Birds with Silviculture in Mind

Birder's Dozen Pocket Guide *for* Vermont Foresters

Identification and ecology of and management for twelve priority forest birds

Created and Published by

Audubon Vermont
255 Sherman Hollow Road
(802) 434-3068
vt.audubon.org
Vermont@audubon.org

And

Vermont Department of Forests, Parks, and Recreation
103 South Main Street
Waterbury, VT 05671-0601
(802) 241-3655
www.vtfpr.org

Authors/Editors

Steve Hagenbuch *Audubon Vermont* shagenbuch@audubon.org
Katherine Manaras *Audubon Vermont* kmanaras@audubon.org
Jim Shallow *Audubon Vermont* jshallow@audubon.org
Kristen Sharpless *Audubon Vermont* ksharpless@audubon.org
Michael Snyder *Vermont Department of Forests, Parks, and Recreation*
Michael.Snyder@state.vt.us

Audubon VERMONT

FORESTS, PARKS & RECREATION
VERMONT
AGENCY OF NATURAL RESOURCES

Table of Contents

Introduction

This guide is designed to assist foresters interested in silviculture that integrates timber and songbird habitat management in Vermont. Information provided here is intended to support both the creation of Stewardship and Use Value Appraisal forest management plans and subsequent implementation of on-the-ground, stand-level management activities that can benefit breeding bird populations while producing timber products.

This guide was created as one of three components of the *Foresters for the Birds* project, a collaborative partnership between the Vermont Department of Forests, Parks, and Recreation and Audubon Vermont. These three documents were developed over a period of two years by staff of these organizations in collaboration with over 100 foresters participating in the project. In this guide, we provide considerations and tips for silvicultural options that have the potential to benefit each of the twelve Birder's Dozen species, along with information on identification and habitat requirements. This guide is intended to be used in conjunction with its two companion documents: *Forest Bird Habitat Assessment Guide: A Guide To Integrating Bird Habitat Data Into A Vermont Forest Inventory* and *Silviculture with Birds in Mind: Options for Integrating Timber and Songbird Habitat Management in Northern Hardwood Stands in Vermont*.

We assume users of these documents already have at least some experience in silviculture for timber production and an interest in managing for bird habitat as well. Our purpose is to provide relevant bird information and guidance on integrating bird habitat management concepts with accepted and widely applied silvicultural treatments.

The Birder's Dozen

The Birder's Dozen is a subset of twelve of the 40 forest songbirds (page 44) that have been identified by Audubon Vermont as being high priorities for protection in the Northern Forest Region. These twelve species were selected because they:

Are simple to identify by sight and/or sound.

Collectively use a wide range of forest types and conditions for feeding and for breeding.

Are showing a decline in their global breeding populations or are at risk for decline.

Have a significant protion of their global population breeding in the Atlantic Northern Forest.

The Birder's Dozen is a great starting place for novice birders. It is also an excellent focal point for those who are interested in managing forests in Vermont and the northeast with birds in mind.

This guide is designed to be a quick field reference that is small enough to fit in your pocket and can be used during forest inventory, timber harvest, and operations. It is not a comprehensive field guide to the life history of these twelve species. Nor is it a silvicultural guide. Instead, it is intended to provide a concentrated dose of bird-by-bird information that is of interest and value to those who manage forests in Vermont and the Northern Forest region and want to do so with birds in mind.

For each of the Birder's Dozen species, this guide provides the following information and tips that are intended to help inform – not prescribe – forest management decisions.

ID Tips

Describes the most distinctive and identifying field marks for males of the species during breeding season. Note that coloration and patterning often varies between males and females, juveniles and adults, and breeding and non-breeding adults.

Song

Describes the most common male song that is used during breeding season to attract a mate and/or defend a territory. Birds often sing more than one song, and individuals may have their own personal variations or regional dialects. Males and females also often have other vocalizations or calls that can be recognized with additional practice.

Habitat

Describes the preferred, highest quality, breeding habitat of the species where it is likely to have the greatest reproductive success. Birds often use lower quality habitat when high quality habitat is not available. Species may also change their habitat uses and preferences during different life stages and seasons, such as after fledging, before and after breeding, and during migration.

Drawings of habitat features important to each species are provided, along with a simple breeding habitiat schematic that highlights important attributes for a quick visual reference. A key to these habitat icons can be found at the end of the guide on pages 42-43.

Territory

Refers to the area a male defends during the breeding season. Territory size is often dependent on the quality of the habitat with smaller territories being possible in higher quality habitat. During the breeding season, some species may restrict their movements to staying entirely within their territories. However, most species require a larger area than their territory for foraging. Although potentially very useful for making management decisions, these area requirements are often difficult to calculate since they are dependent on a large number of factors.

