A Landowner's Guide
to Inventorying and Monitoring Wildlife in New Hampshire

Malin Ely Clyde with Darrel Covell and Matt Tarr • UNH Cooperative Extension

A Landowner's Guide to Inventorying and Monitoring Wildlife in New Hampshire

Malin Ely Clyde
with
Darrel Covell and Matt Tarr
UNH Cooperative Extension

Illustrations by Linda Isaacson

Published by University of New Hampshire Cooperative Extension
2004

Acknowledgements

We would like to thank the following resource professionals for their suggestions and input into this guide:

Kim Babbitt, UNH Department of Natural Resources
Karen Bennett, UNH Cooperative Extension
Charlie Bridges, NH Fish & Game Dept.
Meade Cadot, Harris Center for Conservation Education
Christine Costello, USDA Forest Service
Donna Desautels-Pease, former intern, NH Dept. of Environmental Services
Mark Ellingwood, NH Fish & Game Dept.
Pam Hunt, Audubon Society of NH
Paul Karczmarczk, Ruffed Grouse Society
John Lanier, NH Fish & Game Dept.
Roger Monthey, USDA Forest Service
Julie Robinson, NH Fish & Game Dept.
Judy Silverberg, NH Fish & Game Dept.
Ellen Snyder, private consultant
Becky Suomala, Audubon Society of NH
Mariko Yamasaki, USDA Forest Service
Holly Young, UNH Cooperative Extension

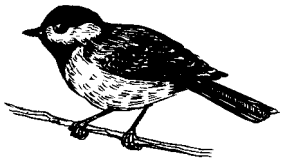
The following citizens, many of them NH Coverts Project volunteers, also provided valuable input and guidance for the guide:

John Asseng
Carolyn Baldwin
Marilyn Bott
Nancy Cowan
Tim Davis
Peter Doyle
John Doyle
Larry Ely
Fred Ernst
Barbara Fales
Betsy Hardwick
Anne Krantz
Peter Moore
Gus Ruth
Carol & Russell Thompson
Jan Woodbury
Ken Wright

This guide was produced by the University of New Hampshire Cooperative Extension, with funding support from the Samuel P. Pardoe Foundation, NH Fish & Game, and the US Fish & Wildlife Service Pittman-Robertson Wildlife Restoration Fund.

University of New Hampshire
Cooperative Extension

CONTENTS



Introduction

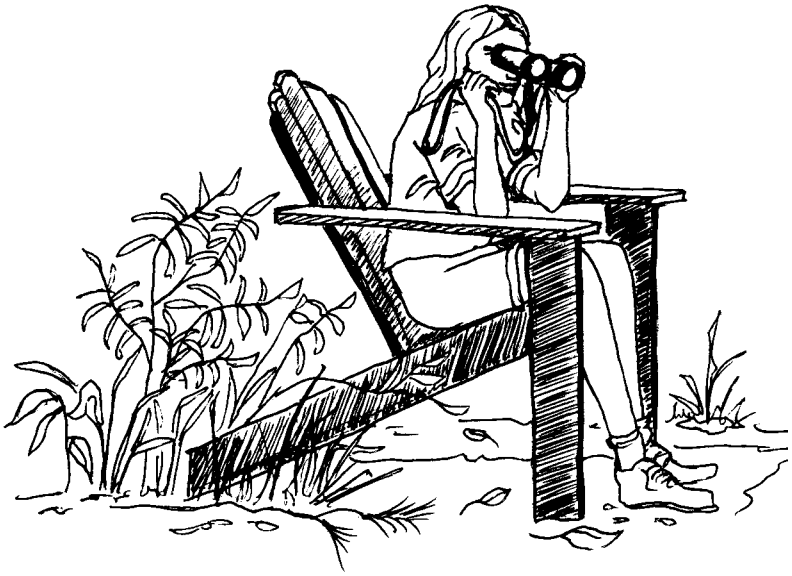
As a child growing up in New Hampshire, I watched chickadees coming and going from our family's bird feeder. I remember wondering how many took advantage of the sunflower seeds my parents supplied. Over time, I began to notice purple-colored birds and birds that were bright yellow, and I wanted to find out what their names were and where they lived in the forest.

In the eyes of a child, these birds sparked my interest in wildlife. But over time, they came to represent more than that. Watching these beautiful creatures out the window made me want to know more, leading me through a process of observation, documentation (as I started to look up the names of birds and write down what I saw), and eventually, to seriously take inventory of the wildlife on my parents' land. My inquiry began early in life, but for others, it comes later. Perhaps your curiosity has started you along a similar path.

In this book we will describe the process of getting to know the wildlife on your land. Even if you aren't a landowner, you may have a special place in your neighborhood—a town forest, a local natural area, a walking path—where you spend a lot of time and have come to appreciate its value as a home for wildlife.

This guide will help you become a better observer of wildlife, and help you understand the needs of different wildlife species and where they might be found on the land. You also will learn how to conduct your own inventory of different wildlife species and to monitor changes in their numbers over time. Finally, you will learn about statewide and national wildlife monitoring programs where your skills, knowledge, and data collection can contribute to broader wildlife studies. While some of these activities may typically be the work of biologists or avid birders, with a bit of training they can be accomplished by anyone with the ambition to learn more about wildlife and the habitats where they live.

Darrel Covell,
Extension Wildlife Specialist
UNH Cooperative Extension



"The first thing we did was buy a couple of comfortable chairs and set them where we could see out across the landscape."

—Don and Lillian Stokes, describing how they began to find out what wildlife used their New Hampshire property.

Chapter 1
MAKING OBSERVATIONS

First Things First—Becoming a Skilled Observer

The advice wildlife writers Don and Lillian Stokes give to new land-owners—or landowners beginning their observations of wildlife—is to place some comfortable chairs in a spot with a good view, get a good pair of binoculars, and keep a pencil and journal handy beside the chairs. This advice gets at the first tenet of observing wildlife: to spend a lot of time outside, quietly watching wildlife. You are more likely to do this if you are drawn to it by the comfort of a chair!

The second part of the Stokes' advice is to always have your binoculars handy, since without them, it is often impossible to get close enough to wildlife to observe carefully, identify the species, or to tell what the animal is doing. Binoculars make a very big difference. Once you start to use them, your eyes will feel naked without them.

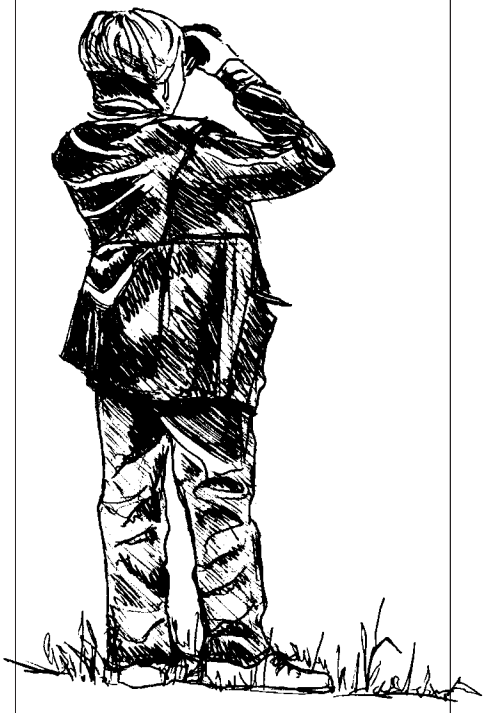
Finally, keeping a journal—whether to document your personal endeavors or those of the animals around you—is a way to engage yourself and others who visit your land. A journal can be a narrative description of the animals you see and where you saw them. It can also be a creative outlet, complete with sketches, quotes or photos. You may add lists of species with habitat descriptions, behaviors witnessed and numbers of species observed. Whatever the format of your journal, the process of writing down your observations can refresh your memory later and can help you make sense of your wildlife observations over time.

What you want to do with your information will determine just how detailed your observations need to be. If you want to learn the names of the animals and compile a list of species found, then a standard inventory or check list may be your tool. If you are interested in tracking the changes in populations of wildlife over time in response to changes in the habitat on your land, it will take more effort—and more time—to detect these trends.

Keeping a journal

Check out these beautiful books:

- Clare Walker Leslie and Charles E. Roth, *Keeping a Nature Journal*, Storey Books, 2000.
- Hannah Hinchman, *A Life in Hand: Creating the Illuminated Journal*. Gibbs Smith Publisher, 1999.



To compare your wildlife observations over the years, you would need to repeatedly visit the same meadow on your property (at the same time of day and season of the year), observing changes in vegetation due to different management or mowing regimes, and following a standard method for collecting information. Who knows, your more in-depth study—or monitoring—of your land could have a more far-reaching effect, too. You may choose to participate in a larger study of wildlife through a non-profit or governmental organization. Chapter 4 describes may of the long-term monitoring programs that exist in New Hampshire, most of which use volunteers to help collect wildlife information.

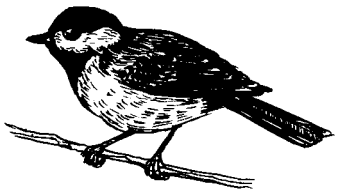
Tips for Observing Wildlife

Many methods for inventorying and monitoring wildlife require some form of stealth. Trying to detect and identify an animal, either by listening to or watching it for awhile, can be frustrating. It isn't something that is easily done with an enthusiastic dog along! The most successful wildlife watcher is akin to a good hunter—someone who can walk through the woods without making a sound, and someone who is keenly aware of his or her surroundings—both sights and sounds, and sometimes even smells.

You can develop good observation skills by practicing. The important thing, especially when observing birds, is to notice (and remember!) all the features of the animal you see. You will be surprised, when you get around to checking a field guide, how many features distinguish one species from another.

For example, in observing a black-capped chickadee, you would want to note the size, shape, colors, and patterns of the bird, as well as any song or noises. Additionally, noting what it is feeding on, its behaviors, and kind of trees or landscape where you saw it, are all clues to the bird's identity. How can you remember all of this? Write it down! If you rely on "mental notes," you may find that by the time you get around to looking up the animal in your field guide, that mental picture is a bit fuzzy. Your journal notes might include:

- *tiny grayish bird smaller than my fist*
- *black on top of head, chin and neck*
- *white from eye to the collar, and white chest and belly*
- *grayish wings, back and tail*
- *the bird was in a small flock of other birds, feeding on sumac fruits*



With closer observation, you might also notice:

- *Two calls heard: a clear, two-pitch simple whistle; and a raspy "chick-a-dee-dee-dee"*
- *the flock flew from the sumacs into the upper branches of some big birch trees*
- *the flock moved from branch to branch in the birches before disappearing into the woods*

Certainly, if you have an animal that you can photograph—such as a frog or salamander that doesn't disappear too quickly—a picture is the best record of the animal. Some long-term monitoring programs require photographic evidence to accompany submissions of rare wildlife sightings. If you want real proof of your amazing discoveries, take a picture.

There are certain types of inventory and monitoring techniques that don't require stealth. Snow tracking needs only a good dusting of fresh snow. Searching for salamanders underneath rocks or cover boards requires only the right season (spring or summer). In fact, these types of surveys are ideal for involving younger children. For a child, there is nothing like seeing a bobcat track or a squirming redback salamander. These images spawn all kinds of questions and can lead to a lifetime of outdoor discovery.

Sometimes the biggest barrier to wildlife observation is the simple fact that "you can't get there from here." A good trail system on your land, with paths that are wide and clear, will enable you and other visitors to easily visit different parts of your land. If your trails are nonexistent, narrow or unmarked, how likely will you be to venture on a night hike listening for owls?

Who to Contact for Assistance

Are your property's boundaries marked? Do you know where the different forest types are on your land? Would you like help making a base map of your property? Some of these steps will be discussed in the next chapter of this guide, but you may want to get help from a professional. If you realize that you don't know your land very well, help is available through several means.

Your local UNH Cooperative Extension Forest Resources Educator is the first person to call. Contact information for the educator in each county is located in the Appendix. They can help you get started with learning about and planning for the care of your land (or land you help manage, such as your town forest). The Extension Educators have expertise in wildlife habitat identification, and they can visit your land to help you identify its significant habitat features. There are many other professionals that go to the next step. Even if wildlife

Extension Educators in Forest Resources — What They Can Do For You

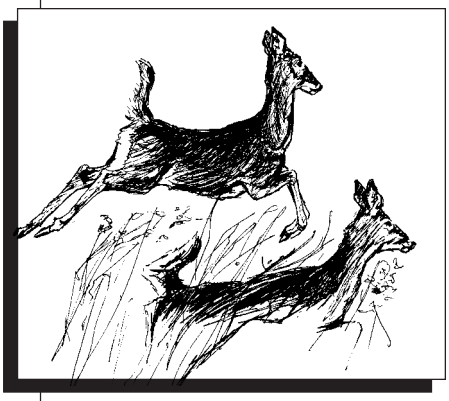
- ♦ Walk your property with you
- ♦ Help define your goals and objectives
- ♦ Discuss forest types on your land
- ♦ Recognize important wildlife habitat and unique habitat features
- ♦ Provide publications on wildlife habitat and land stewardship
- ♦ Discuss management options
- ♦ Provide information on grant programs and cost-share programs for wildlife habitat management work on your land
- ♦ Provide information on community forest stewardship projects such as town forest management or conservation
- ♦ Answer questions about current use, selling timber or firewood, forest harvesting laws, land protection, forest management, licensed foresters and certified loggers
- ♦ Refer you to other professionals

Extension Educators in Forest Resources are available to answer questions by all landowners. In general, they participate in field visits on properties larger than 10 acres in size.

Forestry Information Center

UNH Cooperative Extension publishes a list of licensed foresters, available from its Forestry Information Center:

Call 1-800-444-8978 or visit the website at www.ceinfo.unh.edu



habitat is your primary objective as a landowner, a licensed forester can help with such practices as boundary marking, wildlife habitat identification, forest stewardship, and estate planning in addition to practices related to timber harvesting. A forester will usually create very helpful maps, including a base map and a forest type map (more on this in the next chapter).

Other information sources are workshops and field tours sponsored by wildlife and natural resources organizations such as NH Fish & Game, UNH Cooperative Extension, the Audubon Society of New Hampshire, and other groups. Attending a field workshop is a fun way to learn new wildlife or forestry-related information, while meeting new people who may share your interests. A great many of these events are listed at the UNH Cooperative Extension Forestry & Wildlife events calendar online at:

www.ceinfo.unh.edu

(look under Events > Forestry & Wildlife Calendar)

Volunteers from the New Hampshire Coverts Project who live in your area also may be a good resource for learning about wildlife, habitat and monitoring projects in your town. This program, coordinated through UNH Cooperative Extension, trains volunteers to promote wildlife habitat conservation and forest stewardship in their communities. To find out about Coverts volunteers in your area, contact the project office: Coverts Project Coordinator, UNH Cooperative Extension, (603) 862-2166, or visit the website at www.ceinfo.unh.edu

Chapter 2
CREATING A HABITAT INVENTORY

Learning More About Your Land

As a landowner, you probably already spend time as an observer of your land. Bird watching or viewing deer in a meadow (seated in a comfortable chair!) has brought you pleasure and enjoyment. Did you know that through your own curiosity, you can become an expert? If not an expert naturalist, certainly you can be an expert on your own land.

You may find you want to take your observations a step further, and this added step—making a more deliberate study of your land—brings even more enjoyment. You will be the expert on where to find the nearest porcupine den, where the brown thrashers like to feed, or when is the best time of day to observe fox in your back field. Aldo Leopold, the "father of wildlife conservation," describes the importance and the pleasure of the amateur naturalist:

> *"Wildlife research started as a professional priestcraft…but there are plenty of problems suitable for all grades of amateurs… Do not let anyone tell you that [amateur biologists make] work out of play. They simply realized that the most fun lies in seeing and studying the unknown."*[1]

Wildlife Needs

Wildlife species don't use the landscape—or your property—on a random basis. All species require four things to survive: food, water, cover and space. Each wildlife species fulfills these needs in a specific way. These life requirements define an animal's habitat, or simply the place where an animal lives.[2] Species will most likely be found in the habitats where they can find food, find a mate, and where they have enough cover to feel safe. Some animals are generalists who eat a wide variety of foods and are thus able to take advantage of a wide range of habitats. Black bears will eat roots, nuts, berries, small mammals, and

[1] Leopold, A. 1949. *A Sand County Almanac and Sketches Here and There.* Oxford University Press, New York. 185 pp.

[2] This section adapted from: Kanter, J, Suomala, R., Snyder, S. 2001. *Identifying and Protecting New Hampshsire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups.* New Hampshire Fish & Game Department, 144 pp.

carcasses of deer. They can exist, and in fact require, a wide range of habitats to meet their food needs. On the other hand, New England cottontails eat grasses and herbs, and won't venture far from the dense cover provided in shrublands and young forests. This is their preferred habitat, and you are unlikely to see them in any other habitat type.

In general, larger animals need more space than smaller animals, and carnivores (meat eaters) and omnivores (eat both meat and plants) need more space than herbivores (plant-eaters). Suitable space for a bobcat is measured in square miles whereas a white-footed mouse may live out its entire life in less than one acre. An herbivorous deer is 10 times heavier than a fisher, but the omnivorous fisher roams 10 times further during the year searching for prey. It takes a lot more habitat to support fishers and bobcats than deer and mice.

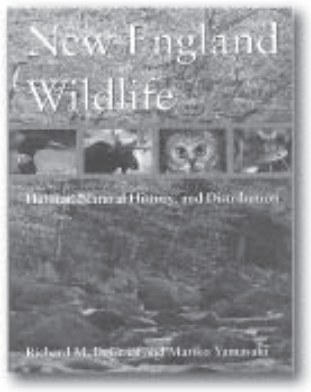
If you know the types of habitat found on your land, you will know what types of wildlife to look for, and you will understand better what is attracting them to use your property. You also can then begin to think about what you can do to maintain, enhance or adapt your land to meet the needs of different wildlife species.

Starting Your Habitat Inventory

Creating an inventory of the different habitats on your property is a great place to begin your study. It is a lot easier to look for wildlife (or do a wildlife inventory) if you know what to look for and where to find it. Remember, the habitat on your property determines which wildlife species will be there. Even if you don't have years of observation under your belt, you can still learn a great deal about your land through the inventory process. A habitat inventory, centered around a map of your land with lots of notes on it, will set a context for further observations of wildlife, and help you use the wildlife inventory methods detailed in Chapter 3. Making your map will help you begin to understand how different wildlife may use your land. For example:

- What kinds of habitat does my land offer?
- What species can I expect to find in which habitats?
- Where are good food sources, and when are they abundant?
- Does my land offer something unique to wildlife?
- What kinds of habitat surround my land, and how might these areas affect the wildlife using my property?

Your map can become a valuable tool to plan inventories of different wildlife species, note where wildlife are observed, note changes in vegetation or wildlife abundances over time, and note the land's response to management or disturbance over time.



New England Wildlife

When trying to determine which wildlife species might use the habitats on your property, you need to have some information about the habitat needs of different species. Not everyone is an expert on New Hampshire's wildlife, and even the experts need a good reference book to help them! Luckily, there is a publication that gives specific habitat requirements of nearly every wildlife species found in New Hampshire. *New England Wildlife: Habitat, Natural History, and Distribution,*[3] by Richard DeGraaf and Mariko Yamasaki, will tell you what an animal eats, where and when it breeds, where you are likely to find it—it includes excellent maps—and something about its behavior. If you need to know about a specific wildlife species, this is a great source.

[3] DeGraaf, R., Yamasaki, M. 2001. *New England Wildlife: Habitat, Natural History and Distribution*. University Press of New England, Hanover, 496 pp.

Making a Base Map

If you aren't already familiar with your property, you will need to do some homework in order to create a habitat map of your land (if you hate homework, you can call on a professional). The map doesn't have to be fancy, or even perfectly to scale, but a good first map will allow you to add lots of information to your map over time. Start with a "base" map showing such things as:

- Your property boundaries
- Streams, lakes, wetlands
- Forest edges, open areas
- Buildings, roads, trails, stone walls
- Gravel pits, railroads, power lines, towers
- Neighboring lands (include areas beyond your own property)

These features are all easily located on a map, even a hand-drawn one, by consulting existing maps. Some easily located sources include:

USGS topographic maps – These are available for purchase online (http://ask.usgs.gov/maps.html or from www.topozone.com) and will show land features such as roads, town lines, railroads, waterbodies, wetlands, open and forested areas, and topographic contour lines. Village stores or outdoors stores often sell these maps covering the local area. The accuracy will depend on the date of the map, but they are a good place to start.

Existing management plan – If you have a management plan for your land, even if it is out of date, it probably includes a forest type map showing the broad divisions of habitat types. If any forest management or development has occurred on your land since the map was made, you will need to update it. Among other elements, a complete management plan will also include such

Credit: Matt Tarr

Sample property map showing property boundaries on aerial photo.

useful features as site and forest stand descriptions, a timber inventory, and wildlife habitat descriptions.

Aerial photographs – These are great for showing waterways, buildings, roads, and different forest types, especially if they are taken in winter (you can see deciduous versus evergreen forest cover). You can view them in person at the UNH Cooperative Extension office in your county (see Appendix for contact information). Most offices have aerial maps from as far back as the 1950s, so you can even get an idea of historical uses of your land. If you want to purchase your own copy, you can order individual photos through the USDA Farm Services Agency (http://www.apfo.usda.gov/).

Conservation Lands Viewer – This website uses statewide map data that allows you to view the area of your land superimposed on a USGS quad or aerial photo, print it out, zoom in or out to different scales, and view the conservation lands in your area.(http://www.granit.sr.unh.edu/cgi-bin/load_file?PATH=/create/index.html).

Adding Habitat to Your Base Map

Once you have a map showing basic features of your land, you can start to add more detailed habitat features. Again, if you have an up-to-date management plan, your forester has probably already done much of this work.

