APPENDIX 2.1

Terrestrial and Aquatic Habitat Descriptions

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Habitat Classification

Adapted from Crisfield and Northeast Fish and Wildlife Diversity Technical Committee (NEFWDTC) 2022

The following habitat descriptions are organized according to the Northeast Association of Fish and Wildlife Agencies (AFWA) NEFWDTC habitat lexicon (Crisfield and NEFWDTC 2022).

The coarse habitat classification is based on NatureServe Biotics 5 and developed for the northeast Regional Species of Greatest Conservation Need (RSGCN) Database (Terwilliger Consulting Inc. and Northeast Fish and Wildlife Diversity Technical Committee 2022). This system provides the necessary consistency at the regional scale to summarize priority conservation themes while allowing states flexibility to define focal habitats contextually. The version presented below was adapted slightly for the 2022 Lexicon to ensure that important habitats like vernal pools, mines & tunnels, caves & karst, and other subterranean were not lost by relying on modifiers that may not be used by all states. (Table App.2.1).

The classification system is based on experience with RSGCN in the northeastern and midwestern U.S. and allows regional themes to be summarized at two levels. Additionally, analysis of anthropogenic habitat use as a conservation opportunity is possible by filtering on the italicized habitat types, embedded within their related natural habitats. Recommended Habitat Modifiers are a subset of the full set of modifiers developed to describe habitat requirements for RSGCN; see Terwilliger Consulting Inc. and NEFWDTC 2022 for a complete discussion. Pennsylvania did not use habitat modifiers uniformly during Wildlife Action Plan (PA WAP) development but will continue to investigate and apply habitat modifiers during PA WAP implementation, as warranted. Habitat modifiers can be useful for communicating more specific species habitat requirements to habitat managers and partners. In particular, the "Features" associated with each Habitat Class can provide important information about niches within habitat types where species can be found during certain life stages. For example, amphibians in forests sometimes require 'logs & woody debris' to provide moist shelter in late summer.

Table App.2.1. Habitat classification system used in the 2025-2035 Pennsylvania Wildlife Action Plan, derived from the northeastern U.S. Regional Species of Greatest Conservation Need Database (Crisfield and Northeast Fish and Wildlife Diversity Technical Committee [NEFWDTC] 2022; Terwilliger Consulting Inc. and NEFWDTC 2022). *Italicized* habitat types are anthropogenic.

Habitat Class	Habitat Types	**Recommended Habitat Modifiers** (as applicable)
Forested Upland	Forests & Woodlands	Type; Age Class; Fire Dependent; Substrate;
	Agriculture: Plantations/Orchards	
	High Elevation Forests	
Open Upland	Grasslands	Substrate; Fire Dependent
	Shrublands	For agriculture: Features (no-till vs. till)
	Glades, Barrens & Savannas	

	Agriculture: Cropland/Pastures	
	Cliff & Talus	
Subterranean	Caves & Karst	Light Zone; Substrate; Soil Moisture Specialist
	Mines & Tunnels	
	Other Subterranean	
Developed	*Developed Areas*	*Density*
Riverine	Big Rivers	Major river basin; Size; Substrate
	Rivers and Streams	
Lacustrine	Great Lakes	Great Lake; Size; Trophic state
	Lakes & Ponds	
Land-Water Interface	Riparian & Floodplains	Substrate; Tree Density; Salinity; Tidal Zone
	Shorelines	
	Beaches & Dunes	
Palustrine	Non-Tidal Wetlands	Substrate (to include peat); Hydroperiod
	Vernal Pools	
Estuarine	Estuaries	Substrate; Emergent Vegetation Density; Floating Vegetation Density' Submerged Vegetation Density
	Tidal Wetlands & Flats	
	Tidal Rivers & Streams	

Glossary

GAP 1 — Permanent protection for biodiversity. Examples: Nature reserves, research natural areas, wilderness areas (TNC 2023).

GAP 2 — Permanent protection to maintain a primarily natural state. Examples: National Wildlife Refuges, many state parks, and high use National Parks (TNC 2023)

GAP 3 — Permanent protection for multiple uses, typically retaining natural cover but often subject to extractive uses such as logging. Examples: State forest managed for timber; land protected from development by forest easements (TNC 2023).

PA SGCN — Pennsylvania Species of Greatest Conservation Need (see Chapter 1-Species and Appendices 1.3 and 1.4)

RSGCN Northeast United States Regional Species of Greatest Conservation Need (Terwilliger Consulting Inc. and Northeast Fish and Wildlife Diversity Technical Committee 2022)

Habitat Statistics Sources

Northeastern United States (Maine to Virginia) habitat extent, aquatic classifications, and regional and Pennsylvania land securement for conservation metrics:

Anderson, M.G., M. Clark, and A. Olivero. 2023. Conservation Status of Natural Habitats in the Northeast. The Nature Conservancy, Center for Resilient Conservation Science. Newburyport, Massachusetts.

Olivero-Sheldon, A. and M.G. Anderson. 2016. Northeast Lake and Pond Habitat Guide. The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office. Boston, MA.

Terwilliger Consulting, Inc. and the Northeast Fish and Wildlife Diversity Technical Committee. 2023. Northeast Regional Conservation Synthesis for 2025 State Wildlife Action Plans. Northeast Association of Fish and Wildlife Agencies, Washington, D.C.

Habitat definitions, descriptions, and Northeastern United States RSGCN counts:

Crisfield, E and the Northeast Fish and Wildlife Diversity Technical Committee. 2022. The 2022 Northeast Lexicon: Terminology Conventions and Data Framework for State Wildlife Action Plans in the Northeast Region. Northeast Association of Fish and Wildlife Agencies, Washington, D.C.

Terwilliger Consulting, Inc. and the Northeast Fish and Wildlife Diversity Technical Committee. 2023. Northeast Regional Conservation Synthesis for 2025 State Wildlife Action Plans. Northeast Association of Fish and Wildlife Agencies, Washington, D.C.

Pennsylvania ecological systems, community classification, and size statistics:

Pennsylvania Department of Environmental Protection (PA DEP). 2026. 2026 Pennsylvania Integrated Water Quality Report. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania. https://storymaps.arcgis.com/stories/c54540d19c2d4aeba8259291f8808bb9

Pennsylvania Game Commission. 2021. Manual of procedure for State Game Land cover typing. Pennsylvania Game Commission, Harrisburg, Pennsylvania.

Pennsylvania Natural Heritage Program (PNHP). 2012. Terrestrial and Palustrine Plant Communities of Pennsylvania, 2nd Edition. Pennsylvania Natural Heritage Program, Pennsylvania Department of Conservation and Natural Resources, Harrisburg, Pennsylvania.

Walsh, M.C., J. Deeds, and B. Nightingale. 2007. User's Manual and Data Guide to the Pennsylvania Aquatic Community Classification. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Middletown, PA, and Pittsburgh, Pennsylvania.

WeConservePA. Pennsylvania Conserved Land Database. Accessed 12 August 2026. https://weconservepa.org. Special thanks to I. Beal for technical assistance to provide land protection statistics.

