



Extension



Introduction

The vast majority of New Hampshire's five million acre forest is in private ownership. Approximately one in 10 people in the state own woodland. A majority of these landowners express a desire to do something for wildlife on their land.

Regardless of the size of your property, what you do on your woodland can have a profound effect on wildlife habitat. You can play an important role in benefiting New Hampshire's wildlife by enhancing wildlife habitat on your property through forest management. Most habitat improvements require a low level of management. Some habitat improvements can be integrated with timber sales and provide substantial revenues.

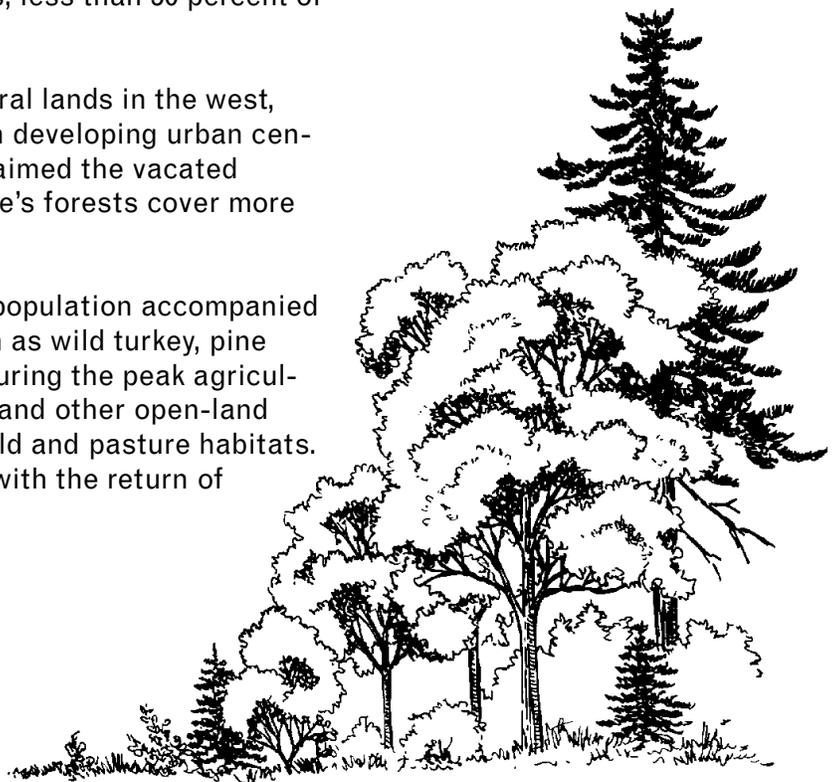
New Hampshire's Forest History

New Hampshire is the second most forested state in the continental U.S., but it hasn't always been that way. Following European settlement, the landscape was cleared and converted to pasture and farmland. By the mid-1800's, less than 50 percent of the state was forested.

With the opening up of prime agricultural lands in the west, the call of the Civil War, and lure of jobs in developing urban centers, farms were abandoned. Forests reclaimed the vacated fields and pastures. Today, New Hampshire's forests cover more than 80 percent of the landscape.

Changes in New Hampshire's wildlife population accompanied shifts in land use. Woodland species such as wild turkey, pine marten, fisher and black bear retreated during the peak agricultural years, while bobolink, meadow vole, and other open-land wildlife benefited from the increase in field and pasture habitats. Many woodland species have rebounded with the return of forest habitats.

Wildlife Habitat Improvement: Woodlands and Wildlife



New Hampshire's Forest Cover Types

Forest cover types are groupings of tree species used to describe typical forests of a region. Soil, geographic, and climatic conditions influence their occurrence and growth. The forest cover types most prevalent in New Hampshire are spruce-fir, northern hardwoods, oak-pine and aspen-birch.

