



Forest Bird Habitat Assessment

**Catamount Outdoor Family Center
McCullough Property
Williston, VT**

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Introduction

The purposes of this document are to 1) provide an assessment of forest bird breeding habitat on the McCullough property in Williston, VT (also the Catamount Outdoor Family Center) and 2) offer management options and considerations with the goal(s) of protecting, enhancing, and/or creating quality breeding habitat conditions for *responsibility forest bird species* as identified by Audubon Vermont's Forest Bird Initiative (FBI). A *responsibility species* is a bird species with a significant amount of its global breeding population found in the Northern Forest region, some of which are showing long-term population declines.

Regional Context

This roughly 450+/- acre property is located in the Atlantic Northern Forest Bird Conservation Region (BCR 14) as delineated by the North American Bird Conservation Initiative (NABCI).

The Atlantic Northern Forest encompasses a geographic area stretching southwest to northeast from the Taconic hills of eastern New York/western Massachusetts and the Adirondack Mountains (cut off from the remainder of the BCR by the Lake Champlain valley), through most of Vermont, New Hampshire and Maine, Quebec south of the St. Lawrence River including the Gaspé Peninsula, and all of the Maritime provinces of New Brunswick, Prince Edward Island, and Nova Scotia. (BCR14 Blueprint page 7.) (Figure 1). Predominant general forest types include spruce-fir, northern hardwood, and mixed deciduous-coniferous forests.

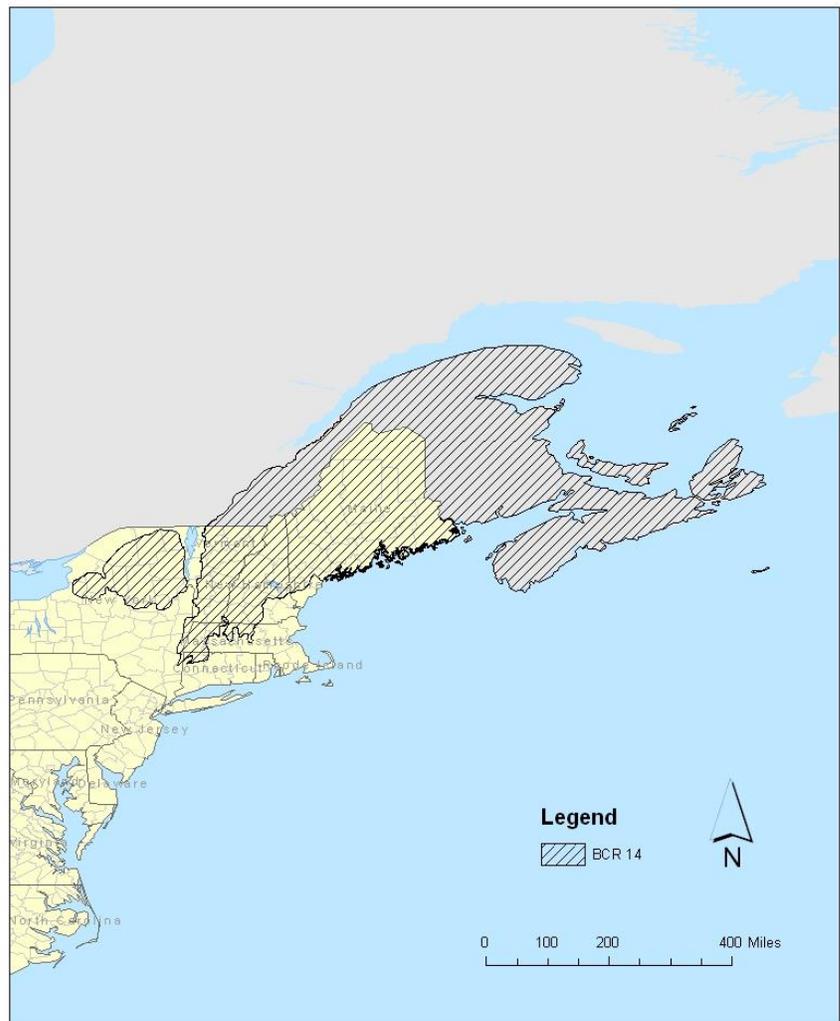


Figure 1 - BCR 14

Landscape Context

A consideration of the property’s surrounding landscape (2,500 acres) is an important component of assessing current habitat conditions and making management recommendations.