A professional can look at an aerial photo and determine the basic natural features of a property, without even going onto the land. You will probably need to combine the knowledge you already have—an aerial photo or topographic map, and some field observations—to accurately map the different habitats on your land. Even if you start with identifying forested stands, shrublands, wetlands, and fields on your map, it will be a good beginning. You can also note the approximate age of a stand of forest—young, old, multi-aged—since the age of a stand helps determine what kinds of wildlife may use it. As you learn about dominant tree species or more detailed age classes of forest stands, either from your own observations or from a professional, you can add this information to your map.

The following includes a description of the most common habitat types, including a brief description of their habitat value and examples of wildlife species associated with each type.

Common Forest Types

These categories of forestland are named after the most common trees in a forest.[4] You can usually differentiate forested areas from each other

[4] Adapted from: *Good Forestry in the Granite State*. 1997. New Hampshire Division of Forests and Lands and the Society for the Protection of New Hampshire Forests, 162 pp.

by noting where you observe a change in the tree species on your land. Of course nature is rarely simple, and forest types often mix with each other. However, if you can identify a few trees, and take note of which species are most common in which parts of your land, you can delineate different forest types onto a base map.

White Pine – Most common in southern New Hampshire, white pine forests often reflect evidence of abandoned agricultural land (pine seedlings require sunny, open areas to get established). In typical pine stands, especially those on infertile, sandy soils, you may find blueberry bushes and starflower on the forest floor, and find wildlife such as red squirrel, deer mouse, pine warbler, and red-breasted nuthatch. Owls often use this type for winter roost sites.

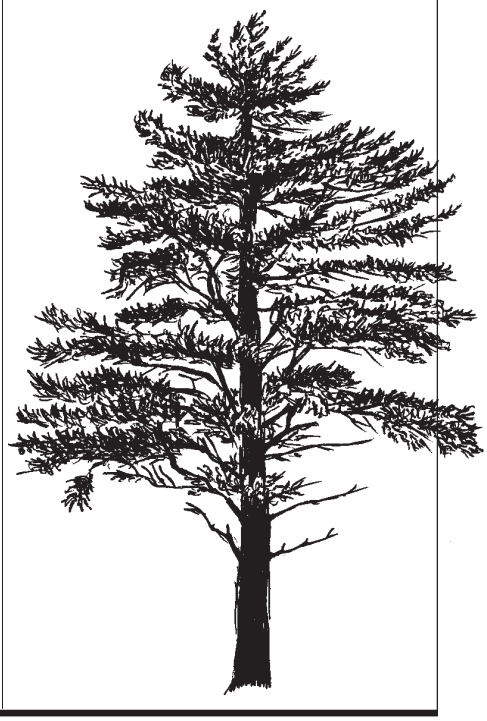
Northern Hardwood – Most common in central and northern New Hampshire, this type is usually a mix of sugar maple, beech, yellow birch, red maple, hemlock, and white ash trees. Common shrubs in this forest type include striped maple, witch hazel, and hobblebush. Typical wildlife found here include gray fox, southern flying squirrel, red-eyed vireo, white-breasted nuthatch, and ovenbird.

Spruce-Fir – Most common in northern New Hampshire, this forest type is dominated by red spruce and balsam fir. You may find wildflowers such as bunchberry and painted trillium growing in these forests, and wildlife such as pine marten*, snowshoe hare, spruce grouse, gray jay, black-backed woodpecker and ruby-crowned kinglet.

Red Oak – Most common in southern New Hampshire, red oak forests are often found close to or mixed with pine stands. Other trees associated with red oak are red maple and black birch. Maple-leaved viburnum, bracken fern, and whorled loosestrife are commonly found in this type of forest. The acorns of red oak are a valuable food source for deer, turkey, gray squirrel, and many other species. Blue jay, tufted titmouse and scarlet tanagers are birds that commonly nest in oak or oak-pine forests.

Hemlock – Most common in southern and central New Hampshire, hemlock often occurs on moist soils and rocky ridge tops. Typical shrubs in this forest type include hobblebush and maple-leafed viburnum, and wildflowers such as spotted wintergreen and downy rattlesnake plantain can be found on the forest floor. Look for red-breasted nuthatches, blue-headed vireos, black-throated green warblers, and hermit thrushes, which breed in hemlock stands. Deer often use dense hemlock stands for winter cover.

Aspen-Birch – This is a relatively uncommon forest type in New Hamp-



* Pine marten is a state-threatened species.

shire, composed of quaking and bigtooth aspen and white birch. Both birch and aspen require full sunlight to grow, so this forest type exists only where disturbances such as fire, windstorms, or clearcutting have occurred. Shrubs such as raspberries and black-berries can be found growing in openings in this forest type. Aspen-birch stands provide important habitat for ruffed grouse and American woodcock. When aspen occurs near wetlands, it is the preferred food for beaver. Some species use only young stands (1-10 years) of aspen-birch, such as chestnut-sided warbler and Nashville warbler.

Open Areas

These areas are defined by what they aren't—not forested and without standing water. Usually created by disturbances such as mowing, the pasturing of animals or beaver activity, they cover a relatively small portion of New Hampshire's landscape. However, they are often very important to wildlife, providing nutritious grasses, forbs (e.g. perennials), brambles, and fruiting shrubs as key food sources. In most cases, open areas represent a temporary stage. Over time, shrubs and trees will reoccupy these sites unless periodic disturbance occurs, such as beaver flooding or land management activities such as mowing or brush-hogging.

Grasslands & Openings – These are areas dominated by grasses, sedges and forbs. Old beaver flowages can provide important habitat for otter, great blue heron, turtles, and moose. When the water level drops after a beaver dam is deserted, the openings fill in with grasses and young trees and yellow warblers, common yellowthroats, bear, and ruffed grouse will frequent the opening. Bobolinks, upland sandpipers, and meadowlarks require open grasslands for nesting and feeding, while small mammals such as meadow voles and deer mice are prey for hawks, owls, foxes and coyotes. The insects in a summer meadow are nutritious food for many species, including many animals that spend most of their time in forests.

Shrublands & Old Fields – As their name suggests, shrubs dominate these sites. In New Hampshire, the most common shrublands are often abandoned agricultural fields, inactive gravel pits, and powerline corridors. Sometimes very poor soils can create areas where permanent shrublands occur, but in most cases, these are a temporary stage, becoming forested over time if left alone. Species typical of shrublands include Eastern cottontail, Eastern towhee, brown thrasher and common nighthawk.

Cropland and Agricultural Land – As any farmer will tell you, the mixture of vegetation types in agriculture areas are a great attraction to many wildlife species, including many migrating songbirds, deer and turkeys. Hayfields act as grasslands and can attract nesting bobolinks and meadowlarks, depending on the size of the fields. Delaying the date of hay harvest until mid July or later is critical for the success of these nesting birds. However, mowing late in the season conflicts with most farmer's goals of producing a valuable hay crop, so creative management (for example, leaving wet swales unmowed until late in summer) is necessary for these crops to sustain habitat for grassland nesting birds

Wet Areas

The areas described here are the most common types of wetlands and shore lands. Some will be easy to identify on your land (are your feet wet?), but others take closer observation to identify as wetlands. Wetlands and shore areas are used by over 90% of New Hampshire's wildlife species and of those, 40% use wetlands as their preferred habitat.[5] Rivers often function as travel corridors for both mammals and migratory birds, and species such as bald eagles** and osprey* nest in large trees along river corridors and lake shores. Locating and protecting wetlands is an important first step toward conserving and enhancing the wildlife diversity on your property. There are many ways to categorize wet areas, but the following descriptions allow you to categorize them on your map according to easily recognized features.[6]

Emergent Marsh – These wetlands have a mix of open water, floating vegetation such as duckweed, and plants growing in standing water such as cattails and pickerelweed. They are often created through beaver activity. The soils will always be wet in an emergent wetland. Wildlife found in these areas include marsh wren, Virginia rail, Wilson's snipe, red-winged blackbird, painted turtle, bullfrog, sedge wren,** muskrat, and mink.

Scrub-Shrub Wetland – These areas have shrubs as the dominant plants growing in wet soil. Typical shrubs species include willows, red-twigged dogwood, buttonbush, and speckled alder. Depending on the density of the shrubs, the ground might have no other vegetation (like a young alder thicket) or be covered in bright green sedges. These areas are critical habitat for ruffed grouse and American woodcock, along with black bear, gray tree frog, wood turtle and red fox.

Forested Wetland – These areas are sometimes harder to identify because they contain tree species that will also grow in non-wetland conditions, such as red maple, white pine, hemlock and balsam fir. Red maple, Atlantic white cedar and black gum swamps are specific types of forested wetlands. Often the understory and groundcover vegetation distinguish these areas as wetlands. Plants like sensitive fern, cinnamon fern, nettle, and jewelweed growing

[5] DeGraaf, R., Yamasaki, M., Leak, W., Lanier, J. 1992. *New England Wildlife: Management of Forested Habitats*. General Technical Report NE-144, USDA Forest Service Northeastern Forest Experimental Station.

[6] The following section adapted from: Yorke, D.E. 1997. *Wildlife Habitat Improvement: Wetlands and Wildlife*. UNH Cooperative Extension.

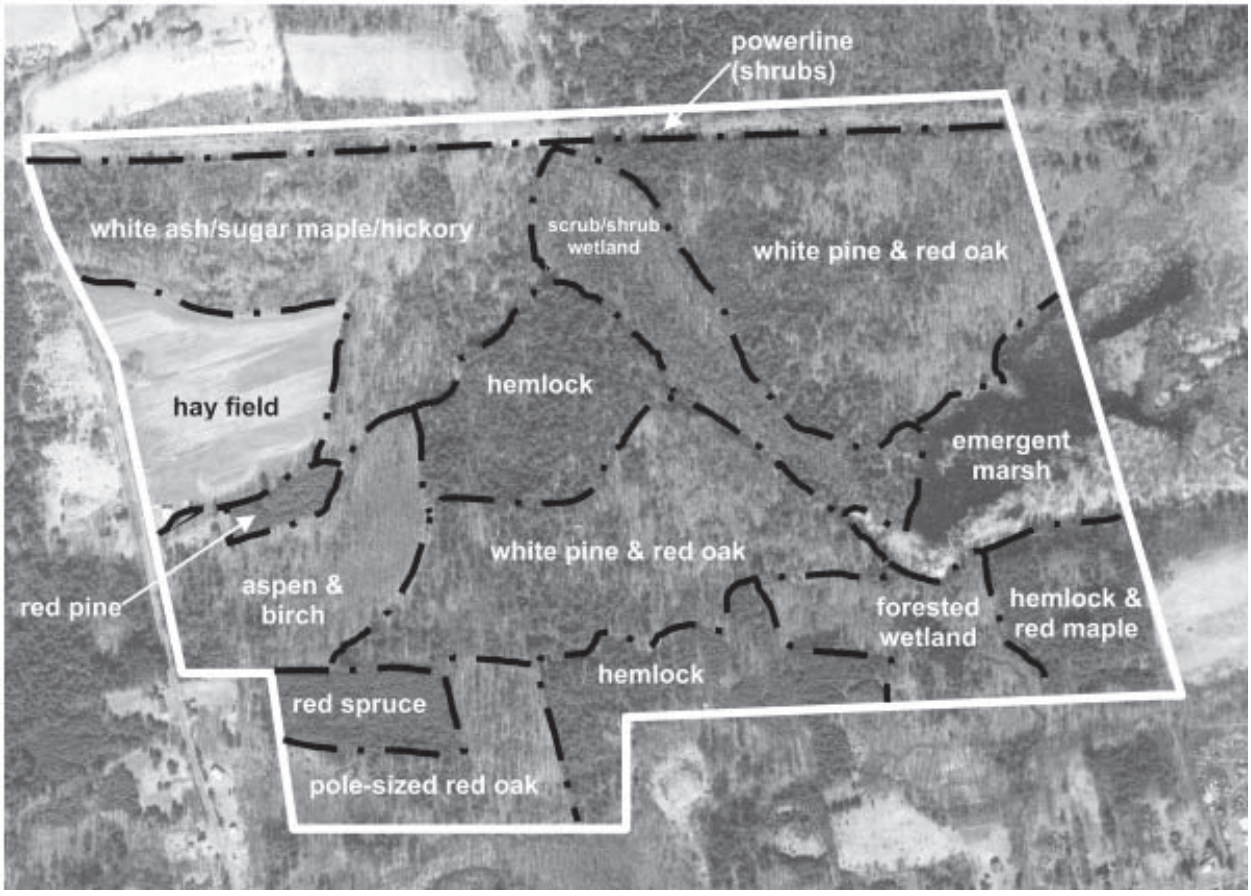
** Bald eagle and sedge wren are state-endangered species.

* Osprey is a state-threatened species.

in the understory are clues that you may be in a forested wetland. During the growing season, look for water marks on the base of trees and other evidence of standing water such as water-stained leaves. These areas are habitat for species such as red-shouldered hawk, brown creeper, moose, bobcat, mink, deer, and star-nosed mole.

Stream & Lake Shores – The rich vegetation along streams and lakes is easily located on a map as a border along permanent waterways. These areas provide nesting habitat for loon,* perch trees for osprey,* bald eagle,** heron, and kingfisher, and travel corridors for many mammals including otter, muskrat, and beaver. Where alder is present, this is also important habitat for American woodcock. Of all the habitats you may have on your land, stream and lake shores are probably some of the richest for wildlife.

Vernal Pools – These are wetland pools that hold water for a short period in early spring, usually found in small depressions in the forest. Vernal pools can be small and inconspicuous, or large and complex. The best way to locate them on your land is to go out in mid-spring and look for pools with no defined inlet or outlet. At other times, look for water marks on trees, matted leaves, or a depression in the land. Vernal pools can provide important breeding



Credit: Matt Tarr

Sample property map showing habitat types on aerial photo.

* Loon and Osprey are state-threatened species.

** Bald eagle is a state-endangered species.

habitat for amphibians such as wood frogs, and spotted and blue-spotted salamanders. They are also critical habitat for rare species like Blanding's and spotted turtles.[7]

Special Habitat Features

It is important to identify blocks of forest, open areas, wetlands and other basic cover types in your habitat inventory. Your land may also provide less obvious and perhaps less common habitat features that you should identify and add to your habitat map. Most of these features aren't rare or unique to a single part of the state, but they may be unusual to your region, your neighborhood, or your land.[8]

Snags and Cavity Trees – Snags are dead trees still standing in the forest. Snags are important to wildlife because they provide perches, cover, and food (insects). Cavity trees can be snags or living trees that contain holes suitable for use as nesting sites and cover for wildlife. Natural cavities or those excavated by birds such as woodpeckers provide nesting, roosting, and denning habitat for more than 50 species in New Hampshire, including white-breasted nuthatch, northern flicker, barred owl, pine marten,* and little brown bat. Each wildlife species requires a certain sized (diameter) cavity tree for their habitat needs. In general, larger diameter cavity trees provide habitat for the greatest number of species (see chart).

Wild Apple Trees/Orchards – Old apple trees, usually remnants of historic home sites and orchards, provide an important food source for deer, ruffed grouse, cottontail rabbits, and gray squirrels. Cavities in old apple trees also provide nesting habitat for bluebirds and flycatchers. American woodcock are also often found in orchards. While they don't eat apples, the decaying leaves of apple trees are an excellent place to find earthworms, the woodcock's primary food. Most old apple trees you will find are crowded and shaded by forests that have grown up around them. These apple trees are often in poor health or have died from lack of sunlight. You can often improve the health and fruit production of these trees by gradually removing the competing vegetation growing around them.[9]

Mast Production Areas – These are areas of beech, oak, and hickory forest that produce nut crops, called "hard mast." Hard mast is an

[7] An excellent reference for vernal pools is: Tappan, A, Marchand, M., eds. 1997. *Identification of Vernal Pools in NH*. New Hampshire Fish & Game Department, Concord.

[8] Adapted from *Good Forestry in Granite State* and *Identifying and Protecting NH's Significant Wildlife Habitat*.

[9] A good source for information on releasing apple trees is: Olson, D., Langer, C. 1990. *Care of Wild Apple Trees*. Brochure published by UNH Cooperative Extension.

* Pine marten is a state-threatened species.

Minimum Tree Diameters for Cavity-Using Species

(From *Good Forestry in the Granite State*)

< 8″
Black-capped Chickadee+
Downy Woodpecker+
Boreal Chickadee+
Tufted Titmouse
House Wren
Winter Wren
Eastern Bluebird

6-12″
Northern Saw-whet Owl
Hairy Woodpecker+
Yellow-bellied Sapsucker+
Red-breasted Nuthatch+
White-breasted Nuthatch
Brown Creeper
Chimney Swift
Southern flying squirrel
Northern flying squirrel
Ermine

12-18″
Eastern Screech-owl
Three-toed Woodpecker+
Black-backed Woodpecker+
Northern Flicker+
Great Crested Flycatcher
Northern long-eared bat
Indiana myotis

> 18″
Wood Duck
Common Goldeneye
Hooded Merganser
Common Merganser
Turkey Vulture
Barred Owl
Pileated Woodpecker+
Silver-haired bat
Gray squirrel
Red squirrel
Porcupine
Pine marten*
Fisher
Long-tailed weasel

> 24″
Little brown bat
Big brown bat
Gray fox
Black bear
Raccoon

+Cavity excavators
*state-threatened species

important food used by many species of wildlife including bear, deer, squirrel, chipmunk, blue jay, ruffed grouse, and turkey. Although mast crops are abundant in some years and light in others, mature beech, oak, and hickory trees with large crowns are the most consistent producers of abundant mast crops each year. Look for claw marks on beech trees and large "nests" of broken branches and leaves in the tops of beeches and oaks as signs of heavy use by bears.

Down and Decaying Woody Debris – Look for areas where there is a lot of "debris" on the forest floor. Down, dead trees and brush provide escape cover, as well as sunning, denning, and feeding sites for small mammals, snakes, salamanders and frogs. In general, larger diameter down wood is better than smaller, and provides habitat for more species. Down logs also provide drumming sites for ruffed grouse. Predators such as fisher, weasel, and barred owls hunt prey found near dead and down woody debris.

Deer Wintering Areas – These are areas of dense softwood—hemlock in southern New Hampshire, spruce and fir in the north—that give winter cover to herds of deer seeking out shallower snow depths and wind protection. Look for dense stands of evergreen trees with concentrations of deer tracks and trails in the snow. These softwood stands also provide critical winter food for porcupines, snowshoe hare, and white-winged crossbills.

Wildlife Travel Corridors – Wildlife often travel between feeding, breeding, watering, and resting areas along established travel routes, or corridors. Travel corridors occur in areas where animals feel secure in their movements, so good cover is often the critical feature. Larger animals will wear down a path, but most travel corridors aren't so obvious. Shorelines, riparian areas, unfragmented lands, and ridgelines are areas used commonly by wildlife as travel corridors.

Bogs – Bogs are wetlands with no inlet or outlet dominated by sphagnum moss. Look for plants such as pitcher plant and sundew, often growing with dwarfed black spruce and tamarack trees. Wildlife typical of bogs include bog lemming, ringed boghaunter (a dragonfly), spring salamander, and palm warbler.

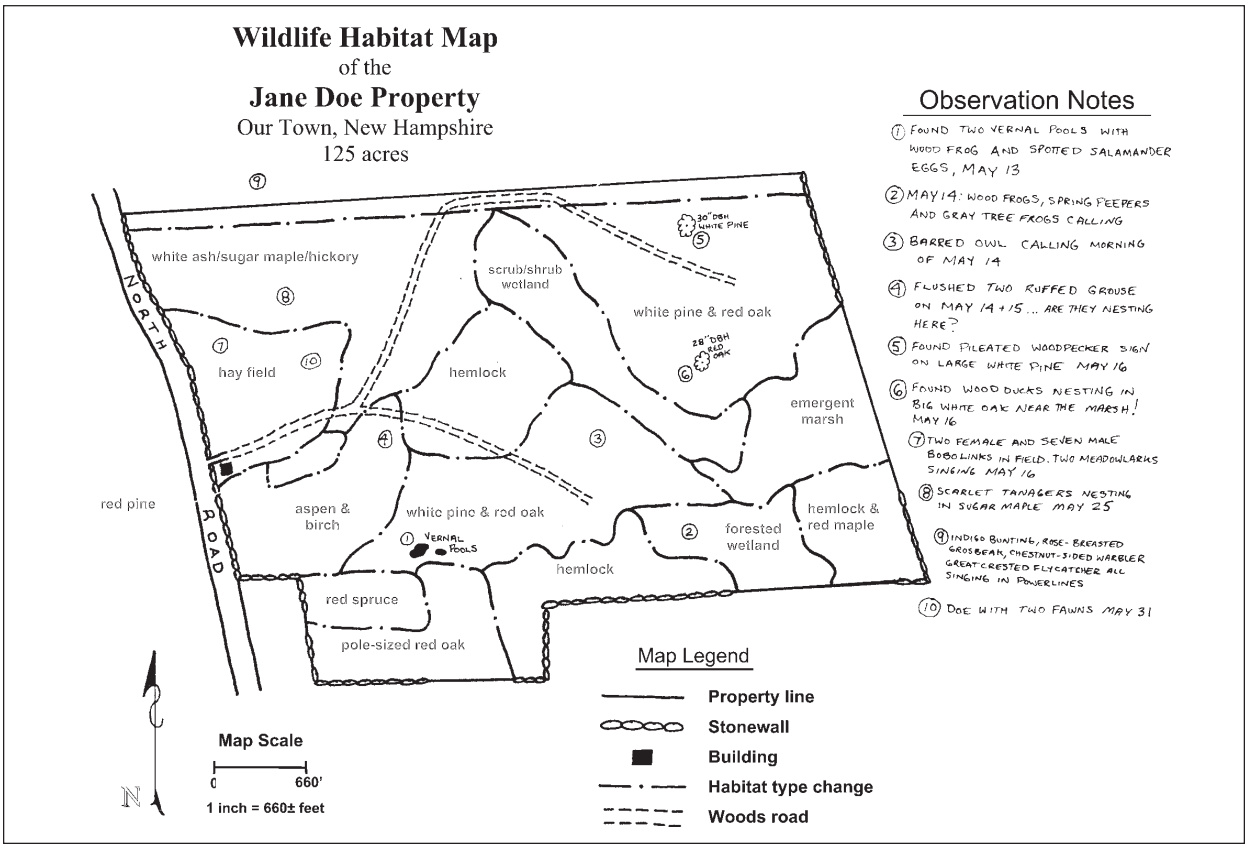
Seeps – These are small (less than ¼ acre) areas that occur where groundwater comes to the surface. Seeps often stay wet all year, even throughout the winter, and are often the first areas to green up in the spring. As a result, they provide important feeding habitat for bears, moose, deer, woodcock, robins, and turkeys. Northern dusky salamanders and two-lined salamanders are attracted to seeps to feed on insects and because they require moist habitats. Predators such as skunks, raccoons, and gray fox hunt small mammals and

insects near seeps. Skunk cabbage, sedges, sensitive fern, false hellebore, and jewelweed are typical plants found in seeps.