Western Pennsylvania Conservancy, Pennsylvania Natural Heritage Program, unpublished data. Special thanks to E. Zimmerman and M. Moore for ecological classification guidance and mapping assistance. *Note: Ecological systems may be associated with one or more Habitat Types.*

Pennsylvania Species of Greatest Conservation Need (SGCN) habitat association statistics:

Species Account authors associated each SGCN with primary Habitat Class and Habitat Type (Appendix 1.4). We summarize taxonomic group statistics for each Habitat Type below. The chart label order is taxonomic group, SGCN count, and percent of total SGCN associated with that Habitat Type. For example, 199 SGCN are associated with Forests & Woodlands, 36 of which are birds. Thus, the chart label will read "Bird, 36, 18%". See Chapter 2-Habitats text for overall Habitat Type-SGCN statistics and individual Species Accounts for specific habitat associations.

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FORESTED UPLAND

Terrestrial habitats characterized by woody vegetation at least
5 meters tall with >25% tree canopy cover.

Forests & Woodlands

Extent

Pennsylvania: 16,861,116 acres
Northeastern U.S.: 83,662,456 acres

General Definition

Forested upland that does not have the primary goal of producing products for people. (Trees can be thinned or logged, with wood products sold, as part of a forest management plan.)

Associated Ecological Systems in Pennsylvania

- Central Appalachian Dry Oak-Pine Forest
- Central Appalachian Pine-Oak Rocky Woodland
- Shrubland/grassland
- South-Central Interior Mesophytic Forest
- Acadian Low-Elevation Spruce-Fir-Hardwood Forest
- Allegheny-Cumberland Dry Oak Forest and Woodland
- Appalachian (Hemlock)-Northern Hardwood Forest
- Central Appalachian Dry Oak-Pine Forest
- Central Appalachian Pine-Oak Rocky Woodland
- Circumneutral Cliff and Talus
- Forest - Uncertain Type
- North-Central Interior Beech-Maple Forest
- Northeastern Interior Dry-Mesic Oak Forest
- Northern Atlantic Coastal Plain Dry Oak-Hardwood Forest
- South-Central Interior Mesophytic Forest
- Southern Appalachian Montane Pine Forest and Woodland
- Southern Atlantic Coastal Plain Mesic Hardwood Forest

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

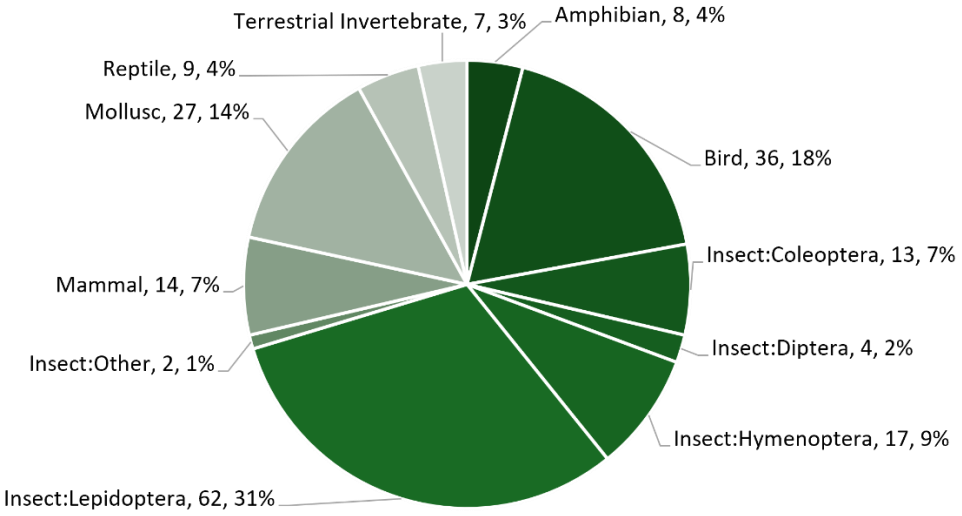
- Dry Oak – Mixed Hardwood Forest
- Dry Oak – Heath Forest
- Red Oak – Mixed Hardwood Forest
- Northern Hardwood Forest
- Black Cherry – Northern Hardwood Forest (Allegheny Hardwoods)
- Black Birch Forest
- Red Maple Forest
- Sugar Maple – Basswood Forest
- Aspen / Grey (Paper) Birch
- Pitch Pine – Mixed Oak Forest
- Virginia Pine – Mixed Hardwood Forest
- Hemlock (White Pine) Forest
- Dry White Pine (Hemlock) – Oak Forest
- Hemlock (White Pine) – Northern Hardwood Forest
- Hemlock (White Pine) – Red Oak – Mixed Hardwood Forest
- Hemlock - Tuliptree – Birch Forest
- Hemlock - Rich Mesic Hardwood Forest
- Black Locust Forest
- Mixed Mesophytic Forest

- Tuliptree – (Beech) – Maple Forest
- Red Pine – Mixed Hardwood
- Pitch Pine – Heath Woodland
- Pitch Pine – Scrub Oak Woodland
- Pitch Pine – Rhodora – Scrub Oak Woodland
- Pitch Pine – Mixed Hardwood Woodland
- Dry Oak – Heath Woodland
- Yellow Oak – Redbud Woodland

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

199 PA SGCN are primarily associated with this Habitat Type.



126 RSGCN are supported by Forests & Woodlands habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Forests & Woodlands span nearly 84 million acres across the northeastern U.S., with 47% secured against conversion to other uses (13% for nature [Gap 1 & 2]; 34% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 20% of Forest & Woodlands habitat in the northeast geography, of which 53% is secured (5% for nature [Gap 1 & 2]; 48% for multiple use [GAP 3]).

Agriculture: Plantations/Orchards

Extent*

Pennsylvania: 2,269,686 acres
Northeastern U.S.: 20,573,979 acres

**sensu U.S. Department of Agriculture 2019 as reported in Terwilliger Consulting Inc. and NEFWDTC 2023*

General Definition

Forested upland with the primary goal of producing products for people. These include ruderal forests, plantations, orchards and vineyards.

Associated Ecological Systems in Pennsylvania

- Shrubland/grassland (mostly ruderal shrublands regenerating clearcuts)
- Agriculture
- Forest - Plantation

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

This habitat type is not included in the Pennsylvania Community Classification; however the Pennsylvania Game Commission includes the following State Game Lands habitat types:

- *Pine Plantation*
- *Spruce Plantation*
- *Hardwood Plantation*
- *Miscellaneous/Mixed Species Plantation*

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

Only 1 PA SGCN is primarily associated with this patch Habitat Type, the Lesser Chestnut Weevil (*Curculio sayi*).

17 RSGCN species are supported by Agriculture: Plantations and Orchards habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Agriculture: Plantations/Orchards habitat spans approximately 21 million acres across the northeastern U.S. Comparatively, Pennsylvania hosts about 11% of Agriculture: Plantations/Orchards habitat in the northeast geography, according to the 2017 USDA Census of Agriculture (USDA 2019). Securement statistics are unavailable.

High Elevation Forests

Extent

Pennsylvania: *unknown*
Northeastern U.S: 8,185 acres in Maine, New Hampshire, New York, and Vermont as “alpine” (above 3000 ft (914 m))

General Definition

Forested upland generally above 1500 ft (457 m) in elevation whose structure is influenced by shallow soils, increased precipitation, and severe weather.