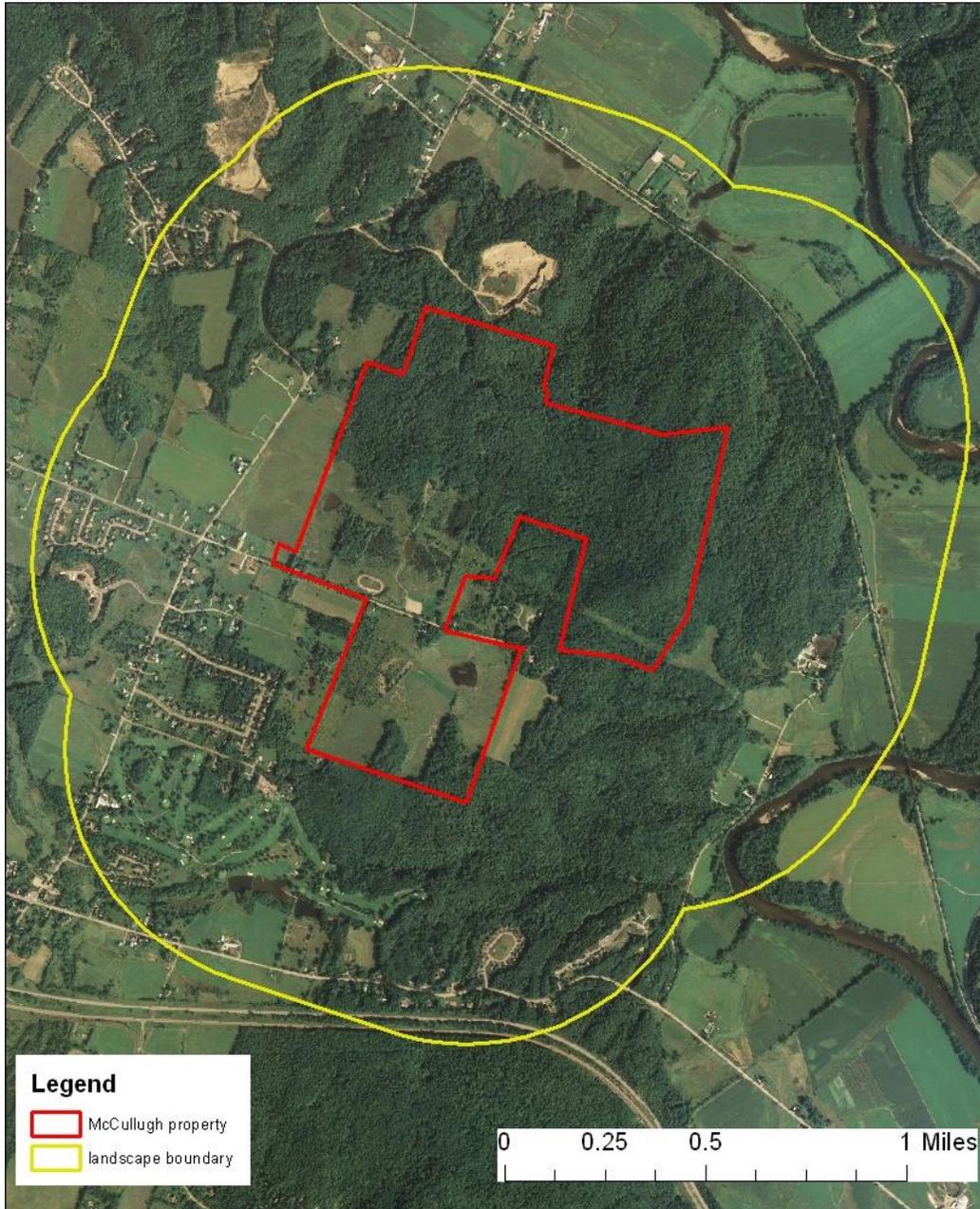


Figure 2. 2,500 acre landscape surrounding the McCullough property.

The McCullough property is an island of forest in a landscape fragmented by agricultural, commercial and residential development. Extensive blocs of contiguous forest are nearby, across the Winooski River to the east. A more developed landscape lies to the west. Despite the fragmented landscape in which the McCullough property lies, the forest area of the property itself, coupled with the forest on adjacent parcels to the north and east, is sufficient to support

area sensitive (forest interior specialist) birds such as the black-throated green warbler and the scarlet tanager. Factors associated with forest fragmentation and negatively influencing the reproductive success of forest birds include the presence of nest predators, such as skunks, raccoons and house cats, and the nest parasite brown-headed cowbird. The impacts of these influences can be mitigated through careful management.

In addition to forest, the property is currently providing habitat for early-successional or young forest species such as the chestnut-sided warbler and American woodcock. A management strategy that protect the interior forest on the property by limiting the size of canopy openings within the forest, and management for early-successional conditions in open areas and/or near existing forest edges is appropriate given the landscape context

Landowner Objectives

The property is enrolled in the Use Value Appraisal Program and supports the Catamount Outdoor Family Center. It has been in the family for generations, and current goals include gaining some income from timber harvest while maintaining year-round recreation trails as part of the Outdoor Center. The McCulloughs are in the process of conserving a portion of their property and are interested in learning more about the ecological values the land provides and how those values – including bird habitat - may be enhanced.

Definitions

Terms defined below are in **bold** in the text of this report.

General habitat terms

Area-sensitive Bird Species

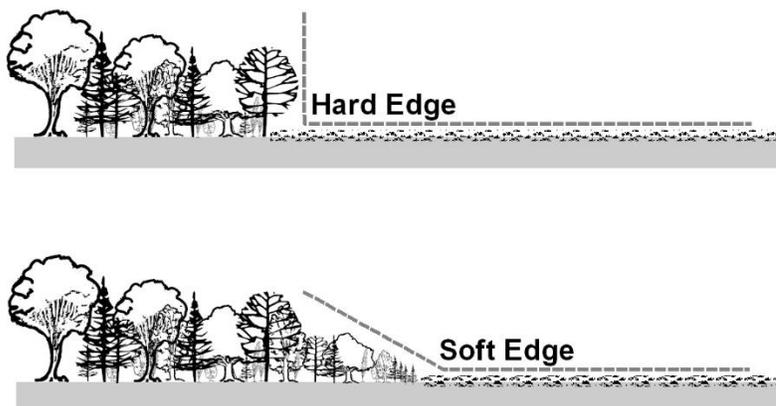
Bird species which increase in abundance, occur more frequently, and/or achieve higher nesting success with increasing forest patch size such as the wood thrush and scarlet tanager.

Early-Successional Habitat

Regenerating forest and brushy, overgrown fields are two of the most common types of early-successional habitat. The vegetative conditions of these areas are often similar; a high density of small, woody-stemmed vegetation. This may include tree seedlings and saplings, blackberry and/or raspberry, and meadowsweet. These conditions are temporal; generally lasting for 15-20 years in regenerating forest area, longer on old fields. Responsibility bird species that require this habitat type for all or a portion of their needs are chestnut-sided warbler, mourning warbler, white-throated sparrow, American woodcock, ruffed grouse, magnolia warbler, and Canada warbler.

Edge

At the edge between forest and open land, the transition from low herbaceous vegetation to tree canopy can be considered either a “soft” or “hard” edge. A soft edge refers to a gradual change in vegetation height moving into the forest. This gradual transition is important for buffering interior forest specialists like the wood thrush from the incursions of nest predators (such as raccoons and skunks) and nest parasites (such as the brown-headed cowbird) that are frequently found in open and developed areas. A gradually increasing canopy height will help shield interior nesting birds from view by predators and parasites. Additionally, the brushy conditions that often develop in a soft edge may provide breeding habitat for early-successional bird species including chestnut-sided warbler and white-throated sparrow.



Fragmented Forest

Forest that is broken into smaller, unconnected patches, primarily due to some form of development (e.g. residential, commercial, major roads). A fragmented forested landscape is more likely to support “generalist” wildlife species, such as raccoons and skunks, which can decrease nesting success of interior forest birds.

