Appendix 1.4A-Birds

- Bird Species of Greatest Conservation Need
- Maps: Physiographic Provinces and HUC Watersheds
- Species Accounts (Click species name below or bookmark to navigate to species account)

**BIRDS**

<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tundra Swan</td>
<td>Northern Goshawk</td>
<td>Northern Saw-whet Owl</td>
</tr>
<tr>
<td>American Black Duck</td>
<td>Broad-winged Hawk</td>
<td>Common Nighthawk</td>
</tr>
<tr>
<td>Blue-winged Teal</td>
<td>Golden Eagle</td>
<td>Eastern Whip-poor-will</td>
</tr>
<tr>
<td>Green-winged Teal</td>
<td>King Rail</td>
<td>Chimney Swift</td>
</tr>
<tr>
<td>Lesser Scaup</td>
<td>Virginia Rail</td>
<td>Red-headed Woodpecker</td>
</tr>
<tr>
<td>Long-tailed Duck</td>
<td>Sora</td>
<td>American Kestrel</td>
</tr>
<tr>
<td>Ruffed Grouse</td>
<td>Common Gallinule</td>
<td>Peregrine Falcon</td>
</tr>
<tr>
<td>Pied-billed Grebe</td>
<td>American Coot</td>
<td>Olive-sided Flycatcher</td>
</tr>
<tr>
<td>Horned Grebe</td>
<td>Piping Plover</td>
<td>Yellow-bellied Flycatcher</td>
</tr>
<tr>
<td>Red-necked Grebe</td>
<td>Spotted Sandpiper</td>
<td>Willow Flycatcher</td>
</tr>
<tr>
<td>American Bittern</td>
<td>Upland Sandpiper</td>
<td>Loggerhead Shrike</td>
</tr>
<tr>
<td>Least Bittern</td>
<td>Red Knot</td>
<td>Purple Martin</td>
</tr>
<tr>
<td>Great Egret</td>
<td>Wilson’s Snipe</td>
<td>Bank Swallow</td>
</tr>
<tr>
<td>Black-crowned Night Heron</td>
<td>American Woodcock</td>
<td>Brown Creeper</td>
</tr>
<tr>
<td>Yellow-crowned Night Heron</td>
<td>Black Tern</td>
<td>Winter Wren</td>
</tr>
<tr>
<td>Osprey</td>
<td>Common Tern</td>
<td>Sedge Wren</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>Barn Owl</td>
<td>Marsh Wren</td>
</tr>
<tr>
<td>Northern Harrier</td>
<td>Long-eared Owl</td>
<td>Swainson’s Thrush</td>
</tr>
<tr>
<td>Sharp-shinned Hawk</td>
<td>Short-eared Owl</td>
<td>Wood Thrush</td>
</tr>
</tbody>
</table>
**BIRDS, CONTINUED**

<table>
<thead>
<tr>
<th>Gray Catbird</th>
<th>Blackburnian Warbler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisiana Waterthrush</td>
<td>Blackpoll Warbler</td>
</tr>
<tr>
<td>Northern Waterthrush</td>
<td>Black-throated Blue Warbler</td>
</tr>
<tr>
<td>Golden-winged Warbler</td>
<td>Prairie Warbler</td>
</tr>
<tr>
<td>Blue-winged Warbler</td>
<td>Black-throated Green Warbler</td>
</tr>
<tr>
<td>Black-and-white Warbler</td>
<td>Canada Warbler</td>
</tr>
<tr>
<td>Prothonotary Warbler</td>
<td>Yellow-breasted Chat</td>
</tr>
<tr>
<td>Nashville Warbler</td>
<td>Eastern Towhee</td>
</tr>
<tr>
<td>Kentucky Warbler</td>
<td>Field Sparrow</td>
</tr>
<tr>
<td>Hooded Warbler</td>
<td>Vesper Sparrow</td>
</tr>
<tr>
<td>Cerulean Warbler</td>
<td>Savannah Sparrow</td>
</tr>
<tr>
<td>Grasshopper Sparrow</td>
<td></td>
</tr>
<tr>
<td>Henslow’s Sparrow</td>
<td></td>
</tr>
<tr>
<td>White-throated Sparrow</td>
<td></td>
</tr>
<tr>
<td>Summer Tanager</td>
<td></td>
</tr>
<tr>
<td>Scarlet Tanager</td>
<td></td>
</tr>
<tr>
<td>Dickcissel</td>
<td></td>
</tr>
<tr>
<td>Bobolink</td>
<td></td>
</tr>
<tr>
<td>Eastern Meadowlark</td>
<td></td>
</tr>
<tr>
<td>Rusty Blackbird</td>
<td></td>
</tr>
<tr>
<td>Red Crossbill</td>
<td></td>
</tr>
<tr>
<td>Pine Siskin</td>
<td></td>
</tr>
</tbody>
</table>

The following Physiographic Province and HUC Watershed maps are presented here for reference with conservation actions identified in the species accounts. Species account authors identified appropriate Physiographic Provinces or HUC Watershed (Level 4, 6, 8, 10, or statewide) for specific conservation actions to address identified threats. HUC watersheds used in this document were developed from the Watershed Boundary Dataset, a joint project of the U.S. Dept. of Agriculture-Natural Resources Conservation Service, the U.S. Geological Survey, and the Environmental Protection Agency.

2 | Appendix 1.4-Birds
Pennsylvania HUC6 and HUC8 Watersheds
Tundra Swan
*Cygnus columbianus*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Not NE Regional SGCN</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Conservation Goal:</td>
<td>Maintain Tundra Swan peak migration counts in the southern Lebanon / northern Lancaster County area above the Global Important Bird Area threshold at least 7 times in the next 10 years.</td>
</tr>
</tbody>
</table>

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>(M) Agricultural</td>
<td>Lakes</td>
</tr>
</tbody>
</table>

Specific Habitat Requirements:
Combination of open water areas (lakes and slow-moving portions of large rivers) for secure roosting with substantial amounts of large agricultural fields (especially harvested corn, harvested soybeans, and winter wheat) for feeding within 5-10 miles of roost sites.

B = Breeding, M = Migration, W = Wintering
### Tundra Swan

**Cygnus columbianus**

#### THREATS AND ACTIONS

| Specific Threat | Loss of agricultural field feeding habitat via conversion to residential and commercial development. |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>By 2020, increase amount of permanently protected farmland in the Middle Creek Initiative Focus Area from current 1,348 acres to 5,000 acres.</td>
<td>Acreage of protected farmland in the Middle Creek Initiative Focus Area.</td>
</tr>
</tbody>
</table>

| Action Location | Physiographic Province: Piedmont, Ridge and Valley |
| Associated Species | Canada Goose, Snow Goose, Mallard |
### Tundra Swan

**Cygnus columbianus**

#### THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Direct mortality/interference with flight paths and access to feeding or roosting habitat sites due to construction of elevated structures such as utility lines.

**Season:** Migration

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>By 2020, create a database of important tundra swan roosting and feeding areas and incorporate in environmental review process for construction of elevated structures.</td>
<td>1) Creation of database of important swan roosting and feeding areas; 2) Incorporation of this database into environmental review process; 3) Changes in corridor-related aspects of current swan use sites and number of swans using these sites.</td>
<td>Creation of database and use in environmental review are a yes/no evaluation. Habitat and swan use changes should be tracked annually through existing and/or newly established monitoring programs identified elsewhere in this account.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley, Central Lowland
### Tundra Swan

**Cygnus columbianus**

#### THREATS AND ACTIONS

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Change in agricultural practices making current high-quality feeding habitat unattractive to swans. |
| Season: | Migration |

**THREATS**

- Change in agricultural practices making current high-quality feeding habitat unattractive to swans.

**ACTIONS**

- **TRACS Action 1.0**
  - Coordination and Administration
  - Annually monitor percent composition of all crop types within the Middle Creek Initiative Focus Area. If significant changes toward unsuitable crops for swan feeding occur, provide financial incentives to agricultural producers to encourage crop rotations and harvest techniques that provide stable to increased levels of food resources for swans.

- **Objective**
  - By 2017, develop a survey program to annually monitor percent composition of all crop types within the Middle Creek Initiative Focus Area. By 2018, identify a procedure to target financial incentives to agricultural producers to encourage crop rotations and harvest techniques that provide stable to increased levels of food resources for swans if needed.

- **Measure**
  - Creation of habitat survey and financial incentive procedure.

- **Monitoring**
  - Measure percentage of agricultural fields in southern Lebanon and northern Lancaster Counties that provide suitable feeding habitat (harvested corn, harvested soybeans, winter wheat) for tundra swans. Alternatively, conduct research and monitoring to estimate amount of metabolizable energy provided by agricultural habitats in this region.

- **Priority**
  - 3

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Canada Goose, Snow Goose, Mallard

### RESEARCH NEEDS

1. **Migration**
   - Collect and compare quantitative site- and landscape-level habitat data from swan use and nonuse sites to clarify the most important components of habitat for migrating swans.

2. **Migration**
   - Examine predicted effects of various climate change scenarios on wetland and agricultural habitats in the Lebanon / Lancaster County area to identify potential long-range concerns and appropriate mitigation approaches.

3. **Migration**
   - Develop methodology / models to estimate metabolizable energy available to tundra swans in the Lebanon / Lancaster County area and measure effects of changes in land use or agricultural practices on swan food resources and bioenergetics.
SURVEY NEEDS

1. Migration- Development of a statistically designed, consistently conducted monitoring program (aerial and / or ground-based) in the broader area around Middle Creek Wildlife Management Area to track progress toward conservation target and maintain an up-to-date registry of roosting and feeding locations most important to migrating swans.

2. Migration- Development of a procedure to achieve regular and standardized compilation of data collected through non-swan-specific monitoring programs (e.g. eBird) on numbers and locations of migrating swans.

3. Migration- Development of a standardized survey of roosting and feeding habitat quantity and characteristics in the southern Lebanon / northern Lancaster County area.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Population Tundra Swan Fall Productivity Survey</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="http://www.fws.gov/migratorybirds/Newreportspublications/PopulationStatus.html">http://www.fws.gov/migratorybirds/Newreportspublications/PopulationStatus.html</a></td>
<td>Annual (December) survey of percentage of juveniles in the population and the number of juveniles per family group during latter stages of fall migration or early stages of winter residency.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Middle Creek Wildlife Management Area waterfowl migration updates</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621427&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621427&amp;mode=2</a></td>
<td>Early morning estimate of number of tundra swans roosting on Middle Creek Lake, obtained approximately daily (at minimum 2-3 times per week) from early February through early April.</td>
</tr>
</tbody>
</table>
**American Black Duck**
*Anas rubripes*

**Photo: Joe Kosack**

### Conservation Profile

**Conservation Goal:**
Due to the lack of identified state-level goals from the management community and the differential seasonal feasibility of maintaining populations, the target for this species should be to maintain current wetland quality and acreage to support Black Ducks and other wetland dependent Species of Greatest Conservation Need.

### HABITAT ASSOCIATIONS

#### Primary
- **Macrogoup:** (B, M, W) Lakes
- **Habitat:** (B, M) Eutrophic, Medium Alkalinity Lake
  - (W) Laurentian-Acadian Freshwater Marsh

#### Secondary
- **Macrogoup:** (B, M, W) Lakes
- **Habitat:** (B, M, W) Hypereutrophic, High Alkalinity Lake

**Specific Habitat Requirements:**
- (B) Palustrine shallow wetlands in forested regions, scrub/shrub, forested wetlands, emergent marshes, and beaver flowages.
- (M) Palustrine and lacustrine wetlands.
- (W) Lacustrine and riverine habitats providing open water.

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**Global Rank**
- G5

**State Rank**
- S3B, S3N (M), S4N (W)

**IUCN Red List**
- LC Least Concern

**Northeast Region**
- Very High Concern / Low Responsibility

**Federal Status**
- Not Listed

**PA Legal Status**
- Protected

**PA Abundance**
- 1600

**PA Short-Term Trend (10 year)**
- (B) Unknown; (M) Unknown; (W) Decline of 11 - 40%
### American Black Duck

**Anas rubripes**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Protect nesting wetland habitats from development. Reduce annual losses to &lt; 100 acres in the Appalachian Plateau.</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associated Species:</strong> Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot</td>
<td></td>
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</tr>
</tbody>
</table>

#### Specific Threat:
Loss of wetland acreage and function to development

#### Season:
Breeding

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<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Identify priority forested wetland habitats for breeding.</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associated Species:</strong> Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot</td>
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<td></td>
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</tr>
</tbody>
</table>

#### Specific Threat:
Fragmentation of forested wetland habitats used for breeding.

#### Season:
Breeding
### American Black Duck (Anas rubripes)

#### THREATS AND ACTIONS

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Season:** Breeding

**Specific Threat:** Disturbance to breeding black ducks from human activities

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Identify priority wetlands through NWI mapping, Breeding Bird Atlas, eBird, etc. and then protect 20% from disturbance during breeding season.</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping; monitoring of breeding population</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot

**IUCN Threat:** 7.0 Natural System Modifications

**Season:** Breeding

**Specific Threat:** Draining, dredging, filling, leveling, and flooding of wetlands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Monitor and manipulate water levels in managed wetlands for optimal breeding conditions, e.g., food resources.</td>
<td>Number of wetland acres protected and under management</td>
<td>Acres protected from draining/filling and managed for maximum production of food resources</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot
### American Black Duck  
*Anas rubripes*

#### Threats and Actions

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Increased drought could cause wetlands to dry out, making them unsuitable for nesting. Alternatively, increases in extreme weather (precipitation) events could cause nest flooding.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Hybridization and competition with mallards

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Identify proportion of mallard x black duck hybrids in the harvest and of banded samples using morphological and (where practicable) genetic techniques.</td>
<td>Proportion of mallard x black duck hybrids</td>
<td>Proportion of mallard x black duck hybrids</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus
**American Black Duck**

**Anas rubripes**

## THREATS AND ACTIONS

### Specific Threat: Bioaccumulation of pesticides and contaminants (e.g. mercury and carbamate pesticides).

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 101.0</strong></td>
<td>Sample breeding black ducks for pesticide and contaminant levels to better understand the impacts to reproductive success and survivorship.</td>
<td>Number of black ducks sampled</td>
<td>Assess contaminant levels in black ducks.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

### Specific Threat: Loss of wetland acreage and function to development. Increased disturbance during migration resulting in reduced survival.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong></td>
<td>Protect migration wetland habitats from development. Reduce annual losses to &lt; 100 acres in the Appalachian Plateau.</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot

---

**Season:** Breeding

**IUCN Threat:** 9.0 Pollution

**Season:** Migration

**IUCN Threat:** 1.0 Residential and Commercial Development

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot
## American Black Duck

### Anas rubripes

#### THREATS AND ACTIONS

| IUCN Threat: | 3.0 Energy Production and Mining |
| Specific Threat: | Loss of wetland acreage and function to development. |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Protect migration wetland habitats from development. Reduce annual losses to &lt; 100 acres per year</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping</td>
</tr>
</tbody>
</table>

- Designate priority migration wetland habitats for protection from energy development

| Action Location: | Physiographic Province: Statewide |
| Associated Species: | Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot |

**Migration**

| IUCN Threat: | 4.0 Transportation and Service Corridors |
| Specific Threat: | Loss of wetland acreage and function to development. |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Protect migration wetland habitats from development. Reduce annual losses to &lt; 100 acres per year</td>
<td>Number of wetland acres protected</td>
<td>Acres protected from loss or degradation through NWI mapping</td>
</tr>
</tbody>
</table>

- Designate priority migration wetland habitats for protection from development

| Action Location: | Physiographic Province: Statewide |
| Associated Species: | Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot |
### THREATS AND ACTIONS

#### American Black Duck

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Draining, dredging, filling, leveling, and flooding of wetlands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Monitor and manipulate water levels in managed wetlands to create food and resting habitat during migration.</td>
<td>Number of wetland acres protected and under management</td>
<td>Acres protected from draining/filling and managed for maximum production of food resources</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Wetland habitat degradation by invasive exotic species (e.g. Phragmites, reed canary grass, purple loosestrife).

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Identify key migration habitat and conduct treatments annually</td>
<td>acres of migration habitat with reduced invasives.</td>
<td>1-presence and abundance of invasive plants, 2-invasive plant surveys/assessment</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, Sora, King Rail

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
### American Black Duck

#### Anas rubripes

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Increased drought could cause wetlands to dry out, reducing food resources for migration.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0  Planning</td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Green-winged Teal, Blue-winged Teal, Common Gallinule, American Coot

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Bioaccumulation of pesticides and contaminants (e.g. mercury and carbamate pesticides).

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0  Species Management</td>
<td>Sample black ducks during migration for pesticide and contaminant levels to better understand the impacts to reproductive success and survivorship.</td>
<td>Number of black ducks sampled.</td>
<td>Assess contaminant levels in black ducks.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide
### American Black Duck

**Anas rubripes**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>Human Intrusions and Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Human disturbance resulting in reduced fitness and survivorship.</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Winter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Develop regulations limiting human disturbance and develop educational program</td>
<td>Number of acres of wintering habitat protected</td>
<td>Number of black ducks in wintering habitats</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Lesser Scaup, Bald Eagle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>Invasive and Other Problematic Species and Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Hybridization and resource competition with mallards.</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Winter</td>
</tr>
</tbody>
</table>

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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
<td>Identify proportion of mallard x black duck hybrids in the harvest and of banded samples using morphological and (where practicable) genetic techniques.</td>
<td>Proportion of mallard x black duck hybrids</td>
<td>Proportion of mallard x black duck hybrids</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Mallards</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### RESEARCH NEEDS

1. **Breeding** - At the flyway and regional scales, support research to develop more accurate population and habitat models for breeding black ducks.

1. **Migration** - None

1. **Wintering** - At the flyway and regional scales, support research to determine carrying capacity of habitats used by wintering black ducks.
SURVEY NEEDS

1. Breeding- Conduct comprehensive assessment of wetland habitats and their quality to support black ducks and other wetland WAP species (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).

1. Migration- 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 migrating black ducks.

1. Wintering- Refine Atlantic Flyway Midwinter Waterfowl Survey to allow for continued monitoring of regional and state trends in wintering black ducks while obtaining data more efficiently and safely for higher-priority species in the survey.

2. Breeding- 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 black ducks.

2. Wintering- 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 wintering black ducks.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Flyway Breeding Waterfowl</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="https://migbirdapps.fws.gov/mbdc/databases/afbws/afbws.asp?opt=afbws">https://migbirdapps.fws.gov/mbdc/databases/afbws/afbws.asp?opt=afbws</a></td>
<td>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.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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</table>
## American Black Duck

### Anas rubripes

## MONITORING PROGRAMS

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<th>Program Name</th>
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</thead>
</table>
**Blue-winged Teal**

*Anas discors*

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**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S1B
- **IUCN Red List**: VU Vulnerable
- **Northeast Region**: Not NE Regional SGCN
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (B) Unknown

- **Conservation Goal:**
  Stabilize the historically declining breeding Blue-winged Teal population size and geographic distribution within Pennsylvania as measured by the periodic Pennsylvania Atlas of Breeding Birds.

---

**HABITAT ASSOCIATIONS**

- **Primary**
  - **Habitat**: Hypereutrophic, Medium Alkalinity Lake
  - **Macrogoup**: Lakes

- **Secondary**
  - **Habitat**: Hypereutrophic, High Alkalinity Lake
  - **Macrogoup**: Lakes

- **Specific Habitat Requirements:**
  Wetlands, particularly emergent marshes, vernal wetlands, lakes and ponds with emergent aquatic vegetation. Shallow wetlands are preferred, and teal are often associated with wetlands of high quality. Agricultural habitats, especially grasslands, are used for nesting.

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*Photo: Jacob Dingel*

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*PENNSYLVANIA GAME COMMISSION*

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*Published September 2015*
# Blue-winged Teal

## Anas discors

### THREATS AND ACTIONS

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Loss or conversion of wetland and associated upland grassland acreage and function to development. |

<table>
<thead>
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<th>Action</th>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect quality wetland and associated upland habitat from development and reduce annual losses.</td>
<td>Number of wetland and grassland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping, grassland acreage protected.</td>
<td>1</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: American Black Duck, Green-winged Teal, Common Gallinule, American Coot

| IUCN Threat: | 6.0 Human Intrusions and Disturbance |
| Specific Threat: | High frequency hay mowing cycles during breeding period that exacerbates nest losses. |

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<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Identify priority agricultural wetland and grassland habitats used by breeding and nesting blue-winged teal</td>
<td>Number of wetland and grassland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping, grassland acreage protected.</td>
<td>1</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: American Black Duck, Green-winged Teal, Common Gallinule, American Coot
### Blue-winged Teal

**Anas discors**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>7.0 Natural System Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Agriculture policies that encourage intensive row-cropping have reduced grasslands required for nesting habitats.</td>
</tr>
</tbody>
</table>

**Season:** Breeding

<table>
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<td>Action Location:</td>
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<tr>
<td>Associated Species:</td>
<td>American Black Duck, Green-winged Teal, Common Gallinule, American Coot</td>
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</table>

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>3.0 Energy Production and Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Loss or conversion of wetland and associated upland grassland acreage and function to development.</td>
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**Season:** Breeding

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<td>Identify priority agricultural wetland and grassland habitats used by breeding and nesting blue-winged teal</td>
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<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
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<td></td>
<td></td>
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<tr>
<td>Associated Species:</td>
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**Blue-winged Teal**  
*Anas discors*

## Threats and Actions

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Provide incentives to control invasive species on breeding habitats and conduct treatments annually</td>
<td>Number of wetland and grassland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping, grassland acreage protected.</td>
</tr>
<tr>
<td><strong>Specific Threat:</strong> Wetland habitat degradation by invasive exotic species (e.g. Phragmites, reed canary grass, purple loosestrife).</td>
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<td></td>
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<td>Action Location: Physiographic Province: Statewide</td>
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<tbody>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
<td>Determine the impact of pesticide use and contaminant bioaccumulation upon aquatic invertebrates.</td>
<td>Number of ducks sampled; number testing positive/negative.</td>
<td>Assess contaminant levels in blue-winged teal.</td>
</tr>
<tr>
<td><strong>Specific Threat:</strong> Bioaccumulation of pesticides and contaminants (e.g. mercury and carbamate pesticides).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location: Physiographic Province: Statewide</td>
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</tr>
</tbody>
</table>

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**IUCN Threat:** 9.0 Pollution

**Season:** Breeding
Blue-winged Teal

**Anas discors**

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Increased drought frequency could cause wetlands to dry out, making them unsuitable for nesting. Alternatively, increases in extreme weather (precipitation) events could cause nest flooding.

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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Develop a statewide climate change mitigation strategy for wetland dependent wildlife.</td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
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**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Green-winged Teal, Common Gallinule, American Coot, American Bittern, Least Bittern

**RESEARCH NEEDS**

1. Breeding- 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.

2. Breeding- Develop best management practices for nesting blue-winged teal and grassland birds in agricultural landscapes.

**SURVEY NEEDS**

1. Breeding- Conduct comprehensive assessment of wetland and grassland habitats and their quality to support blue-winged teal and other wetland and grassland dependent WAP species (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).
## MONITORING PROGRAMS

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</table>
Green-winged Teal
*Anas crecca*

### Conservation Profile

**Conservation Goal:**
Maintain presence as a breeding species by maintaining the current quality and acreage of the wetlands, especially in the northwestern part of the state, on which this and other Species of Greatest Conservation Need rely.

### Habitat Associations

**Primary**
- Emergent Marsh

**Secondary**
- Lakes

**Habitat**
- Laurentian-Acadian Freshwater Marsh
- Mesotrophic, Medium Alkalinity Lake

**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.
### Green-winged Teal

#### Anas crecca

**Threats and Actions**

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>1.0 Residential and Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Loss of wetland acreage and/or loss of function of wetland complexes.</td>
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</tbody>
</table>

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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect quality wetland habitat from development and reduce annual wetland losses.</td>
<td>Number of wetland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot

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**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Loss of wetlands; fragmentation of forested wetland habitats used for breeding.

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<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Identify and protect priority forested wetland habitats used by breeding and nesting Green-winged Teal</td>
<td>Number of wetland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot
**Green-winged Teal**

### Anas crecca

#### THREATS AND ACTIONS

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Human disturbance during breeding, nesting, and brood rearing.

**Season:** Breeding

<table>
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<tbody>
<tr>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Identify priority wetlands through NWI mapping, then place all or a certain percentage of each wetland under protection as a propagation area.</td>
<td>Number of wetland acres protected.</td>
<td>Acres protected from loss or degradation through NWI mapping.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot

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**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Destruction of wetland systems through draining, dredging, or filling of wetlands, and disruption of flooding regimes.

**Season:** Breeding

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Monitor water levels in managed wetlands for optimal conditions.</td>
<td>Number of wetland acres protected and under management.</td>
<td>Acres protected from draining, dredging, or filling and managed for maximum production of foraging and nesting habitat.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot
## THREATS AND ACTIONS

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Extreme weather events as a result of climate change could reduce availability or suitability of breeding and nesting sites.

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<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania's major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxi, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
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**Season:** Breeding

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot, American Bittern, Least Bittern

---

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Bioaccumulation of pesticides, contaminants, and heavy metals.

<table>
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<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Sample breeding Green-winged Teal for pesticide and contaminant levels to better understand the impacts to reproductive success and survivorship.</td>
<td>Number of ducks sampled; number testing positive/negative.</td>
<td>Assess contaminant levels in American green-winged teal.</td>
<td>3</td>
</tr>
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**Action Location:** Physiographic Province: Statewide

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**Action Location:** Physiographic Province: Statewide

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
# Green-winged Teal

### Anas crecca

## RESEARCH NEEDS

1. Breeding: None

## SURVEY NEEDS

1. Breeding: 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.

## MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Flyway Breeding Waterfowl Survey</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="https://migbirdapps.fws.gov/mbdc/databases/afbwsl/afbws.asp?opt=afbws">https://migbirdapps.fws.gov/mbdc/databases/afbwsl/afbws.asp?opt=afbws</a></td>
<td>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.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
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<tr>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>USFWS Harvest Information Program</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="http://www.fws.gov/hip/">http://www.fws.gov/hip/</a></td>
<td>Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.</td>
</tr>
</tbody>
</table>
Lesser Scaup
Aythya affinis

Photo: Jacob Dingel

CONSERVATION PROFILE

Conservation Goal:
Maintain historical distribution and abundance of migrating Lesser Scaup in Pennsylvania and particularly on Lake Erie and Presque Isle Bay as measured by migration surveys conducted at Presque Isle.

HABITAT ASSOCIATIONS

Primary
(M) Lake Erie

Secondary
(M) Eutrophic, Medium Alkalinity Lake

Specific Habitat Requirements:
Large, deep waterbodies providing diverse submerged aquatic vegetation and abundant aquatic invertebrate prey. Lake Erie is believed to be the only portion of Pennsylvania providing adequate habitat to support a significant proportion of the species' population, although scaup also occasionally occur at other locations (on lakes and large rivers) throughout the state.
## Lesser Scaup

**Aythya affinis**

### Threats and Actions

#### Specific Threat:
Fragmentation of migratory paths and lake habitats used for feeding and resting.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie</td>
<td>Creation of risk model for migrating scaup</td>
<td>Yes/no evaluation of whether risk model is completed</td>
</tr>
</tbody>
</table>

Work cooperatively with partners to develop models of high- and low-risk areas for wind turbine placement based on species distribution data during migration. This will provide a needed baseline to pursue additional future actions that will avoid and mitigate impacts.

**Action Location:** Physiographic Province: Central Lowland

#### Specific Threat:
Wetland habitat degradation by invasive exotic species (e.g. Phragmites, reed canary grass, purple loosestrife); replacement of high-quality invertebrate food sources by lower-quality invasive species.

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<tbody>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie</td>
<td>Food availability for migrating scaup</td>
<td>Yes / no evaluation of whether risk model is completed</td>
</tr>
</tbody>
</table>

Monitor aquatic invasive species, use by scaup and functional ecological relationships that impact scaup.

**Action Location:** Physiographic Province: Central Lowland
## THREATS AND ACTIONS

### Specific Threat:
Bioaccumulation of pesticides and contaminants.

<table>
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<th>Action</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Sample migrating lesser scaup for pesticide and contaminant levels to better understand the impacts to post-breeding survival and future reproductive success.</td>
<td>Number of ducks sampled; number testing positive/negative.</td>
<td>Assessment of contaminant levels.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

### RESEARCH NEEDS

1. **Migration** - Examine existing data sources (Lake Erie migration surveys, Christmas Bird Count, eBird) to determine if they provide adequate data quantity/quality to monitor trends in the number of scaup migrating through Pennsylvania.

2. **Migration** - Monitor wind-energy development planning and implementation in relation to established scaup habitats on Lake Erie.

3. **Migration** - Evaluate invasive aquatic species composition in Lake Erie (vegetation, invertebrates, and fish) and potential impacts upon migration food availability for lesser scaup.

### SURVEY NEEDS

1. **Migration** - Compile historical fall scaup migration abundance records from Gerald MacWilliams to determine abundance patterns and if future coordination of efforts are warranted or possible.

2. **Migration** - Participate with coordinated Great Lakes waterbird surveys (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).
<table>
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<th>Program Name</th>
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<tbody>
<tr>
<td>Gerald MacWilliams Lake Erie fall migration survey</td>
<td>Gerald MacWilliams</td>
<td></td>
<td>Daily bird count at Presque Isle from Mid-September through December.</td>
</tr>
<tr>
<td>National Audubon Society Christmas Bird Counts</td>
<td>National Audubon Society</td>
<td><a href="http://birds.audubon.org/christmas-bird-count">http://birds.audubon.org/christmas-bird-count</a></td>
<td>Since 1900, this is an annual winter survey of more than 2,300 count circles worldwide. The longest running Citizen Science survey in the world, Christmas Bird Count provides critical data on population trends.</td>
</tr>
<tr>
<td>USFWS Harvest Information Program</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="http://www.fws.gov/hip/">http://www.fws.gov/hip/</a></td>
<td>Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.</td>
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</tbody>
</table>
**Long-tailed Duck**
*Clangula hyemalis*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4N (M), S4N (W)
- **IUCN Red List**: VU Vulnerable
- **Northeast Region**: Not NE Regional SGCN
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (M) Unknown; (W) Increase of 11 - 25%

**Conservation Goal:**
Identify or develop statistically reliable metric(s) to monitor population trends of migrating and wintering Long-Tailed Ducks in Pennsylvania (especially Lake Erie), and maintain stable or increasing trend in the metric(s).

**HABITAT ASSOCIATIONS**

- **Primary**
  - (M, W) Lakes
- **Secondary**
  - (M, W) Lake Erie

**Specific Habitat Requirements:**
Large, deep waterbodies (both freshwater and marine) providing diverse and abundant invertebrate prey. Lake Erie is believed to be the only portion of Pennsylvania providing adequate habitat to support a significant proportion of the species’ population, although migrating and wintering Long-Tailed Ducks also occasionally occur at other locations (on lakes and large rivers) throughout the state.

B = Breeding, M = Migration, W = Wintering
### Long-tailed Duck (Clangula hyemalis)

#### Threats and Actions

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Current levels of sport harvest may be too high.

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<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>1) By 2016, complete analyses of Long-Tailed Duck harvest potential. 2) By 2017-2018 harvest regulations cycle, implement harvest restrictions (if necessary) to maintain Long-Tailed Duck realized harvest at or below the harvest potential.</td>
<td>1) Calculation of harvest potential; 2) Harvest levels.</td>
<td>1) Yes / no evaluation of whether harvest potential analysis is completed. 2) Harvest levels to be monitored through U.S. Fish and Wildlife Service's Harvest Information Program and Parts Collection Survey.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Direct mortality from disease, especially Type E avian botulism.

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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>During the 2015-2025 period, reduce the frequency, length, and extent of botulism outbreaks in the Lower Great Lakes from the 2005-2014 averages.</td>
<td>Number, temporal extent, and total mortalities recorded for avian botulism outbreaks.</td>
<td>In cooperation with partner agencies, annually enumerate number of botulism outbreaks, temporal length of all outbreaks, and total individuals affected (Long-Tailed Ducks and other species).</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Common Loon, Red-breasted Merganser, Lesser Scaup, lake sturgeon
## Long-tailed Duck

**Clangula hyemalis**

### THREATS AND ACTIONS

#### IUCN Threat: 3.0  Energy Production and Mining

**Specific Threat:** Construction of offshore wind turbines in Lake Erie may reduce foraging habitat availability, create barriers to movement, and cause direct mortality.

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<tr>
<td>TRACS Action 3.0  Data Collection and Analysis</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie.</td>
<td>Creation of risk model for migrating Long-Tailed Ducks.</td>
<td>Yes / no evaluation of whether risk model is completed.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

#### IUCN Threat: 9.0  Pollution

**Specific Threat:** Direct mortality from oil spills.

<table>
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<td>TRACS Action 3.0  Data Collection and Analysis</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie.</td>
<td>Creation of risk model for migrating Long-Tailed Ducks.</td>
<td>Yes / no evaluation of whether risk model is completed.</td>
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**Action Location:** Physiographic Province: Central Lowland
## Long-tailed Duck

### Clangula hyemalis

#### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Construction of offshore wind turbines in Lake Erie may reduce foraging habitat availability, create barriers to movement, and cause direct mortality.

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<tr>
<td><strong>TRACS Action 3.0</strong> Data Collection and Analysis</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie.</td>
<td>Creation of risk model for wintering Long-Tailed Ducks.</td>
<td>Yes / no evaluation of whether risk model is completed.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Season:** Winter

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Direct mortality from oil spills.

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<tr>
<td><strong>TRACS Action 3.0</strong> Data Collection and Analysis</td>
<td>By 2020, complete habitat model for Pennsylvania portion of Lake Erie.</td>
<td>Creation of risk model for wintering Long-Tailed Ducks.</td>
<td>Yes / no evaluation of whether risk model is completed.</td>
<td>2</td>
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**Action Location:** Physiographic Province: Central Lowland

**Season:** Winter

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### THREATS AND ACTIONS

**Long-tailed Duck**

*Clangula hyemalis*

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Starvation mortality in severe winters when extensive ice cover on the Great Lakes reduces or eliminates access to feeding areas.

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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>During the 2015-2014 period, maintain 1,000 ha of open water in Erie and Crawford Counties during winter months.</td>
<td>Acreage of open water maintained.</td>
<td>Bi-weekly during the months of December through March, use remote sensing to assess the amount of open water available in Erie and Crawford Counties.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** All waterfowl, Bald Eagle

### RESEARCH NEEDS

1. **Migration-** Examine existing data sources (e.g. eBird) to determine if they provide adequate data quantity / quality to monitor trends in the number of Long-Tailed Ducks migrating through Pennsylvania.

2. **Wintering-** Examine existing data sources (e.g. Christmas Bird Count, eBird) to determine if they provide adequate data quantity / quality to monitor trends in the number of Long-Tailed Ducks wintering in Pennsylvania.

3. **Migration-** Examine habitat use and selection of Long-Tailed Ducks migrating through Pennsylvania.

4. **Wintering-** Examine habitat use and selection of Long-Tailed Ducks wintering in Pennsylvania.

5. **Migration-** Determine breeding ground affiliations of Long-Tailed Ducks migrating through Pennsylvania.

6. **Wintering-** Determine breeding ground affiliations of Long-Tailed Ducks wintering in Pennsylvania.
SURVEY NEEDS

1. Migration- 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 migrating long-tailed ducks.


MONITORING PROGRAMS

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<tr>
<th>Program Name</th>
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<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Great Lakes Pelagic Bird Surveys</td>
<td>Great Lakes Commission</td>
<td><a href="http://glc.org/">http://glc.org/</a></td>
<td>Aerial transect surveys completed during fall and spring migration periods, and mid-winter as practicable.</td>
</tr>
<tr>
<td>USFWS Harvest Information Program</td>
<td>U.S. Fish &amp; Wildlife Service</td>
<td><a href="http://www.fws.gov/hip/">http://www.fws.gov/hip/</a></td>
<td>Annual survey of migratory game bird license purchasers that provides hunter participation and harvest data for waterfowl and webless migratory game birds.</td>
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</table>
Ruffed Grouse

*Bonasa umbellus*

**CONSERVATION PROFILE**

**Global Rank**  
G5

**State Rank**  
S4B, S3N (W)

**IUCN Red List**  
LC Least Concern

**Northeast Region**  
High Concern / Low Responsibility

**Federal Status**  
Not Listed

**PA Legal Status**  
Protected

**PA Abundance**  
Unknown

**PA Short-Term Trend (10 year)**  
(B, W) Relatively Stable  
(<=10% change)

**Conservation Goal:**

Increase populations to 1980 levels as stated in the Pennsylvania Ruffed Grouse Management Plan (Williams et al. 2011) to reverse long-term declines in this species (see Wilson et al. 2012).

**HABITAT ASSOCIATIONS**

**Primary**

- **Macrogroup**  
  (B) Northern Hardwood & Conifer
  (W) Central Oak-Pine

- **Habitat**  
  (B) Appalachian (Hemlock)-Northern Hardwood Forest
  (W) Northeastern Interior Dry-Mesic Oak Forest

**Secondary**

**Specific Habitat Requirements:**

- (B, W) Mosaic of age classes within a forested landscape, with early succession forest as 12-15% of total.
- (B) Peak use by drummers occurs at years 6-18 of regrowth. Low moist bottomlands with herbaceous cover, as well as coarse woody debris, important as brood habitat.
- (W) High quality, native food and cover species within close proximity to one another. Conifers may provide important thermal cover from winter rain and ice. Diverse and complex native forest structure is preferred over heavily managed or thinned parcels.

*B = Breeding, M = Migration, W = Wintering*
### THREATS AND ACTIONS

**Ruffed Grouse**

**Bonasa umbellus**

#### IUCN Threat: 7.0 Natural System Modifications

**Specific Threat:** Young forest acreage is below the 12-15% of forested acreage needed to maintain grouse populations, and does not occur in the distribution across the landscape needed to support grouse dispersal and colonization. Where private landowners are undertaking active forest management, it is often not appropriate for long term habitat quality.

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<th>Action</th>
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<tbody>
<tr>
<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>By 2025, reverse trend of % young forest on the landscape from declining to increasing.</td>
<td>% young forest (seedling / sapling) forest cover as measured by USFS, DCNR, and PGC forest inventory programs</td>
<td>Monitor trends in proportion of young forest as measured by forest inventory programs conducted by U.S. Forest Service, PA Department of Conservation and Natural Resources, and Pennsylvania Game Commission.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

#### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** West Nile virus may have affected and continue to suppress population recovery; invasive plants impact habitat quality.

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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Conduct Challenge Trial of Ruffed Grouse to WNV. Collect hunter-harvested samples to assess statewide impact. Review current seasons and bag limits based on this new information. Continue to prioritize invasive species control efforts for highly-negative species (buckthorn, stilt grass, tree of heaven, etc.).</td>
<td>lab study completed; # hunter harvested samples; # invasive control projects</td>
<td>Identify how new disease information has informed season structure and development of a harvest framework. Monitor hunter flush rates in good habitat and correlate with WNV Infectivity Index for PA.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

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49| Appendix 1.4-Birds

PENNSYLVANIA FISH & BOAT COMMISSION

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# Ruffed Grouse

**Bonasa umbellus**

## THREATS AND ACTIONS

### IUCN Threat: 1.0 Residential and Commercial Development

### Specific Threat: Feral and domestic pets in habitats surrounding human development likely have a negative impact on this ground nesting species.

<table>
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<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Develop and disseminate education programs.</td>
<td># programs developed; # public education events provided; # people reached</td>
<td>Pre- and post-testing of public event audiences. Human dimensions surveys on public's awareness of dog/cat impacts on ground nesting wildlife and attitudes toward active forestry.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

### IUCN Threat: 3.0 Energy Production and Mining

### Specific Threat: Energy development sites fragment forest habitat and introduce invasive species.

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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Incorporate forest fragmentation concerns into energy development planning.</td>
<td># plans developed; # operators contacted; # cooperative agreements</td>
<td>Project mapping that reflects habitat fragmentation mitigation concerns.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

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### Ruffed Grouse

**Bonasa umbellus**

#### THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Access roads for energy development fragment forest habitat.

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Incorporate forest fragmentation concerns into energy development planning.</td>
<td># plans developed; # operators contacted; # cooperative agreements</td>
<td>Project mapping that reflects habitat fragmentation mitigation concerns.</td>
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</table>

Cluster transportation corridors on the landscape to limit the footprint of forest fragmentation. Create wide borders of young forest parallel to the edges of transportation corridors (or interspersed perpendicular to the transport corridor like branches off the main line) to convert the fragmentation created by energy corridors into a useful habitat matrix. Replace hard edges with wide borders of high quality young forest.

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Acid deposition leads to reduced calcium availability in diet.

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Identify management areas with higher calcium levels and high soil buffering capacity when establishing grouse management activities.</td>
<td># sites identified; # established sites with Calcium analysis conducted</td>
<td>Project planning that reflects Calcium profile, soil buffering capacity and mitigation concerns.</td>
</tr>
</tbody>
</table>

Focus habitat restoration in sites with adequate calcium and/or buffering capacity; seek acid deposition reduction at policy/government levels; explore feasibility of soil liming where grouse are a featured management species.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Forest-dwelling songbirds, regenerating tree and shrub species, fish

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## Ruffed Grouse

### Bonasa umbellus

### Threats and Actions

#### Specific Threat: 
Young forest acreage is below the 12-15% of forested acreage needed to maintain grouse populations, and does not occur in the distribution across the landscape needed to support grouse dispersal and colonization. Where private landowners are undertaking active forest management, it is often not appropriate for long term habitat quality.

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<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Develop and disseminate education programs to public and private land managers</td>
<td>Number of programs developed; number of public education events provided; number of people reached</td>
<td>Human dimensions surveys on public awareness and attitudes toward active forestry.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

#### Specific Threat: 
Reduced habitat suitability from inferior food and cover provided by invasive vegetation.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Investigate and implement best management practices to maintain high-quality young forest.</td>
<td>Number of acres restored; Number of suitable acres maintained</td>
<td>Monitor condition of young forests on public lands; Monitor populations of grouse in good habitat</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle
Ruffed Grouse

**Bonasa umbellus**

**THREATS AND ACTIONS**

**IUCN Threat:** 2.0 Agriculture and Aquaculture

**Specific Threat:** Non-native quick-growing species planted for biomass or pulp production may serve as ecological traps.

**Season:** Winter

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Involve wildlife biologists in the planning and implementation of biomass programs.</td>
<td>Integration of wildlife biologists and natural vegetative community experts in biomass planning processes in public and private ventures.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Extreme caution should be used in evaluating any potential species for biomass production, since dense quick-growing species can often become invasive. Actively manage invasive plants that threaten young forests and those that limit timber harvest opportunities for landowners.**

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

**RESEARCH NEEDS**

1. **Breeding:** Determine vulnerability and mortality rates of ruffed grouse exposed to West Nile Virus.

2. **Wintering:** Comparative study of sex and age ratios in fall population, from 1970-80s (Mgmt. Plan's population baseline years) to present via a Parts Collection Survey.

3. **Breeding:** Analyze expected range contraction of grouse in Pennsylvania and other Northeastern / Appalachian states following methodology used in New York by Porter and Jarzyna (2013) to inform priority areas for intensive habitat management.

4. **Wintering:** Extent of West Nile Virus exposure in PA ruffed grouse, as indexed by antibodies in hunter harvested samples.

5. **Breeding:** Determine impact of changing spring weather conditions on juvenile production, obtain current survival rate estimates of juvenile grouse, and determine relative contributions of various mortality factors (disease, weather, predation) to juvenile mortality.

6. **Wintering:** Suitability of grouse season structure and current harvest levels on PA ruffed grouse, with particular emphasis on north/south population dynamics.
**SURVEY NEEDS**

1. Breeding - Refine PGC Grouse Summer Sighting Survey to provide more reliable data on annual recruitment.

1. Wintering - Develop a targeted hunter survey of grouse habitat with detailed characterization of vegetation and cover types, and repeat visits to determine species presence as a way to identify factors involved in habitat occupancy.

2. Breeding - Expand spring and fall flush counts at priority sites in order to detect a population response where specific management actions have targeted grouse.

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**MONITORING PROGRAMS**

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<th>Program Name</th>
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<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Grouse Summer Sighting Survey</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>PGC employees tally grouse broods and adults seen during normal work hours. Conducted annually as a way to monitor trends in juvenile production.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
## MONITORING PROGRAMS

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<th>Program Name</th>
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</thead>
<tbody>
<tr>
<td>PGC Grouse Drumming Survey</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Spring drumming surveys conducted at PGC locations that have received active grouse management. Used to detect presence and population response pre- and post-management.</td>
</tr>
</tbody>
</table>

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PENNevsYLANIA GAME COMMISSION  
55| Appendix 1.4-Birds  
PENNSYLVANIA FISH & BOAT COMMISSION  
Published September 2015
Pied-billed Grebe
Podilymbus podiceps

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
State Rank: S2B
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed
PA Legal Status: Protected
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Unknown
Conservation Goal:
Maintain at least 10-15 breeding pairs annually in Pennsylvania through 2025.

HABITAT ASSOCIATIONS

Primary
Macrogroup: Lakes
Habitat: Mesotrophic, Low Alkalinity Lake

Secondary
Habitat: Laurentian-Acadian Wet Meadow-Shrub Swamp

Specific Habitat Requirements:
Emergent wetlands with abundant vegetation (70% cover, 69-133cm in height) and shallow water (24-56cm depth).

B = Breeding, M = Migration, W = Wintering
## Pied-billed Grebe

**Podilymbus podiceps**

### THREATS AND ACTIONS

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Draining, dredging, filling, leveling, and flooding of wetlands.

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Implement active water level monitoring and management at 26 BBA confirmed breeding locations during the next 10 years.</td>
<td>Number of breeding locations attaining necessary water depth.</td>
<td>1-wetland water levels, 2-surface water level measurements (e.g. staff gauges), 3-10 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Green-winged Teal, Common Gallinule, American Coot

**Season:** Breeding

### Natural System Modifications

**TRACS Action** 2.0 **Direct Management of Natural Resources**

In wetlands used as breeding habitat, protect sites from draining, dredging and filling due to development and maintain water depths of 24-56cm for open water areas.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Green-winged Teal, Common Gallinule, American Coot

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Wetland habitat degradation by invasive exotic species (e.g. Phragmites, reed canary grass, purple loosestrife).

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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Determine high priority breeding locations where invasives are an issue and implement treatment annually.</td>
<td>Number of breeding locations with reduced invasive vegetation cover.</td>
<td>1-presence and abundance of invasive plants, 2-invasive plant surveys/assessment, 3-annually for 10 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, Sora, King Rail

**Season:** Breeding
**Pied-billed Grebe**

**Podilymbus podiceps**

## THREATS AND ACTIONS

### IUCN Threat: 11.0 Climate Change and Severe Weather

#### Specific Threat:
Increased drought could cause wetlands to dry out, making them unsuitable for nesting. Alternatively, increases in extreme weather (precipitation) events could cause nest flooding.

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<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** American Black Duck, Green-winged Teal, Common Gallinule, American Coot, Virginia Rail, Sora, King Rail

### Season: Breeding

### IUCN Threat: 9.0 Pollution

#### Specific Threat:
Bioaccumulation of pesticides and contaminants (e.g. mercury and carbamate pesticides).

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<tr>
<td><strong>TRACS Action 101.0 Species Management</strong></td>
<td>Test pied-billed grebes from several breeding locations for levels of mercury and pesticides to better understand the impacts to reproductive success and survivorship.</td>
<td>Number of pied-billed grebe samples tested for pollutants.</td>
<td>1-pied-billed grebe contaminant levels, 2- appropriate tissue sample methods and testing, 3-intial assessment over 2 breeding seasons</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

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**PENNСYLVANIA GAME COMMISSION**

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
**Pied-billed Grebe**

*Podilymbus podiceps*

### RESEARCH NEEDS

1. Breeding: Habitat requirements: nest site selection, minimum wetland size, factors affecting nesting success and density, and importance of water quality and disturbance.

2. Breeding: Quantify effects of biocide bioaccumulations.


### SURVEY NEEDS

1. Breeding: Continue statewide surveys of wetlands utilizing the Pennsylvania Game Commission Marsh Bird Survey protocol adapted from North American Marsh Bird Monitoring Protocols and the 2nd PA BBA.

2. Breeding: 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).

3. Breeding: Select 5 breeding locations as long-term (>3 years) monitoring sites to understand population stability across varying habitats.

### MONITORING PROGRAMS

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<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>PENNSYLVANIA GAME COMMISSION Marsh Bird Surveys</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4">http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4</a></td>
<td>During breeding seasons, PGC 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.</td>
</tr>
</tbody>
</table>
Horned Grebe
*Podiceps auritus*

**CONSERVATION PROFILE**

**Conservation Goal:**
Continue to provide ponds, lakes, and rivers with good water quality as wintering habitat across wintering range in Pennsylvania.

**HABITAT ASSOCIATIONS**

- **Primary**
  - Oligotrophic, High Alkalinity Lake

- **Secondary**
  - Mesotrophic, Medium Alkalinity Lake

**Specific Habitat Requirements:**
More common in coastal salt water; in Pennsylvania, medium to large-sized fresh water bodies, including rivers, inland lakes and large ponds.

---

*Photo: Jacob Dingel*
Horned Grebe  

**Podiceps auritus**

### Threats and Actions

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Season:** Winter

**Specific Threat:** Disturbance from boating (i.e. wakes) and other human activities can disrupt normal foraging activity.

<table>
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<th>Measure</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Educate recreational boaters about disturbance impacts to water birds.</td>
<td>Conduct regional outreach about recreational disturbance to wildlife in Western, Central, and Eastern Pennsylvania.</td>
<td>Number of attendees at each of the regional outreach events.</td>
<td>1-public knowledge of wildlife disturbance, 2-before and after surveys of attendees, 3-within next 5 years</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Red-necked Grebe, Pied-billed Grebe, Great Blue Heron, Bald Eagle

### Research Needs

1. Wintering- Investigation of winter behavior and descriptions of wintering habitat locations.

### Survey Needs

1. Wintering- Use eBird and Christmas Bird Count data to determine estimates of winter population sizes, trends, and significant concentration areas.

### Monitoring Programs

<table>
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## Horned Grebe

### Podiceps auritus

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<th>Program Name</th>
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</tr>
</thead>
</table>
Red-necked Grebe

Podiceps grisegena

Photo: Donna Dewhurst

CONSERVATION PROFILE

Conservation Goal:
Continue to provide ponds, lakes, and rivers with good water quality as wintering habitat across wintering range in Pennsylvania.

HABITAT ASSOCIATIONS

Primary
Macrogroup: #N/A
Habitat: Lotic

Specific Habitat Requirements:
In Pennsylvania, medium to large-sized fresh water bodies, including rivers, inland lakes and large ponds, as well as inlets and bays of Lake Erie.

Photo: Donna Dewhurst
Red-necked Grebe

Podiceps grisegena

**THREATS AND ACTIONS**

<table>
<thead>
<tr>
<th>Action Location:</th>
<th>Physiographic Province: Statewide</th>
</tr>
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<tbody>
<tr>
<td>Associated Species:</td>
<td>Horned Grebe, Pied-billed Grebe, Great Blue Heron, Bald Eagle</td>
</tr>
</tbody>
</table>

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Disturbance from boating (i.e. wakes) and other human activities can disrupt normal foraging activity.

**Action** | **Objective** | **Measure** | **Monitoring** | **Priority** |
<table>
<thead>
<tr>
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<tr>
<td>TRACS Action 101.0 Species Management Educate recreational boaters about disturbance impacts to water birds.</td>
<td>Conduct regional outreach about recreational disturbance to wildlife in Western, Central, and Eastern Pennsylvania.</td>
<td>Number of attendees at each of the regional outreach events.</td>
<td>1-public knowledge of wildlife disturbance, 2-before and after surveys of attendees, 3-within next 5 years</td>
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</table>

**Season:** Winter

**RESEARCH NEEDS**

1. Wintering- Investigation of winter behavior and descriptions of wintering habitat locations.

**SURVEY NEEDS**

1. Wintering- Use eBird and Christmas Bird Count data to determine estimates of winter population sizes, trends, and significant concentration areas.

**MONITORING PROGRAMS**

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</thead>
</table>
American Bittern
*Botaurus lentiginosus*

**CONSERVATION PROFILE**

**Global Rank**: G4  
**State Rank**: S2B  
**IUCN Red List**: VU Vulnerable  
**Northeast Region**: Very High Concern / Low Responsibility  
**Federal Status**: Not Listed  
**PA Legal Status**: Endangered  
**PA Abundance**: Unknown  
**PA Short-Term Trend (10 year)**: (B) Unknown

**Conservation Goal:**
Minimize loss and degradation of currently available emergent wetland habitat and increase amount available through habitat restoration where possible. Maintain breeding population at 5 sites identified in the Second Pennsylvania Atlas of Breeding Birds (Wilson et al. 2012).

**HABITAT ASSOCIATIONS**

**Primary**  
- Macrogroup: Emergent Marsh  
- Habitat: Laurentian-Acadian Freshwater Marsh

**Secondary**  
- Habitat: Laurentian-Acadian Wet Meadow-Shrub Swamp

**Specific Habitat Requirements:**
Extensive freshwater wetlands with dense stands of cattails, spatterdock, bulrushes, sedges interspersed with open water.
## American Bittern

### THREATS AND ACTIONS

<p>| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Wetland filling/encroachment |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>No net loss of wetland habitat</td>
<td>DEP monitoring of wetland changes</td>
<td>Annual surveys of obligate wetland species' populations</td>
<td>1</td>
</tr>
<tr>
<td>Avoid, minimize, or mitigate wetland losses, even those &lt; 5 acres.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>All rails, most ardeids and ducks, shorebirds, facultative wetland songbirds</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

<p>| Specific Threat: | Array of wetland plants including phragmites, purple loosestrife, and narrow-stemmed cattail |</p>
<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Remove dense invasive growth in large wetlands</td>
<td>Resurvey following and subsequent summers</td>
<td>Annual surveys of obligate wetland species' populations</td>
<td>1</td>
</tr>
<tr>
<td>Largely physical removal with motorized and/or hand tools; long-term and less reliable biological control with insect predator from native continent may be available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>All rails, most ardeids and ducks</td>
<td></td>
<td></td>
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</table>
### American Bittern

**Botaurus lentiginosus**

#### Threats and Actions

**Specific Threat:** Bioaccumulation of toxins from agricultural runoff, industrial and municipal waste.

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Sustain wetland quality through wastewater treatment operations in municipalities where water feeds into high priority breeding sites. Strengthen nonpoint source pollution regulations and technical assistance.</td>
<td># facilities meeting standards; # nonpoint source improvements</td>
<td>Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Other ardeids

#### IUCN Threat: 9.0 Pollution

- **Season:** Breeding

#### IUCN Threat: 11.0 Climate Change and Severe Weather

**Specific Threat:** Greater frequency/severity of drought in summers

<table>
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<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot, rails
American Bittern  
*Botaurus lentiginosus*

## RESEARCH NEEDS

1. Breeding - Identification habitat suitability of existing sites including better understanding what management techniques enhance manipulated wetlands or restore degraded habitats.