Associated Ecological Systems in Pennsylvania

- Central Appalachian Pine-Oak Rocky Woodland
- Northern Appalachian-Acadian Rocky Heath Outcrop
- Appalachian (Hemlock)-Northern Hardwood Forest

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

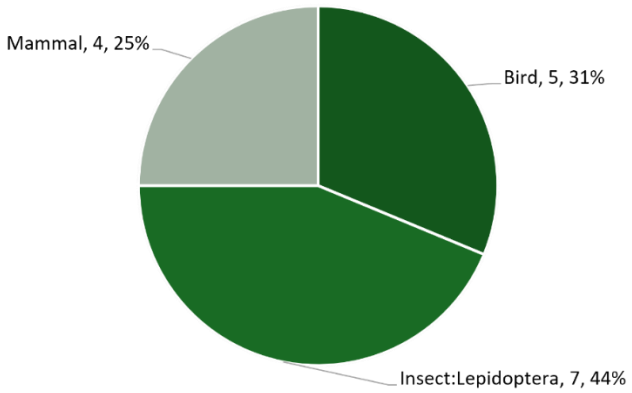
The following Pennsylvania Community Types are typically associated with this habitat:

- Red Spruce Rocky Summit
- Black Gum Ridgetop Forest
- Red Pine – Mixed Hardwood
- Birch (black gum) Rocky Slope Woodland
- Red Oak – Mixed Hardwood Forest
- Northern Hardwood Forest
- Black Cherry – Northern Hardwood Forest (Allegheny Hardwoods)
- Black Birch Forest
- Red Maple Forest
- Aspen / Grey (Paper) Birch
- Pitch Pine – Heath Woodland

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

16 PA SGCN are primarily associated with this Habitat Type.



19 RSGCN species are supported by High Elevation Forests habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

These relational metrics are unavailable due to the northeastern analysis including only the alpine habitat type, which Pennsylvania does not host

OPEN UPLAND

Terrestrial habitats characterized by <25% tree cover.

Grasslands & Shrublands

These are distinct Habitat Types in the northeast lexicon and, therefore, the 2025-35 PA WAP. However, available spatial data group the two types into grasslands and shrublands, thus they are reported together.

Extent

Pennsylvania: 640,499 acres
Northeastern U.S.: 1,864,784 acres (includes coastal and ruderal grasslands and shrublands)

General Definitions

Grassland: Open habitat that is dominated by herbaceous vegetation with few, if any, trees.

Shrubland: Open habitat composed of shrubs (many-stemmed woody plants, generally less than 16 ft [5 m] tall).

Associated Ecological Systems in Pennsylvania

- Central Appalachian Alkaline Glade and Woodland
- Low Vegetation - Unclassified
- Serpentine Barren / Woodland
- *Shrubland/grassland mostly ruderal shrublands regenerating clearcuts**

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

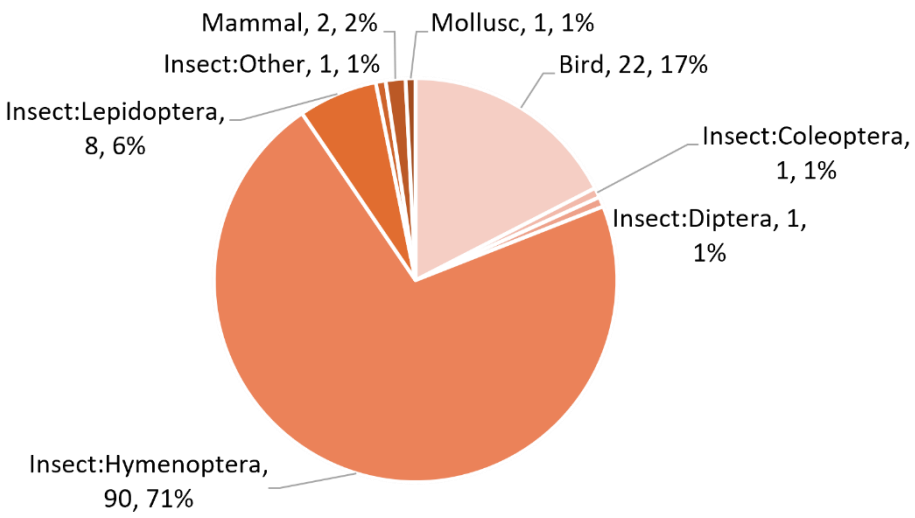
- Little Bluestem - Pennsylvania Sedge Opening
- Side-oats Gramma Calcareous Grassland
- Serpentine Grassland
- Red Cedar – Redbud Shrubland
- *Reclaimed Mine Area**
- *Old Field Reverting Shrubland**

**This is not included in PNHP 2012 but used by the Pennsylvania Game Commission in State Game Land cover typing.*

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

126 PA SGCN are primarily associated with this Habitat Type.



67 RSGCN are supported by Grasslands habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Grassland and Shrubland-Ruderal habitat* spans approximately 1.7 million acres across the northeastern U.S., with 107,857 acres secured against conversion to other uses (1.2 % for nature [Gap 1 & 2]; 5 % for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 9% of Grassland and Shrubland-Ruderal habitat in the northeast geography, of which 13% is secured (3% for nature [Gap 1 & 2]; 10% for multiple use [GAP 3]).

**Anderson et al. 2023 do not differentiate between grassland and shrubland. Their naming convention is used for data reporting consistency in this appendix but is separated in Habitat chapter tables and figures.*

Glades, Barrens & Savanna

Extent

Pennsylvania: 54,863 acres
Northeastern U.S.: 1,003,579 acres

General Definition

Open habitat composed of sparse, low, and open vegetation with some tree cover.

Associated Ecological Systems in Pennsylvania

- Appalachian Shale Barrens
- Serpentine Barren/Woodland
- Great Lakes Wooded Dune and Swale
- Northern Appalachian-Acadian Rocky Heath Outcrop
- Central Appalachian Pine-Oak Rocky Woodland
- *Shrubland/grassland mostly ruderal shrublands regenerating clearcuts**

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

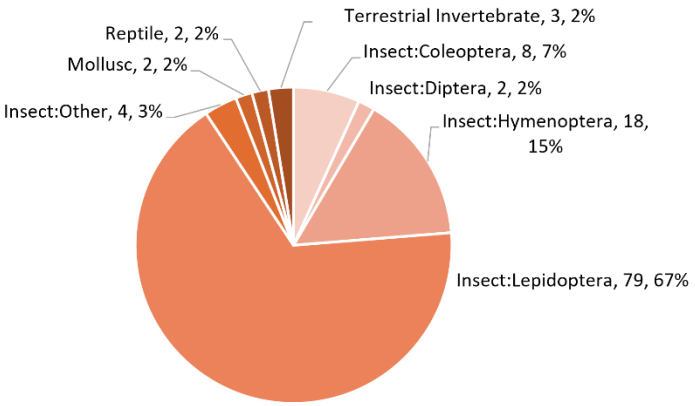
- Serpentine Gravel Forb Community
- Great Lakes Region Dry Sandplain
- Low Heath Shrubland
- Low Heath – Mountain Ash Shrubland
- Rhodora – Mixed Heath Scrub Oak Shrubland
- Scrub Oak Shrubland
- Low Heath Shrubland
- *Reclaimed Mine Area**

**This is not included in PNHP 2012 but used by the Pennsylvania Game Commission in State Game Land cover typing.*

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

118 PA SGCN are primarily associated with this Habitat Type.



77 RSGCN are supported by Glade, Barrens, & Savanna habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Glades, Barrens, & Savanna habitat spans just over 1 million acres across the northeastern U.S., with 34% secured against conversion to other uses (14% for nature [Gap 1 & 2]; 19% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 26% of Glades, Barrens, & Savanna habitat in the northeast geography, of which 10% is secured (1% for nature [Gap 1 & 2]; 9% for multiple use [GAP 3]).