Interior Forest

Forest condition that occurs with increasing distance from a forested/non-forested edge. As perceived from a bird's perspective, interior forest conditions occur approximately 600-900 ft. from an edge. It is at this distance that negative edge-associated effects such as nest predation and parasitism generally no longer occur. Bird species that are labeled interior forest specialists tend to avoid edges.

Structural Complexity

Structural complexity refers to the complexity of vegetation as it is spatially arranged in the forest, both vertically and horizontally. A forest with a well developed under-story, mid-story, and canopy exhibits complex or diverse structure, which offers habitat for a greater array of bird species compared with a structurally simple forest. Non-living features, such as coarse woody material, and canopy gaps, contribute as well.

Habitat parameters

The following attributes of forest structure were evaluated during the field visit:

Cover Type

Cover type is a generalized description of the dominant vegetation of a habitat unit; such as mixed forest, forested wetland, and open field. Focus is given to how the area may be perceived by breeding birds.

Dominant Canopy Trees

Tree species that are most abundant in the dominant and co-dominant forest canopy classes. Applicable only when habitat unit is forested. Some tree species have notable value to responsibility bird species. Yellow birch has been shown to be preferentially chosen by some species of insect eating songbirds as a foraging substrate. Among these are scarlet tanager, black-throated green warbler, and blackburnian warbler. Cherry species are also important, particularly during the post breeding/pre-migration period, as their fruits become a significant component of many bird species diets.

Tree Size Class

Size class(s) of trees in the dominant and co-dominant canopy classes. Determined by measuring the diameter of a tree at breast height (dbh), which is 4 ½ ft. from the ground. Classes include seedling/sapling (≤ 3.9 inches), poletimber (4-8.9 inches for softwoods, 4-11.9 inches for hardwoods), and sawtimber (≥ 9 inches for softwoods, ≥ 12 inches for hardwoods).

Responsibility bird species are often associated with 1 or more size classes. As a general rule, a pre-dominance of seedlings/saplings will provide habitat for early-successional bird species such as chestnut-sided warbler, while pole and sawtimber is more suitable for wood thrush and blue-headed vireo.

Understory Vegetation

Understory vegetation includes the most abundant woody-stemmed vegetation 1-20' in height, such as tree seedlings and saplings along with understory trees and shrubs such as hobblebush. The fruits of understory species such as serviceberry provide food for a number of responsibility

bird species; while the structure created by hobblebush is an ideal nesting substrate for birds that nest in this forest layer (see Understory Development for further detail).

Understory Development

A qualitative, relative measurement of the amount of woody-stemmed vegetation 1-20' in height; described as low, moderate, or high. For some responsibility bird species this is one of the most important habitat features. Black-throated blue warbler and wood thrush are two species that nest almost exclusively in this forest layer. Other species including American redstart and ovenbird spend a portion of their time foraging in the vegetation within this height range. Understory growth is initiated when light reaches the forest floor, which can happen in the event of natural disturbances, such as fire, wind, or other agents of tree death. Human disturbances such as logging can mimic natural disturbances and have a similar effect. Cutting groups of trees will often provide better understory regeneration than single tree removal.

Snags (standing dead trees)

Snags are important nesting habitat for several species including the yellow-bellied sapsucker and northern flicker. In order to provide adequate nesting opportunity for these and other responsibility species, retaining six snags per acre of forest is recommended. Three of the six snags should be of a large size class, greater than 16" diameter at breast height (dbh). This can be accomplished through retaining dead, dying, and old trees and by girdling trees of poor form and quality. Qualitative measurements used are low (overall low abundance of any snags), moderate (snags present, but of small diameter(s)), or, minimal abundance of snags of target diameters), and high (abundance of target diameter snags).

Ground Cover

All layers of the forest are important, including the forest floor. Coarse woody material (CWM) is made up of large woody material (*ie.* tree trunks), branches, limbs, and slash piles. This mix of material provides nesting opportunities for species such as white-throated sparrow that tend to build their nests in and under brush piles. Additionally, ruffed grouse utilize CWM as perches from which to drum during the mating season. Forest management provides an opportunity to increase the amounts of CWM on the forest floor. An abundant layer of moist leaf litter is home to an array of insects, mites, and spiders. These arthropods make up a significant component of an ovenbird's and wood thrush's diet during the breeding season. Management activities that lead to dessication of the leaf litter can negatively effect the habitat suitability of the area to these bird species. Amounts of CWM and leaf litter are described qualitatively as low, moderate, or high.

Trails/Roads

Recreational trails, access roads, and skid trails are often an important component of a habitat unit. In a landscape that is predominately forested, these man-made features generally do not degrade the habitat quality. Research has shown that roads/trails less than 25 ft. in width, when combined with a greater than 70% canopy cover over the road/trail, have minimal negative impact on the forest bird community.

Additional Significant Features

Wetlands and streams sides (riparian habitat) provide nesting and feeding opportunities for a variety of forest nesting birds and wetland specialists. Larger fast moving stream may support nesting of the Louisiana waterthrush, a responsibility species whose nesting is strongly associated with fast moving streams with forested buffers. Protecting this riparian buffer will ensure it is available for Louisiana waterthrush nesting. Other forest features have a high level of value to other wildlife in addition to birds. For this reason, significant habitat elements such as vernal pools, deer winter habitat and bear feeding areas may be taken into account when making management recommendations.

Habitat Assessment

Based on an August 21, 2009 field visit, the property was divided into habitat units, or areas currently providing different habitat conditions for responsibility species.

This section includes:

- 1) General management considerations applicable to all properties
- 2) Description of the habitat units and assessment of their current habitat value
- 3) Description of desired future conditions for enhancing responsibility species habitat in each habitat unit, and management options specific to the property, aimed at achieving the desired conditions

Recommendations are provided for a 10-15 year period. While not always discussed in the report, the recommended practices will also benefit a variety of other bird and other wildlife species. The recommendations are designed to be discussed with the property's forester or land manager and implemented where practical and appropriate. If the property is enrolled in the Use Value Appraisal program, it is important that the forest management plan be amended or updated before any actions not in the plan are taken.