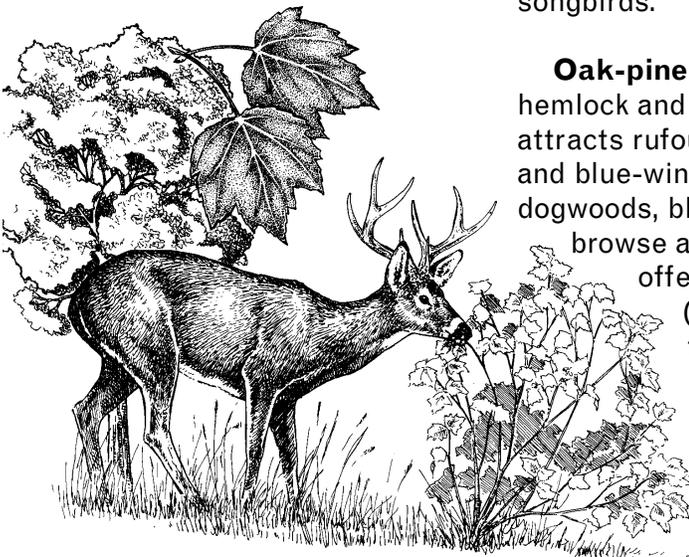


Spruce-fir grows in cool sections of the north and high elevations. This forest type is composed primarily of red spruce and balsam fir, with black spruce, white spruce and tamarack locally interspersed.

Snowshoe hare, spruce grouse, and small mammals use seedlings and saplings of the spruce-fir forest for food and cover. Red squirrels, pine grosbeaks, and crossbills feed on cone seeds of the mature forest. The northern three-toed woodpecker requires large dead fir trees to nest. Bearded lichen grows on the coniferous trees and is the preferred nest site and nest material for northern parula warblers. The lichen also provides an important food source for wintering white-tailed deer.

Spruce-fir in the mountains and ridges above 2700 feet in elevation represents some of the last contiguous area of mature spruce-fir forest in New Hampshire. Nearly 150 species of wildlife use the conifers, including moose, bear, pine marten, raven, and boreal chickadee. Blackpoll warblers require the older but smaller spruce-fir at high elevations for breeding.

Northern hardwoods consist primarily of beech, sugar maple and yellow birch, with ash, red maple, and paper birch common associates. Brown thrashers, cedar waxwings, common yellowthroats, chestnut-sided warblers and white-tailed deer are found in regenerating stands of northern hardwoods. The mature forest provides habitat for pileated woodpeckers, porcupines, black bears, raccoons, fishers, northern goshawks, and many songbirds.



Oak-pine forests generally include oaks, hickories, beech, hemlock and white pine. The regenerating oak-pine forest attracts rufous-sided towhee, eastern bluebird, meadow vole, and blue-winged warbler. Understory shrubs and trees such as dogwoods, blueberries, witch hazel, and brambles provide browse and cover for other wildlife. When mature, the forest offers a diversity of cavities, perch sites, and mast (acorns, nuts, and berries) for wild turkey, gray fox, flying squirrel, and pine warbler.

Aspen-birch consists primarily of quaking aspen and paper birch. This is an early successional type that converts to other types unless maintained through clearcutting or natural disturbances. Bigtooth aspen and gray birch may also be present. Other associated species include pin-cherry, yellow and black birch and red maple. Various age classes of this cover type is the preferred habitat for ruffed grouse and mourning warbler.

Pure, single-species stands can be found within any cover type and generally have a predominant single tree species, such as a hemlock stand, a beech stand, or a white pine stand. Pure stands are beneficial to certain wildlife species. However, an area with a variety of tree species of varying ages and sizes supports habitat for the greatest diversity of wildlife.

Forest Structure

Forest structure is an important factor in providing a diversity of habitats or habitat components for wildlife. Structure refers to horizontal and vertical diversity. Horizontal diversity is a mosaic of different habitat types such as the patchwork of farmlands, wetlands, edges, various forest types, and waterways seen across a broad landscape. Vertical diversity refers to the layers of vegetation and includes the ground cover, shrub and small tree understory and overstory or canopy.



Other structural habitat features important to wildlife include mast producing trees and shrubs, standing dead trees, cavity trees, and decaying woody debris.

Forest Succession

Forests are always changing through natural as well as human induced disturbances. This process, called succession, is the natural progression of plants replacing other plants over time.

When an opening occurs in a forest, whether from fire, wind, or human activity, sunlight can reach the forest floor. Pioneer plants such as gray birch, pin-cherry, paper birch, and aspen are the first to enter the opening as they need full sunlight to germinate. This early successional stage provides an abundance of low vegetation, dense cover and food for wildlife.

