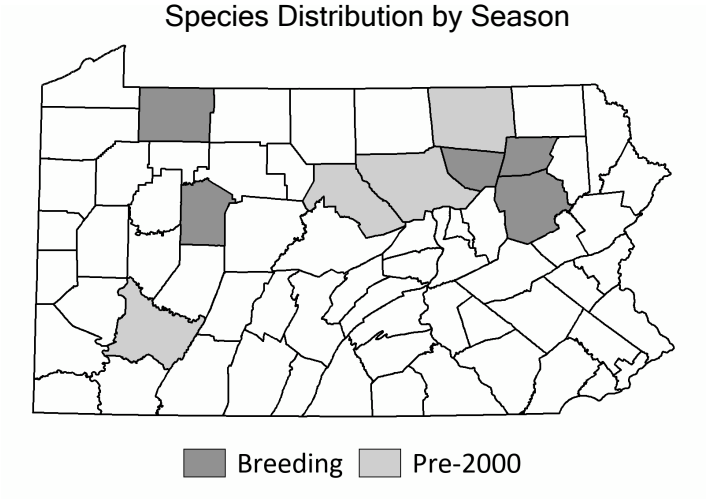
Yellow-bellied Flycatcher

Empidonax flaviventris

Douglas A. Gross

Pennsylvania Biological Survey Ornithological Technical Committee

D. Gross, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: 50 Yellow-bellied Flycatcher territorial pairs in at least five locations by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Cool, shady conifer-dominated forested wetlands and conifer forests. Nest sites are associated with conifer cover (spruce, hemlock), sphagnum moss cover, numerous shrubs and saplings, and a rich layer of ground herbs, species typical of boreal forests (goldthread, starflower, bunchberry, creeping snowberry, blue bead lily). Ferns can be numerous, especially tall Cinnamon Fern. There can be canopy gaps and territories can have less than 50 percent canopy cover and many deciduous trees. Some territories have a fairly high tree canopy cover (> 60%). Yellow-bellied Flycatchers and other boreal forest birds disperse into large conifers that are at the edge of the peatland.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Appalachian Acidic Swamp

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** High

Specific Threat: Marcellus shale and shallow oil well infrastructure permanently replaces or fragments forest.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve boreal conifer forests and swamps through land protection and developing and implementing best management practices.

Objective: Protect core habitat areas for endangered and threatened species.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.

Potential Collaborators: Conserve large, contiguous forests to promote good water quality and support use of this habitat., Encourage complex forest structure, including conifers, to support diverse wildlife populations., Enroll private lands in voluntary conservation programs or establish voluntary conservation easesments to provide fish and wildlife habitat for future generations.

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Glaciated High Plateau, Deep Valleys, High Plateau, Glaciated Pocono Plateau, Glaciated Low Plateau

Other species likely to benefit from this action: Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Medium

Specific Threat: Habitat changes due to climate change likely to reduce or eliminate suitable habitat.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Conserve mature spruce / hemlock / fir forest, release spruce seedlings and saplings, plant spruce and fir seedlings to fill conifer forest gaps and increase conifer component.

Objective: Provide habitat for successful nesting.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Document nesting and nest success.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Glaciated High Plateau, Deep Valleys, High Plateau, Glaciated Pocono Plateau, Glaciated Low Plateau

Other species likely to benefit from this action: Northern Saw-whet Owl, Blackpoll Warbler, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

Season: Breeding

Priority	Need	Partners
1	What is the continued breeding population, habitat, persistence, and nesting success in Pennsylvania? Populations have declined or disappeared from long-occupied habitat islands since the 2nd Pennsylvania Breeding Bird Atlas. Why have these populations declined and where are they persisting? For several years, the species persisted and nests were successful despite limited range and population, suggesting that breeding habitat was acceptable.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations
2	What management approaches can maintain and increase the possibility of this boreal forest species and its ecosystem cohorts to continue in Pennsylvania?	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations, Universities & research institutions
3	What are the limiting factors through its full life cycle? What linkages can be made between the Northeast U.S. and its Middle American wintering ground? With the Pennsylvania population being so small and limited, it would be appropriate to cooperatively study this in the Northeast U.S. region (e.g., tagging individuals in the Adirondacks, Catskills, or other areas where it is more common and there are research partners).	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Continuous monitoring of known and recent breeding populations including breeding confirmation, success, habitat association, continuity of occupation. Explore the use of autonomous recording units to increase detectability in historical sites.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Find undiscovered or new locations that may have been overlooked or newly colonized, allowing study of population and protection of sites. This would include the 3rd Pennsylvania Bird Atlas project - encouraging and educating Atlas volunteers to search for this and other boreal forest birds in remote sites.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project. This would include local bird clubs and Audubon chapters interested in climate change monitoring and tracking effects of silvicultural management on forests.	Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Mountain Bird Watch

Lead(s) : Vermont Center for Ecostudies

Link: http://vtecostudies.org/projects/mountains/mountain-birdwatch/

Description: Mountain Birdwatch (MBW) monitors songbirds that breed in the montane fir and spruce forests of the Northeast. MBW data provide the only region-wide source of population information on these high-elevation breeding birds. MBW's primary focus is Bicknell's Thrush, a montane fir specialist that breeds only in the northeastern U.S. and adjacent areas of Canada, but this project also tracks nine other high-elevation avian breeders, red squirrels, and the conifer seeds that these avian nest predators eat. A Pennsylvania version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for Pennsylvania and the Appalachian Mountains.

Comments: The Pennsylvania Game Commission is working with Mountain Birdwatch to develop a version of this project that is appropriate for Pennsylvania and the Appalachian Mountains. There will be a series of point count trails in appropriate habitat (conifer forests) monitored by some staff, partners, and volunteers.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Marginal in state; not well-represented by standard surveys.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments: Need to explore remote conifer swamps, peatlands, and forests. Volunteers can be very helpful in these projects since they are skilled and motivated to find rare species.

Monitoring Need: Finding any breeding population of this Pennsylvania Endangered species with a limited and fragmented range.

Name: Rare Mountain Forest Bird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments: Studies have shown persistence at locations and nesting success, but also apparent disappearances of the species where it formerly nested. This species and other migratory boreal forest species are capable of colonizing sites with good habitat even after absence of several years.

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Gross, D. A. 1991. Yellow-bellied Flycatcher nesting in Pennsylvania with a review of its history, distribution, ecology, behavior, and conservation problems. Pennsylvania Birds 5:107-113.

Gross, D. A. 1992. Yellow-bellied Flycatcher. Pages 198-199 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2010. Yellow-bellied Flycatcher (Empidonax flaviventris). Pages 211-215 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Gross, D. A. 2012. Yellow-bellied Flycatcher (Empidonax flaviventris). Pages 244-245 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Gross, D. A. and P. E. Lowther. 2011. Yellow-bellied Flycatcher (Empidonax flaviventris). In A. Poole, editor. The Birds of North America Online. Cornell Laboratory of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/566 (accessed July 2015).

Hart, J. A. and J. D. Lambert, editors. 2010. Mountain Birdwatch: Protocol and Standard Operating Procedures for Monitoring High-Elevation Landbirds in the Northern Appalachian and Laurentian Regions. Version 2.0. Vermont Center for Ecostudies and American Bird Conservancy, Norwich, Vermont. Available from http://vtecostudies.org/projects/mountains/mountain-birdwatch/ (accessed July 2015).

Hill, J.M, and D.M. Williams. 2024. The State of the Mountain Birds Report: Northeast 2024. Vermont Center for Ecostudies, White River Junction, VT. Available from https://mountainbirds.vtecostudies.org/ (accessed February 2025).

King, D. I., J. D. Lambert, J. P. Bunnaccord, and L. S. Prout. 2008. Avian population trends in the vulnerable montane forests of the Northern Appalachians, USA. Biodiversity Conservation 17:2691-2700.

Matsuoka, S. M., E. M. Bayne, P. Solymos, P. C. Fontaine, S. G. Cumming, F. K. A. Schmiegelow, and S. J. Song. 2012. Using binomial distance-sampling models to estimate the effective detection radius of point-count surveys across boreal Canada. Auk 129:268-282.

Ralston, J., and J. J. Kirchman. 2013. Predicted range shifts in North American boreal forest birds and the effect of climate change on genetic diversity in Blackpoll Warbler (Setophaga striata). Conservation Genetics 14:543-555.

Rentch, J. S., T. M. Schuler, W. M. Ford, and G. J. Nowacki. 2007. Red spruce stand dynamics, simulations, and restoration opportunities in the Central Appalachians. Restoration Ecology 15:440-452.

Rimmer, C. C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubrey, D. Busbey, and R. J. Taylor. 2005. Mercury concentrations in Bicknell's Thrush and other insectivorous passerines in montane forests of Northeastern North America. Ecotoxicology 14:223-240.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

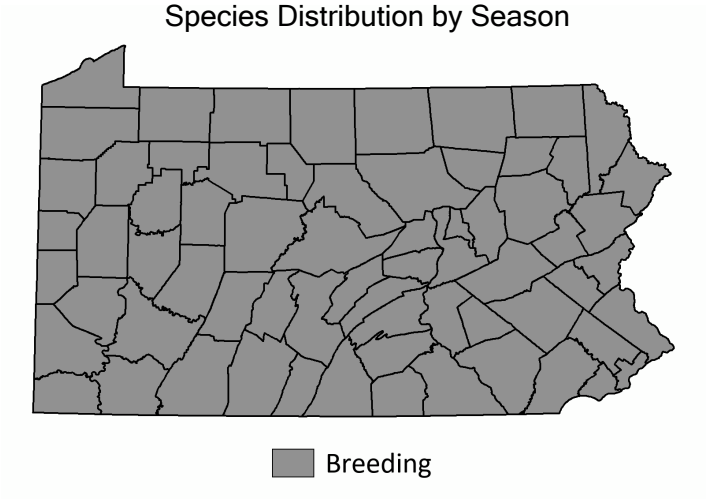
PENNSYLVANIA
WILDLIFE ACTION PLAN

Willow Flycatcher

Empidonax traillii

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase estimated population by 10%, from 250,000 males (from Breeding Bird Survey, PIF 2013) to 275,000, by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Low-elevation shrub swamp, wet meadow, and brushy habitats along streams and the edges of ponds and marshes; sometimes dry upland sites.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Wet Meadow-Shrub Swamp

Habitat Comments: In areas of sympatry with sibling species Alder Flycatcher, Willow Flycatcher tends to prefer more open, less woody habitats. The two species maintain territorial exclusion in zone of overlap (much of northern Pennsylvania).

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** High

Specific Threat: Loss of natural flow regimes due to dams and water management impacting riparian habitats.

Action Category: Mitigate human environmental impact

Specific Action: Promote natural flow regimes to maintain healthy riparian areas through dam removals or other water management actions.

Objective: Maintain natural flow regimes through healthy riparian areas.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Length of streams protected, area in functional riparian habitat.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: Statewide

Other species likely to benefit from this action: Alder Flycatcher, American Woodcock

Season: Breeding

Threat Category: Fire and Fire Suppression **Threat Impact:** High

Specific Threat: Loss of barrens habitats due to succession and fire suppression.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Use prescribed fire or mechanical methods to maintain or increase early successional habitats and barrens.

Objective: Maintain or increase barrens habitats occupied by Willow Flycatcher.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Area of barrens regenerated or created.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Local agencies & municipalities, Non-governmental organizations

Locations: Physiographic Province: Ridge and Valley. Physiographic Section: Appalachian Mountain

Other species likely to benefit from this action: American Woodcock, Eastern Whip-poor-will, Golden-winged Warbler

Season: Breeding

Priority	Need	Partners
1	Assess the relative contributions of wet vs. upland habitats used by this species. Perhaps use Breeding Bird Atlas point count data and assess vegetation within 100m (328 ft) of points with Willow Flycatcher detections.	Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	Investigate sources of nest mortality in different habitats. Are upland habitats more or less productive than wetter ones?	Pennsylvania Game Commission, Universities & research institutions
3	Investigate the effect of habitat management for other priority species (such as American Woodcock) on Willow Flycatchers.	Pennsylvania Game Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Riparian shrubland monitoring especially in Important Bird Areas.	Conservancies & Land Trusts, Delaware River Basin Commission, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission
2	Conduct post-treatment surveys of silvicultural treatments to determine reaction of young forest and shrub species.	Private Landowners, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions
3	Watershed quality monitoring of riparian bird species.	Susquehanna River Basin Commission, Delaware River Basin Commission, U.S. Geological Survey, U.S. Environmental Protection Agency

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: This species is not well-covered by BBS due its remote habitats.

Monitoring Need:

Dettmers, R. 2003. Status and conservation of shrubland birds in the northeastern U.S. Forest Ecology and Management 185:81-93.

Graf, W. L., J. Stromberg, and Brad Valentine. 2002. Rivers, dams, and willow flycatchers: a summary of their science and policy connections. Geomorphology 47(2-4):169-188.

McCabe, R. A. 1991. The little green bird: ecology of the willow flycatcher. Rusty Rock Press, Madison, Wisconsin.

Mulvihill, R. S. 1992. Willow flycatcher (Empidonax traillii). Pages 204-205 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Sedgwick, J. A. 2000. Willow Flycatcher (Empidonax traillii). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/533 (accessed July).

Sheehan, J. 2000. Willow Flycatcher. Pages 283-285 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Shook, R. S., S. H. Stoleson, and P. Boucher. 2003. A field evaluation of the Southwestern Willow Flycatcher survey protocol. Pages 177-179 in M. K. Sogge, B. E. Kus, S. J. Sferra, and M. J. Whitfield, editors. Ecology and Conservation of the Willow Flycatcher. Studies in Avian Biology 26. Cooper Ornithological Society, Allen Press, Lawrence, Kansas.

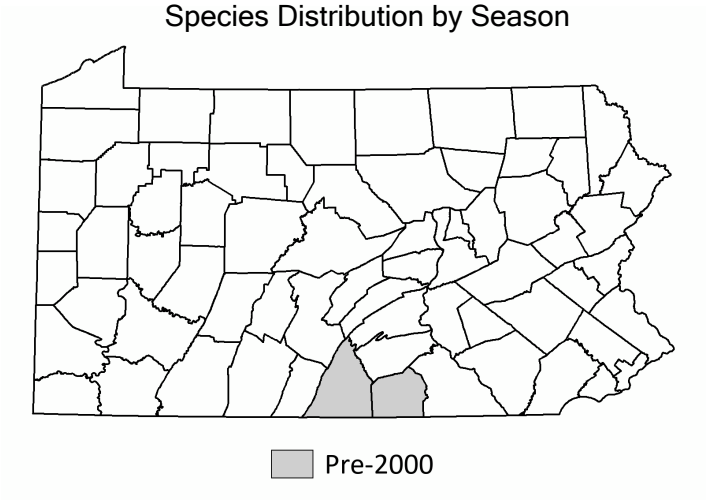
PENNSYLVANIA
WILDLIFE ACTION PLAN

Loggerhead Shrike

Lanius ludovicianus

Patricia M. Barber — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Determine population status and protect/manage nesting sites where found. Reestablish a breeding population of at least 10 nesting pairs annually by 2035.

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Very High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Open country with short grasses and forbs of low stature interspersed with bare ground and shrubs or small trees.

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Direct loss of habitat due to development and modification.

Action Category: Outreach, communication and distribution

Specific Action: Encourage developments to leave space for native, early successional habitat rather than short lawns and exotic vegetation.

Objective: Ten pairs of nesting Loggerhead Shrikes annually by 2035.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Area retained in appropriate habitat.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Physiographic Province: Ridge and Valley, Piedmont

Other species likely to benefit from this action: Other early successional species across all taxa.

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Very High

Specific Threat: Loss and degradation of open nesting habitat to succession.

Action Category: Mitigate human environmental impact

Specific Action: Allowing successional/old field conditions, limiting intensive agriculture to allow edge habitat for shrikes to forage and rear young.

Objective: Ten pairs of nesting Loggerhead Shrikes annually by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of habitat preserved.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other state agency, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Township Zoning Boards, U.S. Army Corps of Engineers, U.S. Department of Agriculture-Natural Resources Conservation Service, Universities & research institutions

Locations: Physiographic Province: Ridge and Valley, Piedmont

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Investigate and document all reports of Loggerhead Shrike during nesting season. Determine status as a Pennsylvania breeding bird. Enter sighting locations into Pennsylvania Natural Diversity Inventory (PNDI).	Non-governmental organizations, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Interested Public
2	Gain a better understanding of the landscape composition and habitat characteristics required for successful breeding habitat.	Pennsylvania Game Commission, Universities & research institutions
3	Evaluate feasibility of reintroduction, including challenges associated with successful captive breeding for a seed population and successful release.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct follow up surveys of any nesting season observations to document presence of any breeding Loggerhead Shrikes.	Pennsylvania Game Commission
2	Partners in Flight hosts an informal working group consisting of partners from the U.S. and Canada. The group has been coordinating a regional approach to answering questions on the population ecology of Loggerhead Shrike on its breeding and wintering grounds within the framework of an initial 5-year plan.	Non-governmental organizations

Name: Annual threatened and endangered species breeding season monitoring

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Conduct annual surveys during nesting season to confirm status, extirpation or presence of Loggerhead Shrike in the state. Monitoring should concentrate on suitable habitat in areas of most recent reports such as Cumberland, Franklin, Adams and Lancaster counties.

Comments:

Monitoring Need:

Name: Ongoing Loggerhead Shrike monitoring by Pennsylvania birding community

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Mining for Loggerhead Shrike data on eBird, reaching out to birding community to share observations and proper documentation during each nesting season.

Comments:

Monitoring Need:

Brauning, D. W. and D. Seifken. 2005. Loggerhead Shrike Research/Management: Loggerhead Shrike Nesting Survey/Habitat Enhancement, Adams and Franklin Counties (Abstract).

Haffner C. and Gross D., Loggerhead Shrike species account. Pennsylvania Game Commission, Harrisburg, Pennsylvania. Available from http://www.portal.state.pa.us/portal/server.pt?open=514&objID=621014&mode=2 (accessed August 2014).

Malosh, G. 2012. Loggerhead Shrike (Lanius ludovicianus). Pages 260-261 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1 NatureServe, Arlington, Virginia. Available from http://www.explorer.natureserve.org (accessed December 2014 and January 2015).

North American Bird Conservation Initiative, U.S. Committee. 2014. The State of the Birds 2014 Report. U.S. Department of Interior, Washington, D.C.

PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission). 2005. Pennsylvania's Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy, L. Williams, editor.) Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, revised 2008, Harrisburg, Pennsylvania.

Sechler Jr., F. C. Loggerhead Shrike. CWCS-Priority Species' Assessment. PA Natural Heritage Program. The Nature Conservancy. Middletown, Pennsylvania.

Sechler Jr., F.C. 2010. Loggerhead Shrike (Lanius ludocicianus). Pages 123-126 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

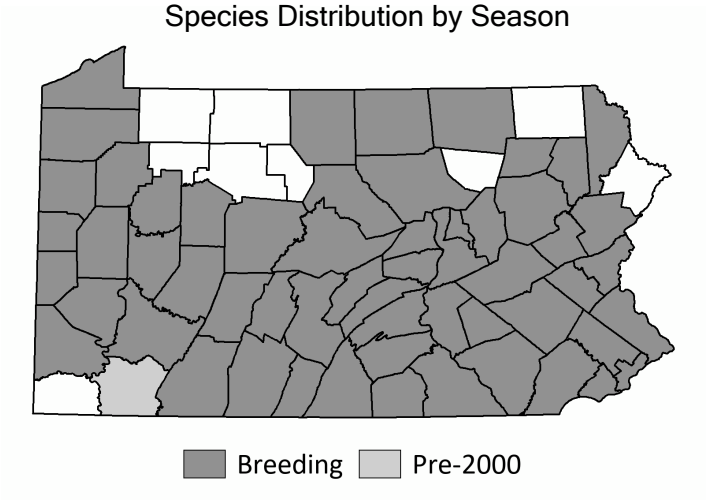
PENNSYLVANIA
WILDLIFE ACTION PLAN

Horned Lark

Eremophila alpestris

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding population at or above 2010 levels as reported by the Second Breeding Bird Atlas (40,500 territorial males in at least 780 atlas blocks).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Nests predominantly in intensively farmed fields, one of the few species to do so. Use of reclaimed strip mines may be limited to the first few years of reclamation, before grasses and forbs become more fully established.

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Herbicide and Pesticide sprays on agricultural fields where birds feed and nest

Action Category: Outreach, communication and distribution

Specific Action: Work with Department of Agriculture to reduce or limit use of damaging pesticides and herbicides in agricultural areas, particularly neonicotinoids.

Objective: Reduce use of neonicotinoids by 75-100% by 2025

Action Priority: 4-Low **Action Urgency:** Can wait 10 years to initiate **Measure:** Acres of Round-up Ready corn or soybean and Acres planted with neonicotinoids GMO seeds.

Potential Collaborators: Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Susquehanna Lowland, Appalachian Mountain, Great Valley, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Upland, Piedmont Upland, Piedmont Lowland, Piedmont Lowland, Anthracite Upland

Other species likely to benefit from this action: Other birds nesting in agricultural fields

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Low

Specific Threat: Use of large scale farming equipment to plant during the nesting season could destroy nests

Action Category: Basic research and status monitoring

Specific Action: Delay farming practices until after nesting season, or advance planting to occur before nesting season.

Objective: Avoid field disturbance from April 15-July 1

Action Priority: 4-Low **Action Urgency:** Can wait 10 years to initiate **Measure:** acres delayed

Potential Collaborators: Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Appalachian Mountain, Susquehanna Lowland, Great Valley, Anthracite Upland, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Upland, Piedmont Upland, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Lowland, Piedmont Upland, Great Valley

Other species likely to benefit from this action: Other birds nesting in agricultural fields

Season: Breeding

Threat Category: Livestock Farming and Ranching **Threat Impact:** Low

Specific Threat: Use of large farming equipment to plant during the nesting season could destroy nests

Action Category: Basic research and status monitoring

Specific Action: Encourage sustainable rotational grazing by farmers that avoids brown lots and maintains at least 3 in (7.6cm) of grass cover.

Objective: Enroll at least 2,500 acres (1012 ha) of pasture into a rotational grazing program.

Action Priority: 4-Low **Action Urgency:** Initiate within 5-10 years **Measure:** Area enrolled.

Potential Collaborators: U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Waynesburg Hills, Allegheny Mountain, Allegheny Front, Appalachian Mountain, Susquehanna Lowland, Great Valley, Gettysburg-Newark Lowland, Piedmont Upland, Piedmont Lowland, Blue Mountain, Anthracite Upland

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Which specific crops and agricultural practices are this species associated with in Pennsylvania?	Universities & research institutions, Pennsylvania Game Commission
2	What are the impacts of pesticides applied directly to agricultural fields on Horned Lark nesting success and fitness?	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Grassland Bird Surveys administered by the Pennsylvania Game Commission focused on state game lands	Pennsylvania Game Commission

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Horned Lark song is easily detected as birds sing in flight above nesting fields. Thus, the Breeding Bird Survey is an effective detection method for this species.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: The Atlas will provide a snapshot of the population status and distribution of birds in the Commonwealth. No other bird surveys are as comprehensive, and for that reason, the results are critical to the establishment of conservation priorities for Pennsylvania birds. The Atlas is open to all volunteer birders, regardless of skill level, primarily by using the popular "eBird" online database to record observations.

Comments: Many roads and trails typically intersect farmland where Horned Larks breed, ensuring easy access to these habitats for volunteers completing surveys.

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

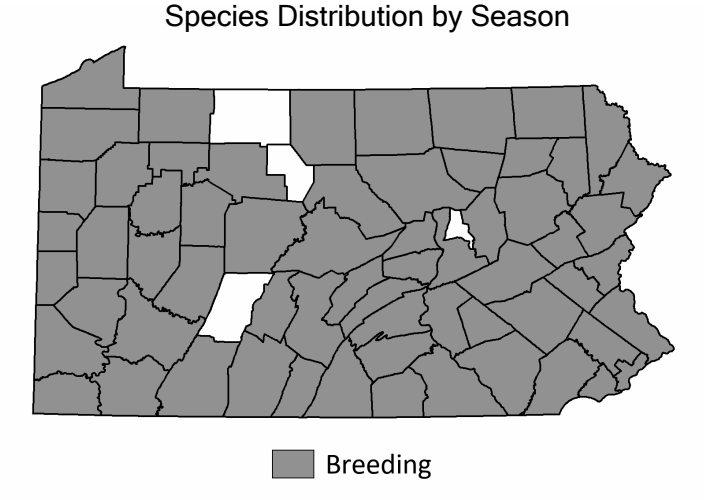
PENNSYLVANIA
WILDLIFE ACTION PLAN

Bank Swallow

Riparia riparia

Nathan J. Zalik *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain nesting distribution with colonies in at least 337 Breeding Bird Atlas blocks (Wilson et al. 2012) through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 70-80%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Nesting burrows excavated in near-vertical banks and bluffs with sandy, erodible soils along lakes, rivers and streams. Nesting colonies also found in artificial sites such as sand and gravel quarries and road cuts. Breeding sites often located near open terrestrial habitat used for aerial foraging (e.g., grasslands, meadows, pastures, and agricultural cropland).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Riparian & Floodplains

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Distribute pesticide application best practice information to private property owners, farmers, and businesses.

Objective: Reduce pesticide use by 25% within the targeted communication population.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Reduction in pesticide use reported in follow-up surveys of the targeted population.

Potential Collaborators: Businesses, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Association of Conservation Districts, Private Landowners, Township Zoning Boards, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Tree Swallow, Barn Swallow, Chimney Swift, Eastern Whip-poor-will

Season: Breeding

Priority	Need	Partners
1	To what degree does pesticide use impact the abundance and diversity of flying insect populations and, in turn, the diets and demographic parameters of aerial insectivores?	Universities & research institutions
2	Assess response of Bank Swallow colonies and other riparian birds to stream health, especially in areas impacted by industrial pollution or heavy pesticide use.	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Identify and monitor large nesting colonies.	Pennsylvania Game Commission, Private Landowners, Businesses, Universities & research institutions
2	Determine the proportion of Bank Swallows that nest in natural sites (e.g., river banks, lakeside cliffs) versus man-made sites (e.g., sand and gravel quarries).	Universities & research institutions, Private Landowners, Businesses
3	Watershed quality monitoring of riparian bird species.	Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Cowley, E. and G. M. Siriwardena. 2005. Long-term variation in survival rates of Sand Martins, Riparia riparia: dependence on breeding and wintering ground weather, age and sex, and their population consequences. Bird Study 52:237-251.

Falconer, M., K. Richardson, A. Heagy, D. Tozer, B. Stewart, J. McCracken, and R. Reid. 2016. Recovery strategy for the Bank Swallow (Riparia riparia) in Ontario. Ontario recovery strategy series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario.

Garrison, B. A. and A. Turner. 2020. Bank Swallow (Riparia riparia), version 1.0 in S. M. Billerman, editor. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Available from https://doi.org/10.2173/bow.banswa.01 (accessed November 2024).

Hallman, C. A., R. P. B. Foppen, C. A. M. van Turnhout, H. de Kroon, and E. Jongejans. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature DOI: 10.1038/nature13531 (accessed July 2015).

K. V. Rosenberg, J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J.D. Alexander, C. J. Beardmore, P. J. Blancher, R. E. Bogart, G. S. Butcher, A. F. Camfield, A. Couturier, D. W. Demarest, W. E. Easton, J.J. Giocomo, R.H. Keller, A. E. Mini, A. O. Panjabi, D. N. Pashley, T. D. Rich, J. M. Ruth, H. Stabins, J. Stanton, T. Will. 2016. Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee. 119 pp.

Malosh, G. 2012. Bank Swallow. Pages 288-289 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Nebel, S. A., J. D. McCracken, and P.D. Taylor. 2010. Declines of aerial insectivores in North America follow a geographic gradient. Avian Conservation and Ecology 5:1. Available from http://www.ace-eco.org/vol5/iss2/art1/ (accessed July 2015).

Ontario Ministry of Natural Resources and Forestry. 2017. Best management practices for the protection, creation and maintenance of bank swallow habitat in Ontario. Queen's Printer for Ontario. 37 pp.

Partners in Flight. 2020. Population Estimates Database, version 3.1. Available at http://pif.birdconservancy.org/population-estimates-database. Accessed February 2025.

Spiller, K. J., and R. Dettmers. 2019. Evidence for multiple drivers of aerial insectivore declines in North America. The Condor: Ornithological Applications 121:1-13.

Szép, T., Z. Szabó D., and J. Vallner. 2003. Integrated population monitoring of sand martin, Riparia riparia-an opportunity to monitor the effects of environmental disasters along the river Tisza. Ornis Hungarica 12-13:169-182.

Wilson, A. 2010. Bank Swallow. Pages 290-293 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

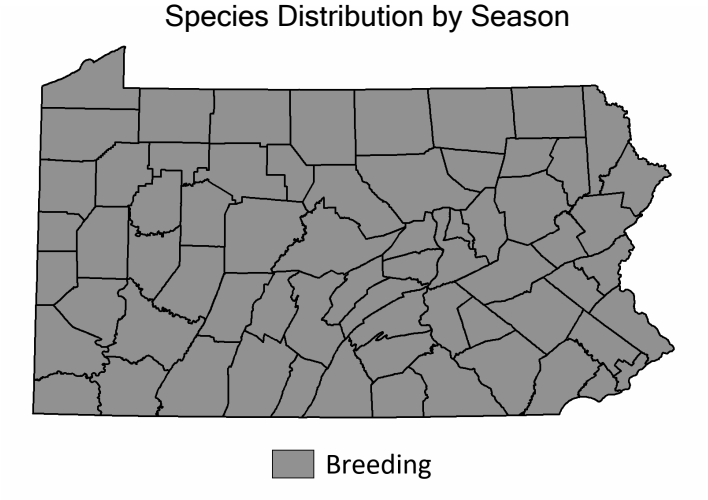
PENNSYLVANIA
WILDLIFE ACTION PLAN

Tree Swallow

Tachycineta bicolor

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain the current estimated population of 270,000 individuals (95% CI, 160,000 - 420,000; Partners in Flight 2020) and seek opportunities to expand and increase the populations through installing nest boxes on public and private lands.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Often associated with water and other open habitats, including farmland. Negatively associated with areas of high percentage forest.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Appalachian Acidic Swamp

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss of natural tree cavity sites for nesting.

Action Category: Stewarding wild individuals

Specific Action: Increase the number of available cavities for nesting Tree Swallows.

Objective: Deploy 500 Tree Swallow nest boxes statewide in suitable habitat.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Number of nest boxes deployed.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Reduce insecticide and herbicide application on large agricultural fields, and encourage 'green' methods of pesticide control, like cover crops and nurse crops.

Objective: Enroll farmers into the Integrated Pest Management Program to reduce the amount of pesticide used.

Action Priority: 4-Low **Action Urgency:** Can wait 10 years to initiate **Measure:** Number of farms enrolled with an Integrated Pest Management plan.

Potential Collaborators: Other state agency, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Other birds nesting in agricultural fields.

Season: Breeding

Priority	Need	Partners
1	Are there short term benefits for a cavity nester resulting from ash tree death by emerald ash borer?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Is climate variability creating a northward shift in the range of Tree Swallows in Pennsylvania?	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

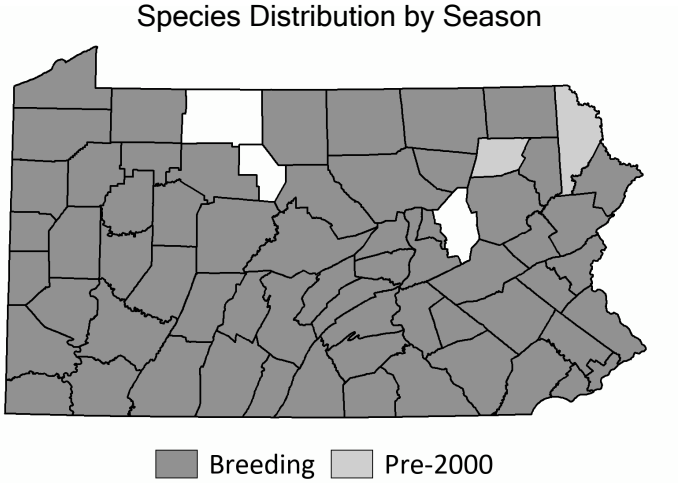
PENNSYLVANIA
WILDLIFE ACTION PLAN

Purple Martin

Progne subis

Joe Siegrist — *Purple Martin Conservation Association*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase the number of active colonies by 20% statewide within the next ten years.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Nearby water sources are not necessary, however they can be helpful as a food source. Martin housing should be placed in the most open spot available, at least 12 meters (40 feet), but preferably 18 meters (60 feet), from trees or buildings and within 30 meters (100 feet) of human housing or activity. Proximity to humans and a wide-open location and flight area will help protect martins from predators.

Primary Habitat: Developed

Primary Habitat Type: Developed Areas

Primary Specific Habitat: NA

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Nest competition from House Sparrows and European Starlings.

Action Category: Outreach, communication and distribution

Specific Action: Inform public of the harm caused by non-native nest competitors, encouraging them to not tolerate nesting House Sparrows or European Starlings.

Objective: Decrease use of Purple Martin housing by House Sparrows or European Starlings by 25% in the next 10 years.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of nest compartments taken over by House Sparrows or European Starlings.

Potential Collaborators: Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: All native cavity nesters

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Reduce insecticide and herbicide application on large agricultural fields, and encourage 'green' methods of pesticide control, like cover crops and nurse crops.

Objective: Enroll farmers into the Integrated Pest Management Program to reduce the amount of pesticide used.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Number of farms enrolled with an Integrated Pest Management plan.

Potential Collaborators: Other state agency, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Aerial insectivores

Season: Breeding

Priority	Need	Partners
1	How are Purple Martins adapting to changing phenologies of insect emergence and climate conditions?	National Oceanic and Atmospheric Administration, Non-governmental organizations, Pennsylvania Biological Survey, Universities & research institutions, U.S. Fish and Wildlife Service, U.S. Geological Survey, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Private Landowners
2	How is the decline in flying insect abundance affecting the reproductive success of Purple Martins?	Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission, U.S. Geological Survey, U.S. Fish and Wildlife Service, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Private Landowners
3	What are the habitat requirements of Purple Martins at migration stop-over locations throughout North, Central and South America?	Non-governmental organizations, Universities & research institutions, Private Landowners, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission
4	What are the long term effects of low level exposure to chemical pollutants?	Universities & research institutions, Non-governmental organizations, Pennsylvania Department of Environmental Protection, U.S. Environmental Protection Agency
5	What is the general makeup of a Purple Martin landlord? What drives an individual to supply martin housing and manage an active colony?	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Private Landowners

Season: Breeding

Priority	Survey	Partners
1	Accurately document the locations of active and inactive Purple Martin colonies throughout the Commonwealth.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Project MartinRoost

Lead(s) : Purple Martin Conservation Association

Link: https://www.purplemartin.org/research/19/project-martinroost/

Description: Annual monitoring of Purple Martin premigratory roosts.

Comments: This task will mainly be completed by Purple Martin landlords but is available online and can be used by other groups and organizations, i.e., Pennsylvania Purple Martin Working Group, state agencies.

