



A Forest Owner's Guide to
**Forestry for
Michigan Birds**



Introduction

Forestry for Michigan Birds (FMB) is a collaborative approach to help recover forest bird populations while maintaining forest ecosystem health and sustainable land use. This guide offers information on why bird conservation should be part of your goals as a land or forest manager, may facilitate discussions between forest planners and land owners, and demonstrates how modified forest management practices can be used to benefit Michigan's priority bird species.

For additional information, guidance on forest management, or questions about Forestry for Michigan Birds, please contact American Bird Conservancy at michiganbirds@abcbirds.org or by phone at 540-253-5780.

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What is Forestry for Michigan Birds?

Forestry for Michigan Birds is an initiative designed to help you, the landowner, make informed decisions about healthy and sustainable forest management, while keeping in mind habitat needs for important forest bird species.

Throughout this guide, we suggest forest management methods that will benefit priority bird species. The accompanying guide, *A Forest Manager's Guide to Forestry for Michigan Birds*, has additional detail about specific forestry prescriptions.

Forestry for Michigan Birds (FMB) is about managing forests with birds in mind — enhancing, creating, and conserving habitat for birds and other wildlife while also:

- Providing for landowner income
- Keeping forests healthy
- Offering forest management options
- Adapting to climate change
- Planning for future generations

450 — 221
 BIRD SPECIES DOCUMENTED IN MI — CONFIRMED BREEDING IN MI




Great Horned Owl, © Kevin Cass/Shutterstock

WHY IS FORESTRY FOR MICHIGAN BIRDS IMPORTANT?

Since 1970, **North America has lost three billion birds**, or roughly one in four birds, which represents an alarming decline of many of our most cherished species such as the Wood Thrush.¹ While populations of some groups of birds such as waterfowl have increased due to successful conservation efforts, other groups including forest and grassland birds have not. **Forest bird populations as a whole have declined by 1.2 billion birds since 1970.**² That means there are simply fewer individuals of most species remaining in our forests, which also means a tremendous decrease in the natural control of forest pests.

Birds face major threats throughout their annual cycle (during breeding, migration, and wintering locations), from climate change, habitat loss or fragmentation, and invasive species. A diversity of bird species is also beneficial for people: birds are important pollinators, seed dispersers, and scavengers, and are important in controlling insect or rodent pest populations. Related environmental issues such as clean water are also addressed by managing for healthy forest ecosystems. Birds additionally have a high cultural value; birding as a pastime continues to grow, with positive impacts for mental and physical well-being. Birding contributes to local economies: in the U.S., birders spend an estimated \$20 billion per year on travel and equipment, and generate even more economic activity in locales known for bird diversity or with bird festivals.

If we wish to continue to enjoy bird life, song, and beauty, we need to take action. Managing Michigan's 20 million acres of forestland is a critical component to addressing the causes of forest bird declines.

Eastern Forest Birds
 MAJOR DECLINES SINCE 1970

Ironically, there is more forest in the East today than there was 100 years ago, but many forest stands are unhealthy due to fragmentation and invasive species.

170 MILLION
 EASTERN FOREST BIRDS LOST SINCE 1970

POPULATION LOSS

1970
 2017

6 IN 10
 WOOD THRUSHES GONE

WOOD THRUSH
Hylocichla mustelina

EASTERN FOREST BIRDS HAVE SUFFERED A -17% POPULATION LOSS SINCE 1970

Courtesy of the Cornell Lab of Ornithology. Source: Science, 2019

Courtesy of Cornell Lab of Ornithology



MAJOR THREATS TO BIRD POPULATIONS

Habitat loss and degradation remain the biggest threats to forest bird populations. Certain birds are more sensitive to the effects of forest fragmentation, where they are increasingly impacted by predators or competitors near forest edges. Conversion of land for human uses, such as agriculture, development, resource extraction, roads, or utility line corridors contributes to forest habitat fragmentation.