2. Breeding - Factors affecting nesting success and mortality in adults, juveniles, nestlings, and eggs in PA priority wetlands (mostly IBAs), including contaminants levels in bitterns and their eggs.

3. Breeding - Basic biology of species is poorly known (BNA account), so research on basic biology, mating system, sources and rates of mortality including contaminants, philopatry of individuals, migration routes and stopovers needed even if part of a larger-scale project.

## SURVEY NEEDS

1. Breeding - Regular surveys in large wetlands where this species and its cohorts have history of breeding (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).

2. Breeding - Total territories and nesting success in wetlands across state; extend wetland surveys to smaller wetlands especially with history of bitterns or newly created wetlands, continuing to pursue unknown populations.

3. Breeding - Persistence and nesting success at key nesting areas in state (mostly PA IBAs).

## MONITORING PROGRAMS

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<tbody>
<tr>
<td>Audubon PA Important Bird Area Surveys</td>
<td>Audubon Pennsylvania</td>
<td></td>
<td>Marsh bird surveys at Important Bird Areas designated due to their importance to wetland birds. Standardized marshbird protocols as described in PGC Marsh Bird Surveys and volunteer surveys.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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Least Bittern
Ixobrychus exilis

Photo: Jacob Dingel

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed
State Rank: S2B
PA Legal Status: Endangered
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

Conservation Goal:
Minimize loss and degradation of currently available emergent wetland habitat (particularly marshes >5ha) and increase amount available through habitat restoration where possible; identify where least bitterns are successfully breeding in the state; develop site-specific conservation plans for sites where least bitterns are currently breeding (Brittingham 2005, Brauning 2005).

HABITAT ASSOCIATIONS

Macrogroup Primary Secondary
Eutrophic, High Alkalinity Lake Laurentian-Acadian Freshwater Marsh

Specific Habitat Requirements:
Palustrine emergent wetlands, dominated by tall emergents such as cattails interspersed with shrubs and open water.

B = Breeding, M = Migration, W = Wintering

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PENNSYLVANIA FISH & BOAT COMMISSION
### THREATS AND ACTIONS

**Least Bittern**

**Ixobrychus exilis**

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Wetland filling/encroachment |
| Action | Objective | Measure | Monitoring | Priority |
| TRACS Action 11.0 | Technical Assistance | No net loss of wetland habitat | DEP monitoring of wetland changes | Annual surveys of obligate wetland species' populations | 2 |

Avoid, minimize, or mitigate wetland losses, even those < 5 acres.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** All rails, most ardeids and ducks, shorebirds, facultative wetland songbirds

**Season:** Breeding

---

| IUCN Threat: | 8.0 Invasive and Other Problematic Species and Genes |
| Specific Threat: | Array of wetland plants including phragmites, purple loosestrife, and narrow-stemmed cattail |
| Action | Objective | Measure | Monitoring | Priority |
| TRACS Action 2.0 | Direct Management of Natural Resources | Remove dense invasive growth in large wetlands | Resurvey following and subsequent summers | Annual surveys of obligate wetland species' populations | 2 |

Largely physical removal with motorized and/or hand tools; long-term and less reliable biological control with insect predator from native continent may be available.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** All rails, most ardeids and ducks

**Season:** Breeding
### Least Bittern

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Methyl-mercury bioaccumulation in top predators such as ardeids causes mortality and sublethal effects impacting populations

<table>
<thead>
<tr>
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<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0  Direct Management of Natural Resources</td>
<td>Sustain wetland quality through wastewater treatment operations in municipalities where water feeds into high priority breeding sites. Strengthen nonpoint source pollution regulations and technical assistance.</td>
<td># facilities meeting standards; # nonpoint source improvements</td>
<td>Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Other ardeids

<table>
<thead>
<tr>
<th>IUCN Threat: 11.0 Climate Change and Severe Weather</th>
</tr>
</thead>
</table>

**Specific Threat:** Greater frequency/severity of drought in summers

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0  Planning</td>
<td>Create a plan for assessing predicted and current climate change impacts to major emergent wetlands in Pennsylvania within the next 2 years and begin implementation of this assessment within the next 5 years.</td>
<td>Number of major wetlands assessed via the plan during next 5 years.</td>
<td>1- A. climate change conservation plan has been created for Pennsylvania’s major emergent wetlands, B. major wetlands are assessed for vulnerability and impacts, 2 - committee of wetland, taxa, and climate change experts, 3 - plan developed within 2 years, wetlands assessment (including field component) within 5 years</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Black Duck, Blue-winged Teal, Common Gallinule, American Coot, rails

---

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**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
**Least Bittern**

**Ixobrychus exilis**

## RESEARCH NEEDS

1. **Breeding** - Continued research into Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of declines, including response to wetland management.

2. **Breeding** - Factors affecting nesting success and mortality in adults, juveniles, nestlings, and eggs.

3. **Breeding** - Effects of industrial and agricultural landscapes on contaminant levels in bitterns and their eggs.

## SURVEY NEEDS

1. **Breeding** - Regular surveys in large wetlands where this species and its cohorts have history of breeding (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).

2. **Breeding** - Total territories and nesting success in wetlands across state; extend wetland surveys to smaller wetlands especially with history of bitterns or newly created wetlands.

3. **Breeding** - Persistence and nesting success at key nesting areas in state (mostly PA IBAs).

## MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audubon PA Important Bird Area Surveys</td>
<td>Audubon Pennsylvania</td>
<td></td>
<td>Marsh bird surveys at Important Bird Areas designated due to their importance to wetland birds. Standardized marshbird protocols as described in PGC Marsh Bird Surveys and volunteer surveys.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
</tbody>
</table>
### Least Bittern

*Ixobrychus exilis*

### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
</table>
CONSERVATION PROFILE

Global Rank: G5
State Rank: S2B
IUCN Red List: LC Least Concern
Northeast Region: Not NE Regional SGCN
PA Legal Status: Endangered
PA Abundance: ~300 individuals
PA Short-Term Trend (10 year): (B) Stable
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 the Kiwanis Park in York, PA (Master 2012).

HABITAT ASSOCIATIONS

Primary
Macrogoupe: Lakes
Habitat: Hypereutrophic, High Alkalinity Lake

Secondary
Large Rivers

Specific Habitat Requirements:
Wade Island - nests built at or near the top of river birch, silver maple, green ash, American sycamore, black willow.

B = Breeding, M = Migration, W = Wintering
## Great Egret (Ardea alba)

### Threats and Actions

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>6.0 Human Intrusions and Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Unauthorized intrusions into the colony would pose a serious problem, especially during courtship, nest repair and incubation periods.</td>
</tr>
</tbody>
</table>

#### Action

- **TRACS Action 6.0 Land and Water Rights Acquisition and Protection**
- Add, as well as repair/maintain no trespassing signs at Wade Island if any are still in existence. Signs should provide a reason, e.g., "disturbance could cause nesting failure" to make clear reasons for denial of access to the island. One hundred meters is a suggested buffer distance from human activity (Erwin 1989, Rogers and Smith 1995). Greater protection required for Kiwanis Lake nests.

#### Objective

- Provide protection of Wade Island from intrusion and disturbance during the nesting season, especially when pairs are courting, repairing/building nests and incubating.

#### Measure

- No trespassing occurring on Wade Island, stable nesting population.

#### Monitoring

- Signs at Wade Island should be permanent and maintained.

#### Priority

- 1

---

**Season:** Breeding

**Physiographic Province:** Ridge and Valley

**HUC10 Watershed:** Susquehanna River

**Associated Species:** Black-crowned Night-Heron
**Great Egret**

**Ardea alba**

## THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Japanese Knotweed may prevent tree regeneration; Double-crested Cormorants threaten other colony inhabitants by usurping nest sites and decreasing soil pH threatening nesting tree survival.

<table>
<thead>
<tr>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Prevent competition for nest sites and death of the relatively few nesting trees on Wade Island.</td>
<td>At a minimum, no increase in nesting Double-crested Cormorant population above that of 2013-14 and hopefully a decrease.</td>
<td>Removal of Japanese Knotweed would have to be done initially and then periodically into the foreseeable future. Double-crested Cormorant numbers can be controlled if culling becomes the most powerful density dependent mechanism influencing the population (Frederikson et al. 2001). Extinction will result if culls exceed the compensatory capacity of the population to repopulate (Middleton et al. 1993) over a number of years. Thus, culling should be effective if the compensatory capacity of the population is known.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Ridge and Valley

**HUC10 Watershed:** Susquehanna River

**Associated Species:** Black-crowned Night-Heron

**Season:** Breeding
### Great Egret

**Ardea alba**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>indirect threat of pollution on prey populations.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
</tr>
<tr>
<td><strong>Action Location:</strong></td>
<td>Physiographic Province: Ridge and Valley</td>
</tr>
<tr>
<td><strong>Associated Species:</strong></td>
<td>Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other fish-eating species frequenting the Susquehanna River</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>Extreme flooding/drought events with respect to the breeding cycle/prey demand are all potential vulnerabilities.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
</tr>
<tr>
<td><strong>Action Location:</strong></td>
<td>HUC10 Watershed: Susquehanna River</td>
</tr>
<tr>
<td><strong>Associated Species:</strong></td>
<td>Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other fish-eating species frequenting the Susquehanna River</td>
</tr>
</tbody>
</table>
Great Egret

**RESEARCH NEEDS**

1. Breeding- Although difficult to determine because of nest height, nesting success (productivity) would be a top research priority (Master 2010).

2. Breeding- Analysis of carcasses/egg shells/feathers from Wade Island for toxic/bioaccumulating substances (Master 2010).

3. Breeding- Post breeding dispersal patterns would be a secondary research priority. The location of foraging individuals both up and down river of Wade Island was determined during an airplane flight in 2006. This was not a research priority at the time. Use of satellite transmitters would provide much more detailed information over time of foraging, post-breeding dispersal and wintering movements of Wade Island individuals.

**SURVEY NEEDS**

1. Breeding- Annual nest/pair counts are conducted by the Pennsylvania Game Commission in late April/early May at Wade Island. It would be interesting to compare those estimates with surveys conducted in early/mid June as a later estimate might be more accurate with regard to determining the number of nesting pairs. Earlier counts could continue for comparative purposes with past surveys (Master 2010).

2. Breeding- Coordinate timing of Wade Island Survey and Kiwanis Lake Survey to provide a more accurate snapshot of nest numbers at the same time.

3. Breeding- Search for additional colonies should be done regularly.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<tbody>
<tr>
<td>Annual nest/pair count conducted by the Pennsylvania Game Commission in late April/early May, depending upon weather/river conditions, at Wade Island</td>
<td>Pennsylvania Game Commission</td>
<td></td>
</tr>
</tbody>
</table>

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.
Black-crowned Night-Heron
*Nycticorax nycticorax*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
<th>State Rank</th>
<th>S2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
<td>PA Abundance</td>
<td>~240 nests</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

Conservation Goal:
300-400 nests distributed among 3-4 well protected main colony sites.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogoup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Warm Large Rivers</td>
<td>Hypereutrophic, High Alkalinity Lake</td>
</tr>
</tbody>
</table>

Specific Habitat Requirements:
Shallow aquatic/terrestrial margins of fresh, brackish and salty aquatic environments - in both remote wetlands and city parks.

Photo: Joe Kosack

Published September 2015
### Black-crowned Night-Heron

**Nycticorax nycticorax**

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Threats at various colony sites include high predation rates, property owner attitudes and general lack of colony protection, especially early in the breeding season through the incubation phase of nesting.

<table>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Provide protection for the Wade Island colony. Develop/enhance dialog with property owners hosting other colonies to encourage protective actions, especially when pairs are courting, repairing/building nests and incubating.</td>
<td>No trespassing occurring on Wade Island, stable nesting population.</td>
<td>Signs at Wade Island should be a permanent fixture. Protections implemented at other colonies need to be monitored, in large part by maintaining friendly/cooperative relationships with private property owners hosting colonies.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** HUC10 Watershed: Susquehanna River

**Associated Species:** Great Egret
### THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Japanese Knotweed may prevent tree regeneration; Double-crested Cormorants threaten other colony inhabitants by usurping nest sites and decreasing soil pH threatening nesting tree survival.

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Prevent competition for nest sites and death of the relatively few nesting trees on Wade Island.</td>
<td>At a minimum, no increase in nesting Double-crested Cormorant population above that of 2013-14 and hopefully a decrease.</td>
<td>Removal of Japanese Knotweed would have to be done initially and then periodically into the foreseeable future. Double-crested Cormorant numbers can be controlled if culling becomes the most powerful density dependent mechanism influencing the population (Frederikson et al. 2001). Extinction will result if culls exceed the compensatory capacity of the population to repopulate (Middleton et al. 1993) over a number of years. Thus, culling should be effective if the compensatory capacity of the population is known.</td>
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**Action Location:** HUC10 Watershed: Susquehanna River

**Associated Species:** Great Egret
## Black-crowned Night-Heron

**Nycticorax nycticorax**

### THREATS AND ACTIONS

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<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Adhere to the 2-year milestones of the EPA's Watershed Implementation Plan for decreasing the total maximum daily load of sediment entering Chesapeake Bay.</td>
<td>Decreasing sediment load in water, no detrimental loads of toxic/bioaccumulating substances in carcasses.</td>
<td>Carcasses of adults and especially juveniles are easily acquired on Wade Island, thus material for determining toxic/bioaccumulating substance loads is readily available.</td>
</tr>
</tbody>
</table>

**Season:** Breeding

**Specific Threat:** Indirect threat of pollution on prey populations.

**IUCN Threat:** 9.0 Pollution

**Associated Species:** Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other fish-eating species frequenting the Susquehanna River

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<tbody>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
<td>Provide critical information on fish populations for timely implementation of mitigating measures.</td>
<td>Stable nesting population on the island with sufficient prey base.</td>
<td>Pervasiveness of the problem and the large scale, global response required makes effectiveness of local actions difficult to determine.</td>
</tr>
</tbody>
</table>

**Season:** Breeding

**Specific Threat:** Extreme flooding/drought events with respect to the breeding cycle/prey demand are all potential vulnerabilities.

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Associated Species:** Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other fish-eating species frequenting the Susquehanna River
Black-crowned Night-Heron

Nycticorax nycticorax

RESEARCH NEEDS

1. Breeding- Observation and quantification of diet composition, foraging behavior, distances traveled to foraging sites, productivity levels, and adult survival at colony sites other than Wade Island where these characteristics have been investigated (Master 2010).

2. Breeding- Continue to study effectiveness of Cormorant removal efforts on Night Heron colonies.


SURVEY NEEDS

1. Breeding- Regular surveys of all known colonies in state.

2. Breeding- Annual nest/pair counts are conducted by the Pennsylvania Game Commission in late April/early May at Wade Island. Conduct additional surveys in early/mid June as a later estimate to compare regular surveys.

3. Breeding- Search for additional colonies not regularly monitored and learn more about foraging range of nesting birds using satellite telemetry.

MONITORING PROGRAMS

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<tr>
<td>Annual nest/pair count conducted by the Pennsylvania Game Commission in late April/early May, depending upon weather/river conditions, at Wade Island</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>
Yellow-crowned Night-Heron

*Nyctanassa violacea*

**CONSERVATION PROFILE**

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<tbody>
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<td>Northeast Region</td>
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<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S1B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>14</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

**Conservation Goal:**

10-20 active nests located at one or more protected colony site.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Rivers</td>
<td>Urban/Suburban Built</td>
</tr>
</tbody>
</table>

| Habitat | Warm Medium Rivers, Low Gradient Small Rivers | Developed (NLCD 21-24 & 31) |

**Specific Habitat Requirements:**

Riparian forest and urban settings. Nests located 30-80 feet on a horizontal branch in tall shade trees, such as American sycamore, with open understory.

**Photo:** Joe Kosack

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PENNSYLVANIA GAME COMMISSION

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## Yellow-crowned Night-Heron

**Nyctanassa violacea**

### Threats and Actions

#### IUCN Threat: 6.0  Human Intrusions and Disturbance

**Specific Threat:** Vulnerable to human disturbance during nesting season

<table>
<thead>
<tr>
<th>Action Location: HUC10 Watershed: Susquehanna River</th>
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</thead>
</table>

<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0</td>
<td>Outreach</td>
<td>Continue educational efforts and enhance dialog with property owners/ neighborhoods hosting colonies to encourage protective actions and &quot;ownership&quot; of the colony, especially when pairs are courting, repairing/building nests and incubating.</td>
<td>Maintain friendly/cooperative relationships with property owners hosting colony sites.</td>
<td>1</td>
</tr>
</tbody>
</table>

#### IUCN Threat: 8.0  Invasive and Other Problematic Species and Genes

**Specific Threat:** Likely vulnerable to medium sized wild and feral mammalian predators and Great-horned Owls.

<table>
<thead>
<tr>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0</td>
<td>Species Management</td>
<td>Prevent predators from access to nests.</td>
<td>Determine if observed nest failure is due to predation based on observational evidence at the nest and below nesting trees.</td>
<td>1</td>
</tr>
</tbody>
</table>
### THREATS AND ACTIONS

#### Yellow-crowned Night-Heron

**Nyctanassa violacea**

#### IUCN Threat:
- Pollution

**Specific Threat:** Indirect threat of pollution on crustacean populations.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Adhere to the 2-year milestones of the EPA's Watershed Implementation Plan for decreasing the total maximum daily load of sediment entering Chesapeake Bay via the Susquehanna River and other tributaries.</td>
<td>Decreasing sediment load in water, no detrimental loads of toxic/bioaccumulating substances in carcasses.</td>
</tr>
</tbody>
</table>

**Action Location:** HUC10 Watershed: Susquehanna River

**Associated Species:** Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other species using aquatic food resources frequenting the Susquehanna River
**Yellow-crowned Night-Heron**

**Nyctanassa violacea**

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** May be vulnerable to extreme weather, particularly floods which could limit access to prey.

**Season:** Breeding

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy Monitor water temperature and crayfish/invertebrate populations.</td>
<td>Provide critical information on crustacean populations for timely implementation of conservation measures, if necessary.</td>
<td>Stable nesting population on the island with sufficient prey base.</td>
<td>Pervasiveness of the problem and the large scale, global response required makes effectiveness of local actions difficult to determine.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** HUC10 Watershed: Susquehanna River

**Associated Species:** Black-crowned Night Heron, Green Heron, Belted Kingfisher, Bald Eagle, Osprey and any other species requiring aquatic resources frequenting the Susquehanna River

**RESEARCH NEEDS**

1. Breeding- Studies of productivity/nesting success, reasons for nest failure and reduced reproductive success, if that occurs, should be determined.

2. Breeding- Studies of prey choice/diet composition are needed generally to quantify the reliance of this species on the Rusty Crayfish population.

3. Breeding- Study ability of this species to coexist with humans and seek opportunities for improving Yellow-crowned Night-Heron nesting success and colonization of the state's southern riparian areas.

**SURVEY NEEDS**

1. Breeding- Continue to survey known nesting colonies.

2. Breeding- Search for additional colonies not regularly monitored.

3. Breeding- Learn more about foraging range of nesting birds.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual count of nesting pairs in primary nesting colony.</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Periodic inspection of nesting colony.</td>
</tr>
</tbody>
</table>
Osprey
*Pandion haliaetus*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S3B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Not NE Regional SGCN
- **Federal Status**: Not Listed
- **PA Legal Status**: Threatened
- **PA Abundance**: 600
- **PA Short-Term Trend (10 year)**: (B) Unknown

**Conservation Goal:**
Five breeding clusters of at least 9 pairs each and a total population of at least 50 nesting pairs annually.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Lakes
- **Secondary Macrogroup**: Lakes
- **Primary Habitat**: Eutrophic, Medium Alkalinity Lake
- **Secondary Habitat**: Mesotrophic, Medium Alkalinity Lake

**Specific Habitat Requirements:**
Shallow water areas with good fish populations and artificial or natural nesting structures nearby.

*Photo: Jacob Dingel*

---

*Breeding*

---

**Patricia M. Barber**
Pennsylvania Game Commission

**PENNSYLVANIA GAME COMMISSION**
90| Appendix 1.4-Birds

**PENNSYLVANIA FISH & BOAT COMMISSION**
Published September 2015
**Osprey**

**Pandion haliaetus**

### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Specific Threat</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Loss of sites with low nest disturbance</td>
<td>Breeding</td>
</tr>
<tr>
<td>6.0</td>
<td>Increased nest disturbance</td>
<td>Breeding</td>
</tr>
<tr>
<td>7.0</td>
<td>Human activity eliminating or changing water levels, reducing nesting attempts, nesting success or productivity</td>
<td>Breeding</td>
</tr>
</tbody>
</table>

#### Action Details

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance Best management practices</td>
<td>Minimize human conflicts</td>
<td>Increasing number of successful nests in industrial and developed areas</td>
<td>Regular periodic monitoring of nesting osprey to determine nesting success</td>
<td>1</td>
</tr>
<tr>
<td>TRACS Action 11.0 Technical Assistance Best management practices</td>
<td>Minimize human disturbance</td>
<td>High nesting success of osprey on human structures</td>
<td>Regular periodic monitoring of nesting osprey to determine nesting success</td>
<td>1</td>
</tr>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources Best management practices</td>
<td>Maintain current acreage of high quality habitat</td>
<td>Acres of clean, slow moving, shallow water</td>
<td>Regular periodic monitoring of nesting osprey to determine nesting success</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide
## Threats and Actions

### IUCN Threat: 9.0 Pollution

**Specific Threat:** Industrial waste that include nutrients, toxic chemicals and/or sediments; recreational lead added to environment especially as fishing sinkers

<table>
<thead>
<tr>
<th>Action Location: Physiographic Province: Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
</tr>
</tbody>
</table>

### IUCN Threat: 11.0 Climate Change and Severe Weather

**Specific Threat:** Breeding distribution and productivity could be impacted by severe weather events and changing foraging opportunities (water levels).

<table>
<thead>
<tr>
<th>Action Location: Physiographic Province: Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>TRACS Action 8.0</td>
</tr>
</tbody>
</table>
RESEARCH NEEDS

1. Breeding - Develop population measures to define recovered population and develop monitoring framework to evaluate population, maximizing confidence while minimizing effort.

2. Breeding - Develop best management practices for nesting osprey to avoid specific human-osprey conflicts.

3. Breeding - Develop education material to help further osprey conservations and facilitate successful human-osprey coexistence.

SURVEY NEEDS

1. Breeding - regular periodic nest monitoring to track population trajectory, ensuring management plan goals are being met.

2. Breeding - Summarize e-bird entries to ensure that all reported nests are identified and protected.

3. Breeding - Contaminant analysis to monitor toxins moving up the food chain and potentially negatively affecting osprey stability.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminant Exposure Food Web Transfer and Effects on Ospreys in Chesapeake Bay Regions of Concern</td>
<td>Patuxent Wildlife Research Center</td>
<td></td>
<td>Ecotoxicological investigation - osprey eggs and nestling's blood are sampled for contaminants.</td>
</tr>
<tr>
<td>Osprey nest monitoring</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=721226&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=721226&amp;mode=2</a></td>
<td>During the breeding season volunteers and staff monitor nests for activity and productivity. Moving forward these survey are likely to focus on sub-sampling to concentrate effort.</td>
</tr>
</tbody>
</table>
**Bald Eagle**

*Haliaeetus leucocephalus*

**Photo: Hal Korber**

---

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4B, S5N (W)
- **IUCN Red List**: LC Least Concern
- **PA Legal Status**: Protected
- **Northeast Region**: Not NE Regional SGCN
- **PA Abundance**: 600
- **Federal Status**: Not Listed
- **PA Short-Term Trend (10 year)**: (B,W) Increase of >25%

**Conservation Goal:**

Maintain a minimum of 150 nesting pairs which includes successful nesting pairs in at least 40 counties, with 60% of known nests successful and a productivity rate of at least 1.2 eaglets fledged per successful nest, based on a five year running period (Gross and Brauning 2011).

---

**HABITAT ASSOCIATIONS**

- **Primary**:
  - (B) Northern Hardwood & Conifer
  - (W) Agricultural
- **Secondary**:
  - (B) Northern Swamp
  - (W) Urban/Suburban Built
- **Habitat**:
  - (B) Appalachian (Hemlock)-Northern Hardwood Forest
  - (W) Agriculture (NLCD 81-82)
  - (B) North-Central Appalachian Acidic Swamp
  - (W) Developed (NLCD 21-24 & 31)

**Specific Habitat Requirements:**

- (B) Shallow flat-water with abundant fish, roost trees and large trees within a mile of water for nesting.
- (W) Protected perch and roost site trees near open water for foraging.

---

B = Breeding, M = Migration, W = Wintering
## Bald Eagle

**Haliaeetus leucocephalus**

### Threats and Actions

#### Specific Threat:
A decline in water quality due to acid mine drainage, gas drilling or wastewater disposal could negatively impact fisheries that support Bald Eagles.

#### Action: Continue to monitor breeding and wintering bald eagle populations.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Early detection of regressing populations.</td>
<td>Annual surveys</td>
<td>Annual surveys of breeding and wintering eagles for 10 years. Subsampling nests for success / productivity to detect issues with nest disturbance, water pollution, etc.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

#### Specific Threat:
Persecution as perceived threat to farm animals and fish and game species.

#### Action: Investigate and prosecute all illegal killings and instances of harassment (Gross and Brauning 2011). Monitor eagle nest productivity as written in Bald Eagle Management plan as strategies.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 7.0 Law enforcement</td>
<td>Deter eagle shootings, killings and harassment.</td>
<td>Prosecute violators and publicize the prosecutions via news releases (Gross and Brauning 2011)</td>
<td>Investigate and prosecute suspected and known killings and harassments of bald eagles and eagle nests; 10 years</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** All birds of prey
### Bald Eagle

#### Haliaeetus leucocephalus

### THREATS AND ACTIONS

**IUCN Threat:** 9.0 Pollution

### Specific Threat:
Disease or heavy metal contamination due to feeding on contaminated carcasses or prey.

#### Action
- **TRACS Action 1.0** Coordination and Administration

#### Objective
Decrease preventable mortality to eagles.

#### Measure
Reports of eagle mortality due to these sources.

#### Monitoring
Track eagle mortality from these sources.

#### Priority
1

**Season:** Breeding

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Many waterbirds, raptors, and scavengers that are vulnerable to diseases and accidental poisoning.

---

**IUCN Threat:** 9.0 Pollution

### Specific Threat:
Lead Poisoning from consuming game animal carcasses that are contaminated by lead ammunition pellets or fragments and other sources that may enter the food chain.

#### Action
- **TRACS Action 101.0** Species Management

#### Objective
Monitor to determine the extent and sources of lead exposure.

#### Measure
Test all sick, injured and dead eagles that are found.

#### Monitoring
Sample the lead levels in blood or tissue from available specimens; 10 years

#### Priority
1

**Season:** Breeding

**Action Location:** Physiographic Province: Statewide
### Threats and Actions

**Bald Eagle**

**Haliaeetus leucocephalus**

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Loss of suitable waterfront and riparian forest habitat to development.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 101.0 Species Management</strong></td>
<td>Continue to monitor breeding and wintering bald eagle populations.</td>
<td>Discover the extent of the limiting factor.</td>
<td>Annual surveys.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Human recreational activities can lead to nest site, roost site, and foraging area disturbance.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 101.0 Species Management</strong></td>
<td>Continue to promote information on Bald Eagles, laws protecting eagles, eagle etiquette and eagle viewing opportunities through the PGC website.</td>
<td>Educate PA citizens about bald eagles and promote conservation stewardship for the species.</td>
<td>An increase in the number of viewers visiting the PGC's Bald Eagle webpages.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Bald Eagle nests and nest trees are susceptible to severe weather events, particularly heavy winds and excessive frozen precipitation.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 101.0 Species Management</strong></td>
<td>Continue to monitor individual nests and nest success.</td>
<td>Monitor weather-related nest failure and eagle adoption of new nests in territories.</td>
<td>Monitor nests throughout nesting period, particularly during and following severe weather events.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide
### Bald Eagle

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Human disturbance from recreation flushes eagles from roost and foraging sites, leading to energy expenditure and reduced fishing success.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Monitor wintering eagles and increase public awareness and stewardship of wintering eagles.</td>
<td>Annual surveys</td>
<td>Monitor roosting and foraging sites during winter and increase public awareness of this critical part of the eagle's life cycle, particularly the need for eagle etiquette.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

### Invasive and Other Problematic Species and Genes

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Invasive plants and animals threaten forest and stream health.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Protection of riparian areas that are beneficial to stream water quality and wildlife persistence and success that the habitat supports.</td>
<td>Bald Eagle nest site / territory</td>
<td>Continued monitoring of eagle nesting territories and other bird populations in riparian forest habitats.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Riparian forest birds including Common Merganser, Wood Duck, and others.

1. Wintering- Identify all communal roost site locations and collect data on size, habitat, and extent of use.

2. Breeding- Annually track nest failures to determine if human interference is affecting nest success and productivity in regions or state-wide. Develop and implement guidelines to reduce impacts on eagle nest success and productivity.

3. Breeding- Monitor Bald Eagle nests for productivity using a matrix of randomly selected nests to determine if there are significant environmental factors limiting eagle productivity that can be addressed.

1. Breeding- Continued monitoring of the bald eagle nesting population including known breeding areas as well as potential areas.

1. Wintering- Continuation of annual mid-winter bald eagle survey.

2. Breeding- Annually assess and address factors potentially affecting nesting Bald Eagle productivity and populations (nest failures, human interference factor, other factors determined).

2. Wintering- Communal roost site monitoring.

3. Breeding- Increase public participation in all Bald Eagle nest surveys to allow continuation of monitoring without burdening staff.

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Name</td>
<td>Lead Agency</td>
<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bald Eagle Mid-winter Survey</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=1667261&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=1667261&amp;mode=2</a></td>
<td>This annual survey is conducted during a selected period in early January along standard survey routes.</td>
</tr>
</tbody>
</table>
Northern Harrier

_Circus cyaneus_

Photo: Jacob Dingel

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
<th>State Rank</th>
<th>S2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
<td>PA Legal Status</td>
<td>Threatened</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
<td>PA Abundance</td>
<td>600</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Reverse declines in number of breeding Northern Harriers and maintain nesting pairs in at least 100 Breeding Bird Atlas blocks by 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
</tbody>
</table>

**Habitat:**
Agriculture (NLCD 81-82)

**Specific Habitat Requirements:**
Large open grasslands (reclaimed strip mines); marshy meadows, wet lightly grazed pastures, open bogs, freshwater and brackish marshes, and riparian woodland.

B = Breeding, M = Migration, W = Wintering
## Northern Harrier (Circus cyaneus)

### Threats and Actions

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>1.0 Residential and Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Fragmentation, degradation and loss of breeding and foraging habitat, direct human disturbance of breeding birds, collisions with motor vehicles</td>
</tr>
</tbody>
</table>

**Action**

| TRACS Action 9.0 Planning | Examine zoning or comprehensive plans especially in areas where known breeding pairs regularly occur. Provide input when variances are requested, acquire potential undeveloped lands in vicinity of known occupancy during breeding season |

**Objective**

Reduce loss, degradation and fragmentation of breeding and foraging habitats. Acquire additional lands in core and buffer areas.

**Measure**

Prevent further development in good to high quality habitat areas. Continued use of areas by breeding birds.

**Monitoring**

Annual grassland raptor surveys

**Priority**

1

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls

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<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>3.0 Energy Production and Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Disturbance/displacement of breeding or potentially breeding birds, disturbance of foraging birds, air pollution, surface water pollution. Planting trees on reclaimed mines</td>
</tr>
</tbody>
</table>

**Action**

| TRACS Action 100.0 Law and Policy | Create new laws where necessary and increase ability to enforce existing laws and standards. |

**Objective**

Create laws that mandate complete avoidance of sensitive habitat areas by gas drillers. Continued mine reclamation projects by coal industry focused on creating higher quality grassland habitat and maintaining it as such through periodic manipulations. Mitigating existing AMD in areas where needed.

**Measure**

No additional wellheads in sensitive habitat areas frequented by Northern harriers. Measurable increase of good to high quality grassland habitats in former strip mine areas.

**Monitoring**

Annual grassland raptor surveys

**Priority**

1

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls
## Northern Harrier

### Threats and Actions

**Circus cyaneus**

| Specific Threat: | Habitat encroachment, loss of native plant species that provide cover and or nesting sites, nest predation |

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
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<th><strong>Monitoring</strong></th>
<th><strong>Priority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>Removal of 90-95% of all invasive plant species.</td>
<td>Measurable amounts of available resources (nest sites, food, water, cover) capable of supporting several pairs of Northern Harriers locally and a larger breeding population regionally throughout breeding season.</td>
<td>Annual grassland raptor surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, New England, Piedmont, Ridge and Valley

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls

| **IUCN Threat:** | 8.0 Invasive and Other Problematic Species and Genes |

| Specific Threat: | Accumulation of Methylmercury (neurotoxin) in body tissues as a result of agricultural runoff (pesticides and sediments) |

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 100.0</strong></td>
<td>Law and Policy</td>
<td>Reduction of multiple pollutants and sediment from point and non-point sources known to impact aquatic systems.</td>
<td>Measureable reduction of specific pollutants [e.g. methyl mercury, lead, fertilizers (nitrogen, phosphorus), residual pesticides, sediment loads, ... Reduced eutrophication and clearer water column], increased nesting success</td>
<td>Annual grassland raptor surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, New England, Piedmont, Ridge and Valley

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls
**Northern Harrier**

* Circus cyaneus

**THREATS AND ACTIONS**

**IUCN Threat:** 2.0 Agriculture and Aquaculture

**Specific Threat:** Loss of nesting habitat, cover, and prey species from agricultural practices including mowing and pesticide application.

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<table>
<thead>
<tr>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Create additional habitats areas for breeding populations and reducing use of synthetically produced pesticides and fertilizers.</td>
<td>Number of landowners enrolled in CREP and WHP programs</td>
<td>Annual grassland raptor surveys</td>
</tr>
</tbody>
</table>

Promote and engage landowners in CREP and WHP programs. Educate landowners about the importance and function of hedgerows and encourage employment of IPM strategies in controlling pest species.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls

---

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Natural succession, reforestation practices, agricultural practices

---

<table>
<thead>
<tr>
<th>Action</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources habitat restoration projects</td>
<td>Reclaim and improve upland and wetland habitats to accommodate ecological needs of Northern Harrier during breeding and young rearing seasons.</td>
<td>Gradual increase in numbers of Northern Harrier and measurable nesting success</td>
<td>Annual grassland raptor surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, New England, Piedmont, Ridge and Valley

**Associated Species:** Wetland & upland grassland birds including Upland Sandpipers and Short-eared Owls
Northern Harrier  

---

**Circus cyaneus**

### THREATS AND ACTIONS

**IUCN Threat:** 11.0 Climate Change and Severe Weather  

**Specific Threat:** Nest site flooding from excessive rainfall; vulnerability of nest sites to predation as a result of drought.  

**Season:** Breeding

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase opportunities for nesting success during periods of excessive rainfall events.</td>
<td>Nesting success and overall higher fecundity per breeding pair.</td>
<td>Annual grassland raptor surveys</td>
</tr>
</tbody>
</table>

A combination of upland and wetland mitigation projects that would facilitate buffering the impacts of extreme weather events. (e.g. creation of additional wetlands and uplands in appropriate areas surrounding core habitat; install mechanisms that facilitate raising and lowering water levels during excessive precipitation events or periods of drought)

**Action Location:** Physiographic Province: Appalachian Plateaus, New England, Piedmont, Ridge and Valley

**Associated Species:** Wetland bird species including rails, herons, egrets

### RESEARCH NEEDS

1. **Breeding**- Determine current status and distribution of breeding population of Northern Harrier in PA using best available information (2nd PABBA, eBird reports, pers. comm.). Conduct additional surveys in suitable habitat areas to include areas of historic nesting to determine extent of actual number of breeding males and females.

2. **Breeding**- 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 populations and local breeding pairs no longer occur.

3. **Breeding**- Examine other factors besides habitat loss that potentially contribute, directly or indirectly, to the decline of breeding northern harrier population in PA and surrounding states (e.g. rodenticides, water pollution (chemical and sediment) originating from agriculture, industry or private lands, methyl mercury levels, lead contamination, nest predation and or failure, agricultural practices, etc.).
Northern Harrier

SURVEY NEEDS

1. Breeding- Breeding season surveys in core and supporting areas where harriers have been confirmed or probable during the breeding season over the last five years (2nd BBA, eBird reports, personal comm.). Determine reproductive status and success, nest survivorship and fledgling success.

2. Breeding- 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.

3. Breeding- Conduct small mammal surveys to determine local and regional abundance of prey species necessary for long term reproductive success of Northern Harrier.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat reclamation projects: present and future Surface Mine Reclamation Act (SMRA)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/community/abandoned_mine_reclamation/13961">http://www.portal.state.pa.us/portal/server.pt/community/abandoned_mine_reclamation/13961</a></td>
<td>surface mine reclamation in areas near known nesting areas that result in beneficial habitat supporting foraging and or nesting Northern Harriers during breeding season.</td>
</tr>
<tr>
<td>Surveys during breeding and overwintering seasons</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Conduct statewide surveys focused specifically on breeding Northern Harrier populations to determine if changes have occurred since the completion of the 2nd Breeding Bird Atlas. Assess changes in breeding population of Northern Harrier in Pennsylvania.</td>
</tr>
</tbody>
</table>

PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
CONSERVATION PROFILE

Global Rank | G5  
IUCN Red List | LC Least Concern  
State Rank | S3B, S5N (M)  
Northeast Region | Not NE Regional SGCN  
Federal Status | Not Listed  
PA Legal Status | Protected  
PA Abundance | 11000  
PA Short-Term Trend (10 year) | (B) Unknown; (M) Increase of >25%

Conservation Goal:
Maintain or increase species breeding population or habitat in Pennsylvania to include nesting territories in at least 950 atlas blocks by 2025, as referenced by the Second Atlas of Breeding Birds (Wilson et al. 2012). Maintain species migratory population at current or higher levels, as measured by Pennsylvania’s raptor counts, through 2025.

HABITAT ASSOCIATIONS

Primary Habitat
(B,M) Appalachian (Hemlock)-Northern Hardwood Forest

Secondary Habitat
(B,M) Northern Hardwood & Conifer

Specific Habitat Requirements:
(B,M) Large, contiguous coniferous or mixed conifer/deciduous forests, away from suburban areas or areas of human consistent human activity.
(B) Dense forest stands of either conifers or younger forest used for nesting. Nesting birds use forest openings, dirt roads or right of ways for foraging.
(M) Migrants select large or contiguous forests greater than 200 hectares (Goodrich 2010) often near streams or rivers or wet thickets.

B = Breeding, M = Migration, W = Wintering
## Sharp-shinned Hawk

### Accipiter striatus

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season: Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in younger deciduous or conifer forest habitat and fragmentation or disturbance of large blocks of forest. Lack of conifer patches in large forest blocks.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>In next five years, create handouts on importance of conifer patches within deciduous forest matrix and implement promotion of this through forestry organizations</td>
<td>Acres of conifer cover and ratio of conifer to deciduous forest</td>
<td>Monitor number of foresters participating in program and over ten year period establishment of new conifer patches or stands</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Black-throated Green Warbler, Northern Goshawk, Broad-winged Hawk, Blue-headed Vireo

---

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season: Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in dense forest structure due to overbrowsing by white-tailed deer; Loss of conifers in Pennsylvania forests, especially hemlock to adelgid infestations.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Continue studies of forest health or support continued work at university level</td>
<td>Regeneration of native forest</td>
<td>Monitor forest regeneration rates in test plots around the state; monitor number of deer per state management area</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Wood Thrush, Ruffed Grouse, etc.
**Sharp-shinned Hawk**  
*Accipiter striatus*

### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest fragmentation reduces suitable nesting habitat, prey availability, and may increase interspecific conflict.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Residential and Commercial Development</td>
<td>Breeding</td>
</tr>
</tbody>
</table>

#### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>In next 10 years, implement state wide private forest land habitat management incentives to conserve forested blocks and protect or reestablish native conifer patches within large deciduous forest areas; In next 10 years, provide educational information and incentives to public land managers to conserve native conifer stands within large forest blocks and provide patches of young forest stands within forest matrix.</td>
<td>Number of landowners conserving forest blocks; percent conifer cover and/or proportion of young forest stands in larger forest blocks.</td>
<td>Monitor coniferous forest cover by region using GIS; Monitor landowner participation in forest conservation incentives; monitor number of nesting pairs in managed areas or in response to forest stand management and incentives with pre and post project playback surveys.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Ruffed Grouse, Rose-breasted Grosbeak, Blackburnian Warbler, Black-throated Green Warbler, Blue-headed Vireo

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**
# Sharp-shinned Hawk

**Accipiter striatus**

## Threats and Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>In next 5 years, create education outreach on importance of contiguous forest habitat and provide to companies and municipalities. Use Atlas data to identify key forest blocks for nesting birds including this species and restrict as possible extensive drilling and fragmentation in these areas. Require reforestation post-drilling. Work with industrial forest owners to maintain contiguous forest blocks and conifer stands in areas away from drilling activities.</td>
<td>Acres of unfragmented forest and proportion of conifer or mixed conifer-deciduous forest; number of shale drilling companies and other large scale forest owners adopting forest conservation measures.</td>
<td>Conduct baseline and tri-annual surveys for this species and other large forest-dependent species in Marcellus Shale impacted forests. Monitor forest fragmentation in northern counties monitor the trend in Sharp-shinned Hawks and other species associated with large forests and conifer stands.</td>
<td>2</td>
</tr>
</tbody>
</table>

### Action Location: Physiographic Province: Appalachian Plateaus

### Associated Species: Northern Goshawk, Broad-winged Hawk

## Specific Threat:

Forest fragmentation reduces suitable nesting habitat, prey availability, and may increase interspecific conflict.
# Sharp-shinned Hawk

**Accipiter striatus**

## Threats and Actions

### IUCN Threat: 4.0 Transportation and Service Corridors

### Specific Threat: Fragmentation of nesting forests and disturbance of nesting areas from noise and traffic.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>In next 5 years, create education outreach on importance of contiguous forest habitat and provide to companies and municipalities. Use Atlas data to identify key forest blocks for nesting birds including this species and restrict as possible extensive drilling and fragmentation in these areas. Require reforestation post-drilling. Work with industrial forest owners to maintain contiguous forest blocks and conifer stands in areas away from drilling activities.</td>
<td>Acres of unfragmented forest and proportion of conifer or mixed conifer-deciduous forest; number of shale drilling companies and other large scale forest owners adopting forest conservation measures.</td>
<td>Conduct baseline and tri-annual surveys for this species and other forest-dependent species in Marcellus Shale impacted forests. Monitor forest fragmentation in northern counties monitor the trend in Sharp-shinned Hawks and other species associated with large forests and conifer stands.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Northern Goshawk, Broad-winged Hawk

---

### IUCN Threat: 11.0 Climate Change and Severe Weather

### Specific Threat: Climate change may change forest structure and composition; possible loss of conifer component would be detrimental.

<table>
<thead>
<tr>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>In next five years, create handouts on importance of conifer patches within deciduous forest matrix and implement promotion of this through forestry organizations</td>
<td>Acres of conifer cover and ratio of conifer to deciduous forest</td>
<td>Monitor forest inventory plots, identify composition changes as they occur; promote additional conifer stands to maintain or improve component at 2014 levels</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Black-throated Green Warbler, Northern Goshawk, Broad-winged Hawk, Blue-headed Vireo

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Published September 2015
## THREATS AND ACTIONS

### Sharp-shinned Hawk

**Accipiter striatus**

#### IUCN Threat: 5.0 Biological Resource Use

**Specific Threat:** Reduced roosting and foraging habitat in industrial forest stands.

**Action** | **Objective** | **Measure** | **Monitoring** | **Priority**
--- | --- | --- | --- | ---
TRACS Action 2.0 Direct Management of Natural Resources | Implement education outreach to agencies managing land on migration corridors such as Blue Mountain. | Acres of contiguous forest. | Monitor acres by forest age in managed forests along migration corridors. | 1

Provide guidance to foresters in migration corridors to maintain some mature forest blocks along Blue Mountain and other key migration corridors (see Wurzbacher 2013).

**Action Location:** Physiographic Province: Ridge and Valley

**Associated Species:** Neotropical songbirds, Broad-winged Hawk, Cerulean Warbler

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Development along migratory corridors can reduce stopover habitat for migrating Sharp-shinned Hawks.

**Action** | **Objective** | **Measure** | **Monitoring** | **Priority**
--- | --- | --- | --- | ---
TRACS Action 1.0 Coordination and Administration | In next 10 years, implement state wide private forest land habitat management incentives to conserve forested blocks and protect or reestablish native conifer patches within large deciduous forest areas; In next 10 years, provide educational information | Number of landowners conserving forest blocks; percent conifer cover and/or proportion of young forest stands in larger forest blocks. | Monitor coniferous forest cover by region using GIS; Monitor landowner participation in forest conservation incentives; monitor number of nesting pairs in managed areas or in response to forest stand management and incentives with pre and post project playback surveys. | 2

Provide incentives such as tax relief or planning assistance to owners of large forests to conserve forest blocks, particularly in Poconos, Appalachians, and Northern Hardwoods. Work with conservancies to conserve forest blocks owned by smaller landowners particularly mixed deciduous-conifer areas, through easements and other resources. Work with industrial forest land owners to conserve conifer stands and provide patches of younger age forest stand habitat.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ruffed Grouse, Northern Goshawk, Broad-winged Hawk, Scarlet Tanager

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Published September 2015
### Threats and Actions

#### Specified Threat:
Reduction and fragmentation of large forested areas along Lake Erie shoreline and on and near Appalachian ridges.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>In next 10 years, implement state wide private forest land habitat management incentives to conserve forested blocks and protect or reestablish native conifer patches within large deciduous forest areas; In next 10 years, provide educational information and incentives to public land managers to conserve native conifer stands within large forest blocks and provide patches of young forest stands within forest matrix.</td>
<td>Number of landowners conserving forest blocks; acres of conserved forest along migration corridors.</td>
<td>Monitor forest cover by region using GIS; Monitor landowner participation in forest conservation incentives within 1-3 miles of migration corridor.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Ridge and Valley

**Associated Species:** Neotropical songbirds, Broad-winged Hawk, Cerulean Warbler

#### IUCN Threat: 3.0 Energy Production and Mining

**Season:** Migration

#### Specific Threat:
Reduced habitat availability and foraging opportunities during migration from human recreational disturbance.

<table>
<thead>
<tr>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Implement outreach to municipal leaders</td>
<td>Zoning for low impact uses in migration corridors</td>
<td>Monitor land use and zoning over time</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Ridge and Valley

**Associated Species:** Neotropical songbirds, Broad-winged Hawk, Cerulean Warbler
**Sharp-shinned Hawk**

**Accipiter striatus**

**THREATS AND ACTIONS**

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Fragmentation of forest patches along migratory corridors and increase in vehicle strikes.

**Season:** Migration

<table>
<thead>
<tr>
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<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Implement education to municipalities on importance of state flyways and reduced vehicular traffic where possible.</td>
<td>Volume of roadways in key flyways</td>
<td>Monitor road volume and traffic by region using GIS;</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Ridge and Valley

**Associated Species:** Neotropical songbirds, Broad-winged Hawk, Cerulean Warbler

**RESEARCH NEEDS**

1. Breeding- 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.

2. Migration- 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 there may be 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.

3. Breeding- Assess habitat use patterns of nesting Sharp-shinned Hawks in north central counties and their sensitivity or tolerance to shale extraction activities.

4. Migration- 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 tracking exposure in other forest birds.

5. Breeding- Gain better understanding of year-round habitat use and movement patterns of Pennsylvania nesting birds by using radio-telemetry or newly developed small satellite-tags or data loggers. 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.

6. Migration- Use ongoing Pennsylvania migration counts to evaluate trends in PA migrant populations (www.rpi-project.org); tap birders to help refine and improve our knowledge of other migration corridors in the state ridge and valley region, Appalachians, and near Lake Erie, i.e. conduct two-season counts in potential corridors to determine their importance and use by this species and others so migrant populations can be better conserved (e.g. Golden Eagles).
SURVEY NEEDS

1. Breeding- 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.

1. Migration- Conduct 1-2 year counts of numbers of birds using other key ridges in Appalachian chain and along Lake Erie shoreline or other potential concentration areas in spring and fall season. 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.

2. Breeding- Once wintering region for Pennsylvania Sharp-shinned Hawks is defined, use Christmas Bird Count data from current through historical to examine trends in wintering populations.

2. Migration- Encourage additional banding station 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, fat levels on migrants to provide index to migrant health annually.

3. Breeding- Once wintering areas defined, examine trends in winter raptor surveys for this species throughout the wintering range and compare to other population indices available.

3. Migration- Encourage consistent migration counts at hawk count sites immediately south of Pennsylvania and during spring in Pennsylvania. Partner with HMANA 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 PA spring migration sites (e.g., RPI).

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>National Audubon Society Christmas Bird Counts</td>
<td>National Audubon Society</td>
<td><a href="http://birds.audubon.org/christmas-bird-count">http://birds.audubon.org/christmas-bird-count</a></td>
<td>Since 1900, this is an annual winter survey of more than 2,300 count circles worldwide. The longest running Citizen Science survey in the world, Christmas Bird Count provides critical data on population trends.</td>
</tr>
</tbody>
</table>
### Sharp-shinned Hawk

**Accipiter striatus**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
<tr>
<td>Winter Raptor Survey</td>
<td>HMANA or Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirds.org">http://www.pabirds.org</a> <a href="http://www.hmana.org">http://www.hmana.org</a></td>
<td>Road surveys in winter are conducted on the same road route annually; two methods in use currently. Eventually data will be available to researchers on <a href="http://www.hmana.org">www.hmana.org</a>.</td>
</tr>
</tbody>
</table>
Northern Goshawk
*Accipiter gentilis*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Very High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **State Rank**: S2B, S2N (M), S3N (W)
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (B) Unknown; (M) Decline of 41 - 60%; (W) Decline of 11 - 40%

**Conservation Goal:**
Recover the nesting population to at least 75 nesting pairs statewide with an annual nesting success rate of 75%.

**HABITAT ASSOCIATIONS**

- **Macrogroup**
  - (B) Northern Hardwood & Conifer
  - (M) Central Oak-Pine

- **Habitat**
  - (B) Appalachian (Hemlock)-Northern Hardwood Forest
  - (M) Central Appalachian Pine-Oak Rocky Woodland

**Specific Habitat Requirements:**
- (B) Large tracks of old growth / mature mixed (hardwood/hemlock) forests with dense canopy for nesting, open understory, near water
- (M) Any forested habitat, including edges and ruderal forests, presumably.
- (W) Extensive forests; not well known.

*Photo: Jacob Dingel*

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*PENNSYLVANIA GAME COMMISSION*  
*PENNSYLVANIA FISH & BOAT COMMISSION*
### Northern Goshawk

**Accipiter gentilis**

#### Threats and Actions

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>5.0 Biological Resource Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Loss of conifers, and even-age management on private land</td>
</tr>
</tbody>
</table>

**Action:** Model goshawk forest habitat to identify critical habitat, and develop BMPs for timber management within most suitable sites.

**Objective:** Conservation of forest blocks

**Measure:** Nesting success.

**Monitoring:** Nesting population size

<table>
<thead>
<tr>
<th>Priority</th>
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<tr>
<td>1</td>
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</tbody>
</table>

**Associated Species:** Interior forest species

#### Threats and Actions

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>8.0 Invasive and Other Problematic Species and Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Invasive species.</td>
</tr>
</tbody>
</table>

**Action:** Model goshawk forest habitat to identify critical habitat, and develop BMPs for timber management within most suitable sites.