Monitoring Need:

Name: Project MartinWatch

Lead(s) : Purple Martin Conservation Association

Link: https://www.purplemartin.org/projectmartinwatch/

Description: Reproductive success of Purple Martins at the colony site. Collects data such as parental age, first egg date, nest success.

Comments: This task will mainly be completed by Purple Martin landlords but is available online and can be used by other groups and organizations, i.e., Pennsylvania Purple Martin Working Group, state agencies.

Monitoring Need:

Name: Scout-Arrival Study

Lead(s) : Purple Martin Conservation Association

Link: http://www.purplemartin.org/scoutreport/

Description: Documents first arrival dates of adult and subadult Purple Martins throughout North America.

Comments: This is an important monitoring and management aid for landlords in Pennsylvania.

Monitoring Need:

Brown, C.R. 1997. Purple Martin (Progne subis). Account 287 in A. Poole and F. Gill, editors. The Birds of North America. The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington D.C.

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Hallman, C. A., R. P. B. Foppen, C. A. M. van Turnhout, H. de Kroon, and E. Jongejans. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature DOI: 10.1038/nature13531 (accessed July 2015).

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

Pyle, P., S. N. G. Howell, and S. Ruck. 1997. Purple Martin. Pages 320-321 in P. Pyle. Identification Guide to North American Birds: A Compendium of Information on Identifying, Ageing, and Sexing "near-passerines" and Passerines in the Hand. Slate Creek, Bolinas, California.

Tautin, J. 2012. Purple Martin (Progne subis). Pages 283-284 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Tautin, J., T. Dodge, and R. Aeppli. 2012. Addressing the decline of Purple Martins in Pennsylvania. Poster. PA Wildlife Diversity Forum, Pennsylvania Game Commission. 28-29 June 2012, State College, Pennsylvania.

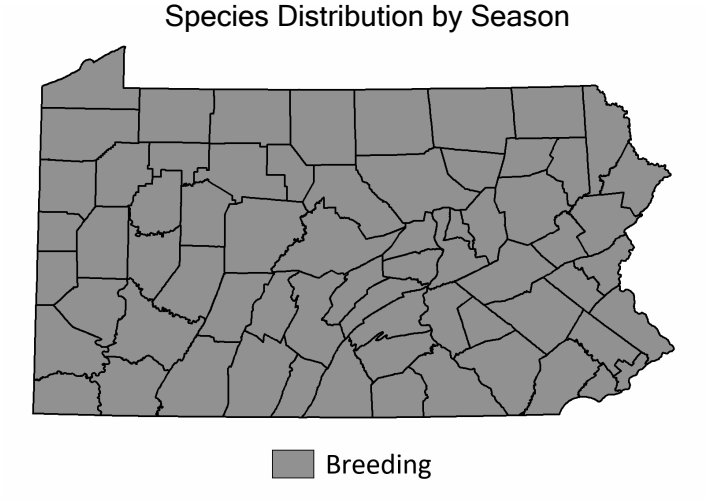
PENNSYLVANIA
WILDLIFE ACTION PLAN

Barn Swallow

Hirundo rustica

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding population at or above 2010 levels as reported by the Second Breeding Bird Atlas (590,000 territorial males in at least 4,350 atlas blocks).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Nest most commonly built on man-made structures in agricultural and other open landscapes.

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Agricultural and Forestry Effluents

Threat Impact: High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Reduce insecticide and herbicide application on large agricultural fields, and encourage 'green' methods of pesticide control, like cover crops and nurse crops.

Objective: Enroll farmers into the Integrated Pest Management Program to reduce the amount of pesticide used.

Action Priority: 4-Low

Action Urgency: Can wait 10 years to initiate

Measure: Number of farms enrolled with an Integrated Pest Management plan.

Potential Collaborators: Other state agency, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Other birds nesting in agricultural areas.

Season: Breeding

Priority	Need	Partners
1	Identify the causes of the worldwide decline in aerial insectivorous bird species, including the Barn Swallow.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Nebel, S., A. Mills, J. D. McCracken, and P. D. Taylor. 2010. Declines of aerial insectivores in North America follow a geographic gradient. Avian Conservation and Ecology - Écologie et conservation des oiseaux 5(2): 1. [online] URL: http://www.ace-eco.org/vol5/iss2/art1/

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

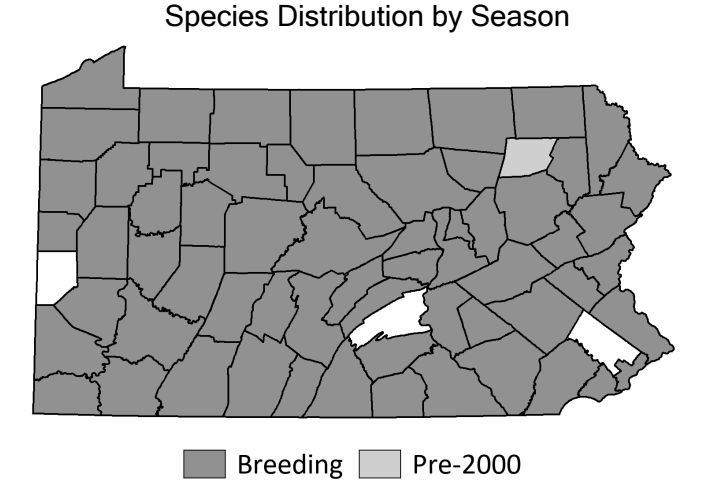
PENNSYLVANIA
WILDLIFE ACTION PLAN

Cliff Swallow

Petrochelidon pyrrhonota

Stefan Karkuff — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain a stable number of nesting pairs with the number of colonies documented in the Second Atlas of Breeding Birds in Pennsylvania (Wilson et al. 2012), through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: In Pennsylvania nests exclusively on human-built structures, primarily bridges but also rural buildings with overhangs (barns, sheds, pavilions).

Primary Habitat: Developed

Primary Habitat Type: Developed Areas

Primary Specific Habitat: NA

Habitat Comments: Bridge colonies average more pairs than colonies at other structures (barns, sheds, pavilions).

Season: Breeding

Threat Category: Agricultural and Forestry Effluents

Threat Impact: High

Specific Threat: Reduced abundance, diversity, and altered timing of flying insect prey due to widespread pesticide use.

Action Category: Outreach, communication and distribution

Specific Action: Reduce insecticide and herbicide application on large agricultural fields, and encourage 'green' methods of pesticide control, like cover crops and nurse crops.

Objective: Enroll farmers into the Integrated Pest Management Program to reduce the amount of pesticide used.

Action Priority: 4-Low

Action Urgency: Can wait 10 years to initiate

Measure: Number of farms enrolled with an Intergrated Pest Management plan.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Aerial insectivores

Season: Breeding

Priority	Need	Partners
1	Do House Sparrows and ectoparasites impact cliff swallow reproductivity at colony sites?	Pennsylvania Game Commission, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Long-term monitoring of historical nesting colonies will reveal trends in local populations and may be the "canary in the coal mine" for statewide trends.	Pennsylvania Game Commission

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments: Cliff Swallows are easily detectable due to their association with man-made structures and colonial nesting habits.

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

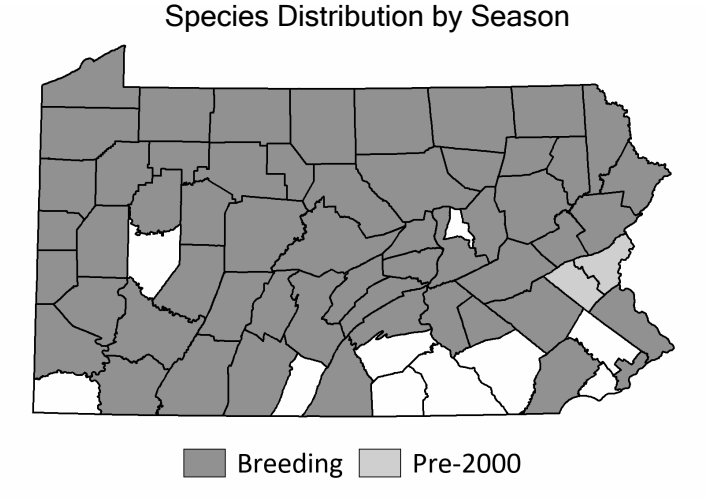
PENNSYLVANIA
WILDLIFE ACTION PLAN

Winter Wren

Troglodytes hiemalis

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain or increase the currently stable Winter Wren population, an estimated 32,000 singing males (Wilson et al. 2012), through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: High elevation, coniferous/mixed forests, with a substantial hemlock component. Nests often near water, particularly streams in hemlock ravines but sometimes near bogs or swamps; require substantial downed woody debris, standing dead trees, or large-diameter logs.

Primary Habitat: Forested Upland

Primary Habitat Type: High Elevation Forests

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: In 2nd PA Breeding Bird Atlas, WIWR had the strongest association with hemlock of all PA birds

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Eastern hemlock (Tsuga canadensis) loss due to hemlock woolly adelgid (HWA) infestation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Control hemlock woolly adelgid (HWA) in areas with high species occurrence.

Objective: Maintain healthy eastern hemlock stands.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Acres of eastern hemlock surviving annually post-treatment for ten years.

Potential Collaborators: Conservancies & Land Trusts, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Section: High Plateau, Deep Valleys, Glaciated Low Plateau

Other species likely to benefit from this action: Swainson's Thrush, Magnolia Warbler, Blackburnian Warbler

Season: Breeding

Priority	Need	Partners
1	Evaluate Winter Wren response to varying levels of habitat damage by hemlock woolly adelgid including suitability of hemlock surrogates (e.g., Norway and red spruce, fir, larch) as Winter Wren habitat to inform restoration efforts in areas hit hard by HWA.	Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	What are effects of energy and residential development on area-sensitve forest birds in the large forest blocks of the state?	Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations
3	Determine Winter Wren responses to silvicultural practices.	Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions, Private Landowners, Other federal agency

Season: Breeding

Priority	Survey	Partners
1	Off road point counts in large-scale forests, mostly Pennsylvania Important Bird Areas.	Conservancies & Land Trusts, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners
2	Mountain Bird Watch extended to Pennsylvania.	Conservancies & Land Trusts, Pennsylvania Game Commission

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Under-represented by surveys but BBS still gives broad geographical coverage that assists monitoring trends and range changes.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Brauning, D. W. 1992. Winter Wren. Pages 254-255 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh.

Gross, D. A. 2003. Avian Population and Habitat Assessment Project: Pennsylvania Important Bird Area #48, State Game Lands #57, Wyoming, Luzerne, and Sullivan Counties. (For Pennsylvania Audubon.) Ecology III, Inc., Berwick, Pennsylvania.

Grove, G. 2010. Winter Wren. Pages 293-295 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Haney, J. C. 1999. Hierarchical comparisons of breeding birds in old-growth conifer-hardwood forest on the Appalachian Plateau. Wilson Bulletin 111: 89-99.

Hejl, S. J., J. A. Holmes, and D. E. Kroodsma. 2002. Winter Wren (Troglodytes hiemalis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/623 (accessed July 2015).

Matthews, S. N., L. R. Iverson, A. M. Prasad, and M. P. Peters. 2007-ongoing. A Climate Change Atlas for 147 Bird Species of the Eastern United States [database]. USDA Forest Service Northern Research Station, Delaware, Ohio. Available from http://www.nrs.fs.fed.us/atlas/bird (accessed July 2015).

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Stoleson, S. H. 2012. Winter Wren (Troglodytes hiemalis). Pages 310-311 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Tingley, M. W., D. A. Orwig, R. Field, and G. Motzkin. 2002. Avian response to removal of a forest dominant: consequences of hemlock woolly adelgid infestations. Journal of Biogeography 29:1505-1516.

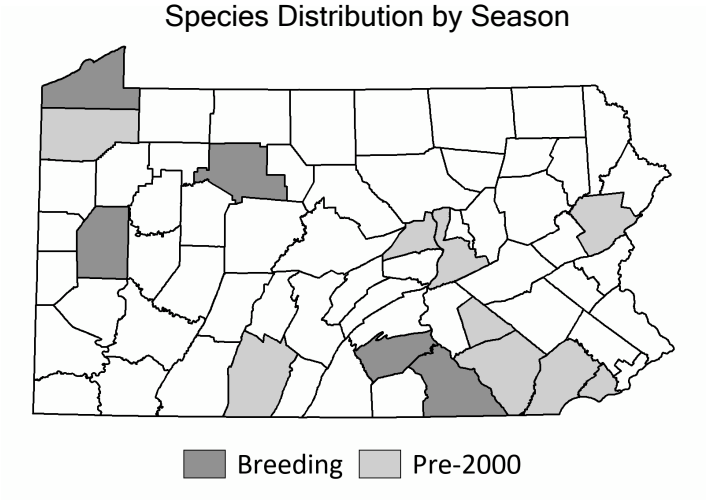
PENNSYLVANIA
WILDLIFE ACTION PLAN

Sedge Wren

Cistothorus stellaris

Richard S. Fritsky — *Pennsylvania Game Commission*

James R. Hill III



Conservation Profile

PA 10-Year Conservation Goal: Maintain population at current levels (~2 nesting territories per year) through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Densely vegetated wet meadows, hayfields, retired croplands, and upland pond and lake margins, and in coastal, brackish marshes with limited standing water.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** High

Specific Threat: Non-point source pollution especially during the nesting and brood-rearing seasons negatively affects breeding success and population recruitment.

Action Category: Complementary or alternative conservation measures

Specific Action: Promote Integrated Pest Management and the use of spot spraying herbicides and spot mowing in place of whole-field broadcast spray applications.

Objective: Minimize the use of pesticides and herbicides to maintain healthy grassland ecosystems.

Action Priority: 2-High **Action Urgency:** **Measure:** Percentage reduction in use of glyphosate, other herbicides, and pesticides.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau

Other species likely to benefit from this action: Bobolink, Eastern Meadowlark, Common Yellowthroat, Red-winged Blackbird, Northern Harrier

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Agricultural producers mowing during the nesting and brood-rearing seasons negatively affects breeding success and population recruitment.

Action Category: Outreach, communication and distribution

Specific Action: Inform public to avoid mowing grasslands and hay fields during the breeding season.

Objective: Reduce mowing of grasslands and hay fields during the breeding season.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Percentage of survey respondents who said they avoid mowing during the breeding season to conserve wildlife.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Pittsburgh Low Plateau, Northwestern Glaciated Plateau

Other species likely to benefit from this action: Bobolink, Eastern Meadowlark, Common Yellowthroat, Red-winged Blackbird, Northern Harrier

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** High

Specific Threat: More intense rainfall events and longer dry spells could stress native grasses and favor drought-resistant or invasive species.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Encourage agricultural practices that maintain soil moisture and reduce habitat loss, especially contour farming and no till seeding.

Objective: Maintain grassland habitat in drought conditions by maintaining soil moisture.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area planted annually using each Conservation District's rental no-till. Area enrolled in the USDA-NRCS Conservation Reserve Enhancement (CREP) Program's contour farming practice.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau

Other species likely to benefit from this action: Bobolink, Eastern Meadowlark, Common Yellowthroat, Red-winged Blackbird, Northern Harrier

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Non-native invasive plants outcompete native plants resulting in degraded habitat.

Action Category: Complementary or alternative conservation measures

Specific Action: Protect existing grasslands from invasive plants through spot spraying and spot mowing.

Objective: To maintain native grassland habitat absent of non-native plants.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Grassland area enrolled in the Conservation Reserve Enhancement Program (CREP).

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau

Other species likely to benefit from this action: Bobolink, Eastern Meadowlark, Common Yellowthroat, Red-winged Blackbird, Northern Harrier

Season: Breeding

Priority	Need	Partners
1	All known locations where breeding activity has been confirmed during the last 20 years should be surveyed during three periods – early June, late June – early July, and late July, for three consecutive years. Sedge Wrens are vocal, and frequently sing during both daylight and nighttime hours. Playback recordings may be effective in locating territorial males.	Private Landowners, Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
2	Determine population structure, productivity and threats, and monitor active breeding sites for five consecutive years to determine degree of site fidelity, and changes in population, productivity, and habitat.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Evaluate habitat characteristics at surveyed breeding sites, especially at the more reliable locations, in an effort to predict potential habitat elsewhere.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Constant search and inventory of the few sites where located.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
2	Local reaction of species to management of wetlands / wet meadows where found.	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations
3	Surveys for secretive wetland birds should include playing audio recordings of sedge wrens or at least register any encounters with the species.	Pennsylvania Game Commission

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Pennsylvania Game Commission Marsh Bird Surveys

Lead(s) : Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Moorhen, and American Coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Criswell, R. 2010. Sedge Wren. Pages 126-128 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Herkert, J. R., D. E. Kroodsma and J. P. Gibbs. 2001. Sedge Wren (Cistothorus platensis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/582 (accessed July 2015).

Johnson, D. H. and M. D. Schwartz. 1993. The Conservation Reserve Program and grassland birds. Conservation Biology 7:934-937.

Leddy, K. et. al. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. Wilson Bulletin 111:100-104.

Wilhelm, G. 2012. Sedge Wren. Pages 312-313 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

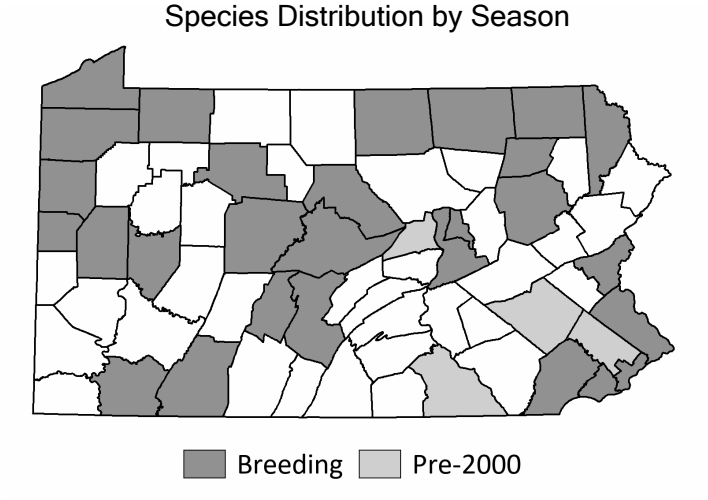
Marsh Wren

Cistothorus palustris

Richard S. Fritsky

Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Expand the breeding populations from 53 Pennsylvania Breeding Bird Atlas blocks (Wilson et al. 2012) to at least 60 blocks.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Wetlands that include dense stands of emergent vegetation, including cattails, bulrushes, sedges, common reed, and other tall, thick-stemmed aquatic plants. Large >8 ha (>20 ac) cattail and bulrush marshes and tidal marshes of the lower Delaware River with an abundance of standing water.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior Freshwater Marsh

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** Medium

Specific Threat: Construction and anthropogenic disturbance leading to erosion, sediment deposition, pollution, and loss of large natural wetlands and surrounding habitat.

Action Category: Mitigate human environmental impact

Specific Action: Restrict development in and around large wetlands >8 ha (20 ac); prevent erosion, sediment deposition, and changes to natural hydrology.

Objective: Maintain large natural wetlands with native plants, natural flow regimes, and ecosystem processes like nutrient cycling.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Percent of wetlands >8 ha (20 ac) that remain in natural state.

Potential Collaborators: Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Environmental Protection Agency

Locations: Physiographic Section: Northwestern Glaciated Plateau, Glaciated Low Plateau, Gettysburg-Newark Lowland, Lowland and Intermediate Upland

Other species likely to benefit from this action: Great Blue Heron, Green Heron, Least Bittern, American Bittern, Wood Duck

Season: Breeding

Priority	Need	Partners
1	Increase knowledge of Marsh Wren abundance and distribution throughout the state.	Pennsylvania Game Commission, Non-governmental organizations, Interested Public
2	Increase knowledge about the impact of invasive species such as purple loosestrife on Marsh Wren habitat usage.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Increase knowledge about the effect of mercury contamination on Marsh Wren productivity.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Environmental Protection

Season: Breeding

Priority	Survey	Partners
1	Surveys for secretive wetland birds should include audio recordings of Marsh Wren or at least document observations.	Pennsylvania Game Commission, Interested Public
2	Monitor changes in abundance and distribution of suitable emergent wetland habitat (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).	Pennsylvania Game Commission, Non-governmental organizations

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Game Commission Marsh Bird Surveys **Lead(s) :** Pennsylvania Game Commission

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-surveys/marsh-birds-survey.html

Description: During breeding seasons, Pennsylvania Game Commission staff, partners, and volunteers conduct standardized audio playback surveys for secretive marsh birds across the state including: Pied-billed Grebe, American Bittern, Least Bittern, Black Rail, King Rail, Virginia Rail, Sora, Common Gallinule, and American coot. Protocol adapted from North American Marsh Bird Monitoring Protocols (Conway 2011) and is very similar to that used in the 2nd Pennsylvania Breeding Bird Atlas. Survey results inform management of these wetlands.

Comments:

Monitoring Need:

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Criswell, R. 2012. Marsh Wren, Cistothorus palustris. Pages 202-203 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second atlas of breeding birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Jackson, A. K., D. C. Evers, M. Etterson, A. M. Condon, S. B. Folsom, J. Detweiler, J. Schmerfeld, and D. A. Cristol. 2011. Mercury exposure affects the reproductive success of a free-living terrestrial songbird, the Carolina Wren (Thryothrus ludovicianus). The Auk 128:759-769.

Mummert, D. P. 2010. Marsh Wren. Pages 148-150 in M. A. Steele, M. C. Brittingham, T. J. Maret and J. F. Merritt, editors. Terrestrial vertebrates of Pennsylvania: a complete guide to species of conservation concern. The Johns Hopkins University Press, Baltimore, Maryland.

Whitt, M. B., H. H. Prince, and R. R. Cox. 1999. Avian use of purple loosestrife dominated habitat relative to other vegetation types in a Lake Huron wetland complex. Wilson Bulletin 111:15-114.

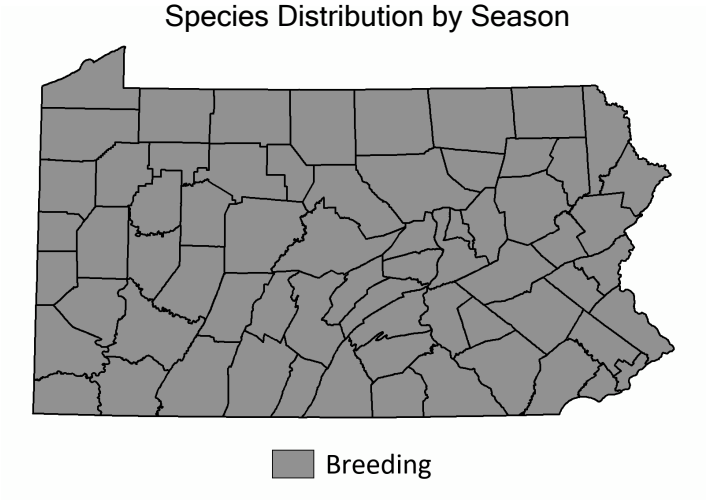
PENNSYLVANIA
WILDLIFE ACTION PLAN

Gray Catbird

Dumetella carolinensis

Nathan J. Zalik *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain statewide population at or above current levels of 25 birds per Breeding Bird Survey route through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Very High

SGCN Season: Breeding

State Rank (Season): S5B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: >1,000,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Dense, shrubby vegetation, including thickets, hedgerows, woodland edges, and regenerating clearcuts.

Primary Habitat: Open Upland

Primary Habitat Type: Shrublands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Predation by free-ranging domestic cats.

Action Category: Outreach, communication and distribution

Specific Action: Disseminate information about the effects of free-ranging cats on birds and the importance of keeping cats indoors or under close supervision at all times.

Objective: Decrease the number of free-ranging cats within the next 10 years.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of free-ranging cats.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Wood Thrush, Blue-winged Warbler, Ruffed Grouse

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Loss of shrubby vegetation to succession in the absence of forest and shrubland disturbance.

Action Category: Manage non-living habitat components

Specific Action: Create and/or maintain shrubby early successional habitat by utilizing prescribed fire.

Objective: Maintain or increase the area of shrubby early successional habitat by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of early successional habitat treatments.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Blue-winged Warbler, Golden-winged Warbler, American Woodcock, Mourning Warbler, Yellow-breasted Chat, Eastern Towhee, Chestnut-sided Warbler

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Loss of shrubby vegetation to succession in the absence of forest and shrubland disturbance.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Create and/or maintain shrubby early successional habitat by utilizing silvicultural treatments.

Objective: Maintain or increase the area of shrubby early successional habitat by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of early successional habitat treatments.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Blue-winged Warbler, Golden-winged Warbler, American Woodcock, Mourning Warbler, Yellow-breasted Chat, Eastern Towhee, Chestnut-sided Warbler

Season: Breeding

Priority	Need	Partners
1	How do Gray Catbirds respond to young forest management treatments in Pennsylvania?	Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners
2	What effects do non-native shrubs have on Gray Catbird diet and reproductive success?	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct pre-treatment and post-treatment bird surveys in areas managed for young forest and shrub species.	Pennsylvania Game Commission, Universities & research institutions, Private Landowners, Pennsylvania Department of Conservation and Natural Resources

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provide survival and productivity information for many songbird species and can be a useful measurement of temporal patterns.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Askins, R. A. 1998. Restoring forest disturbance to sustain populations of shrubland birds. Restoration and Management Notes 16:166-173.

Ickes, R. A. 2012. Gray Catbird. Pages 332-333 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Loss, S. R., T. Will, and P. P. Marra. 2013. The impact of free-ranging domestic cats on wildlife of the United States. Nature Communications 4:1396.

Marra, P. P., C. M. Francis, R. S. Mulvihill, and F. R. Moore. 2005. The influence of climate on the timing and rate of spring bird migration. Oecologia 142:307-315.

Matsuoka. S. M., C. L. Mahon, C. M. Handel, P. Sólymos, E. M. Bayne, P. C. Fontaine, and C. J. Ralph. 2014. Reviving common standards in point-count surveys for broad inference across studies. The Condor 116:599-608.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Roux, K. E., and P. B. Marra. 2007. The presence and impact of environmental lead in passerine birds along an urban to rural land use gradient. Archives of Environmental Contamination and Toxicology 3:261-268.

Ryder, T. B., J. W. Fox, and P. P. Marra. 2011. Estimating migratory connectivity of Gray Catbirds (Dumetella carolinensis) using Geolocator and Mark—Recapture Data. The Auk 128:448-453.

Smith, R. J., M. I. Hatch, D. A. Cimprich and F. R. Moore. 2020. Gray Catbird (Dumetella carolinensis). In A. F. Poole, editor. Birds of the World. Cornell Lab of Ornithology, Ithaca, New York. Available from https://doi.org/10.2173/bow.grycat.01 (accessed November 2024).

Smith, R. J.,and M. I. Hatch. 2008. A comparison of shrub-dominated and forested habitat use by spring migrating landbirds in Northeastern Pennsylvania. Condor 110:682-693.

Suthers, H. B., J. M. Bickal, and P. G. Rodewald. 2000. Use of successional habitat and fruit resources by songbirds during autumn migration in central New Jersey. Wilson Bulletin 112:249-260.

PENNSYLVANIA
WILDLIFE ACTION PLAN

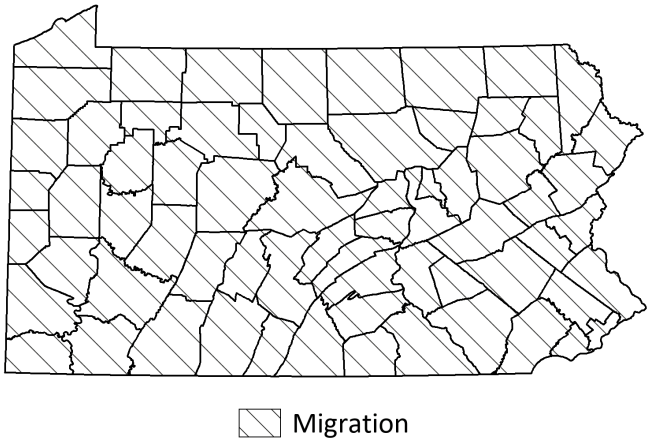
Veery

Catharus fuscescens

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Migration

Conservation Profile

PA 10-Year Conservation Goal: Maintain the current breeding population, an estimated 260,000 individuals, and passage migrant population through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Migration

Specific Habitat Requirements: Fruiting shrubs, dense understory.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: South-Central Interior Mesophytic Forest

Habitat Comments: Stopover habitat not well-known.

Season: Migration

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Continued spread of non-native fruiting shrubs including privet (Lingustrum spp.), various honeysuckles (Lonicera spp.), and multiflora rose (Rosa multiflora), which produce very low-nutrient fruit and fewer insects than native species.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Continue large-scale removal of invasive shrubs, replacing with natives.

Objective: Reduce extent of non-native shrub cover in forests, especially in riparian corridors.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Non-native understory vegetation percentage.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Other thrushes, vireos, finches, catbirds, waxwings

Season: Migration

Priority	Need	Partners
1	Better determine stopover habitat needs and potential effects of different habitats on short-term survival, fat accretion, and stopover length.	Pennsylvania Game Commission, Universities & research institutions

Season: Migration

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Particular need for migration stopover sites.

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bolgiano, N. C. 2012. Veery. Pages 322-323 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Penn State Press, University Park, Pennsylvania.

Goguen, C. B., and L. D. Murray. 2025. Exotic plants and other habitat characteristics do not impact Veery reproductive success at multiple spatial scales in northeastern Pennsylvania. Avian Conservation and Ecology 20(1):8. https://doi.org/10.5751/ACE-02812-200108

Goguen, C.B. 2019. Survival, movements, and habitat use of fledgling Veeries (Catharus fuscescens) in northeastern Pennsylvania. The American Midland Naturalist 181(1):18-28.

Heckscher, C. M. 2004. Veery nest sites in a Mid-Atlantic Piedmont forest: vegetative physiognomy and use of alien shrubs. The American Midland Naturalist 151:326-337.

Smith, R. J.,and M. I. Hatch. 2008. A comparison of shrub-dominated and forested habitat use by spring migrating landbirds in Northeastern Pennsylvania. Condor 110:682-693.

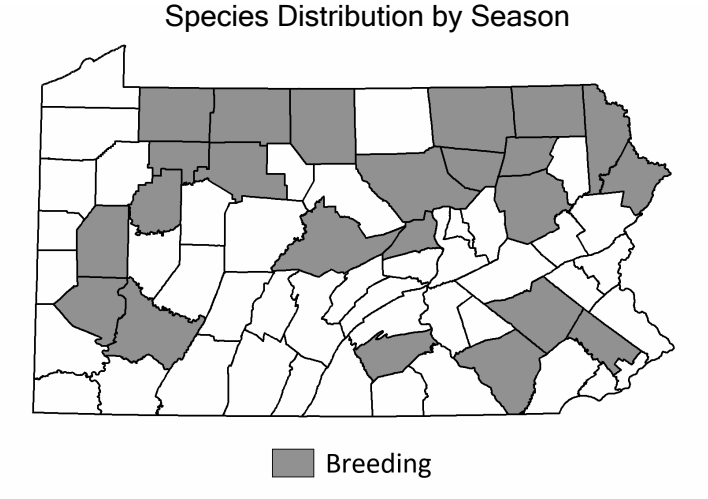
PENNSYLVANIA
WILDLIFE ACTION PLAN

Swainson's Thrush

Catharus ustulatus

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase statewide population by 50%, to an estimated 3,900 singing males, particularly in northcentral and northeastern counties.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: High elevation conifer-dominated forests, typically in extensive unfragmented forest near water.

Primary Habitat: Forested Upland

Primary Habitat Type: High Elevation Forests

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Eastern hemlock (Tsuga canadensis) loss due to hemlock woolly adelgid (HWA) infestation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Hemlock woolly adelgid control.

Objective: Maintain healthy eastern hemlock stands where species occurs.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of acres treated.

Potential Collaborators: Conservancies & Land Trusts, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Deep Valleys, High Plateau

Other species likely to benefit from this action: Winter Wren, Black-throated Green Warbler

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Habitat fragmentation due to oil and gas development, including associated roads

Action Category: Conserve specific land or seascapes

Specific Action: Protect hemlock-dominated stream valleys from conversion to non-habitat, particularly in core areas with known occurrences.

Objective: Prevent further development of occupied habitat.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Acres of habitat protected

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Deep Valleys, High Plateau

Other species likely to benefit from this action: Winter Wren, Black-throated Green Warbler

Season: Breeding

Priority	Need	Partners
1	Evaluate Swainson's Thrush response to varying levels of habitat damage by hemlock woolly adelgid (HWA) and assess suitability of hemlock surrogates (e.g., Norway and red spruce, fir, larch) as Swainson's Thrush habitat to inform restoration efforts in areas of HWA abundance.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	Assess fledgling survival and post-fledging dispersal patterns.	Universities & research institutions, Pennsylvania Game Commission
3	Where possible, establish long-term point count surveys and territory mapping of forest interior birds, such as conducted at Hawk Mountain Sanctuary and Powdermill Nature Reserve, to identify population change at a range of sites.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Identify and map areas of Swainson's Thrush occurrence in Pennsylvania to inform further conservation actions, enlisting volunteers to assist with searches.	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Biological Survey, Pennsylvania Game Commission
2	Expand Mountain Bird Watch into Pennsylvania, including Swainson's Thrush as a target species.	Pennsylvania Game Commission
3	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Pennsylvania Game Commission, Universities & research institutions, Other federal agency, Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Identify locations where Swainson's Thrush breed within Pennsylvania.

Name: Rare Mountain Forest Bird Monitoring

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments:

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Brauning, D. W. 1992. Swainson's Thrush (Catharus ustulatus). Pages 268-269 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh.

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Drohan, P. J., J. C. Finley, P. Roth, T. M. Schuler, S. L. Stout, M. C. Brittingham, and N. C. Johnson. 2012. Perspectives from the field: oil and gas impacts on forest ecosystems: findings gleaned from the 2012 Goddard Forum at Penn State University. Environmental Practice 14(4):394–399. doi:10.1017/S1466046612000300

Faulkenberry, M, D.A. Eggen, and E. Shultzabarger, Eastern Hemlock Conservation Plan, Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, April 23, 2019

Gross, D. 2010. Swainson's Thrush. Pages 215-218 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2012. Swainson's Thrush (Catharus ustulatus). Pages 324-235 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Hall, G. A. 1984. Population decline of neotropical migrants in an Appalachian forest. American Birds 37:14-18.

Haney, J. C. 1999. Hierarchical comparisons of breeding birds in old-growth conifer-hardwood forest on the Appalachian Plateau. Wilson Bulletin 111: 89-99.

Keyser, A. J., G. E. Hill, and E. C. Soehren. 1998. Effects of forest fragment size, nest density, and proximity to edge on the risk of predation to ground-nesting passerine birds. Conservation Biology 12:986-994.

Mack, D. E., and W. Yong. 2000. Swainson's Thrush (Catharus ustulatus). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/540 (accessed July 2015).

