

New Hampshire Wildlife and Habitats At Risk

OVERVIEW

This chapter and the associated species profiles address Element 1 of the NAAT Guidelines, “information on the distribution and abundance of species of wildlife.” In this chapter we describe the process of selecting species in greatest need of conservation (SGNC) and selecting the WAP’s focal habitats. We also present details on the development and plans for continued use of the conservation database, as well as wildlife projects conducted in support of the WAP.

SELECTING SPECIES IN GREATEST NEED OF CONSERVATION

The following information sources were used when selecting and prioritizing New Hampshire’s species in greatest need of conservation.

A. All New Hampshire Species

Non-game species, game species, and fish were evaluated regardless of taxonomic group. Long-term datasets exist for some species, but little is known about many other species, especially invertebrates, fish, and some reptiles and amphibians. To update the SGNC list, these groups will require direct attention in the future.

B. Endangered and Threatened Species Lists

All species listed as endangered or threatened in New Hampshire under FIS 1000 (6/21/01) and those federally listed under the Endangered Species Act (1973) that are known to occur in New Hampshire were

included. New Hampshire currently has 24 species listed as state endangered and 12 listed as threatened.

C. Natural Heritage Rank: Animal Tracking List

Species tracked by the NHHNB rare species database and listed in the Animal Tracking List (June 2003) were considered for inclusion in the SGNC. 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 (critically imperiled because extreme rarity or some factor of its biology that makes it particularly vulnerable to extinction) or S2 (imperiled because rarity or other factors that demonstrably make it very vulnerable to extinction) were included in the SGNC. Invertebrates that were ranked as S1-S2 were incorporated in the list of SGNC if adequate knowledge of those species distribution and abundance was available.

D. Species of Regional Concern

Species identified by the Northeast Wildlife Diversity Technical Committee as a regional concern (Therres 1999) were also considered for the SGNC. This list did not include an assessment of invertebrates other than freshwater mussels and did not include those species already listed as endangered or threatened in the federal Endangered Species Act.

E. Living Legacy Project (Taylor et al. 1996) and New Hampshire Ecological Reserve System Project (1998) expert panels were formed to assess population conditions and vulnerability of species in New Hampshire. A list of critical wildlife habitats was developed based

TABLE 2-1. Species of greatest conservation concern. E = NH endangered (List revised 2001), T = NH threatened (List revised 2001), SC = NH species of special concern (List revised 2000), RC = Regional conservation concern (Therres 1999), FE = Federally endangered (current 8/05), FT = Federally threatened (current 8/05), BGP = Only included in the New Hampshire Big Game Management Plan (Appendix E)