Food

Refers to the main diet and foraging habitats and habits of the species during the breeding season. Birds' diets and foraging habits often vary during different life stages and seasons, such as after fledging, before and after breeding, and during migration.

Silvicultural Considerations

Although birds are affected by both the landscape and stand-level changes and management choices, this guide is intended to inform choices made by foresters at the stand-level only. The *Desired Condition* describes the forest habitat condition that is most desirable for each species and is followed by a table of tips and considerations for silvicultural options that have the potential to create or enhance habitat for the species. When it exists, a reference number to the corresponding *Silviculture with Birds in Mind* option (e.g. 1A) is provided, along with a rough estimate of when and for how long the desired condition is likely to persist post-treatment. This section is meant to be used as a quick reference for foresters in the field who would like ideas for how to protect or enhance habitat for particular species or are wondering how a particular treatment may impact a species.

References

The bird identification and habitat information in this guide was taken primarily from The Birds of North America Online, a web resource managed by the Cornell Lab of Ornithology. The information in the *Silvicultural Considerations* section reflects our own integration and application of current research in the disciplines of bird habitat requirements and silviculture, along with our personal knowledge in these areas that has been developed through practice and field experience. In most cases, it is not based on primary research on the impacts of silvicultural treatments on bird populations, simply because there are still many unanswered questions in this area of study. As a result, the information in this section represents our best informed guess of how silvicultural treatments impact and have the potential to benefit the species in the Birder's Dozen. We anticipate that the tips and considerations in this section will evolve as our understanding of how birds respond to silvicultural treatments develops.

Please contact Audubon Vermont if you would like a complete list of references used in the creation of this guide.

Non-Native Invasive Plant Species

Non-native, invasive plants, such as bush honeysuckles, buckthorn, and Japanese barberry, present a variety of threats to forest health in Vermont and the northeast. Although some species of native forest birds successfully use these shrubby, woody plant species as nesting sites and eat their fruits, the fruits generally have low nutritional value and the invasive plants reduce the diversity of other nesting and foraging options in forest ecosystems. Overall, non-native, invasive plant species degrade the quality of native forest bird habitat in our region. We assume that consideration and control of non-native, invasive plant species is a management priority for every forester practicing in Vermont, and may affect opportunities for implementing silvicultural treatments discussed in this guide and its companion documents.

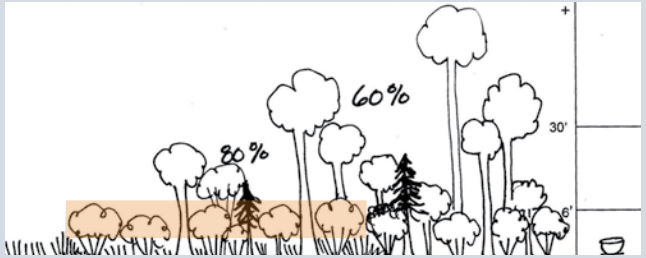
Acknowledgements

The project on which this publication is based is supported by the Northeastern Area State and Private Forestry, U.S. Forest Service and TogetherGreen, an Audubon program with funding from Toyota. Thanks to all the foresters participating in the Foresters for the Birds *project who provided feedback on this document. Drawings were done by Margaret Fowle with inspiration from Laura French. Bird photos were provided courtesy of Roy Pilcher, Charley Eiseman, and the Powdermill Avian Research Center.*

American Woodcock

AMWO

Scolopax minor



ID Tips A plump bird with a long bill, no neck, and short legs; mottled cryptic coloration.

Song A nasal beeping *peent* heard mostly at dusk; also twittering wing sound when in flight.

Habitat Hardwood or mixedwood forest matrix with a mix of openings and young forest in early stages of regeneration (<20 years old). Uses habitats in the following categories depending on activity, time of day, and season: *see opposite >*

Territory Males defend peenting areas in singing grounds with average spacing between birds ≥ 150 feet. Birds form small clusters in other habitats and are not territorial.

Nest Scrape on ground in dead leaves.

Food Primarily earthworms; also eats various insects and larvae, snails, millipedes, centipedes, spiders, and seeds.

Silvicultural Considerations

Desired Condition Maintain or create hardwood or mixedwood forest matrix with a mix of openings and young forest in early stages of regeneration (<20 years old), preferably near an alder swale or other shrub wetland.

Due to the complexity of the habitat requirements and options for management for AMWO, please refer to the Woodcock Conservation Plan prepared by the Wildlife Management Institute available at www.timberdoodle.org for silvicultural guidelines.