Non-native, invasive plants negatively impact bird populations by providing lower quality and quantity of food both in terms of nutritional quality (i.e., from berries), and by not supporting robust insect populations which are a critical food source for birds during breeding and migration seasons. The fruits of invasive plants like multiflora rose, bush honeysuckle, or buckthorn have lower energy densities and percent fat when compared with the fruits of native viburnum, spicebush, and dogwood species.³ This negatively affects songbirds as they fuel up prior to and during migration. Native butterflies and moths (Lepidoptera) co-evolved with native plants and often specialize on only one or a few species of plants, i.e., “host plants.” The leaves of non-native plants are often inedible to caterpillars, the larvae of native butterfly and moth pollinators.⁴ Additionally, when considering the most important trees for birds and pollinators, certain families of trees, deemed “keystone genera,” support far more caterpillars than do most native or non-native plants.⁵ The top five tree family groups supporting caterpillars across North America include oaks (*Quercus*), willows (*Salix*), cherries (*Prunus*), pines (*Pinus*), and poplar/cottonwood/aspen (*Populus*). These groups, especially oaks, are vitally important to breeding birds, as 96% of terrestrial birds rely on insects to feed their young.⁶ For context, one pair of Carolina Chickadees needs 5,000–9,000 caterpillars to raise one brood of chicks.⁴

96% OF NORTH AMERICAN SONGBIRDS FEED THEIR YOUNG INSECTS



Yellow Warbler feeding chicks. © Ivan Kuzmin/Shutterstock

Climate change impacts forest birds in varying ways. A changing climate affects tree growing conditions and will shift tree species’ ranges over time, thus changing habitat suitability for birds. Some tree species will do well in our area or even see improved growth, while others are expected to decline across the landscape. The timing of bird migration has already shifted in many species, and timing mismatches with food sources (e.g., insect emergence and fruit crops) on their breeding grounds can impact survival and breeding success. Many of our forest birds experience the stressors of climate change and forest fragmentation not only when they are in Michigan but also when they fly south to their wintering ranges. Climate change alters cycles of precipitation, fire, forest health concerns (invasive insects and plants; bacterial, fungal, or viral infections), and increases the frequency and severity of major weather events. These altered cycles impact bird nesting success, migration, and food sources.

Water quality can be compromised by unsustainable forestry practices or by other land uses. Water quality impacts us all: ecological services provided by healthy watersheds include mitigation of floods and extreme precipitation events, clean drinking water, and water availability for human food production. Many insects rely on clean water or wetlands for breeding and habitat for larval life stages. When those insects emerge from water as adults, they are a critical food source for insectivorous birds like the Canada Warbler. Forests managed with sustainable harvest practices that maintain riparian buffers not only protect water quality, but also protect bird food and habitat. Forest management for birds also results in improved water quality and coldwater fish habitat (e.g., for trout), and will help to mitigate the effects of climate change.

There are many additional threats to birds that are not covered in this guide. Read more about other impacts and resources to address these in the appendices.



Red-headed Woodpecker feeding young. © Brent Barnes/Shutterstock



Foote Pond, Huron-Manistee NF. © USFS

In this guide, we seek to empower you, the landowner, to help address the most prominent threats to forest birds including habitat loss and habitat degradation due to poor forest management and invasive plants. Cooperative partnerships between government agencies, conservation organizations, timber industry, and private individuals is needed to maintain and improve habitat in order to recover bird populations across North America. As an individual landowner managing your forest, you can be part of the solution by improving bird habitat on your own land. For example, the population of American Woodcock, a remarkable forest sandpiper, has declined by 1.7 million birds since 1970. Initiatives that provide information and assistance to landowners about managing for young forest habitat (e.g., Golden-winged Warbler and American Woodcock habitat) have proven fruitful.

HOW CAN FORESTRY FOR MICHIGAN BIRDS HELP YOU MANAGE WOODLANDS?

Michigan forests, when functioning as healthy, intact, and resilient ecosystems, can play a critical role in reversing the population declines of forest birds. *Forestry for Michigan Birds* is dedicated to restoring and maintaining forest habitat through awareness and prescriptive management to create or enhance necessary structural elements for forest-dependent species.