TAXA		
Invertebrates	Fish (continued)	Birds (continued)
Freshwater molluscs	Swamp darter	Nelson's sharp-tailed sparrow, SC
Brook floater, E, RC	Tessellated darter	Northern goshawk
Dwarf wedgemussel, E, FE	Amphibians	Northern harrier, E, RC
Eastern pondmussel, RC	Blue-spotted salamander, RC	Osprey, T
Insects	Fowler's toad, SC	Palm warbler
Barrens itame	Jefferson salamander, SC, RC	Peregrine falcon, E
Barrens xylotype	Marbled salamander, E	Pied-billed grebe, E, RC
Broad-lined catopyrrha	Mink frog	Piping plover, E, FT
Cobblestone tiger beetle, T	Northern leopard frog, SC, RC	Purple finch
Cora moth	Reptiles	Purple martin, E
Frosted elfin butterfly, E	Black racer	Purple sandpiper
Karner blue butterfly, E, FE	Blanding's turtle, SC, RC	Red shouldered hawk, SC
Persius duskywing, E	Eastern box turtle, RC	Roseate tern, E, FE
Phyllira tiger moth	Eastern hognose snake, T, RC	Ruffed grouse
Pine barrens zancognatha moth, T	Ribbon snake, RC	Rusty blackbird, SC
Pine pinion moth, T	Spotted turtle, SC, RC	Salt marsh sharp-tailed sparrow, SC, RC
Puritan tiger beetle, FT	Smooth green snake, SC	Seaside sparrow, SC
Ringed boghaunter, E	Timber rattlesnake, E, RC	Sedge wren, E, RC
Sleepy duskywing	Wood turtle, SC, RC	Semipalmated sandpiper
White Mountain arctic	Birds	Spruce grouse
White Mountain fritillary	American bittern, RC	Three-toed woodpecker, T
Vertebrates	American black duck	Turkey, BGP
Fish	American pipit, SC	Upland sandpiper, E, RC
Alewife	American woodcock	Veery ²
American brook lamprey, RC	Arctic tern, T	Vesper Sparrow
American eel	Bald eagle, E, FT	Whippoorwill, SC, RC
American shad	Bay-breasted warbler	Willet, SC
Atlantic salmon	Bicknell's thrush, SC, RC	Wood thrush ²
Atlantic sturgeon, RC	Black guillemot, SC	Mammals
Banded sunfish, RC	Canada warbler ² , RC	American marten, T
Blueback herring	Cerulean warbler, RC	Black bear, BGP
Bridle shiner, RC	Common loon, T	Bobcat, SC
Burbot	Common nighthawk, T	Canada lynx, E, RC, FT
Eastern brook trout	Common tern, E, RC	Eastern pipistrelle, SC
Finescale dace	Cooper's hawk, T	Eastern red bat, SC, RC
Lake trout	Common moorhen	Eastern small-footed bat, E, RC
Lake whitefish	Eastern meadowlark	Hoary bat, SC, RC
Northern redbelly dace	Eastern towhee	Indiana bat, FE
Rainbow smelt	Golden eagle, E, RC	Moose, BGP
Redfin pickerel	Golden-winged warbler, SC, RC	New England cottontail, SC, RC
Round whitefish, RC	Grasshopper sparrow, T	Northern bog lemming, SC, RC
Sea lamprey	Great blue heron	Northern myotis
Shortnose sturgeon, E, FE	Horned lark	Silver-haired bat, SC, RC
Slimy sculpin	Least bittern, SC	White-tailed deer, BGP
Sunapee trout, E	Least tern, E, RC	Wolf, FT

¹In addition to the above species of greatest conservation concern, a non-breeding birds profile was completed to assess concentrated wintering and migratory areas of New Hampshire.

²Canada warbler, veery, and wood thrush assessments were incorporated into matrix forest habitat profiles (See Appendix B).

on the habitat requirements of associated wildlife species of concern in the state.

F. Taxonomic Experts

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.). A team of invertebrate specialists was convened for the WAP, and this group determined that current knowledge of invertebrate distribution and abundance was inadequate to refine the list of invertebrates generated by items A-D above. Criteria used to determine a species' status in the state included the following:

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

IDENTIFYING KEY WILDLIFE HABITAT

The New Hampshire Ecological Reserve System Project (renamed to the Living Legacy Project) used expert panels to assess population conditions and vulnerability of species in New Hampshire. A list of critical wildlife habitats was developed based on the habitat requirements of associated wildlife species of concern in the state. The list of associated wildlife species was developed by the Project's Scientific Advisory Group and modified by the Project's Wildlife Working Group. The habitat list was modified by biologists working on the WAP based on internal and external expert review. The wildlife habitat list was then cross-referenced with the NHNHB classification of 192 natural communities and 46 natural community systems to identify areas of correspondence and gaps (Appendix C).

Natural Communities as Surrogates for Biodiversity

Natural communities are recurring assemblages of plants and animals found in particular physical environments (Sperduto 2005); natural community sys-

tems are groups of natural communities that repeat in the landscape and are linked by a common setting or driving force (e.g., flooding or fire; Sperduto and Nichols 2004). Large-scale habitats were added, including matrix forests and aquatic watershed groupings. Other habitat-gaps (i.e., natural communities that did not correspond well with a habitat type) were addressed by considering the natural communities as embedded features within matrix forest systems

Large-scale ecosystem attributes allow conservationists to predict the distribution of taxa without exhaustive ground surveys. Thus, efficient conservation should start with a "coarse filter" approach, seeking to characterize broad natural community types that are correlated with particular species.