Contact Katie Manaras at 802-453-6710 or kmanaras@audubon.org for more information or questions about the report.

General Management Considerations

The following management considerations can be implemented throughout any forested property to protect and enhance the quality of breeding habitat for responsibility species.

✓ **Retain yellow birch**

The branches and foliage of yellow birch are preferentially chosen foraging substrates for insect eating responsibility bird species, including blackburnian warbler, black-throated green warbler, and scarlet tanager. This preference may be due to higher densities of potential prey and the ability of these bird species to forage effectively among the branching and foliage structure of this tree species (Holmes and Robinson 1981). Retain as many individuals, across all size classes, as possible.

✓ **Conduct harvesting operations outside the bird breeding season**

The forest bird breeding season roughly extends from May-August. Harvesting during frozen ground conditions is preferable as it has no direct negative impact on the breeding bird community. Winter harvesting can also help protect advanced regeneration and understory shrubs from damage. If harvesting outside of this time frame is required, schedule it after the second or third week of July, which will allow most birds to fledge a first brood.

✓ **Retain standing snags**

Standing dead trees are of significant value to a number of responsibility bird species including northern flicker, chimney swift, and olive-sided flycatcher as well as many other species of wildlife. To the extent possible retain a minimum of six snags and/or cavity trees per acre, with one exceeding 18 in. dbh and two additional exceeding 16 in. dbh. Priority should be given to hardwood snags as they remain intact longer. Also, retain some live trees of poor form and quality during harvests to serve as the next cohort of snags. If target number of snags does not exist, consider girdling poor quality trees in order to achieve abundance objectives.

✓ **Retain large diameter aspen and birch spp.**

Yellow-bellied sapsuckers and northern flickers frequently excavate nest cavities in trees in the sawtimber size class (≥ 13 in. dbh). aspen and birch spp. Cavities are often made in trees with the heartwood decay fungus *Phellinus tremulae* (*Fomes ignarius* var. *populinus*) (Kilham 1971) and *Fomes fomentarius* and sapwood decay fungi (*Trichaptum biformis* and *Traemetes versicolor*).

✓ **Retain coarse and fine woody material**

Small limbs and branches, including the tops of harvested trees, on the forest floor provide cover and feeding sites for ground and understory foraging bird species such as veery and white-throated sparrow. Larger diameter logs serve as drumming sites for male ruffed grouse and singing perches for songbirds including ovenbird. Refrain from widespread use of whole tree harvesting and leave slash (branches, limbs, etc.) in the forest.

✓ **Minimize extent of forest access roads**

Forest access roads can serve as pathways for increased nest predation and parasitism, particularly in forests within an agricultural matrix. Maintain < 15 percent of a property in roads and access trails and utilize the current trail system as much as possible. Minimize long, straight

stretches of access roads into the forest interior. Road/trail widths <20 ft. are preferred (Rich et al. 1994). Wider forest roads may decrease habitat quality for ground foraging bird species such as ovenbird along the road edge due to decreases in leaf litter moisture, increased leaf litter temperature, and subsequent lowered densities of leaf litter arthropods. Densities of birds and reproductive success may be affected (Ortega and Capen 1999).

✓ **Soften edges between field and forest habitats**

At the interface between forest and open land, the transition from low herbaceous vegetation to tree canopy can be considered either “soft” or “hard”. A soft edge refers to a gradual change in vegetation height moving into the forest. This gradual transition is important for buffering interior forest bird species like the wood thrush from the incursions of nest predators (such as raccoons and skunks) and nest parasites (such as the brown-headed cowbird) that are frequently found in open and developed areas. A gradually increasing canopy height will help shield interior nesting birds from view by predators and nest parasites. Additionally, the brushy conditions that often develop in a soft edge may provide breeding habitat for early-successional bird species including chestnut-sided warbler and white-throated sparrow.

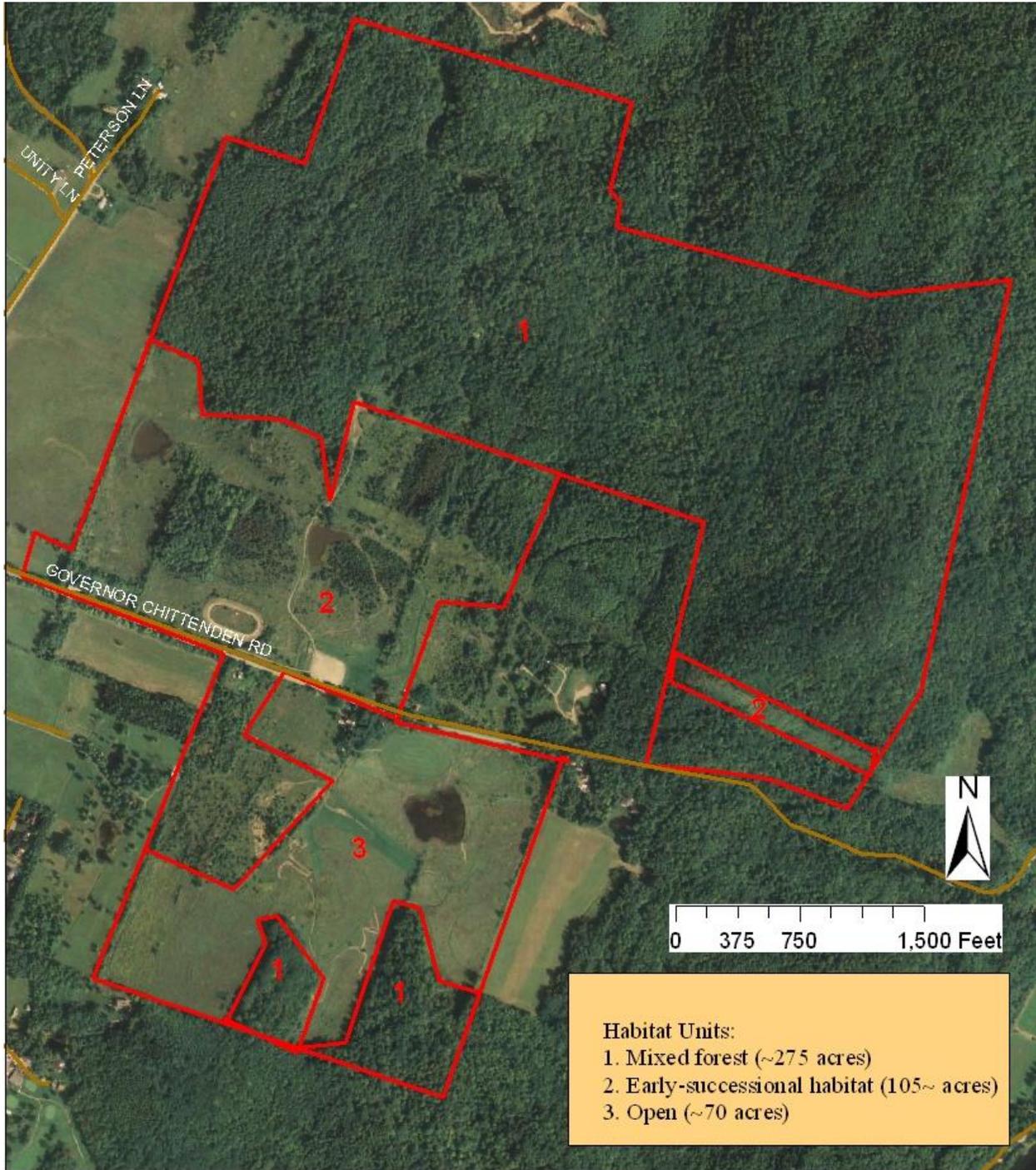
✓ **Monitor and control invasive plants**