	Habitat
Singing grounds	Forest openings, fields, and regenerating fields that are at least 0.5 acre in size and less than 300 feet from diurnal cover. Here males perform display and courtship activities in the spring.
Diurnal cover	Hardwood or mixedwood forest with moderately open canopy (about 60% cover) and dense shrub layer (about 80% cover). Prefers sites with alder, birch, and aspen species near singing grounds with moist soil and an abundance of earthworms.
Nocturnal cover	Regenerating fields and pastures at least 3 - 5 acres in size with shrubby, dense cover for roosting.
Nesting and brood-rearing habitat	Young, dense hardwood sapling stands near singing grounds and diurnal cover with moist soil and an abundance of earthworms.

Black-throated Blue Warbler BTBW

Dendroica caerulescens

ID Tips Deep blue on top with black mask and throat; white wing-patch "handkerchief."

Song A thick & buzzy *I'm-so-la-zeee* with endnote rising up to the "blue" sky.

Habitat Large, continuous tracts (250+ acres) of hardwood or mixedwood with 50-80% canopy cover and a dense understory (0-5' layer) of hobblebush and/or small saplings of sugar maple, American beech, striped maple, and softwoods.

Territory 2.5 – 10 acres (smaller in forests with a dense and diverse understory).

Nest Open cup of bark strips held together with spider web and saliva placed in the fork of a sapling or shrub in 0-5' layer.

Food Insectivorous, feeding largely on moth and butterfly larvae and adults.

Silvicultural Considerations

Desired Condition Maintain or create hardwood and mixedwood stands with 50-80% canopy cover and a dense understory (0-5' layer).

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Take all opportunities to protect advance regeneration.	3-15 years post-treatment
Mixed Intermediate Treatments	3B		
Expanding-gap Group Shelterwood	2A	Keep group width < 2x the canopy height to maximize average stand canopy closure.	
Group and Single Tree Selection	2B		
Shelterwood with Reserves	3A	Greatest increase in understory density occurs between seed and removal cuttings.	

Black Throated Green Warbler BTNW

Dendroica vivens

ID Tips Bright yellow face, olive head and back; black throat drips down sides onto white belly; two white wing-bars.

Song To attract females, males sing *zee-zee-zee-zoo-zee* (also known as *I'm-black-throated-green*); to defend territorial boundaries *zoo-zee-zoo-zoo-zee* (also known as *trees-trees-murmuring-trees*).

Habitat Prefers large, continuous tracts (250+ acres) of closed-canopy (>80% cover) softwood or mixedwood forests. Often strongly associated with red spruce in boreal forests and with eastern hemlock in non-boreal forests.

Territory Average of 1.6 acres in hemlock-beech forest in New York. Smaller in dense, softwood stands than in mixedwood stands.

Nest Open cup placed in crotch of shrub or within a group of thin vertical stems, typically 3-10 feet off ground.

Food Insectivorous; gleans from small branches and needles on conifers.

Silvicultural Considerations

Desired Condition Maintain or create well-stocked, uneven-aged mixedwood and softwood sawtimber stands with >80% canopy cover.

- ⚠ BTNW avoids road edges and forested openings up to ~650 feet from edge or opening.
- ⚠ Consider attempting to regenerate softwoods on sites dominated by red maple which may be present as a result of heavy softwood cutting in the past.
- ⚠ Retain softwood inclusions in hardwood stands; favor red spruce and eastern hemlock.

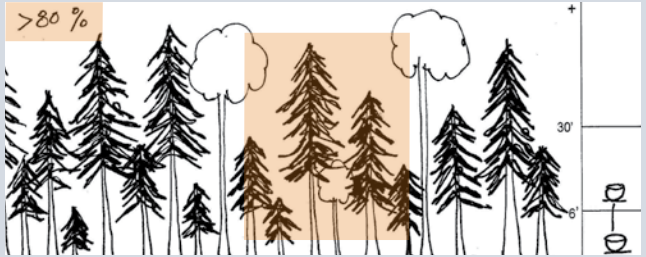
Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Use to enhance weak softwood component and establish new softwood regeneration.	5+ years post-treatment
Single Tree Selection		Use to enhance uneven-aged structure.	
Variable Retention Thinning	1B	Use to enhance weak softwood component.	
Mixed Intermediate Treatments	3B		

Blue-headed Vireo

BHVI

Vireo solitarius

250+ ACRES



ID Tips Bluish-gray head with strong white spectacles (circles around eyes); greenish back with white belly and yellow-olive flanks.

Song *See you…be-seeing ya'…so long…* repeat; slow with pauses inbetween phrases.

Habitat Extensive, moist, softwood or mixedwood forests with spruce, fir, hemlock, and/or pine. Often associated with mid- to late-successional stages with >80% canopy cover and some shrubs and saplings in the understory.