**Objective:** Conservation of forest blocks

**Measure:** Nesting success.

**Monitoring:** Nesting population size

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</table>

**Associated Species:** Interior forest species

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**IUCN Threat:** Breeding

**TRACS Action:** Planning

**Season:** Breeding

**TRACS Action:** Land and Water Rights Acquisition and Protection

**Season:** Breeding
## Northern Goshawk

### Accipiter gentilis

### Threats and Actions

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Action Location</th>
<th>Associated Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest fragmentation from any gas, coal, oil, or wind development in forested settings</td>
<td>Breeding</td>
<td>3.0 Energy Production and Mining</td>
<td>11.0 Technical Assistance</td>
<td>Physiographic Province: Appalachian Plateaus, HUC4 Watershed: Allegheny, Susquehanna</td>
<td>Interior forest species</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maintain records in PNDI to assure known sites are protected from direct development.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nesting success. Nest abandonment</td>
<td>Nest abandonment 2</td>
</tr>
<tr>
<td>Forest fragmentation by gas pipelines, service road expansion, powerlines</td>
<td>Breeding</td>
<td>4.0 Transportation and Service Corridors</td>
<td>11.0 Technical Assistance</td>
<td>Physiographic Province: Appalachian Plateaus, Ridge and Valley, HUC4 Watershed: Allegheny, Susquehanna</td>
<td>Interior forest species</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maintain records in PNDI to assure known sites are protected from direct development.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nesting success. Nest abandonment</td>
<td>Nest abandonment 2</td>
</tr>
</tbody>
</table>
**Northern Goshawk**

**Accipiter gentilis**

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Suburban sprawl into forested stands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Avoid development within CPP Core buffers during nesting season of all known sites.</td>
<td>Nesting success.</td>
<td>Nest abandonment</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Appalachian Plateaus
- **HUC4 Watershed:** Allegheny, Susquehanna
- **Associated Species:** Interior forest species

**Season:** Breeding

---

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Suburban sprawl into forested stands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Extensive forest blocks</td>
<td>Forested ridges</td>
<td>Goshawk migrant counts</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide
- **Associated Species:** Migrant raptors

**Season:** Migration

---
# Northern Goshawk

## Accipiter gentilis

### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Specific Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 Energy Production and Mining</td>
<td>Forest fragmentation from any gas, coal, oil, or wind development in forested settings</td>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Extensive forest blocks</td>
<td>Forested ridges</td>
<td>Goshawk migrant counts</td>
<td>3</td>
</tr>
<tr>
<td>3.0 Energy Production and Mining</td>
<td>Forest fragmentation by gas pipelines, service road expansion, powerlines</td>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Extensive forest blocks</td>
<td>Forested ridges</td>
<td>Goshawk migrant counts</td>
<td>3</td>
</tr>
<tr>
<td>3.0 Energy Production and Mining</td>
<td>Loss of conifers, and even-age management on private land</td>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Extensive forest blocks</td>
<td>Forested ridges</td>
<td>Goshawk migrant counts</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Migrant raptors

**Season:** Migration

---

**IUCN Threat:**

- **Energy Production and Mining:** 3.0
- **Transportation and Service Corridors:** 4.0
- **Biological Resource Use:** 5.0

**TRACS Action:**

- **Facilities and Areas:** 5.0

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**Associated Species:**

- Migrant raptors

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**Monitoring:**

- Goshawk migrant counts

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**Published September 2015**

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**
**Northern Goshawk**

**Accipiter gentilis**

### THREATS AND ACTIONS

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Disruption of foraging opportunities

**Season:** Migration

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Short-term disturbances in extensive forest blocks.</td>
<td>Goshawk numbers at hawk watches</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Model prime goshawk forest habitat, and develop BMPs for timber management within most suitable sites. (see Saunders and Arseneault 2013).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species</td>
<td>Migrant forest raptors, forest interior species</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss of intact forest from suburban sprawl into forested stands.

**Season:** Winter

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Extensive forest blocks</td>
<td>Christmas Bird Counts</td>
<td>3</td>
</tr>
<tr>
<td>Model prime goshawk forest habitat, and develop BMPs for timber management within most suitable sites.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species</td>
<td>Interior forest species</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Northern Goshawk

Accipiter gentilis

**RESEARCH NEEDS**

1. **Breeding**- 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, and evaluate factors.

1. **Migration**- Cause of declines in migratory goshawk populations.

1. **Wintering**- Find if there are any linkages between breeding and wintering populations.

2. **Breeding**- Determine limiting factors for goshawk breeding populations including response to goshawk nesting pairs to residential and energy-based development effects on forest block size and goshawk territory persistence, or if there are other limiting factors for goshawk populations including diseases such as West Nile Virus, nest predation by fishers and other species, and nest disturbance / taking of young by falconers or wildlife observers.

2. **Migration**- Use ongoing Pennsylvania migration counts to evaluate trends in PA migrant populations (www.rpi-project.org); tap birders to help define and improve our knowledge of other migration corridors in the state ridge and valley region, Appalachians, and near Lake Erie, i.e., conduct two-season counts in potential corridors to determine their importance and use by this species and others so migrant populations can be better conserved (e.g. Golden Eagles).

3. **Breeding**- 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. This project could be part of a multi-state effort in the Northern Appalachians (WV, MD, PA, NY).

3. **Migration**- Determine of there are any links between breeding & migrant populations.

**SURVEY NEEDS**

1. **Breeding**- Basic status information is lacking. Need basic evaluation of breeding population size and distribution especially outside of best-studied NW region (ANF). Survey spring gobbler turkey hunters for leads on possible nests. A modified duplication of study in western Great Lakes for the northern Appalachians needed.

1. **Migration**- None

1. **Wintering**- Connection between breeding population and wintering population through marked birds.

2. **Breeding**- Detection rates should be established in good habitat to establish a benchmark for evaluating populations and habitat suitability. Test of USDA FS monitoring protocol, perhaps altered for use in region, needed to streamline effective protocol monitoring.

3. **Breeding**- Evaluation of nesting success, to determine population viability and limiting factors for nesting goshawk populations.
### Northern Goshawk

**Accipiter gentilis**

#### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
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<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>National Audubon Society Christmas Bird Counts</td>
<td>National Audubon Society</td>
<td><a href="http://birds.audubon.org/christmas-bird-count">http://birds.audubon.org/christmas-bird-count</a></td>
<td>Since 1900, this is an annual winter survey of more than 2,300 count circles worldwide. The longest running Citizen Science survey in the world, Christmas Bird Count provides critical data on population trends.</td>
</tr>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
<tr>
<td>PGC Species of Special Concern Monitoring and PNDI</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Reports of Northern Goshawk breeding pairs, territories, nests are pursued to verify species presence and find nests</td>
</tr>
</tbody>
</table>

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PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
Conservation Profile

Conservation Goal:
Maintain breeding range across the state at levels detected during the Second Atlas of Breeding Birds (1725 atlas blocks; Wilson et al. 2012) and increase forest habitat available and species range in southern counties by 2025.

Habitat Associations

Primary
- (B) Appalachian (Hemlock)-Northern Hardwood Forest
- (M) Northeastern Interior Dry-Mesic Oak Forest

Secondary
- (B) Northern Hardwood & Conifer
- (M) Central Oak-Pine

Specific Habitat Requirements:
(B, M) Continuous deciduous or mixed deciduous forests with openings and water source nearby.

B = Breeding, M = Migration, W = Wintering
**Broad-winged Hawk**

**Buteo platypterus**

**THREATS AND ACTIONS**

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Forest fragmentation reduces suitable nesting habitat, prey availability, and may increase interspecific conflict.

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>In next 10 years, implement statewide private forest land habitat management incentives to conserve forested blocks and reestablish deciduous forest cover adjacent to large forest patches; In next 10 years, provide educational information and incentives to public land managers to maintain contiguous forest cover particularly in southern counties.</td>
<td>Number of acres of forest per region and number of large forest patches (&gt;1000 acres) and proportion of forest to developed or open areas.</td>
<td>Monitor forest cover by region annually using GIS; Monitor number of landowners participating in forest conservation incentives and acres of forest restored; monitor number of nesting pairs or occurrences of Broad-winged Hawks and in response to forest cover incentives. Monitor acres of public land in forest in southeast and southcentral counties.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Sharp-shinned Hawk, Scarlet Tanager, Northern Waterthrush, Worm-eating Warbler
### Broad-winged Hawk

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Gypsy moth infestations reduce canopy cover at nest sites; Hemlock Wooly Adelgid and pine infections reduce conifer component in forest and white-tailed deer overbrowsing reducing prey dependent on shrub and ground cover.

### Threats and Actions

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Minimize impacts of nonnative invasive insects and deer on forest-nesting raptors.</td>
<td>Acres defoliated and proportion of hemlocks infested and numbers of white-tailed deer per acre.</td>
<td>Monitor numbers and distribution of Broad-winged Hawks; and, monitor forest health.</td>
</tr>
</tbody>
</table>

**Objective:** Minimize impacts of nonnative invasive insects and deer on forest-nesting raptors.

**Measure:** Acres defoliated and proportion of hemlocks infested and numbers of white-tailed deer per acre.

**Monitoring:** Monitor numbers and distribution of Broad-winged Hawks; and, monitor forest health.

**Priority:** 1

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Sharp-shinned Hawk, Scarlet Tanager, Northern Waterthrush, Worm-eating Warbler

### IUCN Threat: 3.0 Energy Production and Mining

**Specific Threat:** Fragmentation of forest habitat and disturbance of nesting forests with activities around extraction sites.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Maintain undisturbed forest cover for nesting Broad-winged Hawks, particularly during May through mid-July</td>
<td>Number of nesting pairs per forest unit before, during and after activities.</td>
<td>Estimate number of nesting pairs using forest raptor surveys in select forest blocks per region with and without energy development and during next 10 years.</td>
</tr>
</tbody>
</table>

**Objective:** Maintain undisturbed forest cover for nesting Broad-winged Hawks, particularly during May through mid-July

**Measure:** Number of nesting pairs per forest unit before, during and after activities.

**Monitoring:** Estimate number of nesting pairs using forest raptor surveys in select forest blocks per region with and without energy development and during next 10 years.

**Priority:** 2

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Sharp-shinned Hawk, Scarlet Tanager, Northern Waterthrush, Worm-eating Warbler
### Broad-winged Hawk

**Buteo platypterus**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>May be killed by cars when hunting along roadside.</td>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Reduce traffic fatalities and interactions of fast-moving vehicles and forest raptors</td>
<td>Number of road-killed hawks; miles of roads by type of road category (dirt, two lane paved, four lane paved) within large forested areas</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide
- **Associated Species:** Wood Thrush, Sharp-shinned Hawk, Scarlet Tanager, Northern Waterthrush, Worm-eating Warbler

#### IUCN Threat: 4.0 Transportation and Service Corridors

**Season:** Breeding

### Season: IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Forest fragmentation along migratory routes.

<table>
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<tbody>
<tr>
<td><strong>TRACS Action 6.0</strong> Land and Water Rights Acquisition and Protection</td>
<td>Maintain forested areas for stopover particularly in southern, highly developed areas also used by birds and along Lake Erie shoreline or within five miles of such.</td>
<td>Acres of conserved public and private forest per County within main migration pathways.</td>
<td>Monitor forest cover and conserved forest land by county particularly in Appalachian Mountains and regions to south and east of Appalachians and Eastern Lake region.</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide
- **Associated Species:** Neotropical migrant songbirds including Scarlet Tanager.
**Broad-winged Hawk**

*Buteo platypterus*

### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining  
**Season:** Migration

**Specific Threat:** Reduction and fragmentation of large forested areas along Lake Erie shoreline and on and near Appalachian ridges and establishment of industrial wind farms in migration corridors e.g. ridges and shoreline.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Maintain undisturbed migration areas and stopover habitat in key migration corridors within the state.</td>
<td>Acres of conserved public and private forest per County within main migration pathways; number of wind farms on ridges and Lake shoreline.</td>
<td>Monitor use of stopover sites along migration corridors; monitor large-scale energy infrastructure within migration corridors.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Golden Eagle, Scarlet Tanager, Cerulean Warbler, Golden-winged Warbler.

**IUCN Threat:** 4.0 Transportation and Service Corridors  
**Season:** Migration

**Specific Threat:** Large volume roadways may reduce stopover habitat for migrating flocks.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Limit high volume highways within migration corridors, primarily Appalachian Mountains, Blue Mountain and Eastern Lake shore.</td>
<td>Miles of two and four lane highways within migration corridors.</td>
<td>Track number of miles of highway within key migration corridors.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Golden Eagle, Sharp-shinned Hawk, Northern Harrier, Short-eared Owl, American Kestrel.
### THREATS AND ACTIONS

**Broad-winged Hawk**

**Buteo platypterus**

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Reduction of large forest patches for roosting migrants.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain forested areas for stopover particularly in southern, highly developed areas also used by birds and along Lake Erie shoreline or within five miles of each key corridor.</td>
<td>Acres of forest within migration corridors and nearby areas (4-5 mile radius)</td>
<td>Track acres of forest cover by county and along migration corridors.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Neotropical migrant songbirds including Scarlet Tanager.

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Reduction of undisturbed stopover or roosting sites.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain corridor of undisturbed or low disturbance areas of forest for stopover particularly in Appalachians, Blue Mountain, in Piedmont and along Lake Erie shoreline.</td>
<td>Acres of forest within or near migration corridors.</td>
<td>Track acres of forest cover by county and along migration corridors and zoning and use of such areas.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Neotropical migrant songbirds including Scarlet Tanager.
1. Breeding- 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.

1. Migration- Use satellite telemetry or band recoveries on migrating Broadwings to define nesting and wintering range of Pennsylvania migrants, i.e. define source populations. Augment this work with band recovery data and possibly stable isotopes from feathers of birds trapped during migration. Identify key stopover sites and their characteristics to inform conservation planning.

2. Breeding- Gain better understanding of year-round habitat use and movement patterns of Pennsylvania nesting birds by using radio-telemetry or newly developed small satellite-tags. Determine if sex or age classes use different habitats and winter in different locations.

2. Migration- Use ongoing Pennsylvania migration counts to evaluate trends in PA migrant populations (www.rpi-project.org); tap birders to help refine and improve our knowledge of other migration corridors in the state ridge and valley region, Appalachians, in Piedmont, and near Lake Erie, i.e. conduct three-season counts during peak migration period in potential hotspots or corridors to determine their importance and use by this species and others so migrant populations can be better conserved and stopover habitat defined (e.g. other species include Golden Eagles).

3. Breeding- Improve our understanding of prey selection in different forest types across the state conducting observations of nest sites for several years. Such data are important to understanding forest health impacts on the species. Conduct research in fragmented and unfragmented landscapes to evaluate impacts.

3. Migration- Use Satellite telemetry or standard telemetry to examine how far from migration streams birds travel in search of stopover sites. Use data to inform conservation planning around migration corridors.

1. Breeding- Develop effective monitoring technique for nesting population stratified by forest type, and an appropriate frequency (every 3-5 years?) that might track population trends effectively. Implement survey within next five years, and include other forest-raptors not well surveyed by other methods.

1. Migration- Conduct 1-2 year counts of numbers of birds using other key ridges in Appalachian chain and along Lake Erie shoreline or other potential concentration areas in spring and fall season. Although much is known about birds using Blue Mountain and in south east, less is known about volume using other ridges or valleys. Such data are critical to conservation planning.

2. Breeding- Monitor productivity at Broad-winged Hawk nests across the state periodically; have birders and land managers report on nests they locate and number of young produced.

2. Migration- Encourage additional banding station 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, fat levels on migrants to provide index to migrant health annually.

3. Breeding- Once wintering areas defined, partner with other conservation groups and state or federal agencies to implement trail or road surveys for Broadwings on the wintering grounds.
3. Migration - Encourage consistent migration counts at hawk count sites immediately south of Pennsylvania and during spring in Pennsylvania. Partner with HMANA to identify key sites, possibly provide small grants to sustain operation and to encourage each site’s historical hourly data entered and part of the current long-term migration monitoring program particularly for PA spring migration sites (e.g. RPI).

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Hawk Mountain Broad-wing Project</td>
<td>Hawk Mountain Sanctuary Association</td>
<td><a href="http://www.hawkmountain.org/Broadwing">http://www.hawkmountain.org/Broadwing</a></td>
<td>In 2014 with SWG grant, HMS established a webpage to collect sightings of nesting Broadwings from general public; observations are solicited from birders through e-lists and collected from eBird.</td>
</tr>
</tbody>
</table>
**Golden Eagle**  
*Aquila chrysaetos*

### Conservation Profile

**Global Rank**: G5  
**IUCN Red List**: LC Least Concern  
**State Rank**: S4N (M), S5N (W)  
**Northeast Region**: High Concern / High Responsibility  
**Federal Status**: Not Listed  
**Conservation Goal**: At least 150 migrants in both spring and fall at 2 or more hawk migration count sites in Pennsylvania.

### Habitat Associations

**Primary**  
(M) Central Appalachian Dry Oak-Pine Forest  
(W) Central Appalachian Pine-Oak Rocky Woodland

**Secondary**  
(M,W) Central Oak-Pine

**Specific Habitat Requirements:**  
(M) Inhabit rugged, mostly wooded terrain throughout the Allegheny Plateau and Valley and Ridge regions (Ombalski and Brandes 2010).  
(W) Habitat use poorly understood, although telemetry data show that golden eagles are primarily using forested areas in the winter (Katzner et al. 2012, Miller 2012).
### Golden Eagle

**Aquila chrysaetos**

#### THREATS AND ACTIONS

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Loss of forest cover due to development in remote areas, including from shale gas and wind energy development. |
| Season: | Migration |

<table>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Maintain unfragmented forest blocks through land use planning efforts.</td>
<td>Site new commercial or residential development in non-forested areas that will minimize fragmentation of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk

| IUCN Threat: | 3.0 Energy Production and Mining |
| Specific Threat: | Collisions with wind turbines during migration. |
| Season: | Migration |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Site new wind development projects in areas of low risk to wildlife, with special attention to golden eagles, which migrates earlier in the spring and later in the fall than other raptors.</td>
<td>All wind energy development companies operating in Pennsylvania participate in the PGC Wind Energy Voluntary Cooperative Agreement.</td>
<td>Number of wind companies participating in the agreement; number of wildlife mortalities.</td>
<td>Pre- and post-construction monitoring at potential and existing wind energy facilities.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
**Associated Species:** Silver-haired bat, little brown bat, big brown bat, tricolored bat
## THREATS AND ACTIONS

### Golden Eagle

**Aquila chrysaetos**

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Electrocution by power lines and/or collisions with utility poles, cell towers and power lines.

**Season:** Migration

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Reduce avian mortality</td>
<td>Number of utility companies with avian protection plans</td>
<td>Number of avian mortalities.</td>
<td>1</td>
</tr>
</tbody>
</table>

Encourage utility companies to implement an avian protection plan to minimize avian mortality risks.

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Bald Eagle, Peregrine Falcon

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Loss of suitable forest habitat from logging.

**Season:** Migration

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>No net loss of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
<td>1</td>
</tr>
</tbody>
</table>

Maintain unfragmented forest blocks through land use planning efforts.

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk
### Threats and Actions

#### Golden Eagle

**Aquila chrysaetos**

#### Threats and Actions

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Disturbance during migration from human activity at energy development sites.

**Season:** Migration

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Maintain unfragmented forest blocks through land use planning efforts.</td>
<td>Site new commercial or residential development in non-forested areas that will minimize fragmentation of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk

---

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss of forest cover due to energy development in remote areas.

**Season:** Winter

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Maintain unfragmented forest blocks through land use planning efforts.</td>
<td>Site new commercial or residential development in non-forested areas that will minimize fragmentation of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
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<tr>
<td></td>
<td></td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
Golden Eagle

**Aquila chrysaetos**

## THREATS AND ACTIONS

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Disturbance during wintering from human activity at energy development sites.

**Season:** Winter

<table>
<thead>
<tr>
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<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Site new commercial or residential development in non-forested areas that will minimize fragmentation of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk

## RESEARCH NEEDS

1. **Migration-** None

2. **Wintering-** To what degree is lead toxicity, ingested through scavenging on hunter-killed carcasses, a threat to wintering golden eagles?

3. **Wintering-** What are the habitat characteristics of areas used by wintering golden eagles and what prey items are important?

4. **Wintering-** With what frequency are golden eagles captured incidentally in leg-hold traps set for mammals?
SURVEY NEEDS

1. Migration - Encourage consistent migration monitoring effort, especially during the spring migration.

1. Wintering - Continue trail camera surveys especially in remote forested regions.

2. Migration - Pre- and post-construction monitoring at potential and existing wind energy facilities.

2. Wintering - Surveys that document areas consistently used by wintering golden eagles are needed.

3. Wintering - Pre- and post-construction monitoring at potential and existing wind energy facilities.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appalachian Eagles Project</td>
<td>West Virginia University</td>
<td><a href="http://www.appalachianeagles.org/">http://www.appalachianeagles.org/</a></td>
<td>Volunteers operate trail cameras at bait piles (road-killed deer) during the winter.</td>
</tr>
</tbody>
</table>
### CONSERVATION PROFILE

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / High Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S1B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

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

### HABITAT ASSOCIATIONS

<table>
<thead>
<tr>
<th>Macrogoup</th>
<th>Primary</th>
<th>Secondaray</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emergent Marsh</td>
<td>Wet Meadow / Shrub Marsh</td>
</tr>
<tr>
<td>Habitat</td>
<td>Laurentian-Acadian Freshwater Marsh</td>
<td>Laurentian-Acadian Wet Meadow-Shrub Swamp</td>
</tr>
</tbody>
</table>

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

B = Breeding, M = Migration, W = Wintering
# King Rail

**Rallus elegans**

## Threats and Actions

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

### Specific Threat: Habitat encroachment, loss of native plants that provide cover, food, nest materials; increase in plant species that afford little to no value for wetland bird species

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Provide optimal to near optimal habitat conditions for successful habitation and breeding success</td>
<td>Increased breeding success and survivorship of adults and young.</td>
<td>PGC marsh bird monitoring</td>
<td>1</td>
</tr>
</tbody>
</table>

Employ IPM strategies and actions to remove invasives and revegetate with appropriate native plants if and when necessary.

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Central Lowland

**Associated Species:** Rails, Pied-billed Grebe, herons, passerines

### IUCN Threat: 9.0 Pollution

### Specific Threat: Accumulation of Methylmercury (neurotoxin) in body tissues as a result of agricultural runoff (pesticides and sediments)

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce pollutant levels from point and non-point sources on lands and in waterways / wetlands including methyl mercury, agricultural chemicals (pesticides, herbicides and rodenticides), fertilizers, stormwater runoff.</td>
<td>Measureable reduction of specific pollutants [e.g. methyl mercury, lead, fertilizers (nitrogen, phosphorus), residual pesticides, sediment loads, . Reduced eutrophication and clearer water column), increased nesting success</td>
<td>PGC marsh bird monitoring</td>
<td>1</td>
</tr>
</tbody>
</table>

Monitor and assess all coal and oil fired power plants to ensure compliance with EPA's 2011 Mercury and Air Toxics Standards(MATS). Monitor and assess mercury emissions from concrete production facilities. Identify local and regional sources of non-point pollution including sedimentation of waterways and wetlands from agricultural, suburban and urban areas where stormwater runoff has become an increasing issue.

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Central Lowland

**Associated Species:** Rails, Pied-billed Grebe, herons, passerines
### King Rail

**King Rail**

**Rallus elegans**

### Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Natural succession, filling in of wetlands for agriculture or land development

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
</table>
| TRACS Action 2.0  
Habitat restoration projects | Reclaim, revegetate and expand wetland areas that provide appropriate ratio of emergent vegetation and open water. | Increase in number of breeding pairs of King Rail | PGC marsh bird monitoring | 2 |

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Central Lowland

**Associated Species:** Rails, Pied-billed Grebe, herons, passerines

### IUCN Threat: 11.0 Climate Change and Severe Weather

**Specific Threat:** Increase in water depth during breeding season, extended periods of drought resulting in insufficient water levels for prey and nest safety

<table>
<thead>
<tr>
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</thead>
</table>
| TRACS Action 2.0  
Implement wetland mitigation projects that would enable raising or lowering of water levels in response to extreme weather events. Create additional habitat in areas surrounding core habitat | Maintain adequate water levels (< 10 cm) during breeding and fledging seasons to accommodate specific need of birds relative to nesting and foraging habitat. | Occurrence of breeding pairs and measurable reproductive success. | PGC marsh bird monitoring | 2 |

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains, Central Lowland

**Associated Species:** Rails, Pied-billed Grebe, herons, passerines
King Rail

Rallus elegans

RESEARCH NEEDS

1. Breeding- Determine current status and distribution of King Rail in PA using best available information and conducting additional surveys in areas of known and historic occurrences. Support research to examine where the northern migrating population overwinters.

2. Breeding- 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 that could be employed in the future.

3. Breeding- Determine other factors besides loss of wetlands contributing to the decline of King Rail in Pennsylvania including agricultural practices, runoff and sedimentation, methyl mercury pollution, potential sources of lead contamination, mammalian predators of King Rail and their nests, muskrat trapping in areas where King Rail occur. Work collaboratively with other states and countries to determine where northern migrating populations of King Rail over-winter and assess possible impacts to this species on wintering grounds.

SURVEY NEEDS

1. Breeding- Breeding season surveys in areas where birds have been documented during 2nd BBA, recent eBird reports (within safe dates for sp.) and historic occurrences to determine number of breeding pairs within the state. Surveys should be done on foot and or by kayak or canoe depending on location.

2. Breeding- Survey and assess habitat quality relative to ecological needs of king rail in areas of present and historic occurrences. Focus should be on quality and quantity of vegetative cover (native, invasive and exotic plants), quality and quantity of water (sedimentation, pollution and water levels), prey abundance, and potential risk of disturbance.

3. Breeding- Water quality monitoring and invertebrate studies to examine factors contributing to prey availability and abundance. Plus surveys to determine presence/absence of known predators of King Rail and their nests.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Name</td>
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</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
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</tr>
</tbody>
</table>
| Monitoring Programs | Pennsylvania Game Commission | | Work collaboratively with other eastern and southern states as well as Canada and Mexico examining the migrating population of King Rail to assess potential impacts to this northern population on their wintering grounds. | inform management of these wetlands. Project would be a multi-member effort which would involve numerous state, federal and national agencies, NGOs, academic and independent researchers with vested interests in management and conservation of North American KIRA populations.
**Virginia Rail**
*Rallus limicola*

**CONSERVATION PROFILE**
- **Global Rank**: G5
- **State Rank**: S3B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**Conservation Goal:**
Breeding-season detection in at least 150 wetland sites statewide through 2025, as reflected in the Second Atlas of Breeding Birds (Wilson et al. 2012).

**HABITAT ASSOCIATIONS**
- **Primary Macrogroup**: Emergent Marsh
- **Primary Habitat**: Laurentian-Acadian Freshwater Marsh

**Specific Habitat Requirements:**
Shallow-intermediate depth emergent wetlands with a mosaic of open water and dense emergent vegetation.

*Photo: Jacob Dingel*
### Virginia Rail

**Rallus limicola**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>Wetland filling/encroachment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>No net loss of wetland habitat</td>
<td>No net loss of wetland habitat in 10 years</td>
<td>Stable to increased occupancy statewide</td>
</tr>
</tbody>
</table>

- **Avoid, minimize, or mitigate wetland losses, even those < 5 acres**
- **Physiographic Province:** Statewide
- **Associated Species:** All rails, most ardeids and ducks, shorebirds, facultative wetland songbirds

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>Array of wetland plants including phragmites, purple loosestrife, and narrow-stemmed cattail</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Remove dense invasive growth in large wetlands.</td>
<td>Number of acres treated</td>
<td>Increased occupancy of Virginia Rail at treatment site</td>
</tr>
</tbody>
</table>

- **Largely physical removal with motorized and/or hand tools; long-term and less reliable biological control with insect predator from native continent may be available.**
- **Physiographic Province:** Statewide
- **Associated Species:** All rails, most ardeids and ducks

---

**IUCN Threat:** 7.0 Natural System Modifications

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Season:** Breeding
# Virginia Rail

**Rallus limicola**

## THREATS AND ACTIONS

### Specific Threat:
- Bioaccumulation of toxins from agricultural runoff, industrial and municipal waste.

### Action

<table>
<thead>
<tr>
<th>TRACS Action</th>
<th>Direct Management of Natural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enforcement of local, state and regional waste water treatment regulations. Strengthening of nonpoint source pollution regulations and technical assistance in areas draining into high priority sites.</td>
<td></td>
</tr>
</tbody>
</table>

**Objective**
- Sustain wetland quality through wastewater treatment operations in municipalities where water feeds into high priority breeding sites. Strengthen nonpoint source pollution regulations and technical assistance.

**Measure**
- Number of facilities meeting standards; number of nonpoint source improvements

**Monitoring**
- Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.

**Priority**
- 3

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Other rails

### IUCN Threat:
- 9.0 Pollution

### Season:
- Breeding

### Specific Threat:
- Greater frequency/severity of drought in summers

### Action

<table>
<thead>
<tr>
<th>TRACS Action</th>
<th>Direct Management of Natural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire, restore, and manage a diversity of wetlands to build resiliency of landscape-level habitat and Virginia rail populations against potential climate-related habitat loss and degradation.</td>
<td></td>
</tr>
</tbody>
</table>

**Objective**
- Maintain large-wetland water levels.

**Measure**
- Number of facilities meeting standards; number of nonpoint source improvements

**Monitoring**
- Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.

**Priority**
- 3

**Action Location:** Physiographic Province: Statewide

**Associated Species:** All rails, most ardeids and ducks

### IUCN Threat:
- 11.0 Climate Change and Severe Weather

### Season:
- Breeding
Virginia Rail

RESEARCH NEEDS

1. Breeding- Continued research into Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of declines, including response to wetland management.

2. Breeding- Effectiveness of vocalization surveys for estimating population density or indexing population trends


SURVEY NEEDS

1. Breeding- Continue PGC marshbird 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).

2. Breeding- Use PA eBird as an efficient way to gather information on Virginia rail distribution, breeding locales, migratory stopover sites, and timing of migration.

3. Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys, in collaboration with USFWS Harvest Information Program.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audubon PA Important Bird Area Surveys</td>
<td>Audubon Pennsylvania</td>
<td></td>
<td>Marsh bird surveys at Important Bird Areas designated due to their importance to wetland birds. Standardized marshbird protocols as described in PGC Marsh Bird Surveys and volunteer surveys.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
</tbody>
</table>
### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<th>Description</th>
</tr>
</thead>
</table>
**Sora**
*Porzana carolina*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
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<tr>
<td>Northeast Region</td>
<td>High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S3B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**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).

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary Habitat</th>
<th>Secondary Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Laurentian-Acadian Freshwater Marsh</td>
<td>North-Central Appalachian Acidic Swamp</td>
</tr>
<tr>
<td>Secondary</td>
<td>Northern Swamp</td>
<td></td>
</tr>
</tbody>
</table>

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

*Photo: Jacob Dingel*
### Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Conversion of emergent wetlands to open water wetlands; draining of minor emergent wetlands; alteration and/or development of surrounding uplands

<table>
<thead>
<tr>
<th>Action Location</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Approach all adjoining landowner(s) to discuss water/lake management agreements that are compatible with planned use of surrounding uplands.</td>
<td>Number of landowners approached; Number of agreements reached.</td>
<td>Annually monitor breeding marsh birds via (PA modified) North American Marsh Bird Monitoring Protocol. Use Large Wetland species playback. Record vegetation condition. Conduct survey annually during Early (May 15-June 15) and Late (June 16 - July 15) seasons. 10 year duration.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** King Rail, Virginia Rail, American Coot, Common Gallinule, Least Bittern, American Bittern, multiple waterfowl
## Sora

### Porzana carolina

#### THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Invasive species in breeding sites provide inferior food and cover and may choke out open water areas necessary for breeding.

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<td>Number of acres restored; Number of suitable acres maintained.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** King Rail, Virginia Rail, American Coot, Common Gallinule, Least Bittern, American Bittern, multiple waterfowl

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**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Reproduction would be impacted by severe spring precipitation events as well as spring or summer droughts.

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**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** King Rail, Virginia Rail, American Coot, Common Gallinule, Least Bittern, American Bittern, multiple waterfowl

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015

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</tr>
</tbody>
</table>
Sora

Porzana carolina

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Bioaccumulation of toxins from pollution sources including agricultural runoff, industrial and municipal waste.

**Season:** Breeding

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<td>Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** King Rail, Virginia Rail, American Coot, Common Gallinule, Least Bittern, American Bittern, multiple waterfowl

RESEARCH NEEDS

1. Breeding- Continued research into Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of declines, including response to wetland management.

2. Breeding- Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.

3. Breeding- 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.

SURVEY NEEDS

1. Breeding- Continue PGC marshbird surveys annually and expand efforts to smaller wetlands when possible, especially those with history of this species, or that are newly created.

2. Breeding- Use PA eBird as an efficient way to gather information on sora distribution, breeding locales, migratory stopover sites, and timing of migration.

3. Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys, in collaboration with USFWS Harvest Information Program.)
### MONITORING PROGRAMS

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Common Gallinule

Gallinula galeata

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed

State Rank: S2B
PA Legal Status: Protected
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

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 2025.

HABITAT ASSOCIATIONS

Primary
Macrogroup: Lakes
Habitat: Eutrophic, High Alkalinity Lake

Secondary
Habitat: Laurentian-Acadian Freshwater Marsh
Specific Habitat Requirements:
Large shallow-intermediate depth wetlands with a 1:1 ratio of open water and emergent vegetation and vegetated fringes.

B = Breeding, M = Migration, W = Wintering
### Common Gallinule  
*Gallinula galeata*

#### Threats and Actions

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Invasive species in breeding sites provide inferior food and cover and may choke out open water areas necessary for breeding.

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**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains; HUC8 Watershed: Lwr Delaware

**Associated Species:** King Rail, Virginia Rail, American Coot, Sora, Least Bittern, American Bittern, multiple waterfowl

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**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Reproduction would be impacted by severe spring precipitation events as well as spring or summer droughts.

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**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains; HUC8 Watershed: Lwr Delaware

** Associated Species:** King Rail, Virginia Rail, American Coot, Sora, Least Bittern, American Bittern, multiple waterfowl
Common Gallinule

**Gallinula galeata**

### THREATS AND ACTIONS

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<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Identify best management practices on public sites. Inventory private parcels which may support breeding pairs.</td>
<td># best management practices developed; # landowners approached; # agreements reached.</td>
<td>Annually monitor breeding marsh birds via (PA modified) North American Marsh Bird Monitoring Protocol. Use Large Wetland species playback. Record vegetation condition. Conduct survey annually during Early (May 15 - June 15) and Late (June 16 - July 15) seasons. 10 year duration.</td>
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**Season:** Breeding

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Conversion of emergent wetlands to open water wetlands; draining of minor emergent wetlands; alteration and/or development of surrounding uplands.

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains; HUC8 Watershed: Lwr Delaware

**Associated Species:** King Rail, Virginia Rail, American Coot, Sora, Least Bittern, American Bittern, multiple waterfowl

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**Season:** Breeding

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Bioaccumulation of toxins from pollution sources including agricultural runoff, industrial and municipal waste.

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains; HUC8 Watershed: Lwr Delaware

**Associated Species:** King Rail, Virginia Rail, American Coot, Sora, Least Bittern, American Bittern, multiple waterfowl

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Common Gallinule

**Gallinula galeata**

**RESEARCH NEEDS**


2. Breeding- Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.

3. Breeding- 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.

**SURVEY NEEDS**

1. Breeding- Continue PGC marshbird 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).

2. Breeding- Use PA eBird as an efficient way to gather information on common gallinule distribution, breeding locales, migratory stopover sites, and timing of migration.

3. Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys, in collaboration with USFWS Harvest Information Program).

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American Coot
Fulica americana

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed

State Rank: S2B
PA Legal Status: Protected
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

Conservation Goal:
Maintain stable to increasing population levels in PA through 2025 via active management and protection of breeding habitat.

HABITAT ASSOCIATIONS

Macrogroup: Primary - Wet Meadow / Shrub Marsh, Secondary - Emergent Marsh

Habitat: Laurentian-Acadian Wet Meadow-Shrub Swamp, Laurentian-Acadian Freshwater Marsh

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

B = Breeding, M = Migration, W = Wintering
### American Coot

**Fulica americana**

#### THREATS AND ACTIONS

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Conversion of emergent wetlands to open water wetlands; draining of minor emergent wetlands; alteration and/or development of surrounding uplands |

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<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Approach all adjoining landowner(s) to discuss water/lake management agreements that are compatible with planned use of surrounding uplands.</td>
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<td>Annually monitor breeding marsh birds via (PA modified) North American Marsh Bird Monitoring Protocol. Use Large Wetland species playback. Record vegetation condition. Conduct survey annually during Early (May 15 - June 15) and Late (June 16 - July 15) seasons. 10 year duration.</td>
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**Action Location:** Physiographic Province: Piedmont  
**Associated Species:** King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, multiple waterfowl
## American Coot

### Fulica americana

#### THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Season:** Breeding

**Specific Threat:** Invasive species in breeding sites provide inferior food and cover and may choke out open water areas necessary for breeding.

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**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, multiple waterfowl

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Season:** Breeding

**Specific Threat:** Reproduction would be impacted by severe spring precipitation events; spring or summer droughts; possible expansion of AVM (avian vacuolar myelinopathy) risk due to proliferation of cyanobacteria in warmer wetlands in summer/fall.

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**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, multiple waterfowl
**American Coot**

**Fulica americana**

**THREATS AND ACTIONS**

**IUCN Threat:** 9.0 Pollution

**Season:** Breeding

**Specific Threat:** Bioaccumulation of toxins from agricultural runoff, industrial, and municipal waste.

### Action

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<td>Enforcement of local, state and regional waste water treatment regulations. Strengthening of nonpoint source pollution regulations and technical assistance in areas draining into high priority sites.</td>
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**Objective:** Sustain wetland quality through wastewater treatment operations in municipalities where water feeds into high priority breeding sites (Crawford, Lawrence, Berks counties). Strengthen nonpoint source pollution regulations and technical assistance.

**Measure:** Number of facilities meeting standards; number of nonpoint source improvements

**Monitoring:** Monitor pollutant levels with known toxic effects on waterfowl at priority sites. Monitor annually.

**Priority:** 3

**Associated Species:** King Rail, Virginia Rail, Common Gallinule, Sora, Least Bittern, American Bittern, multiple waterfowl

### RESEARCH NEEDS

1. **Breeding** - Continued research into Best Management Practices for maintaining mosaic of emergent vegetation and open water in light of invasive species issues.

2. **Breeding** - Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.

3. **Breeding** - 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.

### SURVEY NEEDS

1. **Breeding** - Continue PGC marshbird 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).

2. **Breeding** - Use PA eBird as an efficient way to gather information on coot distribution, breeding locales, migratory stopover sites, and timing of migration.

3. **Breeding** - Improve methods to track hunter participation and harvest during the migratory period (e.g., human dimensions surveys, in collaboration with USFWS Harvest Information Program.)
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Piping Plover (Great Lakes population)

Charadrius melodus

CONSERVATION PROFILE

Global Rank: G3
IUCN Red List: NT Near Threatened
State Rank: SXB, DDN (M)
Northeast Region: Very High Concern / High Responsibility
Federal Status: Endangered(B), Threatened(M)
PA Legal Status: Protected (extirpated)
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B, M) Unknown

Conservation Goal:
Successful fledging of a single chick from at least one nest by 2025. Also, maintain (n=5) or increase regular migratory stopovers.

HABITAT ASSOCIATIONS

Primary
Macrogroup: (B,M) Coastal Grassland & Shrubland
Habitat: (B,M) Great Lakes Dune and Swale

Secondary

Specific Habitat Requirements:
(B) Great Lakes beaches (see USFWS 2003). Presque Isle State Park, Erie Co. is an historic nesting beach and remains the only location with suitable habitat for nesting Piping Plovers (McWilliams and Brauning 2000, Price 2002, Haffner 2007).
(M) Great Lakes beaches and inland riverine and lacustrine mud flats. Gull Point, Erie Co. is the primary location for migrants, however they have also been observed along the lower Susquehanna Rivers (e.g., Conejohela Flats, Lancaster Co.) (McWilliams and Brauning 2000).

B = Breeding, M = Migration, W = Wintering
## THREATS AND ACTIONS

### Piping Plover (Great Lakes population)  
*Charadrius melodus*

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<td>Specific Threat:</td>
<td>Disturbance from human recreational activities</td>
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</table>

**Action**  
**TRACS Action 7.0** Law enforcement

Conduct a pre-season and post-season conference call with the PA Piping Plover Recovery Team (PGC, PA DCNR, USFWS, USACOE, Audubon PA, WPC, Presque Isle Audubon) to review educational signage needs and strategies for addressing violations within the USFWS designated critical habitat area, with special attention to the Gull Point Natural Area.

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Common Tern, Spotted Sandpiper, all shorebirds

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 7.0</strong></td>
<td>Reduce the number of trespassers in the Gull Point Natural Area (April - November) by 2025.</td>
<td>Number of warnings/violations</td>
<td>Each year during the restricted use timeframe, record the number of personal interactions/warnings/violation in the Gull Point Natural Area.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Season:** Breeding

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Loss/alteration of palustrine sand plain/dune habitat by invasive giant reed, purple loosestrife, and native trees.

**Action**  
**TRACS Action 2.0** Direct Management of Natural Resources

Implement the 10-year adaptive management plan (WPC and Audubon PA 2012) to continue 2012-13 restoration activities in the Gull Point Natural Area. This plan includes inventory and management actions to prevent recolonization of Phragmites, and other species treated during the restoration effort.

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Red Knot, Common Tern, Spotted Sandpiper, all shorebirds, and obligate palustrine sand plain plant communities

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>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 natural occurring, native plant species of the Palustrine Sand Plain, Dry Sand Plain, and Dune communities common to the area over the next 10 years.</td>
<td>Frequency of occurrence of invasive plant species as measured along vegetation transects.</td>
<td>Plants: Survey for rare plants within the 30 acre Gull Point Natural Area using a meander approach and along established transects to assess extent of all plant communities. Birds: Conduct daily shorebird monitoring April through June within the Gull Point Natural Area.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Season:** Breeding

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**PENNSYLVANIA GAME COMMISSION**  
165 | Appendix 1.4-Birds  
**PENNSYLVANIA FISH & BOAT COMMISSION**  
Published September 2015
### Piping Plover (Great Lakes population)  
*Charadrius melodus*

#### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Collisions with offshore wind turbines in Lake Erie and potential degradation of onshore habitat.

<table>
<thead>
<tr>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Minimize direct mortality and habitat loss to turbine development in Lake Erie.</td>
<td>Number of wind project review letters containing recommendations to avoid and minimize impacts to piping plover.</td>
<td>No net reduction in shorebirds numbers over a 10 year period following coastal or offshore wind development.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Red Knot, Common Tern, all shorebirds, migratory tree bats

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Disturbance from human recreational activities

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Reduce the number of trespassers in the Gull Point Natural Area (April - November) by 2025.</td>
<td>Number of warnings-violations</td>
<td>Each year during the restricted use timeframe, record the number of personal interactions/warnings-violations in the Gull Point Natural Area.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Common Tern, Spotted Sandpiper, all shorebirds
Piping Plover (Great Lakes population)  
*Charadrius melodus*

## RESEARCH NEEDS

1. Breeding - Shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.

1. Migration - Shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.

2. Breeding - Invertebrate abundance and biomass along the Presque Isle peninsula, specifically, Gull Point. See Nordstrom 1996.

3. Breeding - Assessment of avian and/or mammalian predator abundance, distribution, and space use on the Presque Isle peninsula.

## SURVEY NEEDS

1. Breeding - Enlist volunteers and professionals to survey the designated critical habitat area at Presque Isle State Park at least twice per week, April through July.

1. Migration - Enlist volunteers and professionals to survey the designated critical habitat area at Presque Isle State Park at least twice per week, August through September.

2. Breeding - Use eBird to encourage observations of piping plover and other beach species.

2. Migration - Use eBird to encourage observations of piping plover and other beach species.

3. Migration - International Shorebird Survey continued and expanded to more locations where shorebirds regularly stop.

## MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Lakes Piping Plover Recovery</td>
<td>U.S. Fish &amp; Wildlife Service;</td>
<td><a href="https://glpipl.wordpress.com/">https://glpipl.wordpress.com/</a></td>
<td>Updates on the status of the Great Lakes Piping Plover population</td>
</tr>
<tr>
<td>Effort</td>
<td>University of Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Shorebird Survey</td>
<td>Manomet Center for Conservation</td>
<td><a href="https://www.manomet.org/program/shorebird-recovery/international-shorebird-survey-iss">https://www.manomet.org/program/shorebird-recovery/international-shorebird-survey-iss</a></td>
<td>A volunteer-based international shorebird survey conducted in spring and fall at focal sites to detect trends in migrant shorebirds</td>
</tr>
<tr>
<td>Program Name</td>
<td>Lead Agency</td>
<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Presque Isle Piping Plover Recovery</td>
<td>Audubon PA</td>
<td></td>
<td>Shorebird monitoring from April through July, following a protocol established through consultation between the Army Corps of Engineers and the U.S. Fish and Wildlife Service.</td>
</tr>
</tbody>
</table>
**Spotted Sandpiper**

*Actitis macularius*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Not NE Regional SGCN</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Conservation Goal</td>
<td>Recover nest-site detections to at least 500 Breeding Bird Atlas blocks by 2025, as measured by the Breeding Bird Atlas (Wilson et al. 2012).</td>
</tr>
<tr>
<td>State Rank</td>
<td>S3B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogoup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Eutrophic, Medium Alkalinity Lake</td>
<td>Hypereutrophic, High Alkalinity Lake</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**

Nests are always associated with water (river, lake, wetland, gravel pit, farm pond, etc.), typically within 100 m of water's edge, but up to 300 m. Shoreline is used for foraging, semi-open nesting habitat with patches of dense vegetation assists brood protection (Reed et al. 2013).
## THREATS AND ACTIONS

**Spotted Sandpiper**  
*Actitis macularius*

### Specific Threat:  Heavy metal contamination in major waterways impacts reproductive capacity and suppresses macroinvertebrate prey communities.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Remediate stream degradation from acid mine drainage and other point-source pollutants.</td>
<td>Documented nesting along major waterways by 2025.</td>
</tr>
</tbody>
</table>

**Action Location:** HUC4 Watershed: Statewide

**Associated Species:** Aquatic macroinvertebrates, river otter, obligate riparian songbirds

### Season: Breeding

### IUCN Threat: 9.0 Pollution

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Develop and implement habitat management plans to secure inland nesting sites in light of changing climatic conditions.</td>
<td>Number of management plans that include Spotted Sandpiper</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

### Specific Threat: Water level fluctuation due to erratic weather patterns.

### Season: Breeding

### IUCN Threat: 11.0 Climate Change and Severe Weather
Spotted Sandpiper

**Actitis macularius**

**THREATS AND ACTIONS**

**IUCN Threat:** 6.0 Human Intrusions and Disturbance

**Specific Threat:** Recreational activities (e.g., boating, fishing) along major river drainages and lakes.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action Location</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUC4 Watershed: Delaware-Mid Atlantic Coastal, Susquehanna</td>
<td>TRACS Action 8.0 Outreach</td>
<td>Increase awareness of boaters about ways to minimize disturbance to shorebirds.</td>
<td>Number of citizens reached.</td>
<td>Survey for nesting Spotted Sandpipers in high human disturbance areas.</td>
<td>3</td>
</tr>
</tbody>
</table>

**RESEARCH NEEDS**

1. Breeding- Is the decline in breeding Spotted Sandpipers an artifact of sampling effort or indicative of direct or indirect threats to the breeding populations?

2. Breeding- Is this an appropriate species to monitor for stream quality and response to energy extraction threats?

**SURVEY NEEDS**

1. Breeding- Establish survey routes along major drainages and request local birding organizations to adopt these routes.

2. Breeding- Important Bird Area monitoring including surveys that capture riparian species in point counts.

3. Breeding- Use eBird to encourage observation of this and other riparian habitat species.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
</tbody>
</table>
Upland Sandpiper

*Bartramia longicauda*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S2B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**Conservation Goal:** Maintain breeding population of at least 20 pairs in suitable sites statewide annually through 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary Macrogoup</th>
<th>Secondary Macrogoup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>Ruderal Shrubland &amp; Grassland</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Specific Habitat Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (NLCD 81-82)</td>
<td>Large tracts of contiguous grassland with mosaics of tall (15-35 cm) stands of grass for nesting and short stands (&lt; 15 cm), often in weed rich pasture, for foraging.</td>
</tr>
<tr>
<td>Shrubland &amp; grassland (NLCD 52/71)</td>
<td></td>
</tr>
</tbody>
</table>

B = Breeding, M = Migration, W = Wintering
### Upland Sandpiper

**Bartramia longicauda**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Ensure that grassland heterogeneity is maintained (Houston and Bowen 2001)</td>
<td>Maintenance of extant populations</td>
<td>Spring (late May) counts of adult birds</td>
<td>1</td>
</tr>
</tbody>
</table>

Maintain lightly grazed pasture in close proximity to undisturbed grassland (Dechant et al. 1999).

Action Location: Physiographic Province: Appalachian Plateaus

### IUCN Threat: 2.0 Agriculture and Aquaculture

**Specific Threat:** Loss of nests to trampling by livestock or loss of young to mowing operations. Reduced suitability of cattle pastures due to spring grazing (e.g. Bowen and Kruse 1993). Conversely, lack of lightly grazed cattle pastures could be detrimental.

<table>
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<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Ensure that extensive habitat patches, sufficient to support &gt;1 breeding pair, are available</td>
<td>Maintenance of extant populations</td>
<td>Spring (late May) counts of adult birds</td>
<td>1</td>
</tr>
</tbody>
</table>

Manage large (>100ha) reclaimed surface mines specifically for grassland biodiversity

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Northern Harrier, Short-eared Owl, American Kestrel, Vesper Sparrow, Savannah Sparrow, Henslow's Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

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PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

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### Upland Sandpiper

**Bartramia longicauda**

### THREATS AND ACTIONS

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Successional change of grassland habitats

**Season:** Breeding

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Prevent natural succession from encroaching important grassland sites</td>
<td>Maintenance of extant populations</td>
<td>Spring (late May) counts of adult birds</td>
</tr>
</tbody>
</table>

Mowing, burning and removing invasive woody vegetation

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Northern Harrier, Short-eared Owl, American Kestrel, Vesper Sparrow, Savannah Sparrow, Henslow’s Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Habitat loss from residential development.

**Season:** Breeding

<table>
<thead>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Prevent loss of habitat in areas close to extant populations</td>
<td>Maintenance of extant populations</td>
<td>Spring (late May) counts of adult birds</td>
</tr>
</tbody>
</table>

Purchase land that may otherwise be sold for development

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Northern Harrier, American Kestrel, Vesper Sparrow, Savannah Sparrow, Henslow’s Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

### RESEARCH NEEDS

1. Breeding- Are Pennsylvanian populations self-sustaining, or do they rely on immigration / rescue effect?

2. Breeding- Can Upland Sandpipers be lured back to apparently well-managed habitats using nocturnal call broadcasting?

3. Breeding- How can grassland habitats be managed to better support Upland Sandpipers in PA?
Upland Sandpiper

SURVEY NEEDS

1. Breeding - Conduct a statewide survey. Sampling based on known recent locations and randomly selected quadrats of high habitat suitability. Survey could include volunteers and students.

2. Breeding - Monitoring of nesting success wherever there are breeding Upland Sandpipers.

3. Breeding - Use eBird to encourage volunteer to report any Upland Sandpiper observations and discover newly colonized sites including IBAs.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<tbody>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
<tr>
<td>Upland Sandpiper Breeding Surveys</td>
<td>Pennsylvania Game Commission with Gettysburg College</td>
<td></td>
<td>Search areas with recent UPSA activity using a visual search augmented by an audio playback in likely habitat.</td>
</tr>
</tbody>
</table>
Red Knot
*Calidris canutus rufa*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / High Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Threatened</td>
</tr>
<tr>
<td>State Rank</td>
<td>S2N (M)</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(M) Unknown</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Maintain protected shorebird habitat at Gull Point, Pesque Isle State Park.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogoup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakes</td>
<td>Oligotrophic, High Alkalinity Lake</td>
<td>Hypereutrophic, High Alkalinity Lake</td>
</tr>
</tbody>
</table>

**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).

Photo: Greg Breese
### Red Knot

**Calidris canutus rufa**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>8.0 Invasive and Other Problematic Species and Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Loss/alteration of palustrine sand plain/dune habitat by invasive giant reed, purple loosestrife, and native trees.</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Piping Plover, Common Tern, Spotted Sandpiper, all shorebirds, and obligate palustrine sand plain plant communities
# Red Knot

*Calidris canutus rufa*

## Threats and Actions

### IUCN Threat: 11.0 Climate Change and Severe Weather

#### Specific Threat: Changing climate conditions favoring invasive plant species.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
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<tbody>
<tr>
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<td>Frequency of occurrence of invasive plant species as measured along vegetation transects.</td>
<td>Plants: Survey for rare plants within the 30 acre Gull Point Natural Area using a meander approach and along established transects to assess extent of all plant communities. Birds: Conduct the International Shorebird Survey following specified protocols and encourage color-band reporting through bandedbirds.org.</td>
<td>1</td>
</tr>
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</table>

*Action Location:* Physiographic Province: Central Lowland

*Associated Species:* Piping Plover, Common Tern, Spotted Sandpiper, all shorebirds, and obligate palustrine sand plain plant communities

### IUCN Threat: 3.0 Energy Production and Mining

#### Specific Threat: Collisions with offshore wind turbines in Lake Erie and potential degradation of onshore habitat.

<table>
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<tr>
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<td>Number of wind project review letters containing recommendations to avoid and minimize impacts to Red Knot.</td>
<td>No net reduction in shorebird numbers over a 10 year period following coastal or offshore wind development.</td>
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</table>

*Action Location:* Physiographic Province: Central Lowland

*Associated Species:* Piping Plover, Common Tern, all shorebirds, migratory tree bats
**Red Knot**

**Calidris canutus rufa**

**THREATS AND ACTIONS**

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Specific Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>Loss of habitat to energy development infrastructure.</td>
<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>Minimize habitat loss to wind and other energy infrastructure.</td>
<td>Number of wind project review letters containing recommendations to avoid and minimize impacts to Red Knot.</td>
<td>No net reduction in shorebird numbers over a 10 year period following coastal or offshore wind development.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**Associated Species:** Piping Plover, Common Tern, all shorebirds, migratory tree bats

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Specific Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
<td>Point, nonpoint and atmospheric pollution into Lake Erie such as human waste and toxic metals, fertilizers and soil runoff, and mercury and polychlorinated biphenyls (PCBs) from burning of fossil fuels.</td>
<td>TRACS Action 7.0</td>
<td>Law enforcement</td>
<td>Reduce point and nonpoint source pollutants to waterways, particularly Lake Erie.</td>
<td>No net reduction in Red Knot numbers over a 10 year period.</td>
<td>International Shorebird Survey Statistics</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

**HUC8 Watershed:** Lwr Susquehanna

**Associated Species:** Aquatic and riparian species
Red Knot
*Calidris canutus rufa*

### THREATS AND ACTIONS

#### IUCN Threat: 1.0 Residential and Commercial Development

#### Specific Threat: Loss of habitat to development.

#### Season: Migration

#### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Integrate fish and wildlife conservation needs into municipal planning code.</td>
<td>Number of revisions to municipal planning code benefitting wildlife.</td>
<td>No net reduction in shorebird numbers.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland

### RESEARCH NEEDS

1. Migration- Shorebird community response to non-native and native invasive vegetation management in the Gull Point Natural Area.