Woodland Raptor Nests – Trees suitable for supporting the large stick nests of raptors may be limited in today's forests. Red-tailed, red-shouldered, broad-winged, sharp-shinned, northern goshawk, and Cooper's hawks build large stick nests in major forks of large hardwood trees, or on whorls of large branches of white pines in New Hampshire forests. Since some hawks may reuse the same nest, and large owls often use old hawk nests, finding existing nests, leaving them undisturbed during breeding season, and locating trails away from them are important considerations.

Areas of Large Trees – True "old growth" forest in New Hampshire is very rare, but your land may have areas with characteristics similar to unharvested forest stands. Look for areas with large diameter trees intermingled with different sized trees, a high density of standing dead trees and large diameter down woody debris. Forests that have a combination of very large trees, smaller trees, and tree seedlings mimic the type of structure that occurs in old growth forests. The combination of large diameter trees, abundant woody debris, and trees of all sizes provides breeding, feeding and cover opportunities to a wide range of wildlife species.

Areas of Young Trees – Young forests (1-15 years) that are rebounding after a disturbance such as a windstorm, fire, logging, or agricultural clearing are temporary habitats, but are none-



Credit: Matt Tarr

Sample property map showing special habitat features and wildlife observations.

the-less very important to many species of wildlife. Young hardwood stands provide excellent habitat for American woodcock, chestnut-sided warbler, ruffed grouse, yellow-breasted chat, northern redbelly snake, snowshoe hare, gray fox, and fisher.

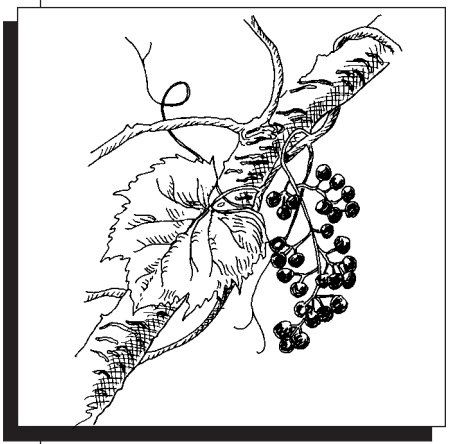
Unfragmented Lands – Your land may be part of a larger block of land with few or no roads, houses or other human habitation. In southern New Hampshire, a 500-acre block of unfragmented land is significant, while in northern New Hampshire, the significant blocks are much larger. These unfragmented lands often contain a diverse array of habitats and animals, and with good connections to other unfragmented lands can support such wide-ranging animals as fisher, northern goshawk, and bobcat that won't tolerate disturbance from humans and cannot meet all of their habitat requirements in small habitat areas.

Rock Outcrops – Rock piles and outcrops provide denning sites for porcupines and bobcats, nest sites for turkey vultures, and hibernation sites for snakes. Ravens and peregrine falcons nest on cliff faces. Other land features such as hilltops or sunny southern slopes can provide special habitat such as sunning sites for bobcat.

Wildlife Food Sources

As any berry picker knows, be they human or bear, the edible bounty of the land varies dramatically by season. When you visit your land during different seasons, take note of which areas have abundant fruit, nuts, or flowers, and at what time of year. For example, you can note on your map that the raspberry bushes surrounding your field usually ripen by mid-July, or where the best acorn trees are. These are obvious food sources, but what other plants do wildlife feed on?

In the Appendix, a list of New Hampshire's native trees, shrubs, and vines with wildlife value lists what plants are important, when they fruit, and which wildlife species feed on which parts.



Uncommon Habitats

The above brief descriptions cover only the most common habitats and habitat features, and these are the ones you are most likely to find on your land. However, it is the *uncommon* types of habitats which are likely to support rare, threatened or unique wildlife species. You or the resource professional you work with should also be alert to whether any of these uncommon habitats are present on your land. Examples of uncommon habitats and associated species that aren't described above include:[10]

[10] Identified in New Hampshire's Living Legacy Project, 12/5/01, see UNH Cooperative Extension website at www.ceinfo.unh.edu

Critical Wildlife Habitat	Associated Species
Merrimack River sand plains/pitch pine	Eastern hognose snake*, Fowler's toad, black racer, Karner blue butterfly**
Pitch pine barrens	Eastern towhee, common nighthawk*, whip-poor-will, frosted elfin**, Persius dusky wing**
Pine barrens	zanclognatha moth*, pine pinion moth*
Caves/mines	Eastern small-footed bat**, northern long-eared bat, Eastern pipistrelle
Cliffs	peregrine falcon**, golden eagle**
High elevation spruce-fir	Canada lynx**, Bicknell's thrush, spruce grouse
Alpine	American pipit, White Mountain butterfly, White Mountain fritillary
Sedge meadow	sedge wren**, ringed bog haaunter**
Northern bog	palm warbler, spruce grouse, mink frog
Riverine cobble	cobblestone tiger beetle
Estuary	bald eagle**, osprey*
Salt marsh	American bittern, willet, common tern**, sharp-tailed sparrow, seaside sparrow
Sand dune	piping plover**, least tern**
Coastal island	common tern**, arctic tern*, roseate tern*, black guillemot
Northern boggy lakes and streams	northern redbelly dace, finescale dace
Weedy lowland streams and ponds	swamp darter, banded sunfish
Quiet shallows over mud or sand	tesselated darter
Coastal freshwater streams	American brook lamprey

* state-threatened species
** state-endangered species

History and Context of Your Land

New Englanders recognize that a look back at the history of the land will probably tell you a lot about what exists today. You can discover some fascinating details about your land by examining historical aerial photos at your county UNH Cooperative Extension office. You may see evidence of a beaver dam 20 years ago where a thicket of aspen grows now. Or you may notice that in 1960 there was a network of logging roads on your land which explains the mixed-age forest that exists today. You will satisfy your curiosity, better understand how the present-day features of your land came to be, and maybe even predict what your property will look like in the future—perhaps that alder thicket may signal a future site for beaver on your land.

Another way to record changes occurring on your land is to establish several photo points that you return to each year. A photo taken from a set point each year can reveal interesting changes to your land over time (mark the point with flagging tape to be sure you are returning to the exact same spot each year). The advent of digital photography also allows easy storage and comparison of photos from year to year. You can observe increases in the shrub growth in an old field, or the vegetation changes caused by releasing old apple trees.

Take a look at the area surrounding your land. Your habitat inventory should extend beyond your own property boundaries to include neighboring areas and the habitats they contain. You can use this as an opportunity to talk to your neighbors about your project.

The History of Your Land

Tom Wessel's *Reading the Forest Landscape* (2004, Countryman Press) helps you piece together the history of your land using clues that exist today: rock walls, depressions, vegetation, and other land features.

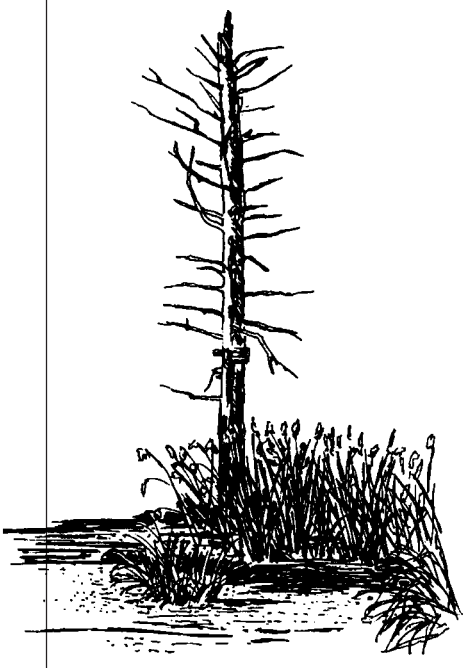
The website *http://docs.unh.edu/nhtopos/nhtopos.htm* has hundreds of historic maps and drawings which show views and USGS maps of most of New Hampshire, starting in the 1800s.

Ask them about the history of their land (most people like to tell their stories) and about what kinds of wildlife they have observed there. This conversation may encourage them to help you in your project, or lead to a combined effort to examine wildlife habitat in your broader neighborhood.

Understanding how the habitats on your property relate to other habitats on your neighbor's land, in your neighborhood, in your town, and in your region is an important part of your habitat inventory. Most wildlife species will only use your property to meet a portion of their habitat needs; they will travel to other properties to find habitats not available on your land. However, this doesn't make your land any less important to wildlife. The habitats on your property probably complement the habitats on surrounding lands—in some cases, the habitats on your property might not be available anywhere else.

Habitat Change

As you draw your habitat map, it will be tempting to commit the details to memory and assume that this is the last map you will ever draw. In fact, your habitat inventory is only a snapshot in time, since the landscape and all habitats undergo constant change. Your land will look different next year, five years from now, and twenty years from now. Whether changes are drastic or more subtle, wildlife will respond to the changes in food, water, cover, and space, and your on-going inventory can be a record of those changes.



Habitat change occurs at different scales, and the different species of animals using a habitat may react quickly or adjust slowly depending on the rate of habitat change. Your woodland might change from having no coarse woody debris on the forest floor to having heaps and mounds after a big windstorm. Similarly, when a beaver builds a dam on a stream, it is easy to see dramatic changes to the land in a matter of days. Trees and shrubs are flooded, open water appears out of nowhere, a new habitat arises and new animals move in to take advantage.

Habitat change occurring in a field is a slower process, measured in months and years. Left unmowed, a field of grasses and forbs used by bobolink will convert to a shrubland through the process of succession, and brown thrashers, field sparrows, and cottontail rabbits will begin to use the area. In five to twenty years the field may be a young hardwood stand full of birch and aspen and used by chestnut-sided warblers and American woodcock.

Finally, in an older forest, habitat change may be so subtle that you might not notice it. It may take 20 years or more to see a recognizable habitat change in a 100-year old pine woodland.

Anytime you notice an obvious change, record it on your map or in your journal. The wildlife inventory and monitoring methods described in the next chapters will help you record your wildlife observations. Over the long term, you will be able to look back over these records and recognize even the more subtle changes occurring on your land.

Chapter 3

WILDLIFE INVENTORIES AND COLLECTING BASELINE INFORMATION

If you complete a basic habitat inventory, you already are an expert on your land. You know where the important habitat features are, where one habitat meets up with another, and where important wildlife food sources exist. The following chapter focuses on techniques for collecting specific information on wildlife species through different types of wildlife inventories. When you combine your habitat inventory and wildlife inventories, you will have a picture of the "baseline" information on your land.

Baseline information about your land is your beginning reference point. It may simply provide you with the starting point for your own record keeping, from which you can measure change over the course of years. Or it may represent the "before" picture of your land, in anticipation of habitat management, restoration, or improvement projects.

In this latter case, without a present-day snapshot, you would have a difficult time making judgments about the effects on wildlife caused by your management decisions. For example, have bluebirds increased their use of your fields now that you have put up bluebird boxes? Or do more bobolinks nest successfully in your meadow now that you mow the field later in the summer? Has the forest opening you created in your woods changed the species of birds frequenting your forest? Without collecting information before and after, your information is merely anecdotal.

This chapter shows you different methods for recording information about the wildlife you observe, and helps you learn more about how species use your property. Chapter 4 shows you how to determine whether your observations might be part of a larger trend in wildlife populations, and help you contribute your observations—or make new observations—as part of a larger regional, statewide, or national study.

Identifying Wildlife

Learning how to identify an animal or read the signs it leaves on the land is half the fun of taking an inventory. Depending on the species you decide to inventory, you may have to do some studying before you begin, or you may leap right in and begin, learning the species as you go. For example, if you are curious about the different frogs and toads using a wetland on your land, you will need to familiarize yourself with the different calls of New Hampshire's 10 species. You may be surprised at how easy this can be with the help of tapes or CDs available for purchase from nature stores. Alternatively, you can use checklists even if you don't recognize very many species. Start by recording only the animals you recognize. You can then add new species as you learn them from field guides or other references.

Common Inventory Problems

Although the aim of this guide is to help you to learn more about your land and the wildlife using it, we thought it worth mentioning that scientists and naturalists—even amateur ones—can sometimes run into problems when inventorying wildlife. Drawing conclusions about changes in wildlife populations based on inventories done through time (monitoring) is difficult even under the most rigid research methods. Many problems with taking inventories relate to data being repeatable by others, but some problems exist for even the most recreational of wildlife inventories. If you wish to compare your collected information over years and draw realistic conclusions from it here are some things to think about first:[11]

- **Changing your inventory process over time –** If you want to make comparisons of your inventories from year to year, you must use the same process in your inventory each and every time. If you change your methods, your results aren't comparable.
- **Counting the same individual in two locations (and counting them as two) –** Be cautious in your counting. If you suspect a frog call you are hearing may be the same one who called a few minutes ago, trust your instincts and don't count it twice.
- **Not knowing your species –** Err on the side of caution. If you don't recognize a species, but you think you know, take notes or a photo, and confirm your guess later with the help of references. It can be tempting to guess, but using question marks (?) or other symbols to express your lack of assurance will give you a more accurate inventory.
- **Losing old information –** If you go to the trouble to collect information, be sure you write it down in the same place (like a journal or notebook), so you can find it the next year, or even in 10 years.
- **Losing track of your survey sites –** Use flagging tape or unmovable locators (such as brightly colored wooden or metal stakes) to help guide you to your survey points. The woods can look very different throughout the year and from year to year. And your memory might not be as accurate as you think!

Inventory Techniques

Choosing which inventory to conduct is a matter of choosing which animals interest you, which ones you have existing knowledge of, or which species you would like to learn more about. We attempted to categorize each inventory according to the degree of difficulty and experience necessary to complete the technique. Included are a list of suggested field guides you can use to help identify species. You may also call on the experience of friends, neighbors, or professionals to confirm a species identification. Again, a picture is worth a thousand words, and keeping a journal which includes notes about an animal's characteristics can help you decipher even the most mysterious of species.

[11] Adapted from: Sutherland, W.J., ed. 1996. *Ecological Census Techniques: A Handbook*. Cambridge University Press, 352 pp.

You will notice that wildlife species that are listed by the State of New Hampshire as threatened (*) or endangered (**) will have asterisk indicators by their names. These species are obviously quite rare, but your careful attention to wildlife and suitable habitat may mean that you will observe them on your land or land you visit. The NH Fish & Game Nongame and Endangered Wildlife Program collects sighting information on all of these species. They welcome hearing from you about your observations, particularly if you have accompanying documentation (photo, notes) which will help them confirm the sighting. Contact their office at (603) 271-2461 or by email at: wilddiv@wildlife.state.nh.us.

All of the following surveys require a data form (which you can photocopy from this guide) and a pencil that you bring with you out in the field. Binoculars are almost always a good idea. A clipboard is useful too, but not as easy to put in your pocket. Other special equipment needed is listed under each method.

We also note for each inventory technique where there are state or national monitoring programs that use similar information (described in Chapter 4). However, remember that these broader data-collection programs may have their own, slightly different survey instructions ("protocols"). If you know you want to contribute information from your land to a broader program, check out the program first, then begin collecting your inventory information.

What to Bring in the Field:

- Data form
- Pencil
- Binoculars
- Clipboard
- Other equipment as noted in each method

Birds

Bird Checklist

Species Groups	All birds.
Objectives	Record the presence or absence of NH bird species.
Description	This checklist is simply a list of all birds that you see or hear during a particular time. A checklist may be used each time you go out on your land, or over the period of a week, a month or a year.
Skill Level	Medium. You may find 25 birds on your land, but you don't need to recognize them ahead of time—you can learn them as you go.
Season	Year-round
Time of Day	Anytime
Duration	Self-determined
Special Equipment	Binoculars, bird guide, CD of bird calls (optional). You may use the following checklist, or one sold by the Audubon Society of NH, which has space for three different visits/places on one data sheet (order on their website at www.nhaudubon.org or call 603-224-9909).
Associated Programs	NH Bird Records NH Backyard Winter Bird Survey Great Backyard Bird Count Christmas Bird Count

New Hampshire Bird Checklist†

Geese, Swans, Ducks
- ☐ Snow Goose
- ☐ Canada Goose
- ☐ Mute Swan
- ☐ Wood Duck
- ☐ Gadwall
- ☐ American Wigeon
- ☐ American Black Duck
- ☐ Mallard
- ☐ Blue-winged Teal
- ☐ Northern Shoveler
- ☐ Northern Pintail
- ☐ Green-winged Teal
- ☐ Canvasback
- ☐ Redhead (r)
- ☐ Ring-necked Duck
- ☐ Greater Scaup
- ☐ Lesser Scaup
- ☐ Bufflehead
- ☐ Common Goldeneye
- ☐ Barrow's Goldeneye
- ☐ Hooded Merganser
- ☐ Red-breasted Merganser
- ☐ Common Merganser
- ☐ Ruddy Duck

Pheasants, Grouse
- ☐ Ring-necked Pheasant
- ☐ Ruffed Grouse
- ☐ Spruce Grouse
- ☐ Wild Turkey

Loons, Grebes
- ☐ Common Loon*
- ☐ Pied-billed Grebe**
- ☐ Horned Grebe
- ☐ Red-necked Grebe

Gannets, Cormorants, Herons, Vultures
- ☐ Double-crested Cormorant
- ☐ American Bittern
- ☐ Great Blue Heron
- ☐ Great Egret
- ☐ Snowy Egret
- ☐ Little Blue Heron
- ☐ Tricolored Heron
- ☐ Cattle Egret (r)
- ☐ Green Heron
- ☐ Black-crowned Night-Heron
- ☐ Yellow-crowned Night-Heron (r)
- ☐ Turkey Vulture

Osprey, Eagles, Hawks, Falcons
- ☐ Osprey*
- ☐ Bald Eagle**
- ☐ Northern Harrier*
- ☐ Sharp-shinned Hawk
- ☐ Cooper's Hawk*
- ☐ Northern Goshawk
- ☐ Red-shouldered Hawk
- ☐ Broad-winged Hawk
- ☐ Red-tailed Hawk
- ☐ Rough-legged Hawk
- ☐ Golden Eagle** (r)
- ☐ American Kestrel
- ☐ Merlin
- ☐ Peregrine Falcon**

Rails, Coot, Crane
- ☐ Virginia Rail
- ☐ Sora
- ☐ Common Moorhen (r)
- ☐ American Coot
- ☐ Sandhill Crane (r)

Plovers, Sandpipers, Snipe
- ☐ Piping Plover** (r)
- ☐ Black-bellied Plover
- ☐ Semipalmated Plover
- ☐ American Golden-Plover (r)
- ☐ Killdeer
- ☐ Greater Yellowlegs
- ☐ Lesser Yellowlegs
- ☐ Solitary Sandpiper
- ☐ Willet
- ☐ Spotted Sandpiper
- ☐ Upland Sandpiper**
- ☐ Sanderling
- ☐ Semipalmated Sandpiper
- ☐ Western Sandpiper (r)
- ☐ Least Sandpiper
- ☐ White-rumped Sandpiper
- ☐ Baird's Sandpiper (r)
- ☐ Pectoral Sandpiper
- ☐ Dunlin
- ☐ Stilt Sandpiper
- ☐ Buff-breasted Sandpiper (r)
- ☐ Short-billed Dowitcher
- ☐ Wilson's Snipe
- ☐ American Woodcock

Gulls, Terns
- ☐ Ring-billed Gull
- ☐ Herring Gull
- ☐ Great Black-backed Gull
- ☐ Roseate Tern**
- ☐ Common Tern**
- ☐ Arctic Tern* (r)
- ☐ Black Tern
- ☐ Least Tern** (r)

Doves, Cuckoos, Owls
- ☐ Rock Pigeon
- ☐ Mourning Dove
- ☐ Black-billed Cuckoo
- ☐ Yellow-billed Cuckoo
- ☐ Eastern Screech-Owl (r)
- ☐ Great Horned Owl
- ☐ Snowy Owl
- ☐ Barred Owl
- ☐ Short-eared Owl
- ☐ Northern Saw-whet Owl

Nightjars, Hummingbirds, Woodpeckers
- ☐ Common Nighthawk*
- ☐ Whip-poor-will
- ☐ Chimney Swift
- ☐ Ruby-throated Hummingbird
- ☐ Belted Kingfisher
- ☐ Red-headed Woodpecker (r)
- ☐ Red-bellied Woodpecker
- ☐ Yellow-bellied Sapsucker
- ☐ Downy Woodpecker
- ☐ Hairy Woodpecker
- ☐ American three-toed Woodpecker* (r)
- ☐ Black-backed Woodpecker
- ☐ Northern Flicker
- ☐ Pileated Woodpecker

Flycatchers, Shrikes, Vireos, Jays, Crows
- ☐ Olive-sided Flycatcher
- ☐ Eastern Wood-Pewee
- ☐ Yellow-bellied Flycatcher
- ☐ Acadian Flycatcher (r)
- ☐ Alder Flycatcher
- ☐ Willow Flycatcher
- ☐ Least Flycatcher
- ☐ Eastern Phoebe
- ☐ Great Crested Flycatcher
- ☐ Eastern Kingbird
- ☐ Northern Shrike
- ☐ Blue-headed Vireo
- ☐ Yellow-throated Vireo
- ☐ Warbling Vireo
- ☐ Philadelphia Vireo
- ☐ Red-eyed Vireo
- ☐ Gray Jay
- ☐ Blue Jay
- ☐ American Crow
- ☐ Fish Crow
- ☐ Common Raven