Around the turn of the twentieth century, Michigan's forests experienced a period of widespread, unsustainable logging prac-



Broad-winged Hawk. © Greg Lavaty



tices. Once cleared, nearly 50% of the original forested land was converted to other uses; the forests we have today are what grew back, or were planted by the Civilian Conservation Corps, and cover 19.3 million acres. Unsustainable management practices since then, and a lack of management in some cases resulted in forests with a uniform, closed canopy of trees that are nearly all the same age and size. These forests lack the structural complexity and ecological resilience provided by forests with trees of various species, sizes, and ages. The absence of structural diversity negatively impacts the nesting, roosting, and foraging opportunities for birds and other wildlife.

Michigan's forest birds are among the most diverse in the U.S., utilizing multiple features in the forest. Some birds need a dense layer of regenerating tree seedlings that appear after a tree falls and creates a gap in the canopy (e.g., Black-throated Blue Warbler). Other birds require dense conifer saplings in which to hide their nests (e.g., Swainson's Thrush). Others still, like the Canada Warbler, nest on the ground or in the upturned root balls of fallen trees or rotten stumps.

Habitat enhancement, by way of forest management activities that mimic natural disturbances offer a mosaic of tree ages and sizes across the landscape. Natural disturbances like wind events, beaver induced flooding, fire, disease, and insect defoliations occur throughout the forested landscape, creating space for young trees to regenerate. The resulting un-even aged forests are more resilient, structurally diverse forests. The recommendations in this guide strive to mimic natural disturbances using forest management techniques that increase or create beneficial forest habitat elements for our forest birds and other wildlife.

Even if you decide to take a hands-off approach to management in your forest (referred to as "do nothing") the habitat elements are always changing. Limbs break, trees fall, and trees age and die, allowing new trees to regenerate. Given the current condition of our forested landscape, these small-scale changes may not be large enough to positively affect the health of the forest or the necessary habitat elements for breeding birds and other wildlife.

The purpose of this guide is to identify habitat requirements of Michigan's forest birds and other wildlife in a manner that easily translates into common terms and concepts for guiding long-term sustainable forest planning.



Cerulean Warbler. © Ray Hennessy/Shutterstock

WHO DEVELOPED FORESTRY FOR MICHIGAN BIRDS?

Forestry for Michigan Birds (FMB) was conceptualized by groups of bird lovers, professional biologists, and foresters from various agencies and organizations across Michigan. FMB materials are adapted from Vermont Foresters for the Birds Program and Maine's Forestry for Maine Birds Program. FMB is led by the American Bird Conservancy in partnership with key state, federal, academic, non-profit, and forest industry partners including: USDA Forest Service and Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, The Forestland Group, Michigan Technological University, Michigan State University Extension, Michigan Audubon, Ruffed Grouse Society, Michigan Conservation Districts, private loggers, and consulting foresters.



Tree Swallow with nest material. © Hayley Crews/Shutterstock

Michigan Priority Forest Birds

Priority bird species were selected for this guide based on a series of criteria, narrowed down from regional lists of conservation concern, including the Upper Mississippi/Great Lakes Joint Venture focal species list, Partners in Flight (PIF) Regional Priority species list, PIF Watch List species, PIF Common Birds in Steep Decline, PIF Regional Stewardship Species, PIF Regional Concern species, and the Michigan Wildlife Action Plan: Species of Greatest Conservation Need. Species were selected to represent forest habitat associations: upland or wetland, forest cover types, and special considerations such as boreal habitat which is severely threatened by climate change.

KEY TO SPECIES PROFILES:

Glossary of terms: See appendices on page 25 for more detailed definitions.

Down Woody Material: Logs and limbs on the forest floor.

Gaps: Openings in the forest canopy that allow more light to reach the mid- and understory layers.

Hardwoods: Broadleaved deciduous trees.

Leaf Litter: Fallen leaf accumulation on the forest floor.

Snags: Standing dead trees.

Softwoods: Coniferous trees.