Margaret C. Brittingham, Kelly O. Maloney, Aïda M. Farag, David D. Harper, and Zachary H. Bowen. 2014. Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats. Environmental Science & Technology 48: 11034-11047
DOI: 10.1021/es5020482

Matthews, S. N., L. R. Iverson, A. M. Prasad, and M. P. Peters. 2007-ongoing. A Climate Change Atlas for 147 Bird Species of the Eastern United States [database]. USDA Forest Service Northern Research Station, Delaware, Ohio. Available from http://www.nrs.fs.fed.us/atlas/bird (accessed July 2015).

Ralston, J., and J. J. Kirchman. 2013. Predicted range shifts in North American boreal forest birds and the effect of climate change on genetic diversity in Blackpoll Warbler (Setophaga striata). Conservation Genetics 14:543-555.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Sargent, S., D. Yeany, N. Michel, and E. Zimmerman. 2017. Final Report for WRCP-14507: Forest interior bird habitat relationships in the Pennsylvania Wilds.

Tingley, M. W., D. A. Orwig, R. Field, and G. Motzkin. 2002. Avian response to removal of a forest dominant: consequences of hemlock woolly adelgid infestations. Journal of Biogeography 29:1505-1516.

Webb, W. L., D. F. Behrend, and B. Saisorn. 1977. Effect of logging on songbird populations in a northern hardwood forest. Wildlife Monographs 55:1-34.

PENNSYLVANIA
WILDLIFE ACTION PLAN

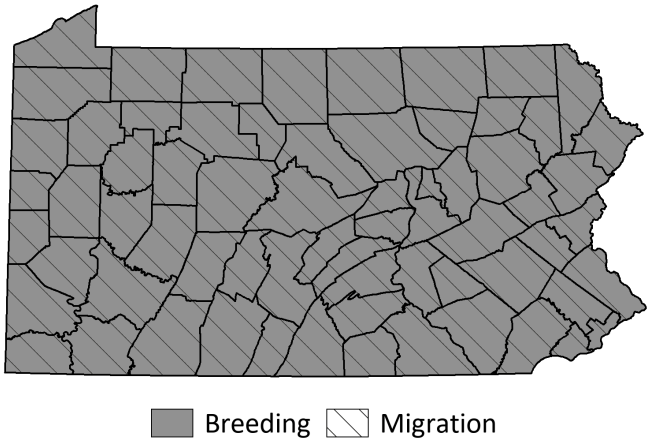
Wood Thrush

Hylocichla mustelina

N. Scott Parkhill *Audubon Mid-Atlantic*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain an estimated breeding population of 660,000 singing males across more than 90% of Pennsylvania Breeding Bird Atlas blocks (see Wilson et al. 2012) during the next 10 years. Protect stopover habitat and food resources that the birds rely on to rest and refuel while traveling between breeding and wintering grounds.

NatureServe Global Rank: G4

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

NatureServe Global Rank: G4

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Second-growth deciduous forest and forest-edge habitats, often with available fruit. Successful nesting within large contiguous mature forest tracts, nest sites oftentimes within understory vegetation within small canopy gaps.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Migration

Specific Habitat Requirements: Second-growth, closed-canopy deciduous and mixed forest, often near water. Forages on fruit bearing shrubs often in gaps during migration.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Housing and Urban Areas

Threat Impact: Medium

Specific Threat: Small woodlots, especially in urban areas, do not provide adequate stand size for successful Wood Thrush nesting. Increased nest parasitism and predation has been linked to highly fragmented landscapes. Edge effects can impact nesting success within 100m of a forest edge. Wood Thrush and other interior forest birds can be negatively impacted with small fragmented woodlots operating as population sinks due to 'wasted' nesting effort below replacement values.

Action Category: Conservation planning

Specific Action: Work with partner organizations, agencies, and private landowners to limit development of contiguous mature forested areas.

Objective: Develop statewide strategy to address forest fragmentation on public and private lands.

Action Priority: 2-High

Action Urgency: Initiate immediately

Measure: Area of forest protected from development or change in developed area across state over time.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Scarlet Tanager, Hooded Warbler, Cerulean Warbler, Black-throated Green Warbler, Acadian Flycatcher

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Increased development may lead to increased window strikes, a major cause of death for Wood Thrush.

Action Category: Conservation planning

Specific Action: Work with partner organizations, agencies, and private landowners to limit development of contiguous mature forested areas.

Objective: Develop statewide strategy to address forest fragmentation on public and private lands.

Action Priority: 1-Highest **Action Urgency:** Initiate within 5 years **Measure:** Area of private land under easement or proposed development area moved out of mature forested areas.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Scarlet Tanager, Hooded Warbler, Cerulean Warbler, Black-throated Green Warbler, Acadian Flycatcher

Season: Migration

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Low

Specific Threat: Increasing prevalence of invasive plant species, exacerbated by browse pressure from high deer densities, in Pennsylvania forests pose a significant risk for Wood Thrush and other interior forest dwelling birds as they do not provide quality nutrition compared to native fruiting shrubs, nor do they host native invertebrate communities for forage.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Promote deer hunting statewide and focus efforts in regions where contiguous mature forest habitat is degraded due to deer overpopulation, seeking particularly to increase deer harvest in region struggling with successful forest regeneration due to deer browse.

Objective: Target 5 Pennsylvania Game Commission Wildlife Management Units with highest deer densities, lowest hunter recruitment, most prevalent issues with forest regeneration, and/or highest declines in forest interior birds.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction in deer densities and improvement in forest regeneration.

Potential Collaborators: Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Scarlet Tanager, Cerulean Warbler, Black-throated Green Warbler, Hooded Warbler, American Redstart

Season: Breeding

Priority	Need	Partners
1	Utilize 3rd Pennsylvania Bird Atlas and LiDAR data to conduct analyses that improve our understanding of the relationship between forest structure and forest interior bird breeding densities.	Pennsylvania Game Commission
2	Long-term studies of seasonal fecundity to identify source/sink populations throughout the state and investigate effects of forest management on nest success, adult survival, and return rates.	Universities & research institutions, Non-governmental organizations
3	Where possible, long term point count surveys and territory mapping of forest interior birds, such as conducted at Hawk Mountain Sanctuary and Powdermill Nature Reserve should be established to identify population change at a range of sites.	Non-governmental organizations

Season: Migration

Priority	Need	Partners
1	Identify key components of important stopover habitats during migration and determine priority areas.	Universities & research institutions
2	Quantify effects of window and building collisions on Wood Thrush and other Neotropical migrants in Pennsylvania. Research solutions to mitigate bird mortalities from collisions.	Universities & research institutions, Non-governmental organizations
3	Investigate links between breeding demographics and non-breeding activities/migratory connectivity.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	Surveys to assess response of forest species to silviculture treatments and other management.	Universities & research institutions, Non-governmental organizations

Season: Migration

Priority	Survey	Partners
1	Continue statewide migration counts and integrate eBird data to better understand migratory patterns of Wood Thrush throughout Pennsylvania and to help identify stopover priority areas and habitats.	Universities & research institutions, Non-governmental organizations

Name: Bird banding at Powdermill Nature Reserve **Lead(s) :** Powdermill Avian Research Center

Link: https://powdermillarc.org/

Description: Constant-effort banding station with continuous operation since 1961.

Comments:

Monitoring Need: Finer scale movement data and collision risk and survival rate.

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Increase access to the public to solicit large datasets and determine regional and temporal shifts in populations.

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need: To assess changes in breeding wood thrush abundance in the state.

Conover, A.M. 2011. The impact of non-native plants on bird communities in suburban forest fragments. M.S. Thesis. University of Delaware, Newark, Delaware.

Dauphine N. and R. J. Cooper. 2009. Impacts of free ranging domestic cats (Felis catus) on birds in the United States: a review of recent research with conservation and management recommendations. Pages 205-219 in T. D. Rich, C. Arizmendi, D. Demarest, and C. Thompson, editors. Tundra to Tropics: Connecting Birds, Habitats and People. Proceedings of the Fourth International Partners in Flight Conference, 13-16 February 2008. McAllen, TX. Partners in Flight.

Evans, M., E. Gow, R. R. Roth, M. S. Johnson and T. J. Underwood. 2011. Wood Thrush (Hylocichla mustelina). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/246 (accessed July 2015).

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Birds with silviculture in mind: birder's dozen pocket guide for Vermont foresters. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Hoover, J. P. and M. C. Brittingham. 1993. Regional variation in cowbird parasitism of Wood Thrushes. Wilson Bulletin 105:228-238.

Hoover, J. P. and M. C. Brittingham. 1998. Nest-site selection and nesting success of Wood Thrushes. Wilson Bulletin 110:375-383.

Hoover, J. P., M. C. Brittingham, and L. J. Goodrich. 1995. Effects of forest patch size on nesting success of Wood Thrushes. Auk 112:146-155.

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

International Wood Thrush Conservation Alliance. Fact sheet. Available from http://amjv.org/documents/IWOTHCA_Fact_Sheet.pdf (accessed July 2015).

Johnson, N., T. Gagnolet, R. Ralls, E. Zimmerman, B. Eichelberger, C. Tracey, G. Kreitler, S. Orndorff, J. Tomlinson, S. Bearer, and S. Sargent. 2010. Pennsylvania energy impacts assessment. Available from http://www.nature.org/media/pa/tnc_energy_analysis.pdf (accessed July 2015).

Lambert, J.D., Leonardi, B., Winant, G., Harding, C., Reitsma, L., 2017. Guidelines for managing wood thrush and scarlet tanager habitat in the Northeast and Mid-Atlantic regions. High Branch Conservation Services, Hartland, VT.

Loss, S. R., T. Will, S. S. Loss, and P. P. Marra. 2014. Bird-building collisions in the United States: Estimates of annual mortality and species vulnerability. The Condor 116:8-23.

Matsuoka. S. M., C. L. Mahon, C. M. Handel, P. Sólymos, E. M. Bayne, P. C. Fontaine, and C. J. Ralph. 2014. Reviving common standards in point-count surveys for broad inference across studies. The Condor 116:599-608.

Newell, F. 2010. Wood thrush. Pages 171-174 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Pabian, S. E., S. M. Rummel, W. E. Sharpe, and M. C. Brittingham. 2012. Terrestrial liming as a restoration technique for acidified forest ecosystems. International Journal of Forestry Research 2012:976809 DOI:10.1155/2012/976809.

Powell, L. A., J. D. Lang, M. J. Conroy and D. G. Krementz. 2000. Effects of forest management on density, survival, and population growth of Wood Thrushes. Journal of Wildlife Management 64:11-23.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Rappole, J. H., M. A. Ramos, and K. Winker. 1989. Wintering Wood Thrush movements and mortality in southern Veracruz. Auk 106:402-410.

Rodewald, P. G., and M. C. Brittingham. 2004. Stopover habitats of landbirds during fall: Use of edge-dominated and early-successional forests. The Auk 121:1040-1055.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Rosenberg, K. V., R. S. Hames, R. W. Rohrbaugh Jr., S. Barker Swarthout, J.D. Lowe, and A. A. Dhondt. 2003. A land manager's guide to improving habitat for forest thrushes. The Cornell Lab of Ornithology, Ithaca, New York.

Roth, R. R. 1987. Assessment of habitat quality for Wood Thrush in a residential area. Pages 139-149 in L. W. Adams and D. L. Leedy, editors. Integrating man and nature in the metropolitan environment. National Institute for Urban Wildlife, Columbia, Maryland.

Schmidt, K. A., and C. J. Whelan. 1999. Effects of Lonicera and Rhamus on songbird nest predation. Conservation Biology 13:1502-1506.

Stanley, C. Q., et al. 2014. Connectivity of wood thrush breeding, wintering and migration sites based on range-wide tracking. Conservation Biology 29:164-174.

Stoleson, S. H., and J. L. Larkin. 2010. Breeding birds of Pennsylvania: forest bird communities. Pages 14-27 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian ecology and conservation: a Pennsylvania focus with national implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Stutchbury, B. J. M. 2012. Wood Thrush (Hylocichla mustelina). Pages 328 -329 in A. M. Wilson, D. W. Brauning, and R. S Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Suthers, H. B., J. M. Bickal, and P. G. Rodewald. 2000. Use of successional habitat and fruit resources by songbirds during autumn migration in central New Jersey. Wilson Bulletin 112:249-260.

Thomas, E. H., M. C. Brittingham, and S. H. Stoleson. 2014. Conventional oil and gas development alters forest songbird communities. The Journal of Wildlife Management 78:293-306.

Winker, K., J. H. Rappole, and M. A. Ramos. 1990. Population dynamics of the Wood Thrush in southern Veracruz, Mexico. Condor 92:444-460.

PENNSYLVANIA
WILDLIFE ACTION PLAN

Evening Grosbeak

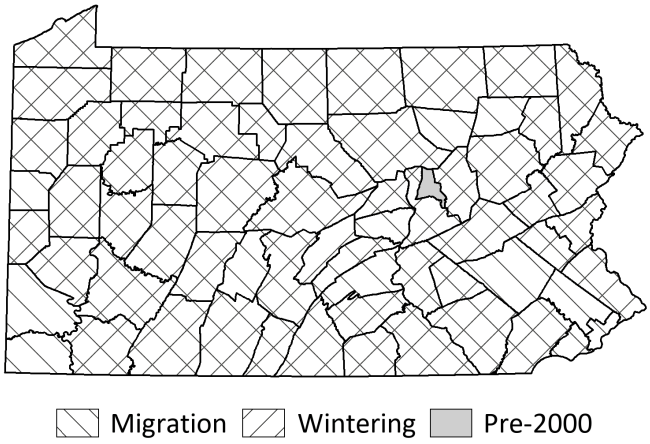
Coccothraustes vespertinus

David Yeany II

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: By 2035, Evening Grosbeak non-breeding population trend in Pennsylvania is stable or increasing as measured by Christmas Bird Count results over previous 25-year period and corroborated with eBird and Project FeederWatch data.

NatureServe Global Rank: G5

IUCN Red List Designation: Vulnerable

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S2M

State Rank Year: 2025

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Vulnerable

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Wintering

State Rank (Season): S2N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: Very High

Season: Migration

Specific Habitat Requirements: Deciduous and mixed northern hardwood forest in the north central region and higher elevations. Natural food sources in forest habitats include cherries, maples, and elm. Most often Evening Grosbeaks are observed near feeding stations with sunflower seeds in residential development within forested landscapes in the northern tier counties. Habitat use away from feeding stations is not well understood.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Spring migration movement data for Evening Grosbeaks has been collected by WPC-PNHP for tagged birds in PA (and other states in Northeast). Analysis has not yet been completed, but when it is, we should know more details about which habitats are being used by PA non-breeding Evening Grosbeaks during migration and how much time they spend in them.

Season: Wintering

Specific Habitat Requirements: Deciduous and mixed northern hardwood forest in the north central region and higher elevations. Natural food sources in forest habitats include cherries, maples, and elm. Most often Evening Grosbeaks are observed near feeding stations with sunflower seeds in residential development within forested landscapes in the northern tier counties. Habitat use away from feeding stations is not well understood.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Winter movement data for Evening Grosbeaks has been collected by WPC-PNHP for tagged birds in PA (and other states in Northeast). Analysis has not yet been completed, but when it is, we should know more details about which habitats are being used by PA non-breeding Evening Grosbeaks and how much time they spend in them.

Season: Migration

Threat Category: Housing and Urban Areas

Threat Impact: Medium

Specific Threat: Untreated glass windows on residential buildings, particularly near bird feeding stations, increases mortality likelihood from glass collisions.

Action Category: Outreach, communication and distribution

Specific Action: Reduce bird-window collisions by promoting and implementing bird collision reduction strategies.

Objective: Increase number of residential buildings with glass that has been treated with best solutions for bird collision prevention.

Action Priority: 1-Highest

Action Urgency: Initiate immediately

Measure: Number of homes with bird safe glass. Area of glass treated with collision solutions.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Fish and Wildlife Service, U.S. Geological Survey

Locations: Statewide

Other species likely to benefit from this action: Finches, woodpeckers, raptors, flycatchers, warblers, any birds near residential buildings

Season: Migration

Threat Category: Habitat Shifting or Alteration **Threat Impact:** High

Specific Threat: Loss of suitable non-breeding (migration stopover) habitat and climate conditions due to a warming climate and increased severe weather (e.g. winter rain and ice storms, spring heat waves).

Action Category: Conservation planning

Specific Action: Implement Pennsylvania Climate Action Plan strategies to reduce greenhouse gas emissions and climate change impacts.

Objective: Reduce climate change factors contributing to projected loss of suitable habitat conditions for non-breeding Evening Grosbeak.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of organizations, businesses, agencies, etc. implementing climate actions. Number of climate actions implemented.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, National Oceanic and Atmospheric Administration, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Fish and Wildlife Service, U.S. Geological Survey, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Horned Grebe, American Goshawk, Wild Turkey, Red Crossbill, Brown Creeper; other SGCN with climate vulnerability

Season: Migration

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Poorly maintained backyard feeding stations (unsanitary feeders promoting the spread of conjunctivitis, West Nile virus, scaly-leg, trichomoniasis); predation by outdoor cats.

Action Category: Conservation planning

Specific Action: Create and implement a statewide plan for reducing mortalities in wild bird and mammal populations as a result of free ranging domestic cats based on the 2023 Pennsylvania One Health Task Force Recommendations on the Management of Domestic Cats (Felis catus).

Objective: Reduce the population of free ranging domestic cats in Pennsylvania by 50% over the next 8 years.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Estimated density of free ranging domestic cats (or equivalent metric). Number of feline rabies cases.

Potential Collaborators: U.S. Department of Agriculture-Animal and Plant Health Inspection Service, Businesses, Local agencies & municipalities, Non-governmental organizations, Other state agency, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Ground and shrub nesting and foraging birds

Season: Migration

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Poorly maintained backyard feeding stations (unsanitary feeders promoting the spread of conjunctivitis, West Nile virus, scaly-leg, trichomoniasis); predation by outdoor cats.

Action Category: Outreach, communication and distribution

Specific Action: Promote bird feeder and feeding station cleanliness best practices to reduce spread of pathogens and disease among congregating flocks.

Objective: Increase and track the number of bird feeding stations that implement best practices for sanitary bird feeding over the next 5 years.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of bird feeding stations using best practices for feeder sanitation.

Potential Collaborators: Businesses, Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Backyard feeder birds

Season: Wintering

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Untreated glass windows on residential buildings, particularly near bird feeding stations, increases mortality likelihood from glass collisions.

Action Category: Outreach, communication and distribution

Specific Action: Reduce bird-window collisions by promoting and implementing bird collision reduction strategies.

Objective: Increase number of residential buildings with glass that has been treated with best solutions for bird collision prevention.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of homes with bird safe glass. Area of glass treated with collision solutions.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Fish and Wildlife Service, U.S. Geological Survey

Locations: Statewide

Other species likely to benefit from this action: Finches, woodpeckers, raptors, flycatchers, warblers, any birds near residential buildings.

Season: Wintering

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Very High

Specific Threat: Loss of suitable wintering habitat and climate conditions due to a warming climate and increased severe weather (e.g., winter rain and ice storms, spring heat waves).

Action Category: Conservation planning

Specific Action: Implement Pennsylvania Climate Action Plan strategies to reduce greenhouse gas emissions and climate change impacts.

Objective: Reduce climate change factors contributing to altered habitat conditions for non-breeding Evening Grosbeak.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Reduction in greenhouse gas emissions.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, National Oceanic and Atmospheric Administration, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Horned Grebe, American Goshawk, Wild Turkey, Red Crossbill, Brown Creeper; other SGCN with climate vulnerability

Season: Wintering

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Poorly maintained backyard feeding stations (unsanitary feeders promoting the spread of conjunctivitis, West Nile virus, scaly-leg, trichomoniasis); predation by outdoor cats.

Action Category: Conservation planning

Specific Action: Create and implement a statewide plan for reducing mortalities in wild bird and mammal populations as a result of free ranging domestic cats based on the 2023 Pennsylvania One Health Task Force Recommendations on the Management of Domestic Cats (Felis catus).

Objective: Reduce the population of free ranging domestic cats in Pennsylvania by 50% over the next 8 years.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Estimated density of free ranging domestic cats (or equivalent metric). Number of feline rabies cases.

Potential Collaborators: Great Lakes Dune and Swale, 7. Natural Systems Modifications, Laurentian-Acadian Freshwater Marsh, Laurentian-Acadian Northern Hardwood Forest

Locations: Statewide

Other species likely to benefit from this action: Ground and shrub nesting and foraging birds; backyard feeder birds.

Season: Wintering

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Poorly maintained backyard feeding stations (unsanitary feeders promoting the spread of conjunctivitis, West Nile virus, scaly-leg, trichomoniasis); predation by outdoor cats.

Action Category: Outreach, communication and distribution

Specific Action: Promote bird feeder and feeding station cleanliness best practices to reduce spread of pathogens and disease among congregating flocks.

Objective: Increase and track the number of bird feeding stations that implement best practices for sanitary bird feeding over the next 5 years.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of bird feeding stations using best practices for feeder sanitation.

Potential Collaborators: Businesses, Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Backyard feeder birds

Season: Migration

Priority	Need	Partners
1	Determine habitat use in migration and requirements for wintering Evening Grosbeak population to inform habitat conservation and management.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions, Other federal agency
2	Quantify migratory connectivity of Pennsylvania's migratory Evening Grosbeak population in the context of the declining continental population to inform conservation decisions across the full annual cycle.	Non-governmental organizations, Other federal agency, Pennsylvania Game Commission, Universities & research institutions, U.S. Geological Survey
3	What are the threats and limiting factors affecting Evening Grosbeaks in Pennsylvania during migration season (e.g., disease and pathogens, window collisions, forest management)?	Non-governmental organizations, Other federal agency, Pennsylvania Game Commission, Universities & research institutions, U.S. Fish and Wildlife Service
4	What are feeding station conditions where Evening Grosbeaks stopover to refuel during migration? Assess sanitation, untreated glass windows, free ranging domestic cats.	Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Determine non-breeding season habitat use and requirements for wintering Evening Grosbeak population to inform habitat conservation and management.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions, Other federal agency
2	Quantify migratory connectivity of Pennsylvania's non-breeding Evening Grosbeak population in the context of the declining continental population to inform conservation decisions across the full annual cycle.	Non-governmental organizations, Other federal agency, Pennsylvania Game Commission, Universities & research institutions, U.S. Geological Survey
3	What are the threats and limiting factors affecting Evening Grosbeaks in Pennsylvania during the non-breeding season (e.g., disease and pathogens, window collisions, forest management)?	Non-governmental organizations, Other federal agency, Pennsylvania Game Commission, Universities & research institutions, U.S. Fish and Wildlife Service
4	What are feeding station conditions where Evening Grosbeaks occur? Assess sanitation, untreated glass windows, free ranging domestic cats.	Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Season: Migration

Priority	Survey	Partners
1	Conduct habitat surveys of high resolution migration stopover positions (e.g., foraging, roosting, etc.) of tracked Evening Grosbeaks to quantify habitat characteristics and inform habitat management for the species.	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Game Commission

Season: Wintering

Priority	Survey	Partners
1	Conduct habitat surveys of high resolution positions of tracked Evening Grosbeaks to quantify habitat characteristics and inform habitat management for the species.	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Game Commission
2	Winter surveys targeting historic locations of non-breeding Evening Grosbeak populations through the winter atlas portion of the 3rd Pennsylvania Bird Atlas.	Pennsylvania Game Commission, Non-governmental organizations, Private Landowners, Pennsylvania Department of Conservation and Natural Resources

Name: National Audubon Society Christmas Bird Count **Lead(s) :** National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need: Tracking non-breeding (wintering) population trends of Evening Grosbeak. Christmas Bird Count data were some of the first to signal the species' decline.

Name: Project FeederWatch **Lead(s) :** Cornell Lab of Ornithology

Link: https://feederwatch.org/

Description: Project FeederWatch is a citizen science survey where people in North America count the birds they see at their feeders or in their yards during the winter months (November to April). Participants periodically record the number of birds of each species they see and submit their data to the Cornell Lab of Ornithology and Birds Canada. This data helps scientists understand bird distribution, abundance, and population trends over time.

Comments:

Monitoring Need: Project FeederWatch data showed some of the first signs of range wide population decline in Evening Grosbeak from 1988 to 2006. The project remains important for continuing to monitor Evening Grosbeak non-breeding populations and tracking their trends in abundance and distribution. Additionally, Project FeederWatch should be utilized to monitor for disease occurrence at feeding stations, such as conjunctivitis, avian pox and Salmonellosis.

Environment and Climate Change Canada. 2022. Management Plan for the Evening Grosbeak (Coccothraustes vespertinus) in Canada. Species at Risk Act Management Plan Series. Environment and Climate Change Canada, Ottawa. v + 44 pp.

Gillihan, S. W. and B. E. Byers. 2020. Evening Grosbeak (Coccothraustes vespertinus), version 1.0. In A. F. Poole and F. B. Gill, editors. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.evegro.01

Wilsey, C, B Bateman, L Taylor, JX Wu, G LeBaron, R Shepherd, C Koseff, S Friedman, R Stone.
Survival by Degrees: 389 Bird Species on the Brink. National Audubon Society: New York.

PENNSYLVANIA
WILDLIFE ACTION PLAN

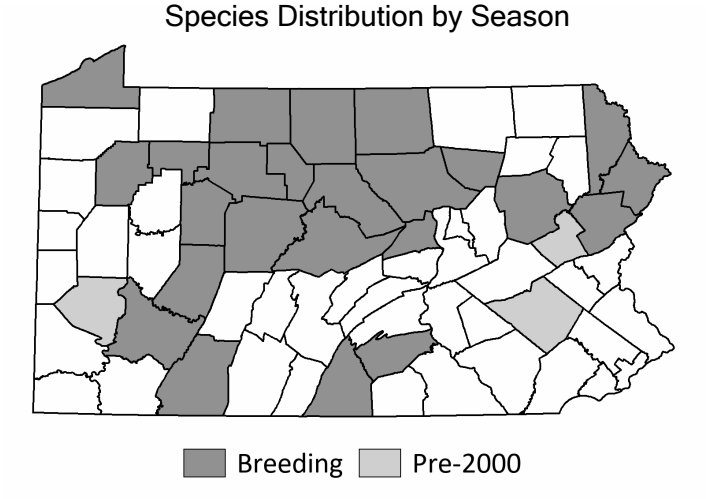
Red Crossbill

Loxia curvirostra

David Yeany II

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Monitor annually for nesting occurrences and prioritize conifer forest protection and maintenance where this species occurs, including plantations.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Occupies mature conifer forest, both natural and plantations, during the breeding season, which can occur at any time through the year, but coincides with cone crop development primarily during Jan-April and July-Aug. Call Type populations recorded in PA includes Type 1, 2, 3, 4, and 12, which each specialize on various conifer cones. They use soft cones - eastern hemlock, red spruce, white spruce to semi-soft cones of Norway spruce and eastern white pine to hard cones of red pine, pitch pine and Virginia pine. Species has nested in Appalachian (Hemlock)-Northern Hardwood Forest, boreal wetlands (North-Central Appalachian Acidic Swamp, High Allegheny Wetland, North-Central Interior and Appalachian Acidic Peatland, and Central Appalachian Dry Oak-Pine Forest. Will nest in non-native conifers such as Norway spruce. May respond to a mix of conifers where each species offers seeds at different times.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Logging and Wood Harvesting **Threat Impact:** Medium

Specific Threat: Conifer forest loss due to logging or timber harvesting resulting in conversion to deciduous dominated forest.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize conifer forest management in appropriate areas by conserving mature forest with spruce, hemlock, and pine.

Objective: 1. Minimize conifer tree harvesting in areas of suitable habitat for breeding Red Crossbills.; 2. Increase conifer forest acreage through spruce seedling and sapling release, plant spruce and pine seedlings to fill conifer forest gaps and increase conifer component in appropriate locations.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Coniferous forest acres and number of conifer forest blocks greater than 10 hectares.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Physiographic Section: Appalachian Mountain, Allegheny Mountain, High Plateau, Deep Valleys, Susquehanna Lowland, Glaciated Pocono Plateau, Glaciated Low Plateau, Glaciated High Plateau

Other species likely to benefit from this action: Blackburnian Warbler, Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare, American Goshawk, Golden-crowned Kinglet, Brown Creeper

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** High

Specific Threat: Longer food scarcity due to increasing winter and spring temperatures causing earlier and more complete conifer cone seed shedding.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Maintain and increase conifer tree species diversity within forest regions with known breeding occurrences.

Objective: Provide multiple options for conifer tree cone seeds to increase resilience in forests where Red Crossbills breed to offset impacts from increased temperature extremes leading to strains on available food resources.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of sites with suitable Red Crossbill breeding habitat where groups or agencies have increased conifer resilience through plantings (e.g., red spruce) or other management to reduce loss of conifers (e.g., eastern hemlock) and encourage recruitment (e.g., eastern white pine, red pine).

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Physiographic Section: High Plateau, Allegheny Mountain, Appalachian Mountain, Allegheny Front, Deep Valleys, Glaciated Low Plateau, Glaciated Pocono Plateau

Other species likely to benefit from this action: Blackburnian Warbler, Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare, American Goshawk, Golden-crowned Kinglet, Brown Creeper

Season: Breeding

Priority	Need	Partners
1	What Red Crossbill call types nest in Pennsylvania and what are their major food sources?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
2	What limits Red Crossbills in Pennsylvania and the northern Appalachians when this species nests nearby in New York?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Where and how can conifer forests be expanded in Pennsylvania to expand the New York population into the state?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Private Landowners

Season: Breeding

Priority	Survey	Partners
1	Conduct annual Red Crossbill breeding surveys statewide in suitable conifer forest habitats.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Other federal agency
2	Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project and Pennsylvania Natural Heritage Program peatland bird monitoring.	Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Name: Crossbill research conducted by Finch Research Network

Lead(s) : Finch Research Network

Link: https://finchnetwork.org/projects/crossbills

Description: Cooperative searches and research for crossbills with Finch Research Network. Red Crossbills nest in New York and new nesting locations in Pennsylvania.

Comments: Red Crossbills will sometimes nest where they have found sufficient food in winter. Nesting can begin in winter months, so there is a not a fine distinction between winter and breeding. However, flocks will react to large cone crops and keep searches for more food resources.

Monitoring Need:

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments: Dependent on birding community to submit high quality observations.

Monitoring Need:

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Name: Rare Mountain Forest Bird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments:

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Adkisson, C. S. 1996. Red Crossbill (Loxia curvirostra). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/256 (accessed July 2015).

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Benkman, C. W. 1993. Logging, conifers, and the conservation of crossbills. Conservation Biology 7:473-479.

Fingerhood, E. 1992. Red Crossbill (Loxia curvirostra). Appendix A, pages 437-438 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2010. Red Crossbill (Loxia curvirostra). Pages 221-224 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Groth, J. G. 1988. Resolution of cryptic species in Appalachian Red Crossbills. Condor 90:745-760.

Groth, J. G. 1993a. Evolutionary differentiation in morphology, vocalizations, and allozyme among nomadic sibling species in the North American Red Crossbill (Loxia curvirostra) complex. University of California Publication of Zoology 127:1-143.

Groth, J. G. 1993b. Call matching and positive assortative mating in Red Crossbills. Auk 110:398-401.

Hart, J. A. and J. D. Lambert, editors. 2010. Mountain Birdwatch: Protocol and Standard Operating Procedures for Monitoring High-Elevation Landbirds in the Northern Appalachian and Laurentian Regions. Version 2.0. Vermont Center for Ecostudies and American Bird Conservancy, Norwich, Vermont. Available from http://vtecostudies.org/projects/mountains/mountain-birdwatch/ (accessed July 2015).

Matsuoka, S. M., E. M. Bayne, P. Solymos, P. C. Fontaine, S. G. Cumming, F. K. A. Schmiegelow, and S. J. Song. 2012. Using binomial distance-sampling models to estimate the effective detection radius of point-count surveys across boreal Canada. Auk 129:268-282.

Rentch, J. S., T. M. Schuler, W. M. Ford, and G. J. Nowacki. 2007. Red spruce stand dynamics, simulations, and restoration opportunities in the Central Appalachians. Restoration Ecology 15:440-452.

Rimmer, C. C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubrey, D. Busbey, and R. J. Taylor. 2005. Mercury concentrations in Bicknell's Thrush and other insectivorous passerines in montane forests of Northeastern North America. Ecotoxicology 14:223-240.

Stokes, L. and M.A. Young. 2024. The Stokes Guide to Finches of the United States and Canada. Little, Brown and Company. New York, New York.

Young, M. A. 2011. Red Crossbill (Loxia curvirostra) call-types of New York: their taxonomy, flight call vocalizations and ecology. Kingbird 61:106-123.

Young, M. A. and D. A. Gross. 2012. Red Crossbill (Loxia curvirostra). Pages 462-463 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Young, M. A., K. Blankenship, M. Westphal, and S. Holzman. 2011. The “Appalachian” Type 1 Red Crossbill (Loxia Curvirostra). North American Birds 65:554-561.

PENNSYLVANIA
WILDLIFE ACTION PLAN

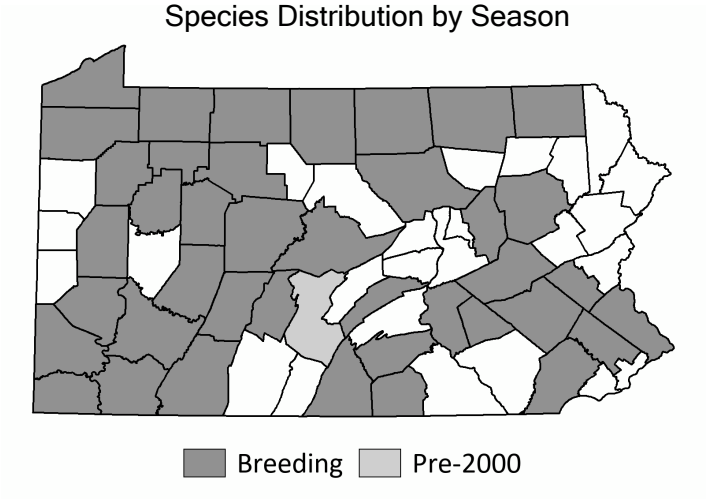
Pine Siskin

Spinus pinus

David Yeany II

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: By 2035, determine the Pennsylvania breeding population extent, and if any sites support regular nesting occurrences.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Conifer forests with eastern hemlock, eastern white pine, and spruces (native red spruce and plantations), often mixed with northern hardwoods like birches and maples. Also nests close to feeding stations near houses and park-like settings that include planted conifers.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Untreated glass windows on residential buildings, particularly near bird feeding stations, increases mortality likelihood from glass collisions.

Action Category: Outreach, communication and distribution

Specific Action: Reduce bird-window collisions by promoting and implementing bird collision reduction strategies.

Objective: Reduce the number of bird mortalities resulting from collisions with glass on residential and commercial buildings.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of participants (e.g. homeowners, businesses, organizations) and buildings enrolled in program that are taking action to make window glass safer for birds (i.e., window decal treatments, retrofitted glass, or patterned glass for new builds).

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Purple Finch, American Goldfinch, Evening Grosbeak, resident feeder birds, White-throated Sparrow, American Woodcock, Yellow-bellied Sapsucker, Neotropical migrants (e.g. Ovenbird, Tennessee Warbler, tanager, flycatchers, etc.)

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Very High

Specific Threat: Eastern hemlock (Tsuga canadensis) loss or degradation due to invasive hemlock woolly adelgid (Adelges tsugae).