Territory About 12.4 acres along streams in the White Mountains, NH.

Nest Open cup suspended by rim from a fork of a branch in a tree or sapling with spider web. Decorated on outside with spider egg cases and birch bark. Generally placed 6-30 feet from ground.

Food Insectivorous

Silvicultural Considerations

Desired Condition Maintain or create well-stocked, uneven-aged mixedwood and softwood sawtimber stands with >80% canopy cover.

- BHVI avoids road edges and forested openings up to ~650 feet from edge or openings.
- Consider attempting to regenerate softwoods on sites dominated by red maple which may be present as a result of heavy softwood cutting in the past.
- Retain softwood inclusions in hardwood stands; favor red spruce and eastern hemlock.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Use to enhance weak softwood component and establish new softwood regeneration.	5+ years post-treatment
Single Tree Selection		Use to enhance uneven-aged structure.	
Variable Retention Thinning	1B	Use to enhance weak softwood component.	
Mixed Intermediate Treatments	3B		

Canada Warbler CAWA

Wilsonia canadensis

ID Tips Necklace of black stripes on bright yellow throat and belly; complete white eye-ring.

Song Often has soft introductory chips, then *I'm-IN-here, but-you-CAN'T-SEE-ME.*

Habitat Most abundant in moist, mixedwood forests with a 50-70% canopy cover and dense understory (0-5') and midstory (6-30'). Often found in swamps, riparian areas, and upland forests with mossy hummocks, root masses, and downed logs.

Territory Males arrive before females and defend small (~0.6 acre) territory until nesting begins. After nesting begins, males found roaming over larger (2-3 acre) area in New York.

Nest Open cup on or near ground on mossy hummock, stump or log, or upturned tree roots.

Food Flying insects and spiders.

Silvicultural Considerations

Desired Condition Maintain or create mixedwood stands with 50-70% canopy cover, a dense understory (0-5') and midstory (6-30'), and an uneven forest floor.

- Leave as much woody debris on site as possible, and do not disturb tipups or logs in or near wet areas during harvest.
- Avoid operating in forested wetlands and riparian areas.
- Retain softwood inclusions in hardwood stands.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Take all opportunities to protect advance regeneration of seedlings and saplings.	Dense understory and midstory: 3-20 years post-treatment
Mixed Intermediate Treatments	3B	Use to enhance weak softwood component and to establish new softwood regeneration.	Enhanced softwood component: 5+ years post-treatment
Expanding-gap Group Shelterwood	2A	Locate groups to release advance softwood regeneration in hardwood stands.	
Group and Single Tree Selection	2B		
Shelterwood with Reserves	3A	Greatest increase in understory density occurs between seed and removal cuttings.	

Chestnut-sided Warbler CSWA

Dendroica pensylvanica

ID Tips Yellow crown, black moustache stripe and chestnut sides following contour of wings; tail held cocked above wingtips.

Song Fast *Please-please-pleased-to-meet-cha* with emphatic ending.

Habitat Young (5-15 years old) hardwood forest with <30% canopy cover and dense shrubs and saplings 3-10 feet high for nesting and foraging. Some larger saplings used as singing perches and to obscure nests.

Territory 2 - 2.5 acres

Nest Open cup placed in crotch of small shrub or within a group of small-diameter, vertical stems less than 6.5 feet off the ground.

Food Insectivorous; prefers caterpillars and fly larvae.

Silvicultural Considerations

Desired Condition Maintain or create well-stocked hardwood seedling/sapling stands ≥ 1 acre in size with < 30% canopy cover.

⚠ Areas that will be maintained as open-canopy, early-successional habitat should be cut on a 7-10 year cycle.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Group and Single Tree Selection Clearcut/Patch Cutting	2B	Openings of at least 1 acre in size are more likely to attract a nesting pair.	3-10 years post-treatment
Shelterwood with Reserves	3A	Desired condition achieved for several years post-removal cuttings. Keep canopy cover of reserves to <30%.	
Shelterwood		Desired condition may persist for several years post-removal cuttings.	

Eastern Wood-Pewee EAWP

Contopus virens

ID Tips A flycatcher; slender, small headed, and grayish-olive above with dull, white wing-bars; "sallies" for insects (flying out from perch and then back again).

Song Plaintive *pee-ahh-weee*.

Habitat Hardwood forests with closed (>80%) canopy cover and open midstory (6-30' layer) near openings and edges.

Territory Variable: 1.4-3.1 acres in lowland forest in Illinois and average of 19.3 acres in forest stands in Wisconsin.