The fruits of invasive plants such as buckthorn and honeysuckle are eaten by birds, but are of low nutritional value. Because many migrants focus their diets on fruits in the fall as they prepare for long migrations, their choice of these plants comes at an energetic cost at a critical time. Additionally, bird nests in invasive plants are more vulnerable to nest predators. When new light is allowed to reach the forest floor, due to either natural or human-induced changes in forest structure, the growth on invasive plants can be stimulated, and they can outcompete native, desirable plants. If invasive plants are present in an area, their response to any canopy openings should be monitored closely. For information about controlling invasive plants contact Sharon Plum, The Nature Conservancy’s “Wise on Weeds” coordinator, at splumb@tnc.org or 802.229.4425 x120.

✓ **Retain streamside buffers**

The edges of swiftly flowing, gravelly to rocky bottomed streams imbedded in a forest matrix can provide suitable nesting habitat for Louisiana waterthrush. Retain streamside buffers sufficient to protect water quality and potential nesting sites for this responsibility bird species. Features to preserve include small hollows or cavities within the root base of upturned tree, within bank of stream, or under fallen log.

Habitat Units



Map 1.

Forest Bird Habitat Assessment McCullough Property, Williston, VT



Prepared 1/12/09 KM
Not a survey. All boundaries approximate.

1. Mixed forest – approximately 275 acres

Area Description

Mixed forest covers roughly 60% of the McCullough property. It is concentrated north of Governor Chittenden Road, but includes 20 acres along the southern edge of the property as well (Map 1).

Assessment of Current Conditions

| Habitat Unit Current Conditions | | |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <u>Variable</u> | <u>Condition/Amounts</u> | <u>Notes</u> |
| Cover Type | Mixed forest | |
| Dominant Canopy Trees | White pine, red oak, sugar maple, red maple, beech, yellow birch, hickory | |
| Dominant Understory Trees | sugar maple, beech, hemlock, red maple, yellow birch | |
| Dominant Tree Size Class | Sawtimber | |
| Understory Development (woody-stemmed vegetation 1-20' in height) | Generally low, with moderate density in patches | |
| Snags (standing dead trees) | Diameter and abundance targets are not met | |
| Ground Cover (fine and coarse woody material/leaf litter) | Ample deciduous leaf litter is available. Coarse woody debris on the ground is in low abundance | |
| Trails/Roads | A system of single and double-track recreational trails wind throughout the property. The trails are mostly <20 ft wide and well drained | |
| Additional Significant Features | stream | At the time of habitat assessment, active logging was occurring on 70% of the forest |
| Responsibility Bird Species Noted | | |

The dominant condition in this habitat unit is two-aged forest, with an over-story of white pine and a younger cohort of hardwood trees growing in the under-story and mid-story. The northernmost reach of this habitat unit is eastern hemlock. Beech and oak with are the most common species on the eastern edge of the habitat unit, along the Indian Lookout ridge. In this

area, a history of less frequent and/or less intense disturbance compared with the rest of the property has led to a mature present-day forest with larger trees.

Some buckthorn and barberry (invasive plants) were noted; they should be closely monitored following summer 2009 logging.



Figure 3. A patch of dense understory growth beneath a canopy of white pine.

Desired Future Habitat Conditions

Maintaining forest interior conditions by limiting the size of canopy openings should be a priority for this area. Desired conditions for the future are mature forest with enhanced understory development, as well as dead wood standing and on the ground.

The current conditions in this habitat are likely to support a range of mixed forest and **area sensitive species** such as the blue-headed vireo, eastern wood-peewee, blackburnian warbler, and yellow-bellied sapsucker. Leaf litter is adequate in hardwood-dominated areas to support ground-foraging and nesting birds such as the ovenbird and wood thrush. Higher amounts of understory vegetation would increase habitat suitability for shrub nesting species such as black-throated blue warbler. Such conditions are a likely result of the summer '09 logging on roughly 70% of the property's forest.

Dead wood, both standing and down on the forest floor, is found in low to moderate densities on the property. **Snags** 16 inches in diameter or larger can be used as nesting trees for cavity excavators including the yellow-bellied sapsucker and northern flicker, and **coarse woody material** on the forest floor serve as drumming sites for ruffed grouse.