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Implement statewide eastern hemlock conservation plan across multiple agencies and private partners to treat hemlock woolly adelgid.

Objective: Reduce advancement of hemlock woolly adelgid via integrated pest management (IPM) strategies.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Area of hemlock stands treated via IPM and health condition of hemlock trees in treated stands.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Northern Flying Squirrel, Red Crossbill, Swainson's Thrush, Golden-crowned Kinglet, Black-throated Green Warbler, Blackburnian Warbler

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** High

Specific Threat: Increased spring heat wave frequency or intensity and timing reduce breeding success and alter food availability.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Promote national legislation and implement the Pennsylvania Climate Action Plan to reduce carbon emissions and mitigate effects of increased frequency of extreme temperature and weather events.

Objective: Reduce atmospheric carbon levels to slow extreme weather events.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Atmospheric carbon levels, and frequency and severity of extreme weather events.

Potential Collaborators: National Oceanic and Atmospheric Administration, Other federal agency, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Red Crossbill, Wood Thrush, Swainson's Thrush, aerial insectivores, Neotropical migrants

Season: Breeding

Priority	Need	Partners
1	Analysis of extant breeding occurrences to determine specific habitat requirements, sites impacted by hemlock woolly adelgid, association with feeding stations and irruptions.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	Would old growth conifer forest management benefit this species and others that use large conifers for nesting and food?	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources
3	What are the causes for Pine Siskin irruptions and do these irruptions relate to nesting events?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
4	What are the Pine Siskins breeding populations related to human-modified locations and natural forests that benefit this species for nesting in concentrations?	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Locate areas in the state used regularly by breeding populations with special surveys initiated earlier in the year (Feb-Mar) when Pine Siskin and Red Crossbill may begin breeding.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	Promote and support projects with off-road bird point counts in core forests. Emphasize surveys within conifer and mixed forests.	Pennsylvania Game Commission, Private Landowners, Non-governmental organizations, Conservancies & Land Trusts, Universities & research institutions

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Mountain Bird Watch **Lead(s) :** Vermont Center for Ecostudies

Link: http://vtecostudies.org/projects/mountains/mountain-birdwatch/

Description: Mountain Birdwatch (MBW) monitors songbirds that breed in the montane fir and spruce forests of the Northeast. MBW data provide the only region-wide source of population information on these high-elevation breeding birds. MBW's primary focus is Bicknell's Thrush, a montane fir specialist that breeds only in the northeastern U.S. and adjacent areas of Canada, but this project also tracks nine other high-elevation avian breeders, red squirrels, and the conifer seeds that these avian nest predators eat. A Pennsylvania version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for the Pennsylvania and Appalachian Mountains.

Comments: The Pennsylvania Game Commission is working with Mountain Birdwatch to develop a version of this project that is appropriate for Pennsylvania and the Appalachian Mountains. There will be a series of point count trails in appropriate habitat (conifer forests) monitored by some staff, partners, and volunteers.

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Rare Mountain Forest Bird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments:

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Dawson, W. 1997. Pine Siskin (Carduelis pinus). Account 298 in A. Poole and F. Gill, editors. The Birds of North America. The Academy of Natural Sciences, Philadelphia, Pennsylvania and The American Ornithologists' Union, Washington, D.C.

Faulkenberry M., D.A. Eggen, and E. Shultzaberger. 2019. Eastern hemlock conservation plan (Final version). Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry. 115 pp.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2010. Pine Siskin (Spinus pinus). Pages 224-226 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Harlow, R. C. 1951. Tribal nesting of the Pine Siskin in Pennsylvania. Cassinia 38:4-9.

Hart, J. A. and J. D. Lambert, editors. 2010. Mountain Birdwatch: Protocol and Standard Operating Procedures for Monitoring High-Elevation Landbirds in the Northern Appalachian and Laurentian Regions. Version 2.0. Vermont Center for Ecostudies and American Bird Conservancy, Norwich, Vermont. Available from http://vtecostudies.org/projects/mountains/mountain-birdwatch/ (accessed July 2015).

Matsuoka, S. M., E. M. Bayne, P. Solymos, P. C. Fontaine, S. G. Cumming, F. K. A. Schmiegelow, and S. J. Song. 2012. Using binomial distance-sampling models to estimate the effective detection radius of point-count surveys across boreal Canada. Auk 129:268-282.

Rentch, J. S., T. M. Schuler, W. M. Ford, and G. J. Nowacki. 2007. Red spruce stand dynamics, simulations, and restoration opportunities in the Central Appalachians. Restoration Ecology 15:440-452.

Rimmer, C. C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubrey, D. Busbey, and R. J. Taylor. 2005. Mercury concentrations in Bicknell's Thrush and other insectivorous passerines in montane forests of Northeastern North America. Ecotoxicology 14:223-240.

Young, M. A., and D. A. Gross. 2012. Pine Siskin (Carduelis pinus). Pages 464-465 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

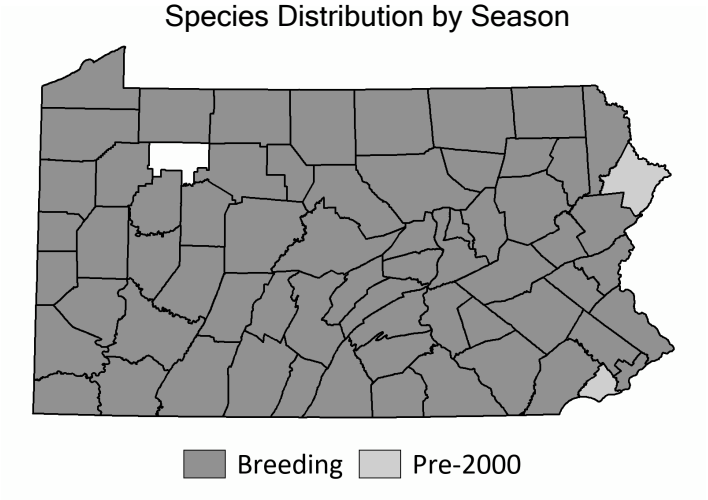
PENNSYLVANIA
WILDLIFE ACTION PLAN

Grasshopper Sparrow

Ammodramus savannarum

Jeffrey A. Stratford *Wilkes University*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase and stabilize populations.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Indicator for large-scale grasslands; grassland obligate species.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Habitat Comments: Not fire dependent but would benefit from fire.

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Conversion of natural grasslands into agriculture

Action Category: Conserve specific land or seascapes

Specific Action: Avoid developing high quality habitat into agricultural fields.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Other grassland species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Conversion of grasslands to developed areas

Action Category: Conserve via zoning or informal designations

Specific Action: Preserve high quality habitat by not developing those lands.

Objective: Reduce grassland habitat loss.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stabilize or increase habitat acreage.

Potential Collaborators: Conservancies & Land Trusts, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Medium

Specific Threat: Woody encroachment

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Decrease woody encroachment by using prescribed fire and herbicide.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increasing populations.

Potential Collaborators: Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	What are the effects of controlled burns on populations?	Universities & research institutions, Pennsylvania Game Commission
2	How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?	Universities & research institutions, Pennsylvania Game Commission
3	Effects of grassland restoration on populations.	Universities & research institutions, Conservancies & Land Trusts, Pennsylvania Game Commission
4	Minimum habitat area requirements.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions

Season: Breeding

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Diefenbach, D. R., M. R. Marshall, J. A. Mattice, and D. W. Brauning. 2007. Incorporating availability for detection in estimates of bird abundance. The Auk 124:96-106.

Hill, J. M., and D. R. Diefenbach. 2013. Experimental removal of woody vegetation does not increase nesting success or fledgling production in two grassland sparrows (Ammodramus) in Pennsylvania. Auk 130:764-773.

Johnson, D. H. and L. D. Igl. 1995. Contributions of the conservation reserve program to populations of breeding birds in North Dakota. Wilson Bulletin 107:709-718.

Koford, R. R. 1999. Density and fledging success of grassland birds in Conservation Reserve Program fields in North Dakota and west-central Minnesota. Pages 187-195 in P. D. Vickery and J. R. Herkert, editors. Studies in Avian Biology 19. Cooper Ornithological Society, Lawrence, Kansas.

Marshall, M. R. and D. R. Diefenbach. 2010. Grasshopper Sparrow. Pages 317-320 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania-A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

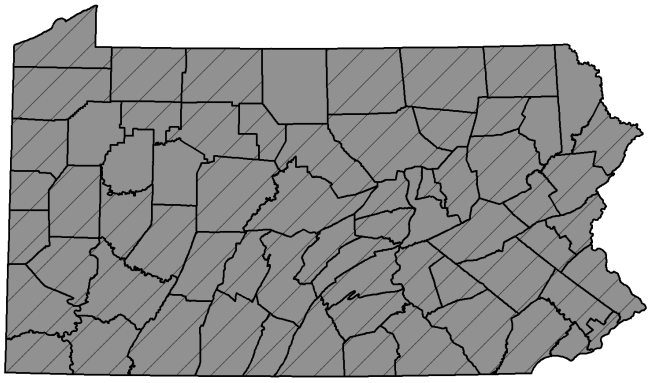
Field Sparrow

Spizella pusilla

Jeffrey A. Stratford *Wilkes University*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Breeding Wintering

Conservation Profile

PA 10-Year Conservation Goal: Increase population to sustainable levels.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Wintering

State Rank (Season): S4N

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Increase of >25%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Mixture of grasses and shrubs.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Wintering

Specific Habitat Requirements: Grasslands with few shrubs.

Primary Habitat: Open Upland

Primary Habitat Type: Shrublands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Conversion of open shrubland habitat to row crops.

Action Category: Economic incentives and disincentives

Specific Action: Limit agricultural development in high quality shrub/grasslands.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increased populations.

Potential Collaborators: Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Indigo Buntings, Yellow-breasted Chat, Golden-winged Warblers, and other early successional species

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Medium

Specific Threat: Woody encroachment.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Control woody encroachment/succession through fire or herbicides.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increased populations.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Shrubland birds

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Land conversion to solar.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Land conversion to solar.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Urbanization and loss of shrubland.

Action Category: Economic incentives and disincentives

Specific Action: Preserve high quality habitat by avoiding development on identified lands.

Objective: Stabilize or increase populations.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Stable or increasing population.

Potential Collaborators: 4. Transportation and Service Corridors, 7. Natural Systems Modifications

Locations: Statewide

Other species likely to benefit from this action: Shrubland and grassland species, Golden-winged Warbler, Blue Grosbeak, Indigo Bunting

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Land conversion to solar.

Action Category: Outreach, communication and distribution

Specific Action: Avoid development of high quality Field Sparrow habitat for solar farms.

Objective: Stabilize or increase populations.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Stable or increased populations.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Shrubland and grassland species

Season: Wintering

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Succession from field to forest.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Mowing, prescribed fire, or targeted herbicide of woody vegetation to maintain grassland.

Objective: Increase use of habitat.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Increasing detections of Field Sparrows on grasslands.

Potential Collaborators: Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland raptors, grassland sparrows

Season: Breeding

Priority	Need	Partners
1	Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of early succession species.	Universities & research institutions, Pennsylvania Game Commission
2	What are the effects of right-of-way management and pipelines on populations?	Pennsylvania Game Commission, Universities & research institutions
3	What are the effects of controlled burns on populations?	Pennsylvania Game Commission, Conservancies & Land Trusts, Universities & research institutions
4	Minimum breeding habitat area requirements.	Pennsylvania Department of Conservation and Natural Resources, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Universities & research institutions

Season: Wintering

Priority	Need	Partners
1	Effects of fire on field use.	Universities & research institutions
2	Minimum wintering habitat area requirements.	Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners

Season: Wintering

Priority	Survey	Partners
1	Survey of fields of various sizes and successional stages.	Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Askins, R. A. 1998. Restoring forest disturbance to sustain populations of shrubland birds. Restoration and Management Notes 16:166-173.

Burhans, D. E. and F. R. Thompson III. 2006. Songbird abundance and parasitism differ between urban and rural shrublands. Ecological Applications 16:394-405.

Carey, M. 1990. Effects of brood size and nestling age on parental care by male Field Sparrows (Spizella pusilla). Auk 107:580-586.

Carey, M. 2012. Field Sparrow. Pages 410-411 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Carey, Michael, M. Carey, D. E. Burhans and D. A. Nelson. 2008. Field Sparrow (Spizella pusilla). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/103 (accessed July 2015).

Herkert, J. R. 1994. Breeding bird communities of midwestern prairie fragments: The effects of prescribed burning and habitat-area. Natural Areas Journal 14:128-135.

Perry, R. W. and R. E. Thill. 2013. Long-term responses of disturbance-associated birds after different timber harvests. Forest Ecology and Management 307:274-283.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wentworth, K. L., M. C. Brittingham, and A. M. Wilson. 2010. Conservation reserve enhancement program fields: Benefits for grassland and shrub-scrub species. Journal of Soil and Water Conservation 65:50-60.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Yahner, R. H. 2003. Responses of bird communities to early successional habitat in a managed landscape. Wilson Bulletin 115:292-298.

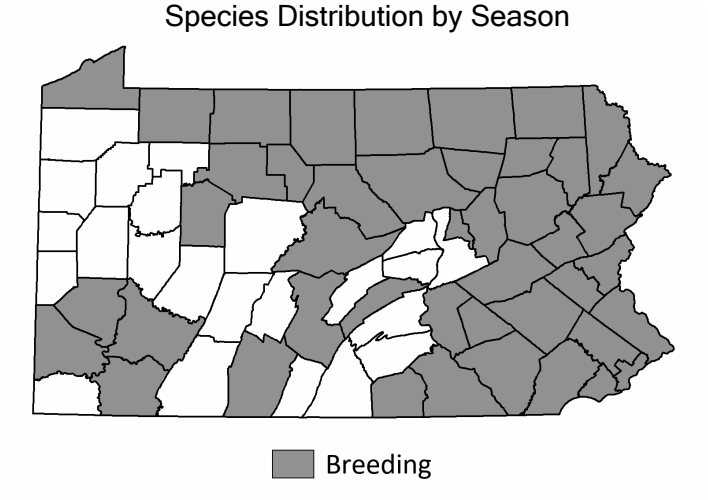
PENNSYLVANIA
WILDLIFE ACTION PLAN

White-throated Sparrow

Zonotrichia albicollis

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain the current breeding population, an estimated 10,000 individuals (Will et al. 2020), through 2035 by protecting nesting sites and their attributes.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Shrubby wetlands and shrub habitats associated with the glaciated northeast.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Appalachian Acidic Swamp

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Medium

Specific Threat: A warmer, drier climate, paired with forest maturation, will result in loss of suitable habitat.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize maintaining a structurally complex understory during forest management as this species will respond favorably provided a well-developed shrub layer is present.

Objective: A combination of management techniques, including selective timber harvesting, mechanical thinning, and prescribed burns, can be used to create and sustain the young forest conditions this species depends on. In regions dominated by mature forests, incorporating early successional habitat patches within rotational forest management plans will help maintain a mosaic of habitat types. Actions focused within breeding range and near ponds, lakes, rivers, bogs and beaver meadows.

Action Priority: 4-Low

Action Urgency: Initiate within 5-10 years

Measure: Number of sites with suitable breeding habitat where groups or agencies have managed forest for dense, shrubby understory or other management to protect known breeding areas.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, reptiles, and insects.

Season: Breeding

Priority	Need	Partners
1	Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of young forest birds.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Private Landowners, U.S. Forest Service
2	What is the effect of human disturbance on breeding populations?	Pennsylvania Game Commission, Pennsylvania Association of Conservation Districts, Universities & research institutions, Non-governmental organizations, U.S. Forest Service
3	How sensitive are boreal forest bird species to changes in climate?	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions, Non-governmental organizations, U.S. Forest Service
4	What is the connectivity of Pennsylvania's breeding population and winter population?	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, U.S. Forest Service, Universities & research institutions, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices focused in the Allegheny Plateaus and Ridge and Valley provinces.	Pennsylvania Game Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, U.S. Forest Service, Private Landowners, Universities & research institutions

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provides survival and productivity information for many songbird species and can be a useful measurement of temporal patterns.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Bolgiano, N. C. 2012. White-throated Sparrow (Zonotrichia albicollis). Pages 424-425 in A. W. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Penn State Press, University Park, Pennsylvania.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Clark, K., D. Euler, and E. Armstrong. 1983. Habitat associations of breeding birds in cottage and natural areas of central Ontario. Wilson Bulletin 95:77-96.

DeSante, D. F. and D. R. Kaschube. 2009. The Monitoring Avian Productivity and Survivorship (MAPS) program 2004, 2005, and 2006 report. Bird Populations 9:86-169.

Falls, J. B. and J. G. Kopachena. 2010. White-throated Sparrow (Zonotrichia albicollis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/128 (accessed July 2015).

Falls, J. B. and J. G. Kopachena. 2020. White-throated Sparrow (Zonotrichia albicollis), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.whtspa.01.

Gross, D. A. 1992. White-throated Sparrow (Zonotrichia albicollis). Pages 392-393 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Gross, D. A. 2003. Avian Population and Habitat Assessment Project: Pennsylvania Important Bird Area #48, State Game Lands #57, Wyoming, Luzerne, and Sullivan Counties. (For Pennsylvania Audubon.) Ecology III, Inc., Berwick, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Hanowski J., G. Niemi, N. Danz, and J. Lind. 2003. Breeding bird response to riparian forest harvest and harvest equipment. Forest Ecology and Management 174: 315-328.

Niemi, G., J. Hanowski, P. Helle, R. Howe, M. Mönkkönen, L. Venier, and D. Welsh. 1998. Ecological sustainability of birds in boreal forests. Conservation Ecology 2:17.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Ralston, J., and J. J. Kirchman. 2013. Predicted range shifts in North American boreal forest birds and the effect of climate change on genetic diversity in Blackpoll Warbler (Setophaga striata). Conservation Genetics 14:543-555.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Will, T., J.C. Stanton, K.V. Rosenberg, A.O. Panjabi, A.F. Camfield, A.E. Shaw, W.E. Thogmartin, and P.J. Blancher. 2020. Handbook to the Partners in Flight Population Estimates Database, Version 3.1. PIF Technical Series No 7.1. pif.birdconservancy.org/popest.handbook.pdf.

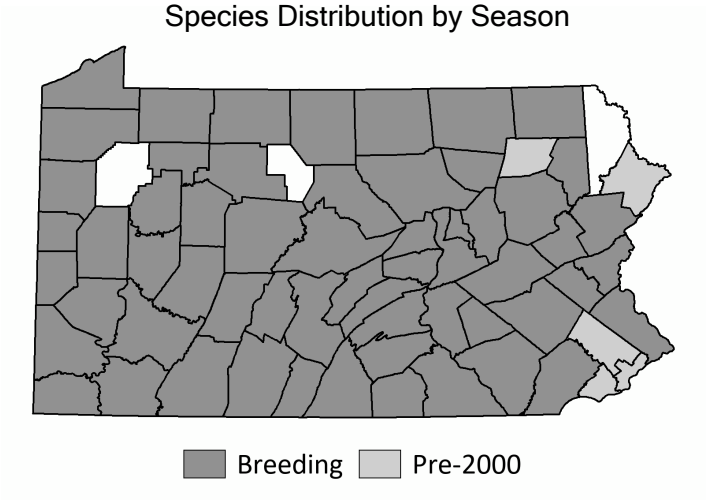
PENNSYLVANIA
WILDLIFE ACTION PLAN

Vesper Sparrow

Pooecetes gramineus

Andrew M. Wilson *Gettysburg College*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase breeding population 10% above 2010 levels as reported by the Second Breeding Bird Atlas (17,000 territorial males in at least 870 atlas blocks) (see Wilson et al. 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups:

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 70-80%

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Agricultural lands and reclaimed surface mines (Santner 1992) to shrubs and woodland edges, with bare ground for foraging (Wilson 2012).

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Intensive agriculture.

Action Category: Conserve specific land or seascapes

Specific Action: Prevent the loss of openland habitat (e.g., farmland, grasslands, reclaimed surface mines).

Objective: Purchase land that may otherwise be sold for development.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of openland habitat purchased.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland bird species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Loss of open farmland and grassland habitats to development.

Action Category: Mitigate human environmental impact

Specific Action: Prevent the loss of openland habitat (e.g., farmland, grasslands, reclaimed surface mines).

Objective: Purchase land that may otherwise be sold for development.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of openland habitat purchased.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland bird species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	Which specific crops and agricultural practices are this species associated with in Pennsylvania?	Private Landowners, Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	How is this species affected by neonicotinoid insecticides?	Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Association of Conservation Districts

Season: Breeding

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Note that if population continues to decline, BBS will no longer adequately monitor populations of this species.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Davis, S.K., D. A. Kirk, L. M. Armstrong, J. H. Devries, R. J. Fisher. 2020. Shifting from spring wheat to winter wheat: a potential conservation strategy for grassland songbirds in cultivated landscapes?
Biological Conservation 245.

Jones, S. L. and J. E. Cornely. 2002. Vesper Sparrow (Pooecetes gramineus). Account 624 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Jones, S. L. and J. E. Cornely. 2020. Vesper Sparrow (Pooecetes gramineus), version 1.0. In A. F. Poole and F. B. Gill, editors. Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA.

Li, Y., R. Miao, and M. Khanna. 2020. Neonicotinoids and decline in bird biodiversity in the United States. Nature Sustainability 3:1027–1035.

Santner, S. 1992. Vesper Sparrow. Pages 380-381 in D. W. Brauning, editor. Atlas of breeding birds in Pennsylvania. University of Pittsburgh Press. Pittsburgh, Pennsylvania.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wentworth, K. L., M. C. Brittingham, and A. M. Wilson. 2010. Conservation reserve enhancement program fields: Benefits for grassland and shrub-scrub species. Journal of Soil and Water Conservation 65:50-60.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M. 2012. Vesper Sparrow (Pooecetes gramineus). In A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

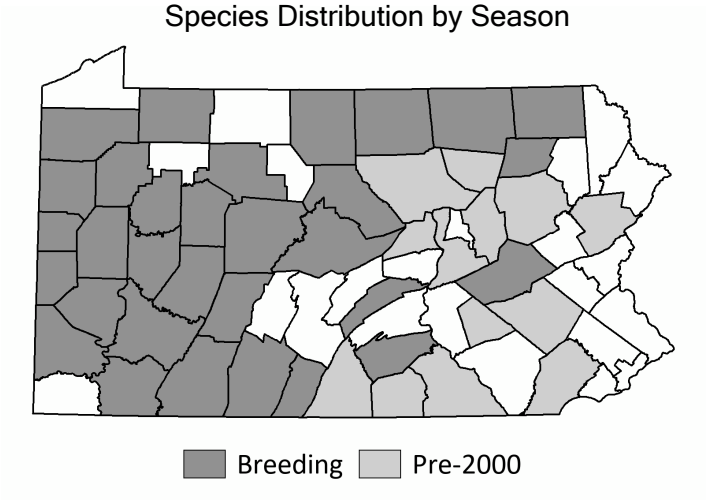
PENNSYLVANIA
WILDLIFE ACTION PLAN

Henslow's Sparrow

Centronyx henslowii

Andrew M. Wilson *Gettysburg College*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain current population size by maintaining habitat on reclaimed strip mines where the species occurs. Manage for additional suitable grassland habitat in appropriate locations.

NatureServe Global Rank: G4

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Indicator for large-scale grasslands; grassland obligate species.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Loss of nests due to agricultural activites

Action Category: Economic incentives and disincentives

Specific Action: Prevent loss of suitable agricultural fields close to core breeding populations.

Objective: Prevent loss of farmland.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Maintenance of extant populations.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Section: Pittsburgh Low Plateau

Other species likely to benefit from this action: Bobolink, Upland Sandpiper, Savannah Sparrow, Northern Harrier, Short-eared Owl

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Development of reclaimed grasslands.

Action Category: Economic incentives and disincentives

Specific Action: Avoid development of reclaimed mines and other suitable fields close to core breeding populations.

Objective: Reduce habitat loss.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Maintenance of extant populations.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Pennsylvania Association of Conservation Districts, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Section: Pittsburgh Low Plateau

Other species likely to benefit from this action: Bobolink, Upland Sandpiper, Savannah Sparrow, Northern Harrier, Short-eared Owl

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Loss of open grassland to invasive shrubs.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Mechanical, biological and chemical control of invasive plants may be needed. Prescribed fire rotation may help.

Objective: Reduce scrub encroachment in open grasslands.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Acres of grassland managed.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Section: Pittsburgh Low Plateau

Other species likely to benefit from this action: All other grassland birds

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** High

Specific Threat: Successional changes, possibly accelerated by climate change.

Action Category: Manage non-living habitat components

Specific Action: Use prescribed fire and mowing to effectively create grassland habitat.

Objective: Maintain mid-seral stage grasslands.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Acres of grassland managed.

Potential Collaborators: Other state agency, Pennsylvania Game Commission, Township Zoning Boards

Locations: Physiographic Section: Pittsburgh Low Plateau

Other species likely to benefit from this action: All grassland birds

Season: Breeding

Priority	Need	Partners
1	Can conservation grasslands (e.g. Conservation Reserve Enhancement Program (CREP)) be targeted to provide habitat for this species?	Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service
2	How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?	Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Monitor populations on a stratified random selection of reclaimed surface mines every 5 years. Use line transect methods (Diefenbach et al. 2007).	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need: Determine where populations persist so that conservation and habitat management can be carefully targeted.

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Diefenbach, D. R., M. R. Marshall, J. A. Mattice, and D. W. Brauning. 2007. Incorporating availability for detection in estimates of bird abundance. The Auk 124:96-106.

Herkert, J. R., P. D. Vickery, and D. E. Kroodsma. 2002. Henslow's Sparrow (Ammodramus henslowii). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/672 (accessed July 2015).

Hill, J. M., and D. R. Diefenbach. 2013. Experimental removal of woody vegetation does not increase nesting success or fledgling production in two grassland sparrows (Ammodramus) in Pennsylvania. Auk 130:764-773.

Hill, J. M., and D. R. Diefenbach. 2014. Occupancy patterns of regionally declining grassland sparrow populations in a forested Pennsylvania landscape. Conservation Biology 28:735-744.

Keating, M. P., P. J. Williams, J. R. Robb, F. E. Buderman, J. P. Lewis, T. Vanosdol, and R. Harer. 2023. Henslow's Sparrow shows positive response to prescribed fire rotation. Ornithological Applications 125:1-9.

Marshall. M. R. and D. R. Diefenbach. 2010. Henslow's Sparrow (Ammodramus henslowii). In M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania-A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Pruitt, L. 1996. Henslow's Sparrow: status assessment. U.S. Fish and Wildlife Service, Bloomington, Indiana.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M. 2012. Henslow's Sparrow (Ammodramus henslowii). In A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

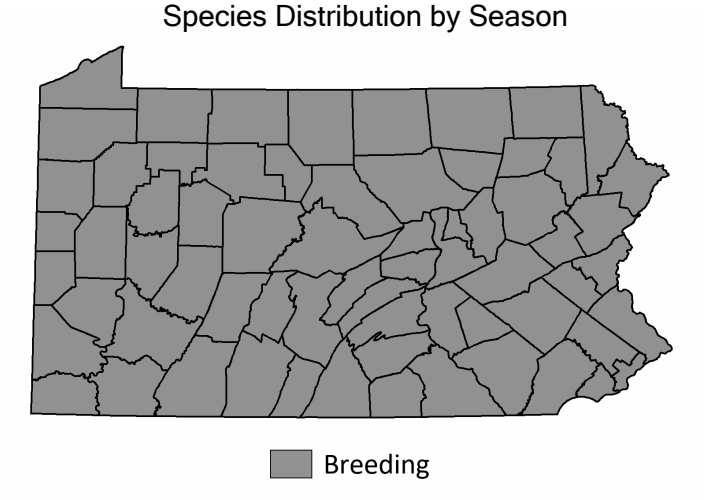
PENNSYLVANIA
WILDLIFE ACTION PLAN

Savannah Sparrow

Passerculus sandwichensis

Andrew M. Wilson *Gettysburg College*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain breeding population at or above 2010 levels as reported by the Second Breeding Bird Atlas (145,000 territorial males in at least 870 atlas blocks) (see Wilson et al. 2012).

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Arable fields, pasture, and reclaimed surface mines (Wilson in Wilson et al. 2012).

Primary Habitat: Open Upland

Primary Habitat Type: Agriculture: Cropland/Pastures

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of and fragmentation of habitat due to renewable energy development and infrastructure

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High - Medium

Specific Threat: Loss of suitable open farmland and grassland to development

Action Category: Mitigate human environmental impact

Specific Action: Prevent the loss of openland habitat (e.g., farmland, grasslands, reclaimed surface mines).

Objective: Purchase land that may otherwise be sold for development,

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of openland habitat purchased.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Grassland bird species

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Loss of nests due to mowing

Action Category: Outreach, communication and distribution

Specific Action: Restrict mowing during peak of breeding season.

Objective: Increase nesting success.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Maintenance of extant populations.

Potential Collaborators: Pennsylvania Association of Conservation Districts, U.S. Department of Agriculture-Natural Resources Conservation Service, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Eastern Meadowlark

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of and fragmentation of habitat due to renewable energy development and infrastructure

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of and fragmentation of habitat due to renewable energy development and infrastructure

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	Identify magnitude of threat due to neonicotinoid insecticides.	Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission
2	How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?	Pennsylvania Game Commission, Private Landowners, Universities & research institutions
3	Is climate change likely to result in changes to agricultural practices (specifically earlier mowing) that could impact this species over coming decades?	Private Landowners, Universities & research institutions
4	Do conservation grasslands (e.g., Conservation Reserve Enhancement Program (CREP)) provide substantial refuges for this species in northern and western Pennsylvania?	U.S. Department of Agriculture-Natural Resources Conservation Service, Private Landowners, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Assessment of use of conservation grasslands (e.g., Conservation Reserve Enhancement Program) in northern and western areas of the state.	Pennsylvania Game Commission, Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Butler, R. W. 2000. Stormy seas for some North American songbirds: are declines related to severe storms during migration? Auk 117:518-522.

Daniel, J., and N. Koper. 2019. Cumulative impacts of roads and energy infrastructure on grassland songbirds, The Condor 121(2): 1-21.

Davis, S. K., D. A. Kirk, L. M. Armstrong, J. H. Devries, R. J. Fisher. 2020. Shifting from spring wheat to winter wheat: a potential conservation strategy for grassland songbirds in cultivated landscapes? Biological Conservation 245.

Nocera, J. J., G. J. Parsons, G. R. Milton, and A. H. Fredeen. 2005. Compatibility of delayed cutting regime with bird breeding and hay nutritional quality. Agriculture Ecosystems & Environment 107:245-253.

Perlut, N. G., A. M. Strong, T. M. Donovan, and N. J. Buckley. 2008. Regional population viability of grassland songbirds: effects of agricultural management. Biological Conservation 141:3139-3151.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wentworth, K. L., M. C. Brittingham, and A. M. Wilson. 2010. Conservation reserve enhancement program fields: Benefits for grassland and shrub-scrub species. Journal of Soil and Water Conservation 65:50-60.

Wheelwright, N. T., and J. D. Rising. 2020. Savannah Sparrow (Passerculus sandwichensis), version 1.0. In A. F. Poole, editor. Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M. 2012. Savannah Sparrow (Passerculus sandwichensis). In A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

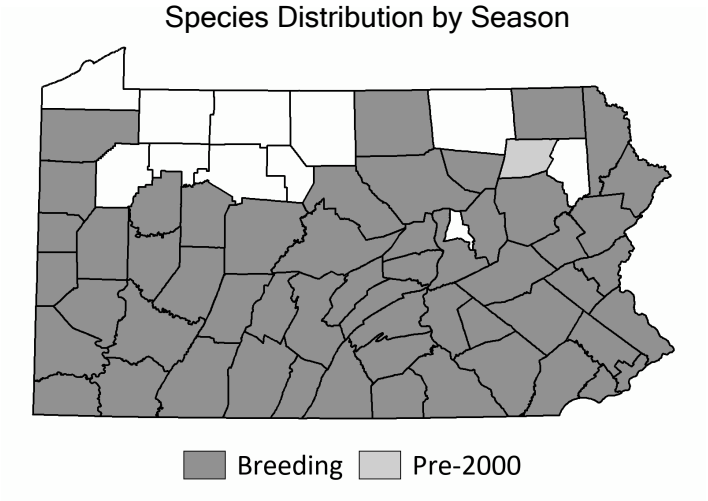
PENNSYLVANIA
WILDLIFE ACTION PLAN

Yellow-breasted Chat

Icteria virens

Jeffrey A. Stratford *Wilkes University*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase and stabilize populations.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 50-70%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Low, dense shrub habitats with an open or partially open tree canopy in regenerating clearcuts, forest edges, abandoned farmland, burned forest, and shrubby margins.

Primary Habitat: Open Upland

Primary Habitat Type: Shrublands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Residential and Commercial Development **Threat Impact:** Low

Specific Threat: Conversion of early successional habitat to developed areas.

Action Category: Economic incentives and disincentives

Specific Action: Preserve high quality habitats.

Objective: Stabilize or increase population.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Businesses, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Other shrubland species

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Invasive shrubs.

Action Category: Basic research and status monitoring

Specific Action: Understand effects of invasive plants, particularly shrubs.

Objective: Study effects of invasive species control on nest success/fitness.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Clear statistical results.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Other shrubland species

Season: Breeding

Threat Category: Natural Systems Modifications **Threat Impact:** High

Specific Threat: Lack of disturbance.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Control woody encroachment/succession through fire and targeted herbicides.

Objective: Stable or increasing populations by setting back succession.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Other shrubland species

Season: Breeding

Priority	Need	Partners
1	Effects of fire on populations.	Pennsylvania Game Commission, Universities & research institutions
2	Effects of habitat area on occupancy.	Conservancies & Land Trusts, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
3	What are the effects of right-of-way management and pipelines on populations?	Universities & research institutions

Season: Breeding

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Askins, R. A. 1998. Restoring forest disturbance to sustain populations of shrubland birds. Restoration and Management Notes 16:166-173.

Dennis, J. V. 1958. Some aspects of the breeding ecology of the Yellow-breasted Chat (Icteria virens). Bird-Banding 29:169-183.

Dettmers, R. 2003. Status and conservation of shrubland birds in the northeastern U.S. Forest Ecology and Management 185:81-93.

Eckerle, K. P. and C. F. Thompson. 2001. Yellow-breasted Chat (Icteria virens). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/575 (accessed July 2015).

Grove, L. 2012. Yellow-breasted Chat (Icteria virens). Pages 402-403 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Orndorff, S., and T. Patten. 2007. Management Guidelines for Barrens Communities in Pennsylvania. Report prepared for the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission. The Nature Conservancy, Harrisburg. Pennsylvania.