Structure: Arrangement of woody vegetation in the forest; may be classified as the following layers:

- **Overstory:** Uppermost layer of forest vegetation including twigs, branches, cavities and trunks in the tallest trees.
- **Midstory:** Intermediate layer of forest vegetation including young trees and shrubs as well as mature shrubs.
- **Understory:** Lower layer of forest vegetation including small shrubs, grasses and herbaceous vegetation.

KEY TO HABITAT FEATURES:

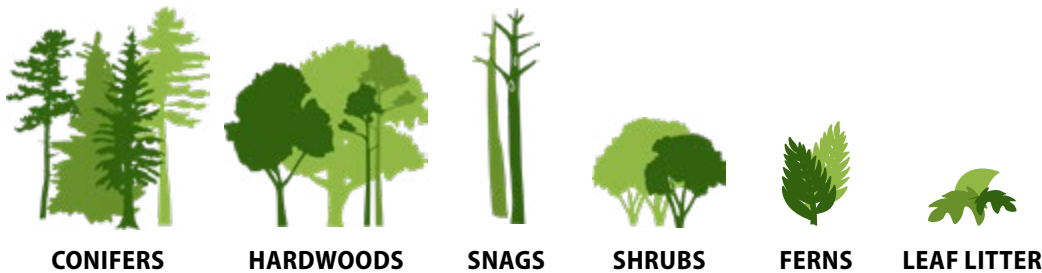
LAYERS: Yellow lines divide overstory (O), midstory (M), and understory (U).



BIRD: Indicates in which layer birds typically sing and forage.

NEST: General nest placement and type.

VEGETATION KEY:

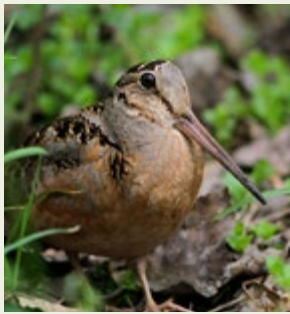


For more information on bird species, visit AllAboutBirds.org.⁷

Habitat illustrations created by Dakota Wagner, Forest Stewards Guild.

American Woodcock (*Scolopax minor*)

© John Turner



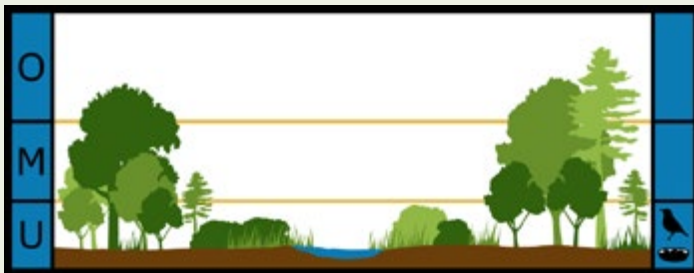
FOREST AGE CLASS: Young to Intermediate Forest

SIZE & SHAPE: Plump, short-legged shorebird with a very long, straight bill. Large head, short neck, and short tail give it a bulbous look.

COLOR PATTERN: Well camouflaged in light brown, black, buff, and gray-brown tones.

CALL: Displaying male gives a repeated, buzzy, nasal *peent* while on the ground between flights. In the air, a displaying male chirps melodically for up to 15 seconds as he zigzags downward from the apex of a display flight.

HABITAT FEATURES: Mosaic of dense young forest, old fields, shrublands, riparian corridors, and wetland-upland transition zones. Nests on the ground.



Broad-winged Hawk (*Buteo platypterus*)

© Paul Witter/Shutterstock



FOREST AGE CLASS: Older Forest

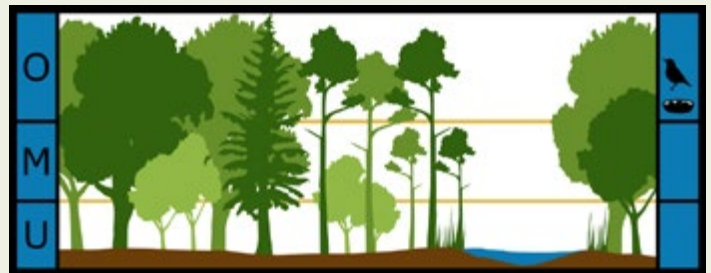
SIZE & SHAPE: Small, compact raptor with a chunky body and large head. Adult has reddish-brown head, barred underparts, and broad black and white bands on the tail.