Sun-loving, fast-growing pioneer plants are short-lived. As they grow, they change the forest environment, shading the forest floor. A second group of plants finds the new environment compatible and moves in to take over, replacing pioneer species. Secondary plants are semi-tolerant of shade, usually fast-growing and longer-lived. These include red maple, black and yellow birch, white pine, white and red oaks, and hickories. As the secondary plants grow, they



also will change the forest environment, making it suitable for shade-tolerant, climax plants.

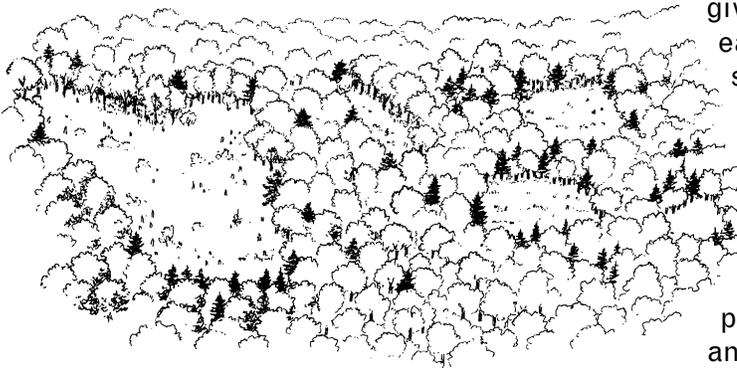
Shade-tolerant trees are fir, spruce, hemlock, beech, sugar maple and yellow birch. Forests continually change as trees grow and die. Insects invade old, decaying trees and create potential feeding, nesting, denning, and escape areas for more than 40 species of wildlife. Though the forest may reach a climax stage in succession, it's always changing - opening and closing with patches created by natural and human-induced disturbances.

Habitat Improvement Through Forest Management

Before you begin, it's important to identify your specific objectives and goals. Assess what natural resources you have to work with. Your County Extension Educator in forest resources is an ideal contact for habitat and forest management. Workshops and field tours provide landowners with practical ideas on identifying management options and goals, assessing current habitat conditions, and developing management plans.

Any forest management benefits some wildlife species. However, the forest cover type as well as the harvest strategy chosen will influence the wildlife attracted to your land. Keep in mind, any management activity designed to benefit some wildlife may reduce suitable habitat for others.

Clearcutting is the removal of most of the forest cover in a given area. This practice promotes regeneration of early successional shade-intolerant species and shrubby ground cover needed by many woodland wildlife for all or part of their habitat. Clearcuts are also used to create "edge" conditions, which benefit some species of wildlife. Irregular-shaped clearcuts provide the most edge.



The **edge** is a meeting and blending of plant communities from both interior woodlands and open areas. It provides rich habitat for wildlife from both adjoining communities. Black bears forage for grasses and soft mast at the edge of clearcuts, and many songbirds feed and nest in edges. Some wildlife that require large, undisturbed blocks of forest benefit from less edge.

Clearcuts are done in various sizes and shapes. Each situation influences the composition of wildlife species that use the openings. A large clear cut or **block cut** is generally greater than one acre in size. In the northern hardwoods, this technique creates browse conditions favorable for moose. Some songbirds find suitable habitat in clearcuts greater than 40 acres.

Patch cuts are smaller and generally one-quarter to one acre in size. They have less impact on forest dependent wildlife species than block cuts because of the minimized travel distance between the openings and mature forest.

Strip cutting removes trees in strips that range from 50 to 200 feet in width. Strip cutting may be done to create or maintain conditions favorable for certain wildlife, such as developing alder cover strips in an appropriate habitat for woodcock.

Shelterwood harvests are used to regenerate tree species that require some shade during their early years. This technique involves gradually removing overstory trees in two to three harvests to allow the understory to grow into the next stand. The resulting wildlife habitat is a combination of shrubby understory and well spaced overstory trees.

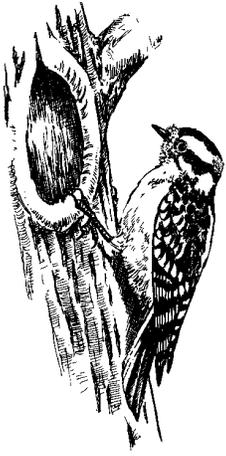
Group selection is a practice where groups of trees up to one-quarter an acre in size are harvested, leaving small openings. This system maintains a mature forest habitat with very small gaps in the canopy. Birds of the mature forest can be maintained while common yellow throats, chestnut-sided warblers, and white-throated sparrows will use the openings.