Rare, endemic, or wide-ranging species may be overlooked in a coarse-filter approach. Thus, conservation of natural communities should be coupled with species-based conservation; this is referred to as the "coarse filter - fine filter" strategy.

Integrating Habitats with Natural Communities and Systems

The wildlife habitats initially selected for inclusion in the WAP reflected habitats for priority wildlife species. We created a hierarchical data structure in which habitats form the largest scale or highest level, with natural community systems and natural communities forming subordinate smaller scale levels. Priority species may require multiple habitat types, and a habitat may provide a necessary component for more than one priority wildlife species (see Appendix D for Species and Habitat Associations).

In some cases, natural communities or ecological systems did not correspond with important wildlife habitats (e.g., grasslands and shrublands). In New Hampshire, shrublands and grasslands are maintained by management activities. Naturally occurring shrublands such as shrub wetlands or early seral stages of forests are included under other habitat types.

Conversely, other habitats correspond closely to a particular natural community system, such as the pine barrens habitat and the pitch pine sand plain system. Habitats with great ecological breadth (e.g., peatlands) or spatial extent (e.g., matrix forests and watershed groupings) were included to help address the full array of habitat diversity when planning for wildlife in New Hampshire.

TABLE 2-2. New Hampshire WAP habitat list.

HABITAT NAME
Large Scale Habitats
Matrix Forest Types
Appalachian Oak - Pine Forest
High-Elevation Spruce - Fir Forest
Lowland Spruce - Fir Forest
Northern Hardwood - Conifer Forest
Hemlock - Hardwood - Pine Forest
Watershed Groupings
Connecticut River Mainstem Watersheds
Southern Upland Watersheds
Northern Upland Watersheds
Montane Watersheds
Coastal Transitional Watersheds
Non-Tidal Coastal Watersheds
Tidal Coastal Watersheds
Open Ocean ¹
Medium and Small-Scale Habitats
Alpine
Shrublands
Grassland
Cliffs
Caves and Mines
Rocky Ridges ²
Talus Slopes ²
Pine Barrens
Marsh and Wet Meadows ³
Shrub Wetlands ³
Peatlands
Floodplain Forests
Vernal Pools
Salt Marshes
Coastal Islands
Dunes

¹ A habitat assessment was not completed for this habitat, nor was this considered in the watershed grouping analysis conducted by TNC. Relevant information, including a list of existing marine plans, was incorporated into the Tidal Coastal Watershed assessment.

² Rocky Ridges and Talus Slopes were combined for the threat ranking process and habitat Profile.

³ Marsh and Wet Meadows and Shrub Wetlands were combined for the threat ranking process and habitat profiles as Marsh and Shrub Wetlands. These habitats were mapped together as one GIS data layer but can be queried separately.

As habitat models are refined and field verified they might be redefined to better reflect related natural communities and systems. Because these communities and systems may be more precisely correlated with particular species and ecological functions, they will be used to prioritize conservation efforts within habitats. For instance, unique systems within the “peatlands” habitat may prove more important, allowing greater precision in conservation.

Aquatic Classification

Unlike wetland and terrestrial habitats, an aquatic classification system for New Hampshire did not exist at the start of this planning effort. NHFG contracted TNC to initiate the development of an aquatic classification system based on a watershed and lake analytical stratification (Olivero and Bechtel 2005). This publication can be downloaded from the NHFG web site: visit www.nhfg.net, click on wildlife.

Watershed classification: The purpose of the watershed classification system was to help guide broad-scale conservation of aquatic ecosystems in New Hampshire. Conservation efforts that preserve the integrity of many types of watersheds provide greater opportunity to preserve unique, functional communities of organisms without having to identify each individual species and define its role in the community. Although this watershed classification system will need to be refined, it is a good step toward a comprehensive approach to aquatic ecosystem protection.