COLOR PATTERN: Adult has reddish-brown head, barred underparts, and broad black and white bands on the tail. The pale

undersides of the wings are bordered in dark brown.

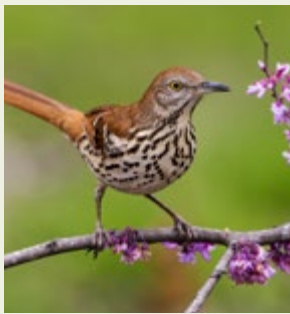
CALL: A plaintive, high-pitched whistle that lasts 2-4 seconds, with a short first note and a long second note: *kee-eee*.

HABITAT FEATURES: Diverse, unbroken forest with small openings or wetlands. Nests are found in the lower third of the canopy in deciduous or coniferous trees, on a main limb intersecting the trunk.



Brown Thrasher (*Toxostoma rufum*)

© Tim Zurovsk/Shutterstock



FOREST AGE CLASS: Young to Intermediate Forest

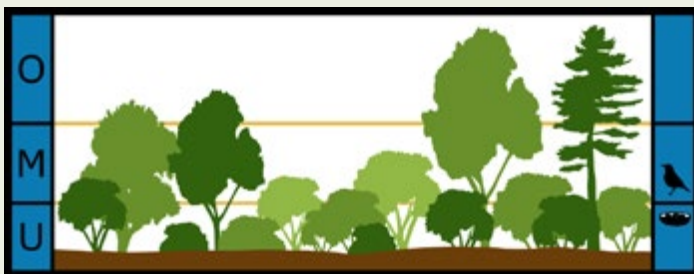
SIZE & SHAPE: Fairly large and slender with long sturdy legs, slightly decurved bill, and bright yellow eyes. Tail is also long and often cocked upward in the manner of wrens.

COLOR PATTERN: Foxy brown plumage with heavy, dark

streaking on whitish underparts.

SONG: Mimics with extremely varied repertoires. Male sings a loud, long series of doubled phrases with no definite beginning or end, described as *Plant a seed, plant a seed, bury it, bury it, cover it up, cover it up, let it grow, let it grow, pull it up, pull it up, eat it, eat it*.

HABITAT FEATURES: Dense young deciduous forest or shrublands. Nests in thickets, low shrubs, or small trees.



Cerulean Warbler (*Setophaga cerulea*)

© Lev Frid/Shutterstock



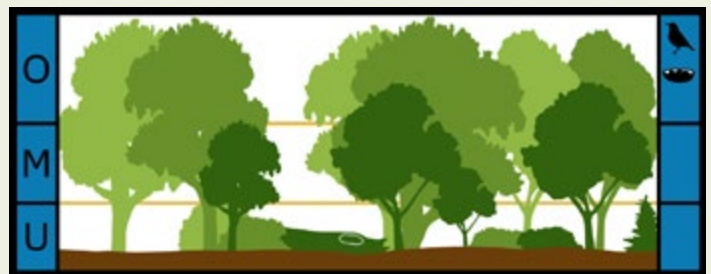
FOREST AGE CLASS: Older Forest

SIZE & SHAPE: A small, compact warbler with a small bill and a short tail.

COLOR PATTERN: Male is sky-blue above with two white wing bars, dark streaking on the back, a thin blue neck band, and blue streaking on the sides of the white belly.

SONG: The male's song starts with 3 buzzy notes, followed by 4 fast warbles, and ends with a higher pitched buzzy trill.

HABITAT FEATURES: Mature white oak and hickory-dominated forests with openings in the canopy and dense understory vegetation. Small cup nests are built in the upperstory, usually near a canopy gap.



Chestnut-sided Warbler (*Setophaga pensylvanica*)

© Michelle Nys/ Shutterstock



FOREST AGE CLASS: Young Forest
SIZE & SHAPE: A slim warbler with a relatively long tail that it often holds cocked upward, giving the tail an even longer appearance.