Single-tree selection is the removal of individual trees or small groups of two or three trees. This harvesting system retains a relatively closed-canopy forest habitat, and promotes regeneration of shade-tolerant species. The continuous forested environment is beneficial to ovenbird, wood thrush, and scarlet tanager.

Thinning is applied to stands not ready for a timber harvest. The primary goal is to improve the growth and quality of trees for the future. Thinning allows greater sunlight penetration to the forest floor, stimulating understory vegetation that provides food and cover. Some thinnings can also be modified to favor key wildlife tree species such as apple, which is shaded out by a maturing forest. Thinnings can also be done to encourage mast producing tree development.

Releasing mast producing trees and shrubs such as oaks, dogwoods, blueberries, sumacs, cherries and apples improves a mast supply. Releasing is done by cutting and removing nearby plants that are competing for the limited crown space. The silvicultural systems described above are seldom applied in unsupervised logging. Landowners who want to care for their forest and its wildlife are advised to consult with a licensed New Hampshire forester.





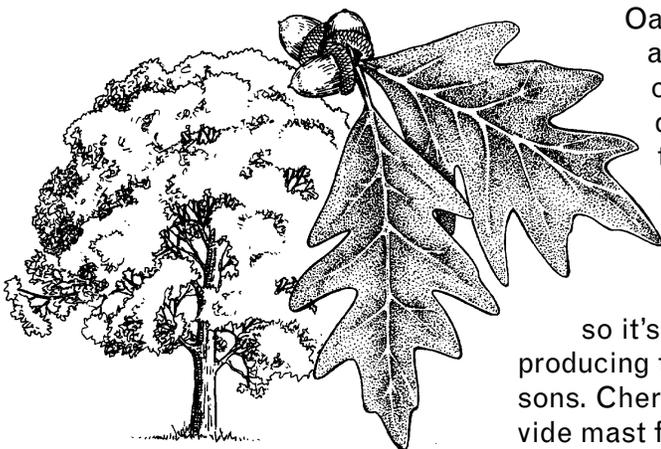
Important Habitat Features

Snags and cavity trees are used by over 30 species of birds and 20 species of mammals for nesting, feeding, and denning. Snags are dead or dying standing trees that are usually infested with insects and provide good feeding and perching sites for woodpeckers, raptors and other wildlife. Cavity trees can be snags or live trees that contain a hole suitable for nesting or cover for wildlife.

All live and standing dead trees with cavities should be retained except when it poses a safety hazard during logging operations or recreational activities. Retaining a variety of cavity sizes provides for a greater diversity of wildlife. For example, cavities in stems of less than two inches dbh (diameter at breast height) are used by nuthatches and white-footed mice. Chickadees, woodpeckers, raccoons, and fishers benefit as tree stems increase from six inches dbh to greater than 18 inches dbh.

Artificial nest boxes can be used to supplement a short supply of cavity and snag trees, but not to replace them because dead and dying trees also provide a source of food and perch sites. Nest boxes in clearings may be used by eastern bluebirds, swallows, bats and kestrels. Nest boxes must be cleaned annually prior to the arrival of birds in early spring.

Mast is the fruit produced by trees, shrubs, and vines, and is a valuable high-protein food source for many wildlife. Hard mast is the nuts produced by butternuts, hickories, oaks, and beech trees. Soft mast is the fleshy fruits produced by mountain ash, blueberries, raspberries, hawthorns, dogwoods, apples and dry seeds or catkins of maple, ash, birches and aspen.



Oak stands should be managed to provide a generous amount of acorns to supply food for wildlife. Large crowned, vigorous trees have the best ability to produce mast. It takes six 20-inch dbh oak trees per acre to produce 100 pounds of acorns. Though smaller trees also contribute, it takes 50 oak trees per acre at 12 inch dbh to supply 100 pounds of acorns.

Not all trees produce good seed crops every year, so it's important to keep a diversity of soft and hard mast producing trees and shrubs to provide food throughout the seasons. Cherries, wild grape, dogwoods, apple, and hawthorn provide mast from summer through winter. Birch catkins and buds are eaten by small mammals in winter and are a primary food source for pine siskins. The buds and catkins of mature male aspen trees are an important winter food for ruffed grouse. White pine, spruce and hemlock seeds are also available in the winter to provide food for chickadees, finches, nuthatches, red squirrels, mice and voles.