Agriculture: Cropland/Pastures

Extent

Pennsylvania: 6,545,165acres
Northeastern U.S.: 27,851,770 acres

General Definition

Open habitats including cultivated fields, pastures, and hayfields.

Associated Ecological Systems in Pennsylvania

- *Shrubland/grassland mostly ruderal shrublands regenerating clearcuts**

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

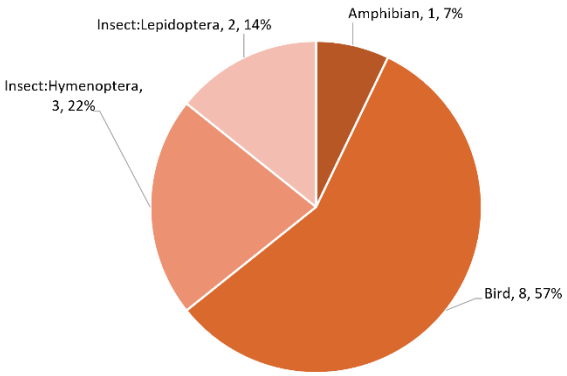
- *Agriculture Herbaceous Area**
- *Old Field Reverting Herbaceous Areas**
- *Cultivated Herbaceous Area**

**This is not included in PNHP 2012 but used by the Pennsylvania Game Commission in State Game Land cover typing.*

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

14 PA SGCN are primarily associated with this Habitat Type.



28 RSGCN are supported by Agriculture: Cropland/Pastures habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Agriculture: Cropland/Pastures span nearly 28 million acres across the northeastern U.S., with 5% secured against conversion to other uses (1 % for nature [Gap 1 & 2]; 4% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 26% of Agriculture: Cropland/Pastures habitat in the northeast geography, of which 2% is secured (1% for nature [Gap 1 & 2]; 1% for multiple use [GAP 3]).

Cliff & Talus

Extent
Pennsylvania: 198,394 acres
Northeastern U.S: 667,681 acres

General Definition

Expanses of bedrock or broken rock generally lacking vascular plants, including vertical or nearly vertical rock outcrops.

Associated Ecological Systems in Pennsylvania

- Acidic Cliff and Talus
- Appalachian Shale Barrens
- Central Interior Calcareous Cliff and Talus
- Circumneutral Cliff and Talus

- North-Central Appalachian Acidic Cliff and Talus
- Northeastern Erosional Bluff
- Northern Appalachian-Acadian Rocky Heath Outcrop

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

- Calcareous Opening/Cliff
- Great Lakes Region Scarp Woodland
- Virginia Pine – Mixed Hardwood Shale Woodland
- Red Cedar – Mixed Hardwood Rich Shale Woodland
- Red Cedar – Prickly Pear Shale Shrubland
- *Acidic Cliff and Talus**

**This community type is not included in PNHP 2012 but used by the Pennsylvania Game Commission in State Game Land cover typing.*

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

Only 1 PA SGCN is primarily associated with this patch Habitat Type, a cellophane bee (*Collete aestivalis*). Several species may be found in talus slopes (e.g., Timber Rattlesnake, Allegheny woodrat) within forested landscapes, though these species' primary habitat is considered Forested Upland.

44 RSGCN are supported by Cliff & Talus habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Cliff & Talus habitat spans approximately 674,700 acres across the northeastern U.S., with 51% secured against conversion to other uses (23% for nature [Gap 1 & 2]; 27% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 30% of Cliff & Talus habitat in the northeast geography, of which 65% is secured (14.3% for nature [Gap 1 & 2]; 50.5% for multiple use [GAP 3]).

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SUBTERRANEAN

Habitats below the soil surface.

Caves & Karst; Mines & Tunnels; Other Subterranean

These three Habitat Types are grouped due to the paucity of data regarding extent and condition of underground habitats.

Extent

Pennsylvania: *unknown*; Horton and San Juan (2022) estimate Pennsylvania has over 1,100 cave systems and 8,220 sites with mine-related features.
Northeastern U.S.: *not evaluated*

General Definitions

Caves & Karst: Subterranean naturally occurring air-filled spaces, ranging in size.

Mines & Tunnels: Human created air-filled spaces below the natural land surface, whether open to daylight or not.

Other Subterranean: all other habitat uses below the soil surface

Associated Ecological Systems in Pennsylvania

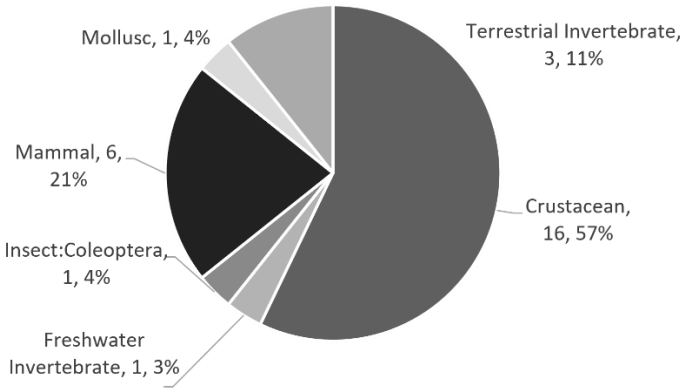
Not applicable.

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

Not applicable.

SGCN Associated with this Habitat

28 PA SGCN are primarily associated with these Habitat Types, principally Cave & Karst (19 SGCN).



15 RSGCN are supported by Subterranean habitats.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics: Unavailable.

DEVELOPED

Terrestrial habitats that are dominated by residential, commercial or industrial land uses, including managed open spaces such as parks, gardens, athletic fields, airports, cemeteries and golf courses.

Developed Areas

Extent

Pennsylvania: 3,719,385 acres
Northeastern U.S.: 15,680,829 acres

General Definition

Same as above.

Associated Ecological Systems in Pennsylvania

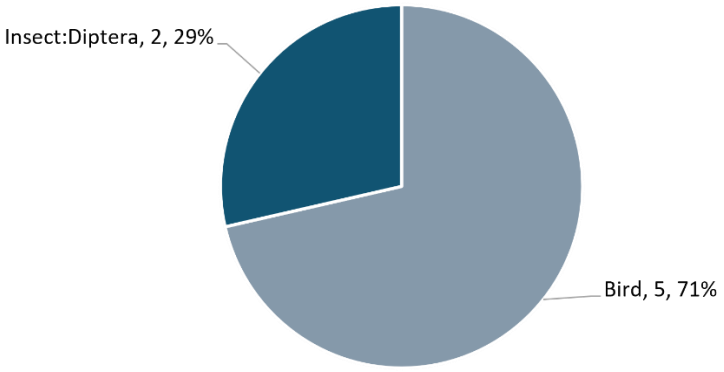
- Barren Land
- Developed

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

Not applicable.