Larks, Swallows, Chickadees, Nuthatches
- ☐ Horned Lark
- ☐ Purple Martin**
- ☐ Tree Swallow
- ☐ Northern Rough-winged Swallow
- ☐ Bank Swallow
- ☐ Barn Swallow
- ☐ Cliff Swallow
- ☐ Black-capped Chickadee
- ☐ Boreal Chickadee
- ☐ Tufted Titmouse
- ☐ Red-breasted Nuthatch
- ☐ White-breasted Nuthatch
- ☐ Brown Creeper

Wrens, Kinglets, Thrushes
- ☐ Carolina Wren
- ☐ House Wren
- ☐ Winter Wren
- ☐ Marsh Wren
- ☐ Golden-crowned Kinglet
- ☐ Ruby-crowned Kinglet
- ☐ Blue-gray Gnatcatcher
- ☐ Eastern Bluebird
- ☐ Veery
- ☐ Gray-cheeked Thrush
- ☐ Bicknell's Thrush
- ☐ Swainson's Thrush
- ☐ Hermit Thrush
- ☐ Wood Thrush
- ☐ American Robin

Mockingbirds, Pipits, Waxwings
- ☐ Gray Catbird
- ☐ Northern Mockingbird
- ☐ Brown Thrasher
- ☐ European Starling
- ☐ American Pipit
- ☐ Bohemian Waxwing
- ☐ Cedar Waxwing

Warblers
- ☐ Blue-winged Warbler
- ☐ Golden-winged Warbler
- ☐ Tennessee Warbler
- ☐ Orange-crowned Warbler (r)
- ☐ Nashville Warbler
- ☐ Northern Parula
- ☐ Yellow Warbler
- ☐ Chestnut-sided Warbler
- ☐ Magnolia Warbler
- ☐ Cape May Warbler
- ☐ Black-throated Blue Warbler
- ☐ Yellow-rumped Warbler
- ☐ Black-throated Green Warbler
- ☐ Blackburnian Warbler
- ☐ Pine Warbler
- ☐ Prairie Warbler
- ☐ Palm Warbler
- ☐ Bay-breasted Warbler
- ☐ Blackpoll Warbler
- ☐ Cerulean Warbler (r)
- ☐ Black-and-white Warbler
- ☐ American Redstart
- ☐ Ovenbird
- ☐ Northern Waterthrush
- ☐ Louisiana Waterthrush
- ☐ Connecticut Warbler (r)
- ☐ Mourning Warbler
- ☐ Common Yellowthroat
- ☐ Wilson's Warbler
- ☐ Canada Warbler
- ☐ Yellow-breasted Chat (r)

Tanagers, Sparrows
- ☐ Scarlet Tanager
- ☐ Eastern Towhee
- ☐ American Tree Sparrow
- ☐ Chipping Sparrow
- ☐ Clay-colored Sparrow (r)
- ☐ Field Sparrow
- ☐ Vesper Sparrow
- ☐ Savannah Sparrow
- ☐ Grasshopper Sparrow* (r)
- ☐ Nelson's Sharp-tailed Sparrow
- ☐ Saltmarsh Sharp-tailed Sparrow
- ☐ Seaside Sparrow (r)
- ☐ Fox Sparrow
- ☐ Song Sparrow
- ☐ Lincoln's Sparrow
- ☐ Swamp Sparrow
- ☐ White-throated Sparrow
- ☐ White-crowned Sparrow
- ☐ Dark-eyed Junco
- ☐ Lapland Longspur
- ☐ Snow Bunting
- ☐ Northern Cardinal
- ☐ Rose-breasted Grosbeak
- ☐ Indigo Bunting
- ☐ Dickcissel (r)

Blackbirds, Finches
- ☐ Bobolink
- ☐ Red-winged Blackbird
- ☐ Eastern Meadowlark
- ☐ Rusty Blackbird
- ☐ Common Grackle
- ☐ Brown-headed Cowbird
- ☐ Orchard Oriole
- ☐ Baltimore Oriole
- ☐ Pine Grosbeak
- ☐ Purple Finch
- ☐ House Finch
- ☐ Red Crossbill
- ☐ White-winged Crossbill
- ☐ Common Redpoll
- ☐ Hoary Redpoll (r)
- ☐ Pine Siskin
- ☐ American Goldfinch
- ☐ Evening Grosbeak
- ☐ House Sparrow

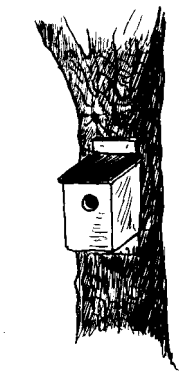
Others:
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

(r) rare
*** state-threatened**
**** state-endangered**

† Adapted from *Birds of NH Field Checklist,* published by Audubon Society of New Hampshire (version 12/2003)

Nest Box Survey

Species Groups	Cavity-nesting birds such as Eastern bluebird, house sparrow, tree swallow, and others.
Objectives	One objective may be to determine the suitability of a nest box to the target species. For example, you could test the effectiveness of two bluebird house styles or two similar bluebird houses placed in different habitats. You may also monitor the overall health of a species' population on your land, over time.
Description	Open each nest box, being careful not to let eggs or chicks tumble from the opened box. Note the date, nesting material if present, and number of eggs if present. Once eggs are present, you will want to identify to whom they belong, and the number of eggs by observing the adults or by using a field guide to eggs and nests. By checking the nest box once a week, you can estimate the date on which eggs were laid. Once young are present, you can track the number of eggs that successfully hatched, and the number of young that survive to fledging. *Note: Although songbirds have a very poor sense of smell and (contrary to popular belief) won't abandon the nest due to your handling the nest, eggs, or chicks, predators have an excellent sense of smell, so wearing gloves when handling nests will help protect the nest.*
Skill Level	Easy. You only need to be familiar with a handful of nest box users such as black-capped chickadee, tree swallow, bluebird, and wood duck.
Season	March–July. Bluebirds typically begin scouting for nest sites in March, though cavity nesters such as barred owls begin nesting as early as February.
Time of Day	You may check nest boxes at any time, but choose to monitor the nests during calm, mild and dry weather to avoid chilling the eggs or chicks should adults flush from the box.
Duration	Nest boxes should be monitored once a week during the season in which they are in use. Including data entry, the procedure should take under five minutes per box.
Special Equipment	Gloves, field guide to nests and eggs (optional).



Nest Box Survey Data Sheet

Observer: Date:

Weather:

Air Temperature: Cloud Cover: Wind Conditions:

Box#	Species using	# Eggs	# Young	Observations
1				
2				
3				
4				
5				

Comments:

Examples of cavity nesters that will use nest boxes:

Residential Areas:
House Wren
House Sparrow
European Starling
Tree Swallow
Northern Flicker
Great Crested Flycatcher
Tufted Titmouse
Red-breasted Nuthatch

Extensive Forested Areas:
White-breasted Nuthatch (also residential)
Black-capped Chickadee (also residential)
Barred Owl
Northern Saw-whet Owl
Pileated Woodpecker
Wood Duck

Open and Agricultural Areas
Tree Swallow
Eastern Screech Owl
Eastern Bluebird
American Kestrel
Purple Martin**

Lakes/Wetlands
Wood Duck
Common Merganser
Hooded Merganser
Common Goldeneye

** state-endangered species

To learn about building appropriate nest boxes, see Carrol Henderson's *Woodworking for Wildlife: Homes for Birds and Mammals*.

Feeder Birds Survey

Species Groups	Birds that frequent feeders.
Objectives	Your bird feeder data can be used to determine: • Presence/absence of feeder birds • Which habitats and foods attract birds • Rare or unusual birds • Seed preferences of various bird species If you choose to contribute your observations to a larger study such as Project Feeder Watch, you may also be able to help: • Track winter bird population changes over time • Track changes in winter ranges over time • Document how far and how fast an infectious disease can spread through a wild bird population
Description	Observe birds at your feeder during the winter. Count the highest number of individuals of each species in view at one time and record this on your data sheet. Repeat this as often as you wish while observing birds. Record the predominant weather over the two-day count period including the daylight temperature extremes, type of weather, and snow cover depth. Data sheet includes nationally-distributed species of interest to such monitoring programs such as Project Feeder Watch (see Chapter 4). However, you can add other species that you observe at your feeder. Some birds ("incidentals") may be attracted by the other birds at your feeder, even if they aren't actually eating your feed.
Skill level	Medium. You may have up to 50 species of birds that come to your feeders, but you don't need to be able to identify all beforehand. You can learn as you encounter them.
Season	November through March/April (feeders shouldn't be up when bears are active).
Time of Day	Count at any time during the day, but it pays to be consistent with your timing so you can compare your notes over time.
Duration	Observe birds on two consecutive days within each two-week period. You may count for as little or as long as you like. Record the amount of time you spent watching birds on your data sheet.
Special Equipment	Outdoor thermometer, binoculars, bird guide.
Associated Programs	NH Backyard Winter Bird Survey NH Bird Records Project Feeder Watch

Feeder Birds Data Sheet

Observer: Date:

Weather: Low temp: High temp: Time spent:

Precipitation: Kind: Amount: Snow depth: Patchiness of snow:

Species	Time Spent	Highest # of Birds Seen at One Time
American Crow		
American Goldfinch		
American Robin		
American Tree Sparrow		
Black-capped Chickadee		
Blue Jay		
Common Grackle		
Dark-eyed Junco		
Downy Woodpecker		
European Starling		
Evening Grosbeak		
Hairy Woodpecker		
House Finch		
House Sparrow		
Mourning Dove		
Northern Cardinal		
Northern Flicker		
Pine Grosbeak		
Pine Siskin		
Purple Finch		
Red-breasted Nuthatch		
Red-bellied Woodpecker		
Tufted Titmouse		
White-breasted Nuthatch		
Other:		

Comments:

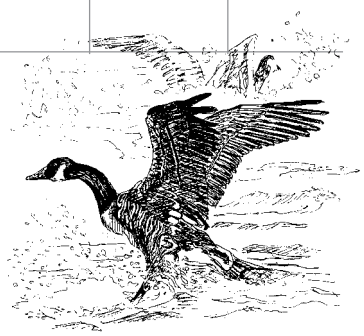
Local Breeding Bird Atlas

Species	All birds that nest in New Hampshire.
Objectives	To understand the species and breeding behaviors of nesting birds (thereby learning about areas important to nesting birds), and to learn about the timing of breeding by different species on your land.
Description	A breeding bird atlas is like a bird checklist, but with more detail collected on each sighting (including geographical location, thus "atlas") and focusing only on the birds nesting in an area. You can create your atlas using a habitat or base map to record your data. You may record nests according to their exact location on your map, or you may identify the general location of the nest such as in an aspen stand, scrub-shrub wetland, or other defined habitat. You can choose the level of detail you wish to record, but keep in mind that if you intend to make management decisions based on your inventory, you may want to record habitat information along with species, number observed, and types of breeding behavior. The data card contains information about the bird species seen on your property: • Habitat (Hab) • Date of highest evidence of breeding (see below) • Breeding evidence category (see below)
Habitat	For each species observed, note the habitat in which you observe breeding behavior (highest evidence of breeding). Use your own habitat map and create some standard abbreviations, such as Oak Forest (OF), Scrub-Shrub Wetland (S/S W), Open Field (OF), etc.
Date of Highest Evidence	This column on your data sheet includes the date you observed a bird species and recorded its behavior under one of the four breeding evidence categories: Observed, Possible, Probable, or Confirmed. If you observe a breeding behavior that provides better evidence that the bird is breeding on your property, then erase and replace with the new date and new code on your field card.
Evidence of Breeding	Your goal is to obtain confirmed evidence of breeding. There are four main levels of breeding evidence: • **O**bserved (**O**) – you observe or hear a bird with no associated breeding behavior or song • **P**ossible (**PO**) – you hear limited singing during the breeding season • **P**robable (**PR**) – You observe more than one singing bird in appropriate breeding habitat on one day, or you observe a pair in suitable nesting habitat during the breeding season • **C**onfirmed (**C**) – you see a bird carrying nesting material, nest-building at the actual nest site, or the nest with eggs or eggshells on the ground, or young in or around the nest.
Note	Use caution when observing nests—although songbirds don't have a good sense of smell, predators do, and are known to follow human scents. Observe nests from a distance, and leave the area as soon as possible. Take notes after you've left the nest area.

Skill Level	Medium. There may be 20 species of birds breeding on your land, but you don't have to be able to identify the birds by sight and sound beforehand. You can learn them as you encounter them.
Season	Primarily June–July, but as early as January and as late as September.
Time of Day	Mainly 5–10 a.m., the closer to sunrise the better.
Duration	Variable, each visit self-determined.
Special Equipment	Binoculars, bird guide, map of property, field journal (optional)
Associated Programs	NH Bird Records Important Bird Areas

Local Breeding Bird Atlas Data Sheet

Species	Habitat	Date of Highest Evidence	Duration of Visit	Observed (O)	Possible (PO)	Probable (PR)	Confirmed (CO)
ex. American Robin	*ORCH*	*6-10-04*	*1/2 hour*			*Pair flying in orchard*	



Grouse Drumming Counts

Species	Ruffed grouse.
Objectives	1) Spot mapping along trails allows for close monitoring of habitat use by drumming grouse. The objective is to locate all the drumming sites on your property and observe general trends in grouse numbers over time. 2) Roadside surveys of drumming grouse give an idea about the number of grouse in an area.
Description	1) Spot mapping of ruffed grouse is a very rewarding activity. Drumming sites are located by searching the wooded areas of your property at any time of year when there is no snow cover to obscure a site, or by walking in on a drumming male. The best time to spot map is from mid-April through late May, during the peak of drumming activity and before "leaf out" in the woods. Suitable habitat for ruffed grouse includes a mixture of habitat types, including drumming sites, nest and feeding areas in hardwood trees, dense brushy cover, and softwoods (evergreens) for winter cover. Look for clues to grouse activity, including bare spots adjacent to logs created by the waving action of the grouse's wings, worn areas on logs, and accumulations of ruffed grouse droppings. Drumming logs within 330' of each other are likely used by the same bird, and constitute an activity center. Mark these sites on a map of your land, pacing (or measuring) from trails and making notations on your habitat map. By placing brightly colored flagging around a twig of a nearby shrub, you can check these same logs for use in future years. Drumming logs may be added or may go unused depending on the status of the ruffed grouse population, and their numbers provide a good way to monitor the population on your land. 2) Roadside grouse surveys are easy. Establish a route around your land (drive, horse, bike, or walking) along interior roads or paths. Each stop on a route should be at least a one-half mile apart to avoid counting the same bird twice. If you wish to be consistent with NH Fish and Game Department biologists, choose 10 stops at one-mile intervals, recording the number of drumming events in a four-minute period. You can extend your survey to include the boundaries of your land and roads within a mile or two of your property if necessary. Perform counts from one-half hour before sunrise to one hour after sunrise. Stop at a designated spot, wait for one minute (for any associated noise to cease), and then tally the number of drums you hear during the next four minutes. Don't perform a drumming count survey if the air temperature is below 25° F, or if it is cloudy and misty, raining, or storming. All these conditions tend to stop or sharply curb drumming activity. Nearby human activity also can disturb birds. If possible, begin your survey route at the place where there is most likely to be human activity later in the morning and thereby avoid human interference.
Skill Level	Easy. Requires ability to identify the low "drumming" sound of ruffed grouse.
Season	Spot mapping may be done at any time of year but is best in spring. Drumming counts should be done in spring (mid-April through late May). Fish and Game biologists do their surveys April 15 to May 10.

Time of Day	Spot mapping can be done anytime, but is easiest in the morning if you are using drumming activity to locate sites. Drumming counts are conducted in the early morning (one-half hour before sunrise until about one hour after sunrise).
Duration	This is up to you, and depends on the amount of suitable habitat available. A nine-mile roadside (car) survey listening at each spot for four minutes would take approximately 1.5 hours.
Special Equipment	Map, watch, compass.
Associated Programs	NH Fish & Game Small Game Hunter Survey Ruffed Grouse Drumming Survey

Ruffed Grouse Drumming Count Data Sheet

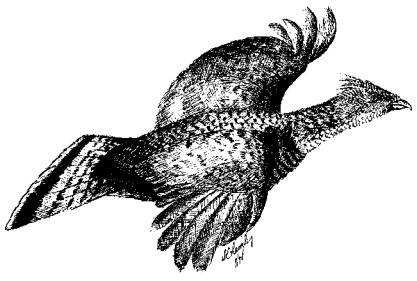
Observer: Date:

Start time: Wind Conditions: Cloud cover:

End time: Wind Conditions: Cloud cover:

Stop#	Stop Description	Start Time	Finish Time	Tally of drummings
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Comments:



Woodcock Peenting Surveys

Species	American woodcock.
Objectives	Allows you to document the presence or absence of woodcock by observing woodcock displaying on your property. Over time, this inventory will allow you to compare changes in numbers of woodcock using your land.
Description	Listen and look for woodcock as you travel an established route on your property. Male woodcock seek mates by producing a nasal "peenting" sound from the ground, followed by an aerial display that Aldo Leopold called a "sky dance." Woodcock are most likely to display in large open areas. Each stop on your route should be at least a 0.4 mile apart. Listen for two minutes at each stop. Record the date, weather, number of birds heard "peenting" on the data form. Note that NH Fish and Game biologists follow the US Fish and Wildlife Service (USFWS) Woodcock Survey protocols.
Skill Level	Easy. You need only be able to identify the American woodcock by sight and sound.
Season	March 15–May 15 (April 25–May 15 if following USFWS protocols).
Time of Day	One-half hour before sunset to shortly after dusk (start 20 minutes after sunset if following USFWS protocols).
Duration	A route with 10 stops should take about one hour to complete.
Special Equipment	Watch, binoculars (optional).
Associated Programs	NH Bird Records NH Fish & Game Hunter Survey

Woodcock Peenting Survey Data Sheet

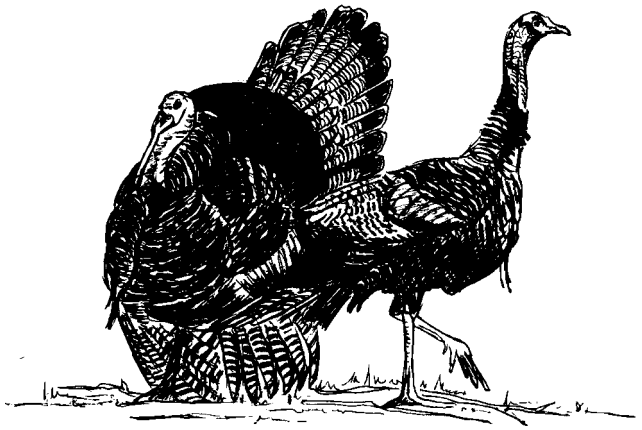
Observer:		Date:	
Start time:	Air Temp:	Wind Conditions:	Cloud cover:
End time:	Air Temp:	Wind Conditions:	Cloud cover:

Stop #	Stop Description	Start Time	Finish Time	# Birds		Other observations
				Seen	Heard	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Comments:

Wild Turkey Poult Surveys

Species	Wild turkey.
Objectives	This inventory allows you to document the presence or absence of turkey on your property. You can also learn about turkey "recruitment"—the addition of youngsters to the adult population. Finally, you may be able to track brood survival if you see the same brood a number of times during the course of the summer.
Description	Observe turkeys while out on your land. Use a separate data sheet for each month—June, July, August—and record the date, weather, number of adults and their sex, and the number of young. For each brood, indicate whether poults were ¼ grown (size of a grouse), ½ grown (size of chicken) or full grown.
Skill Level	Easy. You need only identify one type of bird—the wild turkey—and distinguish between toms (males) and hens (females).
Season	June 1–September 1
Time of Day	Any time of day.
Duration	Spend as little or as much time as you wish. Make your observations as you are out on your land doing other activities.
Associated Programs	NH Fish & Game Turkey Project



Wild Turkey Poult Survey Data Sheet

Observer:	Month:		Year:
Brood 1			
Date:			
Number of Hen			
Number of Poults	1/4 ☐	1/2 ☐	☐ grown
Brood 2			
Date:			
Number of Hens			
Number of Poults	1/4 ☐	1/2 ☐	☐ grown
Brood 3			
Date:			
Number of Hens			
Number of Poults	1/4 ☐	1/2 ☐	☐ grown
Brood 4			
Date:			
Number of Hens			
Number of Poults	1/4 ☐	1/2 ☐	☐ grown
Number of adult hens seen during this month without broods:			
Comments:			

Night Bird and Marsh Bird Survey

Species	Birds active and calling at night, including marsh birds (grebe, bittern, snipe), owls, nightjars, and woodcock.
Objectives	Allows you to document the presence or absence of these birds on your land.
Description	Choose survey points from which to play a tape of calling birds. Select sites that are relatively quiet, represent the habitats of the target species (edges of marshes, woodlands, etc.), and enable good sound projection (e.g., not at the lowest spot). You can make your tape patching together calls from commercially-available tapes from nature stores, or you can create your own by taping night calls. The tape should include 30 seconds or so of a species' call, followed by 30 seconds of silence. Actual numbers of each bird species responding should be recorded on the data sheet. If you are making a tape including owls, record the calls in the order indicated on the data sheet, starting with American woodcock and ending with great horned owl. Barred owl and great horned owl will prey on other species, and playing their calls first may inhibit other species from calling. Play your tape twice. A total of 30 minutes should be spent at your site listening for calls. *Note: Using a callback tape temporarily disrupts the target species' activities. The playing of a taped call can cause a bird to stop foraging, become agitated, or leave its protective cover. Stop playing the tape after getting a response from your species. Call-back surveys should be used sparingly on your property to avoid unintended consequences for the birds in which you are interested.*
Skill Level	Easy. There are only about a dozen species that may be heard (and sometimes seen) on a night birds survey.
Season	For owls, the best time to do a night survey is April–May. For marsh birds and other night-calling species, June is the best month.
Time of Day	Beginning at dusk.
Duration	30 minutes per site.
Special Equipment	Binoculars, bird book, watch, callback tape, tape player.
Associated Programs	NH Bird Records