Target Responsibility Bird Species

- Ovenbird
- Wood thrush
- Veery
- Yellow-bellied sapsucker
- Eastern wood-pewee
- Scarlet tanager
- Northern parula
- American redstart
- Black-throated blue warbler
- Black-throated green warbler
- Blackburnian warbler
- Purple finch
- Blue-headed vireo
- Canada warbler

Management Options

✓ **No additional canopy removal is recommended**

Responsibility bird benefit: Logging on 70% of this habitat unit occurred during summer 2009. Canopy removal is expected to let new light onto the forest floor, stimulating understory growth and opportunities for shrub and mid-story nesters and foragers. In other words, the recent harvest is expected to lead to desired conditions over the next several years. No additional canopy thinning is recommended for the current management period of 10 years.

Management strategy: No management additional is necessary

✓ **Monitor and control invasive plants**

See general management recommendations

Note: Recent logging may have the undesired effect of releasing and encouraging invasive plants. They should be monitored and controlled. See general management recommendations for details.

2. Early-successional habitat – approximately 105 acres

Area Description

Early-successional habitat covers about 23% of the property's total acreage and is located on either side of Governor Chittenden Road (Map 1). This habitat unit includes the young forest and old Christmas tree plantations on the western side of the property, as well as a power-line area on the east side of the property. Some areas of field dominated by herbaceous species such as goldenrod are included in this habitat unit because they may provide **early-successional habitat** in the future, if they cease to be mowed.

Assessment of Current Conditions

| Habitat Unit Current Conditions | | |
|--------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <u>Variable</u> | <u>Condition/Amounts</u> | <u>Notes</u> |
| Cover Type | Early-successional habitat | |
| Dominant Canopy Trees | Paper birch, quaking aspen, balsam fir, hawthorn, apple trees | |
| Dominant Understory Trees | Paper birch, quaking aspen, balsam fir, hawthorn, apple trees | |
| Dominant Tree Size Class | Pole and sapling | |
| Understory Development (woody-stemmed vegetation 1-20' in height) | dense in patches | Areas of this habitat unit dominated by herbaceous cover will likely grow woody plants over time, if not mowed |
| Snags (standing dead trees) | few | |
| Ground Cover (fine and coarse woody material/leaf litter) | low amounts of leaf litter and coarse and fine woody material | |
| Trails/Roads | Recreational trails are narrow and well-drained | |
| Additional Significant Features | wetland | |
| Responsibility Bird Species Noted | | |

Large patches of young, regenerating forest habitat, such as that which exists in this habitat unit, are rapidly disappearing throughout Vermont and the rest of northern New England. These areas of young woody vegetation provide critical breeding habitat for declining bird species such as chestnut-sided warblers, mourning warblers and white-throated sparrows. This habitat unit is

large enough to support numerous breeding pairs of these species. Balsam firs provide additional benefit in the form of dense cover, and may be used for nesting by magnolia warblers and American woodcock.

Recent research indicates that **early-successional habitats**, particularly those with fruit-producing trees and shrubs such as blackberry and hawthorn, are used by mature forest species, including scarlet tanager and wood thrush, as post-breeding habitat.

This area is likely to continue to provide breeding habitat for early-successional species for roughly the next 10-15 years, lacking any management. Management for maintain early-successional conditions could provide habitat for young-forest specialist birds indefinitely.

Desired Future Habitat Conditions

Current conditions are desirable and are expected to continue to provide breeding habitat for early-successional species for roughly the next 10-15 years, lacking any management. Management to maintain brushy, regenerating field conditions could provide habitat for young-forest specialist birds indefinitely.

Target Responsibility Bird Species

- Chestnut-sided warbler
- Mourning warbler
- Magnolia warbler
- Nashville warbler
- Ruffed grouse
- American woodcock

Management Options

✓ **Maintain early-successional habitat conditions**

Responsibility bird benefit: Population levels of birds associated with this habitat type are declining relative to 1960s levels, as their habitat becomes less abundant. Responsibility species that require this habitat type for all or a portion of their needs are chestnut-sided warbler, mourning warbler, white-throated sparrow, American woodcock, ruffed grouse, magnolia warbler, and Canada warbler. Areas that regenerate softwoods will be more suitable for magnolia warbler while hardwood regeneration will be utilized by chestnut-sided and mourning warblers. Early-successional habitat will likely be used by mature forest nesting bird species such as wood thrush and black-throated green warbler during the post-breeding season. The fruits of soft mast producing trees and shrubs that often grow in openings of these sizes are an important food service as the birds prepare for fall migration.

Management strategy: To maintain the best early-successional habitat, brush-hog the area on a rotation designed to keep all sections of the unit between 0 and 15 years post-mowing at all times. For example, half the acreage could be mowed every 7 years, or a quarter of the area could be mowed every 4 years.

✓ **Retain and release apple trees and hawthorne**

Responsibility bird benefit: The fruit, blossoms, seeds and sap are food sources for ruffed grouse, purple finch, and yellow-bellied sapsuckers. Additionally, the blossoms serve as a food source for ruby-throated hummingbirds, and Baltimore orioles, eastern bluebirds and other bird species nest in apple trees. These trees may also be providing a food source for black bear, bobcats, foxes, fishers, and porcupines.

Management strategy: Apple trees and hawthorns are found in the habitat unit and should be retained. Apple trees and hawthorns that are crowded by competing vegetation can be “released” by removing any trees that overtop them as well as any vegetation within their drip-line.

3. Open – approximately 70 acres

Area Description

Open land dominates the property south of the road and accounts for 16% of the property's total acreage (Map 1).

Assessment of Current Conditions

| Habitat Unit Current Conditions | | |
|--------------------------------------------------------------------------|---------------------------------|---------------------|
| <u>Variable</u> | <u>Condition/Amounts</u> | <u>Notes</u> |
| Cover Type | Herbaceous | |
| Dominant Canopy Trees | NA | |
| Dominant Understory Trees | NA | |
| Dominant Tree Size Class | NA | |
| Understory Development (woody-stemmed vegetation 1-20' in height) | NA | |
| Snags (standing dead trees) | NA | |
| Ground Cover (fine and coarse woody material/leaf litter) | NA | |
| Trails/Roads | Trails | |
| Additional Significant Features | NA | |
| Responsibility | | |
| Bird Species Noted | | |

From a responsibility species perspective, this habitat unit is not providing breeding habitat. But it may be providing another important function for American woodcock. Woodcock use three different types of habitat: 1) mature forest for nesting, 2) moist **early-successional habitat** or alder/willow thickets for foraging, and open areas for performing an elaborate mating display. The fact that this field is located in close proximity to both early-successional and mature forest habitat makes it a possible display area for woodcock. The unit may be providing breeding habitat for grassland birds of conservation concern. Some management guidelines for hayfield are listed below. For more information, please contact Mark LaBarr of Audubon's Champlain Valley Bird Initiative (CVBI) at mlabarr@audubon.org or (802) 434-3068.