SGCN Associated with this Habitat

7 PA SGCN are primarily associated with this Habitat Type.



12 RSGCN are supported by Developed habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Developed Areas span nearly 15.7 million acres across the northeastern U.S., with 4% secured against conversion to other uses (1% for nature [Gap 1 & 2]; 3% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 22% of Developed Areas habitat in the northeast geography, of which 4% is secured (0% for nature [Gap 1 & 2]; 4% for multiple use [GAP 3]).

RIVERINE

Aquatic habitats characterized by flowing water (i.e., lotic systems).

Big Rivers

Length

Pennsylvania: 706 miles
Northeastern U.S.: 2,638 miles

General Definition

The largest channels, characterized by large perennial flows, large quantities of nutrients and organic matter, high turbidity, and fine sediments. [e.g., Allegheny, Delaware, Monongahela, Susquehanna, Ohio]. The upstream drainage area is > 3,861 square miles (10,000 square kilometers).

Associated Ecological Systems in Pennsylvania

- Warm, Large River
- Open Water

Pennsylvania Aquatic Community Classification (Walsh et al. 2007) Crosswalk

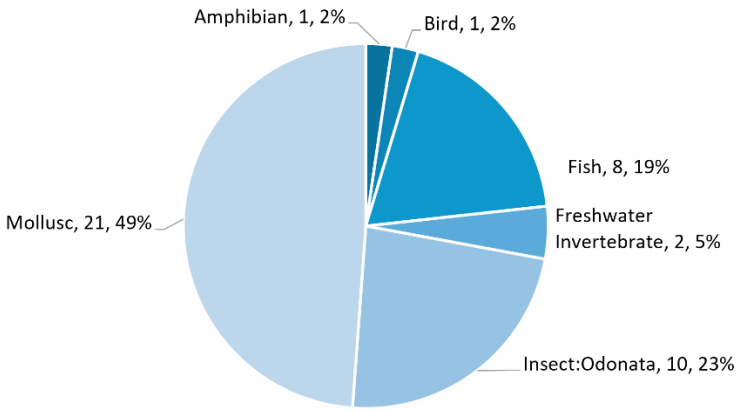
The following Pennsylvania aquatic community types are typically associated with this habitat:

- Atlantic Basin Fish River and Impoundment Community
- Ohio-Great Lakes Basins Fish Large River Community

Visit https://naturalheritage.dcnr.pa.gov/aquaticsUserMan.aspx for community type descriptions.

SGCN Associated with this Habitat

43 PA SGCN are primarily associated with this Habitat Type.



25 RSGCN are supported by Big Rivers habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

See "Pennsylvania Riverine habitat responsibility within the northeastern U.S. and conservation securement metrics" below.

Rivers and Streams

Extent

Pennsylvania: 53,477 miles
Northeastern U.S.: 190,938 miles

General Definition

Perennial tributaries to big rivers with upstream drainage areas ranging from < 4 square miles (10 square kilometers) for headwater streams, to 3861 square miles (10, 000 square kilometers) for mainstem rivers.

Associated Ecological Systems in Pennsylvania

- High Gradient, Cold, Headwaters and Creeks
- High Gradient, Cool, Headwaters and Creeks
- High Gradient, Warm, Headwaters and Creeks
- Moderate Gradient, Cold, Headwaters and Creeks
- Moderate Gradient, Cool, Headwaters and Creeks
- Moderate Gradient, Warm, Headwaters and Creeks
- Low Gradient, Cool, Headwaters and Creeks
- Low Gradient, Warm, Headwaters and Creeks
- Moderate Gradient, Cool, Small River
- Moderate Gradient, Warm, Small River
- Low Gradient, Cool, Small River
- Low Gradient, Warm, Small River
- Cool, Medium River
- Warm, Medium River
- Open Water

- Pennsylvania Aquatic Community Classification (Walsh et al. 2007) Crosswalk

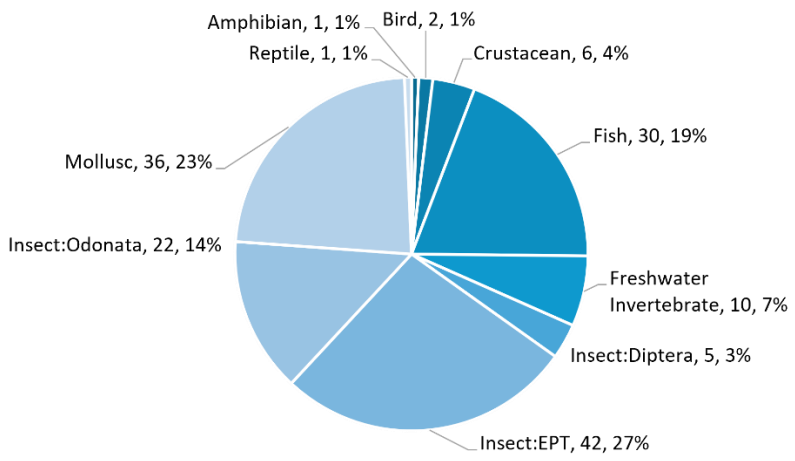
  The following Pennsylvania aquatic community types are typically associated with this habitat:

  - Atlantic Basin Fish Coldwater Community
  - Atlantic Basin Fish Coolwater Community
  - Atlantic Basin Fish Coolwater Community 1
  - Atlantic Basin Fish Coolwater Community 2
  - Atlantic Basin Fish Warmwater Community 1
  - Atlantic Basin Fish Warmwater Community 2
  - Ohio-Great Lakes Basins Fish Coldwater Community
  - Ohio-Great Lakes Basins Fish Coolwater Stream Community
  - Ohio-Great Lakes Basins Fish Warmwater Stream Community
  - Ohio-Great Lakes Basins Mussels Fluted Shell Mussel Community
  - Susquehanna – Potomac River Basins Mussels Eastern Elliptio Community

  Visit https://naturalheritage.dcnr.pa.gov/aquaticsUserMan.aspx for community type descriptions.

SGCN Associated with this Habitat

155 PA SGCN are primarily associated with this Habitat Type.



167 RSGCN are supported by Rivers & Streams habitat.

<u>Pennsylvania Riverine habitat (Big Rivers, Streams and Rivers) responsibility within the northeastern U.S. and conservation securement metrics</u>

Vegetated riparian areas along streams and rivers provide water quality and quantity protection and, if large enough (≥ 75 feet), wildlife habitat (Welsh 1991; Palone et al. 1997). Thus, to evaluate lotic system securement in the northeastern U.S., Anderson et al. (2023) evaluated the proportion of natural land areas conserved to proportion of riparian area converted to agriculture or developed land within 300 ft of rivers and streams, collectively.

Big Rivers and Rivers and Streams riparian areas span over 15.3 million acres across the northeastern U.S., with 24% secured against conversion to other uses (7% for nature [Gap 1 & 2]; 17% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 20% of Riverine riparian acres in the northeast geography, of which 25% is secured (3% for nature [Gap 1 & 2]; 21% for multiple use [GAP 3]).

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LACUSTRINE

Perennial water bodies (i.e., lentic systems).

