

Species Focus of conservation concern

Purple Finch

Purple finches nest in forests with thick hemlock, pine, or other conifers. In winter, they can be found feeding in other habitats such as orchards, shrublands, hardwood forests, or at birdfeeders, often roosting in nearby evergreens. Purple finch populations have declined in New Hampshire over the past forty years for unknown reasons. Purple finch is the state bird of New Hampshire.



Purple finch

Wood turtle

Wood turtles are found throughout New Hampshire, but are more common in the south. They are usually found within 1000 feet of deep, slow-moving rivers and streams, but use surrounding agricultural fields, shrublands, and forestland during the summer. Females lay eggs in sandy soils such as riverbanks, gravel pits or railroad beds. Human development of their habitat, collisions with cars on roads, illegal collection for the pet trade, and injury from mowing equipment threaten the survival of wood turtles.



Wood turtle

American woodcock

Woodcock require patches of dense, young shrubs and trees —alder thickets are ideal. These habitat patches, embedded within a larger forest of hemlock-hardwood-pine, provide cover from flying predators (e.g., hawks), allowing these well-camouflaged birds to hunt for earthworms, their primary food. In early spring, males seeking mates perform a dramatic, circular flight, taking off from grassy openings during dawn and dusk. Listen for the distinctive “peent” call. Woodcock populations have declined in New Hampshire along with the amount of shrubland, young forest, and grassy openings available as habitat.



American woodcock

Blackburnian warbler

The brilliant black and orange Blackburnian warbler is a conspicuous species in mature conifer forest patches, particularly hemlock, spruce and fir. They feed high in the canopy, hunting for beetles, caterpillars, ants and other crawling insects. Populations of Blackburnian warblers are stable in New Hampshire.



Blackburnian warbler

Wildlife that depend on hemlock-hardwood-pine forests

The species listed here are some of the wildlife that use hemlock-hardwood-pine forests. Be on the lookout for these species and follow stewardship guidelines to help maintain or enhance hemlock-hardwood-pine habitats. Species of conservation concern—those wildlife species identified in the Wildlife Action Plan as having the greatest need of conservation—appear in **bold** typeface.

- American toad
- **American woodcock**
- Barred owl
- Black bear
- Black-throated green warbler
- Blackburnian warbler
- **Blanding’s turtle****
- **Blue-spotted salamander**
- **Bobcat**
- Broad-winged hawk
- **Canada warbler**
- **Cerulean warbler**
- **Cooper’s hawk**
- **Eastern pipistrelle**
- **Eastern red bat**
- **Eastern small-footed bat**
- **Eastern towhee**
- Flying squirrel
- Fisher
- **Jefferson’s salamander**
- Moose
- **Northern goshawk**
- **Northern long-eared bat**
- Pine elfin butterfly
- Porcupine
- **Purple finch**
- Red-breasted nuthatch
- **Red-shouldered hawk**
- Red squirrel
- **Ribbon snake**
- **Ruffed grouse**
- **Silver-haired bat**
- Six-spotted tiger beetle
- **Smooth green snake**
- **Spotted turtle***
- **Timber rattlesnake****
- **Veery**
- **Whip-poor-will**
- Wood nymph butterfly
- White-tailed deer
- Wild turkey
- **Wood thrush**
- **Wood turtle**

*state-threatened
**state-endangered

Where to get help

If you have information about a wildlife species of conservation concern, contact NH Fish & Game’s Wildlife Division at 603-271-2461. Contact the UNH Cooperative Extension Wildlife Specialist at 603-862-3594 for technical assistance for landowners or your community.

Publications and assistance on forestry and wildlife topics are available through the UNH Extension Educators in Forest Resources in each county. Contact information for each UNH Cooperative Extension office is provided below. Additional publications, contact information, resources, and web versions of all brochures in the Habitat Stewardship Series are available on the UNH Cooperative Extension website at: nhwoods.org.