Nest Shallow cup of woven grass covered on outside with lichens placed on the horizontal limb of a tree.

Food Insectivorous; primarily catches flying insects taken in the air on forays from a prominent perch.

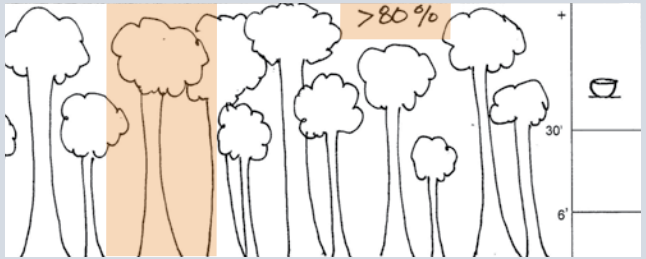
Silvicultural Considerations

Desired Condition Maintain or create hardwood pole/sawtimber stands with >80% canopy cover, gaps, and open midstory (6-30' layer) near forest openings and edges.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Gaps and/or open midstory create foraging opportunities.	1-30 years post-treatment
Variable Retention Thinning	1B		
Expanding-gap Group Shelterwood	2A		
Group and Single Tree Selection	2B		
Mixed Intermediate Treatments	3B		

Scarlet Tanager SCTA

Piranga olivacea



ID Tips Slim, bright red bird with jet black wings and tail ("A black-winged red bird").

Song Like a robin with a sore throat; call an abrupt *chick-burr*.

Habitat Interior, hardwood forests with >80% canopy cover – especially those with a significant oak component.

Territory Variable depending on size of forest area, location, and vegetation type. Males defend mating, nesting and foraging areas. Foraging areas are much larger than mating and nesting area.

Nest Flimsy, shallow cup usually placed among a cluster of leaves on a nearly horizontal branch in the canopy well away from the trunk. Prefers hardwood trees, particularly oaks.

Food Mostly insectivorous; eats a wide variety of adult flying and non-flying insects, insect larvae, and spiders.

Silvicultural Considerations

Desired Condition Maintain or create well-stocked, uneven-aged, hardwood sawtimber stands with >80% canopy cover.

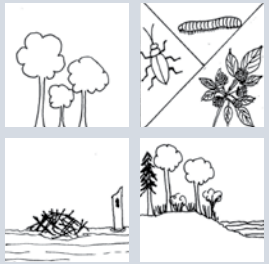
⚠ SCTA are area sensitive. In a heavily forested (70+%) landscape, a patch of at least 40 acres is needed for successful breeding. Larger patches are needed in less forested landscapes.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Favor oaks and maples for crop tree management.	5+ years post-treatment
Mixed Intermediate Treatments	3B		
Variable Retention Thinning	1B	Favor vigorous oaks and maples.	

Veery

VEER

Catharus fuscescens



ID Tips Tawny-brown above, weakly spotted on breast; least spotted of all the thrushes.

Song Flute-like and ethereal; ball spiraling down a tube; call an emphatic *veer!*

Habitat Damp, hardwood forest with intermediate (30-80%) canopy cover and a dense understory (0-5' layer). Often associated with riparian areas, regenerating forests, and beaver wetlands.

Territory 0.25 to 7.5 acres in Connecticut.

Nest Cup of dead leaves, bark, and mud-like leaf mold lined with fine fibers placed on ground or in a low shrub or brush pile.

Food Insects, spiders, centipedes, pill bugs, and fruits. Primarily forages on the ground, but also in the foliage.

Silvicultural Considerations

Desired Condition Maintain or create hardwood stands with 30-80% canopy cover and a dense understory (0-5' layer) proximate to wetlands and/or riparian areas.

- ⚠ Maintain closed-canopy buffers along beaver ponds, wetlands, and riparian areas.
- ⚠ Leave as much slash, stumps, tip-ups, and woody debris on site as possible to provide shelter and nest sites; delimb trees where felled.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Take all opportunities to protect advance regeneration.	3-15 years post-treatment
Group and Single Tree Selection	2B		
Mixed Intermediate Treatments	3B	Encourage coppicing where appropriate to increase understory density.	
Expanding-gap Group Shelterwood	2A	Greatest increase in understory density occurs between seed and removal cuttings.	
Shelterwood with Reserves	3A		

White-throated Sparrow WTSP

Zonotrichia albicollis

ID Tips White throat with yellow in front of eyes; white and black stripes on head; gray chest.

Song Clear whistled, *Poor Sam Peabody Peabody Peabody*.

Habitat Softwood and mixedwood forests containing openings with <50% canopy cover and dense 0-5' layer for cover.

Territory 0.5 - 2.5 acres in Ontario. Males are known to forage in a surrounding area at least three times the size of defended territories.