Perry, R. W. and R. E. Thill. 2013. Long-term responses of disturbance-associated birds after different timber harvests. Forest Ecology and Management 307:274-283.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Sechler, F. C. 2010. Yellow-breasted Chat (Icteria virens). Pages 304-307 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

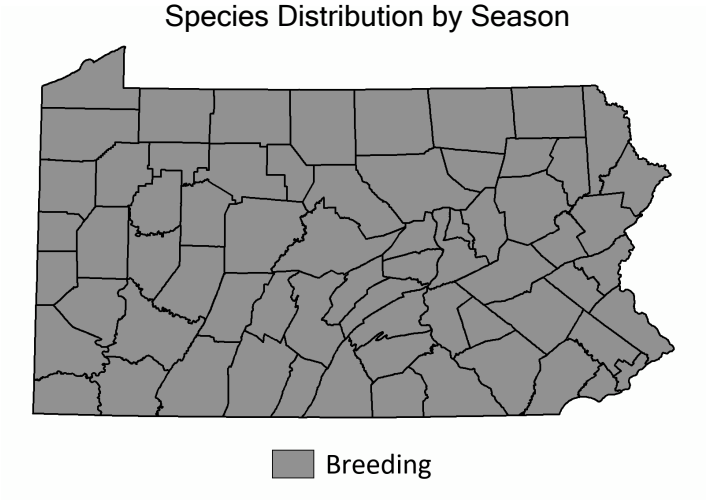
PENNSYLVANIA
WILDLIFE ACTION PLAN

Bobolink

Dolichonyx oryzivorus

Andrew M. Wilson *Gettysburg College*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain the breeding population at or above 2012 levels (average of 2.5 birds per route on at least two-thirds of Pennsylvania Breeding Bird Survey routes) by 2023.

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Moist meadows and fields of hay, clover, alfalfa and other herbaceous vegetation. Reclaimed surface mines provide suitable habitat.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Changes in hay harvesting regimes, with a trend towards earlier mowing.

Action Category: Economic incentives and disincentives

Specific Action: Delay mowing of hayfield until at least 1st July

Objective: Increase nesting success

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Acres of delayed mowing.

Potential Collaborators: Pennsylvania Association of Conservation Districts, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: All grassland bird

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** Medium

Specific Threat: Conversion of pasture to improved seeded grassland

Action Category: Create or amend policies, guidelines, or best practices

Specific Action: Incentivize the retention of unimproved pasture and grassland through conservation easements.

Objective: Prevent the loss of biodiversity rich grassland.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stabilize or increase habitat acreage.

Potential Collaborators: Conservancies & Land Trusts, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: All grasslands birds. Insects.

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Loss of appropriate habitat for solar and wind development.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Interested Public, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Agricultural and Forestry Effluents **Threat Impact:** Low

Specific Threat: Neonicotinoid insecticides.

Action Category: Outreach, communication and distribution

Specific Action: Disincentivize the use of neonicotinoid pesticides.

Objective: Reduce neonicotinoid use.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Number of cooperators and acres not using neonicotinoids.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: All grassland birds and beneficial insects.

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Conversion of grasslands to developed areas

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Disincentivize low-density rural sprawl.

Objective: Reduce grassland habitat loss.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Stabilize or increase habitat acreage.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	Identify magnitude of threat due to neonicotinoid insecticides.	Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service
2	Is climate change likely to result in changes to agricultural practices (specifically earlier mowing) that could impact this species over coming decades?	Private Landowners, Universities & research institutions
3	Do conservation grasslands (e.g., Conservation Reserve Enhancement Program (CREP)) provide substantial refuges for this species in northern and western Pennsylvania?	U.S. Department of Agriculture-Natural Resources Conservation Service, Private Landowners, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Assessment of use of conservation grasslands (e.g., Conservation Reserve Enhancement Program) in northern and western areas of the state.	Pennsylvania Game Commission, Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bollinger, E. K., P. B. Bollinger, and T. A. Gavin. 1990. Effects of hay-cropping on eastern populations of the Bobolink. Wildlife Society Bulletin 18:142-150.

Fromberger, M. A., A. J. Campomizzi, Z. M. Lebrun-Southcott, A. L. Pintaric, N. M. MacDonald, and E. Nol. 2020. Factors affecting Bobolink nest survival across grassland types. Avian Conservation and Ecology 15(2):13. https://doi.org/10.5751/ACE-01666-150213

Kristen M. Diemer, Joseph J. Nocera. 2016. Bobolink reproductive response to three hayfield management regimens in southern Ontario. Journal for Nature Conservation 29: 123-131

Li, Y., R. Miao, and M. Khanna. 2020. Neonicotinoids and decline in bird biodiversity in the United States. Nature Sustainability 3:1027–1035.

Nocera, J. J., G. J. Parsons, G. R. Milton, and A. H. Fredeen. 2005. Compatibility of delayed cutting regime with bird breeding and hay nutritional quality. Agriculture Ecosystems & Environment 107:245-253.

Perlut, N. G., A. M. Strong, T. M. Donovan, and N. J. Buckley. 2008. Regional population viability of grassland songbirds: effects of agricultural management. Biological Conservation 141:3139-3151.

Thompson, S. J., D. H. Johnson, N. D. Niemuth, and C. A. Ribic. 2015. Avoidance of unconventional oil wells and roads exacerbates habitat loss for grassland birds in the North American great plains. Biological Conservation 192:82-90.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M. 2012. Bobolink (Dolichonyx oryzivorus). In A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

PENNSYLVANIA
WILDLIFE ACTION PLAN

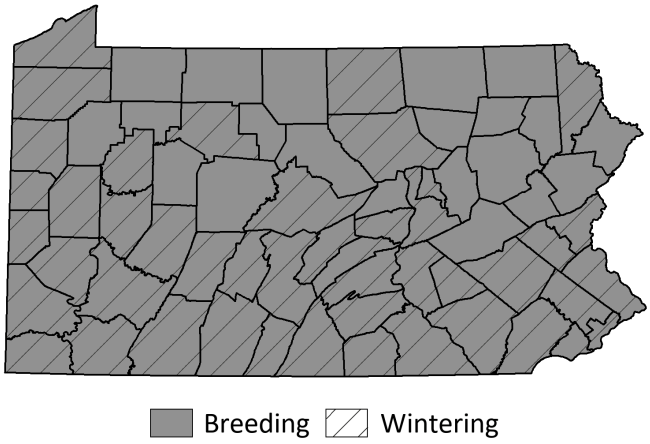
Eastern Meadowlark

Sturnella magna

Jeffrey A. Stratford *Wilkes University*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Increase or stabilize populations by 2035

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Very High

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Wintering

State Rank (Season): S3N

State Rank Year: 2025

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Prairies, pastures, hayfields, and fallow lands.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: Hopefully the goals stated are where grasslands occur and not necessarily all locations.

Season: Wintering

Specific Habitat Requirements: Large grasslands with few or no shrubs

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Woody encroachment

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Delay mowing on grasslands and pastures until outside the bird nesting season.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increased populations.

Potential Collaborators: Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Vesper Sparrow

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Conversion of grassland habitat to developed areas

Action Category: Economic incentives and disincentives

Specific Action: Encourage development, if necessary, on sites without meadowlarks, such as brownfields.

Objective: Stabilize population.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No further declines.

Potential Collaborators: Township Zoning Boards, Businesses, Pennsylvania Department of Community & Economic Development, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Vesper Sparrow, other grassland species

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Conversion of grassland habitat to developed areas

Action Category: Conserve specific land or seascapes

Specific Action: Preserve high quality habitat and protect from development.

Objective: Stabilize or increase populations by preserving high quality grasslands.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Other grassland species, Bobolink, Vesper Sparrow

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Woody encroachment.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Decrease woody encroachment on grasslands through fire and chemical means.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increased populations.

Potential Collaborators: U.S. Fish and Wildlife Service, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Defense

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Vesper Sparrow

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Removal of appropriate habitat for solar and wind

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Removal of appropriate habitat for solar and wind

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Invasive plants altering food supply and habitat. Invasive pests (e.g., fire ants) altering food supply and nest predation.

Action Category: Basic research and status monitoring

Specific Action: Monitor and research the effects of invasive species, including plants, pests, and diseases.

Objective: Understand the effects of new invasive plants, pests, and diseases

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Stable or increased populations.

Potential Collaborators: 4. Transportation and Service Corridors, 7. Natural Systems Modifications

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Vesper Sparrow, winter raptors

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Removal of appropriate habitat for solar and wind

Action Category: Outreach, communication and distribution

Specific Action: Keep solar farms off high value grasslands.

Objective: Stabilize or increase populations.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Stable or increased populations.

Potential Collaborators: Local agencies & municipalities, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Bobolink, Vesper Sparrow, winter raptors

Season: Wintering

Threat Category: Other Ecosystem Modifications **Threat Impact:** Low

Specific Threat: Succession to scrub and forest habitat.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Mow and/or use prescribed fire to impede succession.

Objective: Increased use of habitat.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Increasing presence during winter.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland raptors, grassland sparrows

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Removal of appropriate habitat for wind/solar

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Removal of appropriate habitat for wind/solar

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 3-Medium **Action Urgency:** **Measure:** Area preserved or mitigated.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Wintering

Threat Category: Renewable Energy **Threat Impact:** Low

Specific Threat: Removal of appropriate habitat for wind/solar

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Priority	Need	Partners
1	Effects of grassland restoration on populations; minimum habitat area requirements.	Pennsylvania Game Commission, U.S. Geological Survey
2	What are the effects of controlled burns on populations?	U.S. Geological Survey, Pennsylvania Game Commission
3	Effects of pasture management on populations.	Pennsylvania Game Commission, U.S. Geological Survey

Season: Wintering

Priority	Need	Partners
1	Understand minimum area needed for wintering Eastern Meadowlark.	U.S. Geological Survey, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service
2	Effects of solar energy development on wintering Eastern Meadowlark.	U.S. Geological Survey, Private Landowners, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners

Season: Wintering

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: National Audubon Society Christmas Bird Count

Lead(s) : National Audubon Society

Link: https://www.audubon.org/community-science/christmas-bird-count

Description: The longest running community science survey in the world provides critical data on population trends. An annual winter survey of more than 2,600 count circles worldwide.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Herkert, J. R. 1994. The effects of habitat fragmentation on Midwestern grassland bird communities. Ecological Applications 4:461-471.

Jaster, L. A., W. E. Jensen and W. E. Lanyon. 2012. Eastern Meadowlark (Sturnella magna). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/160 (accessed July 2015).

Rohrbaugh Jr., R. W., D. L. Reinking, D. H. Wolfe, S. K. Sherrod, and M. A. Jenkins. 1999. Effects of prescribed burning and grazing on nesting and reproductive success of three grassland passerine species in tallgrass prairie. Studies in Avian Biology 19:165-170.

Speicher, D., and J. Speicher. 2010. Eastern Meadowlark. In M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Wentworth, K. L., M. C. Brittingham, and A. M. Wilson. 2010. Conservation reserve enhancement program fields: Benefits for grassland and shrub-scrub species. Journal of Soil and Water Conservation 65:50-60.

Wilson, A. M. 2010. The status and conservation of farmland birds in Pennsylvania. Pages 217-231 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

With, K. A., A. W. King, and W. E. Jensen. 2008. Remaining large grasslands may not be sufficient to prevent grassland bird declines. Biological Conservation 141:3152-3167.

PENNSYLVANIA
WILDLIFE ACTION PLAN

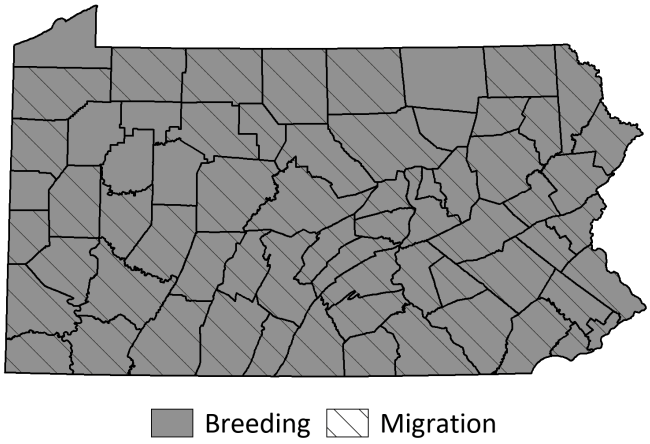
Louisiana Waterthrush

Parkesia motacilla

Terry L. Master — *Distinguished Professor of Biology Emeritus, East Stroudsburg University of Pennsylvania*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain the current population level of at least 0.4 birds per route with detection on at least 50% of Breeding Bird Survey routes, and distribution of at least 1700 Breeding Bird Atlas (Wilson et al. 2012) blocks.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Mature, forested watersheds with med-high gradient headwater (1st-3rd order) streams, associated well-developed banks in ravines with exposed root masses/tangles and on benches (Barnes et al. 2018) with exposed root masses of tree throws. Strong association with streams lined with eastern hemlock stands in the northeast in particular. High-quality stream indicator (O'Connell et al. 2003).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Riparian & Floodplains

Habitat Comments: Eastern hemlock benches often have significantly higher pair densities, fledgling densities and rates of double brooding compared to headwater stream ravines and thus are particularly important habitats in northeastern Pennsylvania (Barnes et al. 2018).

Season: Migration

Specific Habitat Requirements: Mature, forested watersheds with med-high gradient headwater (1st-3rd order) streams, associated well-developed banks in ravines with exposed root masses/tangles and on benches (Barnes et al. 2018) with exposed root masses of tree throws. Strong association with streams lined with eastern hemlock stands in the northeast in particular. High-quality stream indicator (O'Connell et al. 2003).

Primary Habitat: Land-Water Interface

Primary Habitat Type: Riparian & Floodplains

Habitat Comments: Eastern hemlock benches often have significantly higher pair densities, fledgling densities and rates of double brooding compared to headwater stream ravines and thus are particularly important habitats in northeastern Pennsylvania (Barnes et al. 2018).

Season: Breeding

Threat Category: Mining and Quarrying **Threat Impact:** High

Specific Threat: Acid drainage from abandoned coal mines.

Action Category: Manage non-living habitat components

Specific Action: Remediate abandoned coal mine seepage and runoff.

Objective: Prevent acid mine drainage leakage from abandoned coal mines.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of abandoned mines remediated.

Potential Collaborators: Businesses, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Susquehanna River Basin Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Ridge and Valley, Ridge and Valley. Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Waynesburg Hills, Allegheny Mountain, Allegheny Front, Anthracite Valley, Anthracite Upland

Other species likely to benefit from this action: Waterfowl, Belted Kingfisher, Common Merganser, other species utilizing streams.

Season: Breeding

Threat Category: Domestic and Urban Waste Water **Threat Impact:** Low

Specific Threat: Reduction of water quality.

Action Category: Manage non-living habitat components

Specific Action: Conserve existing, or re-establish, forests along streams.

Objective: Water quality improvement.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Improved water quality.

Potential Collaborators: Businesses, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission

Locations: Statewide

Other species likely to benefit from this action: Waterbirds, Belted Kingfishers, Common Mergansers

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Development causing forest fragmentation, removal of riparian forest.

Action Category: Conserve via zoning or informal designations

Specific Action: Maintain 30 m (100 ft) forest buffers along streams.

Objective: Create/maintain/manage riparian buffers.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Acres of protected forests along streams.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Local agencies & municipalities, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission

Locations: Statewide

Other species likely to benefit from this action: Belted Kingfisher

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Populations subject to heavy metal accumulation from fracking.

Action Category: Mitigate human environmental impact

Specific Action: Mitigate the impacts of fracking on headwater stream quality and forest fragmentation.

Objective: Improve headwater stream water quality.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Improved water quality.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Delaware River Basin Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Universities & research institutions

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Birds using aquatic habitats and requiring large, contiguous and riparian forests.

Season: Breeding

Threat Category: Other Impacts **Threat Impact:** High

Specific Threat: Droughts can affect preferred insect prey availability, especially mayflies, stoneflies and caddisflies.

Action Category: Manage non-living habitat components

Specific Action: Maintain stable stream flow regimes and water temperature to extent possible.

Objective: Mitigate potential phenology issues regarding aquatic insect availability and peak demand for food during nesting.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Flow and water temperature measurements during the breeding season.

Potential Collaborators: Delaware River Basin Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission

Locations: Statewide

Other species likely to benefit from this action: Brook trout, other headwater stream associates.

Season: Breeding

Threat Category: Storms and Flooding **Threat Impact:** High

Specific Threat: Increased discharge rate in headwater streams negatively affects prey populations and floods nests.

Action Category: Manage non-living habitat components

Specific Action: Maintain and enhance forested buffers along watershed streams and rivers, employ green infrastructure, and control runoff.

Objective: Establish/maintain forested buffers along headwater streams; Construct temporary storage areas to mitigate runoff.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Headwater stream-miles with sufficient forested buffers; Number of temporary storage areas constructed.

Potential Collaborators: Conservancies & Land Trusts, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Waterbirds, Belted Kingfisher, Common Merganser

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** Medium

Specific Threat: Increasing headwater stream temperatures.

Action Category: Manage non-living habitat components

Specific Action: Protect, maintain, and enhance riparian forests in watershed headwater (1st-3rd order) streams.

Objective: Mitigate/reduce water temperatures.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Headwater stream-miles with adequate 30 meter (100 feet) forested buffers.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Private Landowners, Susquehanna River Basin Commission

Locations: Statewide

Other species likely to benefit from this action: Waterbirds, Belted Kingfisher, Common Merganser

Season: Migration

Threat Category: Other Threat **Threat Impact:** Low

Specific Threat: Mortality caused by collisions with various towers, wind turbines, other tall structures and glass.

Action Category: Development of improved products and production methods

Specific Action: Reduce avian collisions by encouraging lights-out programs in cities during migratory periods, feathering of wind turbines during sensitive periods and encouraging use of internal and external glass modifications to reduce window collisions.

Objective: Reduce avian mortality due to collisions with human-made objects.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Reduction in mortality levels.

Potential Collaborators: Businesses, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Landbirds

Season: Migration

Threat Category: Storms and Flooding **Threat Impact:** High

Specific Threat: Unpredictable periods of drought/flooding. Droughts can affect preferred mayfly, stonefly, and caddisfly prey abundance. Flooding scours aquatic insect prey from rock surfaces.

Action Category: Manage non-living habitat components

Specific Action: Protect, maintain, and enhance riparian forests in watershed headwater (1st-3rd order) streams.

Objective: Use green infrastructure to mitigate flooding events and periods of drought.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Flow and water temperature measurements.

Potential Collaborators: Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Susquehanna River Basin Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	What is the effect of degradation and disappearance of riparian eastern hemlock stands on Louisiana Waterthrush productivity?	Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions, Pennsylvania Fish and Boat Commission
2	What are the long-term effects of Marcellus Shale drilling activity on Louisiana Waterthrush productivity?	Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Universities & research institutions, Businesses
3	How resilient is Louisiana Waterthrush in the face of climate change impacts on headwater streams and surrounding forests?	Delaware River Basin Commission, National Oceanic and Atmospheric Administration, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Universities & research institutions, U.S. Environmental Protection Agency, Susquehanna River Basin Commission, Pennsylvania Department of Conservation and Natural Resources
4	What are the effects of microplastics and forever chemicals on Louisiana Waterthrush productivity (Bob Mulvihill, Steven Latta, National Aviary)?	Universities & research institutions, Businesses, Non-governmental organizations
5	What post breeding habitat is important for fledgling Louisiana Waterthrush?	Universities & research institutions

Season: Migration

Priority	Need	Partners
1	What are the connectivity patterns of Louisiana Waterthrush breeding in Pennsylvania?	Pennsylvania Game Commission, Universities & research institutions
2	What threats do Louisiana Waterthrush face while migrating and on their wintering grounds?	Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Comparison of productivity between streams with Marcellus Shale drilling activity and those without.	Businesses, Delaware River Basin Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Universities & research institutions

Season: Migration

Priority	Survey	Partners

Name: Eastern Rivers and Mountains Inventory and Monitoring Network **Lead(s) :** National Park Service

Link: https://www.nps.gov/articles/000/im_vital-signs-monitoring-taking-the-pulse.htm

Description: Park vital signs are selected physical, chemical, and biological elements and processes of park ecosystems that represent the overall health or condition of park resources, known or hypothesized effects of stressors, or elements that have important human values. In the Eastern Rivers and Mountains section of the National Park Service, riparian bird populations and other resources are being monitored in the Delaware Water Gap National Recreation Area and other parks in this region.

Comments: This project has been going on for many years and is continuing in 2025 although the long term future of the project is now in doubt given funding cuts.

Monitoring Need: Having baseline information on vital park resources makes it easier to detect deteriorating conditions that could affect migrants along with breeding pairs, if they occur, and implement management plans to mitigate those conditions.

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas **Lead(s) :** Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Abdalla, C. W., J. R. Drohan, K. S. Blunk, and J. Edson. 2011. Marcellus Shale Wastewater Issues in Pennsylvania: Current and Emerging Treatment and Disposal Technologies. Penn State Cooperative Extension, College of Agricultural Sciences. The Pennsylvania State University, University Park, Pennsylvania.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

B. D. Hoenig. 2022. A Review of Current Methods in Avian Dietary Analysis and Their Integrated Application to Analyze the Trophic Niche of Louisiana Waterthrush (Parksia motacilla). Thesis Dissertation. Duquesne University, Pittsburgh, PA.

Barnes, K. B. 2014. Using the Louisiana Waterthrush (Parkesia motacilla) and aquatic insect metrics to gauge productivity in two eastern hemlock habitats. M. S. Thesis, East Stroudsburg University of Pennsylvania, East Stroudsburg.

Barnes, K. B., N. Ernst, M. Allen, T. Master and R. Lausch. 2018. Louisiana Waterthrush Density and Productivity in Hemlock-Dominated Headwater Streams: The Influence of Stream Morphology. Northeastern Naturalist 25(4): 587-598.

Bird Migration Explorer

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Craig, R. J. 1985. Comparative habitat use by Louisiana and Northern Waterthrushes. Wilson Bulletin 97:347-355.

Environment and Climate Change Canada - Louisiana Waterthrush

Ernst, N. T. 2012. The Lousiana Waterthrush (Parkesia motacilla) as a bioindicator of hemlock habitat productivity: a comparison of hemlock ravines and benches. M. S. Thesis. East Stroudsburg University of Pennsylvania, East Stroudsburg.

Frantz, M., P. B. Wood, S. C. Latta and A. B. Welsh. 2020. Epigenetic response of Louisiana Waterthrush Parksia motacilla to shale gas development. Ibis http:// doi: 10.1111/ibi.12833.

Frantz, M.W., Wood, P.B., Sheehan, J. & George, G. 2018a. Demographic response of a migratory songbird of conservation concern to shale gas development. Condor 120: 265–282.

Frantz, M.W., Wood, P.B., Sheehan, J. & George, G. 2019. Louisiana Waterthrush (Parkesia motacilla) survival and site fidelity in an area undergoing shale gas development. Wilson J. Ornithol. 131: 84–95.

Freeman, M. C., C. M. Pringle, and C. R. Jackson. 2007. Hydrologic connectivity and the contribution of stream headwaters to ecological integrity at regional scales. Journal of the American Water Resources Association 43:5-14.

Furedi, M., B. Leppo, M. Kowalski, T. Davis, and B. Eichelberger. 2011. Identifying species in Pennsylvania potentially vulnerable to climate change. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Pittsburgh, Pennsylvania.

Gross, D. A. 1992. Louisiana Waterthrush. Pages 344-345 in D. W. Brauning, editor. Atlas of Breeding Birds of Pennsylvania. University of Pittsburgh Press, Pittsburgh, PA

Keyser, A. J., G. E. Hill, and E. C. Soehren. 1998. Effects of forest fragment size, nest density, and proximity to edge on the risk of predation to ground-nesting passerine birds. Conservation Biology 12:986-994.

Ladin, Z.S. and Others. 2021. Forest bird monitoring in the National Capital Region Network: Summary report 2007–2017. Natural Resource Report. NPS/NCRN/NRR—2021/2292. National Park Service. Fort Collins, Colorado. https://doi.org/10.36967/nrr-2287175

Latta, S.C., Marshall, L.C., Frantz, M.W. & Toms, J. 2015. Evidence from two shale regions that a riparian songbird accumulates metals associated with hydraulic fracturing. Ecosphere 6: 144.

Lyons, M. P., J. R. Stevenson, L. L. Thurman, and B. E. Young. 2024. Guidelines for using the NatureServe Climate Change Vulnerability Index, Release 4.0. Arlington, VA: NatureServe.

Majumdar, S. K., T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Huffman. 2010. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Sciences, Easton, Pennsylvania.

Master, T. L., R. S. Mulvihill and S. C. Latta. 2010. Louisiana Waterthrush. Pages 179-182 in M. A. Steele, M. C. Brittingham, T. J. Maret and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Mattingly, J. G. 2015. Limiting factors and their role in explaining differences in Louisiana Waterthrush (Parkesia motacilla) reproductive success between hemlock ravines and benches. M. S. Thesis. East Stroudsburg University of Pennsylvania. East Stroudsburg, PA.

Mattsson, B. J., T. L. Master, R. S. Mulvihill, and W. D. Robinson. 2020. Louisiana Waterthrush (Parkesia motacilla), version 1.0. In A. F. Poole, editor. Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.louwat.01

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Mulvihill, R. 2012. Louisiana Waterthrush. Pages 346-347 in A. M. Wilson, D. W. Brauning and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Mulvihill, R.S., Newell, F.L. & Latta, S.C. 2008. Effects of acidification on the breeding ecology of a stream-dependent songbird, the Louisiana Waterthrush (Seiurus motacilla). Freshw. Biol. 53: 2158–2169.

Northeast Fish and Wildlife Diversity Technical Committee. 2024. Northeast Regional Species of Greatest Conservation Need (RSGCN) Database, version 4.1.

O'Connell, T. J., R. P Brooks, S. E. Laubscher, R. S. Mulvihill and T. L. Master. 2003. Using bioindicators to develop a calibrated index of regional ecological integrity for forested headwater ecosystems. Report 2003-01. U.S. Environmental Protection Agency and Penn State Cooperative Wetlands Center, University Park, Pennsylvania.

Pennsylvania Natural Heritage Program 2014. Climate Change Vulnerability Index. Available from http://www.naturalheritage.state.pa.us/CCVI.aspx (accessed January 2015).

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Robbins, C. S. 1979. Effect of forest fragmentation on bird populations. Pages 198-212 in R. M. DeGraaf and K. E. Evans, editors. Proceedings of the workshop on management of northcentral and northeastern forests for nongame birds. USDA General Technical Report NC-51. USDA Forest Service North Central Forest Experiment Station. St. Paul, Minnesota.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski Jr., and W. A. Link. 2014. The North American Breeding Bird Survey, Results and Analysis 1966-2013. Version 01.30.2015. USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Stoleson, S. H., and J. L. Larkin. 2010. Breeding birds of Pennsylvania: forest bird communities. Pages 14-27 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian ecology and conservation: a Pennsylvania focus with national implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Tingley, M. W., D. A. Orwig, R. Field, and G. Motzkin. 2002. Avian response to removal of a forest dominant: consequences of hemlock woolly adelgid infestations. Journal of Biogeography 29:1505-1516.

Todd, W. E. C. 1940. Birds of Western Pennsylvania. University of Pittsburgh, Pittsbugh, Pennsylvania.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Yeany, D. 2024. Species at Risk: Forest Birds.

Ziolkowski Jr., D.J., Lutmerding, M., English, W.B., and Hudson, M-A.R., 2024, North American Breeding Bird Survey Dataset 1966 - 2023: U.S. Geological Survey data release, https://doi.org/10.5066/P136CRBV.

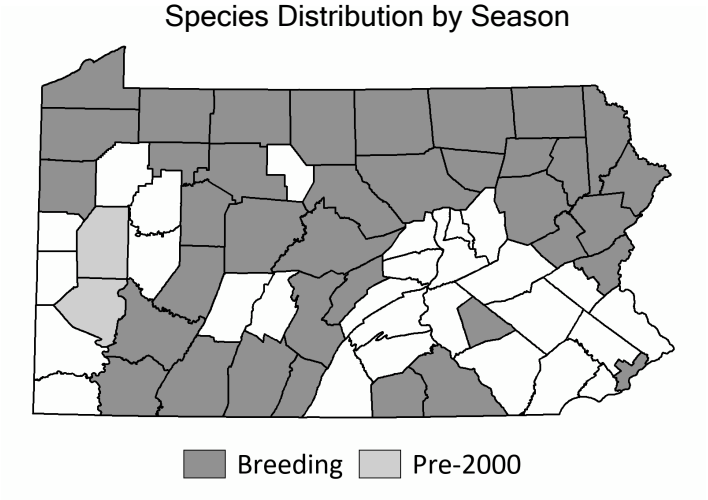
PENNSYLVANIA
WILDLIFE ACTION PLAN

Northern Waterthrush

Parkesia noveboracensis

Daniel W. Brauning — *Pennsylvania Game Commission (retired)*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Stabilize the breeding population, with territorial male detections in at least 230 Breeding Bird Atlas blocks (Wilson et al. 2012) by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Forested swamps, higher elevational headwater streams, scrub-shrub wetlands, and beaver swamps.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior and Appalachian Acidic Peatland

Habitat Comments: Potentially, higher beaver densities could (in the long run) expand habitat for this and other species associated with headwater wetlands.

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** High

Specific Threat: Changes in seasonal precipitation.

Action Category: Conservation planning

Specific Action: Maintain and enhance forested buffers around forested and shrubby wetlands.

Objective: Maintain the highest quality Northern Waterthrush habitat within the state.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acreage of forested buffers around wetlands.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: White-throated Sparrow, Blackpoll Warbler, Yellow-bellied Flycatcher, Canada Warbler, Rusty Blackbird

Season: Breeding

Threat Category: Logging and Wood Harvesting **Threat Impact:** Medium

Specific Threat: Forest loss and fragmentation near forested and shrubby wetlands reduces habitat quality and quantity.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Maintain forested wetlands by avoiding tree clearing within at least 100 meters (328 feet).

Objective: Conserve available breeding habitat.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Stable to increasing populations.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, U.S. Forest Service

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: Forested wetland associates.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** High

Specific Threat: Eastern hemlock (Tsuga candensis) loss due to hemlock woolly adelgid (HWA) infestation.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Control HWA within and around forested wetlands.

Objective: Sustain wetland ecological integrity.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Acres of eastern hemlock surviving annually post-treatment for ten years.

Potential Collaborators: Businesses, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Forest Service, Private Landowners

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: Louisiana Waterthrush, brook trout

Season: Breeding

Threat Category: Droughts **Threat Impact:** High

Specific Threat: Periods of drought may make waterthrush habitats unsuitable.

Action Category: Conserve specific land or seascapes

Specific Action: Proactively protect occupied habitats.

Objective: Protect appropriate wetland habitat through acquisition or conservation easements.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Acres of appropriate wetland habitat protected.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: White-throated Sparrow, Blackpoll Warbler, Yellow-bellied Flycatcher, Canada Warbler, Rusty Blackbird

Season: Breeding

Priority	Need	Partners
1	What are site and landscape characteristics that have supported Northern Waterthrush nest sites? Model these sites.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations
2	Are unoccupied habitats available?	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations
3	Quantify abundance and productivity in remote, poorly monitored boreal forested wetlands and high elevation palustrine habitats (headwaters).	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Northern Waterthrush breeding populations are poorly known. Determine the extent of the breeding population through volunteer surveys such as Bird Atlases.	Pennsylvania Game Commission, Non-governmental organizations, Interested Public, Universities & research institutions
2	Expand Mountain Bird Watch into Pennsylvania including Northern Waterthrush as a target species in palustrine habitats and off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Pennsylvania Game Commission, Non-governmental organizations, Interested Public
3	Establish Monitoring Avian Productivity and Survivorship (MAPS) program for selected locations.	Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments: Although not structured as a monitoring program, eBird provides the most comprehensive compilation of observations for this and other species.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: While a valuable population monitoring tool, it does not adequately detect rare species typically found away from roadsides like the Northern Waterthrush. The Northern Waterthrush was detected on 22 BBS routes in Pennsylvania (1/4 of the total) through 2022 but at an overall rate of just 0.04 birds/route in the past 20 years. Trend assessment is not statistically credible. The long-term, range-wide increase in BBS population trends is not reflected in regional (BCR) trends that include Pennsylvania. This survey is a very poor tool to monitor such an uncommon species found in isolated, off-road locations.

Monitoring Need: Occupancy rates.

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments: Pennsylvania is on the periphery of the breeding range of the Northern Waterthrush. Northern retraction due to changing climate could negatively affect the species. Replication of bird atlas efforts on a 20-year cycle provides an infrequent reference to the species' distribution within the state but does a poor job of monitoring trends.

Monitoring Need: Atlases provide coarse-scale data in the form of long-term inventory and some monitoring. This species is not adequately detected by the Breeding Bird Survey (BBS), so monitoring select historic sites for long-term occupancy and possibly reproductive success but better assess the status in Pennsylvania.

Burson III, S. L., L. R. Reitsma, and P. D. Hunt. 2005. Conservation implications of multiple habitat use by Northern Waterthrushes during the nonbreeding season. Journal of Caribbean Ornithology 18:72-76.

Craig, R. J. 1985. Comparative habitat use by Louisiana and Northern Waterthrushes. Wilson Bulletin 97:347-355.

DeSante, D. F. and D. R. Kaschube. 2009. The Monitoring Avian Productivity and Survivorship (MAPS) program 2004, 2005, and 2006 report. Bird Populations 9:86-169.

Ellison, A. M. and E. J. Farnsworth. 1996. Anthropogenic disturbance of Caribbean mangrove ecosystems: Past impacts, present trends, and future predictions. Biotropica 28:549-565.

Gross, D. A. 1992. Northern Waterthrush (Seiurus noveboracensis). Pages 242-343 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Gross, D. A. 2003. Avian Population and Habitat Assessment Project: Pennsylvania Important Bird Area #48, State Game Lands #57, Wyoming, Luzerne, and Sullivan Counties. (For Pennsylvania Audubon.) Ecology III, Inc., Berwick, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2012 Northern Waterthrush (Parkesia noveboracensis). Pages 348-349 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

McGowan, K. J. 2008. Northern Waterthrush (Seiurus noveboracensis). Pages 520-521 in K. J. McGowan and K. Corwin, editors. The Second Breeding Bird Atlas in New York State. Cornell University Press, Ithaca, New York.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Smith, J. A. M., L. R. Reitsma, and P. P. Marra. 2011. Multiple space-use strategies and their divergent consequences in a nonbreeding migratory bird (Parkesia noveboracensis). Auk 128:53-60.

Snow, D. W. and K. B. Snow. 1960. Northern Waterthrushes returning to same quarters in successive winters. Auk 77:351-352.

Whitaker, D. M., and S. W. Eaton. 2014. Northern Waterthrush (Parkesia noveboracensis). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/182 (accessed July 2015).

Whitaker, D.M., and S. W. Eaton. Northern Waterthrush Parkesia noveboracensis. Birds of the World. 2020.