2. Migration- Where are other stopover locations in PA?

3. Migration- How does PA fit into Red Knot migration pattern, especially as coastal sites are lost to climate change, storms, and development?

### SURVEY NEEDS

1. Migration- International Shorebird Survey continued and expanded to more locations where shorebirds regularly stop.


3. Migration- Promote Red Knot observation reports through the PA eBird portal so the agency & partners can learn of stopover habitats.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandedbirds.org</td>
<td>Multiple</td>
<td><a href="http://www.bandedbirds.org">http://www.bandedbirds.org</a></td>
<td>Web-accessible database for reporting and retrieving information on color-banded shorebirds along the Atlantic Flyway.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>International Shorebird Survey</td>
<td>Manomet Center for Conservation Sciences</td>
<td><a href="https://www.manomet.org/program/shorebird-recovery/international-shorebird-survey-iss">https://www.manomet.org/program/shorebird-recovery/international-shorebird-survey-iss</a></td>
<td>A volunteer-based international shorebird survey conducted in spring and fall at focal sites to detect trends in migrant shorebirds</td>
</tr>
</tbody>
</table>
Wilson's Snipe
Gallinago delicata

CONSERVATION PROFILE

Global Rank: G5
State Rank: S3B

IUCN Red List: NE Not Evaluated
PA Legal Status: Protected

Northeast Region: High Concern / Low Responsibility
PA Abundance: Unknown

Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Relatively Stable (<10% change)

Conservation Goal:
Maintain stable to increasing population levels in PA through 2025 via active management and protection of breeding habitat.

HABITAT ASSOCIATIONS

Primary
- Macrogroup: Northern Swamp
- Habitat: North-Central Appalachian Acidic Swamp

Secondary
- Macrogroup: Emergent Marsh
- Habitat: Laurentian-Acadian Freshwater Marsh

Specific Habitat Requirements:
- Wet meadows and poorly drained pastures where moderate grazing maintains the vegetation in a cropped condition.

B = Breeding, M = Migration, W = Wintering
## Wilson's Snipe

**Gallinago delicata**

### Threats and Actions

#### Specific Threat:
Draining of minor emergent wetlands; alteration and/or development of surrounding uplands; reversion of lightly grazed pastures to shrublands (or human developments) as grazing operations are abandoned. Feral and domestic cats in habitats surrounding human development likely impact this ground nesting species. Invasive species are related concern.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Approach landowner(s) of regular breeding locations to discuss long term management agreements and best management practices for cropping/grazing.</td>
<td># landowners approached; # agreements reached</td>
<td>Annually monitor breeding marsh birds via (PA modified) North American Marsh Bird Monitoring Protocol. Data from the breeding bird atlas efforts should be used to determine primary breeding areas in the state. Monitoring programs (at least three surveys per breeding season) should be established in five areas supporting substantial populations (e.g., &gt;5 pairs). 5 year duration.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** King Rail, Common Gallinule, Least Bittern, American Bittern, American Coot, multiple waterfowl
Wilson's Snipe  
*Gallinago delicata*

**THREATS AND ACTIONS**

**IUCN Threat:** 3.0 Energy Production and Mining  

**Specific Threat:** Mining/quarrying and energy development may lead to loss of wet meadows and negatively impact adjoining wetlands.

<table>
<thead>
<tr>
<th>Action Location:</th>
<th>Physiographic Province: Appalachian Plateaus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated Species:</td>
<td>King Rail, Common Gallinule, Least Bittern, American Bittern, American Coot, multiple waterfowl</td>
</tr>
</tbody>
</table>

<table>
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</tr>
</tbody>
</table>
## Wilson’s Snipe

**Gallinago delicata**

### THREATS AND ACTIONS

#### Specific Threat:
Off road vehicles in wet meadows; domestic/feral dog and cat activity at breeding sites can impact reproductive success of this ground nesting species.

#### Action

<table>
<thead>
<tr>
<th>TRACS Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0 Outreach</td>
<td>Develop and disseminate education programs at high priority breeding locations.</td>
<td># programs developed; # public education events provided; # people reached</td>
<td>Pre- and post-testing of public event audiences. Human dimensions surveys on public's awareness of dog/cat impacts on ground nesting wildlife.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** King Rail, Common Gallinule, Least Bittern, American Bittern, American Coot, multiple waterfowl

#### Specific Threat:
Conversion of emergent wetlands to open water wetlands; draining of minor emergent wetlands; alteration and/or development of surrounding uplands

#### Action

<table>
<thead>
<tr>
<th>TRACS Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 Direct Management of Natural Resources</td>
<td>To maintain habitat quality at known breeding habitats</td>
<td># acres restored; # suitable acres maintained</td>
<td>Annually monitor breeding marsh bird via (PA modified) North American Marsh Bird Monitoring Protocol. Record vegetation condition. Conduct survey annually three times during the breeding season, 5 +year duration.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Virginia Rail, Sora, Common Gallinule, Least Bittern, American Bittern, multiple waterfowl
### Wilson’s Snipe

**Gallinago delicata**

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Reproduction would be impacted by severe spring precipitation events as well as spring or summer droughts, extreme changes in water levels.

**Action**

**TRACS Action 5.0  Facilities and Areas**

Active management and planning on publicly owned wetlands in Erie, Crawford, and Mercer counties, as well as northern tier counties. Goal is adaptive management of marshes and associated uplands to handle increases in rainfall and severe spring precipitation events.

**Objective**

Adaptable approach to water level management so wet grasslands and open water mosaics with grassland uplands can be sustained in periods of high or low precipitation. Includes replacement and upgrade of water control devices suitable for handling predicted precipitation changes.

**Measure**

# sites with adaptive management plans in place; # water control devices upgraded

**Monitoring**

Monitor progress in development and implementation of Adaptation Plans at high-priority sites. Monitor installation of water control devices.

**Priority**

1

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Bioaccumulation of toxins from pollution sources including agricultural runoff, industrial and municipal waste, possibly impacting reproductive success and/or juvenile survival.

**Action**

**TRACS Action 2.0  Direct Management of Natural Resources**

Enforcement of local, state and regional waste water treatment regulations. Strengthening of nonpoint source pollution regulations and technical assistance in areas draining into high priority sites.

**Objective**

Sustain wetland quality through wastewater treatment operations in municipalities where water feeds into high priority breeding sites. Strengthen nonpoint source pollution regulations and technical assistance.

**Measure**

# facilities meeting standards; # nonpoint source improvements

**Monitoring**

Monitor pollutant levels with known toxic effects at priority sites. Monitor annually.

**Priority**

3

**Season:** Breeding

**Associated Species:**
- Virginia Rail, Sora, Common Gallinule, Least Bittern, American Bittern, American Coot, multiple waterfowl

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**PENNSYLVANIA GAME COMMISSION**

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**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
Wilson's Snipe  
*Gallinago delicata*

## RESEARCH NEEDS


2. Breeding- Determine relationships between habitat factors (both site- and landscape-level) and breeding site occupancy and demographic rates.

3. Breeding- Better determine the state’s breeding population and distribution and identify important migratory stopover sites.

## SURVEY NEEDS

1. Breeding- Continue PGC marshbird surveys annually and expand efforts to additional sites with suitable habitat for snipe.

2. Breeding- Use PA eBird as a time-effective way to gather information on snipe distribution, breeding locations including new sites, migratory stopover sites, and timing of migration; encourage searches on private lands with cooperative landowners.

## MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<tr>
<td>eBird (PA eBird as state portal)</td>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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</tbody>
</table>
American Woodcock
*Scolopax minor*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: High Concern / Low Responsibility
- **Federal Status**: Not Listed

**PA Legal Status**: Protected
**PA Abundance**: Unknown
**PA Short-Term Trend (10 year)**: (B) Relatively stable (<= 10% change)

**Conservation Goal:**
Increase populations to 1980 levels as stated in Pennsylvania Woodcock Management Plan (Palmer 2008).

**HABITAT ASSOCIATIONS**

- **Primary Macrogoup**: Ruderal Shrubland & Grassland
- **Secondary Macrogoup**: Agricultural

- **Habitat**: Shrubland & grassland (NLCD 52/71)
- **Agriculture (NLCD 81-82)**

**Specific Habitat Requirements:**
Habitat mosaics that include small, scattered openings and dense stands of shrubs and young trees on moist soils.

Photo: Hal Korber
# American Woodcock

## Scolopax minor

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Residential and commercial development destroys, fragments, and simplifies habitats, and feral and domestic pets likely have negative impact.

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Develop and disseminate education programs.</td>
<td># programs developed; # public education events provided; # people reached</td>
<td>Pre- and post-testing of public event audiences. Human dimensions surveys on public's awareness of dog/cat impacts on ground nesting wildlife and attitudes toward active forestry.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

### IUCN Threat: 4.0 Transportation and Service Corridors

**Specific Threat:** Prevention of shrub/sapling development in right-of-ways prevents nesting; mortality from tower strikes.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Incorporate habitat planning into energy development planning at suitable moist soil sites.</td>
<td># plans developed; # operators contacted; # cooperative agreements</td>
<td>Project mapping and permitting that reflects habitat concerns.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

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**Pennsylvania Game Commission**

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**Pennsylvania Fish & Boat Commission**

Published September 2015
## American Woodcock

* *Scolopax minor*

### Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Young forest acreage is below the 12-15% of forested acreage needed to maintain woodcock populations, and where private landowners are undertaking active forest management, it is often not appropriate for long term habitat quality.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>By 2025, reverse trend of % young forest on the landscape from declining to increasing.</td>
<td>% young forest (seedling / sapling) forest cover as measured by USFS, DCNR, and PGC forest inventory programs</td>
<td>Monitor trends in proportion of young forest as measured by forest inventory programs conducted by U.S. Forest Service, PA Department of Conservation and Natural Resources, and Pennsylvania Game Commission. Monitor condition of young forests and moist thickets on public lands; monitor populations of woodcock in good habitats based upon hunter flush rates and targeted Singing Ground Surveys.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prarie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle
American Woodcock

**Scolopax minor**

### THREATS AND ACTIONS

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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Investigate and implement best management practices to maintain high-quality young forest and old-field habitats.</td>
<td># acres restored; # suitable acres maintained</td>
<td>Monitor condition of young forests and moist thickets on public lands; monitor populations of woodcock in good habitats based upon hunter flush rates and targeted singing ground surveys.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Specific Threat:** Invasive vegetation reduces availability of singing grounds and reduces quality of brood cover by hastening succession of old fields to dense thickets.

**Associated Species:** Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, Eastern Whip-poor-will, Appalachian cottontail, eastern box turtle, eastern fence lizard, wood turtle

### RESEARCH NEEDS

1. Breeding- Investigate impact of changing spring weather conditions on migratory chronology, peak display period, and juvenile production.

2. Breeding- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat.

### SURVEY NEEDS

1. Breeding- Expand annual Singing Ground Surveys at targeted habitat management sites to determine population response to active habitat management.

2. Breeding- Use PA eBird as a time-effective way to gather information on woodcock distribution, breeding locations including new sites, migratory stopover sites, and timing of migration; encourage searches on private lands with cooperative landowners.

3. Breeding- Conduct USFWS Singing Ground Survey annually

---

**Season:** Breeding

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singing Ground Survey</td>
<td>U.S. Fish &amp; Wildlife Service / Pennsylvania Game Commission</td>
<td><a href="https://migbirdapps.fws.gov/mbdc/databases/awsgs/awsgsdb.asp?opt=1">https://migbirdapps.fws.gov/mbdc/databases/awsgs/awsgsdb.asp?opt=1</a></td>
<td>Roadside surveys conducted annually to detect male courtship display as an index to population trends over time.</td>
</tr>
</tbody>
</table>
**Black Tern**
*Chlidonias niger*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G4</th>
<th>State Rank</th>
<th>S1B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
<td>PA Abundance</td>
<td>Presumed Extirpated</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Re-establish three nesting colonies, each containing at least 10 nesting pairs, by 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrogroup</td>
<td>Wet Meadow / Shrub Marsh</td>
<td>Emergent Marsh</td>
</tr>
</tbody>
</table>

| Habitat | Laurentian-Acadian Wet Meadow-Shrub Swamp | Laurentian-Acadian Freshwater Marsh |

**Specific Habitat Requirements:**
Open-water emergent marsh (> 20 hectares or part of a larger complex) with stable water levels during nesting.

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*Photo: Wikimedia/Reago and McClarren*
### Black Tern (Chlidonias niger)

#### THREATS AND ACTIONS

<table>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Manage for stable water level at historic black tern locations during breeding season.</td>
<td>Water level remains within 4 inches from May through July.</td>
<td>Weekly monitor wetland levels.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Specific Threat:** Water-level adjustments for multi-species management in wetlands supporting historic populations may have contributed to the disappearance of this species from Pennsylvania over a 70-year period.

**Associated Species:** Emergent wetland birds including American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail.

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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Establish balance of open and emergent vegetation, and then manage water level during breeding season in historic locations.</td>
<td>Vegetation interspersion.</td>
<td>Aerial measurement of wetland interspersion.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Specific Threat:** Natural wetland succession.

**Associated Species:** Emergent wetland birds including American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail.
**Black Tern**

*Chlidonias niger*

## THREATS AND ACTIONS

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Reduce invasive aquatic vegetation to manageable levels</td>
<td>Vegetation interspersion.</td>
<td>Annually estimate percent of wetlands covered with invasive aquatics.</td>
</tr>
<tr>
<td>Control invasive aquatic plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland, Appalachian Plateaus  
HUC10 Watershed: Conneaut Cr., Crooked Cr.-Frontal Lake Erie, Elk Cr. (Chautauqua-Conneaut)

**Associated Species:** Emergent wetland birds including American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail.

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<tbody>
<tr>
<td>TRACS Action 100.0</td>
<td>Law and Policy</td>
<td>Reduce contaminants below long-term exposure toxic levels.</td>
<td>Parts per million mercury.</td>
<td>Monthly water chemistry sampling.</td>
</tr>
<tr>
<td>Pass legislation to reduce contaminants.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

**Action Location:** Physiographic Province: Central Lowland, Appalachian Plateaus  
HUC10 Watershed: Conneaut Cr., Crooked Cr.-Frontal Lake Erie, Elk Cr. (Chautauqua-Conneaut)

**Associated Species:** American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail, Wilson’s Snipe, American Black Duck, Wood Duck.

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**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Loss/alteration of habitat by invasive aquatic vegetation.  
**Season:** Breeding

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Direct, air-borne pollution (mercury and others) could impact productivity or survival  
**Season:** Breeding
Black Tern

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Season:** Breeding

**Specific Threat:** Extremes in precipitation threaten nesting; mismatch of insect outbreaks and migration / nesting.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain water level in wetlands occupied by nesting black terns within 4 inches from April through June.</td>
<td>Water level remains within 4 inches from May through July.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Monitor and manage water level in wetlands with nesting colonies.</td>
<td></td>
<td>Weekly monitor wetland levels.</td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland, Appalachian Plateaus

HUC10 Watershed: Conneaut Cr., Crooked Cr.-Frontal Lake Erie, Elk Cr. (Chautauqua-Conneaut)

**Associated Species:** American Bittern, Least Bittern, American Coot, Common Gallinule, Pied-billed Grebe, Sora, Virginia Rail, Wilson’s Snipe, American Black Duck, Wood Duck.

**RESEARCH NEEDS**

1. Breeding- Do emergent marshes in the Black Tern’s range support the interspersion of habitats needed to sustain a nesting colony?

2. Breeding- What is the colonization potential for Black Terns in northwestern Pennsylvania?

**SURVEY NEEDS**

1. Breeding- As an extirpated species, the potential suitability of large wetland complexes in northwestern PA should be evaluated for potential recovery.

2. Breeding- Conduct PGC Marsh Bird Monitoring program annually at former nesting grounds to identify if there are any reeding populations.

3. Breeding- Use eBird to encourage volunteers to report any Black Tern observations that would inform PGC of any potential breeding populations.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
<tr>
<td>Pennsylvania Game Commission</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4">http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4</a></td>
<td>During breeding seasons, PGC 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.</td>
</tr>
</tbody>
</table>
Common Tern
Sterna hirundo

Photo: Mary Birdsong

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed

Conservation Goal:
Successful fledging of chicks from at least one nest per year by 2025.

State Rank: Data Deficient (B)
PA Legal Status: Endangered
PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Unknown

HABITAT ASSOCIATIONS

Primary Macrogroup: Coastal Grassland & Shrubland
Habitat: Great Lakes Dune and Swale

Specific Habitat Requirements:
Sandy beaches (Presque Isle State Park is only historic nesting location) and rocky maritime sites.

B = Breeding, M = Migration, W = Wintering
# Common Tern

**Sterna hirundo**

## THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong> Disturbance of nesting pairs by people walking within the restricted area at Gull Point, sometimes with dogs, arriving either on foot or by boat.</td>
<td><strong>Objective:</strong> No disturbance of nesting attempts by people or dogs.</td>
<td><strong>Measure:</strong> Zero instances of people entering restricted area at Gull Point during tern nesting season.</td>
<td><strong>Monitoring:</strong> Observers needed each year during nesting season to detect nesting attempts, establish fencing/exclosures and signage.</td>
<td><strong>Priority:</strong> 1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland HUC10 Watershed: Lake Erie

**Associated Species:** Piping Plover

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong> Encroachment by native and non-native vegetation; terrestrial and aerial nest predation.</td>
<td><strong>Objective:</strong> 1. Maintain at least 100m wide zone from waterline without woody plants around outer edge of Gull Point, 2. Protect nests and young from predators.</td>
<td><strong>Measure:</strong> Width and total area without woody plants.</td>
<td><strong>Monitoring:</strong> Assess recruitment of woody seedlings and regrowth of willows, etc., from residual roots each year. Control growth with herbicides when needed.</td>
<td><strong>Priority:</strong> 2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Central Lowland HUC10 Watershed: Lake Erie

**Associated Species:** Piping Plover
Common Tern

RESEARCH NEEDS

1. Breeding - Nest predation: What are the densities of predators at Gull Point? Are exclosures feasible?

2. Breeding - What are the levels of (illicit) human disturbance in the vicinity of recent nest sites?

3. Breeding - What is the feasibility of creating a man-made nest site near Gull Point that is better protected from predators and human disturbance?

SURVEY NEEDS

1. Breeding - Enlist volunteers and professionals to survey designated critical habitat area at Presque Isle State Park at least twice per week from April through July, coordinated with Piping Plover surveys. Unobtrusive monitoring from the observation tower at Gull Point works best.

2. Breeding - Encourage surveys of additional possible breeding habitat in the state.

3. Breeding - Use eBird to encourage volunteers to report any Common Tern observations that would inform PGC of any potential breeding populations.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presque Isle Shorebird Surveys</td>
<td>Audubon PA</td>
<td></td>
<td>Coordinated with Piping Plover survey efforts during the breeding season.</td>
</tr>
</tbody>
</table>
Barn Owl

*Tyto alba*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S2B
- **IUCN Red List**: LC Least Concern
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**Conservation Goal:**
Documentation of at least 100 active nest sites within a minimum of 15 counties by the year 2025.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Agricultural
- **Habitat**: Agriculture (NLCD 81-82)

**Specific Habitat Requirements:**
Low altitude grasslands (meadows, hayfields and abandoned arable fields) w/ natural and/or artificial cavities (barns, silos).

*Photo: Hal Korber*
## Threats and Actions

### Barn Owl (Tyto alba)

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Fragmentation of agriculturally dominated landscapes and conversion of pasture, hayfields, and other foraging habitat due to residential and commercial development.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0 Coordination and Administration</td>
<td>Finalize long-term conservation easements which prevent the development of farmland of &gt;10,000 acres within targeted, agriculturally rich landscapes. Install &gt;100 barn owl nest boxes at suitable locations.</td>
<td>Number of agricultural acres preserved in conservation easements.</td>
<td>Surveys for sign of barn owls should be conducted. Surveys of barns, silos, and installed nest boxes should be conducted between May 1 and July 15 and should include searches for individuals as well as their sign such as fresh barn owl pellets, feathers and eggs.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Eastern Meadowlark, Grasshopper Sparrow, Northern Harrier, Upland Sandpiper, North American least shrew

**IUCN Threat:** 2.0 Agriculture and Aquaculture

**Specific Threat:** Conversion of hayfields, pastureland and other grassland habitat types to row crops such as corn and soybean fields and removal of cavity tree nest sites.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0 Coordination and Administration</td>
<td>Establish grassland habitat on &gt; 50,000 acres within agriculturally dense landscapes</td>
<td>Number of grassland acres established</td>
<td>Surveys for sign of barn owls within barns and silos and should be conducted within barns and silos between May 1 and July 15 and should include searches for individuals as well as their sign such as fresh barn owl pellets, feathers and eggs.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Eastern Meadowlark, Grasshopper Sparrow, Northern Harrier, Upland Sandpiper, North American least shrew

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**Pennsylvania Game Commission**

**Pennsylvania Fish & Boat Commission**

Published September 2015
### Barn Owl

**Tyto alba**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 Natural System Modifications</td>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>Install at least 200 new barn owl nest boxes in suitable habitat over the next 10 years</td>
<td>Monitor nest boxes between May and July for nesting activity</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number of nest boxes installed in suitable habitat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Replace snags and cavity trees that have been removed by installing nest boxes within landscapes containing suitable foraging habitat.

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** American Kestrel

#### Season: Breeding

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 Energy Production and Mining</td>
<td><strong>TRACS Action 8.0</strong></td>
<td>Outreach</td>
<td>Have all wind and energy developers sign cooperative agreements agreeing to avoid development in optimal habitat.</td>
<td>Count number of confirmed nest sites annually documented by the PGC's Barn Owl Conservation Initiative</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number of cooperative agreements completed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Establish cooperative agreements with wind and solar energy companies to avoid development of facilities in areas of optimal habitat.

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Henslow’s Sparrow, Dickcissel, Short-eared Owl, Savannah Sparrow

**Season:** Breeding
Barn Owl

**Tyto alba**

### THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Increased development and use of roads leading to increases in vehicle collision mortality

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Estimate percentage of population killed each year by vehicle collisions</td>
<td>Conduct surveys of dead barn owls along roadways during the breeding season</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Estimate the number of barn owls killed by vehicle collisions</td>
<td>Number of mortality events caused by vehicle collisions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Piedmont, Ridge and Valley</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### RESEARCH NEEDS

1. Breeding- Determine if a nest box program, in regions where nesting habitat is likely a limiting factor, has a significant effect on the state's population and distribution; reclaimed strip mines for example.

2. Breeding- Increase knowledge of barn owl abundance and distribution throughout the state and its relationship to habitat quality and human use.

3. Breeding- Increase knowledge of habitat usage throughout the winter months when mortality is highest.

### SURVEY NEEDS

1. Breeding- Potential nest sites should be monitored annually for breeding activity as conducted by the PGC’s Barn Owl Conservation Initiative.

2. Breeding- Banding of nestlings should continue as conducted by the PGC’s Barn Owl Conservation Initiative to help provide information about fledgling dispersal and longevity.

3. Breeding- Nest sites should be monitored during the winter to learn more about habitat usage and migration patterns.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Long-eared Owl

Asio otus

Photo: Joe Kosack

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Conservation Goal:</td>
<td>Ten successful nest sites annually.</td>
</tr>
<tr>
<td>State Rank</td>
<td>S1B, S3N (W)</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Threatened</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change); (W) Decline of 50 - 70%</td>
</tr>
</tbody>
</table>

**HABITAT ASSOCIATIONS**

**Primary**
- (B) Northern Hardwood & Conifer
- (W) Agricultural

**Secondary**
- (B) Central Oak-Pine
- (B) Central Appalachian Dry Oak-Pine Forest

Specific Habitat Requirements:
(B,W) Conifer woods, often plantations, intermingled with field and meadows. Few breeding sites and widespread apparent potential makes characterization difficult.

B = Breeding, M = Migration, W = Wintering

PA Abundance: Unknown
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change); (W) Decline of 50 - 70%

PA Legal Status: Threatened
PA Rank: S1B, S3N (W)
### Long-eared Owl (Asio otus)

#### THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Loss of conifer habitat nesting sites, through management, succession, or disease.

#### Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Improve healthy forests metrics.</td>
<td>Conifer regeneration in FIA data.</td>
<td>Determine the number of young produced per nest.</td>
<td>1</td>
</tr>
</tbody>
</table>

Maintain deer population levels that provide for healthy forest regeneration.

**Action Location:** Physiographic Province: Statewide HUC4 Watershed: Statewide

**Associated Species:** None

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss of habitat to development is a minor threat.

#### Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Reduce nesting disturbance at established nests.</td>
<td>Nesting success.</td>
<td>Determine the number of young produced per nest.</td>
<td>3</td>
</tr>
</tbody>
</table>

Seek agreements from landowners to protect nesting sites from disturbance during nesting season.

**Action Location:** Physiographic Province: Statewide HUC4 Watershed: Statewide

**Associated Species:** None
## Long-eared Owl

**Asio otus**

### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>3.0 Energy Production and Mining</th>
<th>Season: Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Loss of habitat to energy production could alter nest sites.</td>
<td></td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>Avoid development within CPP Core buffers during nesting season of all known sites.</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td>HUC4 Watershed: Statewide</td>
</tr>
<tr>
<td>Associated Species:</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

| IUCN Threat: | 4.0 Transportation and Service Corridors | |
| **Specific Threat:** | Long-eared Owls are vulnerable to vehicle strikes. | |
| **Action** | **Objective** | **Measure** | **Monitoring** | **Priority** |
| TRACS Action 11.0 | Technical Assistance | Avoid development within CPP Core buffers during nesting season of all known sites. | Nesting success. | Determine the number of young produced per nest. | 3 |
| Action Location: | Physiographic Province: Statewide | HUC4 Watershed: Statewide | |
| Associated Species: | None | |
## Long-eared Owl (Asio otus)

### THREATS AND ACTIONS

#### IUCN Threat: 5.0 Biological Resource Use

**Specific Threat:** Loss of conifer habitat nesting sites, through management, succession, or disease.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 11.0 Technical Assistance</strong></td>
<td>Avoid disturbance within CPP Core buffers during nesting season of all known sites.</td>
<td>Number of nest sites protected.</td>
<td>Determine the number of young produced per nest.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**HUC4 Watershed:** Statewide

**Associated Species:** None

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#### IUCN Threat: 11.0 Climate Change and Severe Weather

**Specific Threat:** Loss of conifer habitat nesting sites, through management, succession, or disease.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0 Direct Management of Natural Resources</strong></td>
<td>Establish 10 new conifer groves in suitable sites on Game Lands statewide in 10 years.</td>
<td>Number of suitable habitat patches.</td>
<td>Number of long-eared owl nest sites</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**HUC4 Watershed:** Statewide

**Associated Species:** None

---

**Season:** Breeding
### Long-eared Owl

*Asio otus*

#### THREATS AND ACTIONS

| IUCN Threat: | 6.0 Human Intrusions and Disturbance |
| Specific Threat: | Any activity (even recreation) around winter roosts can result in abandonment. |
| Season: | Winter |

#### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Protect long-eared owl winter roosts from disturbance.</td>
<td>Multi-year occupancy of winter roosts.</td>
<td>Number of owls at winter roosts at end of winter season.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** None

#### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 6.0</strong> Land and Water Rights Acquisition and Protection</td>
<td>Establish conservation agreements with landowner/manager of all known winter roosts.</td>
<td>Multi-year occupancy of winter roosts.</td>
<td>Number of conservation agreements.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** None
Long-eared Owl

Asio otus

RESEARCH NEEDS

1. Breeding - Is it possible to conduct a survey of Long-eared Owl nesting population in the state using a standardized protocol? Some precedent set in other parts of range including Canada and Europe.

1. Wintering - Are winter roost sites potential breeding locations?

2. Breeding - What are site and landscape characteristics that have supported Long-eared Owl nest sites? Model these sites.

2. Wintering - What are site and landscape characteristics that have supported long-eared owl winter roosts?

3. Breeding - Study persistence of LEOW at winter roosts (easier to find) into breeding season. Does this enable us to determine if unoccupied sites are available?

3. Wintering - Are unoccupied sites available?

SURVEY NEEDS


1. Wintering - Locate winter roosts which often are sites of breeding birds later in season.

2. Breeding - Conduct a state-wide Long-eared Owl survey using a methodology used elsewhere successfully.

3. Breeding - Conduct Northern Saw-whet Owl breeding surveys in forested areas which includes quiet period when all species are recorded including this species, and including areas where this species could occur.
### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-eared Owl monitoring</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Searches for Long-eared Owl nesting in target areas</td>
</tr>
<tr>
<td>National Audubon Society Christmas</td>
<td>National Audubon Society</td>
<td><a href="http://birds.audubon.org/christmas-bird-count">http://birds.audubon.org/christmas-bird-count</a></td>
<td>Since 1900, this is an annual winter survey of more than 2,300 count circles worldwide. The longest running Citizen Science survey in the world, Christmas Bird Count provides critical data on population trends.</td>
</tr>
<tr>
<td>Bird Counts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
</tbody>
</table>
Short-eared Owl
Asio flammeus

Photo: Jacob Dingel

CONSERVATION PROFILE

Global Rank: G5
State Rank: S1B, S3N (W)
IUCN Red List: LC Least Concern
PA Legal Status: Endangered
Northeast Region: Very High Concern / Low Responsibility
PA Abundance: Unknown
Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Decline of 11-40%; (W) Decline of 30-50%
Conservation Goal:
Minimum of 5-10 nesting pairs by 2025 with habitat available for 25 pairs statewide.

HABITAT ASSOCIATIONS

Primary
Macrogroup
(B,W) Agricultural
Habitat
(B,W) Agriculture (NLCD 81-82)
Specific Habitat Requirements:
(B,W) Large fields or wetlands.

B = Breeding, M = Migration, W = Wintering
## Short-eared Owl

### Asio flammeus

### THREATS AND ACTIONS

#### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Development has reduced availability of large, unfragmented grassland blocks needed by this species

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Establish 5 suitable nesting habitat blocks in areas used by owls (based on Atlas and eBird) in next 5 years; with another five in following 5 years.</td>
<td>Number of grassland blocks exceeding 100 ha in size</td>
<td>Monitor number of nesting owls in large blocks of grassland across the state with targeted surveys.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Upland Sandpiper, Northern Harrier, Bobolink

#### IUCN Threat: 2.0 Agriculture and Aquaculture

**Specific Threat:** Conversion from pasture/hay crops to corn/soybeans and associated pesticide use reduces quantity and quality of wintering habitat for owls.

<table>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Reestablish contiguous 150 acre or more blocks of pasture or grassland type habitat in existing farms in five areas within counties that had nesting owls.</td>
<td>Grassland or pasture acreage, fallow field acreage in large blocks greater than 150 acres.</td>
<td>Monitor nesting owls across the state with targeted surveys of large grasslands.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Ring-necked Pheasant, Northern Harrier, Northern Bobwhite, Upland Sandpiper.
## Short-eared Owl

**Asio flammeus**

### THREATS AND ACTIONS

#### Specific Threat: Afforestation of grassy strip mine reclamation areas.

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<tbody>
<tr>
<td><strong>TRACS Action 8.0 Outreach</strong></td>
<td>Reach out to Bureau of Mine Reclamation and move strongly toward requiring grassy reclamation goal without trees or shrubs, particularly in western counties. And, work towards agreement to keeping part of each reclaimed area free of other structures and disturbances, i.e. drilling and wind power.</td>
<td><strong>Objective</strong>&lt;br&gt;Restore and maintain grasslands on reclaimed strip mines that are greater than 150 acres in size. Target 1000 acres of reclaimed and maintained grassy habitats in 2-5 blocks by 2015.</td>
<td><strong>Monitoring</strong>&lt;br&gt;Monitor acreage of undisturbed grassland on previously strip mined areas.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Ring-necked Pheasant, Northern Harrier, Northern Bobwhite, Upland Sandpiper.

#### Specific Threat: Planting of trees and shrubs in grassland reclamation areas; draining and fragmentation of wetlands.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</strong></td>
<td>Reach out to groups doing mine reclamation including State Bureau of Forestry and obtain agreement to reestablish grassy land cover on reclaimed mine areas in blocks greater than 150 acres to provide habitat for owls; Work to conserve or reestablish large contiguous blocks of wetlands where possible; work with conservancies and PGC or USFWS funding to conserve, reestablish large wetland blocks.</td>
<td><strong>Objective</strong>&lt;br&gt;Restore and conserve large blocks of wetlands in PA.</td>
<td><strong>Monitoring</strong>&lt;br&gt;Monitor acreage of undisturbed grassland on previously strip mined areas.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Ring-necked Pheasant, Northern Harrier, Northern Bobwhite, Upland Sandpiper, American Bittern, Least Bittern, other wetland birds.
# Short-eared Owl

**Asio flammeus**

## THREATS AND ACTIONS

### Specific Threat:
Non-native plants in large wetlands reducing habitat quality for owls.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Reduce invasive wetland plants in large wetlands by 50% in 10 years.</td>
<td>Acres of native wetland habitat restored per year.</td>
<td>Monitor restored wetlands for use by owls and harriers.</td>
<td>1</td>
</tr>
</tbody>
</table>

Work with large wetland land owners to reduce invasive or nonnative wetland plants and restore habitat conducive to owls and other wetland nesting birds.

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Northern Harrier, American Bittern, Least Bittern, other wetland birds.

### Specific Threat:
Sewage, industrial waste effluents in wetland habitats

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Restore 500 to 1000 acres of healthy wetlands along Lake Erie shoreline or Delaware Bay by 2025.</td>
<td>Acres of natural un-degraded wetland habitat in two regions</td>
<td>Monitor wetland health and degradation by pollutants or effluents on Lake Erie shoreline and Delaware Bay.</td>
<td>2</td>
</tr>
</tbody>
</table>

Promote wetland conservation and reduction of pollutants into bays and lakes

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Northern Harrier, American Bittern, Least Bittern, other wetland birds.

---

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**IUCN Threat:** 9.0 Pollution

**Season:** Breeding

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### Short-eared Owl

**Asio flammeus**

#### Threats and Actions

**Specific Threat:** Climate change may reduce or change nesting habitat suitability or needs due to range shifts or influence on prey abundance.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Restore pasture or grassland or purchase in blocks of 1000 acres in at least 4 sites across the state by 2025.</td>
<td>number of contiguous blocks of suitable habitat</td>
<td>Monitor number of large conserved blocks of pasture or grassland</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Northern Harrier, Upland Sandpiper, Ring-necked Pheasant.

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Climate change may reduce or change nesting habitat suitability or needs due to range shifts or influence on prey abundance.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Conserve larger blocks of grassland with some older field (1 to 3 year old) habitat</td>
<td>Number of CREP acres in contiguous blocks of 50 plus acres; number acres of contiguous grassland in state</td>
<td>Monitor number of large blocks of CREP across state; monitor for use by owls, perhaps using eBird and PA Farmland Raptor network</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Northern Harrier, Dickcissel, sparrows, Ring-necked Pheasant, Barn Swallow
## Short-eared Owl

**Asio flammeus**

### THREATS AND ACTIONS

#### IUCN Threat: 1.0 Residential and Commercial Development

#### Specific Threat: Development has reduced availability of large, unfragmented and undisturbed grassland blocks needed by this species

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<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Establish 5 suitable nesting habitat blocks in areas used by owls (based on Atlas and eBird) exceeding 100 ha in size in next 5 years; with another five in following 5 years.</td>
<td>Number of grassland blocks in large (&gt;100 ha) blocks of grassland, focusing first on reclaimed strip mine areas, to maintain or create the habitat needed for this species. Prioritize areas recently used by the owls in western and southwestern counties.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Upland Sandpiper, Northern Harrier, Bobolink

#### IUCN Threat: 2.0 Agriculture and Aquaculture

#### Specific Threat: Conversion from pasture/hay crops to corn/soybeans and associated pesticide use reduces quantity and quality of wintering habitat for owls.

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Reduce use of neonicotinoids by 75-100% by 2025</td>
<td>Acres of Round-up Ready corn or soybean and Acres planted with neonicotinoids GMO seeds.</td>
<td>Monitor use of farmland habitats by owls and acres of GMO corn and soybean fields</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Kestrel, Barn Owl, Northern Harrier, Ring-necked Pheasant, Barn Swallow, Cliff Swallow, Purple Martin
Short-eared Owl

**Asio flammeus**

**RESEARCH NEEDS**

1. **Breeding** - Conduct study of PA nesting short-eared owls to assess productivity, home range, and threats for remaining nesting pairs.

1. **Wintering** - Use banding recoveries and telemetry to identify source population for PA wintering birds, and winter range and timing or duration within the state.

2. **Breeding** - Assess impacts of Marcellus Shale and other energy extraction activities on nesting owls, disturbance distances, impacts on productivity, etc.

2. **Wintering** - Determine habitat use and range size of wintering birds using telemetry.

3. **Breeding** - Research relationship of territory size, habitat type, and prey abundance to inform management and conservation planning.

3. **Wintering** - Evaluate CREP fields, and pheasant recovery areas as suitable owl habitat, determine if species habitat management goals might overlap.

**SURVEY NEEDS**

1. **Breeding** - Develop appropriate survey technique and Conduct survey during breeding season to determine number and location of remaining nesting pairs in large grassland habitats across the state.

1. **Wintering** - 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).

2. **Breeding** - Survey and map potential grassland or marsh land habitats greater than 100 hectares. Use ownership analyses and GIS land cover to determine potential to reclaim grassland or wetland habitats.

2. **Wintering** - Use Winter Raptor Surveys and Christmas Bird Counts to identify possible wintering hotspots for the species.

3. **Breeding** - Monitor use of agricultural pesticides and herbicides and rodenticides across the state and particularly in regions used by wintering birds.

3. **Wintering** - Monitor use of agricultural pesticides and herbicides and rodenticides across the state and particularly in regions used by wintering birds.

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<table>
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<tr>
<th>Program Name</th>
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<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>PA Farmland Raptor project (Hawk Mountain) and eBird may be useful in locating possible nesting areas within the state by tapping birdwatchers and farmland owners</td>
<td>Hawk Mountain Sanctuary for Farmland Raptors; eBird at Cornell Lab of Ornithology</td>
<td><a href="http://www.ebird.org">http://www.ebird.org</a> <a href="http://www.hawkmountain.org">http://www.hawkmountain.org</a></td>
<td>Birder or landowner driven reporting through website.</td>
</tr>
<tr>
<td>Winter Raptor Survey</td>
<td>HMANA or Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirds.org">http://www.pabirds.org</a> <a href="http://www.hmana.org">http://www.hmana.org</a></td>
<td>Road surveys in winter are conducted on the same road route annually; two methods in use currently. Eventually data will be available to researchers on <a href="http://www.hmana.org">www.hmana.org</a>.</td>
</tr>
</tbody>
</table>
Northern Saw-whet Owl
*Aegolius acadicus*

Photo: Joe Kosack

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Not NE Regional SGCN
- **Federal Status**: Not Listed
- **Conservation Goal**: Toot-route detection rate (to be determined).

**State Rank**: S3B, S3N (M)

**PA Legal Status**: Protected

**PA Abundance**: Unknown

**PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change); (M) Unknown

**HABITAT ASSOCIATIONS**

- **Primary**
  - (B) Central Oak-Pine
  - (M) Northern Hardwood & Conifer

- **Secondary**
  - (B) Northeastern Interior Dry-Mesic Oak Forest
  - (M) Appalachian (Hemlock)-Northern Hardwood Forest

**Specific Habitat Requirements**:
- (B) Dense shrubby understory, including ericaceous shrubs, young conifers.
- (M) Any forested habitat, including edges and ruderal forests, presumably.

B = Breeding, M = Migration, W = Wintering
# Northern Saw-whet Owl

### Aegolius acadicus

## Threats and Actions

### IUCN Threat: 1.0 Residential and Commercial Development

### Specific Threat:
Forest fragmentation reduces habitat quality for Saw-whets and increases competition with larger owl species.

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<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Avoid development within known nesting areas during nesting season of all known sites.</td>
<td>Forest fragmentation index</td>
<td>Detection on toot-Route surveys and Breeding Bird Atlas surveys.</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Appalachian Plateaus
HUC6 Watershed: Allegheny, W. Br. Susquehanna

Associated Species: Forest wildlife

### IUCN Threat: 5.0 Biological Resource Use

### Specific Threat:
Loss of conifer habitat nesting sites, through management, succession, or disease.

<table>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintenance of complex forest structure in north-central forests and ANF</td>
<td>Forest understory index in FIA data</td>
<td>Detection on every-3-year toot-Route surveys and Breeding Bird Atlas surveys.</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Appalachian Plateaus
HUC6 Watershed: Allegheny, W. Br. Susquehanna

Associated Species: Forest wildlife
**Northern Saw-whet Owl**

**Aegolius acadicus**

### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Forest fragmentation reduces habitat quality for Saw-whets and increases competition with larger owl species.

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<td>TRACS Action 2.0</td>
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<td>Avoid development within known nesting areas during nesting season of all known sites.</td>
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<td>Action Location: Physiographic Province: Appalachian Plateaus HUC6 Watershed: Allegheny, W. Br. Susquehanna</td>
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<tr>
<td>Associated Species: Forest wildlife</td>
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</table>

**Season:** Breeding

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Road mortality and fragmentation will result from transportation and energy rights-of-way.

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<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Avoid development within known nesting areas during nesting season of all known sites.</td>
<td>Forest fragmentation index</td>
<td>Detection on every-3-year toot- Route surveys and Breeding Bird Atlas surveys.</td>
</tr>
<tr>
<td></td>
<td>Protect large blocks of forest from fragmentation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location: Physiographic Province: Appalachian Plateaus HUC6 Watershed: Allegheny, W. Br. Susquehanna</td>
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</table>

**Season:** Breeding

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## Northern Saw-whet Owl

**Aegolius acadicus**

### THREATS AND ACTIONS

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<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Eastern Hemlock conservation</td>
<td>Hemlock prevalence in FIA data</td>
<td>Detection on every-3-year toot-Route surveys and Breeding Bird Atlas surveys.</td>
</tr>
<tr>
<td>Action Location: Physiographic Province: Appalachian Plateaus HUC6 Watershed: Allegheny, W. Br. Susquehanna</td>
<td>Associated Species: Conifer forest wildlife</td>
<td>IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes</td>
<td>Specific Threat: Increased predation from loss of understory habitat, by management, succession, or deer browse.</td>
<td></td>
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</table>

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintenance of complex forest structure in north-central forests and ANF</td>
<td>Area of complex forest</td>
<td>Detection on every-3-year toot-Route surveys and Breeding Bird Atlas surveys.</td>
</tr>
<tr>
<td>Action Location: Physiographic Province: Appalachian Plateaus HUC6 Watershed: Allegheny, W. Br. Susquehanna</td>
<td>Associated Species: Forest wildlife</td>
<td>IUCN Threat: 11.0 Climate Change and Severe Weather</td>
<td>Specific Threat: Climactic changes that reduce conifer habitat could change forests to be less suitable for nesting Saw-whet Owls.</td>
<td></td>
</tr>
</tbody>
</table>

**Season:** Breeding

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## THREATS AND ACTIONS

**Northern Saw-whet Owl**

**Aegolius acadicus**

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</thead>
<tbody>
<tr>
<td>TRACS Action 3.0 Data Collection and Analysis</td>
<td>Estimate if road mortality is a significant limiting factor to the migratory population.</td>
<td>Number of road kill reports received</td>
<td>Northern Saw-whet Owl migrant population estimate</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specific Threat:** Road mortality from collisions may impact migrant populations.

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Season:** Migration

### RESEARCH NEEDS

1. **Breeding** - What is annual population and distribution of nesting saw-whet owls? A volunteer-based survey may be a needed part of this research question.

1. **Migration** - Project OwlNet expanded and including breeding population.

2. **Breeding** - Are Northern Saw-whet Owls philopatric in PA or in certain areas of the state?

3. **Breeding** - How do saw-whet owls respond to loss of hemlocks and understory where those changes occur?
Northern Saw-whet Owl

*Aegolius acadicus*

**SURVEY NEEDS**

1. Breeding- Saw-whet owl nesting populations are poorly known. Determine extent of breeding population through volunteer surveys.

1. Migration- Project OwlNet at more locations.

2. Breeding- Conduct nest-box surveys to determine saw-whet owl occupancy and persistence at known breeding grounds.

2. Migration- Banding of breeding birds to make Project OwlNet more effective at studying PA breeding population migration pattern.

3. Breeding- Conduct banding studies to determine where PA nesting saw-whet owls migrate in the winter.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Saw-whet Owl breeding surveys (&quot;Toot-Route&quot; survey)</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Point count routes with 8 points each using a audio-lure protocol.</td>
</tr>
<tr>
<td>Saw-whet owl banding</td>
<td>Project Owlnet</td>
<td><a href="http://www.projectowlnet.org/?page_id=201">http://www.projectowlnet.org/?page_id=201</a></td>
<td></td>
</tr>
</tbody>
</table>
Common Nighthawk
*Chordeiles minor*

**CONSERVATION PROFILE**

- **Global Rank:** G5
- **State Rank:** S3B
- **IUCN Red List:** LC Least Concern
- **Northeast Region:** Very High Concern / Low Responsibility
- **Federal Status:** Not Listed
- **PA Legal Status:** Protected
- **PA Abundance:** 2000
- **PA Short-Term Trend (10 year):** (B) Unknown

**Conservation Goal:**
Halt current population decline; maintain nesting presence in at least 250 Breeding Bird Atlas (Wilson et al. 2012) blocks by 2025.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup:** Urban/Suburban Built
  - **Habitat:** Developed (NLCD 21-24 & 31)

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

*B = Breeding, M = Migration, W = Wintering*
## Common Nighthawk

### Chordeiles minor

## THREATS AND ACTIONS

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Loss of suitable nesting substrates in urban areas caused by a shift from small gravel to large gravel, rubberized, or PVC material on flat roofs. |

### Season: Breeding

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<tbody>
<tr>
<td><strong>TRACS Action 11.0</strong> Technical Assistance</td>
<td>Assess the availability of suitable roofs in at least three urban/suburban areas by 2025. Distribute educational material to landowners where suitable roofs exist.</td>
<td>Number of areas assessed for suitable rooftop nesting habitat; Number of landowner contacts made.</td>
<td>Follow up with landowners to assess changes in roofing material. Annual surveys of nighthawks in urban areas during the breeding season. Evening surveys could be conducted by citizen scientists, with potential follow up surveys by professionals to locate nests in areas with nighthawk activity.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Increased abundance of crows in urban areas increases predation risk of eggs and young. |

### Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Test the effectiveness of predator exclosures on nighthawk nests.</td>
<td>Number of nests protected.</td>
<td>Assess tolerance of nighthawks to predator exclosure. Assess effectiveness of exclosures at deterring predators.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide
### Common Nighthawk

#### Chordeiles minor

**IUCN Threat:** 7.0  
**Natural System Modifications**

**Specific Threat:** Fire suppression limits the creation of natural forest openings suitable for nesting.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Double the acreage of prescribed burns conducted annually in the state by 2025.</td>
<td>Number of acres of prescribed burns conducted annually.</td>
<td>Evening surveys for nighthawks in burned areas during the breeding season.</td>
</tr>
</tbody>
</table>

- Maintain an active prescribed burn program to encourage grassy openings and bare patches likely to attract nesting nighthawks.
- **Action Location:** Physiographic Province: Statewide
- **Associated Species:** Golden-winged Warbler, Olive-sided Flycatcher, Prairie Warbler, Red-headed Woodpecker, Yellow-breasted Chat

**IUCN Threat:** 10.0  
**Geological Events**

**Specific Threat:** Increased frequency of heavy rain events due to climate change could damage or destroy potential cliff and talus nest sites.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Reduce potential impacts to wildlife from climate change.</td>
<td># climate change mitigation strategies developed that minimize impacts to wildlife.</td>
<td># of cliff and talus nest sites</td>
</tr>
</tbody>
</table>

- Support development and implementation of climate change mitigation strategies that minimize impacts to wildlife.
- **Action Location:** Physiographic Province: Statewide
- **Associated Species:** Peregrine Falcon, Bank Swallow
**Common Nighthawk**

**Chordeiles minor**

### THREATS AND ACTIONS

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Climate change may alter the timing of insect emergences and abundance so that prey is less available during the nesting season or in migration.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0  Planning</td>
<td>Reduce potential impacts to wildlife from climate change.</td>
<td># climate change mitigation strategies developed that minimize impacts to wildlife..</td>
<td># of cliff and talus nest sites</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Aerial insectivores.

### RESEARCH NEEDS

1. Breeding- 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.

2. Breeding- Assess the threat of nest predation by crows to rooftop nesting nighthawks.

3. Breeding- 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 Bird Records, Project Nighthawk 2013 Summary).

### SURVEY NEEDS

1. Breeding- Survey the availability of suitable gravel roofs; Identify areas that harbor large nighthawk populations.

2. Breeding- Annual monitoring of urban/suburban areas that harbor substantial populations of nighthawks. This effort could be carried out by volunteers.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nightjar Survey Network</td>
<td>Center for Conservation Biology</td>
<td><a href="http://www.nightjars.org/">http://www.nightjars.org/</a></td>
<td>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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Eastern Whip-poor-will
Antrostomus vociferus

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed

State Rank: S3B
PA Legal Status: Protected
PA Abundance: 11000
PA Short-Term Trend (10 year): (B) Unknown

Conservation Goal:
Stabilize population size of this declining species with a target of at least 8000 breeding pairs in Pennsylvania (a 2004 population estimate; Rich et al. 2004 cited in the Second Atlas of Breeding Birds in Pennsylvania) by 2025.

HABITAT ASSOCIATIONS

Primary
Macrogroup: Central Oak-Pine
Habitat: Northeastern Interior Dry-Mesic Oak Forest

Secondary
Macrogroup: Central Oak-Pine
Habitat: Central Appalachian Dry Oak-Pine Forest

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

B = Breeding, M = Migration, W = Wintering
### Eastern Whip-poor-will

**Antrostomus vociferus**

#### THREATS AND ACTIONS

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Suppression of fire reduces availability of forest openings and early to mid-successional forest habitats favored by this species.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Initiate prescribed burning or forest harvest management at at least 1 new state or private managed forest site each year.</td>
<td>Number of new forest sites at which management practices are performed.</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, Gray Catbird, Eastern Towhee, Golden-winged Warbler

---

**IUCN Threat:** 9.0 Pollution

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

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Reduce aerial spraying of pesticides to control gypsy moths by at least 50% by 2025.</td>
<td>Annual percent reduction of pesticide use.</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Wood Thrush, Blackburnian Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Eastern Wood-Pewee
<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 6.0</strong> Land and Water Rights Acquisition and Protection</td>
<td>Protect at least 1000 additional ha of currently unprotected forest habitats in areas vulnerable to sprawl by 2025.</td>
<td>Hectares of vulnerable forest protected</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley</td>
<td><strong>Associated Species:</strong> Red-eyed Vireo, Wood Thrush, Black-and-white Warbler, Ovenbird, Scarlet Tanager.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Coordinate long-range forest management plans among state land management agencies to ensure that harvest is well spaced, both temporally and spatially.</td>
<td>Development of inter-agency forest harvest plans</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus, Ridge and Valley</td>
<td><strong>Associated Species:</strong> Ruffed Grouse, Gray Catbird, Eastern Towhee, Golden-winged Warbler</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Eastern Whip-poor-will

**Antrostomus vociferus**

### Threats and Actions

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Season:** Breeding

**Specific Threat:** Potential mismatch of migration, nesting season, and prey emergences.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0 Coordination and Administration</td>
<td>Develop land management strategy with other states and the federal government to accommodate shifts in distribution that may be necessary for many species due to climate change.</td>
<td>Development of an interstate/interagency management strategy.</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

### Research Needs

1. Breeding- Determine the key features that constitute high quality Whip-poor-will habitat in Pennsylvania.

2. Breeding- Identify key factors that influence Whip-poor-will calling rate to maximize the effectiveness of population surveys.

3. Breeding- Determine response of this species and others to silvicultural treatments especially for young forest / early succession habitats.

### Survey Needs

1. Breeding- Long-term, statewide, nocturnal bird surveys are required in Pennsylvania to better document whip-poor-will abundance, distribution, and population trends.

2. Breeding- Conduct post-treatment surveys of silvicultural treatments to determine reaction of young forest and shrub species.

3. Breeding- Conduct Northern Saw-whet Owl breeding surveys in forested areas which includes quiet period when all species are recorded including this species.
## Eastern Whip-poor-will

### Antrostomus vociferus

### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<tbody>
<tr>
<td>Nightjar Survey Network</td>
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<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations</td>
</tr>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
</tbody>
</table>
Chimney Swift
Chaetura pelagica

CONSERVATION PROFILE

Global Rank: G5
State Rank: S3B
IUCN Red List: NT Near Threatened
PA Legal Status: Protected
Northeast Region: High Concern / Low Responsibility
PA Abundance: 430000
Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Decline of 11 - 40%

Conservation Goal:
Maintain species population at or above Second Breeding Bird Atlas (Wilson et al. 2012) levels of 430,000 birds through 2025, or a Breeding Bird Survey detection rate of 12 birds per route, on average, across 95% of all routes.