Night Bird & Marsh Bird Survey Data Sheet

Route Number/Description: Observers:

Date: Time: Weather:

	# Observed	Calls sound like:
Marsh Birds		
Sora		
Virginia Rail		
Wilson's Snipe		
Pied-billed Grebe		
American Bittern		
Owls, Nightjars, Others		
American Woodcock		
Whip-poor-will		
Common Nighthawk*		
Northern Saw-whet Owl		
Eastern Screech Owl		
Long-eared Owl (r)		
Barred Owl		
Great Horned Owl		

Comments:

(r) rare
* state-threatened species

Breeding Bird Survey

Species Groups	All birds active during the breeding season.
Objectives	Provides information about the numbers of breeding birds on your land and the presence or absence of different species.
Description	Our data sheet allows for the use of five survey points that you establish on your land. Choose spots where you can hear or see birds in different habitat types, for example between a wetland and a forest, or along the edge of a field bordering a forested area. For the best results, start your survey no earlier than a one-half hour before dawn and run no later than 9:30 a.m. This survey uses "point counts," where you record all birds heard or seen from a single point for five minutes. Each point should be located at one-half mile intervals to avoid counting the same call/bird twice. Avoid surveying on windy or rainy days. Mark your points with flagging tape so you can survey from the same point each time. Be sure to flag your points with survey tape or some other permanent marker and to document them on a map for future reference. For each point, write down the total number of each species you see or hear on the data sheet. It may be difficult to estimate whether different calls you hear represent one or more different birds, but attempt to be consistent over time with your distinctions. The number of each species of bird seen and heard at each site are then added together to get an index to abundance, usually expressed as a number of birds per point. While this doesn't measure the actual abundance of each species on your property, it may be used to compare to other surveys with similar methods, as well as to document changes in bird use of your land over time.
Skill Level	High. There could be 30 or more species breeding on your site. Identifying them by sight and song is not an easy process.
Season	June. Choose a date and sample the same points on the same day each year, if possible. Or you may choose two dates, one during early breeding season (late May) and one during late June, in order to capture as many breeding species as possible.
Time of Day	Dawn to 9:30 a.m.
Duration	Five minutes per survey point, plus two minutes quiet waiting per point
Special Equipment	Binoculars, bird guide, watch, flagging tape (first time only).
Associated Programs	NH Bird Records Important Bird Areas

Breeding Bird Survey Data Sheet

Route Name (your land, town forest, etc.):

Observers:

Date: Time: Weather:

Species	Point 1 (5 min)	Point 2 (5 min)	Point 3 (5 min)	Point 4 (5 min)	Point 5 (5 min)	Total

Grassland Nesting Bird Survey

Species Group	Birds that nest in grasslands such as bobolink, Eastern meadowlark, savannah sparrow, grasshopper sparrow,* upland sandpiper.** Also vesper sparrow (short grass areas) and sedge wren** (wet meadows).
Objectives	Provides information about the species and numbers of grassland birds using your land. Can also be used to identify specifically where birds are nesting in your fields.
Description	Select one or more survey points that are centrally located within your grassland habitat, and at least 250 yards apart. At each point, conduct a five-minute "look and listen" survey for birds. Write your start time, and for the next five minutes record the number of individual birds of every species you see or hear, noting whether they occur within 100 yards (length of a football field) or greater than 100 yards from where you are standing. Try not to count an individual bird more than once per day. Stop recording at the end of five minutes. Record any probable or confirmed breeding behavior observed for each species, and/or the number of fledglings observed for each species. Other details you can include on your map are where adults appear to congregate, areas where adults bring food, or the location of a nest. Stay at your point during the five-minute count. Once the count period is over, you can go anywhere you need to in order to identify a bird or make breeding observations. Don't sample if it is raining enough for you to hear raindrops hitting leaves (drizzle is ok), and don't sample if the wind is over 18 miles/hour (when small trees are in motion from the wind). If you conduct this survey several times during the breeding season, you are most likely to have a complete species list.
Skill Level	Medium for point counts. Medium to high for nest detection
Season	June–July. Ideally, conduct at least one survey during the first or second week of June, and at least one more during the third week in June.
Time of Day	Sunrise to 9:00 am
Duration	At least five minutes per point, depending on how many points you establish (based on the size of your grasslands).
Special Equipment	Binoculars, wrist watch, map of your land.
Associated Programs	NH Bird Records

* Grasshopper sparrow is a state-threatened species.

** Upland sandpiper and sedge wren are state-endangered species.

Grassland Nesting Bird Data Sheet

Observer:	Site or Point #:
Date:	Description of Cloud Cover:
Temperature:	Description of Wind:
Start Time:	End Time:

Species	0-5 Minutes		# fledglings	Other Notes
	0-100 yards	> 100 yards		
Bobolink				
Eastern Meadowlark				
Savannah Sparrow				
Vesper Sparrow				
Grasshopper Sparrow*				
Sedge Wren**				
Upland Sandpiper**				
Others:				

Comments (eg. breeding behaviors, nest sites, etc.)

* Grasshopper sparrow is a state-threatened species.

** Sedge wren and upland sandpiper are state-endangered species.

Mammals

Mammal Checklist

Species Groups	All mammals.
Objectives	This technique gives you a snapshot in time of the mammals using your property. Done over the course of a year, it will provide you with a more complete inventory of the mammals that use your land.
Description	This checklist is simply a list of mammals and mammal sign that you see or hear during a particular time, usually over the course of a week. Due to the secretive nature of many of these animals, you are much more likely to see sign of mammals than you are to see the actual animal. However, the following sections describe a variety of methods for recognizing evidence of mammals using your land. For each observation, indicate the date. The checklist has a separate column for dates, but you can also record in this area if you are lucky enough to observe an interesting behavior such as a predator making a kill.
Skill Level	Medium. There are 58 species of mammals in New Hampshire, but you can learn to identify them by sign, sight, or sound as you encounter them.
Season	Mammals and sign can be observed on your property any time of year, but completing the data form at least once per month will yield a more complete inventory.
Time of Day	Any time of day, though mammals are often most active during the morning and evening hours.
Duration	This is up to you, but your inventory will be more complete if you visit each habitat on your property during each of the seasons.
Special Equipment	Mammal field guide, binoculars, plastic bags (to collect fur, scat, etc.), ruler (for measuring tracks), measuring tape (to measure the distance between tracks).
Associated Programs	Keeping Track Wildlife Monitoring Program

New Hampshire Mammal Checklist

Observer:

Start Date: End Date:

	Dates Observed/ Comments		Dates Observed/ Comments
Marsupials		**Rabbits, Hares, Rodents, Squirrels, Chipmunks**	
□ Virginia opossum		□ New England cottontail	
		□ Eastern cottontail	
Moles & Shrews		□ Snowshoe hare	
□ Star-nosed mole		□ Beaver	
□ Eastern mole		□ Porcupine	
□ Hairy-tailed mole		□ Woodchuck	
□ Masked shrew		□ Southern redback vole	
□ Pygmy shrew		□ Woodland vole	
□ Short-tailed shrew		□ Meadow vole	
□ Water shrew		□ Rock vole	
□ Smoky shrew		□ House mouse	
□ Long-tailed shrew		□ Meadow jumping mouse	
		□ Woodland jumping mouse	
Carnivores & Omnivores		□ White-footed mouse	
□ Coyote		□ Deer mouse	
□ Otter		□ Muskrat	
□ Gray fox		□ Norway rat	
□ Red fox		□ Northern bog lemming	
□ Lynx**		□ Southern bog lemming	
□ Bobcat		□ Southern flying squirrel	
□ Pine marten*		□ Northern flying squirrel	
□ Fisher		□ Gray squirrel	
□ Striped skunk		□ Red squirrel	
□ Short-tailed weasel (ermine)		□ Eastern chipmunk	
□ Long-tailed weasel			
□ Mink		**Bats**	
□ Raccoon		□ Big brown bat	
□ Black bear		□ Eastern red bat	
		□ Hoary bat	
Ungulates		□ Little brown bat	
□ White-tailed deer		□ Northern long-eared bat	
□ Moose		□ Silver-haired bat	
		□ Small-footed bat**	
		□ Eastern pipistrelle	

* State-threatened
** State-endangered

Predator Scent Post Survey

Species Group	Predators and furbearers attracted by scent, including raccoon, striped skunk, coyote, bobcat, fisher, pine marten,* mink, red fox, gray fox, and black bear.
Objectives	Provides information on the presence or absence of predators on your property. Because these animals have very large home ranges and move around a lot, most landowners don't have enough land to track the numbers of predators (since there will be so few). However, by doing a scent post survey on a regular basis (once a year) you may observe changes in the presence or absence of these mammals on your property.
Description	A scent-post survey usually consists of a series of scent post stations established along an unpaved road or trail. The stations are set up on one day, and checked the next day. Predators attracted to the scented disc in the center of the station leave behind tracks (and sometimes scat) that you can identify using a mammal track field guide. Scent post surveys shouldn't be done on rainy or snowy evenings since tracks are likely to be ruined by the weather. Establish scent posts at least 300 yards apart along the sides of the road or trail. It is best to alternate the sides of the trail where you place the posts to account for different wind directions. Record the locations of the sites on a map or using a GPS unit, so that you may use the same sites in future years for comparison, or to discern what particular areas predators tend to use more than others. Each station is one meter in diameter (a hula hoop works nicely as a guide). Remove all rocks and vegetation from the circle, and sift soil evenly over the area. Hardware cloth tacked to 2x4's in a square shape works well as a sifter. Place a scented disc (available through USDA Pocatello Supply Depot, 238 E. Dillon, Pocatello, ID, 83201 (208) 236-6920) at the center of each station. Wearing rubber gloves when you handle the disc will minimize any human scent, as well as keep your hands from getting rather smelly! Instead of a disc, you can use other forms of bait to attract predators such as a cotton ball or swab dipped in a mixture of rotten eggs or meat. However, the disks aren't as messy and can be re-used if not chewed up by the animal. The following day, check each scent post station for the tracks of predators. One data sheet should be used for each line of posts that you establish.
Skill Level	Medium. There are about 10 predators in New Hampshire that may be attracted to a scent post (see above), not including domestic dogs and cats. You will need to be able to identify tracks that are left by these animals.
Season	The highest number of visits to scent posts occurs when young predators disperse from their birth areas. In New Hampshire, September is a good time to do scent post surveys. However, many tracks at this time belong to animals dispersing and just passing through your land.
Time of Day	Set up the station any time during daylight hours, and check the line the following day.
Duration	It takes about two hours to set up the scent post line, and about two hours to check it the following day.

* Pine marten is a state-endangered species.

Special Equipment	Rake, shovel, sifter (wood frame with 1/8"–1/4" mesh hardware cloth), hula hoop or 1-meter diameter hoop of hose, hand broom to smooth out sifted sand, scented discs or other bait, rubber gloves, field guide to mammal tracks, GPS unit (optional).
Associated Programs	Keeping Track Wildlife Monitoring Program

Predator Scent Post Survey

Night of (date):	Observer:
Overnight weather:	Current Weather:

Scent Post #	Tracks and Observations
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Comments:

Snow Track Survey

Species Groups	Most medium and large-sized mammals whose tracks are identifiable in snow (predators, ungulates, rabbits, and squirrels).
Objectives	This survey will provide an inventory of mammals on your land that remain active during New Hampshire's winters. By recording the number of sets of tracks you find during regular track surveys over time, you may be able to track changes in numbers of different mammals using your land.
Description	To count mammal tracks in the snow, you will need to drive, snowshoe, or ski along a route of unplowed roads or foot paths. Because some animals, such as predators, have large home ranges, it may take several surveys to feel confident that you have inventoried all the winter-active mammals found on your property. The perimeter of your property is a good route to use—the large home ranges of many predators mean than they will leave tracks crossing the perimeter. If you drive your route, use two observers and keep your speed under 10 miles/hour or you will miss many tracks. Even if you are an experienced tracker, it is best to measure tracks, as they often appear much larger or smaller than they are. The best time to do surveys is one–three days after a fresh snowfall of (ideally) ½–2". This gives enough time for new tracks to accumulate, and will prevent traffic from obliterating tracks. *Don't do a snow survey when sinking depth is greater than 12" (tracks are too difficult to discern and animal travel is greatly reduced) or when night temperatures are below 0 ºF (animal travel is greatly reduced)*. To record as many animals as possible, conduct at least three surveys between November and March. Using a map of the area you are surveying, make notes of where each animal track is discovered. If driving in a vehicle, you can simply record your mileage on the data sheet.
Skill Level	Medium-High. There are about two dozen mammals that may leave tracks in newly fallen snow in New Hampshire. It may be difficult to tell the difference between a coyote and a dog, but some excellent tracking guides are available and are listed under Resources. If you use a camera to photograph difficult-to-identify tracks, remember to photograph a ruler alongside the track so you can refer to the scale when you or an expert views it later.
Season	November to March. *Note: Predator activity will be much lower up to two weeks after the end of the firearms deer season, so avoid doing your surveys during this time.*
Time of Day	During daylight hours when headlights aren't required for driving.
Duration	It may take about a half day to conduct a track survey along 10 miles of roads (by car). A smaller distance (perhaps 2–3 miles) can be covered in the same amount of time if snowshoeing or skiing along a trail. Always make comparisons of information in terms of number of tracks of a given species per mile surveyed.
Equipment Needed	Tracking guide, detailed map of your survey route, watch, ruler, tape measure, and camera.
Associated Programs	NH Fish & Game Small Game Hunter Survey

Snow Track Survey Data Sheet

Date: Observer:

Snow Depth: Temperature (start): (end):

Nights since last snow event: Transect/Route #:

Start Time: End Time:

Mileage	Coyote	Dog	Fox	Ermine	Fisher	Otter	Mink	Skunk	Bobcat	Cat	Bear	Raccoon	Rabbit	Snowshoe Hare	Moose/Deer	Other
0–.5																
.5–1																
1–1.5																
1.5–2																
2–2.5																
2.5–3																
3–3.5																
3.5–4																
4–4.5																
4.5–5																
5–5.5																
5.5–6																
6–6.5																
6.5–7																
7–7.5																
7.5–8																
8–8.5																
8.5–9																
9–9.5																
9.5 –10																

Comments:

Summer Deer Survey

Species	White-tailed deer.
Objectives	This survey provides information on the deer population on your land and will give you an estimate of yearly "recruitment"—adding young to the herd.
Description	This is an informal survey that you can conduct while you are out on your land doing other activities. Simply record the number of deer you see during July, August, and September. It is important to record every deer you see in order to accurately assess the makeup of the deer population. Use a separate data sheet for each month, and record the date, number of deer of unknown sex or age, the number of bucks, lone does, lone fawns, doe-plus-one fawn groups, doe-plus-two fawn groups, and doe-plus-three fawn groups you see.
Skill Level	Easy. You only need to be able to identify white-tailed deer and separate fawns and adults.
Season	July–September
Time of Day	Record deer seen during the day when headlights aren't used in driving.
Duration	At your discretion.
Associated Programs	Deer Hunter Survey

Summer Deer Survey Data Sheet

Observer:

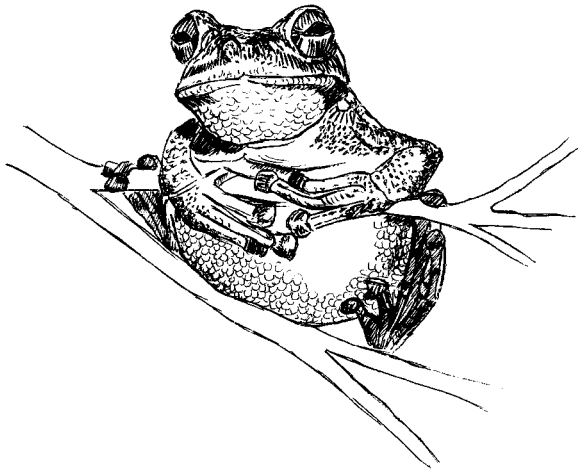
Year:

Date	Unknown	Bucks	Lone doe	Lone fawn	Doe + 1 fawn	Doe + 2 fawns	Doe + 3 fawns	Comments

Amphibians and Reptiles

Amphibian and Reptile Checklist

Species Groups	Amphibians and reptiles.
Objective	Provides information on the presence or absence of different amphibians and reptiles on your land.
Description	This is a checklist of the different reptiles and amphibians that you see or hear during a particular time. To get the most complete representation of species, we suggest doing an inventory once a month between March and October. Consult the other survey methods in this section to learn about where and how to search for salamanders, turtles, amphibians, and snakes.
Skill Level	Medium. There are 40 species of reptiles and amphibians living in New Hampshire, but you don't need to know them all beforehand. You can learn them by sight and sound as you encounter them.
Season	March–October
Time of Day	Anytime, but in spring and fall, aim for the warmest part of the day. In the hottest part of summer, aim for morning and evening when it is coolest.
Duration	This is up to you. You will have the most complete list, however, if you cover all areas of your property during your searches.
Special Equipment	Gloves, ruler, reptile and amphibian field guide, camera (optional, but good for recording unusual or hard-to-identify species).
Associated Programs	NH Reptile and Amphibian Reporting Program FrogwatchUSA Identification & Documentation of Vernal Pools in NH



New Hampshire Amphibian and Reptile Checklist

Observer:

Start Date: End Date:

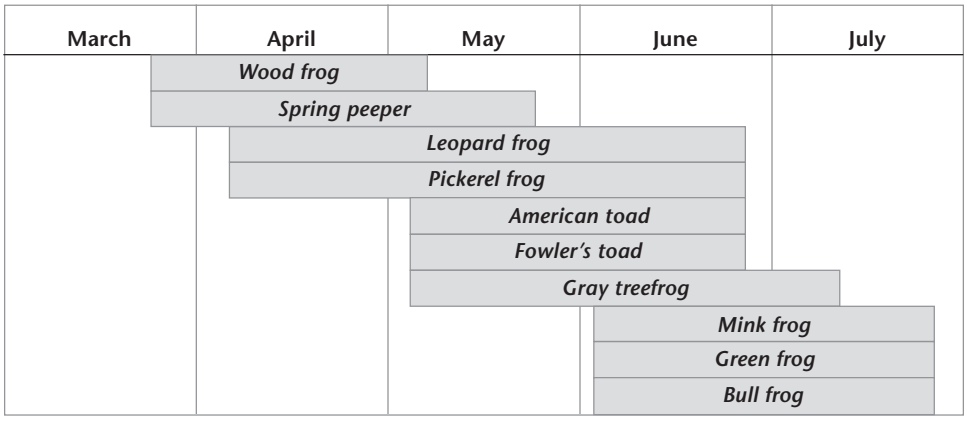
Snakes	Frogs & Toads
□ Northern black racer (r)	□ Bullfrog
□ Timber rattlesnake**	□ Spring peeper
□ Brown snake	□ Green frog
□ Common garter snake	□ Mink frog
□ Eastern hognose snake*	□ Northern leopard frog (r)
□ Eastern ribbon snake	□ Pickerel frog
□ Milk snake	□ Wood frog
□ Northern water snake	□ American toad
□ Redbelly snake	□ Fowler's toad (r)
□ Ringneck snake	□ Gray treefrog
□ Smooth green snake (r)	
	Salamanders and Newts
Turtles	□ Mudpuppy (non-native)
□ Blanding's turtle (r)	□ Eastern newt
□ Common musk turtle (stinkpot)	□ Blue-spotted salamander
□ Eastern box turtle (r)	□ Four-toed salamander
□ Painted turtle	□ Jefferson salamander (r)
□ Snapping turtle	□ Marbled salamander**
□ Spotted turtle (r)	□ Dusky salamander
□ Wood turtle (r)	□ Spring salamander
	□ Two-lined salamander
	□ Redback salamander
	□ Spotted salamander

(r) rare
* State-threatened
** State-endangered

Frog & Toad Calling Survey

Species Groups	Frogs and toads.
Objectives	This survey gives you an inventory of the different frogs and toads on your land, and over time may provide information on changes in the numbers of these species on your property.
Description	Visit wetlands and vernal pool areas on your land after dark four times during the frog calling season. Surveying once in late March/early April, once in late April, once in late May, and once in early July will give you a good spread. Record the temperature at the start and end of your survey, and if it is possible, record the temperature of the water in the wetland upon your arrival. Air and water temperatures are indicators of what species are likely to be calling (see wind and sky codes on data sheet, which match those used by the North American Amphibian Monitoring Program). Wait for one minute, then listen and record frog calls for three minutes. Repeat at each wetland or water course found on your land.
Skill Level	Easy. There are only ten species of frogs and toads in New Hampshire, and usually a maximum of only four or five species are calling at one time. You can learn the calls by listening to a frog call tape available from local nature stores.
Season	April–July
Time of Day	Evening, after nightfall.
Duration	Wait for one minute after you arrive at a wetland, then listen for three minutes for calls. If you do this survey three times during the season, you are likely to hear/observe all the possible species using your land.
Special Equipment	Frog call tape, tape player, watch, air/water thermometer.
Associated Programs	North American Amphibian Monitoring Program NH Reptile and Amphibian Reporting Program (RAARP)

Calling Calendar for Frogs and Toads in New Hampshire[13]



[13] Adapted from *Madison Audubon Frog Call tape & booklet* (to order: http://www.madisonaudubon.org/audubon/html/frogtape.htm)

Frog and Toad Calling Survey

Observer: Date:

Start time:	**End time:**
Wind conditions:	Wind conditions:
Sky conditions:	Sky conditions:
Air Temp:	Air Temp:
Noise Index:	Noise Index:

Location	Water Temp	American toad	Fowler's toad (r)	Spring peeper	Gray treefrog	Bullfrog	Green frog	Mink Frog	N. leopard frog (r)	Pickerel frog	Wood frog

Comments: (Background noise? Uncertain calls? Habitat changes since previous year, etc.)

