

New Hampshire Wildlife and Habitats at Risk

Abstract

All wildlife species native to New Hampshire were eligible for identification as Species of Greatest Conservation Need (SGCN), including game species, non-game species, fish and marine animals. A number of species prioritization lists and expert review processes were used to determine which species should be included as SGCN. A total of 169 species are identified as SGCN in the 2015 Wildlife Action Plan, of which 27 species are listed as state endangered and 14 listed as state threatened. In the 2005 Wildlife Action Plan 118 species were listed as SGCN, and all but 13 of the 2005 SGCN are included in the 2015 revision. The Wildlife Action Plan also identifies 27 distinct habitats that support both common species and species of greatest conservation need. By identifying and protecting high quality examples of all of New Hampshire's natural communities, all of the state's native wildlife species will have access to intact habitats.

Overview

New Hampshire is home to over 500 vertebrate species and thousands of invertebrates. Many of these are common species that thrive in the state's diverse landscapes and provide enjoyment through wildlife observation, hunting, fishing, and trapping. This chapter describes the process of determining which species are in trouble – declining in numbers, squeezed into smaller patches of habitat, and threatened by a host of issues. These species are designated as Species of Greatest Conservation Need (SGCN). They include not only species on the NH Endangered Species list, but also those that are not yet seriously threatened. The habitats that these species inhabit are also discussed, as are the relationships between diverse habitat types. The details of the condition of each species and their habitat needs are discussed in Appendix A.

This chapter and the associated species profiles address Element 1 of the NAAT Guidelines, “the distribution and abundance of species of wildlife, including low and declining populations as each State fish and wildlife agency deemed appropriate, that are indicative of the diversity and health of wildlife of the State.” In this chapter we describe the process of selecting Species of Greatest Conservation Need and the Wildlife Action Plan's focal habitats, as well as the development and maintenance of several databases to store and manage data about species and habitats.

Species of Greatest Conservation Need (SGCN)

Selecting Species

All wildlife species native to New Hampshire were eligible for identification as SGCN (Table 2-1). Non-game species, game species, fish and marine animals were evaluated regardless of taxonomic group. Long-term datasets exist for some species, but little is known about many other species,

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especially many invertebrates (e.g., snails, mayflies), and some fish, reptiles and amphibians. To update the SGCN list, these groups will require directed attention in the future (Table 2-2).

The following information sources were used when selecting and prioritizing New Hampshire's Species of Greatest Conservation Need.

1. Species of Greatest Conservation Need from NH WAP 2005

118 species were listed as SGCN in NH's 2005 Wildlife Action Plan. All but 13 of the 2005 SGCN were included in the 2015 revision (Table 2-3).

2. Regional Species of Greatest Conservation Need

The Northeast Fish and Wildlife Diversity Technical Committee developed a list of species of regional conservation concern (Terwilliger Consulting 2013). All species that were listed on the regional list and are known to occur in NH were considered for inclusion in the NH SGCN list. Birds and marine animals that were considered occasional or accidental in NH were excluded from the NH SGCN list. Species were prioritized for selection based on the following criteria:

- Regional conservation concern – The NH SGCN list includes species listed as 'Very High' or 'High'.
- Regional responsibility – Species listed as 'High' responsibility, meaning the majority of the species' global range occurs in the northeast United States, were evaluated for inclusion within the NH SGCN list. Many of these high regional responsibility species that were determined to have low conservation concern in NH were split out into a separate list of regional responsibility, non-SGCN (Table 2-4).

3. Endangered and Threatened Species Lists

All species listed as endangered or threatened in New Hampshire (updated September 2008), and those federally listed under the Endangered Species Act (1973) that are known to occur in New Hampshire were included. New Hampshire currently has 27 species listed as state endangered and 14 listed as state threatened. Species listed on the International Union for Conservation of Nature (IUCN) Red List as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Near Threatened (NT) were evaluated for inclusion.

4. Representative Species

Species listed as representative species by the USFWS Landscape Conservation Cooperative were evaluated for inclusion to the NH WAP.

5. Natural Heritage Rank: Animal Tracking List

Species tracked in the NHNH rare species database (Biotics) and listed in the Animal Tracking List (2014) were considered for inclusion in the SGCN. The rare species database was used to determine the number of known occurrences of each species in New Hampshire. Species with a state rank of S1 (at very high risk of extinction due to extreme rarity, often 5 or fewer populations, very steep declines, or other factors) or S2 (at high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors) were included in the draft SGCN list. Invertebrates that were ranked as S1-S2 were incorporated in the list of SGCN if adequate knowledge of those species' distributions and abundances was available.