Great Lakes

Extent

Pennsylvania: 314,880 acres (Lake Erie watershed drainage area)
Northeastern U.S.: Lake Erie

General Definition

Lakes >100,000 acres. Lake Erie is the only Great Lake in Pennsylvania.

Associated Ecological Systems in Pennsylvania

- Open Water

Pennsylvania Aquatic Community Classification (Walsh et al. 2007) Crosswalk

Not applicable.

SGCN Associated with this Habitat

5 PA SGCN fishes are primarily associated with Lake Erie. These include Burbot - Lake Erie population (*Lota lota pop. 3*), Cisco (*Coregonus artedi*), Lake Sturgeon (*Acipenser fulvescens*), Lake Whitefish (*Coregonus clupeaformis*), and Spotted Gar (*Lepisosteus oculatus*).

16 RSGCN are supported by Great Lakes habitat (inclusive of Lake Erie, Lake Ontario and, though not officially a Great Lake, Lake Champlain).

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Anderson et al. (2023) group Lake Erie, Lake Ontario, and Lake Champlain acreage and conserved land statistics. Combined, they report 32,777 natural acres within 0.06 mi (100 meters) of the shoreline, with 18% secured against conversion to other uses (~6% for nature [Gap 1 & 2]; 13% for multiple uses [GAP 3]). Pennsylvania hosts only 63 miles of shoreline on Lake Erie, with 31 properties conserved by the state (Pennsylvania Game Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, Pennsylvania Historical & Museum Commission, Pennsylvania Department of Environmental Protection), the county, municipalities, and private landowners. In the Chautauqua-Conneaut drainage basin to Lake Erie, conserved lands account for approximately 8% of the watershed area (WeConservePA 2026).

Lakes & Ponds

Extent

Pennsylvania: 194,277 acres
Northeastern U.S.: 2,702,000 acres

General Definition

Naturally occurring, freshwater bodies ranging from 2 to >10,000 acres in size.

Associated Ecological Systems in Pennsylvania

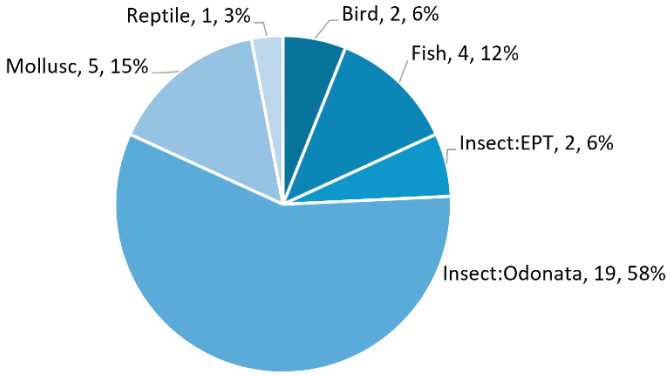
- Very Cold, Oligo-Mesotrophic, Alkaline
- Very Cold, Oligo-Mesotrophic, Circumneutral
- Very Cold, Oligo-Mesotrophic, Acidic
- Very Cold, Eutrophic, Alkaline
- Very Cold, Eutrophic, Circumneutral
- Very Cold, Eutrophic, Acidic
- Cold, Oligo-Mesotrophic, Alkaline
- Cold, Oligo-Mesotrophic, Circumneutral
- Cold, Oligo-Mesotrophic, Acidic
- Cold, Eutrophic, Alkaline
- Cold, Eutrophic, Circumneutral
- Cold, Eutrophic, Acidic
- Warm to Cool, Oligo-Mesotrophic, Alkaline
- Warm to Cool, Oligo-Mesotrophic, Circumneutral
- Warm to Cool, Oligo-Mesotrophic, Acidic
- Warm to Cool, Eutrophic, Alkaline
- Warm to Cool, Eutrophic, Circumneutral
- Warm to Cool, Eutrophic, Acidic
- Open Water

Pennsylvania Aquatic Community Classification (Walsh et al. 2017) Crosswalk

Not applicable. A Pennsylvania lentic system community classification has not yet been developed.

SGCN Associated with this Habitat

33 PA SGCN are primarily associated with this Habitat Type.



63 RSGCN are supported by Lakes & Ponds habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Lake and ponds span over 2.7 million acres across the northeastern U.S., of which there are approximately 1,907,293 natural acres within 0.06 miles (100 meters) of the shoreline. 30% of these acres are secured against conversion to other uses (10% for nature [Gap 1 & 2]; 20% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 7% of lakes and ponds habitat in the northeast geography, of which there are approximately 188,498 natural acres within 0.06 miles (100 meters) of the shoreline. 29% of this area is secured (3% for nature [Gap 1 & 2]; 26% for multiple use [GAP 3]).

LAND - WATER INTERFACE

The zone where terrestrial and aquatic habitats meet and interact, with a boundary that shifts in space, over time, and under different weather conditions.

Riparian & Floodplains; Shorelines

Extent

Pennsylvania: 157,739 acres
Northeastern U.S.: 2,199,376 acres

General Definition

Riparian & Floodplains: A zone of habitats directly associated with stream sides that may be periodically flooded.

Shorelines: Non-beach and dune habitat bordering large waterbodies where vegetation is limited by fluctuating water levels, waves and/or tides.

Associated Ecological Systems in Pennsylvania

- Central Appalachian River Floodplain
- Central Appalachian Stream and Riparian
- Great Lakes Alkaline Rocky Shore and Cliff
- North-Central Appalachian Large River Floodplain
- North-Central Appalachian River Floodplain
- North-Central Interior Large River Floodplain
- North-Central Interior Large River Floodplain
- North-Central Interior Large River Floodplain
- North-Central Interior River Floodplain
- South-Central Interior Large Floodplain

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

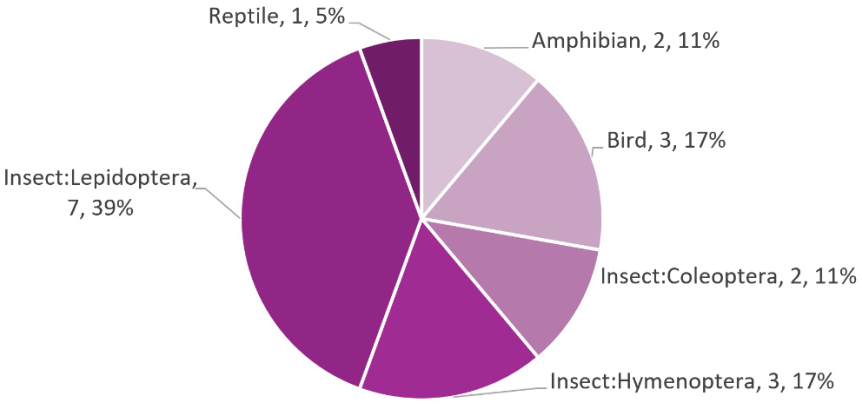
- Alder – Dogwood Floodplain Thicket
- Big Bluestem – Indian-grass Floodplain Grassland
- Bitternut Hickory Floodplain Forest
- Black Willow Floodplain Thicket
- Buttonbush Wetland
- Floodplain Meadow
- Floodplain Scour Community
- Freshwater Tidal Mixed High Marsh
- Green Ash – Mixed Hardwood Floodplain Forest
- Hairy-fruit Sedge (*Carex trichocarpa*) Floodplain Wetland
- Japanese Knotweed Floodplain Thicket
- Lizard's-tail Emergent Bed
- Mixed Hardwood Floodplain Thicket
- Oak – Mixed Hardwood Palustrine Forest
- Periodically Exposed Shoreline Community
- Red Maple – Elm – Willow Floodplain Forest
- Red Maple – Magnolia Palustrine Forest
- Reed Canary-grass Floodplain Grassland
- Silver Maple Floodplain Forest
- Sugar Maple – Mixed Hardwood Floodplain Forest
- Sycamore – Mixed Hardwood Floodplain Forest
- Sycamore Floodplain Forest
- Twisted Sedge (*Carex torta*) Stream Margin