Nest Open cup placed on or just above ground along the edge of an opening.

Food Primarily insects, greens, and fruits foraged from vegetation (low shrubs and lower branches of conifers) and on ground. Prefers to forage along the edges of openings near dense cover.

Silvicultural Considerations

Desired Condition Maintain or create uneven-aged mixedwood and softwood sawtimber stands containing openings with <50% canopy cover and dense understory (0-5' layer).

- Leave as much slash, stumps, tip-ups, and woody debris along edges of openings as possible to provide cover.
- Maintain closed-canopy buffers along beaver ponds, wetlands, and riparian areas.
- Retain softwood inclusions in hardwood stands.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Expanding-gap Group Shelterwood	2A	Locate groups to release advanced softwood regeneration in hardwood stands.	Dense understory: 3-15 years post-treatment Enhanced softwood component: 5+ years post-treatment
Group and Single Tree Selection	2B		
Clearcut with Patch Retention		WTSP is more likely to use retained patches than harvested openings. Retain at least a 0.5 acre patch for every 10 acres harvested.	
Shelterwood with Reserves	3A	Desired condition exists between seed and removal cuttings, and may persist for a few years in reserves post-removal cuttings.	
Shelterwood		Desired condition exists between seed and removal cuttings.	

Wood Thrush WOTH

Hylocichla mustelina

ID Tips Brown back, heavily spotted on white breast; large thrush a little smaller than an American Robin.

Song A flute-like *ee-oh-layyy*, ending in a sound like shattering glass.

Habitat Interior and edges of hardwood and mixedwood forest. Prefers stands with canopy >50 feet in height, a diversity of hardwood tree species, moderate mid-canopy closure and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter.

Territory 0.2 – 7 acres.

Nest Open cup of leaves and grasses lined with mud, placed on lower limb of a tree or shrub 10-13 feet off the ground and well-hidden among leaves in a shady area.

Food Mostly soil invertebrates; some fruits. Primarily forages on ground in leaf litter or on semi-bare ground under forest canopy.

Silvicultural Considerations

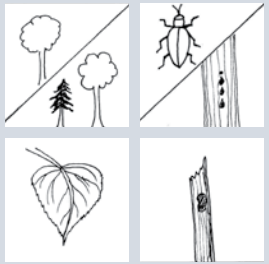
Desired Condition Maintain or create well-stocked, uneven-aged, sawtimber hardwood stands with >80% canopy cover and moist leaf litter.

- WOTH are area sensitive. In a heavily forested (90+%) landscape, a patch of at least 70 acres is needed for successful breeding. Larger patches are needed in less forested landscapes.
- Avoid disturbance and desiccation of leaf litter and soil conditions; consider operating in winter.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Crop Tree Release with Gap Formation	1A	Favor a diversity of hardwood species.	5+ years post-treatment
Mixed Intermediate Treatments	3B		
Variable Retention Thinning	1B	Retain a diversity of vigorous hardwoods.	

Yellow-bellied Sapsucker YBSA

Sphyrapicus varius



ID Tips Messy barring on back; yellowish wash across belly. Vertical white stripe on side distinguishes it from other woodpeckers.

Song Drum burst of 5 rapid taps followed by gradual slowing double taps; call a *QUEEah*.

Habitat Hardwood and mixedwoods with high percentage of intolerant species, especially aspen and birch. Requires hardwood trees with central decay column for nest cavities.

Territory Variable. Average of 5 acres in Ontario.

Nest Cavity in dead or live tree with central decay column. Prefers quaking aspen ≥ 13 inches dbh infected with the heartwood decay fungus *Fomes igniarius var. populinus*.

Food Sap from a diversity of woody plant species, insects, inner bark and cambium layers, fruits, and seeds. Drills and maintains sap wells along trunk below crown and above lowest living branches.

Silvicultural Considerations

Desired Condition Maintain or create hardwood and mixedwood sawtimber stands with 30-80% canopy cover and some dead and dry, or live hardwood trees with central decay for nest sites.

- ⚠ Retain as many live and dying aspen and birch ≥ 13 inches dbh as possible – particularly along forest edges. Leave snags and cavity trees in clusters or in untreated areas.
- ⚠ Recruit dry snags through girdling if suitable snags for nesting are lacking.
- ⚠ Don't cut all large, unmerchantable trees and retain some large, healthy trees that are not hollow or damaged to develop into suitable nest trees in the future.