6. Taxonomic Groups and Experts

Conservation prioritizations are available for some species groups through prominent organizations and planning systems (e.g. Partners in Flight, National Marine Fisheries Service, and Partnership for Amphibian and Reptile Conservation). Species were considered based on comments made by taxonomic experts. For example, ornithologists considered priority species listed in a variety of bird plans (e.g., Partners in Flight, United States Shorebird Conservation Plan, North American Waterfowl Management Plan, etc.) and professional knowledge.

Additional criteria used to determine a species' status in the state included the following:

- Distribution and abundance in New Hampshire and the Northeast
- Statewide, regional, or global population trends
- The status and risk to the species
- Status and risk to species' habitat in New Hampshire
- Species vulnerability due to life-history traits
- Information available to assess species status, trends, and threats.

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Table 2-1. NH Species of Greatest Conservation Need (n= 169), NH Wildlife Action Plan 2015. E = NH endangered (List revised 2008), T = NH threatened (List revised 2008), C = NH species of special concern (List revised 2009), *Federally threatened, **Federally endangered.

Mammals

American Marten (T)
American Water Shrew (Eastern)
Big Brown Bat
Canada Lynx (E)*
Eastern Red Bat (C)
Eastern Small-footed Bat (E)
Fin Whale
Eastern Wolf (E)**
Hoary Bat (C)
Humpback Whale
Little Brown Bat
Long-tailed Shrew
Moose
New England Cottontail (E)
North Atlantic Right Whale
Northern Bog Lemming (C)
Northern Long-eared Bat (T)*
Rock vole
Silver-haired Bat (C)
Southern Bog Lemming
Tricolored Bat (C)

Birds

American Black Duck
American Kestrel (C)
American Pipit (C)
American Three-toed Woodpecker (T)
American Woodcock
Bald Eagle (T)
Bank Swallow (C)
Bay-breasted Warbler
Bicknell's Thrush (C)
Black-billed Cuckoo
Blue-winged Warbler (C)
Bobolink
Brown Thrasher
Canada Warbler
Cape May Warbler
Cerulean Warbler (C)
Chimney Swift
Cliff Swallow (C)
Common Gallinule (C)
Common Loon (T)
Common Nighthawk (E)
Common Tern (T)
Eastern Meadowlark (C)
Eastern Towhee

Eastern Whip-poor-will
Field Sparrow
Golden Eagle (E)
Golden-winged Warbler
Grasshopper Sparrow (T)
Horned Lark (C)
Least Bittern (C)
Least Tern (E)
Marsh Wren
Nelson's Sparrow (C)
Northern Goshawk
Northern Harrier (E)
Olive-sided Flycatcher (C)
Peregrine Falcon (T)
Pied-billed Grebe (T)
Piping Plover (E)*
Prairie Warbler
Purple Finch
Purple Martin (C)
Purple Sandpiper
Red Knot*
Roseate Tern (E)**
Ruddy Turnstone
Ruffed Grouse
Rusty Blackbird (C)
Saltmarsh Sparrow (C)
Sanderling
Scarlet Tanager
Seaside Sparrow (C)
Sedge Wren (E)
Semipalmated Sandpiper
Sora (C)
Spruce Grouse (C)
Upland Sandpiper (E)
Veery
Vesper Sparrow (C)
Whimbrel
Willet (C)
Wood Thrush

Reptiles

Blanding's Turtle (E)
Eastern Box Turtle (C)
Eastern Hog-nosed Snake (E)
Eastern Ribbonsnake
Northern Black Racer (T)
Smooth Greensnake (C)
Spotted Turtle (T)

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Timber Rattlesnake (E)
Wood Turtle (C)

Amphibians

Blue-spotted Salamander complex (C)
Fowler's Toad (C)
Marbled Salamander (E)
Mink Frog
Northern Leopard Frog (C)

Fish

Alewife (C)
American Brook Lamprey (E)
American Eel (C)
American Shad (C)
Atlantic Sturgeon
Banded Sunfish (C)
Blueback Herring (C)
Bridle Shiner (T)
Brook Trout
Burbot
Finescale Dace (C)
Lake Trout
Lake Whitefish (C)
Northern Redbelly Dace (C)
Rainbow Smelt (C)
Redfin Pickerel (C)
Round Whitefish (C)
Sea Lamprey (C)
Shortnose Sturgeon (E)**
Swamp Darter (C)