HABITAT ASSOCIATIONS

Primary
Macrogroup: Urban/Suburban Built
Habitat: Developed (NLCD 21-24 & 31)

Secondary
Macrogroup: Agricultural
Habitat: Agriculture (NLCD 81-82)

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

B = Breeding, M = Migration, W = Wintering

Photo: Wikimedia Commons
## THREATS AND ACTIONS

### Chimney Swift

**IUCN Threat:** 1.0 Residential and Commercial Development

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

**Action**

<table>
<thead>
<tr>
<th>TRACS Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.0 Technical Assistance</td>
<td>Distribute educational materials to landowners.</td>
<td>Number of landowner contacts made.</td>
<td>Breeding Bird Survey.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

### IUCN Threat: 9.0 Pollution

**Specific Threat:** Reduced insect food supply caused by pesticide use.

**Action**

<table>
<thead>
<tr>
<th>TRACS Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 Direct Management of Natural Resources</td>
<td>Reduce the use of pesticides in agricultural and forestry operations by 2025.</td>
<td>Amount of pesticides applied annually.</td>
<td>Monitoring the amount of pesticides sold and/or applied annually.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Bank Swallow, Common Nighthawk, Eastern Whip-poor-will, Purple Martin
### Chimney Swift

**Chimera pelagica**

#### THREATS AND ACTIONS

| IUCN Threat: | 11.0 Climate Change and Severe Weather |
| Specific Threat: | Climate change may alter the timing of insect emergences and abundance so that prey is less available during the nesting season or in migration. |

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 100.0 Law and Policy</strong></td>
<td>Develop land management strategy with other states and the federal government to accommodate shifts in distribution that may be necessary for many species due to climate change.</td>
<td>Development of an interstate/interagency management strategy.</td>
<td>Nocturnal surveys to detect singing males should be conducted during the summer breeding season.</td>
<td>1</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Nearly all species.

| IUCN Threat: | 5.0 Biological Resource Use |
| Specific Threat: | Loss of old forest containing large, hollow trees suitable as natural nesting and roosting sites. |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>By 2025, agencies with major public land holdings (DCNR, PGC, USFS) designate areas to be managed for old-growth forest characteristics.</td>
<td>Acreage of forest designated for old forest management.</td>
<td>Acreage of forest designated for old forest management.</td>
<td>2</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: Northern Flying Squirrel, Northern Goshawk, Olive-sided Flycatcher, Swainson’s Thrush, Yellow-bellied Flycatcher
## Chimney Swift

### Chaetura pelagica

**Threats and Actions**

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>7.0 Natural System Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Reduced insect food supply caused by anthropogenic activities (e.g., pesticide use and acid precipitation).</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Breeding</td>
</tr>
</tbody>
</table>

### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Conduct research leading to best management practices by 2025.</td>
<td>Development of best management practices.</td>
<td>Regular assessments of research progress.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Bank Swallow, Common Nighthawk, Eastern Whip-poor-will, Purple Martin

### Research Needs

1. Breeding- Investigations into the relationships between pesticide use, flying insects, and aerial insectivores are needed.


3. Breeding- Do any Chimney Swifts nest in large trees and old growth forests in the state?

### Survey Needs

1. Breeding- Annual monitoring of urban areas that harbor large populations of chimney swifts. A volunteer survey network could be developed to perform these surveys.

2. Breeding- 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 and Adaptive Management).
# Chimney Swift

**Chimney Swift**

### Chimney Swift

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</tbody>
</table>
Red-headed Woodpecker
*Melanerpes erythrocephalus*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Rank</td>
<td>S4B</td>
</tr>
<tr>
<td>IUCN Red List</td>
<td>NT Near Threatened</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Not NE Regional SGCN</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>4500</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**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).

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Developed (NLCD 21-24 &amp; 31)</td>
<td>Agricultural</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**
Woodlots at least 2 hectares in size with snags near open pasture. Savannah-like forests, parks, swamps.

Photo: Jacob Dingel

B = Breeding, M = Migration, W = Wintering
### Red-headed Woodpecker

**Melanerpes erythrocephalus**

#### THREATS AND ACTIONS

<p>| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Wetland alteration and drainage. |</p>
<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 7.0</td>
<td>Law enforcement</td>
<td>No additional loss of wetlands.</td>
<td>Acres of wetlands</td>
<td>Count number of wetland acres in PA annually.</td>
</tr>
<tr>
<td>Laws pertaining to wetland drainage and modification should be enforced.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>King Rail, Virginia Rail, Sora, American Coot, Wood Duck</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Season: Breeding

<p>| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Removal of snags in residential areas for aesthetic and safety concerns. |</p>
<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0</td>
<td>Outreach</td>
<td>Provide News Releases on importance of snag Number of new cavity nests and dead limb retention (4 per annum), contact large landowner groups directly (public and private)</td>
<td>Count number of singing males during Breeding Season for the BBS annually for 10 years.</td>
<td>2</td>
</tr>
<tr>
<td>Landowner outreach to retain non-hazardous snags</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Red-bellied Woodpecker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Pileated Woodpecker</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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PENNSYLVANIA GAME COMMISSION
244 | Appendix 1.4-Birds

PENNSYLVANIA FISH & BOAT COMMISSION
Published September 2015
### Red-headed Woodpecker

**Melanerpes erythrocephalus**

#### THREATS AND ACTIONS

| Specific Threat: | Removal of snags during commercial timber harvests. |

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Contact forestry associations and landowner groups directly (public and private) on importance of snag retention</td>
<td>Number of new cavity nests</td>
<td>Count number of singing males during Breeding Season for the BBS annually for 10 years.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Red-bellied Woodpecker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Pileated Woodpecker

| Specific Threat: | Increased development and use of roads leading to increases in vehicle collision mortality |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Determine percent of population susceptible to road-kill</td>
<td>Number of road kill</td>
<td>Roadside survey for road-killed RHWO from June to Sept.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

#### RESEARCH NEEDS

1. Breeding - Breeding success and habitat condition throughout the state.

2. Breeding - Response of Red-headed Woodpecker to silviculture treatments including salvage cuttings of diseased trees.
Red-headed Woodpecker

Melanerpes erythrocephalus

SURVEY NEEDS

1. Breeding - Annual BBS.
2. Breeding - Track changes of wetland acreage throughout PA using the National Wetlands Inventory.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
American Kestrel
*Falco sparverius*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

**State Rank**  S4B

**PA Legal Status**  Protected

**PA Abundance**  13600

**PA Short-Term Trend (10 year)**  (B) Relatively Stable (<=10% change)

**Conservation Goal:**

Maintain statewide breeding distribution of at least 25,000 birds (0.9 birds per Breeding Bird Survey route on at least 80% of all routes) by 2025 and increase Breeding Bird Survey detection rate in southeastern and southwestern counties by 10%.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary Macrogroup</th>
<th>Agricultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Agriculture (NLCD 81-82)</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**

Uses variety of grassland habitats with short herbaceous vegetation and sparse woody vegetation preferred; use meadows, agricultural fields, pastures, large lawn areas. Requires nest tree with cavity or nest box on tree, barn, or pole. Prime habitat includes 25 or more hectares of contiguous grassland. Areas used consistently include >65% open habitat in 1 hectare around nest site and distances from woodland >350 meters (Smallwood and Bird 2002).

B = Breeding, M = Migration, W = Wintering
### American Kestrel

*Falco sparverius*

#### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Reduction and fragmentation of grassland habitat statewide, particularly pasture land. Increased exposure to Cooper's Hawks and other predators that are attracted to suburban development and woodlots.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Establish or restore grassland or pasture on 5000 acres or more in 10 years; Conserve remaining grassland farms at 2014 levels.</td>
<td>Number of acres of restored or conserved pasture/grassland.</td>
<td>Use Breeding Bird Survey and Winter Raptor Survey data to monitor status of species over time by region. Work with PA Farmland Raptor Project or AK Partnership to monitor number of nest box programs and their productivity</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Piedmont

**Associated Species:** Henslow's Sparrow, Grasshopper Sparrow, Eastern Meadowlark, Barn Owl
### American Kestrel

**Falco sparverius**

#### THREATS AND ACTIONS

**IUCN Threat:** 2.0 Agriculture and Aquaculture

**Specific Threat:** Intensification in agriculture and shift to row crops; greater use of pesticides and herbicides reducing insect prey. Use of highly toxic rodenticides such as brodifacum.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Reduce pounds of pesticides and herbicides used per 100 acres of farmland by 30% in 10 years.</td>
<td>Number of successful nesting attempts by Kestrels per 100 acres by county</td>
<td>Use Breeding Bird Survey and Winter Raptor Survey data to monitor status of species over time by region. Work with PA Farmland Raptor Project or AK Partnership to monitor number of nest box programs and their productivity; monitor acres of wildlife friendly farms over time</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Meadowlark, Barn Owl, Grasshopper Sparrow, monarch butterfly, honey bee

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Conversion from pasture/alfalfa to corn/soybeans reduces habitat quality.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0 Coordination and Administration</td>
<td>Increase pasture or hay crop acreage in state by 5% per year over next 10 years</td>
<td>Acres of pasture or hay crops versus acres corn and soybean</td>
<td>Monitor grassland bird numbers using Breeding Bird Survey; monitor acres in pasture with dept. of agriculture data.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Ring-necked Pheasant, Eastern Meadowlark, Barn Owl, Bobolink
### American Kestrel

**Falco sparverius**

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Fragmentation and disturbance of field habitats primarily in northern counties.

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Reduce number of new drilling operations in important grassland habitats by 10% in next 10 years (use row crops instead).</td>
<td>Marcellus Shale well distribution. Acres of undisturbed grassland or pastureland per region.</td>
<td>Monitor grassland habitat area per region and number of fields with wells. Monitor kestrel distribution through Shale drilling area using road surveys.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Eastern Meadowlark, Barn Owl, Grasshopper Sparrow, Northern Harrier, Short-eared Owl

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Competition for nest boxes with European Starling.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Decrease or limit use of nest boxes by starlings by 30% in next 10 years; reduce occurrence of West Nile virus in agricultural areas by 10% in next 10 years.</td>
<td>25% less box occupancy by starlings; decrease WNV annual infection rates for wild birds below 2014.</td>
<td>Monitor wild bird infection rates from rehab center reporting and from Dept. of Ag. Veterinary labs., monitor box occupancy by kestrels in all state box programs</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Barn Owl, Eastern Meadowlark, Ring-necked Pheasant
American Kestrel

Falco sparverius

**RESEARCH NEEDS**


2. Breeding - Assess the impacts of modern day farming pesticides and herbicides as well as rodenticides on prey diversity and abundance in kestrel nesting areas, and the level of exposure in current kestrel populations.

3. Breeding - Evaluate nest success in current nest box programs in relation to habitat cover in different areas of state.

**SURVEY NEEDS**

1. Breeding - Survey city environments (Philadelphia and Pittsburgh) for evidence and abundance of urban kestrel populations.

2. Breeding - Encourage or continue winter raptor surveys within winter range for Pennsylvania nesting birds to assess winter range by sex and to provide additional monitoring tool for Pennsylvania population.

3. Breeding - Monitor use of agricultural pesticides and herbicides and rodenticides across the state and their potential impacts.

**MONITORING PROGRAMS**

<table>
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<th>Program Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>American Kestrel nest box programs</td>
<td>Hawk Mountain Sanctuary Association; American Kestrel Partnership, private banders</td>
<td><a href="http://kestrel.peregrinefund.org">http://kestrel.peregrinefund.org</a> <a href="http://www.hawkmountain.org">http://www.hawkmountain.org</a></td>
<td>Many people maintain kestrel nest box networks that they monitor for nest success and band young; Hawk Mt's was established in 1960s. Partnership is new effort to coordinate across continent.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</tr>
<tr>
<td>------------------------------------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PA Winter Raptor Surveys</td>
<td>Pennsylvania Society for Ornithology and HMANA</td>
<td><a href="http://www.pabirds.org">http://www.pabirds.org</a></td>
<td>Roadside counts during winter months of raptors, conducted by volunteers and analyzed annually in PA Birds magazine.</td>
</tr>
</tbody>
</table>
CONSERVATION PROFILE

Conservation Goal:
Achieve a state de-listing threshold: namely, when the total number of cliff-nesting pairs plus 25% of the pairs nesting on man-made structures equals half the historic total (i.e., equals 22), at least half the pairs produce fledglings, and productivity equals at least 1.5 fledglings per occupied nest, for at least 3 consecutive years (Brauning et al., 2013).

HABITAT ASSOCIATIONS

Primary
Macrogroup: Urban/Suburban Built
Habitat: Developed (NLCD 21-24 & 31)

Secondary
Macrogroup: Cliff and Talus

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).

B = Breeding, M = Migration, W = Wintering
### Peregrine Falcon

**Falco peregrinus**

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:**

1. Nesting on man-made structures (buildings, bridges, smokestacks, water towers, etc.) exposes nesting birds to human presence from many sources, such as maintenance and repair of structure or associated equipment, potentially resulting in nest failure, abandonment, or loss of nest site (due to modification or demolition of structure);
2. Nesting in urban/commercial/industrial environment puts young at risk of death from collision (with buildings, especially glass; or with aircraft at nearby airports), electrocution on power lines, etc.; (iii) bridge/building site often inadequate for successful nesting & fledging; (iv) urban environment exposes young to lethal infection by Trichomonas carried by feral pigeons; (v) recreational rock climbing can limit adoption and success of cliff nesting; (vi) nests in active rock quarries are exposed to disturbance by quarrying activities; (vii) urban location of nests exposes adults and young to avicides used to control "pest" species (e.g. feral pigeons), which are frequent prey items; (viii) Human presence resulting from development and urban sprawl can degrade suitability of formerly-remote cliffs for nesting.

**Season:** Breeding

**Action**

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
</tr>
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<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>(i) Reduce disturbance; (ii) reduce mortality; (iii) improve nesting and fledging success; (iv) control disease; (v, vi) reduce disturbance; (vii) remove threat; (viii) reduce disturbance.</td>
<td>(i) Number of occupied nests that are successful; (ii) reduced number of injuries/mortalities; (iii) number of occupied nests that are successful; (iv) reduced mortality from disease; (v) number of occupied &amp; successful nests on cliffs; (vi) reduced nest failure/abandonment; (vii) reduced avicide use; (viii) number of occupied &amp; successful nests on cliffs.</td>
<td>Monitor nesting pairs to document site occupancy, nesting success and productivity, and mortality of young and adults. Monitoring done by agency personnel and volunteers coordinated by agency. Timeline: ongoing; continue &gt;10 years.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

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254| Appendix 1.4-Birds

PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
## Peregrine Falcon

### Falco peregrinus

## Threats and Actions

### IUCN Threat: 4.0 Transportation and Service Corridors

**Specific Threat:** Injury or death from vehicle collisions

| Action Location: | Physiographic Province: Statewide |

### TRACS Action 101.0 Species Management

- Monitoring and rescue of young during early post-fledging period; attempt to attract parental birds to safer nesting location with nest box/tray; relocate pre-fledged young to safer location at appropriate age.

**Objective:** Reduce fledgling mortality

**Measure:** Number of fledglings that survive 30 days after fledging.

**Monitoring:** Monitor nest and vicinity from time of fledging to 30 days after fledging; rescue fledglings from life-threatening situations; rehabilitate injured fledglings. Timeline: ongoing; continue > 10 years.

**Priority:** 1

### IUCN Threat: 9.0 Pollution

**Specific Threat:** Adults and young are exposed to a huge array of pollutants that are pervasive in the environment.

| Action Location: | Physiographic Province: Statewide |

### TRACS Action 100.0 Law and Policy

- Legislation to control release of harmful pollutants into the environment.

**Objective:** Reduce morbidity & mortality

**Measure:** Nest success and productivity; longevity and fecundity of adults.

**Monitoring:** Testing of unhatched eggs, prey remains, or feather samples, collected during banding visit to nest, for contaminants.

**Priority:** 1
Peregrine Falcon

Falco peregrinus

THREATS AND ACTIONS

IUCN Threat: 10.0 Geological Events
Specific Threat: Geological events, storms, and vegetation overgrowth can degrade quality of cliff ledges for nesting.

<table>
<thead>
<tr>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Improve ledge suitability for nesting</td>
<td>Increased adoption of cliff sites by peregrines for nesting</td>
<td>Monitoring of cliffs to document nesting</td>
<td>2</td>
</tr>
</tbody>
</table>

Clearing of excess vegetation and debris from historically-used nest ledges.

Action Location: Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

Associated Species: Common Ravens

Season: Breeding

IUCN Threat: 10.0 Geological Events

TRACS Action 9.0 Planning

1. Breeding- Annually inventory nesting population and monitor all nesting peregrines state-wide. Band all young produced in PA nests.
2. Breeding- Evaluate contaminant load in population by conducting chemical analyses on unhatched eggs and, where appropriate, feather samples.
3. Breeding- Determine why re-colonization of cliffs for nesting is proceeding slowly.

RESEARCH NEEDS

1. Breeding- Survey all historic nesting cliffs for nesting peregrines. Survey tall man-made structures (bridges, buildings, etc.) for new nesting pairs.
2. Breeding- Encourage volunteer participation with searches for nest sites on cliffs with or without previous history of falcon occupancy.
3. Breeding- Monitor Peregrine Falcon migrant numbers at the regular hawk watch sites.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvania Peregrine Falcon Management Program</td>
<td>Pennsylvania Game Commission</td>
<td><a href="https://www.portal.state.pa.us/portal/server.pt/document/1333817/peregrine_falcon_management_plan_pdf">https://www.portal.state.pa.us/portal/server.pt/document/1333817/peregrine_falcon_management_plan_pdf</a></td>
<td>All known peregrine falcon nesting sites are monitored throughout the nesting season for nesting activity and nesting results. Potential new nest sites (natural and man-made) are regularly searched for. Nests are visited wherever possible to verify nest results, perform medical exams on young, and band young. Nests are monitored during fledging period to reduce fledgling mortality. Re-sights of banded birds are recorded to map movements, longevity, and entry of young into the breeding population. Longevity and fecundity of adults are monitored and recorded. Negotiations are conducted with property owners/managers to protect peregrines, especially while nesting. Threats are evaluated and managed. Program is ongoing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=563596&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=563596&amp;mode=2</a></td>
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</tbody>
</table>
Olive-sided Flycatcher  
*Contopus cooperi*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>NT Near Threatened</td>
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<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
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<tr>
<td>State Rank</td>
<td>PA Legal Status</td>
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<tr>
<td></td>
<td>PA Abundance</td>
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<tr>
<td></td>
<td>PA Short-Term Trend (10 year)</td>
</tr>
<tr>
<td>Data Deficient</td>
<td>(B)</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Reestablish breeding population in Pennsylvania by 2025. Maintain passage migrant population.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>North-Central Appalachian Acidic Swamp</td>
<td>Appalachian (Hemlock)-Northern Hardwood Forest</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**
A characteristic member of the North American boreal conifer forest bird community, it is 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.

B = Breeding, M = Migration, W = Wintering
**THREATS AND ACTIONS**

**Olive-sided Flycatcher**  
*Contopus cooperi*

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Deforestation linked to decline and disappearance of species, but it is unknown why it has not recolonized from "rescue effect" since it is a regular passage migrant and forests have recovered substantially since extirpation. Marcellus shale, shallow oil well, and wind energy infrastructure permanently replaces or fragments forest.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase spruce, hemlock, and fir forest acreage and number of blocks.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, U. Delaware

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**RESEARCH NEEDS**

1. Breeding- What are the limiting factors for this species across its range leading to its long-term decline?

2. Breeding- Are there forest conditions in the region and nearby regions (that would allow rescue effect) that do not allow this species to breed in the Appalachian Mountains including Pennsylvania?

3. Breeding- What are the linkages between eastern populations of OSFL and wintering grounds in South and Central America?
Olive-sided Flycatcher

Contopus cooperi

SURVEY NEEDS

1. Breeding - Locate any breeding populations in the state (Now considered Extirpated, no confirmed records since 1930's). Includes active searches at best potential sites.

2. Breeding - 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 OSFL.

3. Breeding - Establish off-road point forest bird counts in large forest blocks as part of state network of point counts (not as technical as Mountain Bird Count).

MONITORING PROGRAMS

<table>
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<th>Program Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Mountain Bird Watch</td>
<td>Vermont Center for Ecostudies</td>
<td><a href="http://vtecostudies.org/projects/mountains/mountain-birdwatch/">http://vtecostudies.org/projects/mountains/mountain-birdwatch/</a></td>
<td>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 PA version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for the PA and the Appalachian Mountains.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
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</thead>
<tbody>
<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Yellow-bellied Flycatcher

*Empidonax flaviventris*

**CONSERVATION PROFILE**

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</tr>
<tr>
<td>Northeast Region</td>
<td>Not NE Regional SGCN</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Conservation Goal:</td>
<td>50 Yellow-bellied Flycatcher territorial pairs in at least 5 locations by 2025.</td>
</tr>
</tbody>
</table>

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-Central Appalachian Acidic Swamp</td>
<td>North-Central Interior and Appalachian Acidic Peatland</td>
<td></td>
</tr>
</tbody>
</table>

**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). Ferns can be numerous. There can be canopy gaps and territories can have less than 50% canopy cover and many deciduous trees.

B = Breeding, M = Migration, W = Wintering
**Yellow-bellied Flycatcher**

*Empidonax flaviventris*

## THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Season:** Breeding

**Specific Threat:** Marcellus shale, shallow oil well, and wind energy infrastructure permanently replaces or fragments forest.

**IUCN Threat:** 3.0 Energy Production and Mining

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
## Yellow-bellied Flycatcher

### Empidonax flaviventris

#### THREATS AND ACTIONS

| IUCN Threat: | 5.0 Biological Resource Use |
| Specific Threat: | Permanent deforestation and replacement of conifer with deciduous forest. |

**Season:** Breeding

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase spruce, hemlock, and fir forest acreage and number of blocks.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

---

**PENNSYLVANIA GAME COMMISSION**  
264 Appendix 1.4-Birds

**PENNSYLVANIA FISH & BOAT COMMISSION**  
Published September 2015
# THREATS AND ACTIONS

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Conversion of palustrine wetlands to open water or uplands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Protect boreal conifer swamps from flooding or conversion.</td>
<td>Number of swamps not flooded or converted.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

*Season: Breeding*
## Yellow-bellied Flycatcher

### THREATS AND ACTIONS

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Residential and road development replaces forest and wetlands.

**Season:** Breeding

### Action | Objective | Measure | Monitoring | Priority
---|---|---|---|---
TRACS Action 9.0 Planning | Protect boreal conifer forest and swamps. | Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares. | Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects. | 2

**Action Location:** Physiographic Province: Appalachian Plateaus
HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
# Yellow-bellied Flycatcher

*Empidonax flaviventris*

## Threats and Actions

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>4.0 Transportation and Service Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Road-building and right-of-way removal of forest and wetlands.</td>
</tr>
</tbody>
</table>

### Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
### THREATS AND ACTIONS

**Yellow-bellied Flycatcher**

#### Empidonax flaviventris

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Deer browsing is oversimplifying the forest species diversity and structure. Invasives are decreasing health and vigor of hemlocks and other conifers.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Maintain vegetation complexity of forest around boreal swamps.</td>
<td>Retain current population size and number of locations occupied by breeding birds. Number of points along transects in habitat blocks.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

HUC8 Watershed: U. Susquehanna, U. Delaware, U. Susquehanna-Tunkhannock

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**Season:** Breeding

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
Yellow-bellied Flycatcher

**Empidonax flaviventris**

### THREATS AND ACTIONS

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Decrease in insects and other prey items composed of a lot of calcium.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Decrease acidification of the soil by liming or other means in addition to standard air pollution regulations.</td>
<td>Maintain high nest success rate in monitored locations.</td>
<td>Nest success rate of known territories remain above 50%.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus
HUC10 Watershed: Upper Loyalsock Creek, Mehoopany Creek, Bowman's Creek, Cherry Run (ANF), Lycoming Creek.

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
Yellow-bellied Flycatcher

**Empidonax flaviventris**

### THREATS AND ACTIONS

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Palustrine wetlands are reduced in health and vigor where conifers grow that this and other species are dependent.

Northern conifers will be stressed by warmer conditions.

**Season:** Breeding

**Action**

- **TRACS Action 2.0**
- Direct Management of Natural Resources

**Objective**

- Retain and promote conifer forest vegetation as a means to counteract the effects of climate change since forests are relatively resilient to the factors expected.

**Measure**

- Retain current population size and number of locations occupied by breeding birds. Number of points along transects in habitat blocks.

**Monitoring**

- Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.

**Action Location:**

- Physiographic Province: Appalachian Plateaus

**Associated Species:**

- Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

### RESEARCH NEEDS

1. Breeding- What is the continued breeding population, habitat, and persistence, & nesting success in YBFL in Pennsylvania? The species seems to persist despite limited range and population.

2. Breeding- What management approaches can maintain and increase the possibility of this boreal forest species and its ecosystem cohorts to continue in Pennsylvania?

3. Breeding- What are the limiting factors for this species through its full life cycle? What linkages can be made between the NE USA and its Middle American wintering ground?
Yellow-bellied Flycatcher

Empidonax flaviventris

**SURVEY NEEDS**

1. Breeding: Continuous monitoring of known and recent breeding populations including breeding confirmation, success, habitat association, continuity of occupation.

2. Breeding: Find undiscovered or new locations that may have been overlooked or newly colonized, allowing study of population and protection of site.

3. Breeding: Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Mountain Bird Watch</td>
<td>Vermont Center for Ecostudies</td>
<td><a href="http://vtecostudies.org/projects-mountains/mountain-birdwatch/">http://vtecostudies.org/projects-mountains/mountain-birdwatch/</a></td>
<td>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 PA version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for the PA and the Appalachian Mountains.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
<tr>
<td>Program Name</td>
<td>Lead Agency</td>
<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
## Conservation Profile

**Conservation Goal:**
Increase estimated population by 10%, from 250,000 males (from Breeding Bird Survey, PIF 2013) to 275,000, by 2025.

## Habitat Associations

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Laurentian-Acadian Wet Meadow-</td>
<td>Agriculture (NLCD 81-82)</td>
</tr>
<tr>
<td></td>
<td>Shrub Swamp</td>
<td></td>
</tr>
</tbody>
</table>

**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.

### Global and State Rankings

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>State Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5</td>
<td>S4B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IUCN Red List</th>
<th>PA Legal Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC Least Concern</td>
<td>Protected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Northeast Region</th>
<th>PA Abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Concern / Low</td>
<td>270000</td>
</tr>
<tr>
<td>Responsibility</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Federal Status</th>
<th>PA Short-Term Trend (10 year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Listed</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

### Pennsylvania Abundance and Trends

- **Abundance:** 270,000
- **Trend (10 year):** Relatively Stable

---

Photo: Jacob Dingel

---

Sarah Sargent  
Audubon Pennsylvania

---

B = Breeding, M = Migration, W = Wintering
## Threats and Actions

### Specific Threat: Land use conversion from brushy, wet meadows to housing or other development. Creation of ponds or draining of wet, brushy areas.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>No net loss of habitat.</td>
<td>Assess habitat available by region using GIS, focusing on regions under most development risk. Reassess at intervals.</td>
<td>Use GIS to track development and habitat conversion. Track implementation of habitat management projects by different organization.</td>
<td>1</td>
</tr>
</tbody>
</table>


**Associated Species:** American Woodcock, Mourning Warbler, Swamp Sparrow.

### Specific Threat: Control of woody vegetation in utility rights-of-way.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 100.0 Law and Policy</strong></td>
<td>Get at least 3 major companies to adopt bird friendly ROW maintenance standards in PA.</td>
<td>Number of miles of ROW managed under new standards.</td>
<td>Conduct follow up study on bird abundance or productivity in ROWs under new management. Spot check implementation quality by companies.</td>
<td>2</td>
</tr>
</tbody>
</table>


**Associated Species:** Prairie Warbler, Eastern Towhee, Brown Thrasher.
### Threats and Actions

#### Specific Threat: Loss of shrubby habitat to forest succession.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain or increase area of suitable habitat in regions of the state where this species occurs.</td>
<td>Assess habitat available by region using GIS, focusing on regions under most development risk. Reassess at intervals.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Atlantic Coastal Plains, Central Lowland, New England, Piedmont, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** American Woodcock, Mourning Warbler, Swamp Sparrow.

#### Season: Breeding

#### IUCN Threat: 7.0 Natural System Modifications

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Reduce browsing pressure enough to allow shrub and sapling growth.</td>
<td>Assess browse damage in systematic way in representative habitats in each WMU.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Atlantic Coastal Plains, Central Lowland, New England, Piedmont, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** All forest and shrub dependent species.

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**PENNSYLVANIA GAME COMMISSION**  
275 | Appendix 1.4-Birds  
**PENNSYLVANIA FISH & BOAT COMMISSION**  
Published September 2015
Willow Flycatcher

**Empidonax traillii**

**RESEARCH NEEDS**

1. Breeding- Habitat Associations: Assess the relative contributions of wet vs. upland habitats used by this species. Perhaps use BBA point count data, assess vegetation within 100m of points with WIFL.

2. Breeding- Mortality factors: Investigate sources of nest mortality in different habitats. Are upland habitats just as productive as wetter ones, or less?

3. Breeding- Investigate the effect of habitat management for other priority species (such as American Woodcock) on Willow Flycatchers.

**SURVEY NEEDS**

1. Breeding- Riparian shrubland monitoring especially in Important Bird Areas.

2. Breeding- Conduct post-treatment surveys of silvicultural treatments to determine reaction of young forest and shrub species.


**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<td>Pennsylvania Game Commission</td>
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<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
**CONSERVATION PROFILE**

**Global Rank**  
G4  

**IUCN Red List**  
LC Least Concern  

**State Rank**  
S1B  

**Northeast Region**  
Very High Concern / Low Responsibility  

**Federal Status**  
Not Listed  

**PA Legal Status**  
Endangered  

**PA Abundance**  
Apparent extirpated  

**PA Short-Term Trend (10 year)**  
(B) Relatively Stable (<10% change)  

**Conservation Goal:**  
Determine population status of the species and protect/manage nesting sites where found. Re-establish a breeding population of at least 10 nesting pairs annually within Pennsylvania by 2025.

**HABITAT ASSOCIATIONS**

**Primary**  
Agricultural  

**Secondary**  

**Macrogroup**  
Agricultural  

**Habitat**  
Agriculture (NLCD 81-82)  

*Specific Habitat Requirements:*  
Open country with short grasses and forbs of low stature interspersed with bare ground and shrubs or small trees.

*B = Breeding, M = Migration, W = Wintering*
# Loggerhead Shrike

**Lanius ludovicianus**

## THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>Provide suitable breeding habitat in areas where there is potential for reappearance.</td>
<td>Presence/absence of species</td>
<td>Analyze BBS and CBC population data, eBird.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Maintain and possibly expand the existing suitable habitat in all historical and recent Loggerhead Shrike population areas.**

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Northern Bobwhite, Short-eared Owl, Upland Sandpiper, Dickcissel, Henslow’s Sparrow, Northern Harrier, Barn Owl, Eastern Meadowlark, Grasshopper Sparrow

<table>
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<tr>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>Maintain suitable habitat for grassland and shrubland species.</td>
<td>Presence/absence of species</td>
<td>Analyze BBS and CBC population data, eBird.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Restore Loggerhead Shrike breeding habitat in the south central region by cutting overgrown and woody vegetation on SGL in areas of historic and recent occurrence. Maintain essential foraging and nesting habitat features including potential hunting perch sites and suitable nest trees and shrubs.**

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

**Associated Species:** Northern Bobwhite, Short-eared Owl, Upland Sandpiper, Dickcissel, Henslow’s Sparrow, Northern Harrier, Barn Owl, Eastern Meadowlark, Grasshopper Sparrow

| Specific Threat: | "Appears to be currently "extirpated" from PA" |

| Specific Threat: | "Appears to be currently "extirpated" from PA" |

**Season:** Breeding

**IUCN Threat:** 1.0 Residential and Commercial Development

**IUCN Threat:** 7.0 Natural System Modifications
**Loggerhead Shrike**

*Lanius ludovicianus*

## THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Season:** Breeding

### Specific Threat:
Mortality from vehicle collision

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Reduce mortality resulting from collisions with vehicles.</td>
<td>Presence/absence of species</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Analyze BBS and CBC population data, eBird.</td>
<td></td>
</tr>
</tbody>
</table>

For specific sites in the Northeast where it is important to maintain a given shrike territory, landscape features that could attract activity to roadways, such as perches and potential nesting trees near highways, might be eliminated if similar features occur away from roadways. (NatureServe, 2014).

**Action Location:** Physiographic Province: Piedmont, Ridge and Valley

### RESEARCH NEEDS

1. Breeding- Investigate and document all reports of loggerhead shrike during nesting season; determine species status as a PA breeding bird; enter sighting locations into Pennsylvania Natural Diversity Inventory (PNDI).

2. Breeding- Gain a better understanding of the landscape composition and habitat characteristics required for LOSH breeding habitat.


### SURVEY NEEDS

1. Breeding- Encourage searches for LOSH by Pennsylvania birding community; working with LOSH Working Group.

2. Breeding- Conduct annual surveys during nesting season to confirm extirpation or document reoccurrence of breeding loggerhead shrike in the state. Searches should concentrate on suitable habitat in areas of most recent reports such as Cumberland, Franklin, Adams and Lancaster counties.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Loggerhead Shrike searches based on observation reports</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Follow-up surveys based on reports submitted to eBird, PA Birds Listserve and other sources.</td>
</tr>
<tr>
<td>Loggerhead Shrike Working Group</td>
<td>Partners in Flight</td>
<td></td>
<td>An informal working group consisting of partners from the U.S. and Canada, 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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Consortival Profile:

Conservation Goal:
20% increase in the number of active colonies throughout Pennsylvania within the next ten years.

Habitat Associations:

Primary

Macroup
Agricultural

Habit
Agriculture (NLCD 81-82)

Specific Habitat Requirements:
Having nearby water sources is not necessary in a Purple Martins habitat, however it can be helpful as a food source. Martin housing should be placed in the most open spot available (at least 40’, but preferably 60’ from trees or buildings) and within 100’ of human housing or activity. Proximity to humans and a wide-open location and flight area will help protect the martins from predators.
**Purple Martin**  
*Progne subis*

## Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Availability of nesting locations is decreasing.

**Season:** Breeding

### Action

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0 Outreach</td>
<td>Complete development of educational programs by 1/31/2016.</td>
<td>Completion of 200 Purple Martin specific educational programs within the next ten years.</td>
<td>Monitoring can be completed through the use of three Programs. The Purple Martin Conservation Associations (PMCA) Colony Registration program, The Breeding Bird Survey and The PA Breeding Bird Atlas. Breeding Bird Survey and PA Atlas protocols should be used. Annually for the next ten years for the different surveys. The PMCA's Colony Registration is a live web-based program.</td>
<td>1</td>
</tr>
</tbody>
</table>

### Action Location

- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

### Associated Species

- None
## Purple Martin

### Progne subis

## Threats and Actions

**IUCN Threat:** 11.0 Climate Change and Severe Weather

### Specific Threat: Specific prolonged weather events have been shown to cause major problems in reproductive success.

<table>
<thead>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 101.0 Species Management</strong></td>
<td>Actively manage martin colonies so that problems can be readily identified.</td>
<td>Educate about and encourage the need for best management practices and invasive species control throughout the breeding season. Management would include supplemental feeding in times of low prey density and housing modifications to moderate temperature extremes. This is ongoing for the last 10 years.</td>
<td>Improved reproductive success during seasons experiencing inclement weather.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide  

**Associated Species:** None

### IUCN Threat: 7.0 Natural System Modifications

### Specific Threat: Decrease in insect prey

<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0 Direct Management of Natural Resources</strong></td>
<td>Complete additional research pertaining to the effects that pesticide usage and the decline of flying insect populations will have on Purple Martins.</td>
<td>Assess the decline of flying insect populations within the next 6 years and provide management recommendations within the next 10 years.</td>
<td>Completion of research and management plan.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide  

**Associated Species:** Aerial Insectivores
RESEARCH NEEDS

1. Breeding- What is the general makeup of a Purple Martin landlord. What drives an individual to supply martin housing and manage an active colony.

2. Breeding- How is the decline in flying insect abundance affecting the reproductive success of Purple Martins.

3. Breeding- What are the habitat requirements of Purple Martins at migration stop-over locations throughout North, Central and South America.

SURVEY NEEDS

1. Breeding- Accurately document the locations of active and inactive Purple Martin colonies throughout the Commonwealth.

2. Breeding- Continued management and collection of reproductive data through Project MartinWatch.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colony Registration</td>
<td>Purple Martin Conservation Association</td>
<td><a href="http://www.purplemartin.org/main/research.html">Link</a></td>
<td>Colony Registration: Supplies a method for locating and mapping colonies throughout North America, while collecting other data such as colony age and size.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">Link</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
<tr>
<td>Project MartinWatch</td>
<td>Purple Martin Conservation Association</td>
<td><a href="http://www.purplemartin.org/pmw/">Link</a></td>
<td>Project MartinWatch-Reproductive success of Purple Martins at the colony site. Collects data such as parental age, first egg date, nest success.</td>
</tr>
</tbody>
</table>
**Bank Swallow**
*Riparia riparia*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S3B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: 13000
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**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 2025.

**HABITAT ASSOCIATIONS**

- **Primary**
  - Macrogoup: Agricultural
  - Habitat: Agricultural (NCLD 81-82)

- **Secondary**
  - Macrogoup: Urban/Suburban Built
  - Habitat: Developed (NCLD 21-24 & 31)

**Specific Habitat Requirements:**
Near-vertical banks/bluffs along rivers and streams w/sandy, compacted soils; sand quarries.

*Photo: Alan Vernon*
# Bank Swallow

**Riparia riparia**

## THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining  
**Season:** Breeding

### Specific Threat:
Habitat and nest site destruction in sand and gravel quarries.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Development and distribution of education materials to all known active sand and gravel operations within the next ten (10) years.</td>
<td>Number of quarry operations made aware of Bank Swallow nesting requirements; Number of quarries implementing recommendations.</td>
<td>Follow up surveys at sand and gravel operations to determine bank swallow use and colony size.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Northern Rough-winged Swallow

### IUCN Threat: 11.0 Climate Change and Severe Weather  
**Season:** Breeding

### Specific Threat:
Climate change may alter the timing of insect emergences and abundance so that prey is less available during the nesting season or in migration.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduction in greenhouse gas emissions.</td>
<td>Greenhouse gas emission levels.</td>
<td>Monitoring of greenhouse gas emissions.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Nearly all species.
### Bank Swallow

**Riparia riparia**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>6.0 Human Intrusions and Disturbance</th>
<th>Season:</th>
<th>Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Recreational ATV use in sand and gravel quarries may destroy nests and/or suitable nesting habitat.</td>
<td></td>
<td></td>
</tr>
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</table>

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<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>Development and distribution of education materials to all known active sand and gravel operations within the next ten (10) years</td>
<td>Number of quarry operations made aware of Bank Swallow nesting requirements; Number of quarries implementing recommendations</td>
<td>Follow up surveys with sand and gravel operations to assess frequency of ATV use</td>
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**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Northern Rough-winged Swallow

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>7.0 Natural System Modifications</th>
<th>Season:</th>
<th>Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Reduced insect food supply caused by anthropogenic activities (e.g., pesticide use and acid precipitation).</td>
<td></td>
<td></td>
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</table>

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<tbody>
<tr>
<td>TRACS Action 8.0</td>
<td>Outreach</td>
<td>Conduct research leading to best management practices by 2025.</td>
<td>Development of best management practices.</td>
<td>Regular assessments of research progress.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Common Nighthawk, Chimney Swift, Eastern Whip-poor-will, Purple Martin
Bank Swallow  
*Riparia riparia*

**RESEARCH NEEDS**

1. Breeding- Investigations into the relationships between pesticide use, flying insects, and aerial insectivores are needed.

2. Breeding- Assess persistence of Bank Swallow colonies in watersheds impacted by energy extraction industry or heavy pesticide use by agriculture.

3. Breeding- Assess response of Bank Swallow and other riparian birds to stream health especially as it relates to energy development (mostly shale drilling).

**SURVEY NEEDS**

1. Breeding- Identify and monitor large nesting colonies.


**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</tbody>
</table>
Brown Creeper  
*Certhia americana*  

**CONSERVATION PROFILE**  
- **Global Rank**: G5  
- **State Rank**: S4B  
- **IUCN Red List**: LC Least Concern  
- **Northeast Region**: High Concern / Low Responsibility  
- **Federal Status**: Not Listed  
- **PA Legal Status**: Protected  
- **PA Abundance**: 68000  
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<10% change)  

**Conservation Goal:**  
Maintain or increase the currently stable population of Brown Creepers in Pennsylvania, est. at 34,000 singing males (Wilson et al. 2012) through 2025.

**HABITAT ASSOCIATIONS**  
- **Primary**  
  - Macrogroup: Northern Hardwood & Conifer  
  - Habitat: Appalachian (Hemlock)-Northern Hardwood Forest  
- **Secondary**  
  - Habitat: Developed (NLCD 21-24 & 31)  

**Specific Habitat Requirements:**  
Requires dead trees with loose bark for nesting in late-successional forest.

![Photo: Jacob Dingel](image)

![Map showing breeding areas in Pennsylvania](image)
### Brown Creeper

**Certhia americana**

#### Threats and Actions

**IUCN Threat:** 3.0  Energy Production and Mining  

**Specific Threat:** Significant forest fragmentation from well-drilling sites, wind turbines, pipelines and roads  

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
</table>
| TRACS Action 100.0  Law and Policy  
Enforce regulations and codes prohibiting energy development in or adjacent to known occupied habitat | Create regulations that would maintain extensive conifer forest off-limits to energy development | Degree of fragmentation as quantified by FRAGSTATS | Assessment of new well/turbine locations in relation to known habitat | 1 |

**Action Location:** Physiographic Province: Appalachian Plateaus  

**Associated Species:** Swainson’s Thrush, Winter Wren, Blue-headed Vireo, northern flying squirrel  

**IUCN Threat:** 8.0  Invasive and Other Problematic Species and Genes  

**Specific Threat:** Highly vulnerable to loss of hemlock to wooly adelgid and deer overbrowse.  

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
</table>
| TRACS Action 2.0  Direct Management of Natural Resources  
Maintain current science-based deer policy in state; identify and disseminate biocontrol for HWA | Keep deer at levels that allow for conifer regeneration; reduce or eliminate HWA in areas in habitats with significant populations of SWTH | Hemlock regeneration, infestation rate, survival | Annual or semi-annual surveys of hemlock infestation, survival, and regeneration success in random sample of large hemlock-dominated tracts | 1 |

**Action Location:** Physiographic Province: Appalachian Plateaus  

**Associated Species:** Swainson’s Thrush, Winter Wren, Blue-headed Vireo, northern flying squirrel  

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**Pennsylvania Game Commission**  
PENNSYLVANIA FISH & BOAT COMMISSION  
Published September 2015
## THREATS AND ACTIONS

### Specific Threat: Habitat changes due to climate change likely to reduce or eliminate suitable habitat within state

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce levels of atmospheric carbon to slow or reverse global climate change</td>
<td>Atmospheric carbon levels</td>
<td>Maintain existing atmospheric monitoring</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Swainson's Thrush, Winter Wren, Blue-headed Vireo,

### IUCN Threat: 11.0 Climate Change and Severe Weather

<table>
<thead>
<tr>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Use annual Breeding Bird Surveys to assess local (route/region)population trends</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Swainson's Thrush, Winter Wren, Blue-headed Vireo, northern flying squirrel

### Specific Threat: Fragmentation from exurban development

**Season:** Breeding
# Brown Creeper

**Certhia americana**

## Threats and Actions

### Specific Threat: Poor management converting mature conifer-dominated forest to young red maple, birch forest; loss of suitable nest sites with removal of larger snags

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Establish minimum of 2 conservation areas of &gt;250 ha annually for 10 yrs.</td>
<td>Acres preserved following guidelines</td>
<td>Use annual point counts in preserved core areas to monitor population levels of BCR and other spp that use habitat</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Swainson's Thrush, Winter Wren, Blue-headed Vireo, northern flying squirrel

### Specific Threat: Acid deposition depletes populations of invertebrate prey.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce levels of acid deposition to level where invertebrates not depleted</td>
<td>Anion levels in precipitation</td>
<td>Maintain existing NOAA meteorological stations</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

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**IUCN Threat:** 5.0 Biological Resource Use

**Season:** Breeding

**IUCN Threat:** 9.0 Pollution

**Season:** Breeding
**Brown Creeper**

**Certhia americana**

## Threats and Actions

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators</td>
<td>Designate &amp; acquire conservation areas to maintain large unfragmented areas of mature conifer forest</td>
<td>Create 2-4 conservation areas, based on PA-BBA data, where most at risk of road/pipeline/powerline development</td>
<td>Acreage of mature conifer forest preserved</td>
<td>Use annual point counts in conservation areas to monitor population levels of BRCR and other spp that use habitat</td>
<td>3</td>
</tr>
</tbody>
</table>

**Season:** Breeding

**Associated Species:** Swainson's Thrush, Winter Wren, Blue-headed Vireo, northern flying squirrel

### Research Needs

1. Breeding- Evaluate Brown Creeper response to varying levels of habitat damage by hemlock woolly adelgid.
2. Breeding- Assess suitability of hemlock surrogates (e.g., Norway and red spruce, fir, larch) as Brown Creeper habitat to inform restoration efforts in areas hit hard by HWA.

### Survey Needs

1. Breeding- Off road point counts in large-scale forests, mostly PA IBA's.
2. Breeding- Mountain Bird Watch extended to PA.
### Brown Creeper  
*Certhia americana*

#### MONITORING PROGRAMS

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</table>
Winter Wren
*Troglodytes hiemalis*

**Photo:** Jacob Dingel

**CONSERVATION PROFILE**
- **Global Rank:** G5
- **State Rank:** S4B
- **IUCN Red List:** LC Least Concern
- **Northeast Region:** < 4 States / High Responsibility
- **Federal Status:** Not Listed
- **PA Legal Status:** Protected
- **PA Abundance:** 56000
- **PA Short-Term Trend (10 year):** (B) Relatively Stable (<=10% change)

**Conservation Goal:**
Maintain or increase the currently stable population of Winter Wrens in Pennsylvania, est. at 32,000 singing males (Wilson et al. 2012) through 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Appalachian (Hemlock)-Northern Hardwood Forest</td>
<td></td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**
High elevation, coniferous/mixed forests, w/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.

**B = Breeding, M = Migration, W = Wintering**
## Threats and Actions

**Winter Wren**

*Troglodytes hiemalis*

### Winter Wren

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Significant forest fragmentation from well-drilling sites, pipelines and roads.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Create regulations that would maintain extensive conifer forest off-limits to energy development</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Assessment of new well/turbine locations in relation to known habitat</td>
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</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Swainson’s Thrush, Blue-headed Vireo, northern flying squirrel

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Highly vulnerable to loss of hemlock to wooly adelgid and deer overbrowse.

<table>
<thead>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Keep deer at levels that allow for conifer regeneration; reduce or eliminate HWA in areas in habitats with significant populations of SWTH</td>
<td>hemlock regen, infestation rate, survival</td>
<td>Annual or semi-annual surveys of hemlock infestation, survival, and regeneration success in random sample of large hemlock-dominated tracts</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Swainson’s Thrush, Blue-headed Vireo, northern flying squirrel
### Winter Wren

#### Troglodytes hiemalis

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce levels of atmospheric carbon to slow or reverse global climate change</td>
<td>Atmospheric carbon levels</td>
<td>Maintain existing atmospheric monitoring</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

### Specific Threat: Habitat changes due to climate change likely to reduce or eliminate suitable habitat within state

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Use annual Breeding Bird Surveys to assess local (route/region)population trends</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Swainson's Thrush, Blue-headed Vireo, northern flying squirrel

---

IUCN Threat: 11.0 Climate Change and Severe Weather

| Specific Threat: | Legislation required at national level to reduce carbon emissions, promote or incentivize carbon sequestration |

IUCN Threat: 1.0 Residential and Commercial Development

| Specific Threat: | Fragmentation from exurban development |

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Swainson's Thrush, Blue-headed Vireo, northern flying squirrel

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PENNSYLVANIA GAME COMMISSION

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Published September 2015
### Winter Wren

*Troglodytes hiemalis*

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Specific Threat</th>
<th>Season</th>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>Poor management converting mature conifer-dominated forest to young red maple, birch forest</td>
<td>Breeding</td>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Establish minimum of 2 conservation areas of &gt;250 ha annually for 10 yrs.</td>
<td>Acres preserved following guidelines</td>
<td>Use annual point counts in preserved core areas to monitor population levels of WIWR and other spp that use habitat</td>
</tr>
<tr>
<td></td>
<td>Associated Species: Brown Creeper, Swainson’s Thrush, Blue-headed Vireo, northern flying squirrel</td>
<td></td>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>Acid deposition depletes populations of invertebrate prey</td>
<td>Breeding</td>
<td>TRACS Action 100.0</td>
<td>Law and Policy</td>
<td>Reduce levels of acid deposition to level where invertebrates not depleted</td>
<td>Anion levels in precipitation</td>
<td>Maintain existing NOAA meteorological stations</td>
</tr>
<tr>
<td></td>
<td>Associated Species: Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler</td>
<td></td>
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</tr>
</tbody>
</table>
## Winter Wren

*Troglodytes hiemalis*

### Threats and Actions

**IUCN Threat:** 4.0  Transportation and Service Corridors

**Specific Threat:** Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators

**Season:** Breeding

<table>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Create 2-4 conservation areas, based on PA-BBA data, where most at risk of road/pipeline/powerline development</td>
<td>Acreage of mature conifer forest preserved</td>
<td>Use point counts in conservation areas to monitor population levels of WIWR and other spp that use habitat</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Swainson's Thrush, Blue-headed Vireo, northern flying squirrel

### Research Needs

1. **Breeding** - 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.

2. **Breeding** - What are effects of energy and residential development on area-sensitive forest birds in the large forest blocks of the state?

3. **Breeding** - Determine Winter Wren responses to silvicultural practices.

### Survey Needs

1. **Breeding** - Off road point counts in large-scale forests, mostly PA IBA's.

2. **Breeding** - Mountain Bird Watch extended to PA.
## Winter Wren

**Troglodytes hiemalis**

### MONITORING PROGRAMS

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<th>Program Name</th>
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<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Sedge Wren
*Cistothorus platensis*

**Photo:** Andy Reago & Chrissy McClarren

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**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Rank</td>
<td>G5</td>
</tr>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S1B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>170</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Maintain species population in Pennsylvania at current levels (~2 nesting territories per year) through 2025.

---

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary Habitat</th>
<th>Secondary Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>Agriculture (NLCD 81-82)</td>
<td></td>
</tr>
</tbody>
</table>

**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
## Sedge Wren  
*Cistothorus platensis*

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss of grassland and wetland habitat due to development

<table>
<thead>
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<th>Monitoring</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Secure 20 nest sites each year.</td>
<td>Number of nest sites secured.</td>
<td>Count number of singing males during Breeding Season for the BBS annually for 10 years.</td>
<td>1</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus, Piedmont</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Wetland habitat degradation by invasive exotic species (e.g. Phragmites, reed canary grass, purple loosestrife), plus loss of shallow, short-term grassy wetlands where this species visits.

<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 5.0 Facilities and Areas</td>
<td>Territorial pair present for 2 successive years. # pairs</td>
<td></td>
<td>Count number of territorial pairs during breeding season for the BBS annually for 10 years.</td>
<td>1</td>
</tr>
<tr>
<td><strong>Action Location:</strong> Physiographic Province: Appalachian Plateaus, Piedmont</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associated Species:</strong> King Rail, Virginia Rail, Sora, American Coot, Wood Duck</td>
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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

**Published September 2015**
Sedge Wren  
*Cistothorus platensis*

### THREATS AND ACTIONS

**SPECIFIC THREAT:** Increased drought could cause wetlands to dry out, making them unsuitable for nesting. Alternatively, increases in extreme weather (precipitation) events could cause nest flooding. Flooded grassy areas are less likely to occur or persist with extremes in precipitation.

#### Action

**TRACS Action 2.0**  
Direct Management of Natural Resources

Active management and planning on confirmed breeding wetlands for adaptive management of marshes and associated uplands. Maintenance of mosaic of shallow (<50 cm) wetlands with open/emergent portions. Specific local management at smaller wetlands where this species can colonize.

**Objective**

Adaptable approach to water level management so open water mosaics can be sustained in periods of high or low precipitation. Includes replacement and upgrade of water control devices suitable for handling predicted precipitation changes.

**Measure**

- # sites with adaptive management plans in place
- # water control devices upgraded

**Monitoring**

Monitor progress in development and implementation of Adaptation Plans at high-priority sites. Monitor installation of water control devices.

**Priority**

1

#### Action Location

Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:**  
Virginia Rail, Sora, American Coot, Least Bittern, American Bittern, multiple waterfowl

---

**IUCN Threat:** 2.0 Agriculture and Aquaculture

**SPECIFIC THREAT:** Intensive ag practices-frequent mowing, overgrazing, and plowing

**Action**

**TRACS Action 1.0**  
Coordination and Administration

Enroll potential nesting areas into the Conservation Reserve Enhancement Program (CREP)

**Objective**

Eliminate intensive ag practices in breeding areas

**Measure**

- Number of acres enrolled in CREP

**Monitoring**

Annually check a sample of CREP fields for contract compliance.

**Priority**

2

#### Action Location

Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:**  
Bobolink, Red-winged Blackbird, Eastern Meadowlark, Grasshopper Sparrow, Henslow's Sparrow

---

**Season:** Breeding
### Sedge Wren

**Cistothorus platensis**

#### THREATS AND ACTIONS

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Wetland alteration and drainage. |

<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 7.0</strong> Law enforcement</td>
<td>No additional loss of wetlands.</td>
<td>Acres of wetlands</td>
<td>Count number of wetland acres in PA annually.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** King Rail, Virginia Rail, Sora, American Coot, Wood Duck

| IUCN Threat: | 3.0 Energy Production and Mining |
| Specific Threat: | Presence of wind turbines discourages nesting. |

<table>
<thead>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 8.0</strong> Outreach</td>
<td>Have 100% participation of active wind developers sign cooperative agreements</td>
<td>Number of cooperative agreements completed</td>
<td>Count number of singing males during Breeding Season for the BBS annually for 10 years.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** Savannah Sparrow, Dickcissel, Bobolink, Red-winged Blackbird, Common Yellowthroat
**Sedge Wren**  
*Cistothorus platensis*

## RESEARCH NEEDS

1. **Breeding**- All known locations where breeding activity has been confirmed during the last 20 years should be surveyed during 3 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 and survey effort should be directed accordingly. Taped playback recordings may be effective in locating territorial males.