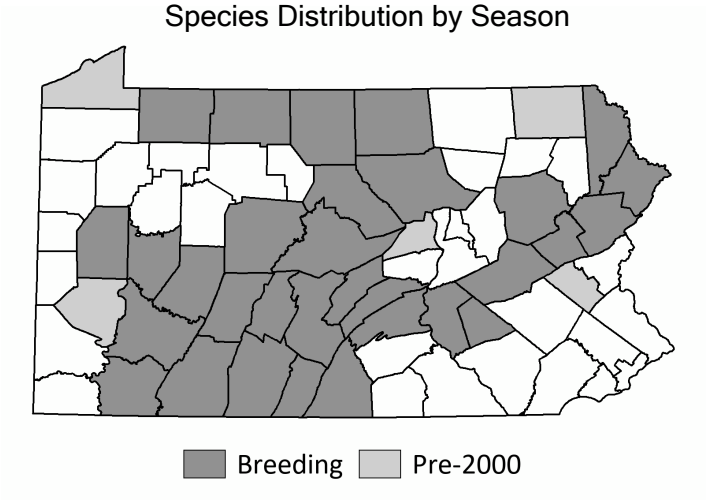
PENNSYLVANIA
WILDLIFE ACTION PLAN

Golden-winged Warbler

Vermivora chrysoptera

Kristin Fuoco *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain the current estimated population of 3,000 individuals (95% CI, 330 - 8,100; Partners in Flight. 2020) and seek opportunities to expand and increase the populations through effective conservation and management.

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Very High Concern

Federal Listing Status: Under Review

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2B

State Rank Year: 2025

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1,000 - 2,500 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Breeding habitat is a mosaic of herbaceous/forb layer, shrubs and saplings, and a few song perches in the form of large trees or snags.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** Very High

Specific Threat: Decreased habitat available due to forest succession and late-stage old field regeneration, as well as suburban expansion will reduce breeding habitat available to the species.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Particularly in regions without Golden-winged Warblers, create or maintain existing early-successional habitats by promoting desirable vegetation structure via practices such as mulching, timber harvest, burning and herbicide treatment of undesirable/invasive species.

Objective: Reset patches that have become too dense for shrubland bird use and/or create new patches to have in rotation for the future (10 year cycles, depending on regeneration response).

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Changes in occupancy/abundance of breeding pairs in management sites.

Potential Collaborators: Great Lakes Dune and Swale, 4. Transportation and Service Corridors, 8. Invasive and Other Problematic Species, Genes and Diseases, 9.1 Domestic and Urban Waste Water, Laurentian-Acadian Northern Hardwood Forest

Locations: Physiographic Section: Glaciated Low Plateau, Appalachian Mountain, Allegheny Front, Allegheny Mountain, Deep Valleys, Susquehanna Lowland

Other species likely to benefit from this action: Yellow-breasted Chat, Prairie Warbler, Gray Catbird, Eastern Towhee, Field Sparrow

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** High

Specific Threat: Bidirectional gene flow and hybridization with Vermivora cyanoptera in areas of breeding habitat overlap such as northcentral and northeast regions (Confer et al. 2020; Vallender et al. 2007)

Action Category: Conservation planning

Specific Action: Promote habitat management projects in areas with little to no overlap with Blue-winged Warbler.

Objective: Target areas with Golden-winged Warblers that have little overlap (or none at all) with Blue-winged Warblers to create early-successional habitat while limiting potential for hybridization. Based on current distribution, target areas should be the Ridge and Valley area and the Poconos area.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Acres managed for Golden-winged Warblers in areas where Blue-winged Warbler distribution does not overlap.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: American Woodcock, Ruffed Grouse, Prairie Warbler, Nashville Warbler, Mourning Warbler

Season: Breeding

Priority	Need	Partners
1	Continue to develop and utilize tools (such as LiDAR, occupancy models, etc.) to identify high priority conservation areas for the species on the breeding grounds.	Universities & research institutions
2	What factors drive reproductive success (nesting, fledging and fledgling survival) in the central and eastern Pennsylvania populations?	Universities & research institutions
3	What, if any, effect does the presence of invasive plant species have on food availability for Golden-winged Warblers?	Universities & research institutions
5	Do Golden-winged Warblers exhibit area sensitivity in some areas more than others?	Pennsylvania Game Commission, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Long-term monitoring of Golden-winged Warbler, Blue-winged Warbler and hybrids as part of the Golden-winged Warbler (CLO) Conservation Initiative Monitoring to collect focal area abundance and distribution data.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources
2	Post-treatment monitoring of locations managed for Golden-winged Warblers.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources
3	Monitor high priority populations within Golden-winged Warbler focal areas, searching for new populations that have responded to disturbances.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources

Name: Golden-winged Warbler Conservation Initiative

Lead(s) : Golden-winged Warbler Working Group; Coordinated by the Cornell Lab of Ornithology

Link: https://www.birds.cornell.edu/home/golden-winged-warbler-conservation-strategy-and-resources/

Description: The study monitors Golden-winged Warblers, Blue-winged Warblers and hybrids during the breeding season in Pennsylvania as part of a regional and national conservation monitoring project.

Comments: The Pennsylvania Game Commission works in partnership with the Cornell Lab of Ornithology to monitor Golden-winged Warbler, Blue-winged Warbler and hybrids. This monitoring program helps to inform the agency of management potential for implementing best management practices where they are most appropriate. Other partners include: Golden-winged Warbler Working Group; Appalachian Mountain Joint Venture; Indiana University of Pennsylvania; Pennsylvania Department of Conservation and Natural Resources; American Bird Conservancy; National Fish and Wildlife Foundation; The Nature Conservancy, Pennsylvania Chapter.

Monitoring Need:

Name: Nicaragua Highlands Project

Lead(s) : El Jaguar Reserva / American Bird Conservancy

Link: https://southern-wings.fishwildlife.org/

Description: The Pennsylvania Game Commission supports this important project which monitors wintering grounds in Central American shade grown coffee plantations and uses native species reforestation to create habitat corridors and protect water sources that can help restore habitat and connectivity for migratory birds in the El Jaguar-Volcan Yali Corridor.

Comments: North Carolina Audubon also a partner and participant in surveys using audio-lure and geospatial approach.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Aldinger, K.R., Terhune, T.M., P.B. Wood, D.A. Buehler, M.H. Bakermans, J.L. Confer, D.J. Flaspohler, J.L. Larkin, J.P. Loegering, K.L. Percy, A.M. Roth, C.G. Smalling. 2015. Variables associated with nest survival of Golden-winged Warblers (Vermivora chrysoptera) among vegetation communities commonly used for nesting. Avian Conservation and Ecology 10(1): 6.

Bakermans, M. H., J. L. Larkin, B. W. Smith, T. M. Fearer, and B. C. Jones. 2011. Golden-winged Warbler Habitat Best Management Practices for Forestlands in Maryland and Pennsylvania. American Bird Conservancy. The Plains, Virginia.

Bellush, E. C., J. Duchamp, J. L. Confer, and J. L. Larkin. 2016. Influence of plant species composition on Golden-winged Warbler foraging ecology in north-central Pennsylvania. Pages 95–108 in H. M. Streby, D. E. Andersen, and D. A. Buehler, editors. Golden-winged Warbler ecology, conservation, and habitat management. Studies in Avian Biology (no. 49), CRC Press, Boca Raton, FL.

Buehler, D. A., J. L. Confer, R. A. Canterbury, T. C. Will, W. C. Hunter, R. Dettmers, and D. Demarest. 2006. Status Assessment and Conservation Plan for the Golden-winged Warbler, Vermivora chrysoptera, in the United States. U. S. Department of the Interior, Fish and Wildlife Service Biological Technical Publication FWS/BTP-R6xxx-2006, Washington, D.C.

Confer, J. L., P. Hartman, A. Roth. 2020. Golden-winged Warbler (Vermivora chrysoptera), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.

Hightower, J.N., D.L. Crawford, W.E. Thogmartin, K.R. Aldinger, S.B. Swarthout, D.A. Buehler, J. Confer, C. Friis, J.L. Larkin, J.D. Lowe, M. Piorkowski, R.W. Rohrbaugh, K.V. Rosenberg, C. Smalling, P.B. Wood, R. Vallender, A.M. Roth. 2022. Change in climatically suitable breeding distributions reduces hybridization potential between Vermivora warblers. Diversity and Distributions 29:254-271.

Keele, E.C., C.J. Fiss, D.J. McNeil, M. Anderson, N. Thomas, D. Shaffer, J.L. Larkin. 2024. Food availability aligns with contrasting demographics in populatiosn of an at-risk songbird. Ecology and Evolution, 14; e11557

Kubel, J. E. 2008. Quality of antropogenic habitats for Golden-winged Warblers in central Pennsylvania. Wilson Journal of Ornithology 120: 801-812.

Kubel, J. E. 2010. Golden-winged Warbler (Vermivora chrysoptera). Pages 150-153 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Larkin, J. L. and M. H. Bakermans. 2012. Golden-winged Warbler (Vermivora chyrsoptera). Pages 350-351 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, Universtiy Park, Pennsylvania.

McNeil, D.J., A.D. Rodewald, O.J. Robinson, C.J. Fiss, K.V. Rosenberg, V. Ruiz-Gutierrez, K.R. Aldinger, A.A. Dhondt, S. Petzinger, J.L. Larkin. 2020. Regional abundance and local breeding productivity explain occupancy of restored habitats in a migratory songbird. Biological Conservation 245; 108463.

McNeil, D.J., A.D. Rodewald, V. Ruiz-Gutierrez, K.E. Johnson, M. Strimas-Mackey, S. Petzinger, O.J. Robinson, G.E. Soto, A.A. Dhondt, J.L. Larkin. 2020. Multiscale drivers of restoration outcomes for an imperiled songbird. Restoration Ecology 28(4); 880-891

McNeil, D.J., K.R. Aldinger, M.H. Bakermans, J.A. Lehman, A.C. Tisdale, J.A. Jones, P.B. Wood, D.A. Buehler, C.G. Smalling, L. Siefferman, J.L. Larkin. 2017. an evaluation and comparison of conservation guidelines for an at-risk migratory songbird. Global Ecology and Conservation 9;90-103.

NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available from http://explorer.natureserve.org (accessed December 2014).

Rohrbaugh, R. W., S. B. Swarthout, D. L. Crawford, M. D. Piorkowski, J. D. Lowe, and K. V. Rosenberg. 2011. Golden-winged Warbler Conservation Initiative: Year 3; Breeding Grounds Monitoring throughout the Appalachian region. Report to the U.S. Fish and Wildlife Service. The Cornell Laboratory of Ornithology, Ithaca, New York.

Roth, A.M., R.W. Rohrbaugh, T. Will, S. Barker Swarthout, and D.A. Buehler, editors. 2019. Golden-winged Warbler Status Review and Conservation Plan. 2nd Edition.

Rothman, A. 2013. Conservation of high priority land bird at Reserva El Jaguar, Nicargua. Report for AFWA Southern Wings project. American Bird Conservancy, The Plains, Virginia.

Rothman, A., R. Bennett, F. Rodriguez. 2014. Alianza Alas Doradas Workshop Meeting Minutes. Copan Ruinas, Honduras. Oct 2014. Unpublished report.

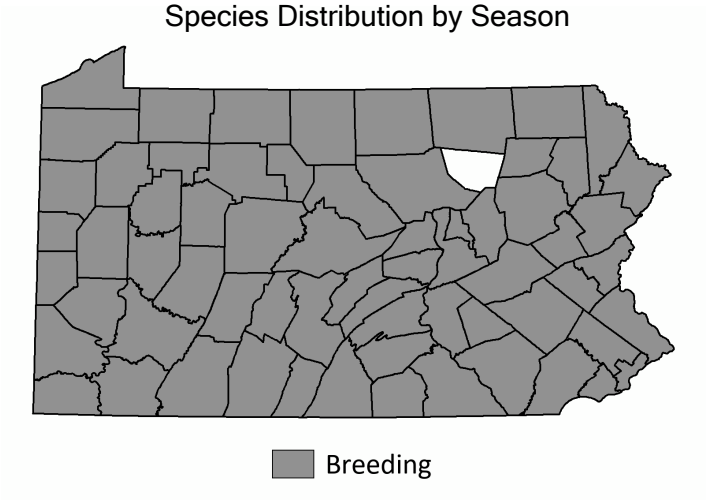
PENNSYLVANIA
WILDLIFE ACTION PLAN

Blue-winged Warbler

Vermivora cyanoptera

Kristin Fuoco *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Support existing populations of Blue-winged Warblers in northwestern and southeastern regions of Pennsylvania by continuing to create and/or maintain old fields and shrublands used for nesting habitat, and achieve a detection rate of at least 0.50 singing males per Breeding Bird Survey route within those regions.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Moderate Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Core territory habitat (typically found in reverting old fields and regenerating forests) consists of a mixed mosaic of herbaceous plants, grasses, shrubs, saplings, and singing perches such as snags and tall deciduous trees. Structurally complex forest edge near core territories is frequently used by the species as well.

Primary Habitat: Open Upland

Primary Habitat Type: Shrublands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Other Ecosystem Modifications **Threat Impact:** High

Specific Threat: Continued forest succession results in forest aging out of early successional forested habitat that Vermivora use.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Particularly in regions without Golden-winged Warblers, create or maintain existing early-successional habitats by promoting desirable vegetation structure via practices such as mulching, timber harvest, burning and herbicide treatment of undesirable/invasive species.

Objective: Reset patches that have become too dense for shrubland bird use and/or create new patches to have in rotation for the future (10-year cycles, depending on regeneration response).

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of restored habitat.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Locations: Physiographic Province: Central Lowlands, Appalachian Plateaus, Piedmont

Other species likely to benefit from this action: Yellow-breasted Chat, Prairie Warbler, Gray Catbird, Eastern Towhee, Field Sparrow

Season: Breeding

Threat Category: Commercial and Industrial Areas **Threat Impact:** High

Specific Threat: Residential and commercial development is depleting existing habitat and eliminating potential habitat.

Action Category: Conserve specific land or seascapes

Specific Action: Create patches of forest openings and young forest habitat (i.e., multiple age stands) through best management practices (e.g., controlled burns or timber harvest).

Objective: To maintain productive Blue-winged Warbler populations outside of Golden-winged Warbler focal areas through active habitat management.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** An increase in the amount of quality habitat.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: American Woodcock, Ruffed Grouse, Prairie Warbler, Nashville Warbler, Mourning Warbler

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High

Specific Threat: Residential and commercial development is depleting existing habitat and eliminating potential habitat.

Action Category: Conserve specific land or seascapes

Specific Action: Create patches of forest openings and young forest habitat (i.e., multiple age stands) through best management practices (e.g., controlled burns or timber harvest).

Objective: To maintain productive Blue-winged Warbler populations outside of Golden-winged Warbler focal areas through active habitat management.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** An increase in the amount of quality habitat.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: American Woodcock, Ruffed Grouse, Prairie Warbler, Nashville Warbler, Mourning Warbler

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Low

Specific Threat: Bidirectional gene flow and hybridization with Golden-winged Warbler in areas of breeding habitat overlap such as the northcentral and northeast regions (Confer et al. 2020; Vallender et al. 2007).

Action Category: Conservation planning

Specific Action: Promote habitat management projects in areas with little to no overlap with Golden-winged Warbler.

Objective: Target areas with Blue-winged Warblers that have little to no overlap with Golden-winged Warblers to create early-successional habitat while limiting potential for hybridization. Target areas should include the northwest and southeast region.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:**

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Central Lowlands, Appalachian Plateaus, Piedmont

Other species likely to benefit from this action:

Season: Breeding

Priority	Need	Partners
1	Where are the most productive breeding areas and habitat types for Blue-winged Warblers in the state; particularly in areas with little to no overlap with Golden-winged Warblers? (Kubel in Steele et al. 2010)	Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations
2	2a.) How does post-fledging habitat selection by adults differ from nesting habitat selection? 2b.) What habitat types are juveniles using after fledgling? (Fuoco et al. 2024)	Universities & research institutions
3	How can female behavior and habitat selection inform conservation efforts for the species? (Gill et al. 2020)	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Post-treatment monitoring of locations in the northwest and southeast regions that are managed for Blue-winged Warblers or early successional species.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations
2	Observe and describe juvenile habitat use after fledging.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
3	Observe and note female behavior and habitat use throughout the breeding season.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission

Name: Golden-winged Warbler Conservation Initiative

Lead(s) : Golden-winged Warbler Working Group; Coordinated by the Cornell Lab of Ornithology (CLO)

Link: https://www.birds.cornell.edu/home/golden-winged-warbler-conservation-strategy-and-resources/

Description: The study monitors Golden-winged Warblers, Blue-winged Warblers and hybrids during the breeding season in Pennsylvania as part of a regional and national conservation monitoring project.

Comments: The Pennsylvania Game Commission works in partnership with the Cornell Lab of Ornithology to monitor Golden-winged Warbler, Blue-winged Warbler and hybrids. This monitoring program helps to inform the agency of management potential for implementing best management practices where they are most appropriate. Other partners include: Golden-winged Warbler Working Group; Appalachian Mountain Joint Venture; Indiana University of Pennsylvania; Pennsylvania Department of Conservation and Natural Resources; American Bird Conservancy; National Fish and Wildlife Foundation; The Nature Conservancy, Pennsylvania Chapter.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Confer, J.L., C. Porter, K.R. Aldinger, R.A. Canterbury, J.L. Larkin, D.J. McNeil. 2020. Implications for evolutionary trends from the pairing frequencies among golden-winged and blue-winged warblers and their hybrids. Ecology and Evolution 10(19):10633-10644.

Fuoco, K.B., D.J. McNeil, C.J. Fiss, C.I. Bocetti, G.B. Fisher, J.L. Larkin. 2024. Breeding season space use and habitat selection by Blue-winged Warblers in managed shrublands. Avian Conservation & Ecology 19(1)6.

Gill, F.B., R.A. Canterbury, J. L. Confer. 2020. Blue-winged Warbler (Vermivora cyanoptera), version 1.0. In Birds of the World (A.F. Poole and F.B. Gill, editors). Cornell Lab of Ornithology, Ithaca, NY, USA.

Hightower, J.N., D.L. Crawford, W.E. Thogmartin, K.R. Aldinger, S.B. Swarthout, D.A. Buehler, J. Confer, C. Friis, J.L. Larkin, J.D. Lowe, M. Piorkowski, R.W. Rohrbaugh, K.V. Rosenberg, C. Smalling, P.B. Wood, R. Vallender, A.M. Roth. 2022. Change in climatically suitable breeding distributions reduces hybridization potential between Vermivora warblers. Diversity and Distributions 29:254-271.

Kubel, J. E. 2010. Blue-winged Warbler (Vermivora pinus). Pages 174-177 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Larkin, J. L. and M. H. Bakermans. 2012. Blue-winged Warbler (Vermivora cyanoptera). Pages 352-353 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, Universtiy Park, Pennsylvania.

NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1 NatureServe, Arlington, Virginia. Available from http://www.explorer.natureserve.org (accessed January 2015).

PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission). 2005. Pennsylvania's Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy, L. Williams, editor.) Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, revised 2008, Harrisburg, Pennsylvania.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Vallender, R., R.J. Robertson, V.L. Friesen, I.J. Lovette. 2007. Complex hybridization dynamics between golden-winged and blue-winged warblers (Vermivora chrysoptera and Vermivora pinus) revealed by AFLP, microsatellite, intron and mtDNA markers. Molecular Ecology, 16(10);2017-2029.

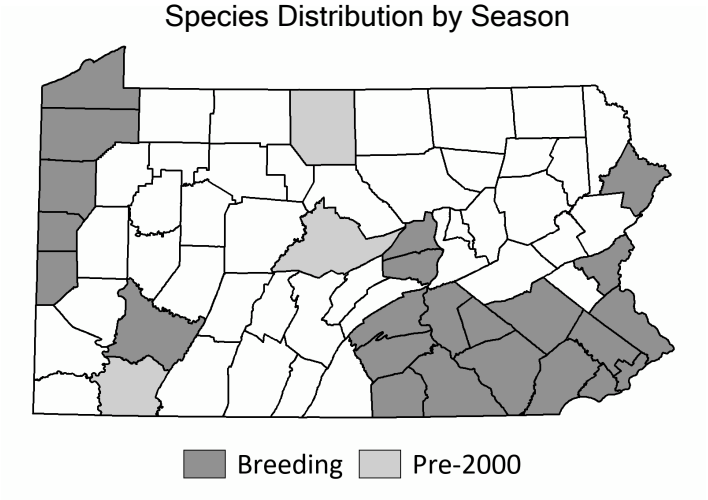
PENNSYLVANIA
WILDLIFE ACTION PLAN

Prothonotary Warbler

Protonotaria citrea

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Documentation of at least 45 active nest sites distributed across at least 6 counties annually by the year 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 50 - 250 individuals

PA Short-term Trend (10-year): Increase of 10-25%

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Wooded swamps or other flooded forest types >100 ha (247 ac); swampy riparian forest >30 m (98 ft) wide.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Appalachian Acidic Swamp

Season: Breeding

Threat Category: Dams and Water Management/Use **Threat Impact:** Low

Specific Threat: Improper water levels for nesting and brood rearing.

Action Category: Manage non-living habitat components

Specific Action: Maintain water levels optimal for nesting for and foraging during the breeding season.

Objective: Maintain at least 20 cm (8 in) of standing water through forested wetlands impacted by water control structures during the nesting season.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Acres of flooded impoundments during bird nesting season

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, U.S. Fish and Wildlife Service

Locations: Physiographic Province: Appalachian Plateaus, Piedmont, Piedmont, Ridge and Valley, Ridge and Valley, Piedmont. Physiographic Section: Eastern Lake, Northwestern Glaciated Plateau, Lowland and Intermediate Upland, Piedmont Upland, Gettysburg-Newark Lowland, Great Valley, Susquehanna Lowland, Piedmont Lowland

Other species likely to benefit from this action: Other wetland obligate birds

Season: Breeding

Threat Category: Droughts **Threat Impact:** Low

Specific Threat: Drought conditions reduce wetland habitats used for foraging and could increase likelihood of nest predation.

Action Category: Manage non-living habitat components

Specific Action: Manage drought conditions through active management and planning on publicly owned wetlands and riparian areas where the species occurs.

Objective: Adaptable approach to water level management so wetlands and riparian forests can be sustained in periods of high or low precipitation. Includes replacement and upgrade of water control devices suitable for handling predicted precipitation changes.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of sites with adaptive management plans in place; number of water control devices upgraded.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Section: Eastern Lake, Northwestern Glaciated Plateau, Great Valley, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Upland, Piedmont Upland, Lowland and Intermediate Upland

Other species likely to benefit from this action: Wetland obligate bird species

Season: Breeding

Priority	Need	Partners
1	Determine if a nest box program, in regions where natural cavities at low heights over standing water is likely a limiting factor, has a significant effect on the state's population and distribution.	Pennsylvania Game Commission
2	Increase knowledge of abundance and distribution throughout the state.	Pennsylvania Game Commission, Non-governmental organizations
3	Determine wetland management options that favor better Prothonotary Warbler productivity.	Non-governmental organizations, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Nest boxes placed for Prothonotary warblers should be annually monitored for nesting success and productivity.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission
2	Surveys for secretive marsh birds should include audio recordings of Prothonotary Warbler or at least document observations.	Pennsylvania Game Commission
3	Monitor changes in abundance and distribution of suitable bottomland riparian and forested wetland habitat.	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: USGS Breeding Bird Surveys may be insufficient to detect Prothonotary Warblers given their restricted range and selective habitat associations in Pennsylvania.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Blem, C. R. and L. B. Blem. 1991. Nest box selection by Prothonotary Warblers. Journal of Field Ornithology 62:299-307.

Goguen, C. B. 2010. Prothonotary Warbler. Pages 156-159 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial vertebrates of Pennsylvania: a complete guide to species of conservation concern. The Johns Hopkins University Press, Baltimore, Maryland.

Kahl, R. B., T. S. Baskett, J. A. Ellis, and J. N. Burroughs. 1985. Characteristics of summer habitats of selected nongame birds in Missouri. University of Missouri Agriculture Experiment Station Research Bulletin 1056. University of Missouri, Columbia.

Leberman R. C., and R. Wiltraut. 2012. Prothonotary warbler. Pages 358-359 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second atlas of breeding birds in Pennsylvania. Pennsylvania State University Press, University Park, Pennsylvania.

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Petit L., W. Fleming, K. Petit, and D. Petit. 1987. Nest-box use by Prothonotary Warblers (Protonotaria citrea) in riverine habitat. Wilson Bulletin 99:485-488.

Petit, L. J., and D. R. Petit. 1996. Factors governing habitat selection by Prothonotary Warblers: field tests of the Fretwell-Lucas models. Ecological Monographs 66:367-387.

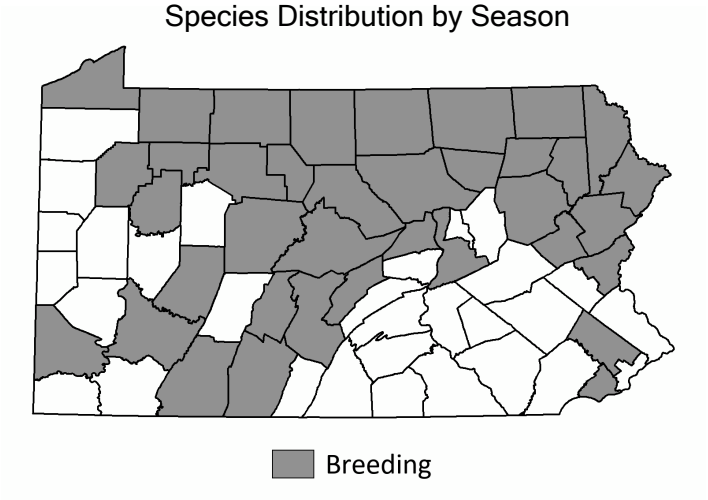
PENNSYLVANIA
WILDLIFE ACTION PLAN

Nashville Warbler

Leiothlypis ruficapilla

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain nesting distribution through 2035, with pairs in at least 200 Breeding Bird Atlas blocks (Wilson et al. 2012) annually.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S2S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: Very High - High

Season: Breeding

Specific Habitat Requirements: Shrub oak barrens and scrub-shrub wetlands at higher elevations (above 457 m (1499 ft)).

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Pine-Oak Rocky Woodland

Habitat Comments: A relatively little-studied species.

Season: Breeding

Threat Category: Droughts

Threat Impact: Medium

Specific Threat: Warmer, drier climate may result in loss of boreal wetlands.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize maintaining a structurally complex understory during forest management as this species will respond favorably provided a well-developed shrub layer is present.

Objective: A combination of management techniques, including selective timber harvesting, mechanical thinning, and prescribed burns, can be used to create and sustain the young forest conditions this species depends on. In regions dominated by mature forests, incorporating early successional habitat patches within rotational forest management plans will help maintain a mosaic of habitat types.

Action Priority: 4-Low

Action Urgency:

Measure: Number of sites with suitable breeding habitat where groups or agencies have managed forest for dense, shrubby understory or other management to protect known breeding areas from urbanization and land conversion.

Potential Collaborators: U.S. Fish and Wildlife Service, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Ridge and Valley, Appalachian Plateaus

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, reptiles, and insects.

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** Low

Specific Threat: Warmer, drier climate may result in loss of boreal wetlands.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize maintaining a structurally complex understory during forest management as this species will respond favorably provided a well-developed shrub layer is present.

Objective: A combination of management techniques, including selective timber harvesting, mechanical thinning, and prescribed burns, can be used to create and sustain the young forest conditions this species depends on. In regions dominated by mature forests, incorporating early successional habitat patches within rotational forest management plans will help maintain a mosaic of habitat types.

Action Priority: 4-Low **Action Urgency:**

Measure: Number of sites with suitable breeding habitat where groups or agencies have managed forest for dense, shrubby understory or other management to protect known breeding areas from urbanization and land conversion.

Potential Collaborators: Actively manage habitat using best practices to promote favorable habitat conditions., Conduct outreach to inspire and promote Species of Greatest Conservation Need protection and habitat conservation., Encourage complex forest structure, including conifers, to support diverse wildlife populations., Keep cats safely indoors to prevent wildlife disturbance and mortality., Manage deer for healthy and sustainable forest habitat., Monitor species abundance and distribution over time to assess population trends., Participate in community science opportunities to contribute data for conservation decisions.

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, reptiles, and insects.

Season: Breeding

Threat Category: Temperature Extremes **Threat Impact:** Medium

Specific Threat: Warmer, drier climate may result in loss of boreal wetlands.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Prioritize maintaining a structurally complex understory during forest management as this species will respond favorably provided a well-developed shrub layer is present.

Objective: A combination of management techniques, including selective timber harvesting, mechanical thinning, and prescribed burns, can be used to create and sustain the young forest conditions this species depends on. In regions dominated by mature forests, incorporating early successional habitat patches within rotational forest management plans will help maintain a mosaic of habitat types.

Action Priority: 4-Low **Action Urgency:**

Measure: Number of sites with suitable breeding habitat where groups or agencies have managed forest for dense, shrubby understory or other management to protect known breeding areas from urbanization and land conversion.

Potential Collaborators: U.S. Fish and Wildlife Service, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Other state agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, reptiles, and insects.

Season: Breeding

Priority	Need	Partners
1	What is the species sensitivity to disturbance along the fringe of the habitat?	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources
2	How close can disturbance be to their breeding habitat without affecting reproductive success?	Pennsylvania Game Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions
3	Following disturbance, what is the timeline for the return of a viable breeding population?	Pennsylvania Game Commission, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices focused in the Allegheny Plateaus and Ridge and Valley provinces.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provides survival and productivity information for many songbird species and can be a useful measurement of temporal patterns.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Gross, D. A. 2003. Avian Population and Habitat Assessment Project: Pennsylvania Important Bird Area #48, State Game Lands #57, Wyoming, Luzerne, and Sullivan Counties. (For Pennsylvania Audubon.) Ecology III, Inc., Berwick, Pennsylvania.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Grove, G. 2012. Nashville Warbler (Oreothlypis ruficapilla). Pages 362-363, in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Lowther, P. E., and J. M. Williams. 2011. Nashville Warbler (Oreothlypis ruficapilla). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/205 (accessed July 2015).

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Schulte, L.A. and G.J. Niemi. 1998. Bird communities of early-successional burned and logged forest. Journal of Wildlife Management 62: 1418-1429.

PENNSYLVANIA
WILDLIFE ACTION PLAN

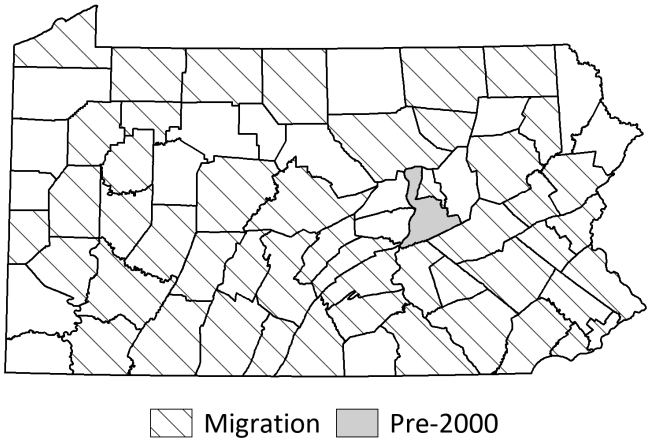
Connecticut Warbler

Oporornis agilis

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Sustain fall migratory populations through maintenance of appropriate stopover habitat.

NatureServe Global Rank: G4G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Low

Season: Migration

Specific Habitat Requirements: Often associated with dense thickets, bogs, and weedy fields where they stay low to the ground and out of sight.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Shrubland/grassland

Habitat Comments: Connecticut Warbler is primarily a fall migrant in Pennsylvania. It is rarely encountered in the state during spring migration.

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Development of retired farmland with old fields to housing and commercial industries; window strikes on buildings during nocturnal migration.

Action Category: Outreach, communication and distribution

Specific Action: Implement lights out programs to reduce building strikes by birds during migration.

Objective: Convince building owners and managers to turn off excess lighting during the months migrating birds are flying overhead.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Focus light reduction efforts on major cities during peak migration flights.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: All nocturnal passerines

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Development of retired farmland with old fields to housing and commercial industries; window strikes on buildings during nocturnal migration.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Restrict mowing in fields with herbaceous, "weedy" cover until after fall migration.

Objective: No net loss of suitable migratory habitat.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Assess habitat available by region using GIS, focusing on regions under most development risk.

Potential Collaborators: Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action:

Season: Migration

Priority	Need	Partners
1	Improved understanding of migration needs, including food requirements, size of habitat used, and length of time spent at migratory stopover points.	Pennsylvania Game Commission, Non-governmental organizations, Universities & research institutions
2	What role does Pennsylvania play in the life cycle of this species and how can the state maintain or increase its role in recovery?	Universities & research institutions
3	What locations are important for this species in Pennsylvania? Where are the larger migration stopover locations?	Universities & research institutions

Season: Migration

Priority	Survey	Partners
1	Autumn surveys at important stopover areas important for foraging and roosting.	Non-governmental organizations, Universities & research institutions, Private Landowners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments: eBird provides mapping for Connecticut Warbler that displays abundance and range during migration which can be used to more precisely identify areas of most importance in Pennsylvania.

Monitoring Need:

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Pitocchelli, J., J. L. Jones, and D. Jones. 2023. Connecticut Warbler (Oporornis agilis), version 2.0. In P. G. Rodewald, editor. Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.conwar.02

PENNSYLVANIA
WILDLIFE ACTION PLAN

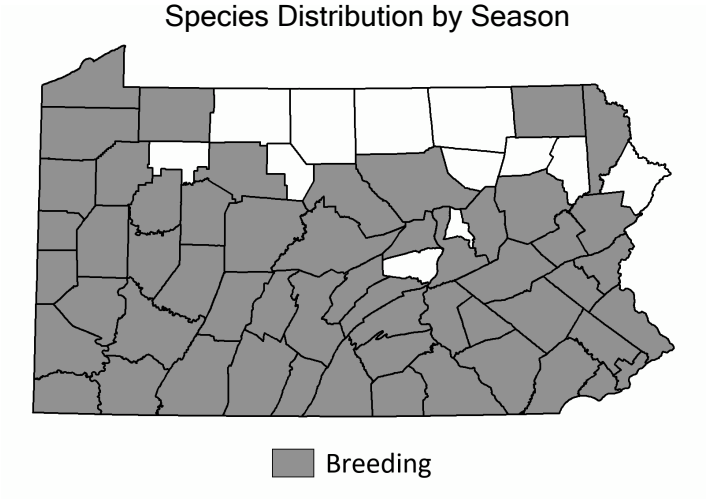
Kentucky Warbler

Geothlypis formosa

David Yeany II

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Stabilize or increase Pennsylvania estimated breeding population of 12,000 breeding pairs (PIF 2020) through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 2,500 - 10,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Deciduous mixed oak and hardwood forests at 200-600m (660-1970 ft) elevations with dense woody understory, including shrubs, saplings and vines. Woody cover between 40cm (16 in) and 1.5m (5 ft) can be as high as 80-100% (Magee and VanClef 2016) with nearly closed canopy mature forests. Spicebush (Lindera benzoin) is a vital component of breeding territories and can be found in nearly every site as high density in some areas. Mixed evidence supports both higher herbaceous layers and sparse layers, as low as 5% or less. Breeding habitat often may include seeps, small mountain streams and river bottom lands.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Reduced breeding success due to degraded forest habitat from invasive non-native plants and insects, and direct mortality from outdoor free-roaming cats.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Implement invasive plant species removal at sites currently or recently (last 10 years) occupied by breeding Kentucky Warblers.

Objective: Improve breeding habitat quality to increase reproductive success.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Increased Kentucky Warbler breeding populations at targeted sites measured by multi-year monitoring, including point counts, Monitoring Avian Productivity and Survivorship (MAPS), productivity assessment, among other demographic measures.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Forest interior breeding birds and other forest breeding birds.