Silvicultural Options	Silviculture *with Birds in Mind* Reference	Tips and Considerations	Duration of Desired Condition
Clearcut with Patch Retention		Retain existing and potential future nest trees along edges of cut and retained patches.	0+ years post-treatment
Shelterwood with Reserves	3A	Retain existing and potential future nest trees along edges of cut (and reserves).	0-15 years post-treatment
Shelterwood		Desired condition exists between seed and removal cuttings when canopy is 30-80% closed.	
Variable Retention Thinning	1B	Retain existing and potential future nest trees; consider girdling 13+ inch dbh UGS to recruit snags.	0+ years post treatment

Stand-level Habitat Associations

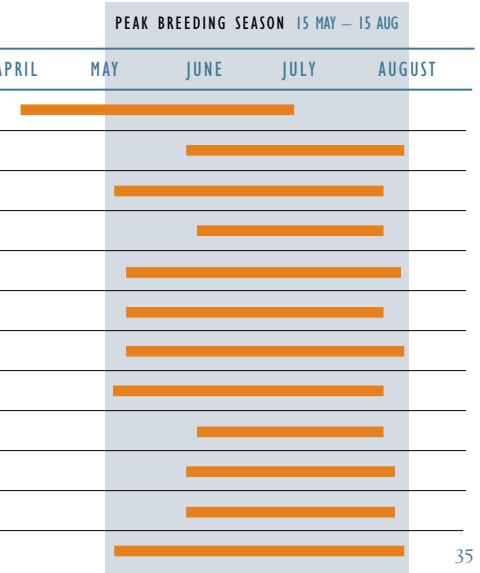
Note that birds may be found in a wider variety of conditions than indicated here.
**Taken from Forest Stand Dynamics (Oliver and Larson 1990).*

STAND		BIRD SPECIES	
Development Stage*	**Structure**	**Deciduous to Mixed Forest**	**Coniferous to Mixed Forest**
Stand establishment	Young forest, 5-15 years following stand-replacing disturbance	American Woodcock Chestnut-sided Warbler	Magnolia Warbler
Stem exclusion	Structurally simple stand with single foliage stratum	Veery American Woodcock	Blue-headed Vireo
Understory reinitiation	Closed-canopy (>80% canopy cover) forest with moderate density of understory trees and shrubs	Black-throated Blue Warbler Eastern Wood-Pewee Wood Thrush Scarlet Tanager	Blue-headed Vireo Black-throated Green Warbler
Late-successional, transition old growth, or old growth	Vertically and horizontally diverse stand with canopy gaps, multiple foliage layers, large trees, snags, and logs. Canopy cover varies spatially within stand; remains >80% in patches	Black-throated Blue Warbler Wood Thrush Scarlet Tanager Eastern Wood-Pewee Yellow-bellied Sapsucker Canada Warbler	Black-throated Green Warbler Blue-headed Vireo Canada Warbler White-throated Sparrow

Table of Vermont Nesting Dates

Note that there are other forest songbird species that begin breeding earlier or end breeding later than those shown here.
Reference: *Vermont Breeding Bird Atlas*

Bird Species	Nesting Dates
American Woodcock	*15 Apr – 15 Jul*
Black-throated Blue Warbler	*1 Jun – 10 Aug*
Black-throated Green Warbler	*25 May – 1 Aug*
Blue-headed Vireo	*5 Jun – 1 Aug*
Canada Warbler	*25 May – 10 Aug*
Chestnut-sided Warbler	*25 May – 1 Aug*
Eastern Wood-Pewee	*25 May – 10 Aug*
Scarlet Tanager	*2o May – 1 Aug*
Veery	*5 Jun – 1 Aug*
White-throated Sparrow	*1 Jun – 5 Aug*
Wood Thrush	*1 Jun – 5 Aug*
Yellow-bellied Sapsucker	*20 May – 10 Aug*



American Woodcock
The American woodcock is Vermont's only forest shorebird.

The flexible tip of the American woodcock's bill is specialized for catching earthworms. The bird probably feels worms as it probes in the ground. A woodcock may rock its body back and forth without moving its head as it slowly walks around, stepping heavily with its front foot. This action may make worms move around in the soil, increasing their detectability.

Black-throated Blue Warbler
Males and females look so different that they were originally thought to be two different species.

Black-throated Green Warbler
The male black-throated green warbler tends to sing his *"zee-zee-zee-zoo-zee"* song near the middle of his territory, largely in the beginning of the breeding season to attract females. He sings the *"zoo-zee-zoo-zoo-zee"* song mostly around the territory's margins to deter other males.

Blue-headed Vireo
The first vireo species to arrive in spring and last to leave in fall.

Only vireo species within its range that extensively uses coniferous forests.

Canada Warbler
Not much is known about the mating system of the Canada warbler, but it appears to be monogamous. The observation of male-female pairs in Panama during fall and spring migration suggests that the pair may stay together year round.