The Forest Floor

Downed and decaying logs on the forest floor provide sunning, denning, feeding, loafing and escape cover for small mammals, snakes, salamanders and other wildlife. Downed logs also provide a drumming site for ruffed grouse. Several downed logs greater than 12 inches dbh and six feet or longer should be maintained per acre during a harvest.

Slash and brush piles provide tunneling space and cover for wildlife such as redback salamanders, house wrens, cottontails and ermines. During a timber harvest, a patchy distribution of slash and trees tops left in piles or rows should be left to benefit wildlife. If harvesting isn't done, brush piles can be created and placed along clearings from 10 to 50 yards apart. An effective size brush pile is four to five feet high with the same diameter. They can be made by placing medium sized logs criss-cross on the ground and covering them with smaller brush on top.



Forest Openings

Landings and logging roads will naturally fill in with vegetation following a harvest. In the event of erosion, the process can be hastened by seeding the area. Seeding with perennial grasses and herbaceous plants such as clover, sorrel and trefoils also provide wildlife a highly nutritional food source. Mowing every three to five years maintains the openings.

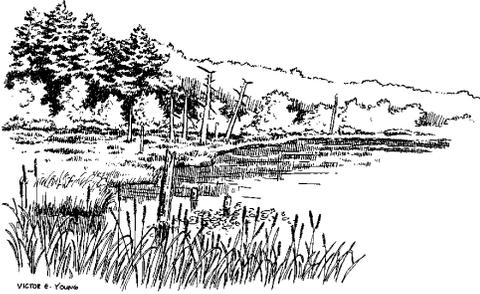
Herbaceous openings provide habitat for meadow voles, white-tailed deer, wild turkeys, rabbits, foxes, songbirds and raptors. Openings can be created by patch cuts and maintained by rotational mowing at two to three year intervals. This should be done in late summer or fall, after most birds have finished the nesting season.

Brushy Areas with fruit-bearing trees and shrubs such as raspberry, blackberry, cherry and sumac attract insects, birds and other wildlife. These areas can be created by patch cuts and maintained on a three to five year rotational brush cutting interval.



Unique Forest Types

You may have unusual forest types on your property that provide unique habitats. These may require special care should you decide to manage. Some examples are bogs, old growth forests, and Atlantic white cedar swamps.



Old growth forests are mature stands of trees that show little or no evidence of human activity. Special features found in an old growth forest are its closed canopy, late successional cover types, large tree cavities, and the amount of dead, and down woody debris. Whether or not you decide to manage, some of the same features of old growth such as large cavity trees and downed logs can be developed in other stands through forest management as well.

Atlantic White Cedar and bogs are other unusual forest types. See Wildlife Habitat Improvement: Wetlands and Wildlife for more information concerning these types.

This publication is one of a series on Wildlife Habitat Improvement. More information and additional help can be obtained through your local UNH Cooperative Extension office.

Written by Diane E. Yorke, Project Assistant, Wildlife, UNH Cooperative Extension. Concepts for the series were developed by David Langley, former assistant Extension Specialist, Wildlife. Funding was provided by NH Fish & Game Department and U.S. Fish and Wildlife Service (Pittman/Robertson funds). Artwork by Victor Young ©.

UNH Cooperative Extension County Offices

BELKNAP

64 Court Street
Laconia, NH 03246-3679
(603) 527-5477

COOS

629A Main St.
Lancaster, NH 03584-3612
(603) 788-4961

MERRIMACK

315 Daniel Webster Hwy.
Boscawen, NH 03303-2410
(603) 796-2151

SULLIVAN

24 Main Street
Newport, NH 03773-9200
(603) 863-9200

CARROLL

73 Main Street
PO Box 1480
Conway, NH 03818
(603) 447-3834

GRAFTON

3855 Dartmouth College Hgwy.
Box 5
North Haverhill, NH 03774-4909
(603) 787-6944

ROCKINGHAM

113 North Road
Brentwood, NH 03833-6623
(603) 679-5616

CHESHIRE

33 West Street Keene,
NH 03431-3361
(603) 352-4550

HILLSBOROUGH

Room 101
329 Mast Road
Goffstown, NH 03045-2422
(603) 641-6060

STRAFFORD

268 County Farm Road
Dover, NH 03820-6003
(603) 749-4445

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