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Medium

Specific Threat: Reduced breeding success due to degraded forest habitat from white-tailed deer over browsing in areas with higher deer densities.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Increase promotion of deer hunting, and implement urban and suburban deer hunting programs in regions where forest interior birds, like Kentucky Warbler, have greatest declines.

Objective: Target PGC WMUs with highest deer densities, lowest hunter recruitment, and/or highest declines in forest interior birds, including Kentucky Warbler, with programs to boost deer hunter numbers and deer harvest (where needed). Provide resources for urban/suburban deer hunting initiatives near human population centers to be successful (e.g. Pittsburgh and Philadelphia).

Action Priority: 1-Highest

Action Urgency: Initiate immediately

Measure: 1. Decreased deer population numbers, increased deer harvest, and increased hunter effort in priority units, suburban and urban areas where forest interior birds like Kentucky Warbler are in decline. 2. Increased Kentucky Warbler breeding populations at targeted sites measured by multi-year monitoring, including point counts, MAPS, productivity assessment, among other demographic measures.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other state agency, Pennsylvania Biological Survey, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Forest interior breeding birds and other forest breeding birds

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss and fragmentation of forest breeding habitat due to residential housing developments.

Action Category: Conservation planning

Specific Action: Promote conservation planning in urban areas that preserves healthy forest conditions where Kentucky Warbler breeding populations are declining.

Objective: Reduce loss and degradation of existing forest habitat within urban centers.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Area of forest preserved within urban areas. Area of forest restored from development caused degradation in urban areas.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Township Zoning Boards

Locations: Physiographic Section: Pittsburgh Low Plateau, Waynesburg Hills, Great Valley, Appalachian Mountain, Allegheny Mountain, Reading Prong, Lowland and Intermediate Upland, Piedmont Upland, South Mountain, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Lowland, Piedmont Upland, Piedmont Lowland, Piedmont Upland, Allegheny Front

Other species likely to benefit from this action: Wood Thrush, Scarlet Tanager, Acadian Flycatcher, Hooded Warbler, Louisiana Waterthrush

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Reduced breeding success due to degraded forest habitat from invasive non-native plants and insects, and direct mortality from outdoor free-roaming cats.

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Reduce bird and small mammal mortalities caused by free-roaming domestic cats, which kill an estimated 2.4 billion birds and 12.3 billion mammals annually in the U.S.

Objective: Implement management and educational recommendations for addressing the impacts of free-roaming domestic cats as outlined in the 2022 PA One Health Task Force assessment.

Action Priority: 2-High

Action Urgency: Initiate within 5 years

Measure: 1. Number of groups or agencies implementing recommendations for managing free-roaming domestic cats. 2. Number of people reached through educational outreach about impacts and management of free-roaming domestic cats.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Biological Survey, Pennsylvania Game Commission, U.S. Department of Agriculture-Animal and Plant Health Inspection Service, U.S. Department of Agriculture-Farm Service Agency, U.S. Fish and Wildlife Service

Locations: Statewide

Other species likely to benefit from this action: Wild birds and small mammals.

Season: Breeding

Priority	Need	Partners
1	Assess the effects of forest fragmentation on forest interior birds, including predation and cowbird parasitism rates, minimum area requirements, as well as minimum viable population sizes, utilizing recent population trend data from eBird trends maps to select sites of stability and decline for comparison.	Conservancies & Land Trusts, Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources
2	Conduct landscape level analysis of areas of forest interior bird species (e.g., Kentucky Warbler) using eBird and 3rd Pennsylvania Bird Atlas data in areas of range change to investigate land use factors influencing that change.	Non-governmental organizations, Universities & research institutions, Pennsylvania Game Commission
3	Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat.	Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Pennsylvania Biological Survey, Pennsylvania Game Commission, Private Landowners, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations, Conservancies & Land Trusts

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provide survival and productivity information for many songbird species and can be a useful measurement of temporal patterns. Long-running standardized bird banding monitoring program.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Bakermans, M. H., A. D. Rodewald, and A. C. Vitz. 2012. Influence of forest structure on density and nest success of mature forest birds in managed landscapes. Journal of Wildlife Management 76:1225-1234.

Bushman, E. S. and G. D. Therres. 1988. Habitat management guidelines for forest interior breeding birds of coastal Maryland. Wildlife Technical Publication 88-1. Maryland Department of Natural Resources.

Conover, A.M. 2011. The impact of non-native plants on bird communities in suburban forest fragments. M.S. Thesis. University of Delaware, Newark, Delaware.

Crawford, H. S., R. G. Hooper, and R. W. Titterington. 1981. Songbird population response to silvicultural practices in central Appalachian hardwoods. Journal of Wildlife Management 45:680-692.

Dauphine N. and R. J. Cooper. 2009. Impacts of free ranging domestic cats (Felis catus) on birds in the United States: a review of recent research with conservation and management recommendations. Pages 205-219 in T. D. Rich, C. Arizmendi, D. Demarest, and C. Thompson, editors. Tundra to Tropics: Connecting Birds, Habitats and People. Proceedings of the Fourth International Partners in Flight Conference, 13-16 February 2008. McAllen, TX. Partners in Flight.

Gibbs, J. P. and J. Faaborg. 1990. Estimating the viability of Ovenbird and Kentucky Warbler populations in forest fragments. Conservation Biology 4:193-196.

Grove, L. 2012. Kentucky Warbler (Geothlypis formosa). Pages 366-367 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Johnson, N., T. Gagnolet, R. Ralls, E. Zimmerman, B. Eichelberger, C. Tracey, G. Kreitler, S. Orndorff, J. Tomlinson, S. Bearer, and S. Sargent. 2010. Pennsylvania energy impacts assessment. Available from http://www.nature.org/media/pa/tnc_energy_analysis.pdf (accessed July 2015).

Magee, C.S. and Van Clef, M., 2016. Plant structure of hooded and Kentucky warbler breeding sites in New Jersey. Cassinia, 76, pp.30-35.

McDonald, M. V. 2013. Kentucky Warbler (Geothlypis formosa). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/324 (accessed July 2015).

McDonald, M. V. 2020. Kentucky Warbler (Geothlypis formosa), version 1.0. In A. F. Poole, editor. Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.kenwar.01

McWilliams, G. M., and D. W. Brauning. 2000. The Birds of Pennsylvania. Cornell University Press, Ithaca, New York.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Pabian, S. E., S. M. Rummel, W. E. Sharpe, and M. C. Brittingham. 2012. Terrestrial liming as a restoration technique for acidified forest ecosystems. International Journal of Forestry Research 2012:976809 DOI:10.1155/2012/976809.

Partners in Flight. 2020. Population Estimates Database, version 3.1. Available at http://pif.birdconservancy.org/population-estimates-database. Accessed February 2025.

Pennsylvania One Health Task Force. 2022. Recommendations on the Management of Domestic Cats (Felis catus).15 pgs.

Perry, R. W. and R. E. Thill. 2013. Long-term responses of disturbance-associated birds after different timber harvests. Forest Ecology and Management 307:274-283.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Russell, K. 2010. Kentucky warbler. Pages 307-310 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Thomas, E. H., M. C. Brittingham, and S. H. Stoleson. 2014. Conventional oil and gas development alters forest songbird communities. The Journal of Wildlife Management 78:293-306.

PENNSYLVANIA
WILDLIFE ACTION PLAN

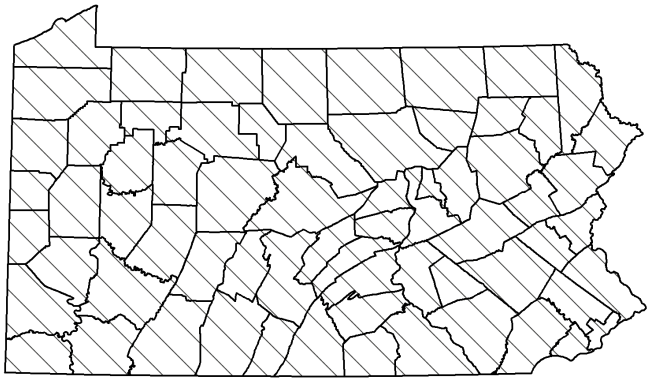
Cape May Warbler

Setophaga tigrina

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Migration

Conservation Profile

PA 10-Year Conservation Goal: Maintain fall migratory populations by managing appropriate stopover habitat.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Migration

Specific Habitat Requirements: Favors conifers during migration (on campuses, golf courses, tree nurseries, pine plantations, and residential areas). Will also use flowering shade and fruit trees, brier patches, overgrown fencerows, and weedy roadsides.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Usually forages among the higher branches in conifers including spruce, larch, and pine.

Season: Migration

Threat Category: Commercial and Industrial Areas **Threat Impact:** Low

Specific Threat: Nocturnal window strikes from brightly lit buildings during peak spring and fall migration.

Action Category: Outreach, communication and distribution

Specific Action: Implement lights out programs to reduce building strikes on birds during migration.

Objective: Convince building owners and managers to turn off excess lighting during migration.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Focus light reduction efforts on major cities during peak migration flights.

Potential Collaborators: Businesses, Non-governmental organizations, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: All nocturnal passerines

Season: Migration

Priority	Need	Partners
1	What role does Pennsylvania play in the life cycle of this species and how can the state maintain or increase its role in recovery?	Non-governmental organizations, Pennsylvania Game Commission
2	What locations are important for this species in Pennsylvania? Where are the larger migration stopover locations?	Pennsylvania Game Commission, Non-governmental organizations, Private Landowners

Season: Migration

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments: eBird provides mapping for Cape May Warbler that displays abundance and range during migration which can be used to more precisely identify areas of most importance in Pennsylvania.

Monitoring Need:

Baltz, M. E. and S. C. Latta (2020). Cape May Warbler (Setophaga tigrina), version 1.0. In Birds of the World (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.camwar.01

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

PENNSYLVANIA
WILDLIFE ACTION PLAN

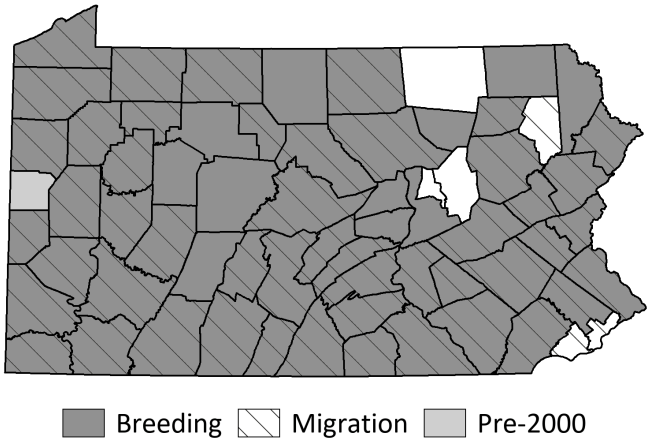
Cerulean Warbler

Setophaga cerulea

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Stabilize apparent statewide population decline indicated by Breeding Bird Survey data to at least 0.25 birds per route on no fewer than 35 routes statewide annually, by 2035. Protect stopover habitat and food resources that the birds rely on to rest and refuel while traveling between breeding and wintering grounds.

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

NatureServe Global Rank: G4

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: High Concern

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Low

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Medium

Season: Breeding

Specific Habitat Requirements: Large stands of mature deciduous forest with large, well-spaced trees with dense, high, often broken or heterogeneous canopies. Especially bottomland forests dominated by sycamore or ridgetop mixed oak with major white oak component.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Migration

Specific Habitat Requirements: Poorly known. Assumed to be similar to breeding habitat. Anecdotal banding records suggest migrants more likely to use younger age classes of forest.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Medium

Specific Threat: Loss of oak and other preferred tree species to spongy moth and other exotic pests.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Aggressively treat known Cerulean Warbler sites for spongy moth.

Objective: Treat spongy moths chemically to maintain mature oak trees.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area sprayed for spongy moth.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Oak trees, various landbirds

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Medium

Specific Threat: Overbrowsing by white-tailed deer reducing forest structure, eliminating oak regeneration.

Action Category: Outreach, communication and distribution

Specific Action: Encourage deer hunting in high-density Cerulean Warbler areas.

Objective: Reduce deer densities sufficiently to sustain or promote forest structural complexity and promote regeneration of oak and other tree species.

Action Priority: 3-Medium **Action Urgency:** Initiate immediately **Measure:** Deer densities, oak regeneration.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Association of Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Wood Thrush, Black-throated Blue Warbler

Season: Migration

Threat Category: Logging and Wood Harvesting **Threat Impact:** Low

Specific Threat: Current forestry practices using short rotation lengths reduce habitat quality for migrating Cerulean Warblers.

Action Category: Outreach, communication and distribution

Specific Action: Within the forestry community, promote practices that encourage or sustain older-growth forest.

Objective: Adoption of forestry practices that include longer rotations and set-asides to maintain old forest characteristics

Action Priority: 2-High **Action Urgency:** Initiate within 5-10 years **Measure:** Area in older-growth (>100 yrs) on commercial and state lands.

Potential Collaborators: Businesses, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources

Locations: Statewide

Other species likely to benefit from this action: Many, including Scarlet Tanager, Bald Eagle, American Goshawk

Season: Breeding

Priority	Need	Partners
1	How does management following forestry guidelines (Wood et al. 2013) affect nest success, survival?	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	What habitats do Cerulean Warblers use post-breeding before migration?	Universities & research institutions, Other federal agency
3	Assess landscape-level characteristics of Cerulean Warbler habitat (degree of fragmentation, slope, aspect, elevation, patch size, proximity to water/anthropogenic habitats/gas & oil infrastructure).	Conservancies & Land Trusts, Businesses, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Association of Conservation Districts, Pennsylvania Game Commission, Universities & research institutions, U.S. Geological Survey

Season: Migration

Priority	Need	Partners
1	What stopover habitats do migrant Cerulean Warblers use?	Non-governmental organizations, Other federal agency, Pennsylvania Game Commission, Universities & research institutions
2	Determine migratory routes and stop-over areas for Cerulean Warblers breeding in Pennsylvania, using light-detecting geolocators.	Universities & research institutions, Pennsylvania Game Commission, Non-governmental organizations

Season: Breeding

Priority	Survey	Partners
1	Identify and map areas of high Cerulean Warbler abundance to inform further conservation actions.	Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations, Other federal agency

Season: Migration

Priority	Survey	Partners
1	Identify high-density Cerulean Warbler sites across state, especially on public lands and other conserved lands.	Conservancies & Land Trusts, Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Name: Bird banding at Powdermill Nature Reserve

Lead(s) : Powdermill Avian Research Center

Link: https://powdermillarc.org/

Description: Constant-effort banding station with continuous operation since 1961.

Comments: Single location.

Monitoring Need:

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Cerulean Warblers poorly sampled by roadside surveys such as the Breeding Bird Survey.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Brittingham, M. C., E. Barton, N. Fronk, J. Bishop, K. L. Sullivan, and S. J. Morreale. 2014. Forest birds, reptiles and amphibians-Quantifying Marcellus Shale associated effects on habitat and communities. Unpublished final report to the Pennsylvania Game Commission, Bureau of Wildlife Management, Harrisburg, Pennsylvania.

Brose, P. H., et al. 2008. Prescribing regeneration treatments for mixed oak forests in the Mid-Atlantic region. General Technical Report NRS-33. U.S. Forest Service, Northern Research Station, Newtown Square, Pennsylvania.

deCalesta, D. S. 1994. Effect of white-tailed deer on songbirds within managed forests in Pennsylvania. Journal of Wildlife Management 58: 711-718.

Delancey, C., K. Islam, G. Kramer, G. MacDonald, A. Sharp, and B. Connare. 2020. Geolocators reveal migration routes, stopover sites, and nonbreeding dispersion in a population of Cerulean Warblers. Animal Migration 7(1):19-26.

Dey, D. C. 2014. Sustaining oak forests in eastern North America: regeneration and recruitment, the pillars of sustainability. Forest Science 60(5):926–942.

Hamel, P. B. 2000. Cerulean Warbler (Dendroica cerulea). Account 511 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Hartman, P. J., D. S. Maehr, and J. L. Larkin. 2009. Habitat selection by Cerulean Warblers in eastern Kentucky. The Wilson Journal of Ornithology 121:469-475.

Matsuoka. S. M., C. L. Mahon, C. M. Handel, P. Sólymos, E. M. Bayne, P. C. Fontaine, and C. J. Ralph. 2014. Reviving common standards in point-count surveys for broad inference across studies. The Condor 116:599-608.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Raybuck, D. W., T. J. Boves, S. H. Stoleson, J. L. Larkin, N. J. Bayly, L. P. Bulluck, G. A. George, K. G. Slankard, L. J. Kearns, S. Petzinger, J. J. Cox, D. A. Buehler. 2022, Cerulean Warblers exhibit parallel migration patterns and multiple migratory stopovers within the Central American Isthmus. Ornithological Applications 124(4):1-18.

Raybuck, D.W., J.L. Larkin, S.H. Stoleson, T.J. Boves, 2020. Radio-tracking reveals insight into survival and dynamic habitat selection of fledgling Cerulean Warblers. Condor 122:1, 3 doi.org/10.1093/condor/duz063

Rich, T. D., et al. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, New York.

Rodewald, A. D. 2004. Landscape and local influences of forest management on Cerulean Warblers in Pennsylvania. Pages 472-477 in D. A. Yaussy, D. M. Hix, R. P. Long, and P. C. Goebel, editors. Proceedings of the 14th Central Hardwood Forest Conference. General Technical Report NE-316. USDA Forest Service Northeastern Research Station, Newtown Square, Pennsylvania.

Spetich, M.A., M. A. Jenkins, S. R. Shifley, R. F. Wittwer, and D. L. Graney. 2022. Characteristics of dry-mesic old-growth oak forests in the eastern United States. Earth 3(3):975-1009.

Stoleson, S. H. 2004. Cerulean Warbler habitat use in an oak-northern hardwoods transition zone: Implications for management. Page 536 in D. A. Yaussy, D. M. Hix, R. P. Long, and P. C. Goebel, editors. Proceedings of the 14th Central Hardwood Forest Conference. General Technical Report NE-316. USDA Forest Service Northeastern Research Station, Newtown Square, Pennsylvania.

Stoleson, S. H., and C. Rutt. 2012. Cerulean Warbler (Setophaga cerulea). Pages 374-375 in A. M. Wilson, D. W. Brauning, and R. S Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Penn State University Press, University Park, Pennsylvania.

Stoleson, S. H., and J. L. Larkin. 2010. Breeding birds of Pennsylvania: forest bird communities. Pages 14-27 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian ecology and conservation: a Pennsylvania focus with national implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Stoleson, S., and F. C. Sechler, Jr. 2010. Cerulean Warbler. Pages 153-156 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Wood, P. B., et al. 2013. Management guidelines for enhancing Cerulean Warbler breeding habitat in Appalachian hardwood forests. American Bird Conservancy, The Plains, Virginia.

PENNSYLVANIA
WILDLIFE ACTION PLAN

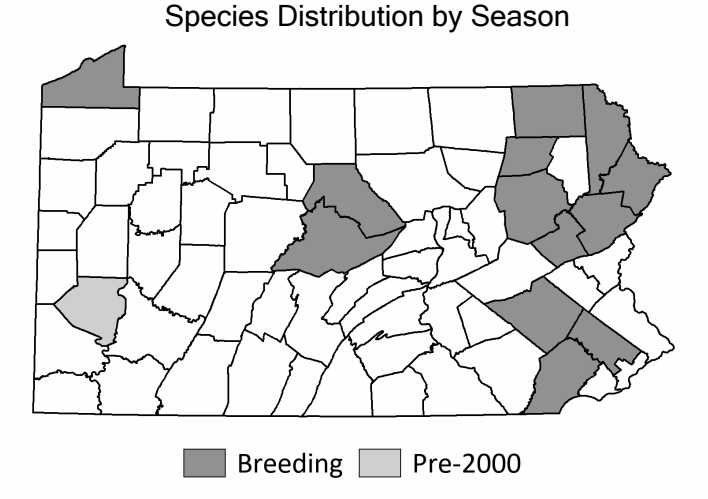
Blackpoll Warbler

Setophaga striata

Douglas A. Gross

Pennsylvania Biological Survey Ornithological Technical Committee

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: 50 Blackpoll Warbler territorial pairs in at least five locations by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Near Threatened

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Boreal conifer swamps that are headwater wetlands above 2000 feet (610 meters) elevation. Pennsylvania Blackpoll Warblers are associated with red spruce, eastern hemlock, eastern larch, eastern white pine, and northern hardwoods, as well as dense shrub cover (blueberry, mountain holly, swamp azalea). They generally occupy dense conifer stands, but some territories have sparse conifer cover. Some Blackpoll Warblers have been found in upland conifer stands as they are found elsewhere in their breeding range. Blackpoll Warbler occupation of spruce, fir, pine, or hemlock summits is possible and perhaps overlooked.

Primary Habitat: Palustrine

Primary Habitat Type: Non-Tidal Wetlands

Primary Specific Habitat: North-Central Interior and Appalachian Acidic Peatland

Habitat Comments: There is appropriate habitat outside of the "Dutch Mountain wetlands" of western Wyoming County in the Poconos especially. There are populations of Blackpoll Warbler in the Catskills, fairly close for colonization. Pennsylvania population is isolated from others. This also is true of the well-established breeding populations in the Catskills and Adirondacks. Species is a long-distance migrant very capable of pioneering into new breeding locations.

Season: Breeding

Threat Category: Habitat Shifting or Alteration **Threat Impact:** High

Specific Threat: Climate change is likely to reduce or eliminate suitable boreal conifer habitat within Pennsylvania.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Conserve mature spruce / hemlock / fir forest, release spruce seedlings and saplings, plant spruce and fir seedlings to fill conifer forest gaps and increase conifer component.

Objective: Maintain high nest success rate in monitored locations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Nest success rate of known territories remains above 50%.

Potential Collaborators: Actively manage habitat using best practices to promote favorable habitat conditions., Conserve large, contiguous forests to promote good water quality and support use of this habitat., Encourage complex forest structure, including conifers, to support diverse wildlife populations.

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Glaciated High Plateau, Glaciated Pocono Plateau, Glaciated Low Plateau

Other species likely to benefit from this action: Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Marcellus shale and shallow oil well infrastructure permanently replaces or fragments forest.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve boreal conifer forests and swamps through land protection and developing and implementing best management practices.

Objective: Protect core habitat areas for endangered and threatened species.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Glaciated Low Plateau, Glaciated High Plateau, Glaciated Pocono Plateau

Other species likely to benefit from this action: Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare.

Season: Breeding

Threat Category: Roads and Railroads **Threat Impact:** Low

Specific Threat: Residential and road development replaces forest and wetlands.

Action Category: Mitigate human environmental impact

Specific Action: Promote forest conservation even where there is light development.

Objective: Protect high elevation, boreal forests and swamps.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Number of hectares of high elevation, boreal forests and number of forest blocks greater than 10 hectares.

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Physiographic Section: Glaciated High Plateau, Glaciated Low Plateau, Glaciated Pocono Plateau

Other species likely to benefit from this action: Other boreal species including Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

Season: Breeding

Priority	Need	Partners
1	What is the continued breeding population, habitat, persistence, and nesting success of Blackpoll Warblers in Pennsylvania? The species seems to persist despite limited range and population.	Pennsylvania Game Commission, Universities & research institutions
2	What management approaches can maintain and increase the possibility of this boreal forest species and its ecosystem cohorts to continue in Pennsylvania?	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions
3	What are the limiting factors for this species through its full life cycle? Is the long-distance migration a major limiting factor?	Universities & research institutions, Non-governmental organizations, Pennsylvania Game Commission
4	Find connectivity to wintering grounds. Capture-recapture individuals from region (including NY Catskills / Adirondacks) to determine where they migrate to and their migration route. As technology permits, tag individuals to track using the Motus Wildlife Tracking System.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Continuous monitoring of known and recent breeding populations including breeding confirmation, success, habitat association, continuity of occupation.	Universities & research institutions, Pennsylvania Game Commission
2	Find undiscovered or new locations (through surveys or autonomous recording units) that may have been overlooked or newly colonized, allowing study of population and protection of site.	Non-governmental organizations, Pennsylvania Game Commission, Universities & research institutions
3	Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project.	Pennsylvania Game Commission, Non-governmental organizations
4	Encourage Atlas and eBird participants to seek out undiscovered breeding populations outside currently known breeding range in Pennsylvania.	Non-governmental organizations

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Mountain Bird Watch

Lead(s) : Vermont Center for Ecostudies

Link: https://vtecostudies.org/what-we-do/projects/mountain-birdwatch

Description: Mountain Birdwatch (MBW) monitors songbirds that breed in the montane fir and spruce forests of the Northeast. MBW data provide the only region-wide source of population information on these high-elevation breeding birds. MBW's primary focus is Bicknell's Thrush, a montane fir specialist that breeds only in the northeastern U.S. and adjacent areas of Canada, but this project also tracks nine other high-elevation avian breeders, red squirrels, and the conifer seeds that these avian nest predators eat. A Pennsylvania version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for the Pennsylvania and the Appalachian Mountains.

Comments: The Pennsylvania Game Commission is working with Mountain Birdwatch to develop a version of this project that is appropriate for Pennsylvania and the Appalachian Mountains. There will be a series of point count trails in appropriate habitat (conifer forests) monitored by some staff, partners, and volunteers.

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations

Comments: May be poorly monitored by BBS surveys due to localized, habitat-specific occurrence and low densities.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments: Need to search off-road in remote areas especially peatlands, headwater swamps, blueberry thickets, spruce and fir forests. Most likely in NE counties including the Pocono Mountains and North Mountain.

Monitoring Need: Monitor isolated populations found in the past and locate additional locations in spruce forests of the state.

Name: Rare Mountain Forest Bird Monitoring **Lead(s) :** Pennsylvania Game Commission

Link: N/A

Description: Not a current monitoring program. See monitoring need.

Comments:

Monitoring Need: Conduct area searches in locations with a history of mountain forest bird breeding populations. Point counts are helpful for many target species in appropriate habitat. Geospatial and behavioral data collection for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson's Thrush, Red Crossbill, Pine Siskin, Canada Warbler, American Goshawk, Sharp-shinned Hawk.

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

DeLuca, W., R. Holberton, P. D. Hunt, and B. C. Eliason. 2020. Blackpoll Warbler (Setophaga striata), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.bkpwar.01

Gross, D. A. 1994. Discovery of a Blackpoll Warbler (Dendroica striata) Nest: A First for Pennsylvania-Wyoming County. Pennsylvania Birds 8: 128-132.

Gross, D. A. 2010. Blackpoll Warbler (Dendroica striata). Pages 218-221 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Gross, D. A. 2012. Blackpoll Warbler (Setophaga striatus) Pages 386-387 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Hart, J. A. and J. D. Lambert, editors. 2010. Mountain Birdwatch: Protocol and Standard Operating Procedures for Monitoring High-Elevation Landbirds in the Northern Appalachian and Laurentian Regions. Version 2.0. Vermont Center for Ecostudies and American Bird Conservancy, Norwich, Vermont. Available from http://vtecostudies.org/projects/mountains/mountain-birdwatch/ (accessed July 2015).

Hunt, P. D. and B. C. Eliason. 1999. Blackpoll Warbler (Setophaga striata). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/431/articles/introduction (accessed July 2015).

Loss, S. R., T. Will, S. S. Loss, and P. P. Marra. 2014. Bird-building collisions in the United States: Estimates of annual mortality and species vulnerability. The Condor 116:8-23.

Matsuoka, S. M., E. M. Bayne, P. Solymos, P. C. Fontaine, S. G. Cumming, F. K. A. Schmiegelow, and S. J. Song. 2012. Using binomial distance-sampling models to estimate the effective detection radius of point-count surveys across boreal Canada. Auk 129:268-282.

Ralston, J., and J. J. Kirchman. 2012. Continent-wide genetic structure in a boreal forest migrant, the Blackpoll Warbler (Setophaga striata). Auk 129:467-478.

Ralston, J., and J. J. Kirchman. 2013. Predicted range shifts in North American boreal forest birds and the effect of climate change on genetic diversity in Blackpoll Warbler (Setophaga striata). Conservation Genetics 14:543-555.

Rentch, J. S., T. M. Schuler, W. M. Ford, and G. J. Nowacki. 2007. Red spruce stand dynamics, simulations, and restoration opportunities in the Central Appalachians. Restoration Ecology 15:440-452.

Rimmer, C. C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubrey, D. Busbey, and R. J. Taylor. 2005. Mercury concentrations in Bicknell's Thrush and other insectivorous passerines in montane forests of Northeastern North America. Ecotoxicology 14:223-240.

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Zawatski, E. J., D. A. Gross, and M. C. Brittingham. 2019. Habitat of breeding blackpoll warblers at a persistent extralimital breeding site in Pennsylvania. Northeastern Naturalist 26(1):31-42. https://doi.org/10.1656/045.026.0104

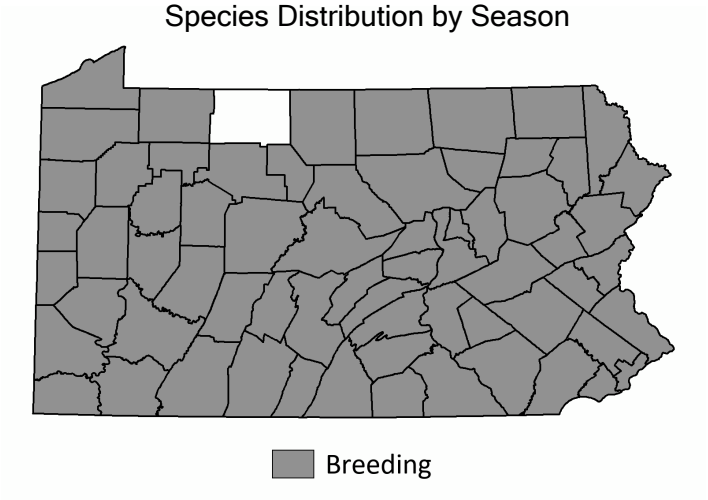
PENNSYLVANIA
WILDLIFE ACTION PLAN

Prairie Warbler

Setophaga discolor

Jeffrey A. Stratford *Wilkes University*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Increase and stabilize populations by 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Data Deficient

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Brushy second growth, dry scrub, low pine-juniper, pine barrens, burned-over areas, and sproutlands.

Primary Habitat: Open Upland

Primary Habitat Type: Shrublands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Loss of habitat through conversion to developed lands.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Preserve high quality habitat.

Objective: Stabilize or increase population.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Stabilized or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Other shrub species: Yellow-breasted Chat, Golden-winged Warbler

Season: Breeding

Threat Category: Fire and Fire Suppression **Threat Impact:** Negligible

Specific Threat: Woody encroachment.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Reduce woody encroachment through fire and targeted herbicide.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Stable or increased populations.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Statewide

Other species likely to benefit from this action: Other shrub species

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Invasive plants altering habitat and food availability.

Action Category: Basic research and status monitoring

Specific Action: Understand impacts of invasive plants on nest success/fitness.

Objective: Understand impacts of invasive plants on nest success/fitness.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Predictable consequences of controlling/not controlling invasive plants.

Potential Collaborators: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Locations: Statewide

Other species likely to benefit from this action: Shrubland and grassland species

Season: Breeding

Priority	Need	Partners
1	What are the effects of controlled burns on populations?	Pennsylvania Game Commission, Universities & research institutions
2	Minimum habitat area requirements.	Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, U.S. Fish and Wildlife Service
3	What are the effects of right-of-way management and pipelines on populations?	Universities & research institutions
4	What are the winter linkage areas for the Pennsylvania breeding population and what are the conditions of those habitats that may affect breeding condition and success?	Universities & research institutions, U.S. Fish and Wildlife Service

Season: Breeding

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Arendt, W. J. 1992. Status of North American migrant landbirds in the Caribbean region: a summary. Pages 143-171 in J. M. Hagan III and D. W. Johnston, editors. Ecology and conservation of neotropical migrant landbirds. Smithsonian Institute Press, Washington, D.C.

Askins, R. A. 1998. Restoring forest disturbance to sustain populations of shrubland birds. Restoration and Management Notes 16:166-173.

Brynes, B. 2012. Prairie Warbler, Setophaga discolor. Pages 396-397 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, University Park, Pennsylvania.

Gram, W. K., P. A. Porneluzi, R. L. Clawson, J. Faaborg, and S. C. Richter. 2003. Effects of experimental forest management on density and nesting success of bird species in Missouri Ozark forests. Conservation Biology 17:1324-1337.

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

Lloyd-Evans, T. L. and J. L. Atwood. 2004. 32 years of changes in passerine numbers during spring and fall migrations in coastal Massachusetts. Wilson Bulletin 116:1-16.

Nolan Jr., V., E. D. Ketterson and C. A. Buerkle. 2014. Prairie Warbler (Setophaga discolor). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/455 (accessed July 2015).

Nolan, Jr., V. 1978. The ecology and behavior of the Prairie Warbler Dendroica discolor. Ornithological Monographs 26:1-595.

Orndorff, S., and T. Patten. 2007. Management Guidelines for Barrens Communities in Pennsylvania. Report prepared for the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission. The Nature Conservancy, Harrisburg. Pennsylvania.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Perry, R. W. and R. E. Thill. 2013. Long-term responses of disturbance-associated birds after different timber harvests. Forest Ecology and Management 307:274-283.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Sechler Jr., F. C. 2010. Prairie Warbler. Pages 304-307 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

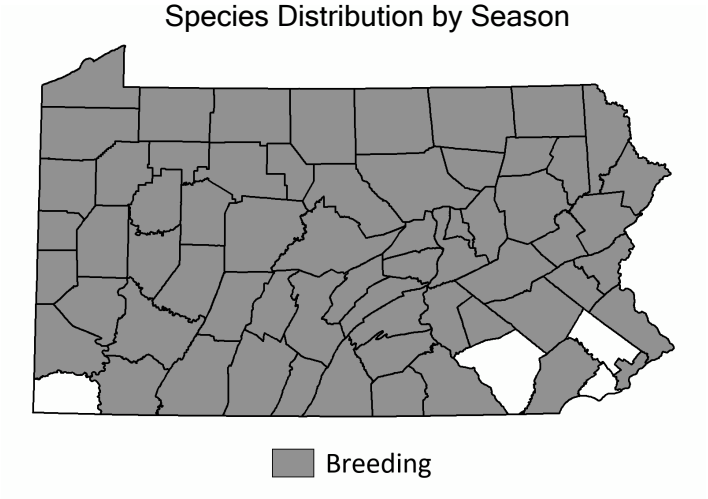
PENNSYLVANIA
WILDLIFE ACTION PLAN

Black-throated Green Warbler

Setophaga virens

Scott H. Stoleson — *U.S. Forest Service, Northern Research Station (retired)*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain current estimated population of 355,000 males (Wilson et al. 2012) through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Decline of 30-50%

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Large coniferous, deciduous, and mixed forests above 984 feet (300 m) elevation.

Primary Habitat: Forested Upland

Primary Habitat Type: High Elevation Forests

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Habitat Comments: Habitat specificity varies across the Commonwealth: strong association with pine and hemlock in eastern and southern parts of range, less so in northwestern/northcentral Pennsylvania.