Marine Invertebrates

American Oyster
Atlantic Sea Scallop
Horseshoe Crab
Northern Shrimp
Softshell Clam

Freshwater Mussels

Alewife Floater
Brook Floater (E)
Creper
Dwarf Wedgemussel (E)**
Eastern Pearlshell
Eastern Pondmussel (C)
Triangle Floater

Dragonflies & Damselflies

Coppery Emerald (C)
Kennedy's Emerald
Lyre-tipped Spreadwing
Ocellated Emerald
Pine Barrens Bluethroat (C)
Rapids Clubtail (C)
Ringed Boghaunter (E)
Ringed Emerald
Sedge Darner
Skillet Clubtail (C)

Butterflies & Moths

A Noctuid Moth
Barrens Itame (C)
Barrens Xylotype (C)
Broad-lined Catopyrrha (C)
Cora Moth (Bird Dropping Moth) (C)
Edward's Hairstreak
Frosted Elfin (E)
Graceful Clearwing
Hessel's Hairstreak
Karner Blue Butterfly (E)**
Monarch
New Jersey Tea Span Worm
Persius Duskywing Skipper (E)
Phyllira Tiger Moth (C)
Pine Pinion Moth (T)
Pinion Moth
Sleepy Duskywing (C)
Twilight Moth
White Mountain Arctic (T)
White Mountain Fritillary (E)
Zale sp. 1 nr. lunifera

Bumblebees

American Bumble Bee
Rusty-patched Bumble Bee
Yellow Bumble Bee
Yellowbanded Bumble Bee

Tiger Beetles

Appalachian Tiger Beetle
Cobblestone Tiger Beetle (E)
Puritan Tiger Beetle (E)*
Margined Tiger Beetle

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Table 2-2. Species and species guilds that were not included as NH SGCN 2015 but were identified as species in need of additional information to assess future SGCN listing. Additional information needed may include distribution, condition, or threats. A brief justification for inclusion is provided after species names.

Mammals (Non-Marine)

- Least Weasel (*Not tracked, need further info/data to evaluate, unaware of documented occurrences in NH.*)

Mammals (Marine)

- Harbor Porpoise (*Undergo an annual stock assessment. Data needed for NH jurisdictional waters.*)

Birds (*All species have declined at an annual rate of at least 1.5% since 1966.*)

- American Bittern (*moved from SGCN 2005*)
- Green Heron
- Killdeer
- Spotted Sandpiper
- Northern Flicker
- Eastern Wood-Pewee
- Yellow-bellied Flycatcher
- Least Flycatcher
- Eastern Kingbird
- Tree Swallow
- Barn Swallow
- Boreal Chickadee
- Northern Waterthrush
- Black-and-white Warbler
- Tennessee Warbler
- Nashville Warbler
- American Redstart
- Yellow Warbler
- Blackpoll Warbler
- Savannah Sparrow
- White-throated Sparrow
- Dark-eyed Junco
- Rose-breasted Grosbeak
- Common Grackle
- Brown-headed Cowbird
- Baltimore Oriole
- Evening Grosbeak

Reptiles

- Musk Turtle (*comment received during SGCN draft review; limited population information*)

Amphibians

- Four-toed Salamander (*very limited records in NH*)
- Northern Spring Salamander (*limited records in NH*)

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Fish

- Atlantic Menhaden (*use Great Bay for juvenile habitat, however, may not have stock issue*)
- Smooth Flounder (*found in NH, experiencing fishing pressure*)
- Eastern Silvery Minnow (*distribution data needed*)
- Banded Killifish (*distribution data needed*)
- Spottail Shiner (*distribution data needed*)

Sharks, Rays, & Skates (*multiple species on regional SGCN list.*)

Tiger Beetles

- Northern Barrens Tiger Beetle (*Cicindella patruela*) (believed extirpated, but no systematic surveys; RSGCN)
- Common Claybank Tiger Beetle (*Cicindella limbalis*) (no recent records, status uncertain)

Butterflies & Moths (*historic data compiled but additional distribution data warranted*)

Mayflies (*sensitive to water quality*)

Freshwater mussels (*additional species added to SGCN – group of conservation concern*)

Freshwater snails (*Johnson et al. 2013 identified group as high conservation concern*)

Crayfish (*limited information on status of native populations*)

Marine invertebrates

Table 2-3. Species removed from the Species in Greatest Conservation Need list for the 2015 NH Wildlife Action Plan Revision and justification comments for removal.