Lake classification: A lake classification system was developed for New Hampshire lakes to provide context for evaluating patterns in biological, water quality, and socioeconomic variables. The lake type classification used a physical environmental classification framework where local lake morphology characteristics define lake types within a larger environmental setting of elevation, geology, and landform patterns. The lakes classification is currently under review by NHFG biologists and will be incorporated into future conservation planning of aquatic systems.

CONSERVATION DATABASE

One of the early goals in the WAP process was to develop and maintain an accurate, up-to-date, geo-

referenced database containing information on New Hampshire's fauna. This process will continue, but several key steps have been completed including the development of a wildlife database website reporting mechanism, rare species database software upgrade to Biotics4, and incorporation of a tremendous amount of field-collected biological data into the database.

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. NHWS employs a web site for collection of species occurrence data by qualified observers (<http://nhwildlifesightings.sr.unh.edu>) in a format that can easily be applied in distribution and habitat analyses. Currently, the pool of qualified observers is small as testing of the process continues.

Web hosting for NHWS is provided by the UNH Complex Systems Research Center. Raw observation data are downloaded from this web site by staff within the Wildlife Division at NHFG and imported into an in-house Access database to allow staff to perform quality control. After quality control is complete, data are forwarded to NHNHB within NHDRED to be incorporated into the rare wildlife, plant, and natural community database.

Software upgrade: BCD to Biotics4

In consultation with NatureServe, the NHFG, and NHNHB upgraded their Biological Conservation Database software to Biotics4 software. All previously entered wildlife, plant, and exemplary natural community data have been converted and stored in Biotics4. New exemplary wetland natural community records and a backlog of previously unprocessed wildlife records were incorporated into Biotics4. NHFG solicited new wildlife location data from experts around the state, which dramatically increased the number of rare species records.

SPECIES AND HABITAT ASSESSMENTS

The 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. Species and habitat assessments were completed by NHFG staff or were contracted to other taxonomic experts. To the extent that information is available, completed profile templates meet the required elements of the WAP. For most priority species (e.g., state-listed species) and habitats, an entire or nearly entire template was completed.

Through State Wildlife Grants, NHFG funded a number of projects to initiate research and compile data where information was lacking or insufficient to develop conservation strategies. The following list includes wildlife research completed or initiated during the WAP planning process:

- Pine Marten Restoration Project (University of Massachusetts, NHFG)
- Blanding's Turtle Nesting Study (NHFG)
- Vernal Pool Research: Amphibians as Indicators of Land and Water Habitat Quality (UNH)
- Salt marsh Bird Recovery (UNH and NHOEP)

Three Masters theses and associated peer-reviewed publications will result from these studies.

For some species, information was lacking and only a portion of the profile (e.g., element 1) was completed. For those species that had a close link to a habitat, detailed condition, threat, and conservation action assessments often were discussed in habitats profiles and referenced in appropriate species profiles.

The information in species and habitat assessments provided the basis for the development of New Hampshire's condition analysis (chapter 3), wildlife risk assessments (chapter 4) and statewide conservation strategies (chapter 5).

DISTRIBUTION MAPS

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

LITERATURE CITED

- New Hampshire Ecological Reserve System Project. 1998. An Assessment of the Biodiversity of New Hampshire with Recommendations for Conservation Action.
- Olivero, A., and D. Bechtel. 2005. Classification and Condition Assessment for New Hampshire Lakes. The Nature Conservancy, New Hampshire Chapter, Concord, New Hampshire, USA.
- Sperduto, D.D. 2005. Natural Community Systems of New Hampshire. New Hampshire Natural Heritage Bureau, Concord, New Hampshire, USA.
- Sperduto, D.D., and W.F. Nichols. 2004. Natural communities of New Hampshire. New Hampshire Natural Heritage Bureau, Concord, New Hampshire, USA.
- Taylor, J., T. Lee, and L.F. McCarthy. 1996. New Hampshire's Living Legacy. The Biodiversity of the Granite State. New Hampshire Fish and Game Department Nongame and Endangered Wildlife Program.
- Therres, G.D. 1999. Wildlife species of regional conservation concern in the northeastern United States. *Northeast Wildlife* 54:93-100.