- Water-willow (*Justicia americana*) – Smartweed Riverbed Community
- Willow – Indian-grass Floodplain Shrub Wetland
- Periodically Exposed Shoreline Community
- Floodplain Scour Community
- Great Lakes Alkaline Rocky Shore and Cliff

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

19 PA SGCN are primarily associated with the Riparian & Floodplains Habitat Type



132 RSGCN are supported by Riparian & Floodplains habitat and 29 are associated with Shorelines.

Only 1 PA SGCN are primarily associated with this Habitat Type, Spotted Sandpiper (*Actitis macularius*).

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Land-water interface habitats (i.e., riparian and floodplains, shorelines) span nearly 2.2 million acres across the northeastern U.S., with 29% secured against conversion to other uses (12% for nature [Gap 1 & 2]; 17% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 7% of land-water interface habitat in the northeast geography, of which 25% is secured (5% for nature [Gap 1 & 2]; 20% for multiple use [GAP 3]).

Beaches & Dunes

Extent

Pennsylvania: 63 miles (Lake Erie shoreline)
Northeastern U.S.: Not available

General Definition

Habitat dominated by sand deposits where wind, tides, and/or waves (current or historical) shape substrate; vegetation is often sparse or absent.

Associated Ecological Systems in Pennsylvania

- Great Lakes Wooded Dune and Swale

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

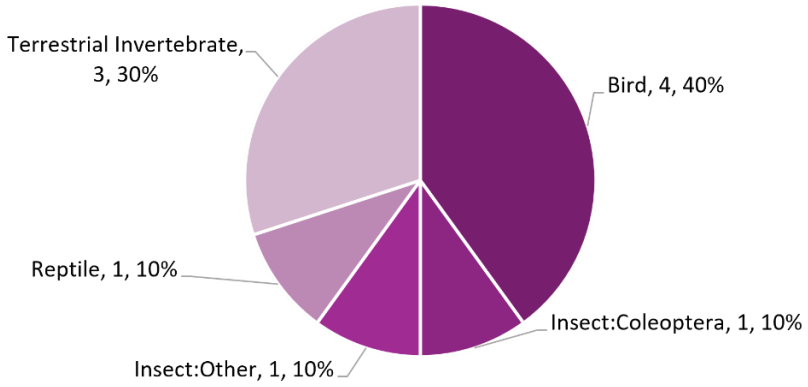
The following Pennsylvania Community Types are typically associated with this habitat:

- Great Lakes Region dry sandplain
- Great Lakes Bayberry – Mixed Shrub Wetland
- Great Lakes Palustrine Sandplain
- Great Lakes Region bayberry - cottonwood community

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

10 PA SGCN are primarily associated with this Habitat Type.



27 RSGCN are supported by Beaches & Dunes habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Anderson et al. (2023) did not assess northeast regional conservation status of this habitat type, so relative metrics are not available. However, because Pennsylvania's only beach and dune habitat is found along Lake Erie, see the Great Lakes section.

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PALUSTRINE

Areas where water either covers the soil or is present at or near the surface of the soil for at least some portion of the year.

Non-Tidal Wetlands

Extent

Pennsylvania: 382,780 acres
Northeastern U.S.: 8,385,560 acres

General Definition

Wet areas, with or without emergent vegetation.

Associated Ecological Systems in Pennsylvania

- Central Interior Highlands and Appalachian Sinkhole and Depression Pond
- High Allegheny Wetland
- North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest
- North-Central and Northeastern Seep
- North-Central Appalachian Acidic Swamp
- North-Central Interior and Appalachian Acidic Peatland
- North-Central Interior and Appalachian Rich Swamp
- North-Central Interior Appalachian Seepage Fen
- North-Central Interior Freshwater Marsh
- North-Central Interior Shrub-Graminoid Alkaline Fen
- North-Central Interior Wet Flatwoods
- North-Central Interior Wet Meadow-Shrub Swamp
- Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

The following Pennsylvania Community Types are typically associated with this habitat:

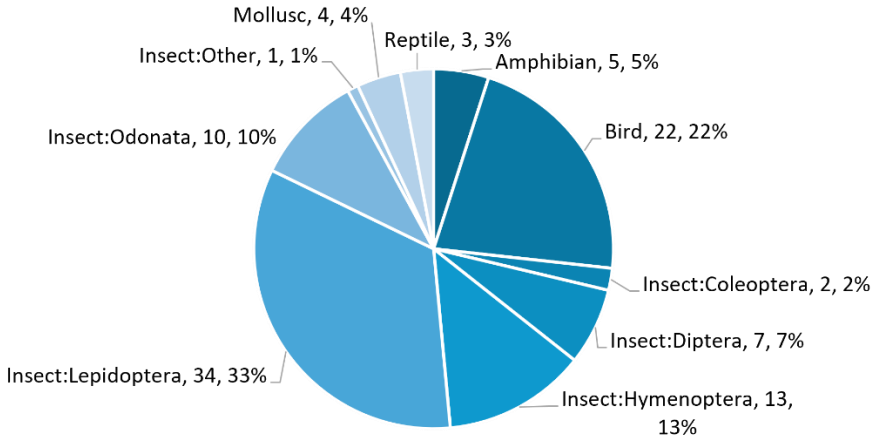
- Black Spruce – Tamarack Palustrine Woodland
- Bluejoint – Reed Canary-grass Marsh
- Buttonbush Wetland
- Cat-tail Marsh
- Circumneutral Mixed Shrub Wetland
- Common Reed Marsh
- Hemlock – Mixed Hardwood Palustrine Forest
- Hemlock – Mixed Hardwood Palustrine Woodland
- Hemlock Palustrine Forest
- Highbush Blueberry – Meadow-sweet Wetland
- Mixed Forb – Graminoid Wet Meadow
- Mixed Forb Marsh
- Oak – Mixed Hardwood Palustrine Forest
- Pitch Pine – Leatherleaf Palustrine Woodland
- Red Maple – Black Ash Palustrine Forest
- Red Maple – Black-gum Palustrine Forest
- Red Maple – Highbush Blueberry Palustrine Woodland
- Red Maple – Magnolia Palustrine Forest
- Red Maple – Mixed shrub Palustrine Woodland
- Red Maple – Sedge Palustrine Woodland