Common Name	Scientific Name	Comments
American Bittern	<i>Botaurus lentiginosus</i>	Population stable/increase
Arctic Char	<i>Salvelinus alpinus oquassa</i>	Species extirpated
Atlantic Salmon	<i>Salmo salar</i>	Species extirpated
Black Guillemot	<i>Cephus grylle</i>	Peripheral in NH
Bobcat	<i>Lynx rufus</i>	Population stable/increase
Coopers Hawk	<i>Accipiter cooperii</i>	Population stable/increase
Great Blue Heron	<i>Ardea herodias</i>	Population stable/increase
Indiana Myotis	<i>Myotis sodalis</i>	Not regular occurrence in NH
Osprey	<i>Pandion haliaetus</i>	Population stable/increase
Palm Warbler	<i>Selophaga palmarum</i>	Population stable/increase
Pine Barrens Zanclognatha Moth	<i>Zanclognatha martha</i>	Population stable/increase
Red-shouldered Hawk	<i>Buteo lineatus</i>	Population stable/increase
Tessellated Darter	<i>Etheostoma olmstedii</i>	Population stable/increase

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Table 2-4. Species of high responsibility in the northeast United States and generally considered low conservation concern in New Hampshire. These species are not considered SGCN in New Hampshire, but will be used in some conservation planning and implementation such as monitoring indicators.

Mammals	Fish	Freshwater Mussels
Hairy-tailed Mole	Atlantic Herring	Eastern Lampmussel
Smoky Shrew	Atlantic Mackerel	
Star-nosed Mole	Atlantic Silverside	Sharks, Rays, & Skates
Woodland Jumping Mouse	Atlantic Tomcod	Little Skate
	Cunner	Smooth Skate
Birds	Eastern Silvery Minnow	Spiny Dogfish
Northern Gannet*	Fallfish	Thorny Skate
Red-throated Loon*	Fourspine Stickleback	Winter Skate
Razorbill*	Goosefish	
White-winged Scoter*	Longhorn Sculpin	Dragonflies &
Long-tailed Duck*	Mummichog	Damselflies**
Red-necked Phalarope*	Ocean Pout	Ebony Boghaunter
Ipswich Sparrow	Red Hake	Elfin Skimmer
	Redbreast Sunfish	Little Bluet
Reptiles	Sea Raven	Martha's Pennant
Brownsnake	Silver Hake	New England Bluet
Northern Ring-necked Snake	Striped Killifish	Scarlet Bluet
	Windowpane	Ski-tipped Emerald
Amphibians	Winter Flounder	White Corporal
Northern Dusky Salamander		
Northern Two-lined Salamander		
Spring Salamander		

**Non-breeding marine birds were not included in the official RSGCN list. However, they meet the criteria for regional responsibility.*

***Dragonflies and damselflies were evaluated using a similar methodology but were not included in the official RSGCN list due to timing of completion.*

Review and Prioritization of SGCN List

A draft of the NH SGCN list was distributed for comment in September 2014. The draft list was emailed to 123 professionals with taxonomic expertise. Comments were evaluated and species were added and/or removed to the draft list when justified. Species prioritization occurred as part of standardized and structured threat assessments (Chapter 4).

Wildlife Habitats

The word “habitat” can be interpreted in many ways, even within the Wildlife Action Plan. Commonly, “habitat” either describes the specific needs of a particular species/guild or is a classification of vegetation or other features that occupy a particular portion of the landscape. While it is clearly linked to the SGCN in plan requirements, Wildlife Action Plans are comprehensive planning documents that guide conservation actions statewide, and thus benefit from taking a landscape-scale perspective that can produce multi-species plans. Furthermore, for the vast majority of species, insufficient data on habitat use and requirements prevents detailed species-specific habitat descriptions. To resolve these disparate interpretations of “habitat”, the Northeast Lexicon primarily views habitat classification at the landscape scale while providing for species-specific habitat description separately.

Table 2-5. New Hampshire Wildlife Action Plan habitat list, 2015.