2. **Breeding**- Determine population structure, productivity and threats, and monitor active breeding sites for 5 consecutive years to determine degree of site-fidelity, and changes in population, productivity, and habitat.

3. **Breeding**- Habitat characteristics at surveyed breeding sites should be evaluated, especially at the more reliable locations, in an effort to predict potential habitat elsewhere.

## SURVEY NEEDS

1. **Breeding**- Constant search and inventory of the few sites where located.

2. **Breeding**- Local reaction of species to management of wetlands/wet meadows where found.

3. **Breeding**- Surveys for secretive wetland birds should include audio recordings of marsh wren or at least register any encounters with the species.

## MONITORING PROGRAMS

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<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<td>Pennsylvania Game Commission</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=818061414&amp;rank=4">http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=818061414&amp;rank=4</a></td>
<td>During breeding seasons, PGC 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.</td>
</tr>
</tbody>
</table>
**Marsh Wren**
*Cistothorus palustris*

**CONSERVATION PROFILE**

- **Global Rank:** G5
- **IUCN Red List:** LC Least Concern
- **Northeast Region:** High Concern / Low Responsibility
- **Federal Status:** Not Listed
- **State Rank:** S2B
- **PA Legal Status:** Protected
- **PA Abundance:** 1300
- **PA Short-Term Trend (10 year):** (B) Unknown

**Conservation Goal:**
Expand the breeding populations from 53 Breeding Bird Atlas blocks (see Wilson et al. 2012) to at least 60 Breeding Bird Atlas blocks.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup:** Emergent Marsh
- **Secondary Macrogroup:** Wet Meadow / Shrub Marsh

- **Habitat:** Laurentian-Acadian Freshwater Marsh
- **Laurentian-Acadian Wet Meadow-Shrub Swamp**

**Specific Habitat Requirements:**
Large (>20 acre) cattail and bulrush marshes tidal marshes of the lower Delaware River with an abundance of standing water.

*Photo: Carl Freeman*
# Marsh Wren

**Cistothorus palustris**

## Threats and Actions

### IUCN Threat: 7.0 Natural System Modifications

### Specific Threat: Loss of emergent vegetation due to fluctuating water levels.

### Action: TRACS Action 2.0

**Objective:** In Conneaut Marsh, manage water levels to maintain vegetative structure critical to successful nesting.

**Measure:** Number of acres of emergent vegetation suitable for nesting substrate.

**Monitoring:** Use aerial photos once every five years to survey the acreage of emergent vegetation.

**Priority:** 1

### Action Location: Physiographic Province: Appalachian Plateaus

### Associated Species: American Bittern, Least Bittern, King Rail, Sora, Virginia Rail

---

### IUCN Threat: 11.0 Climate Change and Severe Weather

### Specific Threat: Increased drought could cause wetlands to dry out, making them unsuitable for nesting. Alternatively, increases in extreme weather (precipitation) events could cause nest flooding.

### Action: TRACS Action 2.0

**Objective:** Adaptable approach to water level management so open water mosaics can be sustained in periods of high or low precipitation. Includes replacement and upgrade of water control devices suitable for handling predicted precipitation changes.

**Measure:** # sites with adaptive management plans in place; # water control devices upgraded.

**Monitoring:** Monitor progress in development and implementation of Adaptation Plans at high-priority sites. Monitor installation of water control devices.

**Priority:** 1

### Action Location: Physiographic Province: Appalachian Plateaus, Piedmont

### Associated Species: Virginia Rail, Sora, American Coot, Least Bittern, American Bittern, multiple waterfowl
### Marsh Wren

**Scientific Name:** *Cistothorus palustris*

### Threats and Actions

#### Specific Threat:
Marsh Wrens avoid otherwise suitable emergent wetlands that contain an abundance of purple loosestrife.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Use biological, chemical and/or mechanical methods to reduce the abundance of purple loosestrife in wetland used by marsh wren</td>
<td>Number of acres with a reduced density of purple loosestrife</td>
<td>Use vegetation surveys every five years to determine effectiveness of control measures</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains

**Associated Species:** American Bittern, Least Bittern, King Rail, Sora, Virginia Rail

#### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

#### Season: Breeding

**Specific Threat:** Mercury contamination

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<tr>
<td>TRACS Action 100.0</td>
<td>Law and Policy</td>
<td>Promote legislation that reduces anthropomorphic causes of mercury contamination</td>
<td>Reduced levels of mercury in large emergent wetlands</td>
<td>Sample large wetlands for mercury pollution once every five years</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Atlantic Coastal Plains

**Associated Species:** Bald Eagle, Osprey, Virginia Rail

### Research Needs
1. Breeding- Increase knowledge of marsh wren abundance and distribution throughout the state.
2. Breeding- Increase knowledge about the impact of invasive species such as purple loosestrife on marsh wren habitat usage.
3. Breeding- Increase knowledge about the effect of mercury contamination on marsh wren productivity.
SURVEY NEEDS

1. Breeding - Breeding bird survey should be continued to help annual monitoring of abundance and distribution.

2. Breeding - Surveys for secretive wetland birds should include audio recordings of marsh wren or at least register any encounters with the species.

3. Breeding - Monitor changes in abundance and distribution of suitable emergent wetland habitat (e.g., Great Lakes Marsh Monitoring Survey, Bird Studies Canada).

MONITORING PROGRAMS

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<td><a href="http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4">http://www.portal.state.pa.us/portal/server.pt/community/birding_and_bird_conservation/21066/marsh_bird_survey?qid=81806114&amp;rank=4</a></td>
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**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S3B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: High Concern / High Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: 5200
- **PA Short-Term Trend (10 year)**: (B) Unknown

**Conservation Goal:**
Increase statewide population by 50%, to an estimated 3,900 singing males, particularly in northcentral and northeastern counties.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Northern Hardwood & Conifer
- **Secondary Habitat**: Appalachian (Hemlock)-Northern Hardwood Forest

**Specific Habitat Requirements:**
High elevation conifer-dominated forests, typically in extensive unfragmented forest near water.

*Photo: Jacob Dingel*

*B = Breeding, M = Migration, W = Wintering*
## Swainson's Thrush  
*Centurias ustulatus*

### THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Highly vulnerable to loss of hemlock to wooly adelgid and deer overbrowse.

<table>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
</table>
| TRACS Action 2.0 Direct Management of Natural Resources  
Maintain current science-based deer policy in state; identify and disseminate biocontrol for HWA | Keep deer at levels that allow for conifer regeneration; reduce or eliminate HWA in areas in habitats with significant populations of SWTH | hemlock regen, infestation rate, survival | annual or semi-annual surveys of hemlock infestation, survival, and regeneration success in selected areas of importance to SWTH | 1 |

**Action Location:** Physiographic Province: Appalachian Plateaus  
**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Habitat changes due to climate change likely to reduce or eliminate suitable conifer habitat within state

<table>
<thead>
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</thead>
</table>
| TRACS Action 100.0 Law and Policy  
Legislation required at national level to reduce carbon emissions, promote or incentivize carbon sequestration | Reduce levels of atmospheric carbon to slow or reverse global climate change | Atmospheric carbon levels | Maintain existing atmospheric monitoring | 1 |

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

---

**Season:** Breeding
### Swainson's Thrush

**Catharus ustulatus**

## Threats and Actions

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Fragmentation from exurban development

<table>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Annual or biannual surveys using tape-playback for SWTH, BBS-style point counts for associated species</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel

### IUCN Threat: 3.0 Energy Production and Mining

**Specific Threat:** Significant forest fragmentation from well-drilling sites, wind turbines, pipelines and roads

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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Create regulations that would maintain extensive conifer forest off-limits to energy development</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Assessment of new well/turbine locations in relation to known habitat</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel
# Swainson's Thrush

## Threats and Actions

**Species:** *Catharus ustulatus*

### Specific Threat:
Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators

<table>
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<tbody>
<tr>
<td><strong>TRACS Action 6.0</strong></td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Create 2-4 conservation areas, based on PA-BBA data, where most at risk of road/pipeline/powerline development</td>
<td>Acreage of habitat protected by designated areas</td>
<td></td>
</tr>
<tr>
<td>Designate SWTH-specific conservation areas to maintain large unfragmented areas of conifer forest</td>
<td></td>
<td></td>
<td>Annual or biannual surveys using tape-playback for SWTH, BBS-style point counts for associated species</td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel

### Season: Breeding

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Poor management converting mature conifer-dominated forest to young red maple, birch forest

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<th>Monitoring</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 6.0</strong></td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Establish minimum of 2 conservation areas of &gt;250 ha annually for 10 yrs.</td>
<td>Acres preserved following guidelines</td>
<td></td>
</tr>
<tr>
<td>Develop and disseminate guidelines for preserving large core areas of mature conifer plus 100 m buffer</td>
<td></td>
<td></td>
<td>Use annual point counts in preserved core areas to monitor population levels of SWTH and other spp that use habitat</td>
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</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel

### Season: Breeding

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Poor management converting mature conifer-dominated forest to young red maple, birch forest

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**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Brown Creeper, Winter Wren, Blue-headed Vireo, northern flying squirrel

---
# Swainson's Thrush

**Catharus ustulatus**

## Threats and Actions

| IUCN Threat: | 9.0 Pollution |
| Specific Threat: | Acid deposition depletes populations of invertebrate prey. |
| **Season:** | Breeding |

### Action

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<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce levels of acid deposition to level where invertebrates not depleted</td>
<td>Anion levels in precipitation</td>
<td>Maintain existing NOAA meteorological stations</td>
</tr>
</tbody>
</table>

### Action Location

Physiographic Province: Statewide

### Associated Species

Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

## Research Needs

1. Breeding: Evaluate Swainson's thrush response to varying levels of habitat damage by hemlock woolly adelgid 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 hit hard by HWA.

2. Breeding: Assess fledgling survival and post-fledging dispersal patterns.

3. Breeding: 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.

## Survey Needs

1. Breeding: Identify and map areas of SWTH occurrence in PA to inform further conservation actions, enlisting volunteers to assist with searches

2. Breeding: Expand Mountain Bird Watch into PA including SWTH as a target species.

3. Breeding: Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.
<table>
<thead>
<tr>
<th>Program Name</th>
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<td>eBird (PA eBird as state portal)</td>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Wood Thrush
*Hylocichla mustelina*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **IUCN Red List**: LC Least Concern
- **State Rank**: S4B, S4N (M)
- **PA Legal Status**: Protected
- **Northeast Region**: Very High Concern / High Responsibility
- **PA Abundance**: 132000
- **PA Short-Term Trend (10 year)**: (B) Decline of 11 - 40%; (M) Unknown
- **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.

**HABITAT ASSOCIATIONS**

- **Primary**
  - (B) Appalachian (Hemlock)-Northern Hardwood Forest
  - (M) Northeastern Interior Dry-Mesic Oak Forest
- **Secondary**
  - (B) Northern Hardwood & Conifer
  - (M) Central Oak-Pine

**Specific Habitat Requirements:**
- (B) Second-growth deciduous forest and forest-edge habitats; often with available fruit.
- (M) Second-growth, closed-canopy deciduous and mixed forest often near water.

*B = Breeding, M = Migration, W = Wintering*
### Wood Thrush

**Hylocichla mustelina**

**THREATS AND ACTIONS**

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Forest loss and fragmentation from new building and infrastructure development.

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<td>Number of municipalities and counties adopting the plan with intent to implement.</td>
<td>1. Monitor number of development projects/acreage in municipalities/counties implementing that results in loss of interior forest; 2. Survey participating municipalities/counties for data; 3. Monitor for 5 years after completion of plan.</td>
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**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson's Thrush, Cerulean Warbler, Canada Warbler

**IUCN Threat:** 3.0 Energy Production and Mining

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

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**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler

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**PENNSYLVANIA GAME COMMISSION**

**PENNSYLVANIA FISH & BOAT COMMISSION**

Published September 2015
# Wood Thrush

**Hylocichla mustelina**

## Threats and Actions

### Specific Threat:
Forest loss and fragmentation from development of transportation and service corridors.

### Action Location:
Physiographic Province: Statewide

### Associated Species:
Eastern Whip-poor will, Winter Wren, Swainson's Thrush, Louisiana Waterthrush, Canada Warbler

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**Season:** Breeding
### Threats and Actions

#### Specific Threat:
Non-native species (plants and insects) and overbrowsing by abundant deer populations degrade the health of natural forest ecosystems, reducing breeding success of forest birds, and free-ranging cats kill an estimated 500 million to 1 billion birds each year in the U.S.

#### Objective
1. Target 5 PGC WMUs with highest deer densities, lowest hunter recruitment, and/or highest declines in forest interior birds with programs to boost deer hunter numbers and deer harvest (where needed), and create urban/suburban deer hunting initiatives in Pittsburgh and Philadelphia. 2. Establish a statewide strategy for invasive species management, drawing upon DCNR’s established guidelines and implement on 50 properties (i.e. State Forest, Game Lands, land trusts properties). 3. Provide means for statewide promotion of American Bird Conservancy’s "Cats Indoors Campaign".

#### Measure
1. Reduction of deer populations and increased hunter recruitment in priority units and urban areas. 2. Successful removal of invasive species on 50 conservation properties. 3. Number of groups promoting "Cats Indoors" and number of people reached.

#### Monitoring
1. Deer densities/hunter numbers, conservation lands with invasive species management, reach of "Cats Indoors" campaign; 2. Standard agency/program tracking and monitoring; 3. Annually for 10 years.

#### Priority
1

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**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler
# Wood Thrush

**Hylocichla mustelina**

## THREATS AND ACTIONS

### Specific Threat:
Reduced abundance and availability of calcium-rich invertebrate prey in areas with high acidic atmospheric deposition (rain).

### Action

<table>
<thead>
<tr>
<th>TRACS Action: 2.0</th>
<th>Direct Management of Natural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action Location:</strong></td>
<td>Physiographic Province: Appalachian Plateaus, Ridge and Valley</td>
</tr>
<tr>
<td><strong>Associated Species:</strong></td>
<td>Kentucky Warbler, Ovenbird, Veery, Louisiana Waterthrush</td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td>Select 10 of the most severely acidified sites on state managed lands in western and northcentral Pennsylvania and treat them with lime applications over the next 5 years to increase invertebrate prey abundance.</td>
</tr>
<tr>
<td><strong>Measure:</strong></td>
<td>Change in soil chemistry, invertebrate prey abundance, and forest bird abundance/productivity (i.e. Wood Thrush) at treated sites.</td>
</tr>
<tr>
<td><strong>Monitoring:</strong></td>
<td>1. Monitor soil pH, invertebrate abundance, forest breeding bird abundance &amp; productivity (i.e. Wood Thrush); 2. See Pabian and Brittingham (2007, 2011); 3. Monitor annually for 5 years.</td>
</tr>
<tr>
<td><strong>Priority:</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

### Specific Threat:
Forest loss and fragmentation, threat of window strikes from new building and infrastructure development.

### Action

<table>
<thead>
<tr>
<th>TRACS Action: 8.0</th>
<th>Outreach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action Location:</strong></td>
<td>Physiographic Province: Statewide</td>
</tr>
<tr>
<td><strong>Associated Species:</strong></td>
<td>Kentucky Warbler, Canada Warbler, American Woodcock, Golden-winged Warbler, Swainson’s Thrush</td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td>Ensure funding is available during the next 3-5 years to enable current bird collision conservation efforts (i.e. Philadelphia and Pittsburgh) to continue and grow.</td>
</tr>
<tr>
<td><strong>Measure:</strong></td>
<td>Successful continuation of existing Pennsylvania projects addressing bird collisions.</td>
</tr>
<tr>
<td><strong>Monitoring:</strong></td>
<td>1. Partnership projects focused on bird collisions in Philadelphia and Pittsburgh are able to expand efforts; 2. Evaluate program reach (#buildings monitoring/mitigating, #groups/individuals educated about problem); 3. Duration of</td>
</tr>
<tr>
<td><strong>Priority:</strong></td>
<td>1</td>
</tr>
</tbody>
</table>
# Wood Thrush

**Hylocichla mustelina**

## Threats and Actions

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

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### Action Location:
Physiographic Province: Statewide

### Associated Species:
Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler

### Specific Threat:
Forest loss and fragmentation from development of transportation and service corridors.

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### Action Location:
Physiographic Province: Statewide

### Associated Species:
Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler
Wood Thrush

Hylocichla mustelina

**THREATS AND ACTIONS**

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Season:** Migration

**Specific Threat:** Non-native plants, insects, and deer overbrowsing degrade forest ecosystems, leading to reduced breeding success, while feral cats may cause direct mortality.

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<td>Direct Management of Natural Resources</td>
<td>1. Target 5 PGC WMUs with highest deer densities, lowest hunter recruitment, and/or highest declines in forest interior birds with programs to boost deer hunter numbers and deer harvest (where needed), and create urban/suburban deer hunting initiatives in Pittsburgh and Philadelphia. 2. Establish a statewide strategy for invasive species management, drawing upon DCNR's established guidelines and implement on 50 properties (i.e. State Forest, Game Lands, land trusts properties). 3. Provide means for statewide promotion of American Bird Conservancy's &quot;Cats Indoors Campaign&quot;.</td>
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**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson's Thrush, Louisiana Waterthrush, Canada Warbler
Wood Thrush

Hylocichla mustelina

THREATS AND ACTIONS

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Loss and alteration of forested migration stopover habitat.

**Season:** Migration

<table>
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<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Within 3 years, utilize the work of the International Wood Thrush Conservation Alliance to identify migration habitat priorities for protection in Pennsylvania and match those with priorities in Central America.</td>
<td>Number of Wood Thrush stopover sites identified as priorities for land protection.</td>
<td>1. Number of Wood Thrush migration habitat sites; 2. Monitor work of IWOTHCA; 3. 3-year time frame.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Neotropical migrants, Eastern Whip-poor will, Swainson's Thrush, Louisiana Waterthrush, Cerulean Warbler, Canada Warbler

**RESEARCH NEEDS**

1. Breeding- Utilize 2nd Breeding Bird Atlas and LiDAR data to conduct analyses that improve our understanding of the relationship between forest structure and forest interior bird breeding densities.

2. Migration- Identify key components of important stopover habitats during migration and determine priority areas.

3. Breeding- Long-term studies of seasonal fecundity to identify source/sink populations throughout the state and investigate effects of forest age on nest success, adult survival, and return rates.


5. Breeding- 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.

6. Migration- Investigate links between breeding demographics and non-breeding activities/migratory connectivity.
Wood Thrush

**Hylocichla mustelina**

**SURVEY NEEDS**

1. **Breeding-** Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

2. **Migration-** Continue statewide migration counts and integrate eBird data to better understand migratory patterns of Wood Thrush through Pennsylvania and to help identify stopover priority areas and habitats.

2. **Breeding-Surveys** to assess response of forest species to silviculture treatments and other management.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
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<tr>
<td>Carnegie Museum of Natural History's Powdermill Avian Research Center</td>
<td>Carnegie Museum of Natural History</td>
<td><a href="http://www.powderrmillarc.org/">http://www.powderrmillarc.org/</a></td>
<td>Powdermill Avian Research Center (PARC) is part of Carnegie Museum of Natural History’s biological research station Powdermill Nature Reserve. PARC operates a bird banding station, conducts bioacoustical research, and performs flight tunnel analysis with the goal of reducing window collisions. With more than 50 years experience, and having surpassed a milestone of 500,000 birds banded in 2001, PARC is uniquely situated to capitalize on its bird capture techniques. Birds studied through our banding program may also be utilized for bioacoustical, window avoidance, telemetry studies and more, all while handling these species in a gentle and humane manner.</td>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
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| Pennsylvania Annual Migration Count (PAMC) | Pennsylvania Society for Ornithology | [http://www.pabirds.org/PAMC/Index.html](http://www.pabirds.org/PAMC/Index.html) | Held on the second Saturday in May, this event is similar to the Christmas Bird Count except it is done on a county basis. Participants go out and identify and count all of the birds they can find on that day (including owling at night if so inclined).
Gray Catbird  
*Dumetella carolinensis*

**CONSERVATION PROFILE**

- **Global Rank:** G5
- **State Rank:** S5B
- **IUCN Red List:** LC Least Concern
- **Northeast Region:** Not NE Regional SGCN
- **Federal Status:** Not Listed
- **PA Legal Status:** Protected
- **PA Abundance:** 4760000
- **PA Short-Term Trend (10 year):** (B) Increase of 11 - 25%

**Conservation Goal:**
Maintain species population at or above current levels of 25 birds per Breeding Bird Survey route, statewide, through 2025.

**HABITAT ASSOCIATIONS**

- **Primary:**
  - **Macrogroup:** Urban/Suburban Built
  - **Habitat:** Developed (NLCD 21-24 & 31)

- **Secondary:**

**Specific Habitat Requirements:**
Dense, shrubby vegetation, including thickets, hedgerows, woodland edges, and regenerating clearcuts.

Photo: Jacob Dingel
**Gray Catbird**  
*Dumetella carolinensis*

**THREATS AND ACTIONS**

**IUCN Threat:** 4.0 Transportation and Service Corridors  
**Specific Threat:** Loss of shrubby vegetation in utility rights-of-way (e.g., gas pipelines) as a result of intensive maintenance practices that do not allow for woody plants within rights-of-way.

**Action**  
**TRACS Action 11.0** Technical Assistance  
Encourage utility companies to create shrubby edges along edges of rights-of-way.

**Objective**  
Within the next five years, develop and distribute best management practices for creating early successional habitat within utility rights-of-way.

**Measure**  
Number of companies implementing best management practices.

**Monitoring**  
Avian point count surveys within rights-of-way.

**Priority**  
1

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Chestnut-sided Warbler, Eastern Towhee, Prairie Warbler, Golden-winged Warbler, Blue-winged Warbler

**IUCN Threat:** 1.0 Residential and Commercial Development  
**Specific Threat:** Loss of habitat to high density urban development.

**Action**  
**TRACS Action 2.0** Direct Management of Natural Resources  
Creation of early successional habitat.

**Objective**  
Increase the statewide acreage of early successional habitat.

**Measure**  
Number of acres of habitat.

**Monitoring**  
Breeding Bird Survey trends.

**Priority**  
2

**Action Location:** Physiographic Province: Statewide

**Associated Species:** American Woodcock, Blue-winged Warbler, Golden-winged Warbler, Yellow-breasted Chat

**RESEARCH NEEDS**

1. Breeding- What is Gray Catbird response to silviculture / young forest management in PA?

2. Breeding- What is Gray Catbird response to scrub barrens management in PA?
**Gray Catbird**  
*Gray Catbird*  
*Dumetella carolinensis*

**SURVEY NEEDS**

1. Breeding - Conduct post-treatment surveys of silvicultural treatments to determine reaction of young forest and shrub species.

2. Breeding - MAPS program for selected locations.

**MONITORING PROGRAMS**

<table>
<thead>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</tbody>
</table>
Louisiana Waterthrush
*Parkesia motacilla*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Very High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: 70000
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**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.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Northern Hardwood & Conifer
- **Primary Habitat**: Appalachian (Hemlock)-Northern Hardwood Forest

**Specific Habitat Requirements:**
Mature, forested watersheds w/ med-high gradient headwater (1st-3rd order) streams, with well developed banks (ravines) and/or plentiful overturned trees with exposed root masses. High-quality stream indicator.

Photo: Jacob Dingel

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Terry L. Master
East Stroudsburg University of Pennsylvania

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PENNSYLVANIA GAME COMMISSION
PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
### Louisiana Waterthrush

**Parkesia motacilla**

#### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Natural gas development may lead to increased acidification, sedimentation, and altered/reduced prey base in headwater stream reaches inhabited by Louisiana Waterthrushes.

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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Prevent decrease in density/productivity of breeding Waterthrushes.</td>
<td>Breeding density (pairs per km of stream reach) and nest success (number of fledglings per nest).</td>
<td>Monitor breeding densities (pairs per km of stream reach) and reproductive success (number of fledglings per nest).</td>
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<td>Action Location: HUC10 Watershed: Statewide</td>
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<td>Associated Species: Belted Kingfisher, Eastern Phoebe, Winter Wren, Acadian Flycatcher, Bank Swallow</td>
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**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Increased pollution, runoff, and sedimentation, especially in headwater streams.

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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Re-establish breeding populations/increase breeding density/productivity on acid impacted streams. Prevent decrease in density/productivity of breeding Waterthrushes.</td>
<td>Breeding density (pairs per km of stream reach) and nest success (number of fledglings per nest).</td>
<td>Monitor breeding densities (pairs per km of stream reach) and reproductive success (number of fledglings per nest).</td>
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</table>
# Louisiana Waterthrush

*Parkesia motacilla*

## Threats and Actions

### Specific Threat: Expected increase in extreme flooding events and droughts will impact nesting success through nest inundation/destruction and water temperature increases reducing both abundance and diversity of aquatic macroinvertebrate prey.

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</table>

**Action Location:** HUC10 Watershed: Statewide

**Associated Species:** Belted Kingfisher, Eastern Phoebe, Winter Wren, Acadian Flycatcher, Bank Swallow

### Specific Threat: Forest fragmentation and sedimentation of foraging sites from residential and commercial development.

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<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Prevent decrease in density/productivity of breeding Waterthrushes.</td>
<td>Breeding density (pairs per km of stream reach) and nest success (number of fledglings per nest).</td>
<td>Monitor breeding densities (pairs per km of stream reach) and reproductive success (number of fledglings per nest).</td>
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**Action Location:** HUC10 Watershed: Statewide

**Associated Species:** Belted Kingfisher, Eastern Phoebe, Winter Wren, Acadian Flycatcher, Bank Swallow

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**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Season:** Breeding

**IUCN Threat:** 1.0 Residential and Commercial Development

**Season:** Breeding
**Louisiana Waterthrush**

**Parkesia motacilla**

## THREATS AND ACTIONS

| IUCN Threat: | 4.0 Transportation and Service Corridors |
| Specific Threat: | Mining and Quarrying fragment extensive forest tracts and increase stream sedimentation. |
| Season: | Breeding |

### Specific Threat: Mining and Quarrying

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**Action Location:** HUC10 Watershed: Statewide

**Associated Species:** Belted Kingfisher, Eastern Phoebe, Winter Wren, Acadian Flycatcher, Bank Swallow

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**IUCN Threat: 6.0 Human Intrusions and Disturbance**

| Specific Threat: | Human disturbance early in breeding/nesting season |
| Season: | Breeding |

### Specific Threat: Human Disturbance

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<td>Breeding density (pairs per km of stream reach) and nest success (number of fledglings per nest).</td>
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**Action Location:** HUC10 Watershed: Statewide

**Associated Species:** Belted Kingfisher, Eastern Phoebe, Winter Wren, Acadian Flycatcher, Bank Swallow
## Louisiana Waterthrush

*Parkesia motacilla*

### RESEARCH NEEDS

1. Breeding - Effects of Marcellus Shale drilling activity (ongoing - Steven Latta and Margaret Brittingham).

2. Breeding - Effect of disappearance of riparian hemlock stands (ongoing - Terry Master and graduate students).

3. Breeding - Post breeding habitat use.

### SURVEY NEEDS

1. Breeding - Monitoring of breeding densities, productivity and chemical residues in tissues in areas of high Marcellus Shale drilling activity (ongoing - Steven Latta and Margaret Brittingham).

2. Breeding - Monitoring of breeding densities and productivity in hemlock dominated riparian areas with differing hemlock woolly adelgid infestation levels.

3. Breeding - Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

### MONITORING PROGRAMS

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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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<tr>
<td>Ongoing monitoring of population densities and productivity in areas of high Marcellus Shale drilling activity (Steven Latta and Margaret Brittingham) and Hemlock Woolly Adelgid infestation (Terry Master and graduate students)</td>
<td>Marcellus Shale impacts - Penn State University and The National Aviary, Hemlock Woolly Adelgid Impacts - East Stroudsburg University.</td>
<td></td>
<td>Monitoring of population densities on designated stream reaches, nest monitoring to determine productivity, tissue analysis and Hemlock Woolly adelgid infestation level surveys.</td>
</tr>
</tbody>
</table>

PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
Northern Waterthrush

_Parkesia noveboracensis_

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S2B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Not NE Regional SGCN
- **PA Legal Status**: Protected
- **PA Abundance**: 2000
- **PA Short-Term Trend (10 year)**: (B) Unknown

**Conservation Goal:**
Expand breeding population at least 10% to detection of territorial males in at least 250 breeding bird atlas blocks by 2025.

**HABITAT ASSOCIATIONS**

- **Primary**
  - **Macrogroup**: Northern Hardwood & Conifer
  - **Habitat**: Appalachian (Hemlock)-Northern Hardwood Forest

- **Specific Habitat Requirements**:
  - Forested swamps, scrub-shrub wetlands, and beaver swamps.

*B = Breeding, M = Migration, W = Wintering*
## Threats and Actions

### Northern Waterthrush

**IUCN Threat:** 1.0 Residential and Commercial Development  

**Season:** Breeding  

**Specific Threat:** Loss of habitat to development could potentially fragment forest blocks and development could change hydrology that would reduce habitat availability.

<table>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Develop BMPs for development in forested landscapes</td>
<td>Forest fragmentation index</td>
<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  

HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny  

**Associated Species:** Forested wetland species

### Invasive and Other Problematic Species and Genes

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes  

**Season:** Breeding  

**Specific Threat:** Browsing and insect pests alter forest structure that makes habitat less suitable.

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Healthy forest metrics</td>
<td>FIA understory metrics</td>
<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  

HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny  

**Associated Species:** Forested wetland species
## Northern Waterthrush

**Parkesia noveboracensis**

### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Fragmentation of contiguous forests would undermine the integrity of forested wetlands.

**Season:** Breeding

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<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Secure forested wetland environments</td>
<td>Forest block size around wetlands</td>
<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
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</tbody>
</table>

- Designate core forested wetland habitats for Northern Waterthrush and other associated species, and develop best management practices within and around these areas.

**Action Location:** Physiographic Province: Appalachian Plateaus
HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny

**Associated Species:** Forested wetland species

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Pipelines and energy corridors have the potential to fragment contiguous forested blocks and change hydrology, affecting habitat suitability.

**Season:** Breeding

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<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain large unfragmented forest blocks</td>
<td>Forest fragmentation index</td>
<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
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- Designate core forested wetland habitats for Northern Waterthrush and other associated species, and develop best management practices within and around these areas.

**Action Location:** Physiographic Province: Appalachian Plateaus
HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny

**Associated Species:** Forested wetland species

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**PENNSYLVANIA GAME COMMISSION**

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## Northern Waterthrush

*Parkesia noveboracensis*

### Threats and Actions

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<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
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</table>

Develop BMPs for forested wetlands that highlight Northern Waterthrush's requirements and promote, whether on public or private property, and use the regulatory protections of wetland as the best mechanism for non-listed species.

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny

**Associated Species:** Forested wetland species

### IUCN Threat: 5.0 Biological Resource Use

**Specific Threat:** Forest fragmentation reduces habitat quality for Northern Waterthrushes.

**Season:** Breeding

### IUCN Threat: 7.0 Natural System Modifications

**Specific Threat:** Flooding of forested wetlands, either by human activity or due to beavers, may have short-term impacts on nesting success.

**Season:** Breeding

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Develop BMPs for forested wetlands that highlight Northern Waterthrush's requirements and promote, whether on public or private property, and use the regulatory protections of wetland as the best mechanism for non-listed species.

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny

**Associated Species:** Forested wetland species
Northern Waterthrush

**Parkesia noveboracensis**

**THREATS AND ACTIONS**

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<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce contaminants below long-term exposure toxic levels.</td>
<td>Mercury and PCBs PPM.</td>
<td>Species-specific presence/absence surveys of forested wetlands every 5 years.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specific Threat:** Acid deposition leads to reduced calcium availability in diet.

**Season:** Breeding

**IUCN Threat:** 9.0 Pollution

**Action Location:** Physiographic Province: Appalachian Plateaus

HUC6 Watershed: U. Susquehanna, W. Br. Susquehanna, Allegheny

**Associated Species:** Forested wetland species

**RESEARCH NEEDS**

1. Breeding- What are site and landscape characteristics that have supported northern Waterthrush nest sites? Model these sites.

2. Breeding- Are unoccupied habitats available?

3. Breeding- What are population sizes and productivity in boreal forested wetlands and high elevation palustrine habitats (headwaters) that are off-road and poorly monitored currently?

**SURVEY NEEDS**

1. Breeding- Northern Waterthrush breeding populations are poorly known. Determine extent of breeding population through volunteer surveys.

2. Breeding- Expand Mountain Bird Watch into PA including NOWA 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.

3. Breeding- MAPS program for selected locations.
## MONITORING PROGRAMS

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<td>Monitoring Avian Productivity and Survivorship (MAPS)</td>
<td>The Institute for Bird Populations</td>
<td><a href="http://www.birdpop.org/MAPSPROG.htm">http://www.birdpop.org/MAPSPROG.htm</a></td>
<td>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.</td>
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<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
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<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Golden-winged Warbler
Vermivora chrysoptera

CONSERVATION PROFILE

Conservation Goal:
Double detection of territories using the Conservation Initiative Monitoring protocol to at least 2 birds per 10 points surveyed, distributed over 20 randomly established quads throughout the focal area.

HABITAT ASSOCIATIONS

Primary

- Northeastern Interior Dry-Mesic Oak Forest

Secondary

- Central Oak-Pine

Specific Habitat Requirements:
Mosaic of herbaceous patches and shrubby thickets located along a forest edge, often at higher elevations; increasingly found in higher elevation bogs and forested wetlands.

Photo: Jacob Dingel

Published September 2015
### Golden-winged Warbler

**Vermivora chrysoptera**

#### THREATS AND ACTIONS

**IUCN Threat: 1.0 Residential and Commercial Development**

**Specific Threat:** Loss of forest and wetland forest habitats to development in the Appalachian and Pocono Plateaus and Ridge and Valley regions.

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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>To create and continuously maintain early successional patches within largely forested landscapes to ensure long-term breeding populations. (Bakerman et al. 2011)</td>
<td>Acreage of available young forest and early successional habitats.</td>
<td>Annual breeding season monitoring of territorial males in new areas.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare

**IUCN Threat: 7.0 Natural System Modifications**

**Specific Threat:** Loss of young forest habitat to succession and the lack of a disturbance regime in Pennsylvania forests.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Mimic natural forest disturbances, particularly through prescribed fire which initiates regeneration prior to timber harvesting and maintains early successional structural components, including savannah-type scrub habitats.</td>
<td>Measure GWWA response through breeding population monitoring.</td>
<td>Annual breeding season monitoring of territorial males.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare
## Threats and Actions

### Golden-winged Warbler

**Vermivora chrysoptera**

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

#### Specific Threat:
Hybridization and competition with Blue-winged Warbler as a result of its range expansion.

#### Action
**TRACS Action 9.0 Planning**

Identify important populations of GWWA in areas devoid of Blue-winged Warblers and protect and intensively manage those areas; identify habitat features that are more favorable to GWWA and manage for those conditions, especially in forested landscapes at higher elevations (>1500 ft).

**Objective**
Identify populations and habitats that have the highest potential for management success (CWCS Priority Species Account); minimize hybridization with Blue-winged Warbler.

**Measure**
Preserved areas of "pure" Golden-winged Warbler populations.

**Monitoring**
Annual breeding season monitoring of territorial males, including the presence of BWWA and hybrids.

**Priority**
1

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare

### IUCN Threat: 4.0 Transportation and Service Corridors

#### Specific Threat:
Vegetation management along roadway and utility right-of-ways may lead to population sinks.

#### Action
**TRACS Action 2.0 Direct Management of Natural Resources**

Identify ROWs within focal areas that are suitable for GWWA and that have potential for habitat management on adjoining land. Collaborate with public utilities to develop habitat management strategies that incorporate the regulatory requirements for vegetation maintenance of ROWs while creating or enhancing habitat for GWWA.

**Objective**
Use the ROW to provide the herbaceous or shrub components within a larger scale management strategy involving adjacent land, including savannah-type scrub habitats (Golden-winged Warbler Working Group 2012).

**Measure**
Measure GWWA response through breeding population monitoring.

**Monitoring**
Annual breeding season monitoring of territorial males.

**Priority**
2

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare

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**Pennsylvania Game Commission**

**Pennsylvania Fish & Boat Commission**

Published September 2015
### Golden-winged Warbler

**Vermivora chrysoptera**

#### THREATS AND ACTIONS

| IUCN Threat: | 8.0 | Invasive and Other Problematic Species and Genes |
| Specific Threat: | White-tailed deer browsing inhibits growth of suitable breeding habitat. | |

#### Specific Threat: White-tailed deer browsing inhibits growth of suitable breeding habitat.

<table>
<thead>
<tr>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Improve forest regeneration and structural diversity of vegetation in areas with overbrowsing.</td>
<td>Measure GWWA response through breeding population monitoring of treatment areas.</td>
<td>Long-term breeding season monitoring of territorial males and territory density before and after management action.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare

### Acid deposition leads to reduced calcium availability in diet.

| IUCN Threat: | 9.0 | Pollution |
| Specific Threat: | Acid deposition leads to reduced calcium availability in diet. | |

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 3.0 Data Collection and Analysis</td>
<td>Determine the influence of soil calcium depletion on GWWA decline, particularly at higher elevations; and test liming on sample sites for its potential as a mitigation technique.</td>
<td>Test site breeding population monitoring before treatment and post-treatment annually for five years.</td>
<td>Breeding season monitoring of territorial males and territory density before and after application; annually for five years to show initial short-term trend in response to treatment.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Ruffed Grouse, American Woodcock, Gray Catbird, Prairie Warbler, Eastern Towhee, Field Sparrow, Appalachian cottontail, snowshoe hare
Golden-winged Warbler

**RESEARCH NEEDS**

1. Breeding- In addition to continued breeding population monitoring within PA focal areas, identify and monitor specific populations that occur in areas devoid of Blue-winged Warbler and areas that have lower rates of hybridization.

2. Breeding- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat.

3. Breeding- Find linkage between PA GWWA populations and wintering grounds in Central and NW South America.

**SURVEY NEEDS**


3. Breeding- Monitor high priority populations within GWWA focal areas, searching for new populations that have responded to disturbances.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
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<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Golden-winged Warbler Conservation Initiative Monitoring</td>
<td>Golden-winged Warbler Working Group; Coordinated by the Cornell Lab of Ornithology (CLO)</td>
<td></td>
<td>PGC works with partners to monitor GWWA, BWWA, and hybrids as part of the regional and national conservation monitoring project. This program helps to inform the agency of management potential for implementing best management practices where they are most appropriate.</td>
</tr>
<tr>
<td>Program Name</td>
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<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Golden-winged Warbler Monitoring on state game</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/document/1460133/71040-13z_pdf">http://www.portal.state.pa.us/portal/server.pt/document/1460133/71040-13z_pdf</a></td>
<td>In addition to CLO surveys, the PGC staff and volunteers conduct GWWA surveys of game lands, forest lands and other areas where there is potential for management within GWWA focal areas.</td>
</tr>
<tr>
<td>lands, forest land and adjacent lands within focal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>areas.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicaragua Highlands Project</td>
<td>El Jaguar Reserva / American Bird Conservancy</td>
<td></td>
<td>PGC supports this important project which monitors wintering grounds in Central America 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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Blue-winged Warbler
Vermivora cyanoptera

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Federal Status: Not Listed
Conservation Goal:
Protect existing populations of Blue-winged Warblers in northwestern and southeastern regions of Pennsylvania where Golden-winged Warblers do not occur, and maintain a detection rate of at least 0.50 singing males per Breeding Bird Survey route within those regions.

State Rank: S4B
Northeast Region: Very High Concern / High Responsibility
PA Legal Status: Protected
PA Abundance: 104000
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

HABITAT ASSOCIATIONS

Macrogoup: Agricultural
Habitat: Agriculture (NLCD 81-82)

Specific Habitat Requirements:
Early-mid successional forests and thickets w/openings; areas marked by patches of herbs, shrubs, and trees and often located near a forest edge.

Photo: Jacob Dingel
**Blue-winged Warbler**

**Vermivora cyanoptera**

## THREATS AND ACTIONS

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Residential and commercial development is depleting existing habitat and eliminating potential habitat.

<table>
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<tr>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>To maintain productive Blue-winged Warbler populations outside of Golden-winged Warbler focal areas through active habitat management.</td>
<td>An increase in the amount of quality habitat in the northwest and southeast regions.</td>
<td>Breeding Bird Surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** American Woodcock, Ruffed Grouse, Prairie Warbler, Nashville Warbler, Mourning Warbler

### IUCN Threat: 7.0 Natural System Modifications

**Specific Threat:** Loss of early successional habitat through forest maturation in the absence of disturbance regimes such as wildfire and timber harvest.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase the amount of suitable habitat and improve the quality of existing habitat outside of Golden-winged Warbler focal areas.</td>
<td>An increase in the amount of suitable habitat in the northwest and southeast regions.</td>
<td>Breeding Bird Surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** American Woodcock, Ruffed Grouse, Prairie Warbler, Nashville Warbler, Mourning Warbler
Blue-winged Warbler

**Vermivora cyanoptera**

## THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Season:** Breeding

**Specific Threat:** Vegetation management along roadways and utility right-of-ways may reduce habitat quality and suitability.

### Action

<table>
<thead>
<tr>
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<th>Objective</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Improve habitat quality of ROWs and incorporate the habitat components into a larger scale management strategy involving the adjacent lands.</td>
<td>The amount and quality of habitat available through ROW management.</td>
<td>Breeding Bird Surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** Prairie Warbler, Field Sparrow, Brown Thrasher, Eastern Towhee, Indigo Bunting

## RESEARCH NEEDS

1. Breeding- Population, range, and distribution through annual statewide monitoring of Golden-winged and Blue-winged Warblers and hybrids, with emphasis on northwestern and southeastern regions or anywhere within agricultural landscapes or below 1500 feet.

2. Breeding- An intensive demographic study of multiple breeding populations of Blue-winged Warblers to identify the most productive breeding areas and habitat types. (Kubel in Steele et al. 2010).

3. Breeding- A field study that investigates what habitat conditions, if any, favor blue-winged warblers to the exclusion of golden-winged warblers and hybrids. (Kubel in Steele et al. 2010); also, an international research collaboration that identifies wintering grounds for Pennsylvania Blue-winged Warblers as well as habitat associations and conditions of wintering grounds.
Blue-winged Warbler

**Vermivora cyanoptera**

### SURVEY NEEDS


2. Breeding- Conduct additional surveys in the northwest and southeast regions (outside of GWWA focal areas) and encourage the Pennsylvania birding community to concentrate search efforts in these regions.

3. Breeding- Post-treatment monitoring of locations in the northwest and southeast regions that are managed for Blue-winged Warblers or managed for early successional species.

### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Blue-winged Warblers and hybrids are monitored on state game lands, forest land and adjacent lands within the Golden-winged winged warbler focal areas.</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt/document/1460133/71040-13z_pdf">http://www.portal.state.pa.us/portal/server.pt/document/1460133/71040-13z_pdf</a></td>
<td>The PGC staff and volunteers collect Blue-winged Warbler and hybrid count data on searches for Golden-winged Warbler on game lands, forest lands and other areas where there is potential for management.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Surveys for Blue-winged Warblers and hybrids as part of the Golden-winged Warbler Conservation Initiative Monitoring</td>
<td>Golden-winged Warbler Working Group; Coordinated by the Cornell Lab of Ornithology (CLO)</td>
<td><a href="http://www.birds.cornell.edu/page.aspx?pid=2679">http://www.birds.cornell.edu/page.aspx?pid=2679</a></td>
<td>The study monitors golden-winged warblers, Blue-winged Warblers and hybrids during the breeding season in PA as part of a regional and national conservation monitoring project.</td>
</tr>
</tbody>
</table>
**CONSERVATION PROFILE**

**Global Rank**: G5  
**State Rank**: S4B  
**IUCN Red List**: LC Least Concern  
**Northeast Region**: High Concern / Low Responsibility  
**Federal Status**: Not Listed  
**PA Legal Status**: Protected  
**PA Abundance**: 500000  
**PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**Conservation Goal**:  
Increase statewide population estimate to 1.0 bird per route on three-quarters of routes, as indicated by Breeding Bird Survey data.

**HABITAT ASSOCIATIONS**

**Primary**  
- **Macrogroup**: Northern Hardwood & Conifer  
- **Habitat**: Appalachian (Hemlock)-Northern Hardwood Forest

**Secondary**  
- **Macrogroup**: Central Oak-Pine  
- **Habitat**: Northeastern Interior Dry-Mesic Oak Forest

**Specific Habitat Requirements**:  
Reported by some as an area-sensitive forest breeder, although apparently accepts early-successional forest; most abundant in forest with dense understory, including scrubby barrens.

B = Breeding, M = Migration, W = Wintering
# Black-and-white Warbler

*Mniotilta varia*

## Threats and Actions

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Action Location</th>
<th>Associated Species</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred dense understory reduced or eliminated by heavy deer browsing</td>
<td>Breeding</td>
<td>8.0</td>
<td>2.0</td>
<td>Physiographic Province: Statewide</td>
<td>Hooded Warbler, Canada Warbler, Black-throated Blue Warbler, Kentucky Warbler</td>
<td>Keep deer at levels that allow for shrubby understory regeneration</td>
<td>Woody understory cover, as assessed by FIA</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Point counts to quantify avian populations; FIA-style understory plots to assess vegetation responses</td>
<td></td>
</tr>
<tr>
<td>Specific Threat</td>
<td></td>
<td>3.0</td>
<td>100.0</td>
<td>Physiographic Province: Statewide</td>
<td>Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager</td>
<td>Create regulations that would limit density of energy development in large tracts of forest</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assessment of new well/turbine locations in relation to known habitat</td>
<td></td>
</tr>
</tbody>
</table>
### Black-and-white Warbler

**Mniotilta varia**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>4.0 Transportation and Service Corridors</th>
<th>Season: Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators</td>
<td></td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Discourage placement of new roads/pipelines/powerlines in extensive forest habitat</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>7.0 Natural System Modifications</th>
<th>Season: Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Fire suppression reduces area and quality of scrub barrens highly favored by BAWW</td>
<td></td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase and sustain acreage in scrub barren habitat across state</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Prairie Warbler, Eastern Whip-poor-will, Field Sparrow, Gray Catbird</td>
<td></td>
</tr>
</tbody>
</table>
Black-and-white Warbler

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Forest fragmentation from exurban, suburban development

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>use annual Breeding Bird Surveys to assess local (route/region)population trends</td>
<td>3</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

IUCN Threat: 9.0 Pollution

Specific Threat: Acid deposition depletes populations of invertebrate prey.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Reduce levels of acid deposition to level where invertebrates not depleted</td>
<td>Anion levels in precipitation</td>
<td>Maintain existing NOAA meteorological stations</td>
<td>3</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

RESEARCH NEEDS

1. Breeding- Determine habitat correlates of nest success, abundance, and site fidelity to identify optimal habitat of BAWW in PA.

2. Breeding- Evaluate population response to habitat management prescriptions, including silviculture, used to create, maintain or enhance breeding habitat of forest birds.

3. Breeding- Determine the adequacy of BBS to monitor populations compared to off-road surveys.
1. Breeding - Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

**MONITORING PROGRAMS**

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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
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<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</tbody>
</table>
Prothonotary Warbler
Protonotaria citrea

CONSERVATION PROFILE

Global Rank: G5
State Rank: S3B
IUCN Red List: LC Least Concern
Federal Status: Not Listed

Northeast Region: Very High Concern / Low Responsibility
PA Legal Status: Protected
PA Abundance: 400
PA Short-Term Trend (10 year): (B) Unknown

Conservation Goal:
Documentation of at least 45 active nest sites distributed across at least 6 counties annually by the year 2025.

HABITAT ASSOCIATIONS

Primary
Macrogoup: Northern Swamp
Habitat: North-Central Appalachian Acidic Swamp

Secondary

Specific Habitat Requirements:
Wooded swamps or other flooded forest types > 100 hectares; swampy riparian forest > 30 meters wide.

B = Breeding, M = Migration, W = Wintering
**Prothonotary Warbler**

**Protonotaria citrea**

**THREATS AND ACTIONS**

<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Establish nest boxes within stretches of suitable habitat of the Susquehanna, Schuylkill and Delaware Rivers</td>
<td>Number of nest boxes installed</td>
<td>Nest boxes should be monitored for nesting success annually for ten years.</td>
</tr>
</tbody>
</table>

**Specific Threat:** Loss of potential nest sites due to removal of snags and cavity trees within bottomland forests

**Focus management on maintaining large blocks of floodplain forest; implement nest box program to provide alternative nesting substrate.**

**Action Location:** Physiographic Province: Piedmont

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 5.0</td>
<td>Facilities and Areas</td>
<td>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.</td>
<td># sites with adaptive management plans in place; # water control devices upgraded</td>
<td>Monitor progress in development and implementation of Adaptation Plans at high-priority sites. Monitor installation of water control devices.</td>
</tr>
</tbody>
</table>

**Specific Threat:** Nesting/prey availability impacted by severe precipitation and/or drought

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Virginia Rail, Sora, Common Gallinule, Least Bittern American Bittern, American Coot, Wilson's Snipe.
### Prothonotary Warbler

*Protonotaria citrea*

#### THREATS AND ACTIONS

**IUCN Threat:** 6.0 Human Intrusions and Disturbance  
**Season:** Breeding

**Specific Threat:** Disturbance of nest sites due to human activities such as motorboats and fishing

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Establish protected areas where human activity is restricted during the breeding season.</td>
<td>Number of acres protected from human activity</td>
<td>Annual surveys should be conducted within protected management areas once every five years during the breeding season to determine population trend</td>
</tr>
</tbody>
</table>

Areas of significant importance to Prothonotary warblers should be protected from human activity during the breeding season when possible.

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Red-headed Woodpecker, Bald Eagle, Osprey, Cerulean Warbler, Louisiana Waterthrush

**IUCN Threat:** 7.0 Natural System Modifications  
**Season:** Breeding

**Specific Threat:** Loss of suitable habitat due to draining of bottomland wetland forests

<table>
<thead>
<tr>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Eliminate loss of bottomland swamp forest habitat</td>
<td>Number of acres of protected bottomland swamp forest habitat</td>
<td>Annual point count surveys should be conducted within protected management areas once every five years during the breeding season to determine population trend</td>
</tr>
</tbody>
</table>

Areas of significant importance to Prothonotary warblers should be protected from draining of suitable bottomland forest habitat.

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Red-headed Woodpecker, Bald Eagle, Osprey, Cerulean Warbler, Louisiana Waterthrush
Prothonotary Warbler

Protonotaria citrea

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Loss of suitable habitat due to excessive pollution along riparian corridors and within bottomland wetland forests

Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 7.0</td>
<td>Law enforcement</td>
<td>Minimize pollution in our rivers and wetlands</td>
<td>Amount of pollutants within our rivers and wetlands</td>
<td>Sample suitable wetlands and riparian corridors for pollutants once every five years</td>
</tr>
</tbody>
</table>

Laws need to be enforced to minimize pollution to our rivers and wetlands

Action Location: Physiographic Province: Statewide

Associated Species: Great Egret, Black-crowned Night-Heron, Yellow-crowned Night-Heron, Bald Eagle, Osprey, Spotted Sandpiper, Belted Kingfisher, Louisiana Waterthrush, Prothonotary Warbler.

RESEARCH NEEDS

1. Breeding- 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.

2. Breeding- Increase knowledge of abundance and distribution throughout the state.

3. Breeding- Determine wetland management options that favor better Prothonotary Warbler productivity.

SURVEY NEEDS

1. Breeding- Nest boxes placed for Prothonotary warblers should be annually monitored for nesting success and productivity

2. Breeding- Surveys for secretive marsh birds should include audio recordings of Prothonotary warbler or at least registering observations of this species.

3. Breeding- Monitor changes in abundance and distribution of suitable bottomland riparian and forested wetland habitat.
<table>
<thead>
<tr>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</table>
Nashville Warbler
Oreothlypis ruficapilla

CONSERVATION PROFILE

Global Rank: G5
State Rank: S3B
IUCN Red List: LC Least Concern
PA Legal Status: Protected
Northeast Region: Not NE Regional SGCN
PA Abundance: 3000
Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Unknown

Conservation Goal:

HABITAT ASSOCIATIONS

Primary
Macrogroup: Northern Peatland & Fens
Habitat: North-Central Interior and Appalachian Acidic Peatland

Secondary
Macrogroup: Northern Swamp
Habitat: North-Central Appalachian Acidic Swamp

Specific Habitat Requirements:
Shrub oak barrens and scrub shrub wetlands, higher elevations (greater than 457 meters).

Photo: Jacob Dingel
### Threats and Actions

**Nashville Warbler**

*Oreothlypis ruficapilla*

**IUCN Threat:** 4.0 Transportation and Service Corridors  
**Season:** Breeding

**Specific Threat:** Natural gas pipelines

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Minimize long-term impact</td>
<td>vegetation surveys</td>
<td>vegetation surveys</td>
</tr>
<tr>
<td></td>
<td>Restoration of disturbed areas.</td>
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</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Upland riparian bird species, mammals, amphibians, and insects and reptiles.</td>
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</tr>
</tbody>
</table>

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes  
**Season:** Breeding

**Specific Threat:** Habitat degradation

<table>
<thead>
<tr>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Understanding of effects of invasive species</td>
<td>Bird surveys</td>
<td>population size</td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
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</tr>
<tr>
<td>Action Location:</td>
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<td>Associated Species:</td>
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</table>

**IUCN Threat:** 9.0 Pollution  
**Season:** Breeding

**Specific Threat:** Disruption of food chain

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Increase quality of food supply</td>
<td>Invertebrate surveys</td>
<td>species productivity and health</td>
</tr>
<tr>
<td></td>
<td>Reduction of air pollution</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
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<tr>
<td>Associated Species:</td>
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</table>
## Nashville Warbler

### Oreothlypis ruficapilla

### Threats and Actions

#### Specific Threat: Peat Mining

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Habitat protection</td>
<td>Stable populations</td>
<td>Bird surveys</td>
</tr>
</tbody>
</table>

- Acquisition of open space lands surrounding sphagnum dominated wetlands.

- Action Location: Physiographic Province: Appalachian Plateaus

- Associated Species: Upland riparian bird species, mammals, amphibians, and insects and reptiles.