- Red Spruce – Mixed Hardwood Palustrine Forest
- Red Spruce – Mixed Hardwood Palustrine Woodland
- Red Spruce Palustrine Forest
- Water-willow (*Decodon verticillatus*) Shrub Wetland
- Wool-grass – Mannagrass Mixed Shrub Marsh
- Elm – Ash – Maple Lakeplain Forest
- Pickerel-weed – Arrow-arum – Arrowhead Emergent Wetland
- Spatterdock – Water-lily Emergent Wetland
- Acidic Mixed Shrub – Sphagnum Wetland
- Alder-leaved Buckthorn – Inland Sedge – Golden Ragwort Shrub Fen
- Black Spruce – Tamarack Peatland Forest
- Cotton-grass Poor Fen
- Highbush Blueberry – Sphagnum Wetland
- Leatherleaf – Bog-rosemary Bog
- Leatherleaf – Cranberry Bog
- Leatherleaf – Sedge Wetland
- Many-Fruited Sedge – Bladderwort Poor Fen
- Poison Sumac – Red-cedar – Bayberry Fen
- Sedge – Mixed Forb Fen
- Sphagnum – Beak-rush Peatland
- Sweet-gale – Leatherleaf Shrub Fen

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

101 PA SGCN are primarily associated with this Habitat Type.



120 RSGCN are supported by Non-Tidal Wetlands habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Non-tidal wetlands (e.g., emergent herbaceous wetland, woody wetland) span nearly 8.5 million acres across the northeastern U.S., with 25% secured against conversion to other uses (9% for nature [Gap 1 & 2]; 15% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 5% of non-tidal wetlands habitat in the northeast geography, of which 26% is secured (4% for nature [Gap 1 & 2]; 22% for multiple use [GAP 3]).

Vernal Pools/Ephemeral Wetlands

Extent

Pennsylvania: 1,576* field documented vernal pools statewide (count)
Northeastern U.S.: *Not available*

*this is an underestimate of all vernal pools in the state but is the best available information at time of publication.

General Definition

Small depressions in which surface water is present for an extended period in the spring but is absent by the end of the season in most years.

Associated Ecological Systems in Pennsylvania

- Central Interior Highlands and Appalachian Sinkhole and Depression Pond

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

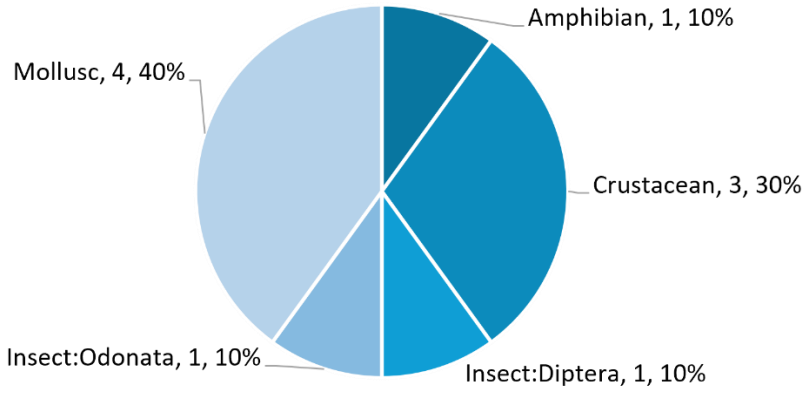
The following Pennsylvania Community Types are typically associated with this habitat:

- Rice Cutgrass – Bulrush Vernal Pool
- Sparsely Vegetated Vernal Pool Community
- Wool-grass – Mannagrass Mixed Shrub Marsh
- Buttonbush Wetland
- Oak – Mixed Hardwood Palustrine Forest

Visit https://naturalheritage.dcnr.pa.gov/Uplands.aspx for community type descriptions.

SGCN Associated with this Habitat

10 PA SGCN are primarily associated with this Habitat Type.



Vernal Pool/Ephemeral Wetland RSGCN are included in Non-Tidal Wetlands statistics.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Northeastern U.S. vernal pool statistics are unavailable. In Pennsylvania, we evaluated securement of more than 1,500 verified vernal pools by intersecting a 100-meter buffer around the vernal pool with

the conserved land database. Of 7,474 total acres within the buffer area, 66% is secured against conversion to other uses (36% conserved for nature [GAP 1 & 2]; 30% conserved for multiple use [GAP 3]). Land managers and researchers contributed many of the vernal pool locations while on public land, which likely accounts for the high proportion of conserved land surrounding known vernal pools.

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ESTUARINE

Subtidal (continuously submerged) open brackish water, excluding river mouths.

Estuaries

Extent

Pennsylvania: 41 acres
Northeastern U.S.: 9,086,688 acres

General Definition

Subtidal (continuously submerged) open brackish water, excluding river mouths.

Associated Ecological Systems in Pennsylvania

- Coastal Plain Estuary
- Open Water

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

Not applicable.

SGCN Associated with this Habitat

No PA SGCN are primarily associated with this Habitat Type.

43 RSGCN are supported by Estuaries habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Estuaries span over 9 million acres across the northeastern U.S., with only about 2% protected. Comparatively, Pennsylvania hosts about 0.0005% of estuarine habitat in the northeast geography, of which 100% is protected. (GAP metrics are unavailable.)

Tidal Rivers & Streams

Extent

Pennsylvania: 51 miles
Northeastern U.S.: 8,420 miles

General Definition

Lower reaches of flowing water with brackish water and tidal influence.

Associated Ecological Systems in Pennsylvania

- Tidal Headwaters and Creeks
- Tidal Small-Medium Rivers
- Tidal Large Rivers
- Open Water

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

Not applicable.

SGCN Associated with this Habitat

Only 1 PA SGCN is primarily associated with this Habitat Type, Big Bluet [damselfly] (*Enallagma durum*).

26 RSGCN are supported by Tidal Rivers & Streams habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Tidal rivers and streams span over 8,000 miles across the northeastern U.S., with 12% secured against conversion to other uses (9% for nature [Gap 1 & 2]; 3% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts 5% of tidal rivers and streams habitat in the northeast geography, of which 9% is secured (2% for nature [Gap 1 & 2];7% for multiple use [GAP 3]).

Tidal Wetlands & Flats

Extent

Pennsylvania: 1,713 acres
Northeastern U.S.: 1,046,027 acres

General Definition

Wetlands, with or without emergent vegetation, that are strongly influenced by tidal forces.

Associated Ecological Systems in Pennsylvania

- Northern Atlantic Coastal Plain Fresh and Oligohaline Tidal Marsh
- Northern Atlantic Coastal Plain Tidal Salt Marsh
- Northern Atlantic Coastal Plain Tidal Swamp

Pennsylvania Terrestrial and Palustrine Community Classification (PNHP 2012) Crosswalk

Not applicable.

SGCN Associated with this Habitat

Only 2 PA SGCN are primarily associated with this Habitat Type, A crane fly (*Tipula subeluta*) and Seaside Dragonlet [dragonfly] (*Erythrodiplax berenice*).

38 RSGCN are supported by Tidal Wetlands & Flats habitat.

Pennsylvania habitat responsibility within the northeastern U.S. and conservation securement metrics

Tidal wetlands and flats span over 1 million acres across the northeastern U.S., with 51% secured against conversion to other uses (31% for nature [Gap 1 & 2]; 20% for multiple uses [GAP 3]). Comparatively, Pennsylvania hosts about 0.2% of tidal wetlands and flats habitat in the northeast geography, of which 30% is secured (28% for nature [Gap 1 & 2] at John Heinz Wildlife Refuge; 2% for multiple use [GAP 3]).