Call Index:
1 = individual frogs/toads can be counted; space between calls
2 = individuals can be distinguished but calls overlap
3 = full chorus; calls constant and overlapping

Sky Codes:
0 = Few clouds
1 = Partly cloudy (scattered) or variable sky
2 = Cloudy or overcast
4 = Fog or smoke
5 = Drizzle or light rain (not affecting hearing)
7 = Snow
8 = Showers (affecting hearing...don't do survey)

Beaufort Wind Codes:
0 = Calm
1 = Light Air – smoke drifts, weather vane active
2 = Light Breeze–leaves rustle, can feel wind on face
3 = Gentle Breeze – leaves and twigs move around
4 = Moderate Breeze – moves thin branches, raises loose papers (don't conduct survey)
5 = Fresh Breeze – small trees begin to sway (don't conduct survey)

Noise Index:
0 = no appreciable effect (e.g. owl calling)
1 = slightly affecting sampling (distant traffic, dog barking, 1 car passing)
2 = moderately affecting sampling (nearby traffic, 2-5 cars passing)
3 = seriously affecting sampling (continuous traffic nearby, 6-10 cars)
4 = Profoundly affecting sampling (continuous traffic passing, noise)

(r) rare

Salamander Cover Board Survey

Species Group	Salamanders that use cover boards, including northern redback, two-lined (near streams), Northern dusky, and four-toed salamanders and red eft (the juvenile form of the Eastern newt).
Objectives	This survey will give you an inventory of the different salamanders on your land, and over time it may give you information about changes in the populations of these salamander species on your land.
Description	Many types of terrestrial (land) salamanders hide under logs or other debris in their forested habitats. In this survey, you will lay out a series of cover boards or plastic in forested habitats and salamanders will crawl under them. If you have the space and time, use a paired series of 50 1' x 1' boards (this is approximate—the shape and thickness aren't important). You can put out fewer boards, but the chance of finding salamanders under your boards will increase the more you put out. Make sure they are made of untreated wood, as chemical preservatives can seep into the soil and be absorbed by salamanders. Alternatively, you can try using pieces of black plastic secured by rock or wood instead of boards. Place pairs of boards/plastic in a straight line (transect) or in a grid (see data sheet). If you set up boards near streams, you may find two-lined salamanders in addition to the other varieties. The two boards in a pair should be at least one-half meter apart, and each pair should be placed at least 18 feet apart to minimize territoriality. Assign a number to each individual board. Remove the leaf litter and level the soil under the board, then place the board so that its entire surface is on the earth. Newly-placed cover boards have very low capture rates in relation to older ones, so the results from your first year of surveys may be unusually low. Check your cover boards three times during the season, with at least a week between checks. Only check boards when the temperature is above freezing, and don't check them on misty or rainy days, or within 24 hours of rain; these are times when salamanders may be out foraging in the litter. When you find an animal under a cover board, capture it if necessary, identify it, and then release it immediately next to the cover board so that it can crawl back under without being crushed. To hold an animal for identification, mist the inside of a sandwich bag with a plant sprayer and place the salamander in the sandwich bag, keeping the top of the bag open.
Note	A sample search under logs and rocks can also give you some useful information about the salamanders on your property.
Skill Level	Easy. There are only four salamanders likely to be found under cover boards in New Hampshire: northern redback, four-toed, two-lined (near streams) and the juvenile stage of the Eastern newt (red eft). Some snakes, frogs, and small mammals may also use your cover boards.
Season	The best times to survey are early spring and late autumn when temperatures are above freezing and the ground isn't frozen. You can sample any time between spring and fall, but capture rates are lower when weather is warmer than 50° F.

Time of Day	Check cover boards during daylight hours.
Duration	It may take up to a half day to set up your grid and place the boards. Allow a similar amount of time for pickup when done at the end of the season. Expect to spend one-and-a-half hours to check 50 cover boards.
Special Equipment	Field guide to amphibians, (50) 1′ x 1′ untreated wood cover boards (or similarly-sized pieces of black plastic), plastic sandwich bags, spray bottle.
Associated Programs	NH Reptile and Amphibian Reporting Program (RAARP)

Salamander Cover Board Survey Data Sheet

Route Name: Observers:

Date: Time: Weather:

SALAMANDERS	Cover Board Number(s)	OTHER ANIMALS	Cover Board Number(s)
☐ Northern redback salamander		☐	
☐ Red eft (juvenile Eastern newt)		☐	
☐ Four-toed salamander		☐	
☐ Two-lined salamander (found near streams)		☐	
☐ Northern dusky salamander		☐	
☐ Other:		☐	
☐		☐	

Example of layout of 50 paired boards in a grid:

1/2	3/4	5/6	7/8	9/10
11/12	13/14	15/16	17/18	19/20
21/22	23/24	25/26	27/28	29/30
31/32	33/34	35/36	37/38	39/40
41/42	43/44	45/46	47/48	49/50

Comments:

Turtle Basking Survey

Species Group	Turtles, especially painted, snapping, spotted, and Blanding's turtles.
Objective	This survey will give you information on the presence or absence of different turtle species on your land.
Description	Many of the turtle species in New Hampshire spend time basking in the sun, particularly painted turtles, snapping turtles, spotted turtles and Blanding's turtles (the latter two are rare). Look on logs, rocks, or banks along freshwater streams, ponds and wetlands. You are likely to find wood turtles near streams, and musk turtles swimming in ponds or lakes. Eastern box turtles are rare—existing sightings may actually represent pets released into the wild. *Note: There are four species of turtles in New Hampshire that are protected by law, and which should be neither disturbed nor collected: Blanding's, Eastern box, spotted and wood turtles.*
Skill Level	Easy. You only need to recognize the seven species of turtles in New Hampshire.
Season	Sunny days, April–September.
Time of Day	Sunniest part of the day—direct sunlight will give you the most sightings.
Duration	1–2 hours is recommended for a good count, but you can spend more or less time according to your interest.
Special Equipment	Binoculars, reptile field guide.
Associated Programs	NH Reptile and Amphibian Reporting Program

NH Turtle Basking Survey

Observer:	Date:	
Temperature:	Sky conditions:	(see below)
Start time:	End time:	

Location	Blanding's turtle (r)	Common musk turtle	Painted turtle	Snapping turtle	Spotted turtle (r)	Wood turtle (r)	Eastern box turtle (r)

Comments:

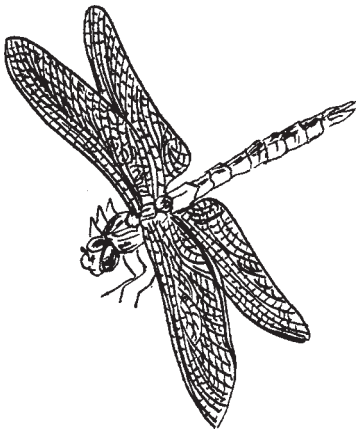
Sky Codes:
0 = Few clouds
1 = Partly cloudy (scattered) or variable sky
2 = Cloudy or overcast

(r) rare

Insects

Damselfly and Dragonfly Checklist

Species Groups	Damselflies and dragonflies.
Objectives	Records the presence or absence of these insects on your land.
Description	This checklist is simply a list of all damselflies and dragonflies that you see during a particular time. A checklist may be used each time you go out on your land, or over the period of a week, a month or a year.
Skill Level	Medium–High. You may have 10–20 dragonflies using your land, but you don't need to recognize them ahead of time—you can learn them as you go. Many dragonflies and the majority of damselflies require magnification with a hand lens for identification by species, and this can be tricky.
Season	June–September
Time of Day	Day light hours
Duration	Self-determined
Special Equipment	Binoculars, insect net, magnifier/hand lens, damselfly and dragonfly (or insect) field guide.
Associated Programs	NH Odonates Club



NH Damselfly & Dragonfly Checklist*

Observer:

Start Date: End Date:

- ☐ River Jewelwing
- ☐ Superb Jewelwing
- ☐ Sparkling Jewelwing (local)
- ☐ Ebony Jewelwing
- ☐ American Rubyspot
- ☐ Spotted Spreadwing
- ☐ Common Spreadwing
- ☐ Emerald Spreadwing
- ☐ Amber-winged Spreadwing
- ☐ Sweetflag Spreadwing
- ☐ Elegant Spreadwing
- ☐ Slender Spreadwing
- ☐ Lyre-tipped Spreadwing (r)
- ☐ Swamp Spreadwing
- ☐ Eastern Red Damsel
- ☐ Blue-fronted Dancer
- ☐ Variable Dancer
- ☐ Powdered Dancer
- ☐ Aurora Damsel
- ☐ Taiga Bluet (r)
- ☐ Azure Bluet
- ☐ Boreal Bluet
- ☐ Tule Bluet (rare)
- ☐ Familiar Bluet
- ☐ Northern Bluet
- ☐ Turquoise Bluet
- ☐ Marsh Bluet
- ☐ Stream Bluet
- ☐ Skimming Bluet
- ☐ Hagen's Bluet
- ☐ New England Bluet
- ☐ Little Bluet
- ☐ Scarlet Bluet (r)
- ☐ Pine Barrens Bluet (vr)
- ☐ Orange Bluet
- ☐ Slender Bluet (r)
- ☐ Springtime Bluet
- ☐ Vesper Bluet
- ☐ Lilypad Forktail
- ☐ Fragile Forktail
- ☐ Eastern Forktail
- ☐ Sphagnum Sprite
- ☐ Sedge Sprite
- ☐ Canada Darner
- ☐ Mottled Darner
- ☐ Lance-tipped Darner
- ☐ Lake Darner
- ☐ Variable Darner
- ☐ Spatterdock Darner (r)
- ☐ Black-tipped Darner
- ☐ Shadow Darner
- ☐ Green-striped Darner
- ☐ Common Green Darner
- ☐ Springtime Darner
- ☐ Ocellated Darner (r)
- ☐ Fawn Darner
- ☐ Swamp Darner (r)
- ☐ Harlequin Darner
- ☐ Cyrano Darner
- ☐ Lilypad Clubtail
- ☐ Unicorn Clubtail
- ☐ Black-shouldered Spinyleg
- ☐ Spine-crowned Clubtail
- ☐ Moustached Clubtail
- ☐ Beaverpond Clubtail
- ☐ Harpoon Clubtail
- ☐ Lancet Clubtail
- ☐ Ashy Clubtail
- ☐ Rapids Clubtail (r)
- ☐ Dusky Clubtail
- ☐ Cobra Clubtail
- ☐ Skillet Clubtail (rare)
- ☐ Dragonhunter
- ☐ Northern Pygmy Clubtail
- ☐ Southern Pygmy Clubtail (vr)
- ☐ Brook Snaketail
- ☐ Riffle Snaketail
- ☐ Maine Snaketail
- ☐ Rusty Snaketail
- ☐ Common Sanddragon
- ☐ Least Clubtail
- ☐ Zebra Clubtail
- ☐ Arrow Clubtail
- ☐ Delta-spotted Spiketail
- ☐ Twin-spotted Spiketail
- ☐ Arrowhead Spiketail (r)
- ☐ Stream Cruiser
- ☐ Illinois River Cruiser
- ☐ American Emerald
- ☐ Petite Emerald
- ☐ Racket-tailed Emerald
- ☐ Beaverpond Baskettail
- ☐ Common Baskettail
- ☐ Prince Baskettail
- ☐ Spiny Baskettail
- ☐ Uhler's Sundragon
- ☐ Umber Shadowdragon (r)
- ☐ Ringed Emerald
- ☐ Lake Emerald
- ☐ Ski-tailed Emerald
- ☐ Forcipate Emerald (r)
- ☐ Delicate Emerald (r)
- ☐ Incurvate Emerald (r)
- ☐ Kennedy's Emerald (r)
- ☐ Ocellated Emerald (r)
- ☐ Clamp-tipped Emerald
- ☐ Brush-tipped Emerald
- ☐ Williamson's Emerald
- ☐ Ebony Boghaunter (r)
- ☐ Ringed Boghaunter** (vr)
- ☐ Calico Pennant
- ☐ Halloween Pennant
- ☐ Martha's Pennant (local)
- ☐ Eastern Pondhawk
- ☐ Seaside Dragonlet (local)
- ☐ White Corporal
- ☐ Chalk-fronted Corporal
- ☐ Frosted Whiteface
- ☐ Crimson-ringed Whiteface
- ☐ Hudsonian Whiteface
- ☐ Dot-tailed Whiteface
- ☐ Red-waisted Whiteface
- ☐ Spangled Skimmer
- ☐ Slaty Skimmer
- ☐ Widow Skimmer
- ☐ Twelve-spotted Skimmer
- ☐ Four-spotted Skimmer
- ☐ Painted Skimmer
- ☐ Elfin Skimmer
- ☐ Blue Dasher
- ☐ Wandering Glider
- ☐ Spot-winged Glider
- ☐ Eastern Amberwing
- ☐ Common Whitetail
- ☐ Saffron-winged Meadowhawk
- ☐ Black Meadowhawk
- ☐ Cherry-faced Meadowhawk
- ☐ White-faced Meadowhawk
- ☐ Ruby Meadowhawk
- ☐ Band-winged Meadowhawk
- ☐ Yellow-legged Meadowhawk
- ☐ Black Saddlebags

** state-endangered species
r = rare
vr = very rare

* Adapted from list by Pam Hunt, Biodiversity Coordinator, Audubon Society of New Hampshire, and NH Odonates Club

Butterfly Checklist

Species Groups	Butterflies.
Objectives	Records the presence or absence of these insects on your land.
Description	This checklist is simply a list of all butterflies that you see during a particular time. A checklist may be used each time you go out on your land, or over the period of a week, a month or a year.
Skill Level	Medium. You may have 10–20 butterflies using your land, but you don't need to recognize them ahead of time—you can learn them as you go.
Season	June–August
Time of Day	Day light hours
Duration	Self-determined
Special Equipment	Binoculars, insect net, butterfly (or insect) field guide.
Associated Programs	4th of July Butterfly Count

NH Butterfly Checklist*

Observer:

Start Date: End Date:

Swallowtails
- ☐ Black Swallowtail
- ☐ Eastern Tiger Swallowtail
- ☐ Canadian Tiger Swallowtail
- ☐ Spicebush Swallowtail

Whites
- ☐ Mustard White
- ☐ Cabbage White

Sulphurs
- ☐ Clouded Sulphur
- ☐ Orange Sulphur
- ☐ Pink-edged Sulphur

Harvesters
- ☐ Harvester

Coppers
- ☐ American Copper
- ☐ Bronze Copper
- ☐ Bog Copper

Hairstreaks
- ☐ White Mountain Hairstreak
- ☐ Southern Hairstreak
- ☐ Coral Hairstreak
- ☐ Acadian Hairstreak
- ☐ Edwards' Hairstreak
- ☐ Banded Hairstreak
- ☐ Striped Hairstreak
- ☐ Brown Elfin
- ☐ Hoary Elfin
- ☐ Frosted Elfin**
- ☐ Henry's Elfin
- ☐ Bog Elfin
- ☐ Eastern Pine Elfin
- ☐ Western Pine Elfin
- ☐ Hessel's Hairstreak
- ☐ Gray Hairstreak
- ☐ Early Hairstreak

Blues
- ☐ Eastern Tailed-Blue
- ☐ Spring Azure
- ☐ Summer Azure
- ☐ Silvery Blue
- ☐ Karner Blue**
- ☐ Greenish Blue

Heliconians and Fritillaries
- ☐ Great Spangled Fritillary
- ☐ Aphrodite Fritillary
- ☐ Atlantis Fritillary
- ☐ Silver-bordered Fritillary
- ☐ Meadow Fritillary
- ☐ Arctic Fritillary
- ☐ White Mountain Fritillary

True Brush-foots
- ☐ Silvery Checkerspot
- ☐ Harris' Checkerspot
- ☐ Pearl Crescent
- ☐ Northern Crescent
- ☐ Baltimore
- ☐ Question Mark
- ☐ Eastern Comma
- ☐ Satyr Comma
- ☐ Green Comma
- ☐ Hoary Comma
- ☐ Gray Comma
- ☐ Compton Tortoiseshell
- ☐ Mourning Cloak
- ☐ Milbert's Tortoiseshell
- ☐ American Lady
- ☐ Painted Lady
- ☐ Red Admiral
- ☐ Common Buckeye

Admirals and Relatives
- ☐ Red-spotted Purple
- ☐ 'Astyanax' Red-spotted Purple
- ☐ White Admiral
- ☐ Viceroy

Satyrs
- ☐ Northern Pearly Eye
- ☐ Eyed Brown
- ☐ Appalachian Brown
- ☐ Little Wood Satyr
- ☐ Common Ringlet
- ☐ Common Wood Nymph
- ☐ Jutta Arctic
- ☐ White Mountain

Monarchs
- ☐ Monarch

Spread-wing Skippers
- ☐ Silver-spotted Skipper
- ☐ Southern Cloudywing
- ☐ Northern Cloudywing
- ☐ Dreamy Duskywing
- ☐ Sleepy Duskywing
- ☐ Juvenal's Duskywing
- ☐ Persius Duskywing **
- ☐ Common Sootywing

Grass Skippers
- ☐ Arctic Skipper
- ☐ Least Skipper
- ☐ European Skipper
- ☐ Common Branded Skipper
- ☐ Leonard's Skipper
- ☐ Cobweb Skipper
- ☐ Indian Skipper
- ☐ Peck's Skipper
- ☐ Tawny-edged Skipper
- ☐ Crossline Skipper
- ☐ Long Dash
- ☐ Northern Broken-Dash
- ☐ Little Glassywing
- ☐ Delaware Skipper
- ☐ Mulberry Wing
- ☐ Hobomok Skipper
- ☐ Broad-winged Skipper
- ☐ Black Dash
- ☐ Two-spotted Skipper
- ☐ Dun Skipper
- ☐ Dusted Skipper
- ☐ Pepper and Salt Skipper
- ☐ Common Roadside-Skipper

* Adapted by Pam Hunt, ASNH Biodiversity Coordinator, based on range maps in: Glassberg, J. 1999. *Butterflies Through Binoculars: East*.

** State-endangered

Suggested Field Guides

You will need a good field guide for all of the inventory methods included in this guide. There are many good choices, some of which we suggest here:

Birds

Baicich, P. J., Harrison, C. J. O. 1997. *A Guide to the Nests, Eggs, and Nestlings of North American Birds*. Academic Press, 350 pp.

DeGraaf, R. M., Yamasaki, M. 2001. *New England Wildlife: Habitat, Natural History, and Distribution.* University Press of New England, Hanover, 496 pp.

Ehrlich, P. R., with Dobkin, D. S., Wheye, D. (contr.). 1994. *The Birdwatcher's Handbook: A Guide to the Natural History of the Birds of Britain and Europe.* Oxford University Press, 660 pp.

Foss, C., ed. 1994. *Atlas of Breeding Birds in New Hampshire*. Audubon Society of New Hampshire, 464 pp.

Kaufman, K. 1996. *Lives of North American Birds*. Houghton Mifflin Co., 704 pp.

National Geographic Society. 2002. *National Geographic Field Guide to the Birds of North America,* 4th Edition. National Geographic, 480 pp.

Peterson, R. T. (ed.) 2002. *Eastern Birds*. 5th Edition. Houghton Mifflin, Boston, 450 pp.

Sibley, D. A. 2003. *The Sibley Field Guide to Birds of Eastern North America.* Knopf, 544 pp.

Stokes, D, Stokes, L. 1997. *Stokes Field Guide to Bird Songs – Eastern Region.* Audio CD. Warner Adult.

Stokes, D., Stokes, L. 1996. *Stokes Field Guide to Birds – Eastern Region.* Little Brown & Company, 496 pp.

Mammals

Burt, W. H, Grossenheider, R. P. 1964. *Peterson Field Guides: Mammals*. Houghton Mifflin, New York, 367 pp.

DeGraaf, R. M., Yamasaki, M. 2001. *New England Wildlife: Habitat, Natural History, and Distribution.* University Press of New England, Hanover, 496 pp.

Elbroch, M. 2003. *Mammal Tracks and Sign*. Stackpole Books, 792 pp.

Gibbons, D. K. 2003. *Mammal Tracks and Sign of the Northeast*. University Press of New England, Hanover, 152 pp.

Murie, O. 1982. *Peterson Field Guides: Animal Tracks.* 2nd ed., Houghton Hifflin, New York, 375 pp.

Rezendes, P. 1999. *Tracking & the Art of Seeing : How to Read Animal Tracks & Sign.* Harper Resource, 336 pp.

Stokes, D., Stokes, L. 1979. *Stokes' Guide to Nature in Winter.* Little Brown & Co, 374 pp.

Amphibians and Reptiles

Carroll, D. M. 1991. *The Year of the Turtle: A Natural History.* St. Martin's Press, New York, 172 pp.

Conant, R. (author), Collins, J. T. and Hunt, I. (illus.), Johnson, T. R. (ed.) Collins, S. L. (photo). 1998. *A Field Guide to Reptiles & Amphibians of Eastern & Central North America (Peterson Field Guide Series)*. Houghton Mifflin Co; Revised edition, 634 pp.

DeGraaf, R. M., Yamasaki, M. 2001. *New England Wildlife: Habitat, Natural History, and Distribution.* University Press of New England, Hanover, 496 pp.

FrogwatchUSA. Frog calls of New Hampshire species online at: www.nwf.org/frogwatchUSA

Hunter, M. L., Calhoun, A. J. K., McCollough, M. (eds.) 1999. *Maine Amphibians and Reptiles.* Univ of Maine Press (book and CD-ROM with frog calls), 272 pp.

Kenny, L. P., Burne, M. R. 2001. A *Field Guide to the Animals of Vernal Pools*. Massachusetts Division of Wildlife and Natural Heritage and Endangered Species Program, 2nd edition, 73 pp.