Forest

High Elevation Spruce-Fir Forest
Low Elevation Spruce-Fir Forest
Northern Hardwood-Conifer Forest
Hemlock-Hardwood-Pine Forest
Appalachian Oak-Pine Forest

Freshwater Aquatic

Large Warmwater Rivers
Warmwater Rivers and Streams
Coldwater Rivers and Streams
Warmwater Lakes and Ponds
Lakes and Pond with Coldwater Habitat

Freshwater Wetland

Floodplain Forests
Vernal Pools
Northern Swamps
Temperate Swamps
Peatlands
Marsh and Shrub Wetlands

Coastal

Salt Marsh
Dunes
Coastal Islands
Estuarine
Marine

Other Terrestrial Habitats

Pine Barrens
Grasslands
Shrublands
Alpine
Rocky Ridge, Cliff, and Talus
Cave Mines and Other Subterranean

Identifying NH’s Wildlife Habitat

The list of 27 key habitat types represents the suite of broad conditions that occur in New Hampshire, from alpine mountaintops to open ocean (marine), and the species groups associated with these habitats. The revised NH WAP (2015) uses habitat types developed by the Northeast Terrestrial Habitat Classification (NETH) (Gawler 2008) and the Northeast Aquatic Habitat Classification (Olivero and Anderson 2008), which are hierarchical (broad to detailed) systematic systems for classifying habitats. These detailed classifications were used for developing NH’s Wildlife Action Plan habitat maps and for

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assessing the condition of habitats (Chapter 3). NH grouped the units from these regional classifications into 27 broad habitat types that are easily described and understandable by the public and partners (Table 2-5). These NH habitat types roughly correspond to those in the 2005 NH WAP and the NH Ecosystems and Wildlife Climate Change Adaptation Plan. Differences between NH WAP 2005 and 2015 habitat lists include the addition of two forested wetland types (northern swamp, temperate swamp) and two coastal habitat types (i.e., marine, estuarine). Also, five aquatic habitat types (lake & ponds, and rivers & streams) replace watershed groupings from 2005. The NH Wildlife Action Plan wildlife habitat list was then cross-referenced with the NHNHB classification of 197 natural communities and 45 natural community systems (Appendix C).

Other Habitat Types

- **Agricultural** areas were included within the grassland habitat type and not specifically identified as a focal habitat. Wildlife use, risks, and actions may vary considerably between row crops (including sod) and areas dominated by pasture grasses. See grassland habitat profile (Appendix B) for details and actions.
- **Developed** areas were not mapped as a key wildlife habitat in NH and are generally considered a risk to wildlife. However, certain types of development can provide important habitat for some wildlife and will require consideration and action to fully conserve SGCN in NH. A few examples include:
 - Chimney swifts roost in large chimneys within developed areas.
 - Little and big brown bats often use attics and abandoned buildings for raising pups.
 - Purple martins nest in man-made nest boxes, often in close proximity to development.
 - Common nighthawks use rooftops with small stones for nesting.
 - Turtles often lay eggs in residential lawns and gardens.
- **Sand & Gravel excavation areas** are not specifically listed as a key wildlife habitat in NH's Wildlife Action Plan. However, the habitat conditions present in active and abandoned excavation areas can provide unique and important wildlife habitat. These habitats can be found in a variety of places such as along major river corridors, within historic pine barrens, or within larger matrix forest types. When sand and gravel mines are abandoned, the exposed sandy deposits lack mineral and organic nutrients required by plants, and tend to be very dry due to rapid drainage of precipitation. In these harsh conditions, vegetation tends to recover very slowly, and these sites are often maintained as shrubland or grassland habitats for a longer time period than areas with intact soils. These areas are often prioritized for development for several reasons: 1) they typically lack wetlands and therefore have fewer regulatory restrictions; 2) they are considered disturbed or impacted and assumed to be of lesser value for wildlife; and 3) they often occur in areas where development pressure is high. Abandoned excavation areas not immediately developed are often reclaimed, which may involve adding loam and seeding or planting, potentially reducing their value to wildlife. Some examples of wildlife that use this habitat type include:
 - Common nighthawk nesting
 - Bank swallows nesting in steep sand banks

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- Blanding's, spotted, and wood turtles nesting in areas of bare soil without large trees
- Black racers, hognose snakes, and smooth green snakes utilizing the diverse vegetative structure and laying eggs in bare sandy areas
- Tiger beetles using exposed sandy areas provided by excavation areas.
- New England cottontail using dense regenerating shrubland habitat.
- Nesting and migration habitat for shrubland and grassland birds