COLOR PATTERN: Breeding adults are crisp gray-and-white birds with a yellow crown, black face markings, and rich chestnut flanks.

SONG: The song most often heard is a short ditty often described as *Pleased, pleased, pleased to meetcha!* or *I wish to meet Miss Beecher!* This song ends with a decisive accented ending.

HABITAT FEATURES: Young, dense forests or shrubby regeneration after clearcuts or other disturbances. Nests in dense branches of tree saplings or shrubs within six feet of the ground.



Eastern Whip-poor-will (*Antrostomus vociferous*)

© Heather L. Hubbard/ Shutterstock



FOREST AGE CLASS: Young to Intermediate Forest

SIZE & SHAPE: Medium-sized with a large, rounded head and stout chest that tapers to a long tail and wings; has a distinctly front-heavy look.

COLOR PATTERN: Like all nightjars, plumage is a complicated mottling of gray and brown, which camouflages nearly perfectly with leaf litter or tree

bark. Blackish throat is bordered at the bottom by a neat, white bib.
SONG: The male's emphatic, chanted *whip-poor-will*, is sometimes repeated for hours on end.

HABITAT FEATURES: Dry, open woodlands with little understory, preferably near open areas. Eggs are laid directly on the ground, on soil with leaf litter, near a clearing edge.



Golden-winged Warbler (*Vermivora chrysoptera*)

© Agami Photo Agency/ Shutterstock



FOREST AGE CLASS: Young Forest
SIZE & SHAPE: Small songbird with a fairly slim body and short tail. The bill is thin, straight, and sharply pointed.

COLOR PATTERN: Adult male is silvery gray with a strong black-and-white face pattern, yellow crown, and large yellow wing patches. Hybrids with Blue-winged Warbler can

produce a light gray form (Brewster's) or a golden form (Lawrence's).

SONG: Male sings a buzzy, two-parted song: a long high-pitched note followed by 3-6 shorter, lower notes: *bee-bz-bz-bz*.

HABITAT FEATURES: Dense, young deciduous forest or shrubby patches adjacent to mature forest. Key features include "perch trees" and transitional zones between open areas and older forest. Usually builds cup nest on the ground at the base of a shrub or grass clump.



Least Flycatcher (*Empidonax minimus*)

© Owen Deutsch



FOREST AGE CLASS: Older Forest

SIZE & SHAPE: The smallest *Empidonax* flycatcher in the East. Like other flycatchers they tend to perch upright; very difficult to identify except by call.

COLOR PATTERN: Grayish olive head and back, a bold white eye-ring, dusky breast, and two white wing bars.

SONG: Very short and distinctive, dry *chebec* that sounds more like a call. The two notes each last less than a quarter of a second. Song is repeated, sometimes as frequently as 60 *chebecs* per minute.

HABITAT FEATURES: Diverse forest with a well-developed canopy and open understory. Multiple breeding pairs may commonly hold very small territories in one general location; nests are placed 12-25 feet high in a small deciduous tree.



Ovenbird (*Seiurus aurocapilla*)

© Dennis W. Donohue/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: A chunky, larger-than-average warbler, with a round head, fairly thick bill, and a jaunty tail often cocked upward.
COLOR PATTERN: Olive-green above and spotted below, with bold black-and-orange crown stripes. A white eyering gives it a somewhat surprised expression.

SONG: A rapid, resounding *tea-cher, Tea-cher, TEA-cher* growing louder over the first few repetitions, with 8-13 *teacher* phrases in all.

HABITAT FEATURES: Large, contiguous blocks of mature forest with closed canopy, abundant leaf litter, and open understory. Nests are built on the ground as small, rounded "ovens" of leaves and plant fibers.



Red-headed Woodpecker (*Melanerpes erythrocephalus*)

© Foto Request/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: Medium-sized woodpecker with fairly large, rounded head, short, stiff tail, and powerful, spike-like bill.
COLOR PATTERN: Adult has bright red head, white underparts, and black backs with large white patches in the wings; the lower back appears all white when perched.