#### Specific Threat: Habitat loss and degradation

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Management of stand composition</td>
<td>Bird surveys</td>
<td>Population stability</td>
</tr>
</tbody>
</table>

- Selective harvest and planting

- Action Location: Physiographic Province: Appalachian Plateaus

- Associated Species: Upland riparian bird species, mammals, amphibians, and insects and reptiles.
Nashville Warbler

**Oreothlypis ruficapilla**

### Threats and Actions

#### Specific Threat: Habitat degradation

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Season:** Breeding

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain habitat quality</td>
<td>Bird surveys</td>
<td>Population stability</td>
</tr>
</tbody>
</table>

Uncertain

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

### Research Needs

1. Breeding- What is the species sensitivity to disturbance along the fringe of the habitat?

2. Breeding- How close can disturbance be to their breeding habitat without affecting breeding activities?

3. Breeding- Following disturbance, what is the timeline for the return of a viable breeding population?

### Survey Needs

1. Breeding- 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.

2. Breeding- Mountain Bird Watch / Rare Mountain Bird Surveys.

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<tr>
<td>Monitoring Avian Productivity and Survivorship (MAPS)</td>
<td>The Institute for Bird Populations</td>
<td><a href="http://www.birdpop.org/MAPSPROG.htm">http://www.birdpop.org/MAPSPROG.htm</a></td>
<td>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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
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</tr>
</tbody>
</table>
**Kentucky Warbler**  
*Geothlypis formosa*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Very High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **State Rank**: S4B
- **PA Legal Status**: Protected
- **PA Abundance**: 35400
- **PA Short-Term Trend (10 year)**: (B) Relatively Stable (<=10% change)

**Conservation Goal:**

Stabilize or increase an estimated breeding population of 17,700 singing males in Pennsylvania as reflective of detections on Breeding Bird Survey routes statewide as through 2025.

**HABITAT ASSOCIATIONS**

- **Primary**
  - Macrogroup: Central Oak-Pine
  - Habitat: Northeastern Interior Dry-Mesic Oak Forest

- **Secondary**
  - Macrogroup: Northern Hardwood & Conifer
  - Habitat: South-Central Interior Mesophytic Forest

**Specific Habitat Requirements:**

Lowland deciduous forests with well developed ground cover and a dense brushy or vine-filled understory, often near streams.

*B = Breeding, M = Migration, W = Wintering*
### Kentucky Warbler

**Geothlypis formosa**

#### THREATS AND ACTIONS

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<tr>
<td>TRACS Action 9.0  Planning</td>
<td>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.</td>
<td>Number of municipalities and counties adopting the plan with intent to implement.</td>
<td>1-monitor number of development projects/acreage in municipalities/counties implementing that results in loss of interior forest, 2-survey participating municipalities/counties for data, 3-monitor for 5 years after completion of plan</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson's Thrush, Louisiana Waterthrush, Canada Warbler

### Specific Threat:
Forest loss and fragmentation from new building and infrastructure development.

**IUCN Threat:** 1.0 Residential and Commercial Development

**Season:** Breeding

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<tr>
<td>TRACS Action 9.0  Planning</td>
<td>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.</td>
<td>Number of municipalities and counties within areas of high shale gas and wind development adopting the plan with intent to implement.</td>
<td>1-monitor number of development projects/acreage in municipalities/counties implementing that results in loss of interior forest, 2-survey participating municipalities/counties for data, 3-monitor for 5 years after completion of plan</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson's Thrush, Louisiana Waterthrush, Canada Warbler

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

**IUCN Threat:** 3.0 Energy Production and Mining

**Season:** Breeding

---
Kentucky Warbler

**Geothlypis formosa**

**THREATS AND ACTIONS**

**IUCN Threat:** 4.0 Transportation and Service Corridors

| Specific Threat: | Forest loss and fragmentation from development of transportation and service corridors. |

<table>
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<td>TRACS Action 9.0 Planning</td>
<td>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.</td>
<td>Number of municipalities and counties adopting the plan with intent to implement.</td>
<td>1-monitor number of development projects/acreage in municipalities/counties implementing that results in loss of interior forest, 2-survey participating municipalities/counties for data, 3-monitor for 5 years after completion of plan</td>
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</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler

**Season:** Breeding
**Kentucky Warbler**

**Geothlypis formosa**

**THREATS AND ACTIONS**

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Non-native plants, insects, and deer overbrowsing degrade forest ecosystems, leading to reduced breeding success, while feral cats may cause direct mortality.

**Season:** Breeding

<table>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>1. Target 5 PGC WMUs with highest deer densities, lowest hunter recruitment, and/or highest declines in forest interior birds with programs to boost deer hunter numbers and deer harvest (where needed), and create urban/suburban deer hunting initiatives in Pittsburgh and Philadelphia. 2. Establish a statewide strategy for invasive species management, drawing upon DCNR's established guidelines and implement on 50 properties (i.e. State Forest, Game Lands, land trusts properties). 3. Provide means for statewide promotion of American Bird Conservancy's &quot;Cats Indoors Campaign&quot;.</td>
<td>1. Reduction of deer populations in priority units and urban areas. 2. Successful removal of invasive species on 50 conservation properties. 3. Number of groups promoting &quot;Cats Indoors&quot; and number of people reached.</td>
<td>1 - deer densities/hunter numbers, conservation lands with invasive species management, reach of &quot;Cats Indoors&quot; campaign, 2 - standard agency/program tracking and monitoring, 3 - annually for 10 years</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

**Associated Species:** Eastern Whip-poor will, Winter Wren, Swainson’s Thrush, Louisiana Waterthrush, Canada Warbler
### Kentucky Warbler

**Geothlypis formosa**

#### THREATS AND ACTIONS

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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Select 10 of the most severely acidified sites on state managed lands in western and northcentral Pennsylvania and treat them with lime applications over the next 5 years to increase invertebrate prey abundance.</td>
<td>Change in soil chemistry, invertebrate prey abundance, and forest bird abundance/productivity (i.e. Kentucky Warbler) at treated sites.</td>
<td>1-Soil pH, invertebrate abundance, forest breeding bird abundance &amp; productivity (i.e. Kentucky Warbler), 2-see Pabian and Brittingham (2007, 2011), 3-annually for 5 years</td>
<td>2</td>
</tr>
</tbody>
</table>

**Associated Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Wood Thrush, Ovenbird, Veery, Louisiana Waterthrush

#### RESEARCH NEEDS

1. **Breeding**: Assess the effects of forest fragmentation on forest interior birds, including predation/parasitism rates, minimum area requirements, as well as minimum viable population sizes, utilizing population trend data from the 2nd Breeding Bird Atlas to select sites of stability and decline for comparison.

2. **Breeding**: Conduct landscape level analysis of areas of forest interior bird species (e.g. Kentucky Warbler) using 2nd Breeding Bird Atlas data in areas of range change to investigate land use factors influencing that change.

3. **Breeding**: Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat.

#### SURVEY NEEDS

1. **Breeding**: 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.

2. **Breeding**: Design and conduct off-road point count surveys to estimate Kentucky Warbler (and other forest interior bird) populations to enable evaluation of roadside point counts and associated population estimates from the 2nd Breeding Bird Atlas.
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CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: High Concern / Low Responsibility
Federal Status: Not Listed
State Rank: S4N (M)
PA Legal Status: Protected
PA Abundance: 528,000
PA Short-Term Trend (10 year): (M) Unknown

Conservation Goal:
Sustain abundance during spring and fall migration in Pennsylvania through maintenance of appropriate migratory stopover habitat.

HABITAT ASSOCIATIONS

Primary
(M) Central Oak-Pine

Secondary
(M) Northern Hardwood & Conifer
(M) Appalachian (Hemlock)-Northern Hardwood Forest

Specific Habitat Requirements:
(M) Most frequent during migration in edges and early-successional deciduous forest (Rodewald & Matthews 2005).
## THREATS AND ACTIONS

### Hooded Warbler

**Setophaga citrina**

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>1.0 Residential and Commercial Development</th>
<th>Season: Migration</th>
</tr>
</thead>
</table>

**Specific Threat:** Fragmentation from exurban and suburban development

<table>
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<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Use annual Breeding Bird Surveys to assess local (route/region)population trends</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Central Lowland

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>3.0 Energy Production and Mining</th>
<th>Season: Migration</th>
</tr>
</thead>
</table>

**Specific Threat:** Significant forest fragmentation from well-drilling sites, pipelines and roads.

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<th>Monitoring</th>
<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Create regulations that would limit density of energy development in large tracts of forest</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Assessment of new well/turbine locations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager
### Hooded Warbler

**Setophaga citrina**

#### THREATS AND ACTIONS

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<thead>
<tr>
<th>IUCN Threat:</th>
<th>4.0 Transportation and Service Corridors</th>
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<tr>
<td><strong>Specific Threat:</strong></td>
<td>Roads, pipelines, and powerlines fragment forest and facilitate passage by mesopredators</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Migration</td>
</tr>
</tbody>
</table>

**Action**  | **Objective**  | **Measure**  | **Monitoring**  | **Priority** |
<table>
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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Discourage placement of new roads in extensive forest habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Use existing network of migration banding stations (e.g., Powdermill) to test for trends in populations over time</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Unsustainable harvesting (high-grading)

<table>
<thead>
<tr>
<th>Action</th>
<th><strong>Objective</strong></th>
<th><strong>Measure</strong></th>
<th><strong>Monitoring</strong></th>
<th><strong>Priority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 8.0</td>
<td>Outreach</td>
<td>Increase proportion of lands assessed to be sustainably managed 50% by 2025</td>
<td>Number of acres deemed sustainable</td>
<td>Use existing network of migration banding stations (e.g., Powdermill) to test for trends in populations over time</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Black-throated Blue Warbler, Wood Thrush, Swainson's Thrush, Scarlet Tanager, Eastern Towhee</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### RESEARCH NEEDS

1. Migration- Determine what stopover habitats migrant Hooded Warblers use.

2. Migration- What is the linkage of Pennsylvania’s nesting Hooded Warbler population on wintering ground?

3. Migration- Evaluate population response to habitat management prescriptions including silviculture used to create, maintain or enhance breeding habitat of forest species.
**Hooded Warbler**

**Setophaga citrina**

**SURVEY NEEDS**

1. Migration- None

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
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<tr>
<td>eBird (PA eBird as state portal)</td>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
</tbody>
</table>
Cerulean Warbler
Setophaga cerulea

Photo: Wayne Miller

CONSERVATION PROFILE

Global Rank: G4
State Rank: S3B, S4N (M)
IUCN Red List: VU Vulnerable
PA Legal Status: Protected
Northeast Region: High Concern / Low Responsibility
PA Abundance: 48000
Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Relatively Stable; (M) Unknown
Conservation Goal:
Stabilize apparent decline in statewide population indicated by Breeding Bird Survey data to at least 0.25 birds per route on no fewer than 35 routes statewide annually, by 2025.

HABITAT ASSOCIATIONS

Macrogroup
(B, M) Central Oak-Pine

Habitat
(B) Central Appalachian Dry Oak-Pine Forest
(M) Northeastern Interior Dry-Mesic Oak Forest

Specific Habitat Requirements:
(B) 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.
(M) Poorly known. Assumed to be similar to breeding habitat.

B = Breeding, M = Migration, W = Wintering
### Cerulean Warbler

**Setophaga cerulea**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Designate 10 CERW conservation areas distributed across the state by 2025</td>
<td>Acreage designated as CA for CERW, OR number of breeding pairs within conservation areas</td>
<td>1</td>
</tr>
<tr>
<td>identify and establish development-free conservation areas in locations with high densities of CERW</td>
<td>Tape-playback surveys following COL protocol in designated areas</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Sustainably create oak-dominated, structurally complex forests, in 10 areas with significant CERW populations, by 2025</td>
<td>Acres or proportion of oak forest treated following guidelines</td>
<td>1</td>
</tr>
<tr>
<td>Implement Cerulean Management Guidelines (Wood et al. 2013) in appropriate areas; follow sustainable oak forestry guidelines generally (Brose et al 2008).</td>
<td>Survey for presence/abundance/nest success of Cerulean Warblers in treated areas, compare with untreated areas</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Associated Species:** Yellow-throated Vireo, Worm-eating Warbler

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Significant forest fragmentation from well-drilling sites, wind turbines, pipelines and access roads

**Season:** Breeding

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Unsustainable harvesting (high-grading) converts to unsuitable red maple, black birch forest type

**Season:** Breeding

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

**TRACS Action 6.0**
Land and Water Rights Acquisition and Protection

**Objective**
Designate 10 CERW conservation areas distributed across the state by 2025

**Measure**
Acreage designated as CA for CERW, OR number of breeding pairs within conservation areas

**Monitoring**
Tape-playback surveys following COL protocol in designated areas

**Priority**
1

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Unsustainable harvesting (high-grading) converts to unsuitable red maple, black birch forest type

**Season:** Breeding

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

**TRACS Action 2.0**
Direct Management of Natural Resources

**Objective**
Sustainably create oak-dominated, structurally complex forests, in 10 areas with significant CERW populations, by 2025

**Measure**
Acres or proportion of oak forest treated following guidelines

**Monitoring**
Survey for presence/abundance/nest success of Cerulean Warblers in treated areas, compare with untreated areas

**Priority**
1
## Cerulean Warbler

**Setophaga cerulea**

### Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Oak regeneration problems, replacement by red maple/black birch threaten suitability of future forests; structural simplification and homogenization of forests impacts structural complexity required by CERW

<table>
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<th>Measure</th>
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<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Sustainably create oak-dominated, structurally complex forests, in 10 areas with significant CERW populations, by 2025</td>
<td>Acres or proportion of oak forest treated following guidelines</td>
<td>Survey for presence/abundance/nest success of Cerulean Warblers in treated areas, compare with untreated areas</td>
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</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Yellow-throated Vireo, Worm-eating Warbler

---

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Significant forest fragmentation and structural simplification from development

<table>
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<tr>
<th>Action</th>
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<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>use annual Breeding Bird Survey to assess local (route/region)population trends</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Scarlet Tanager, Black-throated Blue Warbler, Wood Thrush, Hooded Warbler
### Cerulean Warbler

**Setophaga cerulea**

**THREATS AND ACTIONS**

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>4.0 Transportation and Service Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Breeding</td>
</tr>
</tbody>
</table>

#### Action

**TRACS Action 1.0** Coordination and Administration

- **Objective:** Discourage placement of new roads/pipelines/powerlines in extensive forest habitat
- **Measure:** Degree of fragmentation as quantified by FRAGSTATS
- **Monitoring:** Use annual Breeding Bird Surveys to assess local (route/region) population trends

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>8.0 Invasive and Other Problematic Species and Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Gypsy moth, oak wilt facilitate conversion to non-favored forest types</td>
</tr>
<tr>
<td><strong>Season:</strong></td>
<td>Breeding</td>
</tr>
</tbody>
</table>

#### Action

**TRACS Action 2.0** Direct Management of Natural Resources

- **Objective:** Minimize impacts of gypsy moth and pathogens on oak survival & regeneration
- **Measure:** Oak importance value, regeneration
- **Monitoring:** FIA-style overstory inventories every 5 yrs. to determine oak IV, survival, recruitment

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager
### Cerulean Warbler

**Setophaga cerulea**

#### THREATS AND ACTIONS

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Acid deposition depletes populations of invertebrate prey.

**Season:** Breeding

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 100.0 Law and Policy</strong></td>
<td>Reduce levels of acid deposition to levels where invertebrates not depleted</td>
<td>Anion levels in precipitation</td>
<td>Maintain existing NOAA meteorological stations</td>
<td>2</td>
</tr>
</tbody>
</table>

**Legislation required at national level (since most of acid deposition originates west of PA) to reduce allowable levels of acid discharge**

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Veery, Ovenbird, Kentucky Warbler, Canada Warbler

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Unsustainable harvesting (high-grading) converts to unsuitable red maple, black birch forest type

**Season:** Migration

<table>
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<tr>
<td><strong>TRACS Action 2.0 Direct Management of Natural Resources</strong></td>
<td>Sustainably create oak-dominated, structurally complex forests, in 10 areas with significant CERW populations, by 2025</td>
<td>Acres or proportion of oak forest treated following guidelines</td>
<td>Survey for presence/abundance/nest success of Cerulean Warblers in treated areas, compare with untreated areas</td>
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</tbody>
</table>

**Implement Cerulean Management Guidelines (Wood et al. 2013) in appropriate areas; follow sustainable oak forestry guidelines generally (Brose et al 2008).**

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Yellow-throated Vireo, Worm-eating Warbler
### Cerulean Warbler

**Setophaga cerulea**

#### THREATS AND ACTIONS

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Significant forest fragmentation and structural simplification from development |

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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize fragmentation of current occupied habitat</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Use existing network of migration banding stations (e.g., Powdermill) to test for trends in migrant populations over time</td>
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</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Scarlet Tanager, Black-throated Blue Warbler, Wood Thrush, Hooded Warbler

| IUCN Threat: | 3.0 Energy Production and Mining |
| Specific Threat: | Significant forest fragmentation from well-drilling sites, wind turbines, pipelines and access roads |

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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Create regulations that would limit density of energy development in large tracts of forest</td>
<td>Degree of fragmentation as quantified by FRAGSTATS</td>
<td>Assessment of new well/turbine locations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager
Cerulean Warbler

Setophaga cerulea

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads, pipelines, and powerlines fragment forest and facilitate passage by brood parasites and mesopredators

Season: Migration

**Action**  
TRACS Action 1.0 Coordination and Administration

**Objective**  
Discourage placement of new roads/pipelines/powerlines in extensive forest habitat

**Measure**  
Degree of fragmentation as quantified by FRAGSTATS

**Monitoring**  
Assess levels of fragmentation of important areas for CERW using GIS, FRAGSTATS

**Priority**  
3

**Associated Species:** Wood Thrush, Ovenbird, Worm-eating Warbler, Scarlet Tanager

RESEARCH NEEDS

1. Breeding- How does management following forestry guidelines (Wood et al.) affect nest success, survival?

2. Migration- Determine migratory routes and stop-over areas for Cerulean Warblers breeding in PA, using light-detecting geolocators.

3. Breeding- Assess landscape-level characteristics of cerulean habitat (degree of fragmentation, slope, aspect, elevation, patch size, proximity to water/anthropogenic habitats/gas & oil infrastructure).
Cerulean Warbler

**Setophaga cerulea**

**SURVEY NEEDS**

1. Breeding- Identify and map areas of high CERW abundance in PA to inform further conservation actions.

1. Migration- None

2. Breeding- Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Blackburnian Warbler
Setophaga fusca

CONSERVATION PROFILE

Global Rank: G5
State Rank: S4N (M)
IUCN Red List: LC Least Concern
PA Legal Status: Protected
Northeast Region: High Concern / Low Responsibility
PA Abundance: 720000
Federal Status: Not Listed
PA Short-Term Trend (10 year): (M) Unknown
Conservation Goal:
Sustain abundance during spring migration in Pennsylvania through maintenance of appropriate migratory stopover habitat.

HABITAT ASSOCIATIONS

Primary
(M) Northeastern Interior Dry-Mesic Oak Forest

Secondary
(M) Central Oak-Pine

Specific Habitat Requirements:
(M) Not very specific during migration. Any habitat with at least some woody vegetation may be used.

Photo: Shawn Collins

Non-Breeding
## Blackburnian Warbler

**Setophaga fusca**

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss and degradation of habitat due to urbanization and development.

<table>
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<th>Action</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Improve quantity and quality of stopover habitat in urban/heavy use areas. Reduce mortality of migrants due to glass/lights in major cities during migration.</td>
<td>Area of restored/enhance habitat (acres). Number of dead/injured birds found on survey routes.</td>
<td>Habitat use of restored areas can be assessed by surveys or mist netting. Volunteer programs for survey routes for finding dead/injured birds below skyscrapers can be established.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Atlantic Coastal Plains, Central Lowland, Piedmont  
HUC4 Watershed: Statewide

**Associated Species:** Other migrant land birds.

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Energy development resulting in loss of intact forest habitat and other direct effects.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Require compliance with BMPs on state lands (at least). Develop strategy for promoting compliance on private lands.</td>
<td>Number of well sites with BMPs in place.</td>
<td>Conduct study comparing sites with and without BMPs, assess abundance of migrant songbirds within 100m of well site.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.
## Blackburnian Warbler

**Setophaga fusca**

### Threats and Actions

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Reduction in size of large, intact forested landscapes will reduce habitat available for migrants.

**Season:** Migration

<table>
<thead>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0 Planning</strong></td>
<td>Minimize or prevent new utility rights-of-way through existing forest blocks larger than 1000 acres.</td>
<td>Miles of new ROWs.</td>
<td>Monitor creation of new ROWs via GIS in priority forest blocks.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**HUC4 Watershed:** Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.

### IUCN Threat: 5.0 Biological Resource Use

**Specific Threat:** Poor forestry practices may reduce quality of habitat available for migrants in the long term.

**Season:** Migration

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>TRACS Action 2.0 Direct Management of Natural Resources</strong></td>
<td>Develop information regarding bird requirements that can be used by foresters and incorporated into tools used by foresters (e.g., SILVAH).</td>
<td>Foresters using bird friendly management.</td>
<td>Either conduct detailed studies comparing bird use of areas with and without bird friendly management, or just track areas reported as managed in compliance with recommendations.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**HUC4 Watershed:** Statewide

**Associated Species:** Forest Breeding birds and other migrant land birds.
Blackburnian Warbler

RESEARCH NEEDS

1. What stopover habitats do migrant Blackburnians use?

2. Where are the breeding grounds of Blackburnian Warblers that pass through Pennsylvania during migration?

3. Does the loss of hemlock have a negative effect on Blackburnian Warbler as a stopover passage migrant?

SURVEY NEEDS

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.

2. Conduct mist netting and banding at heavily used migration sites to monitor frequency of this species and others.

MONITORING PROGRAMS

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<tbody>
<tr>
<td>Banding at migration banding stations, e.g., Powdermill Avian Research Center.</td>
<td>NGOs, data centralized at the USGS Bird Banding Laboratory.</td>
<td></td>
<td>The timing and relative frequency of this species can be assessed at sites where migration banding occurs (or used to occur).</td>
</tr>
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<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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</table>
Blackpoll Warbler
Setophaga striata

CONSERVATION PROFILE

Global Rank: G5
State Rank: S1B
IUCN Red List: LC Least Concern
Northeast Region: Very High Concern / Low Responsibility
Federal Status: Not Listed

PA Legal Status: Endangered
PA Abundance: < 50 pairs
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

Conservation Goal:
50 Blackpoll Warbler territorial pairs in at least 5 locations by 2025.

HABITAT ASSOCIATIONS

Primary
- Northern Peatland & Fens
- North-Central Interior and Appalachian Acidic Peatland

Secondary
- Northern Hardwood & Conifer
- Appalachian (Hemlock)-Northern Hardwood Forest

Specific Habitat Requirements:
Boreal conifer swamps that are headwater wetlands above 2000 feet elev. Pennsylvania Blackpolls 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 azelea). 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.

B = Breeding, M = Migration, W = Wintering
## Blackpoll Warbler

*Setophaga striata*

### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Marcellus shale and wind energy infrastructure permanently replaces or fragments forest.

**Season:** Breeding

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
### Blackpoll Warbler

**Setophaga striata**

### Threats and Actions

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Permanent deforestation and replacement of conifer with deciduous forest.

**Season:** Breeding

### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Increase spruce, hemlock, and fir forest acreage and number of blocks.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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</tbody>
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**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

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**Pennsylvania Game Commission**  
390 Appendix 1.4-Birds

**Pennsylvania Fish & Boat Commission**  
Published September 2015
# Blackpoll Warbler

*Setophaga striata*

## Threats and Actions

### IUCN Threat:
1.0 Residential and Commercial Development

### Specific Threat:
Residential and road development replaces forest and wetlands.

### Season:
Breeding

### Action

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect boreal conifer forest and swamps.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus
HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
### Threats and Actions

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Residential and road development replaces forest and wetlands.

**Season:** Breeding

<table>
<thead>
<tr>
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<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0</td>
<td>Technical Assistance&lt;br&gt;Protect high quality and larger blocks of boreal and northern conifer forest including wetlands with PNDI and best management practices of forested wetlands.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>2</td>
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</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus<br>HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
**Blackpoll Warbler**  
*Setophaga striata*

## THREATS AND ACTIONS

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Deer browsing is oversimplifying the forest species diversity and structure. Invasives are decreasing health and vigor of hemlocks and other conifers.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Protect boreal conifer swamps from flooding or conversion.</td>
<td>Number of swamps not flooded or converted.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus  
HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
**Blackpoll Warbler**

*Setophaga striata*

## Threats and Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain vegetation complexity of forest around boreal swamps.</td>
<td>Retain current population size and number of locations occupied by breeding birds. Number of points along transects in habitat blocks.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:**
- Physiographic Province: Appalachian Plateaus
- HUC10 Watershed: Lwr Susquehanna R. (U. Susquehanna)

**Associated Species:**
- Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Decrease in insects and other prey items composed of a lot of calcium.

**Season:** Breeding
**Blackpoll Warbler**

**Setophaga striata**

**THREATS AND ACTIONS**

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Palustrine wetlands are reduced in health and vigor where conifers grow that this and other species are dependent. Northern conifers will be stressed by warmer conditions.

**Season:** Breeding

<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain high nest success rate in monitored locations.</td>
<td>Nest success rate of known territories remain above 50%.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

HUC6 Watershed: U. Susquehanna, U. Delaware, W. Br. Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**RESEARCH NEEDS**

1. Breeding- What is the continued breeding population, habitat vegetation, and persistence, & nesting success in BLPW in Pennsylvania? The species seems to persist despite limited range and population.

2. Breeding- What management approaches can maintain and increase the possibility of this boreal forest species and its ecosystem cohorts to continue in Pennsylvania.

3. Breeding- What are the limiting factors for this species through its full life cycle? Is the long-distance migration a major limiting factor?
SURVEY NEEDS

1. Breeding- Continuous monitoring of known and recent breeding populations including breeding confirmation, success, habitat association, continuity of occupation.

2. Breeding- Find undiscovered or new locations that may have been overlooked or newly colonized, allowing study of population and protection of site.

3. Breeding- Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Mountain Bird Watch</td>
<td>Vermont Center for Ecostudies</td>
<td><a href="http://vtecostudies.org/projects/mountains/mountain-birdwatch/">http://vtecostudies.org/projects/mountains/mountain-birdwatch/</a></td>
<td>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 PA version of this project will not include Bicknell's Thrush and will focus on state priority mountain forest species for the PA and the Appalachian Mountains.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations</td>
</tr>
<tr>
<td>Program Name</td>
<td>Lead Agency</td>
<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Black-throated Blue Warbler
*Setophaga caerulescens*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S4B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>300000</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Increase estimated population by 10% by 2025 from 150,000 males (from Wilson et al 2012) to 165,000.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrogroup</td>
<td>Northern Hardwood &amp; Conifer</td>
</tr>
<tr>
<td>Habitat</td>
<td>Appalachian (Hemlock)-Northern Hardwood Forest</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**
Unfragmented mixed, coniferous forest with structural diversity, elevation > 800 m.

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Photo: Jacob Dingel

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B = Breeding, M = Migration, W = Wintering

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PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
# Black-throated Blue Warbler

### Setophaga caerulescens

## Threats and Actions

**IUCN Threat:** 5.0 Biological Resource Use

**Season:** Breeding

**Specific Threat:** Poor forest management during harvesting leading to shift in species composition.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Train forest managers within BTBW range in PA on BMPs for birds.</td>
<td>Acres under management by trained foresters</td>
<td>Assess bird responses to management in subset of areas.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley HUC4 Watershed: Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Season:** Breeding

**Specific Threat:** Overbrowsing limits shrub and sapling density. This species nests in understory.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Reduce browsing pressure enough to allow shrub and sapling growth.</td>
<td>Assess browse damage in systematic way in representative habitats in each WMU.</td>
<td>Annual browse damage survey conducted systematically in forest habitat.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley HUC4 Watershed: Statewide

**Associated Species:** All forest and shrub dependent species.
## Black-throated Blue Warbler

*Setophaga caerulescens*

### Threats and Actions

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Fragmentation of large forested areas. This species is area sensitive.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Maintain integrity of large forest landscapes.</td>
<td>Number of miles of new roads into forest blocks over 1000a (should be as close to 0 as possible)</td>
<td>GIS, satellite imagery inspection.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** Other forest breeding birds.

**Season:** Breeding

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Fragmentation of large forested areas. This species is area sensitive.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Minimize or prevent new utility rights-of-way through existing forest blocks larger than 1000 acres.</td>
<td>Miles of new ROWs.</td>
<td>GIS, satellite imagery inspection.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.

**Season:** Breeding
### Black-throated Blue Warbler

*Setophaga caerulescens*

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Season</th>
<th>Specific Threat</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Breeding</td>
<td>Fragmentation of large forested areas. This species is area sensitive.</td>
<td>No net loss of habitat.</td>
<td>Assess habitat available by region using GIS, focusing on regions under most development risk. Reassess at intervals.</td>
<td>Use GIS to track development and habitat conversion. Track implementation of habitat management projects by different organization.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action**
- TRACS Action 9.0 Planning
  - Promote smart development. Limit development in priority areas.

**Action Location**
- Physiographic Province: Appalachian Plateaus, Ridge and Valley
- HUC4 Watershed: Statewide

**Associated Species**
- Other forest breeding birds.

---

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Season</th>
<th>Specific Threat</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
<td>Breeding</td>
<td>Acid deposition leads to reduced calcium availability in diet.</td>
<td>Reduce acid deposition.</td>
<td>Acidity of precipitation.</td>
<td>Sample precipitation, measure pH.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action**
- TRACS Action 100.0 Law and Policy
  - Reduce air pollution upwind. (This problem is largely under control already. No new action needed at this time. See link in Comments column.)

**Action Location**
- Physiographic Province: Appalachian Plateaus, Ridge and Valley
- HUC4 Watershed: Statewide

**Associated Species**
- Wood Thrush
Black-throated Blue Warbler

Setophaga caerulescens

THREATS AND ACTIONS

<table>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Select top 10-20% sites in state to develop plans for, to protect the most species.</td>
<td>Areas identified and plans created.</td>
<td>Not sure.</td>
</tr>
</tbody>
</table>

Specific Threat: Change in species composition in forest, including loss of hemlock.

Season: Breeding

IUCN Threat: Climate Change and Severe Weather

Associated Species: All wildlife species.

RESEARCH NEEDS

1. Breeding- What are effects of energy and residential development on area-sensitive forest birds in the large forest blocks of the state?

2. Breeding- What are the limiting factors for this species through its full life cycle? Is the long-distance migration and winter habitat important limiting factors?

3. Breeding- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of forest species.

SURVEY NEEDS

1. Breeding- Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

2. Breeding- Mountain Bird Watch / Rare Mountain Bird Surveys.
### MONITORING PROGRAMS

<table>
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<tr>
<th>Program Name</th>
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<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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</table>
**CONSERVATION PROFILE**

Conservation Goal: Stabilize eastern populations, increase western population by 30% by 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Macrogoup</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ruderal Shrubland &amp; Grassland</td>
<td></td>
</tr>
</tbody>
</table>

Habitat: Shrubland & grassland (NLCD 52/71)

Specific Habitat Requirements: Brushy second growth, dry scrub, low pine-juniper, pine barrens, burned-over areas, and sproutlands.

*Photo: Jacob Dingel*
### Prairie Warbler

**Setophaga discolor**

**THREATS AND ACTIONS**

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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Increase in area of mid-successional habitat by allowing some succession</td>
<td>Increased breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
<td>1</td>
</tr>
</tbody>
</table>

**Create habitat mosaics with fire**

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Eastern Towhee, Chestnut-sided Warbler

<table>
<thead>
<tr>
<th>IUCN Threat: 7.0 Natural System Modifications</th>
<th>Season: Breeding</th>
</tr>
</thead>
</table>

**Specific Threat:** This species requires early successional habitat created by fire and other large-scale disturbances

### IUCN Threat: 4.0 Transportation and Service Corridors

**Season:** Breeding

**Specific Threat:** Prevention of shrub growth

<table>
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</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>Increase in area of mid-successional habitat by allowing some succession</td>
<td>Increased breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
<td>2</td>
</tr>
</tbody>
</table>

**Maintain mid-successional habitat**

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Eastern Towhee, Chestnut-sided Warbler
### Threats and Actions

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Invasive shrubs and forbs have unknown effects on foraging quality for this species

**Action**

<table>
<thead>
<tr>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Allow some early successional</td>
<td>Increased breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
<tr>
<td>Reduce deer population and maintain mid-successional habitat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:**
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Eastern Towhee, Chestnut-sided Warbler

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Development results in loss of habitat if the developed land is early successional habitat

**Action**

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Minimize impact of suburban sprawl on existing early successional areas</td>
<td>Sustainable populations</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
<tr>
<td>Reduce suburban sprawl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:**
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Eastern Towhee, Chestnut-sided Warbler

---

### Research Needs

1. Breeding- What are the effects of controlled burns (fire) on populations?

2. Breeding- What are the effects of right-of-way management and pipelines on populations?

3. Breeding- What are the winter linkage areas for the PA breeding population of this long-distance migrant and what are the conditions of those habitats that may effect breeding condition and success?
1. Breeding- Continued breeding bird survey data.

2. Breeding- Continued breeding bird atlas efforts.

### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
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<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Black-throated Green Warbler

*Setophaga virens*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: 710000
- **PA Short-Term Trend (10 year)**: (B) Decline of 41 - 60%

**Conservation Goal:**

Maintain current estimated population of 355,000 males (from Wilson et al 2012) through 2025.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Northern Hardwood & Conifer
- **Secondary Habitat**: Appalachian (Hemlock)-Northern Hardwood Forest

**Specific Habitat Requirements:**

Large tracks of coniferous, deciduous, and mixed forests > 300 m elevation.

*Photo: Jacob Dingel*
## THREATS AND ACTIONS

### Specific Threat: Loss of core forest habitat to fragmentation by unconventional gas well development.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain integrity of large forest blocks (at least on state-owned).</td>
<td>Acres of unfragmented forest in selected areas</td>
<td>Monitor public involvement</td>
</tr>
</tbody>
</table>

Designate some of the remaining largest forest blocks as High Value Forests where no drilling or ROWs are allowed. On state lands where leasing has not yet taken place.

**Action Location:** Physiographic Province: Appalachian Plateaus
HUC4 Watershed: Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.

### Specific Threat: Poor forest management during harvesting leading to shift in species composition.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0</td>
<td>Technical Assistance</td>
<td>Train forest managers within BTNW range in PA on BMPs for birds.</td>
<td>Acres under management by trained foresters</td>
<td>Assess bird responses to management in subset of areas.</td>
</tr>
</tbody>
</table>

Promote forestry practices that provide adequate nesting substrate and regenerate conifers.

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley
HUC4 Watershed: Statewide

**Associated Species:** Forest breeding birds and other migrant land birds.
### THREATS AND ACTIONS

**Black-throated Green Warbler**  
*Setophaga virens*

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes  
**Specific Threat:** Overbrowsing limits shrub and sapling density. This species nests in understory.  
**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Reduce browsing pressure enough to allow shrub and sapling growth.</td>
<td>Assess browse damage in systematic way in representative habitats in each WMU.</td>
<td>1</td>
</tr>
<tr>
<td>Action Location</td>
<td>Physiographic Province: Appalachian Plateaus, Ridge and Valley HUC4 Watershed: Statewide</td>
<td></td>
<td>Annual browse damage survey conducted systematically in forest habitat.</td>
<td></td>
</tr>
</tbody>
</table>

Control deer herd through hunting. Maintain concurrent seasons in WMUs at core of species breeding range.

**Associated Species:** All forest and shrub dependent species.

**IUCN Threat:** 4.0 Transportation and Service Corridors  
**Specific Threat:** Reduction in size of large, intact forested landscapes will reduce habitat available for interior forest breeding birds.  
**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Minimize or prevent new utility rights-of-way through existing forest blocks larger than 1000 acres.</td>
<td>GIS, satellite imagery inspection.</td>
<td>2</td>
</tr>
<tr>
<td>Action Location</td>
<td>Physiographic Province: Appalachian Plateaus, Ridge and Valley HUC4 Watershed: Statewide</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Work with power line and pipeline companies to route new corridors in close proximity to existing roads or rights-of-way.

**Associated Species:** Forest breeding birds and other migrant land birds.
### Black-throated Green Warbler

**Setophaga virens**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Planning</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmentation of large forested areas. This species is area sensitive.</td>
<td>1.0 Residential and Commercial Development</td>
<td>9.0</td>
<td>Promote smart development. Limit development in priority areas.</td>
<td>No net loss of habitat.</td>
<td>Assess habitat available by region using GIS, focusing on regions under most development risk. Reassess at intervals.</td>
<td>Use GIS to track development and habitat conversion. Track implementation of habitat management projects by different organization.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley, New England

HUC4 Watershed: Statewide

Associated Species: Forest breeding birds and other migrant land birds.

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Law and Policy</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid deposition leads to reduced calcium availability in diet.</td>
<td>9.0 Pollution</td>
<td>100.0</td>
<td>Reduce air pollution upwind. (This problem is largely under control already. No new action needed at this time. See link in Comments column.)</td>
<td>Acidity of precipitation.</td>
<td>Acidity of precipitation.</td>
<td>Sample precipitation, measure pH.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

HUC4 Watershed: Statewide

Associated Species: Wood Thrush
**Black-throated Green Warbler**  
*Setophaga virens*

### Threats and Actions

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Change in species composition in forest, including loss of hemlock.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Select top 10-20% sites in state to develop plans for, to protect the most species.</td>
<td>Areas identified and plans created.</td>
<td>Not sure.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC4 Watershed: Statewide

**Associated Species:** All wildlife species.

### Research Needs

1. Breeding: What are effects of energy and residential development on area-sensitive forest birds in the large forest blocks of the state?

### Survey Needs

1. Breeding: Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

2. Breeding: Mountain Bird Watch / Rare Mountain Bird Surveys.
## Black-throated Green Warbler

*Setophaga virens*

## MONITORING PROGRAMS

<table>
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</table>
Canada Warbler  
*Cardellina canadensis*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>State Rank</td>
<td>S4B</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>54000</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Relatively Stable (&lt;=10% change)</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Maintain current estimated population of 27,000 singing males (95% CI, 21,500 - 38,000; Wilson et al. 2012) and seek opportunities to increase population through conservation and management. There is a need for better monitoring of this species as it is not well covered by the Breeding Bird Survey.

**HABITAT ASSOCIATIONS**

**Primary**
- Macrogoup: Northern Hardwood & Conifer
- Habitat: Appalachian (Hemlock)-Northern Hardwood Forest

**Secondary**
- Macrogoup: Northern Swamp
- Habitat: North-Central Appalachian Acidic Swamp

**Specific Habitat Requirements:**
Hemlock-dominated ravines and wet sites in northern hardwood and mixed forest with a dense understory of shrubs such as rhododendron or hobblebush; higher elevations (greater than 457 m).

**Photo:** Jacob Dingel
## Canada Warbler

**Cardellina canadensis**

### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat: 1.0 Residential and Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat: Habitat loss</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 1.0</strong> Coordination and Administration</td>
<td>Protection of habitat. Stream and wetland functionality.</td>
<td>Comparative studies between sites with buffers and those without buffers</td>
<td>Bird surveys, mammal surveys, rapid bioassessment, vegetation analysis</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

<table>
<thead>
<tr>
<th>IUCN Threat: 4.0 Transportation and Service Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat: Natural gas pipelines</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 1.0</strong> Coordination and Administration</td>
<td>Minimize long-term impact</td>
<td>vegetation surveys</td>
<td>vegetation surveys</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

<table>
<thead>
<tr>
<th>IUCN Threat: 5.0 Biological Resource Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat: Habitat loss and degradation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
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<th>Measure</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong> Direct Management of Natural Resources</td>
<td>management of stand composition</td>
<td>Bird surveys</td>
<td>population stability</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.
## THREATS AND ACTIONS

### Canada Warbler

**Cardellina canadensis**

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Habitat degradation |

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Protection of habitat. Stream and wetland functionality.</td>
<td>Comparative studies between sites with buffers and those without buffers</td>
<td>Bird surveys, mammal surveys, rapid bioassessment, vegetation analysis</td>
</tr>
</tbody>
</table>

Implement wetland regulations that require upland buffers of at least 150 feet.

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

| IUCN Threat: | 8.0 Invasive and Other Problematic Species and Genes |
| Specific Threat: | Habitat degradation |

<table>
<thead>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Understanding of effects of invasive species</td>
<td>Bird surveys</td>
<td>population size</td>
</tr>
</tbody>
</table>

**Monitoring**

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

| IUCN Threat: | 9.0 Pollution |
| Specific Threat: | Disruption of food chain |

<table>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Increase quality of food supply</td>
<td>Invertebrate surveys</td>
<td>species productivity and health</td>
</tr>
</tbody>
</table>

**Reduction of air pollution**

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.
## Canada Warbler

### Cardellina canadensis

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>3.0 Energy Production and Mining</th>
<th>Specific Threat:</th>
<th>Peat Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
<td><strong>Monitoring</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Habitat protection</td>
<td>Stable populations</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Upland riparian bird species, mammals, amphibians, and insects and reptiles.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### IUCN Threat: | 11.0 Climate Change and Severe Weather | Specific Threat: | Habitat degradation |
| **Action**   | **Objective**                    | **Measure**     | **Monitoring** | **Priority** |
| TRACS Action 2.0 | Direct Management of Natural Resources | Maintain habitat quality | Bird surveys | Look at population stability | 3 |
| Action Location: | Physiographic Province: Appalachian Plateaus |
| Associated Species: | Upland riparian bird species, mammals, amphibians, and insects and reptiles. |

#### RESEARCH NEEDS

1. Breeding- What are effects of energy and residential development on area-sensitive forest birds in the large forest blocks of the state?

2. Breeding- 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?

3. Breeding- Following disturbance, what is the timeline for the return of a viable breeding population?
Canada Warbler  
*Cardellina canadensis*

**SURVEY NEEDS**

1. Breeding- Conduct off-road point count surveys and spot-mapping for forest interior birds to determine habitat requirements and association with current forest management practices.

2. Breeding- Mountain Bird Watch / Rare Mountain Bird Surveys.


**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring Avian Productivity and Survivorship (MAPS)</td>
<td>The Institute for Bird Populations</td>
<td><a href="http://www.birdpop.org/MAPSPROG.htm">http://www.birdpop.org/MAPSPROG.htm</a></td>
<td>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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Yellow-breasted Chat

Yellow-breasted Chat

Icteria virens

CONSERVATION PROFILE

Global Rank: G5
State Rank: S2B

IUCN Red List: LC Least Concern
PA Legal Status: Protected

Northeast Region: High Concern / Low Responsibility
PA Abundance: 22400

Federal Status: Not Listed
PA Short-Term Trend (10 year): (B) Decline of 41 - 60%

Conservation Goal:
Increase statewide population by 33% to a detection rate of 0.3 birds per Breeding Bird Survey route, on at least 50 routes, by 2025.

HABITAT ASSOCIATIONS

Primary Macrogroup: Northern Hardwood & Conifer
Secondary Habitat: South-Central Interior Mesophytic Forest

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.

Photo: Jacob Dingel

Published September 2015

419 | Appendix 1.4-Birds
## Yellow-breasted Chat

**Threats and Actions**

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>7.0 Natural System Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>This species requires early successional habitat created by fire and other large-scale disturbances</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Use fire to create a mosaic of habitats including mid-successional habitat</td>
<td>Increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

Use fire to create habitat mosaics including mid-successional habitat

**Action Location:** Physiographic Province: Statewide
HUC4 Watershed: Statewide

**Associated Species:** Prairie Warbler, American Kestrel, Blue Grosbeak

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>4.0 Transportation and Service Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Threat:</strong></td>
<td>Prevention of shrub growth</td>
</tr>
</tbody>
</table>

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<tr>
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<th>Objective</th>
<th>Measure</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase area of mid-successional habitat</td>
<td>Increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

Maintain mid-successional habitat

**Action Location:** Physiographic Province: Statewide
HUC4 Watershed: Statewide

**Associated Species:** Prairie Warbler, American Kestrel, Blue Grosbeak

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**Pennsylvania Game Commission**

420| Appendix 1.4-Birds
### Yellow-breasted Chat (Icteria virens)

#### Threats and Actions

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Development results in loss of habitat if the developed land is early successional habitat |

<table>
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<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Minimize impact of development on existing mid-successional habitat</td>
<td>No decrease in breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide
- **HUC4 Watershed:** Statewide
- **Associated Species:** Prairie Warbler, American Kestrel, Blue Grosbeak

| IUCN Threat: | 9.0 Pollution |
| Specific Threat: | Acid deposition leads to reduced calcium availability in diet. |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Increase pH of rainwater</td>
<td>Increased reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide
- **HUC4 Watershed:** Statewide
- **Associated Species:** All birds

#### Research Needs

1. Breeding- Effects of fire on populations.

2. Breeding- What are the effects of right-of-way management and pipelines on populations?

## Yellow-breasted Chat

*Icteria virens*

### SURVEY NEEDS

1. Breeding- Continued breeding bird survey data.
2. Breeding- Continued breeding bird atlas efforts.

### MONITORING PROGRAMS

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</tr>
</tbody>
</table>
Eastern Towhee

*Pipilo erythrophthalmus*

**Photo:** Jacob Dingel

---

### CONSERVATION PROFILE

- **Global Rank:** G5
- **IUCN Red List:** LC Least Concern
- **Northeast Region:** Very High Concern / Low Responsibility
- **Federal Status:** Not Listed
- **State Rank:** S4N (M)
- **PA Legal Status:** Protected
- **PA Abundance:** 1220000
- **PA Short-Term Trend (10 year):** (M) Unknown

**Conservation Goal:**
Sustain abundance during spring and fall migration in Pennsylvania through maintenance of appropriate migratory stopover habitat.

---

### HABITAT ASSOCIATIONS

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruderal Shrubland &amp; Grassland</td>
<td></td>
</tr>
</tbody>
</table>

#### Specific Habitat Requirements:
- Edges, shrublands

*B = Breeding, M = Migration, W = Wintering*
## Eastern Towhee

### Pipilo erythrophthalmus

#### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Pipelines and gas pads could potentially increase habitat is maintained in early successional habitat.

**Season:** Migration

<table>
<thead>
<tr>
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<th>Priority</th>
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<tr>
<td>TRACS Action 2.0</td>
<td>Maintain or create mid-successional habitat</td>
<td>Increase the area of mid-successional habitat</td>
<td>increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Chestnut-sided Warbler

---

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Prevention of shrub growth

**Season:** Migration

<table>
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**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Chestnut-sided Warbler
## Eastern Towhee

**IUCN Threat:** 5.0 Biological Resource Use

### Specific Threat:
Logging for this species can be beneficial if scattered trees are left with shrubs

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase the area of mid-successional habitat</td>
<td>increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
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</tbody>
</table>

**Season:** Migration

### Action Location:
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

### Associated Species:
Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Chestnut-sided Warbler

---

## Invasive and Other Problematic Species and Genes

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

### Specific Threat:
Invasive shrubs and forbs have unknown effects on foraging quality for this species

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<td>1. singing males, 2. BBS, 3. annually</td>
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**Season:** Migration

### Action Location:
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

### Associated Species:
Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Chestnut-sided Warbler
Eastern Towhee

THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>1.0 Residential and Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Development results in loss of habitat if the developed land is early successional habitat</td>
</tr>
<tr>
<td>Season:</td>
<td>Migration</td>
</tr>
</tbody>
</table>

**Action** | **Objective** | **Measure** | **Monitoring** | **Priority**
---|---|---|---|---
TRACS Action 2.0 | Direct Management of Natural Resources | Maintain the amount of existing mid-successional habitat | no decrease in breeding pairs and reproductive success | 1. singing males, 2. BBS, 3. annually | 3

Reduce urban sprawl

Action Location: Physiographic Province: Statewide
HUC4 Watershed: Statewide

Associated Species: Yellow-breasted Chat, Golden-winged Warbler, Field Sparrow, Chestnut-sided Warbler

RESEARCH NEEDS

1. Migration- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of young forest birds?

2. Migration- What are the effects of right-of-way management and pipelines on populations?

3. Migration- How does towhee and other forest understory species react to deer browse effect on forest vegetation structure and diversity?

SURVEY NEEDS

1. Migration- Continued breeding bird survey data.

2. Migration- Continued breeding bird atlas efforts.
### MONITORING PROGRAMS

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<tr>
<td>Monitoring Avian Productivity and Survivorship (MAPS)</td>
<td>The Institute for Bird Populations</td>
<td><a href="http://www.birdpop.org/MAPSPROG.htm">http://www.birdpop.org/MAPSPROG.htm</a></td>
<td>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.</td>
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Field Sparrow
Spizella pusilla

Photo: Jacob Dingel

CONSERVATION PROFILE

Global Rank  G5  State Rank  S3B
IUCN Red List  LC Least Concern  PA Legal Status  Protected
Northeast Region  Very High Concern / Low Responsibility  PA Abundance  420000
Federal Status  Not Listed  PA Short-Term Trend (10 year)  (B) Decline of 11 - 40%

Conservation Goal:
Stabilize population detection on Breeding Bird Survey routes to an average of 6.0 birds per route statewide.

HABITAT ASSOCIATIONS

Primary  Secondary
Macrogroup  Agricultural
Habitat  Agriculture (NLCD 81-82)

Specific Habitat Requirements:
Mixture of grasses and shrubs

B = Breeding, M = Migration, W = Wintering
## Field Sparrow

### Spizella pusilla

### Threats and Actions

<table>
<thead>
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<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Increase in area of early-successional habitat/grasslands</td>
<td>Increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>maintain early successional habitat with warm season grasses</td>
<td></td>
<td></td>
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<td>Action Location: Physiographic Province: Statewide HUC4 Watershed: Statewide</td>
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<tr>
<td>Associated Species: Eastern Meadowlark, Bobolink, Grasshopper Sparrow</td>
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</tr>
</tbody>
</table>

### IUCN Threat: 2.0 Agriculture and Aquaculture

#### Specific Threat: Species needs early successional habitat.

### Season: Breeding

### Action Location:
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

### Associated Species:
- Eastern Meadowlark, Bobolink, Grasshopper Sparrow

<table>
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<tr>
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<td></td>
</tr>
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<td>Action Location: Physiographic Province: Statewide HUC4 Watershed: Statewide</td>
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</table>

### IUCN Threat: 3.0 Energy Production and Mining

#### Specific Threat: Pipelines and gas pads could potentially increase habitat is maintained in early successional habitat.

### Season: Breeding

### Action Location:
- Physiographic Province: Statewide
- HUC4 Watershed: Statewide

### Associated Species:
- Eastern Meadowlark, Bobolink, Grasshopper Sparrow
## Field Sparrow

### Spizella pusilla

### Threats and Actions

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Action Location</th>
<th>Associated Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>This species requires early successional habitat created by fire and other large-scale disturbances</td>
<td>Breeding</td>
<td>7.0 Natural System Modifications</td>
<td>2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Physiographic Province: Statewide, HUC4 Watershed: Statewide</td>
</tr>
</tbody>
</table>

**Objective**: Increase in area of early-successional habitat/grasslands

**Measure**: Increase in the number of breeding pairs and reproductive success

**Monitoring**: 1. singing males, 2. BBS, 3. annually

**Priority**: 1

---

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Season</th>
<th>IUCN Threat</th>
<th>TRACS Action</th>
<th>Action Location</th>
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<tr>
<td>Development results in loss of habitat if the developed land is early successional habitat</td>
<td>Breeding</td>
<td>1.0 Residential and Commercial Development</td>
<td>2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Physiographic Province: Statewide, HUC4 Watershed: Statewide</td>
</tr>
</tbody>
</table>

**Objective**: Minimize impact of development on existing early-successional habitat

**Measure**: No decrease in breeding pairs and reproductive success

**Monitoring**: 1. singing males, 2. BBS, 3. annually

**Priority**: 3
Field Sparrow

Spizella pusilla

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Invasive shrubs and forbs have unknown effects on foraging quality for this species

Season: Breeding

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</table>

Use fire or mowing with planting warm season grasses

Action Location: Physiographic Province: Statewide
HUC4 Watershed: Statewide

Associated Species: Eastern Meadowlark, Bobolink, Grasshopper Sparrow

RESEARCH NEEDS

1. Breeding- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of early succession species?

2. Breeding- What are the effects of Right-of-way management and pipelines on populations?

3. Breeding- What are the effects of controlled burns (fire) on populations?

SURVEY NEEDS

1. Breeding- Continued breeding bird survey data.

2. Breeding- Continued breeding bird atlas efforts.
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**CONSERVATION PROFILE**

**Vesper Sparrow**

*Poecetes gramineus*

**Photo: Jacob Dingel**

**Global Rank**

G5

**IUCN Red List**

LC Least Concern

**State Rank**

S2B

**Northeast Region**

Very High Concern / Low Responsibility

**Federal Status**

Not Listed

**PA Legal Status**

Protected

**PA Abundance**

34000

**PA Short-Term Trend (10 year)**

(B) Decline of 41 - 60%

**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).

**HABITAT ASSOCIATIONS**

**Macrogoup**

Agricultural

**Primary Habitat**

Agriculture (NLCD 81-82)

**Specific Habitat Requirements:**

Agricultural lands and reclaimed surface mines (Santner 1992) to shrubs and woodland edges, with bare ground for foraging (Wilson in Wilson et al. 2012).