Terrestrial and Wetland Habitat Classification

The Northeastern Terrestrial Wildlife Habitat Classification System (hereafter NETH) (Figure 2-1) was developed in 2008 to provide a coarse but cohesive system to describe the physical and biological characteristics relevant to wildlife conservation (Gawler 2008). The habitat classification consists of two levels – a habitat system and a structural modifier. The habitat system corresponds to the ecological system units developed by NatureServe which occur in the Northeast, with additional systems for altered habitats and land-use types. The hierarchical system includes 7 Formation Classes at the top level, 15 Formations in the second tier, 35 Macrogroups in the third tier and 143 habitat types in the bottom level (fourth tier) of a hierarchical system (Table 5). Structural modifiers can be added to describe cover (herbaceous, shrub, open water), age classes, disturbance history, or geologic features like karst.

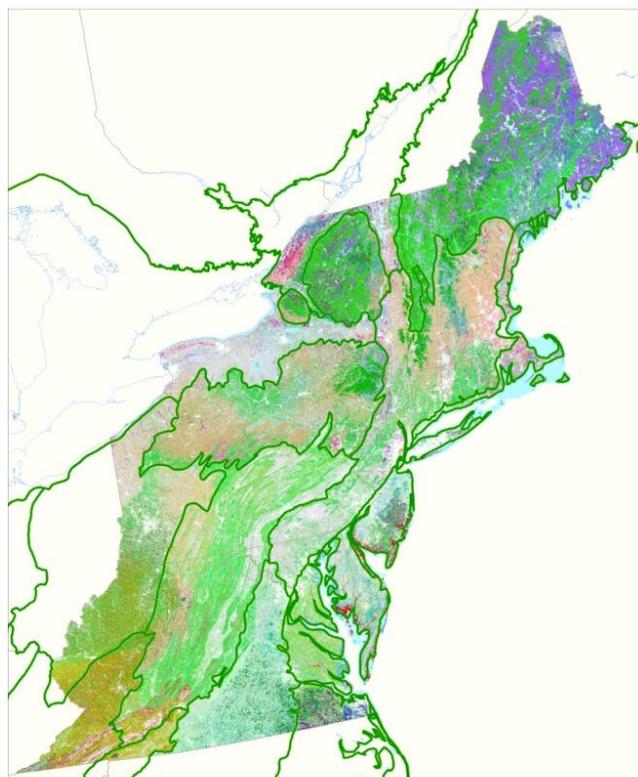


Figure 2-1. Northeast Terrestrial Wildlife Habitat Classification System.

Aquatic Classification

Aquatic classification includes a river and stream classification and a lake and pond classification.

River and Stream Classification: NH used a river and stream classification system developed for the Northeast United States (Olivero and Anderson 2008) and modified habitat types based on NH-specific data and knowledge. The Northeast system was designed to unify state classifications and promote an understanding of aquatic biodiversity patterns across the entire region. The regional stream and river classification was developed to represent flowing water habitat types in the Northeast based on four major variables: size class, gradient, geology, and temperature. Subsequently, NH Department of Environmental Services provided an update to the state's coldwater rivers and streams classification using predictions based on a logistic regression model using latitude, longitude, and upstream drainage. Coldwater determination was made where the probability of occurrence was $\geq 50\%$ (from NHDES 2007), or where two (2) or more brook trout or slimy sculpin were observed (observations by NHFG

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through Spring 2014). NHFG will use both the geospatial habitat condition and aquatic connectivity assessment produced by TNC to assess the relative condition of rivers and streams in the state.

Lake and Pond Classification: In 2014 The Nature Conservancy developed a lake and pond classification system for the Northeast using 1:100,000-scale National Hydrography Data (NHD) and integrated four key variables: trophic level, alkalinity, water temperature, and light penetration depth. Trophic-dependent depth thresholds determined if a water body is a pond (light penetration to the bottom, photosynthesis throughout), or a lake (areas where light does not penetrate, profundal zone with no photosynthesis). NHFG transferred these attributes to the 1:24,000-scale NHD data and then used fishery information (presence of lake trout or naturally reproducing Eastern brook trout populations) or water bodies with an elevation above 1900 feet to assign the classification of coldwater lakes and ponds, and assigned all remaining water bodies to a warm/cold temperature class.