SONG: Red-headed Woodpeckers give all kinds of chirps, cackles, and other raucous calls. Their most common call is a shrill, hoarse *tchur*, like a Red-bellied Woodpecker's but higher-pitched and less rolling.

HABITAT FEATURES: Open woodland, barrens, or savanna with scattered trees and snags; avoids unfragmented interior forest. Uses dead tree limbs and cavities for nesting, roosting, and foraging.



Wood Thrush (*Hylocichla mustelina*)

© Paul Reeves Photography/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: A pot-bellied body, short tail, straight bill, big head, and upright posture give it the profile of a scaled-down American Robin.
COLOR PATTERN: Warm reddish-brown upperparts, bold black spots on white underparts, and a bold white eyering.

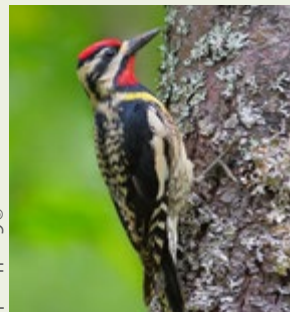
SONG: A flute-like *ee-oh-lay* is the middle phrase of a three-part song. It learns the phrase from other Wood Thrushes and sings several variants with 2-10 loud, clear notes.

HABITAT FEATURES: Moist woods with structural diversity: moderate understory of saplings and shrubs, within a large unfragmented forest. Nests are placed 10-15 feet above the ground on a tree branch or fork.



Yellow-bellied Sapsucker (*Sphyrapicus varius*)

© Greg Homel



FOREST AGE CLASS: Young to Intermediate Forest
SIZE & SHAPE: Fairly small woodpecker with stout, straight bill. Long wings extend about halfway to the tip of the stiff, pointed tail at rest. Crown feathers often help up to form a peak at the back of head.
COLOR PATTERN: Mostly black and white with boldly patterned faces.

Both sexes have red foreheads, and males also have red throats.

CALL: Signature call is a scratchy, nasal mewling that is often repeated. A squealing, repeated call, *quee-ah, quee-ah*, is territorial and often heard in breeding season.

HABITAT FEATURES: Early successional habitat with young, fast-growing trees favored for sapwells and with snags for cavity nests.



Black-throated Blue Warbler (*Setophaga caerulescens*)



© Brian Lasenby/Shutterstock

FOREST AGE CLASS: Older Forest
SIZE & SHAPE: Small, well-proportioned songbird. Compared with other warblers, they are fairly large and plump.

COLOR PATTERN: Males are midnight blue above and white below with black on the throat, face, and sides. Females are plain grayish olive overall. Both sexes have a

characteristic small white patch on the wing, sometimes called a "pocket handkerchief."

SONG: Song is a slow-paced series of 3-7 buzzy notes, with the last note slurred upward: *I-am-so-la-zee*, or *Please, please, please squeeeze*.

HABITAT FEATURES: Unfragmented, interior mature forest with a dense shrub understory. Nests are placed in forked branches of low shrubs, usually below 6 feet in height.



Black-throated Green Warbler (*Setophaga virens*)



© John Turner

FOREST AGE CLASS: Older Forest
SIZE & SHAPE: A medium-sized warbler. Plump and seemingly large-headed, with a shortish tail.

COLOR PATTERN: Olive-green back, white underparts. Adult males have a bright yellow face and extensive black on the throat turning to black streaks on the flanks. Two bright white wing bars.

SONG: Song is a high, cheery-sounding *buzz, zoo zee zo zo zee*, or *zee zee zee zo zee*. Also described as *Trees trees I love trees*.

HABITAT FEATURES: Open stands of mixed hardwoods and softwoods with hemlock or pine preferred for nesting. Nests are usually placed 3-10 feet above the ground in a small tree or sapling.



Canada Warbler (*Cardellina canadensis*)



© Ray Hennessy/Shutterstock

FOREST AGE CLASS: Intermediate Forest

SIZE & SHAPE: Small, well-proportioned songbird with a slightly longer tail and fuller chest than most warblers.