Desired Future Habitat Conditions

Ideally, this hayfield would function as breeding habitat for grassland birds. That means intervals between mowing of 65 days minimum, and a target mowing height of 8 inches or more. If the field is not managed for hay, it can be mowed to suit the landowners' needs, with late mowing once per year in the fall being ideal. Alternatively, if commensurate with landowner goals, the field could be allowed to grow woody species and become a young forest over time. In this case, monitoring for invasive species will be important.

Target Responsibility Bird Species

This habitat is not suitable breeding habitat any Forest Bird Initiative responsibility species. American woodcock may use the area for courtship displays. Grassland birds of conservation concern, however, such as bobolinks, may find suitable habitat here.

Management Options

✓ **Mowing schedule**

Responsibility bird benefit: None. These recommendations are designed to benefit grassland birds of conservation concern, such as bobolink, meadowlark, and grasshopper sparrow.

Management strategy:

- If fields are not managed for hay, mow once annually. October is a good month to mow because most migrant grassland birds have departed for their winter ranges.
- For fields managed for hay, mow before June 1st. Later cuts should be completed after a 65-day waiting period if possible. If mowing is needed prior to this date, the cut should be completed after July 4th. Leaving the field uncut for 65 days after an early cut will allow the birds to re-nest successfully. This cutting regime and cutting areas to a height greater than 8 inches tall will benefit grassland species and may be successfully integrated into current agricultural practices.
- Remove hay after each cutting to provide the best conditions for re-growth of grass. Birds will settle in greener fields in the spring.
- Maintain old fence posts for perching and erect and maintain nest boxes to provide possible nesting habitat for cavity nesting species such as Eastern Bluebirds and Tree Swallows. Boxes should be cleaned every spring.

Bird Monitoring

Understanding the response of bird communities to forest management is a critical aspect of conservation efforts. It is important for us to understand how our management activities impact bird populations over time, so that we can adapt practices accordingly. One method to collect this information is through a bird monitoring program. By periodically recording the bird species present at a given time and place on the property in question, we can see if and how the composition of the bird community is changing in response to management activity.

For assistance on getting started with monitoring on this property, please contact Audubon Vermont at 802-434-5827 or shagenbuch@audubon.org.

Appendix 1: Forest Bird Initiative Responsibility Species



Audubon VERMONT

Bicknell's Thrush
Wood Thrush
Canada Warbler
Bay-breasted Warbler
American Woodcock
Olive-sided Flycatcher
Rusty Blackbird
Cape May Warbler
Chestnut-sided Warbler
Veery
Eastern Wood-Pewee
Purple Finch
Yellow-bellied Sapsucker
American Redstart
Boreal Chickadee
Black-throated Blue Warbler
Chimney Swift
Ruffed Grouse
Blackpoll Warbler

Louisiana Waterthrush
Northern Parula
Blackburnian Warbler
Black-throated Green Warbler
Ovenbird
Yellow-bellied Flycatcher
Gray Jay
Palm Warbler
Northern Flicker
Black-backed Woodpecker
Tennessee Warbler
White-throated Sparrow
Mourning Warbler
Spruce Grouse
Magnolia Warbler
Alder Flycatcher
Nashville Warbler
Lincoln's Sparrow
Swamp Sparrow
Blue-headed Vireo
Scarlet Tanager

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Appendix F

| | Sp | S | F | W |
|-----------------------------------|----|---|---|---|
| Waxwings | | | | |
| __ Cedar Waxwing* | L | H | L | L |
| __ Bohemian Waxwing | | | R | M |
| Wood Warblers and Tanagers | | | | |
| __ Blue-winged Warbler | | R | | |
| __ Nashville Warbler | R | R | R | |
| __ Yellow Warbler | M | H | R | |
| __ Chestnut-sided Warbler* | L | H | L | |
| __ Magnolia Warbler | | R | | |
| __ Black-throated Blue Warbler* | L | L | R | |
| __ Yellow-rumped Warbler | L | L | L | |
| __ Black-throated Green Warbler | L | L | L | |
| __ Pine Warbler | L | L | L | |
| __ Palm Warbler | | | L | |
| __ Black-and-white Warbler* | L | L | R | |
| __ American Redstart | L | L | L | |
| __ Ovenbird* | L | M | R | |
| __ Common Yellowthroat* | M | H | L | |
| __ Wilson's Warbler | | | R | |
| __ Northern Parula | R | | | |
| __ Blackburnian Warbler* | L | L | | |
| __ Prairie Warbler | R | | | |
| __ Scarlet Tanager* | L | M | | |
| New World Sparrows | | | | |
| __ American Tree Sparrow | R | | L | L |
| __ Chipping Sparrow | L | R | R | |
| __ Savannah Sparrow* | L | M | | |
| __ Fox Sparrow | | | L | |
| __ Song Sparrow* | H | H | H | |
| __ Lincoln's Sparrow | | | R | |
| __ Swamp Sparrow* | | R | R | |
| __ White-throated Sparrow | L | L | M | |
| __ White-crowned Sparrow | R | | L | |
| __ Dark-eyed Junco | L | R | M | L |
| __ Field Sparrow | L | L | | |
| Cardinals and Buntings | | | | |
| __ Northern Cardinal | M | H | H | L |
| __ Rose-breasted Grosbeak* | L | M | R | |
| __ Indigo Bunting | R | L | | |

| | Sp | S | F | W |
|--------------------------|----|---|---|---|
| Blackbirds | | | | |
| __ Bobolink* | L | M | | |
| __ Red-winged Blackbird* | H | H | L | |
| __ Eastern Meadowlark | R | | | |
| __ Common Grackle | L | L | | |
| __ Brown-headed Cowbird | L | L | | |
| __ Baltimore Oriole* | L | M | R | |
| Finches | | | | |
| __ House Finch* | L | | L | |
| __ American Goldfinch* | M | H | H | M |
| __ Pine Siskin | | | R | |
| __ Common Redpoll | | | | L |
| Kingfishers | | | | |
| __ Belted Kingfisher | | R | | |
| Starlings | | | | |
| __ European Starling* | H | H | M | M |

Field Notes:

Catamount Outdoor Family Center Birds



The Catamount Family Center is an Important Bird Education site sponsored by the Green Mountain Audubon Society. We thank Carl Runge for his leadership, the National Audubon Society for financial support through its collaborative grant program, and the many volunteers who participated in our monitoring surveys.