Integrating Habitats with Natural Communities and Systems

While the WAP focuses on species of greatest conservation need, it is intended to serve as a plan for all of New Hampshire's wildlife, both common and rare, including many species about which very little is known. Surveying for all wildlife species, including the thousands of invertebrates, is impossible. In order to find broad surrogates for all of these species, a classification of natural communities and natural community systems (hereafter, "systems") was developed. Natural communities are recurring assemblages of plants and animals found in particular physical environments (Sperduto & Nichols 2011); systems are groups of natural communities that repeatedly co-occur in the landscape and are linked by a common set of driving forces, such as landforms, flooding, soils, and nutrient regime (Sperduto 2011). The underlying assumption behind this approach is that, by identifying and protecting high quality examples of all of NH's natural communities, all of the state's native wildlife species will have access to intact habitats. The systems of the NHNHB classification are roughly equivalent in scale to the ecological systems of the NETH, which were used to create the WAP habitat map, although because they were developed with New Hampshire-specific data, NHNHB system descriptions tend to more accurately reflect vegetation types as they are encountered in the state. A crosswalk between the Wildlife Action Plan habitats, NETH ecological systems, and NHNHB systems can be found in Appendix C.

Species and Habitat Distribution Maps

Distribution maps for species and habitats were compiled from various sources. Data for species distribution maps came from the Element Occurrence database maintained by NHNHB, Reptile and Amphibian Database, Wildlife Sightings Database, New Hampshire Bird Records/NH eBird (NH Audubon), museum records, and literature and expert reviews. Not all maps are complete or verified. Maps are constantly being updated based on new reports. Habitat distribution maps consisted largely of mapped known or predicted polygons completed as part of the WAP.

Species and Habitat Assessments

A species and habitat profile template was designed to gather known information on the distribution, abundance, condition, threats, conservation actions, monitoring, and research for a particular species or habitat (Appendix H). Species and habitat assessments were completed by NHFG staff and partner organizations (e.g. NH Audubon, NH Natural Heritage Bureau, The Nature Conservancy, US Fish &

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Wildlife Service). To the extent that information is available, completed profile templates meet the required elements of the Wildlife Action Plan. Species templates were modified from the 2005 WAP to reflect regional coordination (Northeast Synthesis) and national initiatives (e.g., USFWS TRACS grant reporting database). Species profiles were updated from the 2005 NH Wildlife Action Plan based on new knowledge from the previous 10 years. For species and habitats that were new to the SGCN list in 2015, a data evaluation was completed and a new profile was developed.

Database Development

NHFG and partners developed or enhanced several databases to complete the NH Wildlife Action Plan revision and assist with implementation of the plan.

Wildlife Action Plan – Species and Habitat database

A comprehensive Access database was developed (modified from Delaware) to capture species and habitat data and generate reports. Advantages of the database include the ability to make future updates to species and habitat profiles more easily, ensure consistent use of terms and language within profiles, search data across species and habitats using a variety of combinations, and generate reports that can be used for a variety of purposes. Species and habitat reports in Appendix A and B were generated directly from information populated in the database.

NHNHB Biotics database

NHFG partners with the NH Natural Heritage Bureau (NHNHB) to maintain a comprehensive conservation database which includes the known locations for wildlife species of conservation concern, rare plant species, and exemplary natural communities and systems in New Hampshire. One of the early goals in the WAP 2005 development process was to develop and maintain an accurate, up-to-date, geo-referenced database containing information on New Hampshire's fauna. From 2005-2015, 2,248 wildlife records were added to the database. Maintaining and enhancing this database will continue to be a priority for WAP implementation.

Development of a Framework for the Collection and Maintenance of Wildlife Data

A data collection tool, New Hampshire Wildlife Sightings (NHWS), was developed in cooperation with a number of government and nongovernment entities (Figure 2-2). NHWS is a web site for collection of species occurrence data (<http://nhwildlifesightings.unh.edu/>). Web hosting for NHWS is provided by the UNH Complex Systems Research Center. Staff within the Wildlife Division at NHFG perform quality control of all data. After quality control is complete, data are forwarded to NHNHB to be incorporated into the rare wildlife, plant, and natural community database.

Species databases

NHFG maintains databases for several species and species groups such as freshwater fish and freshwater mussels. The NHFGD Fish Survey Database has over 1,500 records of fish survey data from 1980 to present, compiled and maintained by the Inland Fisheries Division of NHFG.

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Figure 2-2. NH Wildlife Sightings homepage (<http://nhwildlifesightings.unh.edu/>). Observations of many species, including SGCN, can be reported through a web-based database format that is compatible with mobile phones.

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