Belknap County	603-527-5475	Grafton County	603-787-6944	Rockingham County	603-679-5616
Carroll County	603-447-3834	Hillsborough County	603-641-6060	Strafford County	603-749-4445
Cheshire County	603-352-4550	Merrimack County	603-225-5505	Sullivan County	603-863-9200
Coös County	603-788-4961				

Authorship

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About the Habitat Stewardship Series

Much of the land in New Hampshire is privately owned. These individuals are the primary stewards of our wildlife and forests, and also our clean water, scenic views, fresh air, natural and cultural heritage, and recreational resources. The Habitat Stewardship Series has been created to help landowners and land managers recognize the habitats critical for wildlife species at risk, and to illustrate the role private landowners can play in sustaining those species through conservation, management, and sound land stewardship.

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Hemlock-Hardwood-Pine Forest

Habitat Stewardship Series

NEW HAMPSHIRE WILDLIFE ACTION PLAN

Recognizing hemlock-hardwood-pine forest

Hemlock-hardwood-pine forest is the most wide-spread habitat in New Hampshire. Considered the transitional forest habitat between lower



Pure hemlock stand

elevations of Appalachian oak-pine habitat (<400'), and higher elevations of northern hardwood habitat (>1,500'), hemlock-hardwood-pine forests cover almost 50% of New Hampshire, most of it south of the White Mountains.

White pine and eastern hemlock are most often the dominant trees, but these forests are highly variable and contain a mix of trees common in other forest types. In typical hemlock-hardwood-pine forests, you'll also find beech and patches of sugar maple and white ash (on rich sites) and red oak (on drier sites). Under the canopy, look for small trees or shrubs such as witch hazel, maple-leaved viburnum, black birch, black cherry, and ironwood, with starflower and Canada mayflower on the forest floor.

Most white pine stands that have grown up from abandoned pastures are examples of this type of forest habitat. On fertile soils, white pine will be replaced over time by hemlock or hardwoods through a process known as forest succession. Although genuine old-growth forests are rare in New Hampshire, look for forests with old-growth features such as patches of large (>18" diameter) hemlock or beech in the canopy, layers of young trees and shrubs growing in the understory, many standing dead trees ("snags"), and abundant decaying wood on the ground. Large-sized cavity trees, pockets of wetlands, patches of acorn-rich oaks, seeps, and "supra canopy" pine trees (extra-tall pines that rise above the rest of the forest) make some areas of hemlock-hardwood-pine forest especially rich for wildlife.



Woodland seep



Where are hemlock-hardwood-pine forests?

Much of Belknap, Merrimack, Hillsborough, Cheshire and Carroll Counties are covered with hemlock-hardwood-pine forests, with excellent examples located at Five Finger Point in Tamworth, Sheldrick Forest Preserve in Wilton, and at University of New Hampshire's College Woods in Durham. Hemlock-hardwood-pine forests are shown in the shaded areas of the map at left.

Why are hemlock-hardwood-pine forests important?

Hemlock-hardwood-pine forests are the habitat that surround and support many smaller and unique habitat types in southern New Hampshire. Most wildlife that require vernal pools, marsh habitat, headwater streams, floodplains, shrublands, grasslands, or peat bogs will also use the surrounding forest to meet their needs for food, cover, or breeding. Hemlock-hardwood-pine forests are common, but shouldn't be taken for granted given the important supporting role they play in the ecosystem.

Acorns and beech nuts in these forests (produced by mature oak and beech trees) are important food for many species including black bear, deer, ruffed grouse, chipmunk, squirrels and blue jay. In turn, raptors such as northern goshawk and Cooper's hawk feed on small mammals and find nesting and perching sites in white pines in the tree canopy. Large areas of hemlock-hardwood-pine provide habitat for forest birds such as scarlet tanager, hermit thrush, Blackburnian warbler and black-throated green warbler.

Habitat loss from development

The biggest threat to hemlock-hardwood-pine habitats in New Hampshire is the loss of these forests to residential and commercial development. New Hampshire has led New England with the fastest population growth for decades, and it continues to lead the region in loss of forestland. Development permanently eliminates habitat, affecting both forest-dwelling wildlife and animals that use forests as corridors between other habitats such as wetlands. Building and construction of paved roads separates wildlife populations, inhibits migration, increases predation and promotes wildlife-vehicle collisions on roads.