B = Breeding, M = Migration, W = Wintering
## Vesper Sparrow

### Pooecetes gramineus

## THREATS AND ACTIONS

### IUCN Threat: 3.0 Energy Production and Mining

**Specific Threat:** Loss of sparsely vegetated reclaimed surface mines due to reforestation and successional change.

**Season:** Breeding

<table>
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<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain short and spare grassland vegetation</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
<tr>
<td><strong>Burning or disking of existing reclaimed surface mine grasslands</strong> Action Location: Physiographic Province: Appalachian Plateaus Associated Species: Upland Sandpiper</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Loss of habitat

**Season:** Breeding

<table>
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<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Prevent loss of farmland</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
<tr>
<td><strong>Purchase land that may otherwise be sold for development</strong> Action Location: Physiographic Province: Statewide Associated Species: American Kestrel, Savannah Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark</td>
<td></td>
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</table>
## THREATS AND ACTIONS

### Vesper Sparrow

**Pooecetes gramineus**

**IUCN Threat:**
2.0 Agriculture and Aquaculture

**Specific Threat:**
Lack of crops residue, excessive herbicide use, and frequent mowing, are hypothesized threats.

**Season:** Breeding

### Specific Threat: Lack of crops residue, excessive herbicide use, and frequent mowing, are hypothesized threats.

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<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain weedy areas within agricultural systems</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Upland Sandpiper, American Kestrel, Savannah Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

### IUCN Threat:
7.0 Natural System Modifications

**Specific Threat:** Successional change of grassland habitats

**Season:** Breeding

<table>
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<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Prevent natural succession from encroaching important grassland sites</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Northern Harrier, Upland Sandpiper, Short-eared Owl, American Kestrel, Savannah Sparrow, Henslow's Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

### RESEARCH NEEDS

1. Breeding- Which specific crops and agricultural practices are this species associated with in Pennsylvania?

### SURVEY NEEDS

1. Breeding- None: Monitored through USGS Breeding Bird Survey (BBS), but note that if population continues to decline, BBS will no longer adequately monitor populations of this species.
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CONSERVATION PROFILE

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).

HABITAT ASSOCIATIONS

Primary
Macrogroup: Agricultural
Habitat: Agriculture (NLCD 81-82)

Secondary
Specific Habitat Requirements:

B = Breeding, M = Migration, W = Wintering
## Savannah Sparrow

### Passerculus sandwichensis

#### Threats and Actions

| IUCN Threat: | 2.0 Agriculture and Aquaculture |
| Specific Threat: | Loss of nests and young in agricultural grasslands is hypothesized to be a major driver of declines. |

**Season:** Breeding

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<td>Prevent loss of nests and nestlings</td>
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<td>USGS Breeding Bird Survey trends</td>
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</table>

Restrict mowing during peak of breeding season (Nocera et al. 2005; Perlut et al. 2008)

**Associated Species:** Vesper Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark

| IUCN Threat: | 1.0 Residential and Commercial Development |
| Specific Threat: | Loss of habitat |

**Season:** Breeding

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Purchase land that may otherwise be sold for development

**Associated Species:** American Kestrel, Vesper Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark
### Savannah Sparrow

#### Passerellus sandwichensis

**THREATS AND ACTIONS**

| IUCN Threat: | 3.0 Energy Production and Mining |
| Specific Threat: | Reforestation of reclaimed surface mine grasslands. |
| **Season:** | Breeding |

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain grassland habitat</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
<tr>
<td>Mowing, burning and removing invasive woody vegetation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Species:</td>
<td>Northern Harrier, Upland Sandpiper, Short-eared Owl, Vesper Sparrow, Savannah Sparrow, Henslow's Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark</td>
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</tr>
</tbody>
</table>

| IUCN Threat: | 7.0 Natural System Modifications |
| Specific Threat: | Successional change of grassland habitats |
| **Season:** | Breeding |

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<thead>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Prevent natural succession from encroaching important grassland sites</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
<tr>
<td>Mowing, burning and removing invasive woody vegetation</td>
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<td>Action Location:</td>
<td>Physiographic Province: Statewide</td>
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**PENNSYLVANIA GAME COMMISSION**

Published September 2015
Savannah Sparrow

Passerculus sandwichensis

RESEARCH NEEDS

1. Breeding- Do Conservation Grasslands provide substantial refuges for this species in northern and western Pennsylvania?

2. Breeding- How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?

3. Breeding- Is climate change likely to result in changes to agricultural practices (specifically earlier mowing) that could impact this species over coming decades?

SURVEY NEEDS

1. Breeding- None: Monitored through USGS Breeding Bird Survey (BBS).

2. Breeding- Assessment of use of Conservation Grasslands in north and west of state.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<th>Description</th>
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<tbody>
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<td>eBird (PA eBird as state portal)</td>
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</tbody>
</table>
Grasshopper Sparrow
*Ammodramus savannarum*

Photo: Jacob Dingel

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Rank</td>
<td>S3B</td>
</tr>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>184000</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Decline of 41 - 60%</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Increase population to 100,000 singing males by 2025 as reflected in the Second Breeding Bird Atlas (Wilson et al. 2012).

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrogoup</td>
<td>Agricultural</td>
</tr>
<tr>
<td>Habitat</td>
<td>Agriculture (NLCD 81-82)</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**
Indicator for large-scale grasslands; grassland obligate species

B = Breeding, M = Migration, W = Wintering
### Grasshopper Sparrow

**Ammodramus savannarum**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>2.0 Agriculture and Aquaculture</th>
<th>Specific Threat:</th>
<th>Lack of warm season grasses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
<td><strong>Monitoring</strong></td>
</tr>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase the amount of early to mid-successional habitat</td>
<td>Increase in the number of breeding pairs and reproductive success</td>
</tr>
<tr>
<td></td>
<td>Create early successional habitat with warm season grasses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Action Location: Physiographic Province: Statewide HUC4 Watershed: Statewide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Associated Species: Eastern Meadowlark, American Kestrel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IUCN Threat: 3.0 Energy Production and Mining

#### Specific Threat:
- Pipelines and gas pads not managed using Best Practices

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
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<th><strong>Monitoring</strong></th>
<th><strong>Priority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase the area of early to mid-successional areas</td>
<td>Increase the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
<tr>
<td>Create early successional habitat with warm season grasses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Location: Physiographic Province: Statewide HUC4 Watershed: Statewide</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Associated Species: Eastern Meadowlark, American Kestrel</td>
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</table>
Grasshopper Sparrow  

**Ammodramus savannarum**

### Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

**Specific Threat:** Fire suppression

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
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<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase the area of early to mid-successional areas</td>
<td>Increase the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
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</tbody>
</table>

Use fire to create early successional habitat

- **Action Location:** Physiographic Province: Statewide  
  HUC4 Watershed: Statewide

- **Associated Species:** Eastern Meadowlark, American Kestrel

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Permanent conversion of early successional habitat to developed land cover

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Minimize the effect of development on existing early to mid-successional areas</td>
<td>No decline in the number of breeding pairs or reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

- **Action Location:** Physiographic Province: Statewide  
  HUC4 Watershed: Statewide

- **Associated Species:** Eastern Meadowlark, American Kestrel

### Research Needs

1. Breeding- What are the effects of controlled burns (fire) on populations?

2. Breeding- How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?

**Grasshopper Sparrow**  
*Ammodramus savannarum*

### SURVEY NEEDS

1. Breeding - Continued breeding bird survey data.
2. Breeding - Continued breeding bird atlas efforts.

### MONITORING PROGRAMS

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</tbody>
</table>
Henslow's Sparrow
Ammodramus henslowii

Photo: Jacob Dingel

CONSERVATION PROFILE

Global Rank G4
State Rank S3B
IUCN Red List NT Near Threatened
PA Legal Status Protected
Northeast Region Very High Concern / Low Responsibility
PA Abundance 14000
Federal Status Not Listed
PA Short-Term Trend (10 year) (B) Unknown

Conservation Goal:
Maintain current population by maintaining habitat on reclaimed strip mines where they occur. Look for opportunities for more management that increases population at appropriate locations where grassland would be priority for habitat management.

HABITAT ASSOCIATIONS

Primary Secondary

Macrogroup Agricultural

Habitat Agriculture (NLCD 81-82)

Specific Habitat Requirements:
Indicator for large-scale grasslands; grassland obligate species

B = Breeding, M = Migration, W = Wintering
### Henslow's Sparrow

**Ammodramus henslowii**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 Energy Production and Mining</td>
<td>Breeding</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Action Location</th>
<th>Associated Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reforestation of reclaimed surface mine grasslands.</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td>Northern Harrier, American Kestrel, Short-eared Owl, Savannah Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark</td>
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<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Prevent grassland loss, and ensure availability of later seral stage grasslands with dead litter and perennial stalks (Herkert et al. 2002)</td>
<td>Maintenance of extant populations</td>
<td>Would require targeted surveys within the species' range</td>
<td>1</td>
</tr>
<tr>
<td>Rotational mowing or burning &amp; removal of woody vegetation</td>
<td></td>
<td></td>
<td></td>
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<table>
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<table>
<thead>
<tr>
<th>Specific Threat</th>
<th>Action Location</th>
<th>Associated Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species prefers undisturbed late seral stage grasslands, which are not commonly found in active agricultural systems.</td>
<td>Physiographic Province: Appalachian Plateaus</td>
<td>Northern Harrier, American Kestrel, Short-eared Owl, Savannah Sparrow, Grasshopper Sparrow, Bobolink, Eastern Meadowlark</td>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>Increase availability of undisturbed grasslands</td>
<td>Maintenance of extant populations</td>
<td>Would require targeted surveys within the species' range</td>
<td>2</td>
</tr>
<tr>
<td>Target enrollment of conservation grassland within the species' range</td>
<td></td>
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</tbody>
</table>

PENNSYLVANIA GAME COMMISSION

PENNYSYLVANIA FISH & BOAT COMMISSION

Published September 2015
### Henslow's Sparrow

**Ammodramus henslowii**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>IUCN Threat:</th>
<th>1.0 Residential and Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Threat:</td>
<td>Loss of habitat</td>
</tr>
</tbody>
</table>

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<thead>
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<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Prevent loss of farmland</td>
<td>Maintenance of extant populations</td>
<td>Would require targeted surveys within the species' range</td>
</tr>
<tr>
<td>Action Location:</td>
<td>Physiographic Province: Appalachian Plateaus</td>
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</table>

#### Season: Breeding

- **IUCN Threat:** 1.0 Residential and Commercial Development
- **Specific Threat:** Loss of habitat

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</tbody>
</table>

### RESEARCH NEEDS

1. Breeding- Can Conservation Grasslands (e.g. CREP) be targeted to provide habitat for this species?

2. Breeding- How can reclaimed strip mine grasslands be managed to improve the density and productivity of high priority grassland sparrows?
Henslow's Sparrow

Ammodramus henslowii

SURVEY NEEDS

1. Breeding- Monitor populations on a stratified random selection of reclaimed surface mines every 5 years. Use line transect methods (Diefenbach et al. 2007).

MONITORING PROGRAMS

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</tbody>
</table>
White-throated Sparrow

*Zonotrichia albicollis*

**CONSERVATION PROFILE**

<table>
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<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Rank</td>
<td>S3B</td>
</tr>
<tr>
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<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Not NE Regional SGCN</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>3800</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Sustain current populations by protecting nesting sites and their attributes.

**HABITAT ASSOCIATIONS**

**Primary**
- **Macrogroup:** Northern Swamp
- **Habitat:** North-Central Appalachian Acidic Swamp

**Secondary**

Specific Habitat Requirements:
Shrubby wetlands and shrub habitats associated with the glaciated northeast

B = Breeding, M = Migration, W = Wintering
## THREATS AND ACTIONS

### Specific Threat: Habitat loss

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Protection of habitat. Stream and wetland functionality.</td>
<td>Comparative studies between sites with buffers and those without buffers</td>
<td>Bird surveys, mammal surveys, rapid bioassessment, vegetation analysis</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

### IUCN Threat: Residential and Commercial Development

**Season:** Breeding

### Specific Threat: Natural gas well pads

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Habitat protection</td>
<td>Determining how many municipal zoning regulations require the additional setback distances.</td>
<td>Site surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

### IUCN Threat: Energy Production and Mining

**Season:** Breeding

### Specific Threat: Natural gas pipelines

<table>
<thead>
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<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 1.0</td>
<td>Coordination and Administration</td>
<td>Minimize long-term impact</td>
<td>vegetation surveys</td>
<td>vegetation surveys</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.
## Threats and Actions

**IUCN Threat:** 7.0 Natural System Modifications

### Specific Threat: Habitat degradation

<table>
<thead>
<tr>
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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Protection of habitat. Stream and wetland functionality.</td>
<td>Comparative studies between sites with buffers and those without buffers</td>
<td>Bird surveys, mammal surveys, rapid bioassessment, vegetation analysis</td>
<td>1</td>
</tr>
</tbody>
</table>

Implement wetland regulations that require upland buffers of at least 150 feet.

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

### IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

### Specific Threat: Habitat degradation

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 101.0 Species Management</td>
<td>Understanding of effects of invasive species</td>
<td>Bird surveys</td>
<td>population size</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

### IUCN Threat: 9.0 Pollution

### Specific Threat: Disruption of food chain

<table>
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</thead>
<tbody>
<tr>
<td>TRACS Action 1.0 Coordination and Administration</td>
<td>Increase quality of food supply</td>
<td>Invertebrate surveys</td>
<td>species productivity and health</td>
<td>1</td>
</tr>
</tbody>
</table>

Reduction of air pollution

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.
White-throated Sparrow

**THREATS AND ACTIONS**

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Habitat loss and degradation

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>management of stand composition</td>
<td>Bird surveys, vegetation analysis</td>
<td>Population stability</td>
</tr>
</tbody>
</table>

Selective harvest and plantings

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Habitat degradation

<table>
<thead>
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<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Maintain habitat quality</td>
<td>Bird surveys</td>
<td>Look at population stability</td>
</tr>
</tbody>
</table>

**Uncertain**

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Upland riparian bird species, mammals, amphibians, and insects and reptiles.

**RESEARCH NEEDS**

1. Breeding- Evaluate population response to habitat management prescriptions used to create, maintain or enhance breeding habitat of young forest birds?

2. Breeding- What is the effect of human disturbance on breeding populations?

3. Breeding- How sensitive are boreal forest bird species to changes in climate?
1. Breeding - Monitoring avian productivity and survivorship surveys (Institute for Bird Populations protocols).

2. Breeding - Off-road forest bird surveys/point counts.

### MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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<td>Monitoring Avian Productivity and Survivorship (MAPS)</td>
<td>The Institute for Bird Populations</td>
<td><a href="http://www.birdpop.org/MAPSPROG.htm">http://www.birdpop.org/MAPSPROG.htm</a></td>
<td>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.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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<td>Program Name</td>
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<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Summer Tanager

Piranga rubra

CONSERVATION PROFILE

Global Rank: G5
IUCN Red List: LC Least Concern
Northeast Region: High Concern / Low Responsibility
Federal Status: Not Listed
State Rank: S1B
PA Legal Status: Protected
PA Abundance: 160
PA Short-Term Trend (10 year): (B) Relatively Stable (<=10% change)

Conservation Goal:
Prevent species extirpation at the state level. Maintain available habitat for the species.

HABITAT ASSOCIATIONS

Primary
- Macrogroup: Glade, Barren and Savanna
- Habitat: Eastern Serpentine Woodland

Secondary
- Macrogroup: Central Oak-Pine
- Habitat: Northeastern Interior Dry-Mesic Oak Forest

Specific Habitat Requirements:
Dry, upland forests, particularly oak woodlands with an open understory; often near minor openings.

B = Breeding, M = Migration, W = Wintering
## Threats and Actions

### Summer Tanager

**Piranga rubra**

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Loss and fragmentation of forested breeding habitat due to residential and commercial development.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Site new commercial or residential development in non-forested areas that will minimize fragmentation of forested habitat.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years.)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk

### IUCN Threat: 3.0 Energy Production and Mining

**Specific Threat:** Loss and fragmentation of forested breeding habitat due to energy development.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Site new energy development projects and associated infrastructure in non-forested habitat whenever possible. Large forest blocks are particularly important to keep intact.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years.)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk
## Summer Tanager

**Piranga rubra**

### Threats and Actions

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Season:** Breeding

**Specific Threat:** Loss and fragmentation of breeding habitat due to expansion of transportation corridors, gas pipelines, and electric transmission lines.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Maintain unfragmented forest blocks through local land use planning efforts.</td>
<td>Site new transportation corridors and transmission lines in non-forested habitat whenever possible. Large forest blocks are particularly important to keep intact.</td>
<td>Percent forested habitat and core forest patch size.</td>
<td>Spatial analyses of forested area and forest patch size completed at regular intervals (e.g., every 5 years).</td>
</tr>
<tr>
<td>Associated Species: Broad-winged Hawk, Cerulean Warbler, Kentucky Warbler, Sharp-shinned Hawk</td>
<td></td>
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</tbody>
</table>

### Specific Threat: As with other songbirds, feral cats may be a cause of mortality.

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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Develop a statewide comprehensive management plan to control feral cat populations.</td>
<td>Develop a statewide comprehensive management plan for controlling feral cat populations by 2020.</td>
<td>Plan creation.</td>
<td>Once a plan is developed and implemented, assess feral cat populations through regular surveys.</td>
</tr>
<tr>
<td>Associated Species: Numerous species of songbirds and small mammals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Research Needs

1. Breeding- How are changes in forest structure and size affecting the range and population of this species at northern extent of range?

2. Breeding- What are the natural history traits of this species that will affect its ability to persist in the state, for instance its preference for Hymenopterans?

3. Breeding- Are changes in climate affecting the range of this southern forest species in the state?
SURVEY NEEDS

1. Breeding - Follow up on reports of birds (e.g. submitted through eBird, PABirds listserv) during the breeding season to determine breeding status.

MONITORING PROGRAMS

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<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
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**CONSERVATION PROFILE**

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<tbody>
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<td>State Rank</td>
<td>S4B</td>
</tr>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>High Concern / High Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>PA Legal Status</td>
<td>Protected</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>1150000</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Decline of 11 - 40%</td>
</tr>
</tbody>
</table>

**Conservation Goal:**
Maintain species population in Pennsylvania at current levels (average of 7.5 birds per Breeding Bird Survey route statewide) through 2025.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup:** Northern Hardwood & Conifer
- **Habitat:** Appalachian (Hemlock)-Northern Hardwood Forest

**Specific Habitat Requirements:**
A wide variety of mature deciduous and mixed-deciduous forest types.
# Scarlet Tanager

**Scientific Name:** *Piranga olivacea*

## Threats and Actions

### Specific Threat: Forest fragmentation and direct mortality from natural gas and wind energy development.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Enhance state regulations to minimize impacts of natural gas extraction industry on forest habitats.</td>
<td>Creation and implementation of appropriate regulations</td>
<td>Annual data from USGS Breeding Bird Survey would provide adequate information concerning population trends of scarlet tanager and other potentially impacted birds.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** Wood Thrush, Blackburnian Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Hooded Warbler

### Season: Breeding

### IUCN Threat: 3.0 Energy Production and Mining

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Create regulations to prevent/minimize development of new road systems through large contiguous forest patches</td>
<td>Develop state regulations that make it more difficult to build new road systems that fragment large forest blocks</td>
<td>Creation and implementation of appropriate regulation(s)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Blackburnian Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Hooded Warbler

### Season: Breeding

### IUCN Threat: 4.0 Transportation and Service Corridors

<table>
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<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**Associated Species:** Wood Thrush, Blackburnian Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Hooded Warbler

### Season: Breeding
**Scarlet Tanager**

**Piranga olivacea**

### THREATS AND ACTIONS

**IUCN Threat:** 9.0 Pollution  

**Specific Threat:** Reduction of nesting success due to calcium depletion in areas impacted by acid deposition.

<table>
<thead>
<tr>
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<th>Objective</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 100.0 Law and Policy</td>
<td>Seek stricter legislation that further reduces industrial emissions of pollutants that cause acid precipitation.</td>
<td>Develop and implement federal legislation reducing the allowed emissions of acid-precipitation causing pollutants by industry.</td>
<td>Creation and implementation of appropriate legislation</td>
<td>Annual data from USGS Breeding Bird Survey would provide adequate information concerning population trends of scarlet tanager and other potentially impacted birds.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  

**Associated Species:** Wood Thrush, Blackburnian Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Ovenbird

### IUCN Threat: 1.0 Residential and Commercial Development

**Specific Threat:** Loss of habitat due to suburban growth and reduction in habitat quality due to fragmentation.

<table>
<thead>
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<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>In areas vulnerable to forest loss to suburban sprawl (particularly SE and SW PA), purchase unprotected forest habitats to maintain as many large (&gt;100 ha) forest patches as possible. Purchases should be prioritized to target protection of the largest remaining forest patches first.</td>
<td>Protect at least 1000 additional ha of currently unprotected forest habitats in areas protected vulnerable to sprawl by 2025.</td>
<td>Hectares of vulnerable forest protected</td>
<td>Abundance of singing males during the breeding season could be monitored with fixed survey routes, performed annually through newly protected areas.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont  

**Associated Species:** Red-eyed Vireo, Wood thrush, Black-and-white Warbler, Ovenbird, Whip-poor-will
Scarlet Tanager

Piranga olivacea

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Loss of understory and sub-canopy forest layers for tanager foraging due to white-tailed deer overabundance. Predation of adults and fledglings by feral and domestic cats.

<table>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Implement harvest regulations to reduce white-tailed deer population density by 25% in areas with little forest regeneration/understory</td>
<td>Reduction in white-tailed deer density</td>
<td>Annual data from USGS Breeding Bird Survey would provide adequate information concerning population trends of scarlet tanager and other potentially impacted birds.</td>
<td>2</td>
</tr>
</tbody>
</table>

Action Location: Physiographic Province: Statewide

Associated Species: Wood Thrush, Black-throated Blue Warbler, Ovenbird, Hooded Warbler, Veery

RESEARCH NEEDS

1. Breeding: Determine key features of high quality breeding habitat (i.e., source habitat) for the Scarlet Tanager in Pennsylvania, particularly within fragmented landscapes.

2. Breeding: Determine how forest management practices (e.g. timber harvest), natural forest maturation, and effects of deer over-browsing affect breeding habitat quality for tanagers.

3. Breeding: Post-nesting dispersal and migration pattern to the wintering ground little known but may be consequential.

SURVEY NEEDS

1. Breeding: None
<table>
<thead>
<tr>
<th>Program Name</th>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
<tr>
<td>Pennsylvania Breeding Bird Atlas</td>
<td>Pennsylvania Game Commission, Carnegie Museum of Natural History, Audubon Pennsylvania, Pennsylvania Society for Ornithology</td>
<td><a href="http://www.pabirdatlas.psu.edu/">http://www.pabirdatlas.psu.edu/</a></td>
<td>Status of all breeding birds in 5,000+ 2-mile square blocks (presence/absence plus point-count data) at 20-year intervals</td>
</tr>
</tbody>
</table>
**CONSERVATION PROFILE**

<table>
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<tr>
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<td>High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Conservation Goal:</td>
<td>Maintain at least 10-15 breeding pairs annually in Pennsylvania through 2025.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Rank</th>
<th>S3B</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Legal Status</td>
<td>Endangered</td>
</tr>
<tr>
<td>PA Abundance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PA Short-Term Trend (10 year)</td>
<td>(B) Unknown</td>
</tr>
</tbody>
</table>

**HABITAT ASSOCIATIONS**

- **Primary**
  - Macrogoup: Agricultural
  - Habitat: Agriculture (NLCD 81-82)

- **Secondary**
  - Macrogoup: Ruderal Shrubland & Grassland
  - Habitat: Shrubland & Grassland (NLCD 52/71)

Specific Habitat Requirements:
Old fields, grasslands with medium to high vegetation and moderate litter

B = Breeding, M = Migration, W = Wintering
## Dickcissel (Spiza americana)

### Threats and Actions

#### IUCN Threat: 1.0 Residential and Commercial Development

#### Specific Threat: Loss and fragmentation of grassland habitat.

<table>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0 Land and Water Rights Acquisition and Protection</td>
<td>To ensure available habitat for Dickcissel.</td>
<td>Grassland habitat inventory.</td>
<td>Locations within Private Lands Programs and reclaimed surface mines may be monitored through Pennsylvania eBird observation submissions and staff or volunteer follow-up surveys to look for singing male Dickcissel; presence of females; confirmation of nesting; and occurrence over multiple breeding seasons.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

**Associated Species:** Northern Harrier, Sedge Wren, Henslow’s Sparrow, Vesper Sparrow, Eastern Meadowlark
Dickcissel  
Spiza americana

THREATS AND ACTIONS

IUCN Threat: 2.0 Agriculture and Aquaculture

Specific Threat: Intensified agriculture practices; mowing hay fields during nesting periods

<table>
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<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>To increase quantity and quality of grassland habitat and to minimize disturbance during nesting.</td>
<td>Grassland habitat that remains suitable throughout nesting season.</td>
<td>Breeding Bird Surveys and eBird observation submissions will identify locations of Dickcissel activity. Follow-up surveys are required to monitor persistence, breeding confirmation and nesting success.</td>
</tr>
</tbody>
</table>

Implement the Deferred Grassland Use program; promote enrollment of farm fields in CREP; encourage participation in Private Landowner Assistance Program (PLAP); outreach and consultation with Regional Wildlife Diversity Biologists. Areas with known Dickcissel activity and counties bordering stable populations in neighboring states should be targeted for enrollment.

Action Location: Physiographic Province: Piedmont, Ridge and Valley

Associated Species: Sedge Wren, Henslow's Sparrow, Vesper Sparrow, Eastern Meadowlark, Bobolink

RESEARCH NEEDS

1. Breeding- Research should focus on determining the best way to manage agricultural fields and reclaimed strip mines for the guild of grassland obligates that currently breed in Pennsylvania. (Wentworth in Steele et al. 2010)

2. Breeding- Monitor stable populations of Dickcissel that persist on reclaimed surface mine grasslands.

3. Breeding- Closely monitor breeding activity on acreage in the Deferred Grassland Use program to assess effectiveness.

SURVEY NEEDS

1. Breeding- Focused surveys on lands participating in Private Lands Programs. Also, focused surveys in areas with recent nesting activity.

2. Breeding- Encourage Pennsylvania's birding community to survey areas of most recent (previous breeding season) Dickcissel observations.

PENNSYLVANIA GAME COMMISSION  
466 Appendix 1.4-Birds

PENNSYLVANIA FISH & BOAT COMMISSION  
Published September 2015
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<tbody>
<tr>
<td>Dickcissel Surveys based on observation reports</td>
<td>Pennsylvania Game Commission</td>
<td></td>
<td>Follow-up surveys based on reports submitted to eBird, PA Birds Listserve and other sources.</td>
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<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
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</table>
Bobolink  
*Dolichonyx oryzivorus*

**CONSERVATION PROFILE**

- **Global Rank**: G5
- **State Rank**: S4B
- **IUCN Red List**: LC Least Concern
- **Northeast Region**: Very High Concern / Low Responsibility
- **Federal Status**: Not Listed
- **PA Legal Status**: Protected
- **PA Abundance**: 19,250
- **PA Short-Term Trend (10 year)**: (<=10% change)

**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 2025.

**HABITAT ASSOCIATIONS**

- **Primary Macrogroup**: Agricultural
- **Secondary Macrogroup**: Not applicable
- **Habitat**: Agriculture (NLCD 81-82)

**Specific Habitat Requirements:**

- Moist meadows and fields of hay, clover, alfalfa and other herbaceous vegetation

(B = Breeding, M = Migration, W = Wintering)
# Bobolink

**Dolichonyx oryzivorus**

## Threats and Actions

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>Loss of nests and young in agricultural grasslands is hypothesized to be a major driver of declines.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IUCN Threat:</strong></td>
<td>2.0 Agriculture and Aquaculture</td>
</tr>
</tbody>
</table>

### Season: Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>Prevent loss of nests and nestlings</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
</tbody>
</table>

Restrict mowing during peak of breeding season (Perlut et al. 2008)

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** American Kestrel, Grasshopper Sparrow, Savannah Sparrow, Eastern Meadowlark

### Season: Breeding

<table>
<thead>
<tr>
<th>Specific Threat:</th>
<th>Loss of habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IUCN Threat:</strong></td>
<td>1.0 Residential and Commercial Development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>Prevent loss of farmland</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
</tr>
</tbody>
</table>

Create grassland habitat and maintain the areas as grass

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

**Associated Species:** American Kestrel, Grasshopper Sparrow, Savannah Sparrow, Eastern Meadowlark
## THREATS AND ACTIONS

### Bobolink

**Dolichonyx oryzivorus**

| IUCN Threat: | 3.0  | Energy Production and Mining |
| Specific Threat: | Reforestation of reclaimed surface mine grasslands. |

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Maintain grassland habitat</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
<td>3</td>
</tr>
</tbody>
</table>

Mowing, burning and removing invasive woody vegetation

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** American Kestrel, Grasshopper Sparrow, Savannah Sparrow, Eastern Meadowlark

| IUCN Threat: | 7.0  | Natural System Modifications |
| Specific Threat: | Successional change of grassland habitats |

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Prevent natural succession from encroaching important grassland sites</td>
<td>Maintenance of extant populations</td>
<td>USGS Breeding Bird Survey trends</td>
<td>3</td>
</tr>
</tbody>
</table>

Mowing, burning and removing invasive woody vegetation

**Action Location:** Physiographic Province: Appalachian Plateaus

**Associated Species:** American Kestrel, Grasshopper Sparrow, Savannah Sparrow, Eastern Meadowlark

### RESEARCH NEEDS

1. Breeding- Do Conservation Grasslands provide substantial refuges for this species in northern and western Pennsylvania?

2. Breeding- Is climate change likely to result in changes to agricultural practices (specifically earlier mowing) that could impact this species over coming decades?
**SURVEY NEEDS**

1. Breeding - None: Monitored through USGS Breeding Bird Survey.

2. Breeding - Assessment of use of Conservation Grasslands in north and west of state.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Eastern Meadowlark

*Sturnella magna*

**CONSERVATION PROFILE**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUCN Red List</td>
<td>LC Least Concern</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>Very High Concern / Low Responsibility</td>
</tr>
<tr>
<td>Federal Status</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

**State Rank**

- **G5**
- **S3B**

**PA Legal Status**

- **Protected**
- **155750**
- **(B) Decline of 11 - 40%**

**PA Short-Term Trend (10 year)**

**Conservation Goal:**

Increase population to an average of 5.0 birds per Breeding Bird Survey route by 2025.

**HABITAT ASSOCIATIONS**

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrogroup</td>
<td>Agricultural</td>
</tr>
<tr>
<td>Habitat</td>
<td>Agriculture (NLCD 81-82)</td>
</tr>
</tbody>
</table>

**Specific Habitat Requirements:**

- Prairies, pastures, hayfields, and fallow lands.

B = Breeding, M = Migration, W = Wintering
### Eastern Meadowlark

#### Sturnella magna

**THREATS AND ACTIONS**

<table>
<thead>
<tr>
<th>IUCN Threat: 2.0</th>
<th>Agriculture and Aquaculture</th>
<th>Specific Threat: Species needs grassland habitat.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th><strong>Objective</strong></th>
<th><strong>Measure</strong></th>
<th><strong>Monitoring</strong></th>
<th><strong>Priority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>increase areas of pasture that is warm season grasslands</td>
<td>increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

- **Create grassland habitat**

- **Action Location:** Physiographic Province: Statewide
  - HUC4 Watershed: Statewide

- **Associated Species:** American Kestrel, Grasshopper Sparrow

<table>
<thead>
<tr>
<th>IUCN Threat: 3.0</th>
<th>Energy Production and Mining</th>
<th>Specific Threat: Pipelines and gas pads could potentially increase habitat is maintained in grassland habitat.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th><strong>Objective</strong></th>
<th><strong>Measure</strong></th>
<th><strong>Monitoring</strong></th>
<th><strong>Priority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 2.0</strong></td>
<td>Direct Management of Natural Resources</td>
<td>Plant impacted areas with warm season grasses that are maintained with mowing</td>
<td>increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
</tbody>
</table>

- **Create grassland habitat and maintain the areas as grass**

- **Action Location:** Physiographic Province: Statewide
  - HUC4 Watershed: Statewide

- **Associated Species:** American Kestrel, Grasshopper Sparrow

---

**PENNSYLVANIA GAME COMMISSION**

473 Appendix 1.4-Birds
## Eastern Meadowlark

### THREATS AND ACTIONS

**IUCN Threat:** 7.0 Natural System Modifications  
**Specific Threat:** This species requires grassland habitat that becomes unsuitable within a few years after disturbance  
**Season:** Breeding

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>increase areas of grasslands</td>
<td>increase in the number of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
<tr>
<td>Use fire or mowing to create grassland habitat and plant warm season grasses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide |
| **Associated Species:** American Kestrel, Grasshopper Sparrow |

**IUCN Threat:** 1.0 Residential and Commercial Development  
**Specific Threat:** Development results in loss of habitat if the developed land is grassland habitat  
**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>reduce development on existing grasslands</td>
<td>maintenance of breeding pairs and reproductive success</td>
<td>1. singing males, 2. BBS, 3. annually</td>
</tr>
<tr>
<td>Minimize suburban sprawl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide |
| **Associated Species:** American Kestrel, Grasshopper Sparrow |

## RESEARCH NEEDS

1. Breeding- Effects of grassland restoration on populations, needed habitat block size limitations.
2. Breeding- What are the effects of controlled burns (fire) on populations?
**Eastern Meadowlark**

*Sturnella magna*

**SURVEY NEEDS**

1. Breeding - Continued breeding bird survey data.
2. Breeding - Continued breeding bird atlas efforts.

**MONITORING PROGRAMS**

<table>
<thead>
<tr>
<th>Program Name</th>
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<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
</tr>
</tbody>
</table>
Rusty Blackbird

*Euphagus carolinus*

**CONSERVATION PROFILE**

- **Global Rank**: G4
- **State Rank**: S3N (M), S5N (W)
- **IUCN Red List**: VU Vulnerable
- **Federal Status**: Not Listed
- **Northeast Region**: Very High Concern / Low Responsibility
- **PA Legal Status**: Protected
- **PA Abundance**: Unknown
- **PA Short-Term Trend (10 year)**: (M) Unknown; (W) Increase of >25%

**Conservation Goal:**
Maintain populations at current levels and seek opportunities to increase population.

**HABITAT ASSOCIATIONS**

- **Primary**
  - (W) Hypereutrophic, Medium Alkalinity Lake

- **Secondary**
  - (W) Mesotrophic, Medium Alkalinity Lake

**Specific Habitat Requirements:**
(M) Generally forages in shallow waters such as stream sides, wet woods, lake and pond edges, swamps and other wetlands including adjacent fields. Roosts in tree groves and orchards, crop stubble.
(W) Generally winters in swampy areas, pond and stream edges.

B = Breeding, M = Migration, W = Wintering

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Photo: Jacob Dingel

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PENNSYLVANIA GAME COMMISSION

PENNSYLVANIA FISH & BOAT COMMISSION

Published September 2015
## THREATS AND ACTIONS

**Rusty Blackbird**

**Euphagus carolinus**

### Specific Threat: Residential and road development replaces forest and wetlands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Maintain streamside and wetland shallow water habitat.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
<td>2</td>
</tr>
</tbody>
</table>

**Migration Action**

**Objective**

Maintain streamside and wetland shallow water habitat.

**Measure**

Number of Rusty Blackbird sightings in eBird

**Monitoring**

eBird, Rusty Blackbird Blitz

**Priority**

2

**Associated Species:**

American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.

### Specific Threat: Marcellus shale and wind energy infrastructure.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Prevent pollution to streams and wetlands that provide habitat for species.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
<td>2</td>
</tr>
</tbody>
</table>

**Migration Action**

**Objective**

Prevent pollution to streams and wetlands that provide habitat for species.

**Measure**

Number of Rusty Blackbird sightings in eBird

**Monitoring**

eBird, Rusty Blackbird Blitz

**Priority**

2

**Associated Species:**

American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.
**Rusty Blackbird**

**Euphagus carolinus**

### THREATS AND ACTIONS

**IUCN Threat:** 4.0  Transportation and Service Corridors  
**Season:** Migration

**Specific Threat:** Road-building and right-of-way removal of forest and wetlands.

<table>
<thead>
<tr>
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<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 11.0  Technical Assistance</td>
<td>Maintain streamside and wetland shallow water habitat.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.

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**IUCN Threat:** 7.0  Natural System Modifications  
**Season:** Migration

**Specific Threat:** Conversion of palustrine wetlands to open water or uplands.

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 6.0  Land and Water Rights Acquisition and Protection</td>
<td>Maintain streamside and wetland shallow water habitat.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
<td>2</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide  
HUC4 Watershed: Statewide

**Associated Species:** American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.
### Rusty Blackbird

**Euphagus carolinus**

**IUCN Threat:** 9.0 Pollution

**Specific Threat:** Decrease in insects and other prey items composed of a lot of calcium.

**Season:** Migration

<table>
<thead>
<tr>
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<th>Measure</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 7.0</td>
<td>Law enforcement</td>
<td>Prevent pollution to streams and wetlands that provide habitat for species.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**HUC4 Watershed:** Statewide

**Associated Species:** American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Palustrine wetlands are reduced in health and vigor where conifers grow that this and other species are dependent. Northern conifers will be stressed by warmer conditions.

**Season:** Migration

<table>
<thead>
<tr>
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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
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<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Planning</td>
<td>Maintain streamside and wetland shallow water habitat.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Statewide

**HUC4 Watershed:** Statewide

**Associated Species:** American Black Duck, Wood Duck, Solitary Sandpiper, Spotted Sandpiper, Wilson's Snipe, other riparian birds, river otter.
Rusty Blackbird

Euphagus carolinus

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Conversion of palustrine wetlands to open water or uplands.

Season: Winter

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 6.0</td>
<td>Land and Water Rights Acquisition and Protection</td>
<td>Maintain streamside and wetland shallow water habitat.</td>
<td>Number of Rusty Blackbird sightings in eBird</td>
<td>eBird, Rusty Blackbird Blitz, National Audubon Society Christmas Bird Counts</td>
</tr>
</tbody>
</table>

Avoid destruction of conifer swamps by damming or increasing water levels.

Action Location: Physiographic Province: Atlantic Coastal Plains, Appalachian Plateaus, Piedmont

HUC4 Watershed: Statewide


RESEARCH NEEDS

1. Migration- What are the limiting factors for this species across its range leading to its long-term decline?

1. Wintering- What are the limiting factors for this species across its range leading to its long-term decline?

2. Migration- What locations are important for this species in Pennsylvania? Where are the larger migration stopover locations and roosts?

2. Wintering- What locations are important winter locations for this species and how can the conditions for these locations be maintained or improved?

3. Migration- What role does PA play in the life cycle of this species and how can the state maintain or increase its role in recovery?

3. Wintering- What role does PA play in the life cycle of this species and how can the state maintain or increase its role in recovery?
SURVEY NEEDS

1. Migration - Rusty Blackbird Spring Blitz, project of the International Rusty Blackbird Working Group (IRBWG). Find locations that are important to this species for foraging and roosting.

1. Wintering - Winter surveys through IRBWB projects and eBird.

2. Migration - Autumn concentration surveys through the IRBWG and eBird. Find locations that are important for foraging and roosting.

2. Wintering - Getting better coverage of winter IBA wetland populations.

3. Migration - Find association between feeding locations and roosts.

3. Wintering - Determine if there is movement between different locations in winter or as winter progresses.

MONITORING PROGRAMS

<table>
<thead>
<tr>
<th>Program Name</th>
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<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Flyway waterfowl surveys - include Rusty Blackbirds</td>
<td>U.S. Fish &amp; Wildlife Service / Pennsylvania Game Commission</td>
<td></td>
<td>The Flyway waterfowl surveys are made in randomized plots, many of which are appropriate RUBL migration habitat.</td>
</tr>
<tr>
<td>Rusty Blackbird monitoring through the International Rusty Blackbird Working Group and eBird.</td>
<td>International Rusty Blackbird Working Group</td>
<td><a href="http://rustyblackbird.org/">http://rustyblackbird.org/</a></td>
<td>Search for Rusty Blackbirds in all times of the year including winter when some visit the state, especially in wetlands.</td>
</tr>
<tr>
<td>Program Name</td>
<td>Lead Agency</td>
<td>Hyperlink</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Rusty Blackbird Spring Migration Blitz</td>
<td>International Rusty Blackbird Working Group</td>
<td><a href="http://rustyblackbird.org/outreach/migration-blitz/">http://rustyblackbird.org/outreach/migration-blitz/</a></td>
<td>Search for Rusty Blackbirds during spring migration to determine important stopover sites and involve the birding community in monitoring this declined songbird.</td>
</tr>
</tbody>
</table>
Red Crossbill
*Loxia curvirostra*

**CONSERVATION PROFILE**

- **Conservation Goal:** Confirm annual nesting population in state and protect/promote conifer forests that support this species.

**HABITAT ASSOCIATIONS**

- **Primary**
  - (B) Central Oak-Pine

- **Secondary**
  - (B) Laurentian-Acadian Wet Meadow-Shrub Swamp

**Specific Habitat Requirements:**

- (B) Northern boreal forest; eastern white pine, red pine, eastern hemlock, red spruce, and white spruce. Has nested in pine barrens. Will nest where there is abundant cone crop at any time of year, but usually in spring. 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. (W) Irruptive, responding to cone crops including pines, spruces, hemlocks, firs. Winter flocks can be very large and generally responding to mature trees including old growth hemlocks.

<table>
<thead>
<tr>
<th>Macrogroup</th>
<th>Primary Habitat</th>
<th>Secondary Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(B) Central Appalachian Dry Oak-Pine Forest</td>
<td>(B) Laurentian-Acadian Wet Meadow-Shrub Swamp</td>
</tr>
</tbody>
</table>

- B = Breeding, M = Migration, W = Wintering

**Photo:** Jacob Dingel

---

**Global Rank:** G5
**State Rank:** S1B, S4N (W)
**IUCN Red List:** LC Least Concern
**Northeast Region:** Not NE Regional SGCN
**Federal Status:** Not Listed
**PA Legal Status:** Protected

**PA Abundance:** Unknown (100 estimated by PIF)
**PA Short-Term Trend (10 year):** Relatively Stable; (W) Unknown
### Red Crossbill

**Loxia curvirostra**

#### THREATS AND ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRACS Action 9.0</strong> Planning</td>
<td>Promote conifer tree protection and planting in high elevation, even in developments.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Priority**: 1

### Specific Threat:
Residential and road development replaces forest and wetlands.

### Action Location:
**Physiographic Province**: Appalachian Plateaus, Ridge and Valley  
**HUC4 Watershed**: Delaware-Mid Atlantic Coastal, Susquehanna

### Associated Species:
- Northern Saw-whet Owl
- Yellow-bellied Flycatcher
- Winter Wren
- Swainson's Thrush
- Canada Warbler
- northern flying squirrel
- snowshoe hare

### Season:
Breeding
## Red Crossbill

**Loxia curvirostra**

### THREATS AND ACTIONS

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Marcellus shale and wind energy infrastructure permanently replaces or fragments forest.

**Season:** Breeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective</th>
<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
HUC4 Watershed: Delaware-Mid Atlantic Coastal, Susquehanna, Allegheny

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

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**PENNSYLVANIA GAME COMMISSION**  
**PENNSYLVANIA FISH & BOAT COMMISSION**  
Published September 2015
**Red Crossbill**

*Loxia curvirostra*

## Threats and Actions

### IUCN Threat: 5.0 Biological Resource Use

### Specific Threat: Permanent deforestation and replacement of conifer with deciduous forest.

<table>
<thead>
<tr>
<th>Action</th>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase spruce, hemlock, and fir forest acreage and number of blocks.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley  
**HUC4 Watershed:** Delaware-Mid Atlantic Coastal, Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

### IUCN Threat: 7.0 Natural System Modifications

### Specific Threat: Fire suppression is decreasing conifer regeneration.

<table>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase pine component of forest that could support this species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
**Red Crossbill**

*Loxia curvirostra*

**THREATS AND ACTIONS**

**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Deer browsing is oversimplifying the forest species diversity and structure. Invasives are decreasing health and vigor of hemlocks and other conifers.

**Season:** Breeding

### Action

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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase potential for a viable nesting population in mature conifers.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
### Red Crossbill  
*Loxia curvirostra*

#### Threats and Actions

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<th>Measure</th>
<th>Monitoring</th>
<th>Priority</th>
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</table>
| TRACS Action 2.0  
Direct Management of Natural Resources | Increase potential for a viable nesting population in mature conifers. | Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares. | Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects. | 2 |

**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Palustrine wetlands are reduced in health and vigor where conifers grow that this and other species are dependent.  
Northern conifers will be stressed by warmer conditions.

**Season:** Breeding

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:**  
Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
## Red Crossbill (Loxia curvirostra)

### THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Residential and road development replaces forest and wetlands.

<table>
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<tbody>
<tr>
<td>TRACS Action 11.0</td>
<td>Protect high quality and larger blocks of boreal and northern conifer forest including wetlands with PNDI and best management practices of forested wetlands.</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**HUC4 Watershed:** Delaware-Mid Atlantic Coastal, Susquehanna

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**Season:** Breeding

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**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Residential and road development replaces forest and wetlands.

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<tbody>
<tr>
<td>TRACS Action 9.0</td>
<td>Promote conifer forest conservation even where there is development in the mountains where this species has occurred.</td>
<td>Increase potential for a viable nesting population in mature conifers.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**Season:** Winter
Red Crossbill

RESEARCH NEEDS

1. Breeding- What Red Crossbill call types nest in Pennsylvania and what are their major food sources?

1. Wintering- What conifer resources are limiting Red Crossbill in Pennsylvania and which species can be managed on its behalf?

2. Breeding- What limits Red Crossbills in PA and the northern Appalachians when this species nests nearby in NY?

2. Wintering- Would old growth conifer forest management benefit this species and others that use large conifers for nesting and food?

3. Breeding- Where and how can conifer forests be expanded in PA to expand the NY population into the state?

3. Wintering- What are the source populations for wintering Red Crossbills in PA?

SURVEY NEEDS

1. Breeding- Locate any breeding population in the state.

1. Wintering- Locate wintering populations.

2. Breeding- Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project.

2. Wintering- Conduct conifer cone surveys where any wintering populations can be found.

3. Breeding- Establish off-road point forest bird counts in large forest blocks as part of state network of point counts (not as technical as Mountain Bird Count).
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Lead Agency</th>
<th>Hyperlink</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossbill research conducted by Cornell Laboratory of Ornithology (Matt Young).</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Cooperative searches and research for crossbills with M. Young. Red Crossbills nest in New York. Similar conditions may occur in PA also.</td>
</tr>
<tr>
<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
</tr>
<tr>
<td>Mountain Bird Watch</td>
<td>Vermont Center for Ecostudies</td>
<td><a href="http://vtecostudies.org/projects/mountains/mountain-birdwatch/">http://vtecostudies.org/projects/mountains/mountain-birdwatch/</a></td>
<td>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 PA version of this project will not include Bicknell’s Thrush and will focus on state priority mountain forest species for the PA and the Appalachian Mountains.</td>
</tr>
<tr>
<td>North American Breeding Bird Survey</td>
<td>USGS</td>
<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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<tr>
<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
</tr>
</tbody>
</table>
Pine Siskin
Spinus pinus

CONSERVATION PROFILE

Global Rank: G5
State Rank: S3B
IUCN Red List: LC Least Concern
Northeast Region: Not NE Regional SGCN
Federal Status: Not Listed
PA Legal Status: Protected
PA Abundance: Variable (1700 PIF estimate)
PA Short-Term Trend (10 year): (B) Unknown

Conservation Goal:
Increase knowledge of known breeding population, determining if there are regular breeding locations.

HABITAT ASSOCIATIONS

Primary
Habitat: Appalachian (Hemlock)-Northern Hardwood Forest
Macrogroup: Northern Hardwood & Conifer

Specific Habitat Requirements:
Northern boreal forest, preferring open stands of spruce and pine interspersed with birch and maple hardwood. Also nests in yards and park-like settings that include conifers.

B = Breeding, M = Migration, W = Wintering
**Pine Siskin**

**Spinus pinus**

### Threats and Actions

**IUCN Threat:** 5.0 Biological Resource Use

**Specific Threat:** Permanent deforestation and replacement of conifer with deciduous forest.

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Increase spruce, hemlock, and fir forest acreage and number of blocks.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
</tr>
</tbody>
</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

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**IUCN Threat:** 8.0 Invasive and Other Problematic Species and Genes

**Specific Threat:** Deer browsing is oversimplifying the forest species diversity and structure. Invasives are decreasing health and vigor of hemlocks and other conifers.

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</thead>
<tbody>
<tr>
<td>TRACS Action 2.0</td>
<td>Direct Management of Natural Resources</td>
<td>Protect boreal conifer swamps from flooding or conversion.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson’s Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
## Pine Siskin

**Spinus pinus**

### Threats and Actions

**IUCN Threat:** 1.0 Residential and Commercial Development

**Specific Threat:** Residential and road development replaces forest and wetlands.

<table>
<thead>
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<th>Monitoring</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect boreal conifer forests.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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</table>

**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

**IUCN Threat:** 3.0 Energy Production and Mining

**Specific Threat:** Marcellus shale and wind energy infrastructure.

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<th>Priority</th>
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<tbody>
<tr>
<td>TRACS Action 9.0 Planning</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
### Pine Siskin

**Spinus pinus**

#### THREATS AND ACTIONS

**IUCN Threat:** 4.0 Transportation and Service Corridors

**Specific Threat:** Road-building and right-of-way removal of forest and wetlands.

**Season:** Breeding

<table>
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<th>Priority</th>
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</thead>
<tbody>
<tr>
<td>TRACS Action 11.0 Technical Assistance</td>
<td>Protect core habitat areas for endangered and threatened species.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare

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**IUCN Threat:** 11.0 Climate Change and Severe Weather

**Specific Threat:** Northern conifers will be stressed by warmer conditions.

**Season:** Breeding

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<tr>
<td>TRACS Action 2.0 Direct Management of Natural Resources</td>
<td>Maintain vegetation complexity of forest.</td>
<td>Number of hectares of boreal conifer forest and number of boreal conifer blocks greater than 10 hectares.</td>
<td>Monitor boreal forest breeding birds through BBS, eBird, area searches in targeted areas, and off-road point counts (Mountain Bird protocol, other point counts) over an indefinite period since some of these programs are long-term and part of larger projects.</td>
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**Action Location:** Physiographic Province: Appalachian Plateaus, Ridge and Valley

**Associated Species:** Northern Saw-whet Owl, Yellow-bellied Flycatcher, Winter Wren, Swainson's Thrush, Canada Warbler, northern flying squirrel, snowshoe hare
**RESEARCH NEEDS**

1. Breeding- What are the Pine Siskins breeding populations related to human-modified locations and natural forests that benefit this species for nesting in concentrations?

2. Breeding- What are the causes for the Pine Siskin irruptions and do these irruptions relate to nesting events?

3. Breeding- Would old growth conifer forest management benefit this species and others that use large conifers for nesting and food?

**SURVEY NEEDS**

1. Breeding- Locate regularly used breeding populations in the state.

2. Breeding- Establish off-road point counts for boreal conifer forest guild species similar to Mountain Bird Count project.

3. Breeding- Establish off-road point forest bird counts in large forest blocks as part of state network of point counts (not as technical as Mountain Bird Count or focused on boreal forests).

**MONITORING PROGRAMS**

<table>
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<th>Program Name</th>
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<td>eBird (PA eBird as state portal)</td>
<td>Pennsylvania Game Commission</td>
<td><a href="http://ebird.org/content/pa">http://ebird.org/content/pa</a></td>
<td>Open database of geospatially designated locations with on-line data entry and portals to the database with news and stories that provide guidance, education, and instructions to participants.</td>
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<td>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 PA version of this project will not include Bicknell’s Thrush and will focus on state priority mountain forest species for the PA and the Appalachian Mountains.</td>
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<td><a href="https://www.pwrc.usgs.gov/bbs/">https://www.pwrc.usgs.gov/bbs/</a></td>
<td>The BBS is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations.</td>
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<td>Yellow-bellied Flycatcher / Rare Mountain Forest Bird Studies and Conservation</td>
<td>Pennsylvania Game Commission / Cornell Laboratory of Ornithology</td>
<td><a href="http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2">http://www.portal.state.pa.us/portal/server.pt?open=514&amp;objID=621014&amp;mode=2</a></td>
<td>Area searches in targeted locations with history of mountain forest bird breeding populations. Geospatial and behavioral data collected for each location / territory found for priority species: Yellow-bellied Flycatcher, Blackpoll Warbler, Olive-sided Flycatcher, Swainson’s Thrush, Red Crossbill, Pine Siskin.</td>
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</table>

Pine Siskin

Spinus pinus
REFERENCES

**Birds**

**Tundra Swan**


**American Black Duck**


**Blue-winged Teal**


**Green-winged Teal**


REFERENCES


**Lesser Scaup**


**Long-tailed Duck**


**Ruffed Grouse**

REFERENCES


Pied-billed Grebe


REFERENCES


**Horned Grebe**


**Red-necked Grebe**


**American Bittern**


**Least Bittern**


REFERENCES


Great Egret


REFERENCES


**Black-crowned Night-Heron**


**Yellow-crowned Night-Heron**


**Osprey**


**Bald Eagle**


REFERENCES


Northern Harrier


REFERENCES


**Sharp-shinned Hawk**


REFERENCES


Northern Goshawk


REFERENCES


**Broad-winged Hawk**


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**Golden Eagle**


**King Rail**


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**Virginia Rail**


### Sora


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**Common Gallinule**


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American Coot


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**Piping Plover (Great Lakes)**


**Spotted Sandpiper**


**Upland Sandpiper**


**Red Knot**


**Wilson's Snipe**


**American Woodcock**


**Black Tern**


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Common Tern


**Barn Owl**


**Long-eared Owl**


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**Short-eared Owl**


Northern Saw-whet Owl


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Common Nighthawk


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**Eastern Whip-poor-will**


Chimney Swift


Red-headed Woodpecker


American Kestrel


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Nashville Warbler

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Kentucky Warbler


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Hooded Warbler


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Cerulean Warbler


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**Blackpoll Warbler**


Black-throated Blue Warbler


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Prairie Warbler


**Black-throated Green Warbler**


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Canada Warbler


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Yellow-breasted Chat


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Eastern Towhee


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Field Sparrow


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**Savannah Sparrow**


**Grasshopper Sparrow**


**Henslow's Sparrow**


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**White-throated Sparrow**


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**Summer Tanager**


**Scarlet Tanager**


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Dickcissel


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**Bobolink**


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**Rusty Blackbird**


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