Appendix F

Catamount Family Center Birds

| Seasonal appearance | | |
|--------------------------|--------------------|--------------------|
| Sp | Spring | March-May |
| S | Summer | June-August |
| F | Fall | September-November |
| W | Winter | December-February |
| Probability of Detection | | |
| H | High | 70%-100% |
| M | Medium | 40%-69% |
| L | Low | 10%-39% |
| R | Rare | <10% |
| * | Confirmed Breeding | |

| | Sp | S | F | W |
|-----------------------------|----|---|---|---|
| Grebes | | | | |
| __ Pied-billed Grebe | R | | | |
| Cormorants | | | | |
| __ Double-crested Cormorant | | R | | |
| Waders | | | | |
| __ Great Blue Heron | R | L | M | |
| __ Green Heron | | L | | |
| __ American Bittern | | R | | |
| Geese and Ducks | | | | |
| __ Canada Goose* | H | R | M | |
| __ Mallard* | M | L | L | |
| __ Wood Duck* | R | L | L | |
| __ Green-winged Teal | | | R | |
| __ Common Merganser | | R | | L |
| __ Hooded Merganser | L | R | L | L |
| Shorebirds | | | | |
| __ Killdeer | L | R | | |
| __ Solitary Sandpiper | | | R | |
| __ Spotted Sandpiper | | | R | |
| Gulls | | | | |
| __ Ring-billed Gull | M | L | R | |
| Vultures | | | | |
| __ Turkey Vulture | L | L | L | |

| | Sp | S | F | W |
|------------------------------------|----|---|---|---|
| Eagles, Hawks, and Falcons | | | | |
| __ Bald Eagle | | R | | |
| __ Osprey | | R | L | |
| __ Northern Harrier | | L | L | |
| __ Cooper's Hawk* | R | R | L | |
| __ Sharp-shinned Hawk | R | | L | |
| __ Northern Goshawk* | R | | | |
| __ Broad-winged Hawk | R | R | R | |
| __ Red-tailed Hawk | L | R | L | |
| __ Red-shouldered Hawk | L | | | |
| __ American Kestrel* | M | M | R | |
| __ Merlin | R | | | |
| Owls | | | | |
| __ Great Horned Owl | | R | R | R |
| __ Barred Owl | | | R | |
| __ Northern Saw-whet Owl | | | | R |
| Turkeys, Grouse, and Allies | | | | |
| __ Wild Turkey | L | R | | |
| __ Ruffed Grouse | R | R | L | |
| __ Northern Bobwhite | | R | | |
| Pigeons and Doves | | | | |
| __ Rock Pigeon | | R | R | |
| __ Mourning Dove* | H | M | L | L |
| Swifts and Swallows | | | | |
| __ Chimney Swift | L | M | | |
| __ Tree Swallow* | M | M | | |
| __ Barn Swallow | L | M | | |
| __ Northern Rough-wing Swallow | | R | | |
| __ Bank Swallow | | R | | |
| Shrikes | | | | |
| __ Northern Shrike | | | | L |
| Hummingbirds | | | | |
| __ Ruby-throated Hummingbird | | M | R | |
| Woodpeckers | | | | |
| __ Downy Woodpecker | L | M | M | L |
| __ Hairy Woodpecker | R | M | L | M |
| __ Pileated Woodpecker | L | L | L | |
| __ Northern Flicker* | M | M | M | L |
| __ Red-bellied Woodpecker | | R | | |
| __ Yellow-bellied Sapsucker* | L | M | L | |

| | Sp | S | F | W |
|--------------------------------|----|---|---|---|
| Flycatchers | | | | |
| __ Eastern Kingbird* | M | H | | |
| __ Great-crested Flycatcher | R | L | R | |
| __ Eastern Wood-Pewee* | L | H | L | |
| __ Eastern Phoebe* | M | M | M | |
| __ Least Flycatcher | L | L | R | |
| __ Alder Flycatcher | L | M | | |
| __ Willow Flycatcher | | R | | |
| Vireos | | | | |
| __ Blue-headed Vireo | L | L | R | |
| __ Warbling Vireo | | L | | |
| __ Philadelphia Vireo | | | R | |
| __ Red-eyed Vireo* | L | H | L | |
| Jays, Crows, and Ravens | | | | |
| __ Blue Jay* | H | H | H | H |
| __ American Crow* | H | H | H | H |
| __ Common Raven | L | R | R | L |
| Chickadees and Titmice | | | | |
| __ Black-capped Chickadee* | H | H | H | H |
| __ Tufted Titmouse* | M | L | L | L |
| Nuthatches and Creepers | | | | |
| __ Red-breasted Nuthatch* | M | M | L | M |
| __ White-breasted Nuthatch | M | H | M | M |
| __ Brown Creeper | L | L | L | |
| Wrens | | | | |
| __ House Wren* | M | M | M | |
| __ Winter Wren | R | L | | |
| Kinglets | | | | |
| __ Golden-crowned Kinglet | | | L | L |
| __ Ruby-crowned Kinglet | | R | L | |
| Thrushes | | | | |
| __ Veery | L | H | | |
| __ Hermit Thrush | L | L | L | |
| __ Wood Thrush* | L | L | L | |
| __ American Robin* | H | H | H | H |
| __ Eastern Bluebird* | M | L | L | |
| Mimics | | | | |
| __ Gray Catbird* | M | H | M | |
| __ Brown Thrasher* | M | M | L | |
| __ Northern Mockingbird | R | R | | |