Season: Breeding

Threat Category: Invasive Non-native/Alien Species/Diseases **Threat Impact:** Low

Specific Threat: Loss of hemlock to invasive hemlock woolly adelgid.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Treat hemlocks for hemlock woolly adelgid (HWA) in areas with high Black-throated Green Warbler densities.

Objective: Keep key areas treated to maintain healthy hemlock component.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Health of hemlocks, presence of HWA.

Potential Collaborators: Conservancies & Land Trusts, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Statewide

Other species likely to benefit from this action: Winter Wren, Swainson's Thrush, Blue-headed Vireo, Magnolia Warbler

Season: Breeding

Priority	Need	Partners
1	What are effects of energy and residential development on area-sensitve forest birds in the large forest blocks of the state?	Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Other federal agency, Pennsylvania Biological Survey, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	Assess the effect of hemlock woolly adelgid on Black-throated Green Warbler and sympatric birds in hemlock-based stands.	Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Non-governmental organizations, Other federal agency, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions
2	Mountain Bird Watch / Rare Mountain Bird Surveys.	Universities & research institutions, Pennsylvania Game Commission

Name: eBird **Lead(s) :** Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey **Lead(s) :** U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Allen, M. C. and J. Sheehan, Jr. 2010. Eastern hemlock decline and its effect on Pennsylvania's birds. Pages 232-245 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Brittingham, M. C., E. Barton, N. Fronk, J. Bishop, K. L. Sullivan, and S. J. Morreale. 2014. Forest birds, reptiles and amphibians-Quantifying Marcellus Shale associated effects on habitat and communities. Unpublished final report to the Pennsylvania Game Commission, Bureau of Wildlife Management, Harrisburg, Pennsylvania.

Collins, S. L. 1983. Geographic variation in habitat structure of the Black-Throated Green Warbler (Dendroica virens). The Auk 100:382–389.

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Birds with silviculture in mind: birder's dozen pocket guide for Vermont foresters. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Forest Bird Habitat Assessment: A Guide to Integrating Bird Habitat Data into a Vermont Forest Inventory. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Haney, J. C. 1999. Hierarchical comparisons of breeding birds in old-growth conifer-hardwood forest on the Appalachian Plateau. Wilson Bulletin 111: 89-99.

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

Morse, Douglass H. and Alan F. Poole. 2005. Black-throated Green Warbler (Setophaga virens). In A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available from http://bna.birds.cornell.edu/bna/species/055 (accessed July 2015).

Pabian, S. 2010. Black-throated Green Warbler. Pages 300-302 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Paton, P. W. C. 1994. The effect of edge on avian nest success: how strong is the evidence? Conservation Biology 8:17-26.

Robichaud, I, and M-A Villard. 1999. Do Black-Throated Green Warblers Prefer Conifers? Meso- and Microhabitat Use in a Mixedwood Forest? The Condor 101:262–271.

Rodewald, P. G., and M. C. Brittingham. 2004. Stopover habitats of landbirds during fall: Use of edge-dominated and early-successional forests. The Auk 121:1040-1055.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Sargent, S., D. Yeany, N. Michel, and E. Zimmerman. 2017. Final Report for WRCP-14507: Forest interior bird habitat relationships in the Pennsylvania Wilds.

Skinner, J. 2012. Black-throated Green Warbler (Setophaga virens). Pages 398-399 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania. Pennsylvania State University Press, University Park, Pennsylvania.

Zitske, B.P., Betts, M.G. and A. W. Diamond. 2011. Negative Effects of Habitat Loss on Survival of Migrant Warblers in a Forest Mosaic.

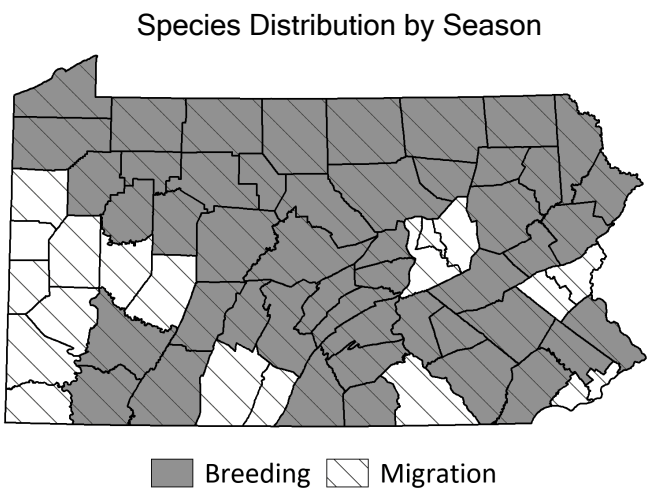
PENNSYLVANIA
WILDLIFE ACTION PLAN

Canada Warbler

Cardellina canadensis

Sean Murphy *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain current estimated population of 36,000 individuals (95% CI: 15,000 - 66,000; Partners in Flight 2020) and increase population growth through habitat conservation and management.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S3B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 10,000 - 100,000 individuals

PA Short-term Trend (10-year): Decline of 10-30%

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: Hemlock-dominated ravines and wet sites in northern hardwood and mixed forest above 1499 ft (457 m) with a dense, shrubby understory, such as rhododendron or hobblebush.

Primary Habitat: Forested Upland

Primary Habitat Type: High Elevation Forests

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Migration

Specific Habitat Requirements: Variety of forest habitats--shrubbery, bushes and vine tangles near edge of parks, villages, and cities, thickets of stream and woodland edges, swamps, and willow trees.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Season: Breeding

Threat Category: Oil and Gas Drilling **Threat Impact:** Medium

Specific Threat: Species is highly sensitive to forest size. Probability of occurrence drops to 50% in forest <400ha (988 ac), and 0% in forests <187ha (462 ac) (Reitsma et al. 2020).

Action Category: Conservation planning

Specific Action: Focus conservation resources on large forested areas (>400ha (1,000 acres)) with known breeding occurrences, especially where moist forest, dense understory, and relatively open canopy are naturally maintained (e.g., headwater swamps, boreal peatlands, ravines, and steep, east-facing slopes). Minimize forest loss and fragmentation within such areas and consider reforestation of adjacent lands as opportunities allow.

Objective: In harvest areas > 2 acres, retain at least 5 standing trees per acre, dispersed individually or in several clumps. These may range from large saplings to trees under 50 ft in height. Provide at least 15 ft of separation among these singing/visual display centers. Choose stems that reach at least 10 ft above the subcanopy (if present).

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of harvested areas meeting requirements.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners

Locations: Physiographic Section: Pittsburgh Low Plateau, High Plateau, Deep Valleys, Allegheny Front, Appalachian Mountain, Susquehanna Lowland, Glaciated High Plateau, Glaciated Low Plateau, Glaciated Pocono Plateau, Anthracite Upland

Other species likely to benefit from this action: Ruffed grouse, Cerulean Warbler, Scarlet Tanager, Black-billed Cuckoo, New England cottontail

Season: Breeding

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Medium

Specific Threat: Sensitive to reduction of understory vegetation by forest ungulates.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Protect and promote high volume of understory foliage in forested wetland, riparian forest, moist forest, old forest subject to canopy breakup.

Objective: Control deer numbers in core, priority areas of Canada Warblers.

Action Priority: 2-High **Action Urgency:** Initiate within 5 years **Measure:** Number of breeding pairs and reproductive success.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Universities & research institutions

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, and insects and reptiles.

Season: Migration

Threat Category: Problematic Native Species/Diseases **Threat Impact:** Low

Specific Threat: Sensitive to reduction of understory vegetation by forest ungulates.

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Protect and promote high volume of understory foliage in forested wetland, riparian forest, moist forest, old forest subject to canopy breakup.

Objective: Control deer numbers in core, priority areas of Canada Warblers.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Migratory bird counts.

Potential Collaborators: Conservancies & Land Trusts, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission

Locations: Physiographic Province: Appalachian Plateaus

Other species likely to benefit from this action: Upland riparian bird species, mammals, amphibians, and insects and reptiles.

Season: Breeding

Priority	Need	Partners
1	How do demographic parameters (e.g., annual survival, nest success) vary across elevation gradient and in response to other environmental variables?	Non-governmental organizations, Other state agency, Pennsylvania Game Commission, Universities & research institutions
2	What is the species sensitivity to disturbance along the fringe of the habitat? How close can disturbance be to their breeding habitat without affecting breeding activities?	Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Universities & research institutions, Non-governmental organizations
3	Following disturbance, what is the timeline for the return of a viable breeding population?	Pennsylvania Game Commission, Universities & research institutions, Pennsylvania Department of Conservation and Natural Resources, Non-governmental organizations

Season: Migration

Priority	Need	Partners

Season: Breeding

Priority	Survey	Partners
1	Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.	Pennsylvania Game Commission, Universities & research institutions, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources

Season: Migration

Priority	Survey	Partners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provides survival and productivity information for many songbird species and can be a useful measurement of temporal patterns.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: There is a need for better monitoring of this species as it is in steep decline (Fink et al. 2023) and not well covered by the Breeding Bird Survey.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Augustine, S. H. 2022. Population and migratory ecology of Canada Warblers (Cardellina canadensis) in the central Appalachian Mountains, West Virginia, USA. M.S. Thesis. West Virginia University.

Brauning, D. and G. McWilliams. 2000. The birds of Pennsylvania. Cornell University Press, Ithaca, New York.

DeSante, D. F. and D. R. Kaschube. 2009. The Monitoring Avian Productivity and Survivorship (MAPS) program 2004, 2005, and 2006 report. Bird Populations 9:86-169.

Environment Canada. 2014. Recovery Strategy for Canada Warbler (Cardellina canadensis) in Canada [Draft]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa, Ontario.

Gross, D. A. 2010. Pennsylvania boreal conifer forests and their bird communities: past, present, and future potential. Pages 48-73 in J. S. Rentch and T. M. Schuler, editors. Proceedings of the Conference on Ecology and Management of High-Elevation Forests of the Central and Southern Appalachian Mountains. 14-15 May, 2009, Slatyfork, WV. U.S. Forest Service General Technical Report NRS-P-64.

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Birds with silviculture in mind: birder's dozen pocket guide for Vermont foresters. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Forest Bird Habitat Assessment: A Guide to Integrating Bird Habitat Data into a Vermont Forest Inventory. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Harding, C., L. Reitsma, and J. D. Lambert. 2017. Guidelines for managing Canada warbler habitat in the Northeast and Mid-Atlantic regions. High Branch Conservation Services, Hartland, VT

Hostetler, J. A., T. S. Sillett, and P. P. Marra. 2015. Full-annual-cycle population models for migratory birds. The Auk 132:433-449.

Lambert, J. D. and S. D. Faccio. 2005. Canada Warbler Population Status, Habitat Use, and Stewardship Guidelines for Northeastern Forests. VINS technical report 05-4. Vermont Institute of Natural Sciences, Woodstock, Vermont.

Mulvihill, R. S. 1992. Canada Warbler (Wilsonia canadensis). Pages 354-355 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Mumme, R. L. , D. A. Gross, and S. H. Stoleson. 2012. Canada Warbler (Cardellina canadensis). In A.M. Wilson, D.W. Brauning, and R.S. Mulvihill, editors. The Second Atlas of Breeding Birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Reitsma, L. R., M. T. Hallworth, M. McMahon, and C. J. Conway. 2020. Canada Warbler (Cardellina canadensis), version 2.0. In P. G. Rodewald and B. K. Keeney, editors. Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.canwar.02

Rodenhouse, N. L., S. N. Matthews, K. P. McFarland, J. D. Lambert, L. R. Iverson, A. Prasad, T. S. Sillett, and R. T. Holmes. 2008. Potential effects of climate change on birds of the Northeast. Mitigation and Adaptation Strategies for Global Change 13:517-540.

Rodewald, P. G., and M. C. Brittingham. 2004. Stopover habitats of landbirds during fall: Use of edge-dominated and early-successional forests. The Auk 121:1040-1055.

Rodewald, P. G., and S. N. Matthews. 2005. Landbird use of riparian and upland forest stopover habitats in an urban landscape. The Condor 107:259-268.

Ross, R. M., L. A. Redell, and R. M. Bennett. 2004. Mesohabitat use of threatened hemlock forests by breeding birds of the Delaware River Basin in Northeastern United States. Natural Areas Journal 24:307-215.

Stoleson, S. H., and J. L. Larkin. 2010. Breeding birds of Pennsylvania: forest bird communities. Pages 14-27 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian ecology and conservation: a Pennsylvania focus with national implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

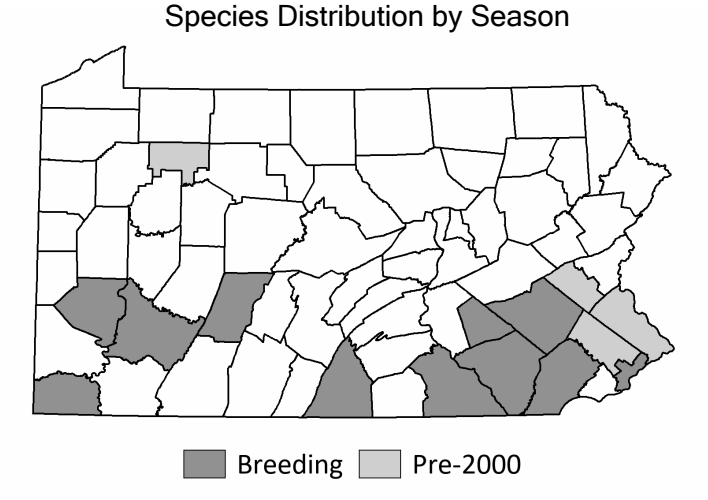
PENNSYLVANIA
WILDLIFE ACTION PLAN

Summer Tanager

Piranga rubra

Nathan J. Zalik — *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain presence as a breeding species. In southern Pennsylvania, maintain and manage for open oak-hickory and oak-pine woodlands preferred by this species.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Increasing

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: Medium

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 1 - 250 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Low

Season: Breeding

Specific Habitat Requirements: Dry, upland forests, particularly oak woodlands with an open understory; often near minor openings.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Central Appalachian Dry Oak-Pine Forest

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss and fragmentation of forested breeding habitat due to residential development.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve appropriate habitat through conservation easements.

Objective: Conserve at least 2500 acres (1012 ha) of currently unprotected forest habitat in areas vulnerable to suburban sprawl by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of forest habitat conserved.

Potential Collaborators: Great Lakes Dune and Swale, Laurentian-Acadian Northern Hardwood Forest

Locations: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus. Physiographic Section: Allegheny Front, Allegheny Mountain, Pittsburgh Low Plateau, Waynesburg Hills

Other species likely to benefit from this action: Scarlet Tanager, Cerulean Warbler, Louisiana Waterthrush, Wood Thrush

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Low

Specific Threat: Loss and fragmentation of forested breeding habitat due to residential development.

Action Category: Conserve specific land or seascapes

Specific Action: Conserve appropriate habitat through land acquisition.

Objective: Protect at least 2500 acres (1012 ha) of currently unprotected forest habitat in areas vulnerable to suburban sprawl by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of forest habitat conserved.

Potential Collaborators: Great Lakes Dune and Swale, Laurentian-Acadian Northern Hardwood Forest

Locations: Physiographic Province: Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Appalachian Plateaus, Piedmont, New England, Ridge and Valley. Physiographic Section: Waynesburg Hills, Pittsburgh Low Plateau, Allegheny Mountain, Allegheny Front

Other species likely to benefit from this action: Scarlet Tanager, Cerulean Warbler, Louisiana Waterthrush, Wood Thrush

Season: Breeding

Priority	Need	Partners
1	How are changes in forest structure and size affecting the range and population of this species at the northern extent of its range?	Universities & research institutions
2	Are changes in climate leading to a northward range shift?	Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	Follow up on reports of birds (e.g., submitted through eBird, PABirds listserv, social media) during the breeding season to determine breeding status.	Pennsylvania Game Commission, Private Landowners

Name: eBird

Lead(s) : Cornell Lab of Ornithology

Link: https://ebird.org/

Description: An online database of bird observations that provides scientists, researchers, and amateur naturalists with real-time data about bird distribution and abundance.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Goguen, C. B. 2010. Summer Tanager. Pages 162-165 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial vertebrates of Pennsylvania: a complete guide to species of conservation concern. The Johns Hopkins University Press, Baltimore, Maryland.

Ickes, R. 1992. Summer Tanager. Pages 358-359 in D. W. Brauning, editor. Atlas of breeding birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Ickes, R. A. 2012. Summer Tanager. Pages 428-429 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second atlas of breeding birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

J. L. Reidy, F. R. Thompson III, and S. W. Kendrick. 2014. Breeding bird response to habitat and landscape factors across a gradient of savanna, woodland, and forest in the Missouri Ozarks. Forest Ecology and Management 313:34-46.

Roach, M. C., F. R. Thompson III, and T. Jones-Farrand. 2019. Effects of pine-oak woodland restoration on breeding bird densities in the Ozark-Ouachita Interior Highlands. Forest Ecology and Management 437:443-459.

Robinson, W. D. 2020. Summer Tanager (Piranga rubra), version 1.0. In A. F. Poole, editor. Birds of the world. Cornell Lab of Ornithology, Ithaca, New York. Available from https://doi.org/10.2173/bow.sumtan.01 (accessed November 2024).

Rosenberg, K. V., J. D. Lowe, and A. A. Dhondt. 1999. Effects of forest fragmentation on breeding tanagers: A continental perspective. Conservation Biology 13:568-583.

Rosenberg, K. V., R. W. Rohrbaugh Jr., S. E. Barker, J. D. Lowe, R. S. Hames, and A. A. Dhondt. 1999. A land manager's guide to improving habitat for scarlet tanagers and other forest interior birds. The Cornell Lab of Ornithology. Ithaca, New York.

PENNSYLVANIA
WILDLIFE ACTION PLAN

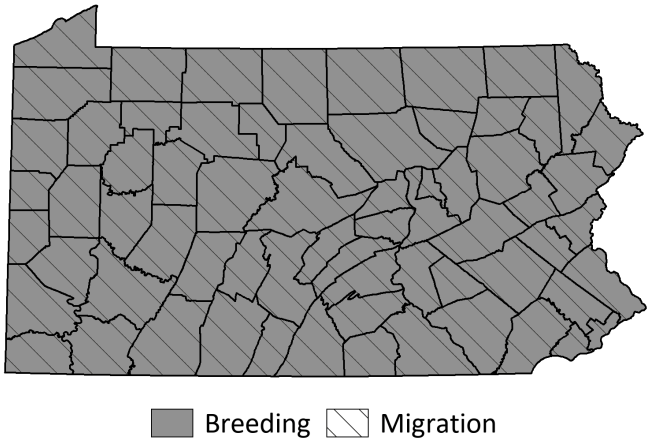
Scarlet Tanager

Piranga olivacea

N. Scott Parkhill *Audubon Mid-Atlantic*

J. Dingel, Pennsylvania Game Commission

Species Distribution by Season



Conservation Profile

PA 10-Year Conservation Goal: Maintain species population in Pennsylvania at current levels (average of 7.5 birds per Breeding Bird Survey route statewide) through 2035. Protect stopover habitat and food resources that the birds rely on to rest and refuel while traveling between breeding and wintering grounds.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S4B

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: 100,000 - 1,000,000 individuals

PA Short-term Trend (10-year): Relatively stable (<=10% change)

Cumulative Threat Impact: High

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Decreasing

Identified Conservation Priority by Established Groups: Yes

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Migration

State Rank (Season): S4M

State Rank Year: 2024

PA Legal Designation: Not Listed (Protected)

PA Abundance: Unknown

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: High

Season: Breeding

Specific Habitat Requirements: A wide variety of mature deciduous and mixed-deciduous forest types with a well developed herbaceous and woody understory.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Migration

Specific Habitat Requirements: Similar habitats used during migration as during the breeding season, predominantly mixed hardwood forests.

Primary Habitat: Forested Upland

Primary Habitat Type: Forests & Woodlands

Primary Specific Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Residential development can cause increased forest fragmentation and edge effects such as increased nest parasitism and predation. Development can also increase the likelihood of window collisions, establishment and spread of invasive plants, and exposure to outdoor cats.

Action Category: Conserve specific land or seascapes

Specific Action: Identify and conserve unprotected large forest blocks >100 ha (247 ac).

Objective: Protect at least 1000 additional ha (2471 ac) of currently unprotected forest habitats in areas vulnerable to sprawl by 2035.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of vulnerable forest protected.

Potential Collaborators: Actively manage habitat using best practices to promote favorable habitat conditions.

Locations: Physiographic Province: Ridge and Valley, Piedmont

Other species likely to benefit from this action: Red-eyed Vireo, Wood thrush, Black-and-white Warbler, Ovenbird, Eastern Whip-poor-will

Season: Migration

Threat Category: Housing and Urban Areas **Threat Impact:** Medium

Specific Threat: Increased development is a large source of mortality from window strikes during migration.

Action Category: Conservation planning

Specific Action: Work with partner organizations, agencies, and private landowners to limit development of contiguous mature forested areas.

Objective: Develop statewide strategy to address forest fragmentation on public and private lands.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Area of forest protected from development or change in developed area across state over time.

Potential Collaborators: Businesses, Conservancies & Land Trusts, Local agencies & municipalities, Non-governmental organizations, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Scarlet Tanager, Hooded Warbler, Cerulean Warbler, Black-throated Green Warbler, Acadian Flycatcher

Season: Breeding

Priority	Need	Partners
1	Determine key features of high quality breeding habitat (i.e., source habitat) for the Scarlet Tanager in Pennsylvania, particularly within fragmented landscapes.	Non-governmental organizations, Universities & research institutions
2	Determine how forest management practices (e.g., timber harvest), natural forest maturation, and effects of deer over-browsing affect breeding habitat quality for tanagers.	Universities & research institutions, Non-governmental organizations

Season: Migration

Priority	Need	Partners
1	Post-nesting dispersal and migration pattern to the wintering ground little known but may be consequential.	Non-governmental organizations, Universities & research institutions

Season: Breeding

Priority	Survey	Partners
1	None	

Season: Migration

Priority	Survey	Partners

Name: Monitoring Avian Productivity and Survivorship (MAPS)

Lead(s) : Institute for Bird Populations

Link: https://www.birdpop.org/pages/maps.php

Description: A continent-wide network of constant-effort mist netting stations, including several stations in Pennsylvania. Data collected provides survival and productivity information for many songbird species and can be a useful measurement of temporal patterns. Long-running standardized bird banding monitoring program.

Comments:

Monitoring Need: Track breeding activity and productivity.

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments:

Monitoring Need: Assist with long term population trends.

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Goguen, C. B. 2010. Scarlet Tanager. Pages 182-185 in M. A. Steele, M. C. Brittingham, T. J. Maret, J. F. Merritt, editors. Terrestrial vertebrates of Pennsylvania: a complete guide to species of conservation concern. The Johns Hopkins University Press, Baltimore, Maryland.

Hagenbuch, S., K. Manaras, J. Shallow, K. Sharpless, and M. Snyder. 2011. Birds with silviculture in mind: birder's dozen pocket guide for Vermont foresters. Audubon Vermont and Vermont Department of Forests, Parks, and Recreation, Waterbury, Vermont.

Lambert, J.D., Leonardi, B., Winant, G., Harding, C., Reitsma, L., 2017. Guidelines for managing wood thrush and scarlet tanager habitat in the Northeast and Mid-Atlantic regions. High Branch Conservation Services, Hartland, VT.

Maurer, B. A. and R. C. Whitmore. 1981. Foraging of five bird species in two forests with different vegetation structure. Wilson Bulletin 93:478-490.

Mowbray, T. B. 1999. Scarlet Tanager. Account 479 in A. Poole and F. Gill, editors. The birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Pabian, S. E., and M. C. Brittingham. 2007. Terrestrial liming benefits birds in an acidified forest in the Northeast. Ecological Applications 17:2184-2194.

Pabian, S. E., and M. C. Brittingham. 2011. Soil calcium availability limits forest songbird productivity and density. The Auk 128:441-447.

Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-175 in C. J. Ralph, J. R. Sauer, and S. Droege, editors. Monitoring bird populations by point counts. General Technical Report PSW-GTR-149. USDA Forest Service Pacific Southwest Research Station, Albany, California.

Roberts, C., and C. J. Norment. 1999. Effects of plot size and habitat characteristics on breeding success of Scarlet Tanagers. Auk 116:73-82.

Rodewald, P. G., and M. C. Brittingham. 2004. Stopover habitats of landbirds during fall: Use of edge-dominated and early-successional forests. The Auk 121:1040-1055.

Rosenberg, K. V., J. D. Lowe, and A. A. Dhondt. 1999. Effects of forest fragmentation on breeding tanagers: A continental perspective. Conservation Biology 13:568-583.

Rosenberg, K. V., R. W. Rohrbaugh Jr., S. E. Barker, J. D. Lowe, R. S. Hames, and A. A. Dhondt. 1999. A land manager’s guide to improving habitat for scarlet tanagers and other forest interior birds. The Cornell Lab of Ornithology. Ithaca, New York.

Sabo, S. R., and R. T. Holmes. 1983. Foraging niches and the structure of forest bird communities in contrasting montane habitats. Condor 85:121-138.

Stoleson, S. H., and J. L. Larkin. 2010. Breeding birds of Pennsylvania: forest bird communities. Pages 14-27 in S. K. Majumdar, T. L. Master, M. C. Brittingham, R. M. Ross, R. S. Mulvihill, and J. E. Humman, editors. Avian ecology and conservation: a Pennsylvania focus with national implications. Pennsylvania Academy of Science, Easton, Pennsylvania.

Stutchbury, B. M. 2012. Scarlet tanager. Pages 430-431 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second atlas of breeding birds in Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.

Villard, M. A., M. K. Trzcinski, and G. Merriam. 1999. Fragmentation effects on forest birds: relative influence of woodland cover and configuration on landscape occupancy. Conservation Biology 13:774-783.

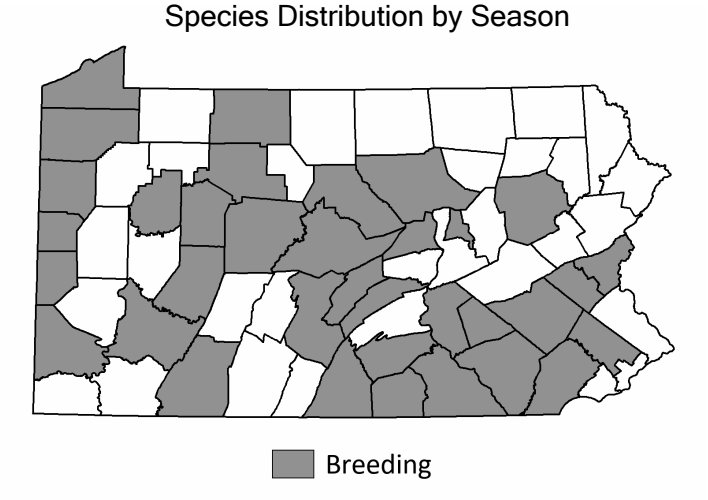
PENNSYLVANIA
WILDLIFE ACTION PLAN

Dickcissel

Spiza americana

Stefan Karkuff *Pennsylvania Game Commission*

J. Dingel, Pennsylvania Game Commission



Conservation Profile

PA 10-Year Conservation Goal: Maintain at least 25 breeding pairs annually in Pennsylvania through 2035.

NatureServe Global Rank: G5

IUCN Red List Designation: Least Concern

IUCN Red List Trend: Stable

Identified Conservation Priority by Established Groups: No

Northeast U.S.RSGCN: Not RSGCN

Federal Listing Status: Not Listed

Feasiblity of Recovering or Sustaining the PA Population: High

SGCN Season: Breeding

State Rank (Season): S1B

State Rank Year: 2024

PA Legal Designation: Endangered

PA Abundance: 1 - 50 individuals

PA Short-term Trend (10-year): Unknown

Cumulative Threat Impact: Very High

Season: Breeding

Specific Habitat Requirements: Old fields, grasslands with medium to high vegetation and moderate litter.

Primary Habitat: Open Upland

Primary Habitat Type: Grasslands

Primary Specific Habitat: Shrubland/grassland

Season: Breeding

Threat Category: Annual and Perennial Non-timber Crops **Threat Impact:** High

Specific Threat: Mowing and haying of grasslands during the bird nesting season

Action Category: Manage plants, animals, fungi, or bacteria

Specific Action: Delay mowing on grasslands and pastures until outside the nesting season.

Objective: Enroll properties in delayed mowing programs (USDA conservation programs, e.g., CREP, CRP, EQIP, CSP) to promote wildlife habitat.

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Acres of land with delayed mowing

Potential Collaborators: Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Section: Northwestern Glaciated Plateau, Pittsburgh Low Plateau, Susquehanna Lowland, Great Valley, Gettysburg-Newark Lowland, Piedmont Lowland, Piedmont Upland, Piedmont Lowland, Piedmont Lowland

Other species likely to benefit from this action: Grassland nesting birds

Season: Breeding

Threat Category: Housing and Urban Areas **Threat Impact:** High

Specific Threat: Development of agricultural landscapes for commercial and residential building reduces available nesting habitat

Action Category: Conservation planning

Specific Action: Focus land preservation and long-term habitat management on landscapes favored by Dickcissels.

Objective: Enroll farms in land preservation agreements (Agland Preservation, USDA conservation programs)

Action Priority: 1-Highest **Action Urgency:** Initiate immediately **Measure:** Number of farms enrolled in preservation agreements

Potential Collaborators: Conservancies & Land Trusts, Local agencies & municipalities, Private Landowners, U.S. Department of Agriculture-Farm Service Agency, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Physiographic Section: Pittsburgh Low Plateau, Northwestern Glaciated Plateau, Great Valley, Gettysburg-Newark Lowland, Piedmont Upland, Piedmont Lowland, Piedmont Lowland, Susquehanna Lowland, Piedmont Lowland, Piedmont Upland

Other species likely to benefit from this action: Grassland nesting birds

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy

Action Category: Conserve specific land or seascapes

Specific Action: Avoid development of high-quality habitat for energy development, including solar and wind.

Objective: Stabilize or increase populations.

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** Stable or increasing populations.

Potential Collaborators: Conservancies & Land Trusts, Non-governmental organizations, Pennsylvania Game Commission, Private Landowners, U.S. Department of Agriculture-Natural Resources Conservation Service

Locations: Statewide

Other species likely to benefit from this action: Grassland species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy

Action Category: Create, amend, or influence legislation, regulation, or codes

Specific Action: Increase ability to enforce existing laws and standards and create new laws and standards where necessary.

Objective: Create laws that mandate avoidance of sensitive and critical habitats areas by energy site developers (solar, and wind).

Action Priority: 2-High **Action Urgency:** Initiate immediately **Measure:** No additional solar arrays or wind turbines in sensitive habitats frequented grassland obligate species.

Potential Collaborators: Conservancies & Land Trusts, Interested Public, Local agencies & municipalities, Non-governmental organizations, Private Landowners, Township Zoning Boards

Locations: Statewide

Other species likely to benefit from this action: Grassland obligate species

Season: Breeding

Threat Category: Renewable Energy **Threat Impact:** Medium

Specific Threat: Agricultural land is being developed for solar energy

Action Category: Outreach, communication and distribution

Specific Action: Encourage mitigation or preservation of land being considered for solar development, preferably in larger habitat blocks.

Objective: Preserve or mitigate land under consideration for solar energy development.

Action Priority: 3-Medium **Action Urgency:** Initiate within 5 years **Measure:** Area preserved or mitigated.

Potential Collaborators: Businesses, Non-governmental organizations

Locations: Statewide

Other species likely to benefit from this action: Grassland nesting species

Season: Breeding

Priority	Need	Partners
1	Determine the best way to manage agricultural fields and reclaimed strip mines for the guild of grassland obligates that currently breed in Pennsylvania (Wentworth 2010).	Non-governmental organizations, Universities & research institutions
2	Monitor stable populations of Dickcissel that persist on reclaimed surface mine grasslands.	Universities & research institutions, Pennsylvania Game Commission

Season: Breeding

Priority	Survey	Partners
2	Grassland Bird Surveys administered by the Pennsylvania Game Commission focused on state game lands	Pennsylvania Game Commission
3	Encourage Pennsylvania's birding community to survey areas of most recent (previous breeding season) Dickcissel observations.	Pennsylvania Game Commission, Private Landowners

Name: Dickcissel surveys based on reported observations.

Lead(s) : Pennsylvania Game Commission

Link: N/A

Description: Follow-up surveys based on reports submitted to eBird, PA Birds Listserve and other sources.

Comments:

Monitoring Need:

Name: North American Breeding Bird Survey

Lead(s) : U.S. Geological Survey

Link: https://www.usgs.gov/centers/eesc/science/north-american-breeding-bird-survey

Description: A long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.

Comments: Note that this species is rare across Pennsylvania and USGS Breeding Bird Surveys may not adequately monitor populations of this species.

Monitoring Need:

Name: Pennsylvania Bird Atlas

Lead(s) : Pennsylvania Game Commission, Hawk Mountain Sanctuary

Link: https://www.pa.gov/agencies/pgc/wildlife/wildlife-viewing/birding/pa-bird-atlas

Description: Statewide bird inventory conducted approximately every 20 years by professional and amateur ornithologists.

Comments:

Monitoring Need: Statewide distribution and abundance of Pennsylvania birds.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, A. L. Zimmerman, and B. R. Euliss. 2002. Effects of management practices on grassland birds: Dickcissel. USGS Northern Prairie Wildlife Research Center. Paper 114. Available from http://digitalcommons.unl.edu/usgsnpwrc/114 (accessed July 2015).

Haffner, C., and D. Gross. 2014. Dickcissel (Spiza americana). Pennsylvania Game Commission, Harrisburg, Pennsylvania. Available from http://www.portal.state.pa.us/portal/server.pt?open=514&objID=1913843&mode=2 (accessed July 2015).

Partners in Flight Databases. Bird Conservancy of the Rockies. Brighton, Colorado. Available from https://pif.birdconservancy.org/ (Accessed January 2025).

Pennsylvania Audubon. 2005. Important Bird Area Conservation Plans. Pennsylvania Audubon Society, Harrisburg, Pennsylvania.

Vickery, P. D., and P. W. Dunwiddie, editors. 1997. Grasslands of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, Massachusetts.

Weidensaul, S. 2012. Dickcissel (Spiza americana). Pages 440-441 in A. M. Wilson, D. W. Brauning, and R. S. Mulvihill, editors. Second Atlas of Breeding Birds in Pennsylvania, Pennsylvania State University Press, University Park, Pennsylvania.

Wentworth, K. 2010. Dickcissel (Spiza americana). Pages 165-167 in M. A. Steele, M. C. Brittingham, T. J. Maret, and J. F. Merritt, editors. Terrestrial Vertebrates of Pennsylvania: A Complete Guide to Species of Conservation Concern. The Johns Hopkins University Press, Baltimore, Maryland.

Wentworth, K. L., M. C. Brittingham, and A. M. Wilson. 2010. Conservation reserve enhancement program fields: Benefits for grassland and shrub-scrub species. Journal of Soil and Water Conservation 65:50-60.

Wilson, A. M., D. W. Brauning, and R. S. Mulvihill, editors. 2012. Second Atlas of Breeding Birds of Pennsylvania. The Pennsylvania State University Press, University Park, Pennsylvania.