Taylor, J. 1993. The Amphibians and Reptiles of New Hampshire. New Hampshire Fish & Game Nongame and Endangered Wildlife Program, 71 pp.

Insects

Dunkle, S. 2000. *Dragonflies Through Binoculars: A Field Guide to Dragonflies of North America*. Oxford Press, 368 pp.

Glassberg, J. 1999. *Butterflies Through Binoculars: The East*. Oxford University Press, 400 pp.

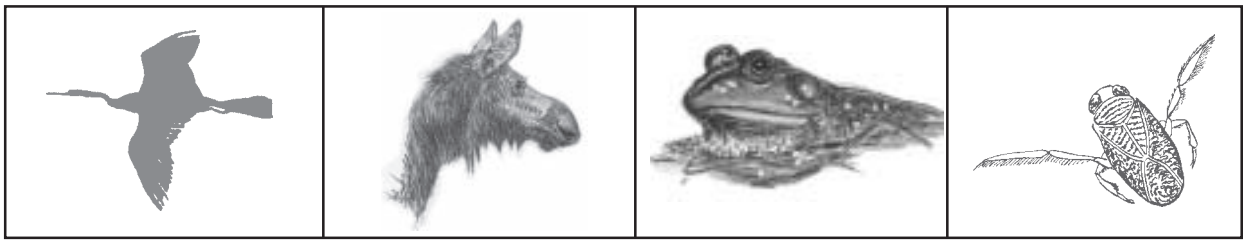
Kiel, W., and De Luca, L (illus). 2003. *The Butterflies of the White Mountains of New Hampshire*. Falcon Press, 196 pp.

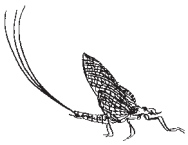
Nikula, B., Loose, J., Burne, M. 2003. *A Field Guide to the Dragonflies and Damselflies of Massachusetts.* Massachusetts Natural Heritage Program, (available through mail order: Call (508) 792-7270), 197 pp.

Nikula, B., Sones, J., Stokes, D., Stokes, L. 2002. *Stokes' Beginning Guide to Dragonflies*. Little Brown & Company, 150 pp.

Opler, P. A., Pavulaan, H. Stanford, R.E. (coordinators). 1995. *Butterflies of North America.* Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm (Version 12DEC2003).

Weber, L. 2002. *The Butterflies of New England.* Adventure Publications, 172 pp.





Chapter 4
WILDLIFE MONITORING AND DATA COLLECTION

Wildlife Habitat Management - Making Decisions

The process of learning about the wildlife on your own land can be enriching and exciting, whether it is through casual observation, careful record-keeping, or rigorous inventories of habitats and species. Perhaps this knowledge will inspire you to enhance your land for wildlife, undertaking specific wildlife management practices focused on increasing populations of wildlife you have observed in your inventories or would like to observe in the future.

By managing your land for wildlife, you will certainly be able to attract wildlife to your land. By enhancing the suitability of a species' habitat on your land, you may simply attract that species from neighboring lands because your habitat is better (more food, better cover, etc.) If many landowners practice the same kinds of habitat enhancement on their lands, the habitat for the species improves over a larger area, thus increasing the overall habitat for that species (and perhaps, therefore, increasing the population of that species on the landscape).

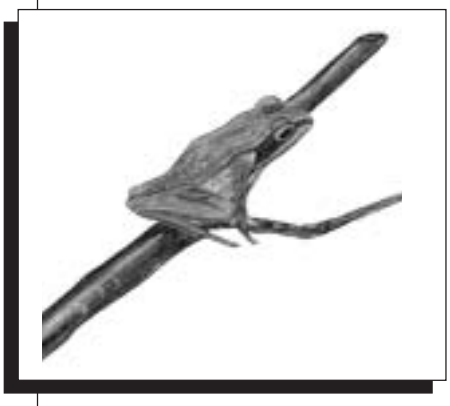
Some habitat improvements have a very direct impact on certain species. For example, protecting winter deer yards, maintaining the integrity of vernal pools, and leaving cavity trees in your forest can have a measurable effect on deer, amphibians, and cavity nesters, respectively. Other habitat improvements may be more subtle. For example, releasing large oak trees—thereby enhancing acorn production—may mean a better food supply for such species as bear, deer, squirrels, turkey, ruffed grouse, blue jay, and flying squirrel. However, it may be difficult to measure the increased use of the oak stand by these species, since acorn production already varies annually. Also, such species as bear and turkey roam widely, are dependent on many other food sources, and may only visit your oak stand periodically.

Wildlife Monitoring

Many of the inventory methods described in Chapter 3 indicate that, when practiced and repeated, the information you gather on your land can shed light on changes in the wildlife populations on your land over time. This extension of your surveys through time becomes a process of *wildlife monitoring*—keeping track of species, their numbers, and distribution over time.

However, just because you notice a shift in populations over time in your area, this doesn't necessarily mean it is part of a larger trend. It isn't easy to draw conclusions based on information collected by one person. In fact, many wildlife biologists will attest to the enthusiasm with which people speculate on the causes for changes in observed wildlife activity: "I've noticed there are fewer deer bedding down in my field this year. It must be that cold snap we had back in January" or, "I've seen dozens of redpolls at my feeders the last two years and fewer goldfinches. Those redpolls are taking over and driving off the prettier birds." Even if you have been careful in your observations and record-keeping, drawing conclusions from your own data should be done with caution. Changes in wildlife species, populations, and their distributions can be caused by many things including weather patterns, distant food sources, diseases, and many other factors.

To account for the variability in wildlife population data, many wildlife managers and researchers draw on information that has been collected by many people over large areas. This pooled information has more power to reflect what is really happening on the ground. For example, New Hampshire Fish & Game biologists rely on observations by qualified birders conducting Breeding Bird Surveys throughout the state and region. These surveys, coordinated by the US Geological Survey's Biological Resources Division, are used to show population trends and distribution changes that inform policy decisions at the state level.



So the information you have gathered will be of great interest to you as a landowner and as a naturalist. But it may have its greatest *utility* if it can become part of a larger study which collects wildlife information from many other wildlife enthusiasts just like you. To this end, we encourage you to read further, and to look into participating in one or more of the following state or national data-collection efforts.

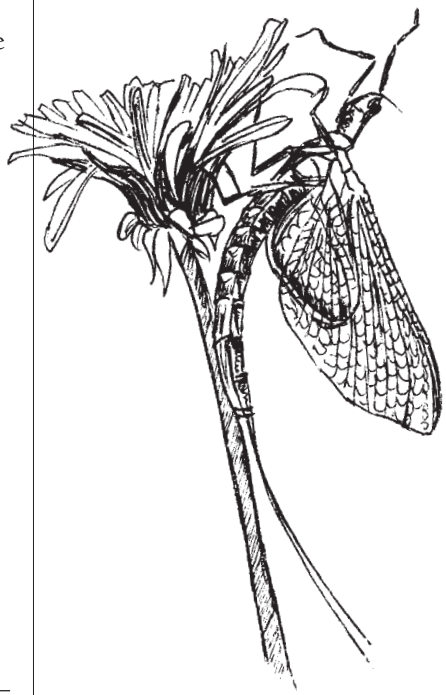
Contributing Data to Established Monitoring Programs

Getting involved in a statewide or national wildlife monitoring program is a great way to use your observational and identification skills for a larger purpose. Some of these programs offer the benefit of training, and many allow you to access the compiled data to learn more about species' distributions and populations over time. Some programs require adherence to data collection protocols, such as the National Audubon Society's Christmas Bird Count. Others are simple reporting programs, where the information you have already collected on your own land is of interest to state biologists, as in the New Hampshire Reptile and Amphibian Reporting Program.

There are a great number of "citizen scientist" programs where you can use your enthusiasm and knowledge for the greater good of New Hampshire's wildlife. The following section briefly describes many of the programs available to New Hampshire volunteers. The programs vary in the necessary skill level, but we have tried to note the volunteer qualifications recommended by the programs' sponsors.

Things to keep in mind when contributing data to a larger program:[14]

- Stick to the protocols of the program.
- Know where you are, and describe it accurately.
- Don't deviate from transect routes, despite the temptation.
- A note about random sampling—it is rewarding to sample rare species or rich areas but seeking out these sites at the expense of protocol ruins an experiment. A common problem is to visit the best sites in an area, and use the data to estimate population size.
- Know your species—if you can't identify a species, make this clear in your reporting.



[14] Adapted from: Sutherland, W., ed. 1996. *Ecological Census Techniques: A Handbook*. Cambridge University Press.

New Hampshire Audubon Bird Programs

The Audubon Society of New Hampshire coordinates a wide variety of volunteer data collection efforts focused on birds. For the following projects, contact the main ASNH office.

Contact: Audubon Society of New Hampshire
3 Silk Farm Road, Concord, NH 03301
(603) 224-9909
Website: www.nhaudubon.org

DAVID LANGLEY

New Hampshire Bird Records

The Audubon Society of New Hampshire keeps a database of bird observations made by a corps of over 100 birders across the state. Anyone may contribute by following the reporting guidelines available on the NH Bird Records website (below), or you may request a reporter packet. Results provide baseline information on bird populations for potential conservation lands, Important Bird Areas, and other conservation projects. The sightings are also compiled in a quarterly publication, available by subscription, which also includes interpretive summaries of each season as well as articles on birds and birding in New Hampshire.

Contact: NH Bird Records, Managing Editor
email: birdrecords@nhaudubon.org

Important Bird Areas

The goal of this international program is to identify and conserve areas that are critical to one or more bird species for breeding, feeding, wintering, or migration. In New Hampshire, the program partners (Audubon Society of New Hampshire, UNH Cooperative Extension, NH Fish & Game, and Partners in Flight) are seeking volunteers to help nominate new areas according to established scientific criteria, conduct bird surveys to provide supporting data for nominated sites, and do long-term monitoring of established IBAs. Good birding skills are necessary.

Contact: Important Bird Areas Coordinator – Audubon Society of NH
Website: http://www.ceinfo.unh.edu/forestry/documents/NHIBA.htm

NH Backyard Winter Bird Survey

Participants report any bird species visiting their yard and/or feeders in New Hampshire on the second weekend of February. The Audubon Society of NH welcomes broad participation in this event, with all skill levels welcome. They will send you a packet with data forms, instructions, last year's summary data, and tips on commonly confused species.

Contact: BWBS – Audubon Society of NH
Website: www.nhaudubon.org (BWBS section)

Threatened and Endangered Raptors

The Audubon Society of New Hampshire coordinates several volunteer monitoring programs focused on threatened and endangered species or species of conservation concern in the state. These include observations of peregrine falcons, breeding and wintering eagles, and ospreys statewide.

Contact: Conservation Department, Audubon Society of NH

Loon Survey

The Loon Preservation Committee (a self-funded project of the Audubon Society of New Hampshire) organizes two data collection projects on loons (state-threatened species) in New Hampshire. A one-hour simultaneous census occurs once during the summer by loon biologists and volunteers. Even more valuable to loon research, however, are volunteers who live on lakes with loon populations who can serve as "watchers"—recording the date birds return, their nesting status, hatches—and helping loon biologists on an on-going basis.

Contact: Loon Preservation Committee
P.O. Box 604, Moultonborough, NH 03254
(603) 476-LOON
Website: www.loon.org

Project Osprey

This program is a partnership between ASNH, NH Fish & Game, and Public Service of NH, working toward a full recovery of the state-threatened osprey by 2005. Currently, volunteers can participate in monitoring ospreys and their nests in the Great Bay region through the Osprey Stewards Training program. Plans are also underway for monitoring ospreys in other watersheds in the state. Data on Great Bay osprey monitoring is available for review on the web.

Contact: Sandy Point Discovery Center
Great Bay National Estuarine Research Reserve
89 Depot Road, Stratham, NH 03885
(603) 778-0015
Website: http://ourworld-top.cs.com/projosprstewards/

Nationwide Bird Monitoring Programs

Christmas Bird Count

Coordinated by the National Audubon Society, this is an all-day, one-day census of early-winter bird populations, conducted by over 50,000 volunteers across the Americas. For a small fee ($5), participants follow cover a specified section of a designated 15-mile diameter circle, counting every bird they see or hear all day. Each local survey is done on a specific date between December 14 and January 5. You can join an existing field party/circle and team up with experienced birders, so anyone is welcome to participate. Good birding skills are important, though less so when you team up with an experienced group. Many chapters of the Audubon Society of New Hampshire coordinate local Christmas Bird Counts, with more information at their local chapter websites (for links go to: http://www.nhaudubon.org/chapters.htm).

Website: For national coordination information – www.audubon.org/bird/cbc

eBird

eBird, a project developed by the Cornell Lab of Ornithology and the National Audubon Society, provides a simple way for you to keep track of the birds you see anywhere in North America. You can retrieve information on your bird observations, from your backyard to your neighborhood to your favorite bird-watching locations, at any time for your personal use. You can also access the entire historical database to find out what other eBirders are reporting from across North America. In addition, the cumulative eBird database is used by birdwatchers, scientists, and conservationists who want to know more about the distributions and movement patterns of birds across the continent.

Contact: eBird
Cornell Lab of Ornithology
159 Sapsucker Woods Road
Ithaca, NY 14850
(607) 254-2416 or (800) 843-BIRD
Website: www.ebird.org

The Birdhouse Network

Coordinated by the Cornell Lab of Ornithology, the Birdhouse Network is a citizen-science nest box monitoring program focused on North America. It is intended for people of all ages and backgrounds who provide birdhouses (nest boxes) for cavity-nesting birds (birds that nest in cavities or nest boxes). Participants observe and record the lives of these birds up close throughout the breeding season, and record their data online at the website. Participants and the public can view national data and read reports on cavity-nesting species through the website.

Contact: The Birdhouse Network
Cornell Lab of Ornithology
159 Sapsucker Woods Road,
Ithaca, NY 14850
(607) 254-2416 or (800) 843-BIRD
email: birdhouse@cornell.edu
Website: http://www.birds.cornell.edu/birdhouse/

North American Breeding Bird Survey

This is a national survey effort tracking long-term population trends and distribution patterns for over 400 North American breeding bird species. It uses established birding routes which are visited by expert birders once/year during the height of the breeding season. The BBS website allows visitors to access all the compiled data in national distribution maps (according to species, region, population change, etc.). It also has great bird identification information and a description of the different survey routes in New Hampshire. To participate, contact the state coordinator through the Breeding Bird Survey website. This program requires excellent birding skills.

Contact: USGS Patuxent Wildlife Research Center
12100 Beech Forest Road, Laurel, MD 20708-4038
(301) 497-5843
Website: www.mp2-pwrc.usgs.gov/bbs

Project Feeder Watch

This is a winter-long survey of birds at feeders across the U.S. Anyone with an interest in birds can participate by sending their observations and data to the Cornell Lab of Ornithology (via the internet or paper data forms). The program helps scientists track broad scale movements of winter bird populations and long-term trends in bird distribution and abundance. Most participants are backyard bird watchers, but the program is also popular with classroom teachers. Participants pay a small fee ($15) and receive information packets, forms, and project reports in a quarterly newsletter.

Contact: Project FeederWatch, Cornell Lab of Ornithology
P.O. Box 11, Ithaca NY 14851-0011
Credit card users may call to sign up:
1-800-843-2473
Website: www.birds.cornell.edu/pfw

Great Backyard Bird Count

This national winter bird count, coordinated by Cornell Laboratory of Ornithology, usually occurs the week after NH's Backyard Winter Bird Survey (usually on the third weekend in February). Participation is online through their website.

Contact: Great Backyard Bird Count
Website: www.birdsource.org

Hawk Migration Association of America (Hawk Watch)

This group sponsors a website where citizens can report data about migrating hawks collected during spring and fall. There are established watch sites (mountains and other highpoints) across the state, and participants can add new sites or visit an existing site (data forms are online), all using the HMANA website. The site also includes some compiled data, organized by watch site. Locally, you can participate in existing fall hawk watches through the Audubon Society of New Hampshire's programs and chapter field trips, listed on the ASNH website (www.nhaudubon.org).

Contact: Hawk Migration Association of America
Website: www.hmana.org

New Hampshire Fish & Game Monitoring Programs

For all programs listed below, contact the main Fish & Game Wildlife Division office listed below. Inquiries are then forwarded to the appropriate staff person or biologist.

Contact: NH Fish & Game Dept.
11 Hazen Dr., Concord, NH 03301-6500
(603) 271-2461
email: wilddiv@wildlife.state.nh.us
Website: www.wildlife.state.nh.us

NH Reptile and Amphibian Reporting Program (RAARP)

The purpose of this project is to collect accurate information on the distribution and occurrence of reptiles and amphibians in New Hampshire. Participants provide both "sighting reports" (undocumented observations) or "verified reports" (documented with a photograph) of frogs, toads, snakes, salamanders, and turtles. The information packet, mailed out in late winter, describes the protocols, provides reporting slips, and lists the species of special interest to the project.

Contact: RAARP Coordinator, NH Fish & Game

Identification & Documentation of Vernal Pools in NH

NH Fish & Game collects documentation of vernal pools in New Hampshire, considered critical wildlife habitat for certain amphibians and invertebrates. This citizen documentation process exists to raise awareness about vernal pools, provide a basis for their protection at a local level, increase statewide information about vernal pool distribution, and contribute to scientific studies on vernal pools statewide. To participate, consult the NH Fish & Game Publication, "*Identification and Documentation of Vernal Pools in New Hampshire"* (listed under References), which provides a step-by-step guide to documenting the vernal pools on your land or in your community.

Contact: Wetlands Coordinator, NH Fish & Game

Small Game Hunter Survey

Small-game hunters can provide valuable feedback to state wildlife biologists about woodcock, grouse, gray squirrel, cottontail rabbit, and snowshoe hare in New Hampshire. The annual data collected is used to understand species distributions and abundance, generate hunting forecasts, determine management needs, and identify areas for possible habitat management.

Contact: Small Game Project Leader, NH Fish & Game

Bow Hunter Survey

Successful bow hunters can participate in this annual survey which records their observation rates of various wildlife species.

Contact: Small Game Project Leader, NH Fish & Game

New Hampshire Turkey Project

Regional biologists with NH Fish & Game collect information on both summer broods and winter flocks of wild turkeys across the state. They also seek volunteers to participate in recording and reporting their observations, including the size and number of poults, and the size, location, and general behavior of winter flocks. To participate, contact your region's Fish & Game biologist, or the state coordinator.

Contact: Turkey Project State Coordinator, NH Fish & Game

Deer Hunter Survey

This survey, sent to all successful hunters from the previous season, collects information on deer, moose, and bear sighted during hunting hours. The survey is valuable in tracking the abundance and distribution of these big game animals, and participation is actively encouraged.

Contact: Deer Project Leader, NH Fish & Game

Other Wildlife Monitoring Programs

NH Odonates Club

A small group of dragonfly and damselfly enthusiasts collect data on sightings of these insects throughout the state. Field trips and group survey events are sponsored by the group, with information and records of existing survey data on the website.

Website: http://users.rcn.com/mirick/odonates/nhodesclub.html

FrogwatchUSA

Frogwatch USA is a long-term frog and toad monitoring program managed by the National Wildlife Federation in partnership with the United States Geological Survey. The goals of the program are to collect information from volunteer "frogwatchers" about frog and toad populations in the U.S. and to promote an appreciation for the diversity of frog and toad species. From their website, volunteers can view regional data, learn frog calls of all the frogs found in each state (the calls are all available on links on the website), and learn about amphibian conservation efforts.

Contact: National Wildlife Federation - FrogwatchUSA

Website: www.nwf.org/frogwatchUSA/index.cfm

North American Amphibian Monitoring Program (NAAMP)

This project, coordinated by the U.S. Geological Survey, works with local volunteers to monitor populations of calling amphibians. It is a calling survey with established driving routes, and a state coordinator organizes training to identify local species by their unique calls. Details on the survey protocols, review of compiled data by route and by state, and contact information for the current state coordinator is available through the website.

Contact: North American Amphibian Monitoring Program – NH State Coordinator
Website: www.mp2-pwrc.usgs.gov/NAAMP/

July 4th Butterfly Count

Coordinated by the North American Butterfly Association, this annual count on or near the 4th of July, is similar to the Christmas Bird Count, but with butterflies. Volunteers select a count area with a 15-mile diameter and conduct a one-day census of all butterflies observed in the circle. Participants pay a small fee ($3) and may join an existing count in their area or begin their own. Summary data from past years, data forms, and maps of existing circles are available at the website.

Contact: NABA Butterfly Counts
2533 McCart
Fort Worth, TX 76110
email: naba@naba.org
Website: www.naba.org

USGS Butterfly Reporting Program

The USGS Northern Prairie Research Center hosts a website containing vast information on butterflies (and other species), viewable by species, state and county. You can help establish new county records for the species that are presently included in the "Butterflies of North America" section of the webpage. If you find a species in a county beyond its confirmed range, as shown in the species distribution map, you can report your discovery. Each individual's contributions must be confirmed by an expert - verification requires either a clear photograph that shows the scientifically accepted diagnostic features of the species or an actual specimen.

Contact: Butterflies of North America
Northern Prairie Wildlife Research Center Home Page.
Website: http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm

Keeping Track Wildlife Monitoring Program

This privately-run program trains and assists volunteers in establishing wildlife habitat monitoring programs in their towns. Keeping Track instructors visit towns for training sessions ("Wildlife Events") on how to detect, identify, interpret and record the track and sign of certain target species. After one or more public training sessions, communities run their own monitoring programs with support and assistance from Keeping Track. Information on instructors' fees and examples of towns that have developed Keeping Track monitoring programs are available on the website.