Hemlock woolly adelgid

The hemlock woolly adelgid is an insect introduced from Asia that targets both young and mature hemlock trees, killing them over time. A cottony substance on the underside of needles signals an infestation. Infested trees occur in many towns in southern New Hampshire. Preventative or control measures (e.g., insecticides) are ineffective for more than a few trees at time. If hemlock woolly adelgid results in fewer hemlocks in the forest, critical winter cover will be less available for wildlife such as deer, grouse, fisher, and porcupine, and will also negatively affect migrant breeding birds such as black-throated green warbler.



Hemlock woolly adelgid

Uniformity

Many stands of hemlock-hardwood-pine forest in New Hampshire are the same age, roughly 80-100 years old. They grew back after extensive timber harvesting and abandonment of farms throughout the last century. Many wildlife species of conservation concern found in these forests are attracted to patches of old or young trees within the larger forest area. Today's forests don't support the same high diversity of wildlife species as older forests that contain a diversity of live and dead trees of different ages and sizes. Complicating matters, the public may prefer to view extensive, unbroken mature forest. As a result, managers are less likely to make large openings (e.g. clearcuts) that will re-grow into the young forests required by many wildlife species.

Stewardship Guidelines for hemlock-hardwood-pine forests

- **Conserving large blocks (>1000 acres) of hemlock-hardwood-pine forest from development** will provide habitat for wide-ranging wildlife such as black bear, bobcat, northern goshawk, Cooper's hawk and bald eagle.
- **Check hemlock trees regularly for the presence of hemlock woolly adelgid.** Prevention and elimination of new outbreaks and elimination of new infestations is the most effective protection. The University of New Hampshire Cooperative Extension and the N.H. Division of Forests & Lands can help with identification and control options.
- For both land conservation and land stewardship efforts, focus on hemlock-hardwood-pine habitat characterized by **unique features** such as:
 - Areas with **large trees (>18" diameter)** which are important for roosting bats, goshawk nests, and as future snags (standing dead trees) and den trees for bears, bats, birds, and other wildlife.
 - **Rocky cliffs** which provide sunning areas for bobcat.
 - **Forested areas near wetlands**, streams, ponds, or seeps which provide moist habitat for wood turtle, blue-spotted salamander, ribbon snake, and many songbirds.
 - **Areas of young, regrowing forest**, which provide critical habitat for many wildlife species of conservation concern such as American woodcock, Canada warbler, and bobcat. Patches of alder, aspen, birch, and pin cherry are particularly valuable for wildlife.
 - **Areas of mature forest** with old-growth characteristics, such as:
 - many snags and cavity trees,
 - a diversity of tree sizes including both young and old trees growing at all levels of the forest,
 - fallen, decaying trees on the forest floor,
 - gaps in the canopy where trees have fallen or been cut.
- **Using forest management practices, work to regenerate a mix of tree age classes and tree species.** A full range of age classes, well-distributed across the landscape, is important to support the great diversity of wildlife dependent on hemlock-hardwood-pine habitats. For more information about how forestry can enhance habitat, consult the publication *Good Forestry in the Granite State, 2nd edition*.
- **Provide a continuous supply of young, regenerating forest habitat in patches at least 2 acres in size** to enhance cover for wildlife, berry-producing shrubs, hardwood stump sprouts, and other key features of "early successional" habitats (refer to Shrublands brochure in this series). The larger the forest opening or clearcut, the greater benefit it has for breeding birds, including those breeding in surrounding forests. To maximize the benefit of new forest openings to wildlife, create new patches, at least 5 acres in size, near utility corridors, shrub wetlands, or brushy old fields.
- **Always consult a licensed New Hampshire forester before conducting a timber harvest on your property.** Understand and follow all laws pertaining to the harvesting of trees near wetlands and waterbodies. Follow established Best Management Practices, and harvest timber near wetlands only when the soils are either frozen (winter) or very dry (summer).



Young, regrowing forest