Spends relatively little time on breeding grounds; one of the last warblers to arrive in spring and first to depart after nesting cycle.

Chestnut-sided Warbler
Males sing two different songs. The well-known song, generally described as *Please, please, pleased to meetcha*, belongs to the accented-ending class of songs and is used before the arrival of females and early in the nesting cycle; it is believed to be used to attract females. Unaccented-ending songs, a second class, are used as the nesting cycle progresses and in aggressive encounters against other males.

The two song classes are learned separately. Birds require visual contact with tutor males to fully develop their repertoires.

Eastern Wood-Pewee
Pewees weave their nests out of grass and cover the outside in lichens so that the nest resembles a knot on the tree branch on which it sits. Since the nests are so well-camouflaged and are often up to 60 feet off the ground, little is known about the breeding biology of this species.

Scarlet Tanager
The female scarlet tanager sings a song similar to the male's song, but softer, shorter, and less harsh. She sings in answer to the male's song and while she is gathering nesting material.

Veery
A study of migration using radio telemetry showed that the veery can fly up to 285 km (160 mi) in one night, and that it can fly at altitudes above 2,000 m (1.2 mi).

White-throated Sparrow
The oldest recorded white-throated sparrow was 9 years 8 months old.

Wood Thrush
Thrushes have a complicated syrinx (song box) that allows them to sing two notes at the same time and harmonize with their own voice.

Yellow-bellied Sapsucker
The yellow-bellied sapsucker makes two kinds of holes in trees to harvest sap. Round holes extend deep in the tree and are not enlarged. The sapsucker inserts its bill into the hole to probe for sap. Rectangular holes are shallower, and must be maintained continually for the sap to flow. The sapsucker licks the sap from these holes, and eats the cambium of the tree too. New holes usually are made in a line with old holes, or in a new line above the old.

Caution!

A consideration or tip that is especially important for this species.

Audubon WatchList Bird

A bird species that has been identified by the National Audubon Society and the America Bird Conservancy as being of high global and/or national conservation concern due to rapid population decline as a result of threats including habitat loss and degredation, global warming, and invasive species.

Birder's Dozen WatchList birds include:

Canada Warbler

Wood Thrush

Vermont Species of Greatest Conservation Need

A bird species that has been identified by the Vermont Fish and Wildlife Department as being of particular conservation concern in the state of Vermont due to rarity, population decline, and/or vulnerability to habitat loss from threats such as fragmentation, forest succession, invasive species, and/or conversion.

Birder's Dozen Vermont Species of Greatest Conservation Need include:

Canada Warbler *high priority*

American Woodcock *medium priority*

Veery *medium priority*

Wood Thrush *medium priority*

Chestnut-sided Warbler *medium priority*

Black-throated Blue Warbler *medium priority*

Key to Habitat Feature Icons

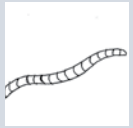
Forest type


hardwood


mixedwood


softwood

Food


earthworms


moths and butterflies


caterpillars

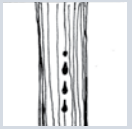

beetles


spiders


flying insects


fruits/soft mast


soil invertebrates


sap and cambium

Associated Woody Species


alder, birch and aspen


quaking aspen


hobblebush


eastern hemlock and red spruce


oak

Other

requires multiple habitat types in proximity to each other

area sensitive; requires large forested patches


forested wetlands


riparian areas


beaver wetlands


uneven forest floor

1+ acre opening in forest matrix


singing perch in opening


perch on edge of opening


opening/edge


thick leaf litter


snag or cavity tree

Northern Forest Breeding Responsibility Birds

Bicknell's Thrush	Northern Parula
Wood Thrush	Blackburnian Warbler
Canada Warbler	Black-throated Green Warbler
Bay-breasted Warbler	Ovenbird
American Woodcock	Yellow-bellied Flycatcher
Olive-sided Flycatcher	Gray Jay
Rusty Blackbird	Palm Warbler
Cape May Warbler	Northern Flicker
Chestnut-sided Warbler	Black-backed Woodpecker
Veery	Tennessee Warbler
Eastern Wood-Pewee	White-throated Sparrow
Purple Finch	Mourning Warbler
Yellow-bellied Sapsucker	Spruce Grouse
American Redstart	Magnolia Warbler
Boreal Chickadee	Alder Flycatcher
Black-throated Blue Warbler	Nashville Warbler
Chimney Swift	Lincoln's Sparrow
Ruffed Grouse	Swamp Sparrow
Blackpoll Warbler	Blue-headed Vireo
Louisiana Waterthrush	Scarlet Tanager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