Contact: Keeping Track, Inc.,
PO Box 444, Huntington, VT 05462
(802) 434-7000
Website: www.keepingtrackinc.org

APPENDIX

UNH Cooperative Extension Educators, Forest Resources - County Offices

Revised 4/2004 (check website to confirm up-to-date contact information: www.ceinfo.unh.edu)

Belknap County
Sumner Dole
36 County Drive
Laconia, NH 03246-2900
email: sumner.dole@unh.edu
603-527-5475
Fax: 603-527-5477

Carroll County
Peter Pohl
75 Main Street, PO Box 860
Ctr. Ossipee, NH 03814-0860
email: peter.pohl@unh.edu
603-539-3331
FAX: 603-539-3335

Cheshire County
Marshall Patmos
800 Park Avenue
Keene, NH 03431-1513
email: marshall.patmos@unh.edu
603-352-4550 FAX: 603-358-0494

Coos County
Sam Stoddard
629A Main Street
Lancaster, NH 03584-9612
email: sam.stoddard@unh.edu
603-788-4961
FAX: 603-788-3629

Grafton County
Nory Parr
3785 Dartmouth College Hwy
Box 8
No. Haverhill, NH 03774-9708
email: northam.parr@unh.edu
603-787-6944 FAX: 603-787-2009

Hillsborough County
Jon Nute
329 Mast Road
Goffstown, NH 03045
email: jonathan.nute@unh.edu
603-641-6060
FAX: 603-645-5252

Hillsborough County
Mary Tebo - Community Forestry Coordinator
200 Bedford St. (Mill #3)
Manchester, NH 03101
email: mary.tebo@unh.edu
629-9494 x 140 FAX: 629-9998

Merrimack County
Tim Fleury
315 Daniel Webster Highway
Boscawen, NH 03303
email: tim.fleury@unh.edu
603-796-2151 or 225-5505
FAX: 603-796-2271

Rockingham County
Phil Auger
Land and Water Conservation Educator
113 North Road
Brentwood, NH 03833-6623
email: phil.auger@unh.edu
603-679-5616 FAX: 603-679-8070

Rockingham County
Matt Tarr
113 North Road
Brentwood, NH 03833-6623
email: matt.tarr@unh.edu
603-679-5616
FAX: 603-679-807

Strafford County
Don Black
259 County Farm Road, Unit 5
Dover, NH 03820-6015
email: don.black@unh.edu
603-749-4445 FAX: 603-743-3431

Sullivan County
24 Main Street
Newport, NH 03773-1515
603-863-9200
FAX: 603-863-4730

Extension Specialists, Forestry and Wildlife - UNH Campus Offices

Karen P. Bennett
Forest Resources
212 Nesmith Hall
131 Main Street
Durham, NH 03824-3597
email: karen.bennett@unh.edu
603-862-4861
FAX: 603-862-0107

Darrel Covell
Wildlife
216 Nesmith Hall
131 Main Street
Durham, NH 03824-3597
email: darrel.covell@unh.edu
603-862-3594

Sarah Smith
Forest Industry
FAX: 603-862-0107
210 Nesmith Hall
131 Main Street
Durham, NH 03824-3597
email: sarah.smith@unh.edu
603-862-2647
FAX: 603-862-0107

Robert Edmonds
Program Leader
Forestry and Wildlife
215 Nesmith Hall
131 Main Street
Durham, NH 03824-3599
email: bob.edmonds@unh.edu
603-862-2619 FAX: 862-0107

Forestry Information Center
211 Nesmith Hall
131 Main Street
Durham, NH 03824-3597
email: forest.info@unh.edu
1-800-444-8978 within New England
603-862-3883 outside New England

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

NEW HAMPSHIRE'S NATIVE TREES, SHRUBS, AND VINES WITH WILDLIFE VALUE

SPECIES	FRUITING PERIOD	WILDLIFE USE	WILDLIFE USING PLANT FOR FOOD
TREES			
Common Apple* *Malus pumila* *non-native	September - March	Fruit, twigs, buds, and bark. Excellent winter food.	Preferred by ruffed grouse, pine grosbeak, and cedar waxwing. Also consumed by wild turkey, ring-necked pheasant, various songbirds (purple finch eat spring buds), deer, rabbits, and red and gray fox.
Mountain Ash *Sorbus americana*	August - March	Fruit and twigs. Fast growing tree. Excellent winter food.	Wild turkey, catbird, cedar waxwing, bluebird, robin, thrushes, mockingbird, brown thrasher, and bear.
Big-toothed Aspen *Populus grandidentala*	May - June	Buds, catkins, twigs and foliage. Fair winter food.	Catkins preferred by ruffed grouse. Yellow-bellied sapsucker, black-capped chickadee, evening grosbeak, purple finch, squirrel, and browsed by deer.
Quaking Aspen *Populus tremuloides*	May - June	Buds, catkins, bark, twigs, and foliage. Excellent winter food.	Preferred by ruffed grouse and browsed on by deer, snowshoe hare, beaver and porcupine.
American Beech *Fagus grandifolia*	September - November	Nuts. Good winter food.	Deer, bear, tufted titmouse, preferred by ruffed grouse, wild turkey, fox, porcupine, squirrel, chipmunk, and snowshoe hare.
Yellow Birch *Betula allegheniensis*	September - February	Catkins, bud, bark, twigs, and foliage. Good winter food.	Ruffed grouse, common redpoll, pine siskins, black-capped chickadee, deer, snowshoe hare, beaver, porcupine and other various songbirds.
Butternut *Juglans cinerea*	September - November	Nuts. Good winter food.	Preferred by black-capped chickadee, tufted titmouse, nuthatches, yellow-rumped warbler, pine warbler, purple finch, and field sparrow. Nuts also eaten by squirrels.
Eastern Red Cedar *Juniperus virginiana*	September - March	Seeds and foliage. Fair winter food and excellent winter cover.	Wild turkey, ruffed grouse, ring-necked pheasant, northern flicker, phoebe, tree swallow, mockingbird, catbird, brown thrasher, robin, bluebird, cedar waxwing, yellow-rumped warbler, grosbeaks, purple finch, deer, squirrels. Used for nesting and cover by many species.
Atlantic White Cedar *Thuja occidentalis*	September - March	Seeds and foliage. Fair winter food and excellent winter cover.	Pine siskin, deer, and snowshoe hare.
Black Cherry *Prunus serotina*	June - October	Fruits and buds. Excellent summer wildlife food.	Preferred by ruffed grouse, northern flicker, yellow-bellied sapsucker, eastern kingbird, blue jay, common crow, mockingbird, catbird, brown thrasher, robin, thrushes, veery, bluebird, cedar waxwing, vireo, orchard and northern oriole, tanager, cardinal, rose-breasted and evening grosbeaks, and white-throated sparrow.

Choke Cherry *Prunus virginiana*	July - October	Fruits and buds. Excellent summer food.	Preferred by ruffed grouse, ring-necked pheasant, pileated woodpecker, yellow-bellied sapsucker, eastern kingbird, common crow, thrushes, robin, catbird, brown thrasher, bluebird, and evening and rose-breasted grosbeaks.
Pin Cherry *Prunus pensylvanica*	July - December	Fruits and buds. Excellent summer food.	Preferred by ruffed grouse, ring-necked pheasant, northern flicker, eastern kingbird, common crow, catbird, cedar waxwing, bluebird, robin, rose-breasted grosbeak, thrushes, purple finch, brown thrasher, vireo, veery, red squirrel, white-footed mouse, raccoon, fox, and black bear.
Hazelnut *Corylus americana*	July - October	Nuts, catkins, and buds. Fair winter food.	Squirrels and chipmunks eat nuts. Preferred by ruffed grouse, ring-necked pheasant, hairy woodpecker, and blue jay. Browsed by deer and rabbits.
Eastern Hemlock *Tsuga canadensis*	September - March	Twigs, foliage, and seeds. Excellent winter cover and nesting.	Seeds eaten by pine siskin, crossbill, black-capped chickadee, and red squirrel, white-footed mouse. Cover for deer wild turkey, and ruffed grouse. Nesting sites for veery, black-throated blue warbler, black-throated green warbler, black burnian warbler, and juncos. Porcupines eat bark of young hemlocks.
Shagbark Hickory *Carya ovata*	September - October	Nuts. Good winter food.	Red squirrels, wild turkey, field sparrows, white-breasted nuthatch, yellow-rumped warbler, pine warbler, cardinal, rose-breasted grosbeaks, rufous-sided towhee, wood ducks and chipmunks.
Hop-hornbeam *Ostrya virginiana*	August - October	Seeds, catkins, and buds. Seeds persist into winter. Fair summer food.	Common merganser, wild turkey, ruffed grouse, ring-necked pheasant, downy woodpecker, mockingbird, rose-breasted grosbeak, and purple finch.
Red Maple *Acer rubrum*	March - July	Seeds, buds, and sap. Good summer food and nest sites.	Yellow-bellied sapsucker, cardinal, evening and pine grosbeaks, and goldfinch. Nesting site for robin and prairie warbler. Browse for deer and rabbits.
Silver Maple *Acer saccharinum*	April - June	Seeds and buds. Fair summer food. Good nest sites.	Cardinal and evening and pine grosbeaks. Nesting sites for northern oriole and goldfinch.
Sugar Maple *Acer saccharum*	June - December	Seeds, twigs, and bark. Fair summer food. Good nest sites.	Ruffed grouse, ring-necked pheasant, snowshoe hare, squirrel, evening and rose-breasted grosbeak, cardinal, chipmunk, beaver, and porcupine; nest site for robin, vireo, grosbeak, and goldfinch; browse for deer and rabbit.
Red Oak *Quercus rubra*	September - December	Acorns. Excellent winter food.	Wild turkey, ruffed grouse, blue jay, squirrel, wood duck, deer, bear, cottontail, flying squirrel, and various songbirds.
White Oak *Quercus alba*	September - November	Acorns. Excellent winter food.	Wild turkey, ruffed grouse, blue jay, squirrel, wood duck, deer, bear, cottontail, flying squirrel, and various songbirds.
White Pine *Pinus strobus*	August - September	Seeds, foliage, and twigs. Good for winter cover and songbird nesting. Excellent winter food.	Spruce grouse, wild turkey, chickadee, nuthatch, grosbeak, crossbill, junco, chipping & white-throated sparrow, pine warbler, brown creeper, snowshoe hare, rabbit, gray and red squirrel, chipmunk, porcupine, beaver, and deer.
Serviceberry *Amelanchier spp.*	July - August	Fruit. Excellent summer food and cover.	Bluebird, cardinal, cedar waxwing, gray catbird, red squirrel, scarlet tanager, veery, beaver, and deer.

Spruce *Picea spp.*	August - November	Bark, needles, and seeds. Important northern wildlife food.	Spruce grouse, crossbills, snowshoe hare, and deer.
Pussy Willow *Salix discolor*	April - May	Buds, catkins, twigs, and bark. Moderately important to wildlife.	Ruffed grouse, various songbirds, rabbits, beaver, hare, squirrel, and other browsing and bud-eating wildlife.
Witchhazel *Hamamelis virginiana*	Spring - fall of second year	Woody seeds, buds, twigs, and bark. Fair wildlife use, produces winter flowers.	Catkins preferred by ruffed grouse. Wild turkey, ring-necked pheasant, cardinal, squirrels and browsed by deer.
SHRUBS			
Blackberry *Rubus spp.*	July - September	Fruits and canes. Includes raspberries. Excellent wildlife cover and nesting.	Wild turkey, ruffed grouse, ring-necked pheasant, blue jay, various woodpeckers, tufted titmouse, mockingbird, gray catbird, brown thrasher, robin, wood thrush, veery, cedar waxwing, grackle, oriole, tanager, cardinal, grosbeak, rufous-sided towhee, raccoon, chipmunk, squirrel, deer, and rabbit.
Highbush Blueberry *Vaccinium corymbosum*	June - September	Fruit, twigs, and buds. Excellent summer food.	Ruffed grouse, scarlet tanager, bluebird, gray catbird, rufous sided towhee, thrushes, black bear, chipmunk, white-footed mouse, deer, and rabbit.
Flowering Dogwood *Cornus florida*	August - November	Fruit. Excellent fall food. Good cover and nesting sites.	Preferred by wild turkey, northern flicker, pileated woodpecker, yellow-bellied sapsucker, hairy woodpecker, mockingbird, brown thrasher, robin, thrushes, bluebird, cedar waxwing, yellow-rumped warbler, cardinal, and evening and pine grosbeak. Also used by deer, rabbits, and squirrels.
Gray Dogwood *Cornus racemosa*	July - October	Fruits persistent to early winter. Excellent fall food. Good cover and nesting sites.	Preferred by wild turkey, ruffed grouse, northern flicker, downy woodpecker, eastern kingbird, catbird, robin, thrush, cedar waxwing, cardinal, and pine grosbeak. Also used by wood duck, squirrel, rabbit and deer.
Red-osier Dogwood *Cornus sericea*	July - October	Fruit. Excellent fall food. Good cover and nesting sites.	Preferred by wild turkey, ruffed grouse, northern flicker, downy woodpecker, eastern kingbird, common crow, catbird, brown thrasher, robin, bluebird, cedar waxwing, and purple finch. Also used by rabbits, deer, and squirrels.
Silky Dogwood *Cornus amomum*	August - October	Fruit. Excellent fall food. Good cover and nesting sites.	Preferred by wild turkey, ruffed grouse, northern flicker, downy woodpecker, eastern kingbird, catbird, brown thrasher, robin, wood thrush, bluebird, cedar waxwing, and purple finch. Also used by wood duck, rabbits, deer, and squirrel.
Elderberry *Sambucus canadensis*	July - September	Fruit, twigs, and buds. Grows in moist soil. Good summer food.	Ruffed grouse, wild turkey, ring-necked pheasant, robin, catbird, bluebird, cardinal, indigo bunting, brown thrasher, squirrel, and rabbit.
Hawthorn *Crataegus spp.*	September - March	Fruit. Good cover and nesting site. Excellent winter food.	Favored by ruffed grouse and cedar waxwing.
Common Juniper *Juniperus communis*	September - March	Twigs, foliage, and bluish-black fruit. Good wildlife food.	Foliage browsed by deer, rabbits, and other songbirds. Fruit eaten by robin, bluebird, finches, grosbeaks, and cedar waxwing.
Pasture Rose *Rosa carolina*	July - March	Hips. Important winter food and summer cover.	Used by wildlife in winter when other food sources are scarce. Browsed on by deer and rabbits.

Virginia Rose *Rosa virginiana*	July- August	Hips. Good summer and winter food. Good cover.	Wildlife use hips as alternative food source while frequently used for nesting and cover.
Smooth Sumac *Rhus glabra*	August - October	Fruit persistent through winter. Used as an emergency winter and early spring food source.	Wild turkey, bluebird, robin, gray catbird, cardinal, black-capped chickadee, hermit and wood thrush, mockingbird, rabbit, deer and various overwintering birds.
Staghorn Sumac *Rhus glabra*	August - March	Fruit persistent. Good for cover and nesting in spring. Important winter and early spring food source.	Wild turkey, bluebird, robin, gray catbird, cardinal, black-capped chickadee, hermit and wood thrush, mockingbird, rabbit, deer and various overwintering birds.
Viburnums	August - October	Bark, twigs, and buds. Good cover. Late summer or fall ripened fruit.	Ruffed grouse, brown thrasher, cedar waxwing, red squirrel, and deer.
Winterberry *Ilex verticillata*	August - March	Berries. Persist through winter. Excellent fall food.	Consumed by many fruit eating songbirds.
Canada Yew *Taxus canadensis*	July - September	Fruit and foliage. Good browse.	Ruffed Groused, mockingbird, robin, wood thrush, and white-throated, song, and chipping sparrow. Browsed by deer.
VINES			
Bittersweet *Celastrus scandens*	August - February	Fruits, buds, and leaves. One native species, can be very invasive. Excellent winter food.	Wild turkey, ruffed grouse, bluebirds, and other various songbirds.
Wild Grape *Vitis spp.*	August - October	Fruit. Excellent summer food. Good cover. Bark used for nest building. Favored by a large number of songbirds.	Ruffed grouse, ring-necked pheasant, wild turkey, bluebird, cardinal, mockingbird, robin, thrushes, brown thrasher, vireos, various warblers, tanagers, fox sparrow, cedar waxwing, woodpeckers, black bear, gray fox, raccoon, and skunk.
Poison Ivy *Toxicodendron radicans*	August - November	Fruit. Persists through the winter. Excellent fall and winter food.	Wild turkey, downy and hairy woodpecker, northern flicker, yellow-bellied sapsucker, black-capped chickadee, mockingbird, catbird, hermit thrush, bluebird, ruby-crowned kinglet, yellow-rumped warbler, and white-crowned sparrow.
Virginia creeper *Parthenocissus quiquefolia*	August - February	Fruit. Excellent fall food.	Bluebird, great-crested flycatcher, pileated woodpecker, red-eyed vireo.

Compiled by Wendy Patmos 9/04

REFERENCES

1. DeGraaf, R. M. 2002. Trees, Shrubs, and Vines for Attracting Birds. 2nd Edition. University Press of New England, Hanover, 224 pp.
2. Harris Center for Conservation Education. Hancock, NH.
3. Martin, A. M., Zim, H. S., and Nelson, A. L. 1951. American Wildlife & Plants A Guide to Wildlife Food Habits. General Publishing Company, Ltd, Canada. 500 pp.

Additional References

DeGraaf, R. M. 2002. *Trees, Shrubs, and Vines for Attracting Birds.* University Press of New England, Hanover 224 pp.

DeGraaf, R. M., Yamasaki, M., Leak, W., Lanier, J. 1992. *New England Wildlife: Management of Forested Habitats.* General Technical Report NE-144, USDA Forest Service Northeastern Forest Experimental Station.

Good Forestry in the Granite State. 1997. New Hampshire Division of Forests and Lands and the Society for the Protection of New Hampshire Forests. Concord, 162 pp.

Henderson, C. L. 1992. *Woodworking for Wildlife: Homes for Birds and Mammals*. Minnesota Department of Natural Resources Nongame Program, 112 pp. (phone orders at 612-297-3000).

Heyer W. R., Donnelly, M., Heyer, R. W., McDiarmid, R. W., Hayek, L. C., (eds.). 1994. *Measuring and Monitoring Biodiversity: Standard Methods for Amphibians* (Biological Diversity Handbook). Smithsonian Institution Press, 364 pp.

Hinchman, H. 1999. *A Life in Hand: Creating the Illuminated Journal*. Gibbs Smith Publisher, 160 pp.

Kanter, J., Suomala, R., Snyder, E. 2001. *Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups* New Hampshire Fish & Game Department, Concord, 144 pp.

Karczmarczyk, P. 2003. "Forest Management: Why it Matters in the Northeast." The Ruffed Grouse Society, in *Outdoors Magazine*; Vol. VIII, Issue 5. October 2003, p. 43.

Leopold, A. 1949. *A Sand County Almanac and Sketches Here and There.* Oxford University Press, 185 pp.

Leslie, C. W., and Roth, C. E. (ills.). 2000. *Keeping a Nature Journal*. Storey Books, 224 pp.

Madison Audubon Frog Call Tape & Booklet (available online: http://www.madisonaudubon.org/audubon/html/frogtape.htm

Olson, D., Langer, C. 1990. *Care of Wild Apple Trees*. UNH Cooperative Extension brochure

Sutherland, W., ed. 1996. *Ecological Census Techniques: A Handbook.* Cambridge University Press, 352 pp.

Tappan, A., Marchand, M. (eds.). 2004. *Identification of Vernal Pools in NH.* 2nd edition, New Hampshire Fish & Game Department, Concord, 70 pp.

Thomasma, S. A., Thomasma, L. E., Twery, M. J. *NEWild* [computer program]. USDA Forest Service, Northeastern Research Station, Gen. Tech. Rep. NE-242. Download this wildlife and habitat management computer program (free) from: http://www.fs.fed.us/ne/burlington/ned/download/download.htm

Wessels, T., and Swinger, A. H., Cohen, B. D. (ills.). 2004. *Reading the Forested Landscape: A Natural History of New England*, 2nd Edition. Countryman Press, 200 pp.

Wilson, D. E., Cole, F. R., Nichols, J.D., Rudron, R., Foster, M.S. (eds.). 1996. *Measuring and Monitoring Biological Diversity: Standard Methods for Mammals* (Biological Diversity Handbook Series). Smithsonian Institution Press, 409 pp.

Yorke, D. E. 1997. *Wildlife Habitat Improvement: Wetlands and Wildlife.* UNH Cooperative Extension brochure, 4 pp.

About the Authors

Malin Ely Clyde works for UNH Cooperative Extension as the coordinator of the New Hampshire Coverts Project, and on special writing projects such as this guide. The Coverts Project is a volunteer training program focused on promoting wildlife habitat conservation and forest stewardship. Before joining UNH Cooperative Extension, Malin worked at the Audubon Society of New Hampshire and in natural resource positions in Michigan and Washington. Originally from Anchorage, Alaska, Malin holds a B.A from Yale University and an M.S. degree in Forest Resources from the University of Washington, College of Forest Resources.

Darrel Covell is an Assistant Extension Professor and Wildlife Specialist for UNH Cooperative Extension. Darrel is responsible for training natural resource professionals, educating private landowners and helping communities manage and protect wildlife habitat. He was previously the Executive Director of the New Hampshire Wildlife Federation and is a native of Pittsburg, NH. Darrel also worked as the Wildlife Outreach Specialist for University of Wisconsin Cooperative Extension for seven years. He has a B.S. degree in Wildlife Management from UNH and an M.S. degree in Wildlife Ecology from the University of Wisconsin-Madison.

Matthew Tarr is an Extension Educator in Forest Resources in Rockingham County for UNH Cooperative Extension. Matt is both a forester and a wildlife biologist, and is originally from Hancock, NH. He holds a B.S. in Wildlife Management from UNH and an M.S. in Wildlife Ecology, also from UNH. While in graduate school, Matt was the manager of the UNH Wildlife Research facility in Brentwood and he studied winter supplemental feeding of deer in northern NH. After graduate school, Matt worked in temporary positions with the NH Division of Forest and Lands and with UNH Cooperative Extension as an Assistant Rockingham County Extension Educator in forestry. Matt worked in the private sector as a forester and wildlife biologist before assuming the role of Rockingham Forest Resources Educator in 2002.

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Published by University of New Hampshire Cooperative Extension
2004

ISBN 0-9719675-5-5