COLOR PATTERN: Steely blue-gray above and bright yellow below with an obvious whitish eyering. Noticeable black necklace

markings across the chest on adult males.

SONG: Song is clear and loud, starting with a chip and followed by a series of warbling notes that often ends on a higher pitch: *I'm-IN-here, but-you-CAN'T-SEE-ME*.

HABITAT FEATURES: Moderately closed canopy forest with dense mid- and understory; moist riparian conditions with plenty of down woody material. Nests are on or near the ground, on mossy hummocks, root masses, or down logs.



Connecticut Warbler (*Oporornis agilis*)



© Dan Behm

FOREST AGE CLASS: Older Forest

SIZE & SHAPE: A plump warbler with short tail, rather long, pink legs, large eyes, and heavy bill. Long undertail feathers almost reach the tip of the rather short tail.

COLOR PATTERN: Gray hood with a bold white eyering, yellow belly, and olive back. Younger birds and females show a fainter hood and

more muted tones than adult males.

SONG: Song is a loud, ringing *chippy-chuppy, chippy-chuppy, chippy-chuppy*, being most emphatic in the middle.

HABITAT FEATURES: Conifer-dominated mixed forest with diverse layers and dense hardwood understory. Nests in dense undergrowth, on or very near the ground.



Northern Goshawk (*Accipiter gentilis*)

© Lukas Gojda/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: A large hawk and the largest and bulkiest of the *Accipiters*, with broad, rounded wings and long tail.

COLOR PATTERN: Adult is dark slate gray above with pale gray barred underparts. Head is dark with a wide white stripe over the eye; the eye is orange to red.

CALL: Rapid-fire *ki-ki-ki-ki* alarm call repeated 10-20 times in response to threats or when chasing prey. This call is sometimes preceded by a drawn-out *kreey-a*.

HABITAT FEATURES: Large, unbroken forest tracts with large trees for nesting, water features, and snags. Down woody debris and young forest stands are important to support prey species. Stick nests are placed in a large tree next to the trunk.



SOFTWOODS

Blackburnian Warbler (*Setophaga fusca*)

© Frode Jacobsen/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: A medium-sized warbler with a trim body and medium-length tail.

COLOR PATTERN: Breeding male is unmistakable with vivid orange on face and throat, and intricate black-and-white plumage. Females also show the unique facial pattern (in gray, rather than black).

SONG: Primary song is a rapid *zip zip zip zip zip zip zip titititi tseeeee*; the final note is much higher pitched, and so high that many people cannot hear it.

HABITAT FEATURES: Boreal coniferous or mixed forests, especially with spruce, hemlock, or white pine. Diverse age classes and intact canopy are preferred. Nests are built high in a coniferous tree in dense foliage.



Kirtland's Warbler (*Setophaga kirtlandii*)

© USFWS



FOREST AGE CLASS: Young Forest
SIZE & SHAPE: A fairly large, plump warbler with a relatively short tail. Constantly pumps its tail.

COLOR PATTERN: Steel-gray with black streaks on the upperparts and lemon yellow underparts. Head is gray with a black mask and white eye crescents (an incomplete eye ring).

SONG: Clear, distinct series of three emphatic couplets: *chip-chip-che-way-o*.

HABITAT FEATURES: Young, expansive, high density jack pine communities on sandy outwash plains. Jack pine trees are typically between 5-15 years old with trees about 5-15 feet tall; dense lower branches help to conceal nest sites. Simple cup nests are placed on the ground, concealed by grasses and low vegetation.



Swainson's Thrush (*Catharus ustulatus*)

© Agami Photo Agency/Shutterstock



FOREST AGE CLASS: Older Forest
SIZE & SHAPE: Medium-sized thrush with a round head and short, straight bill. Fairly long wings and medium-length tail can make the back half of the bird appear long.

COLOR PATTERN: Medium-brown with pale underparts, spotted breast, and large buffy eyerings

that extend in front of the eye, creating "spectacles."

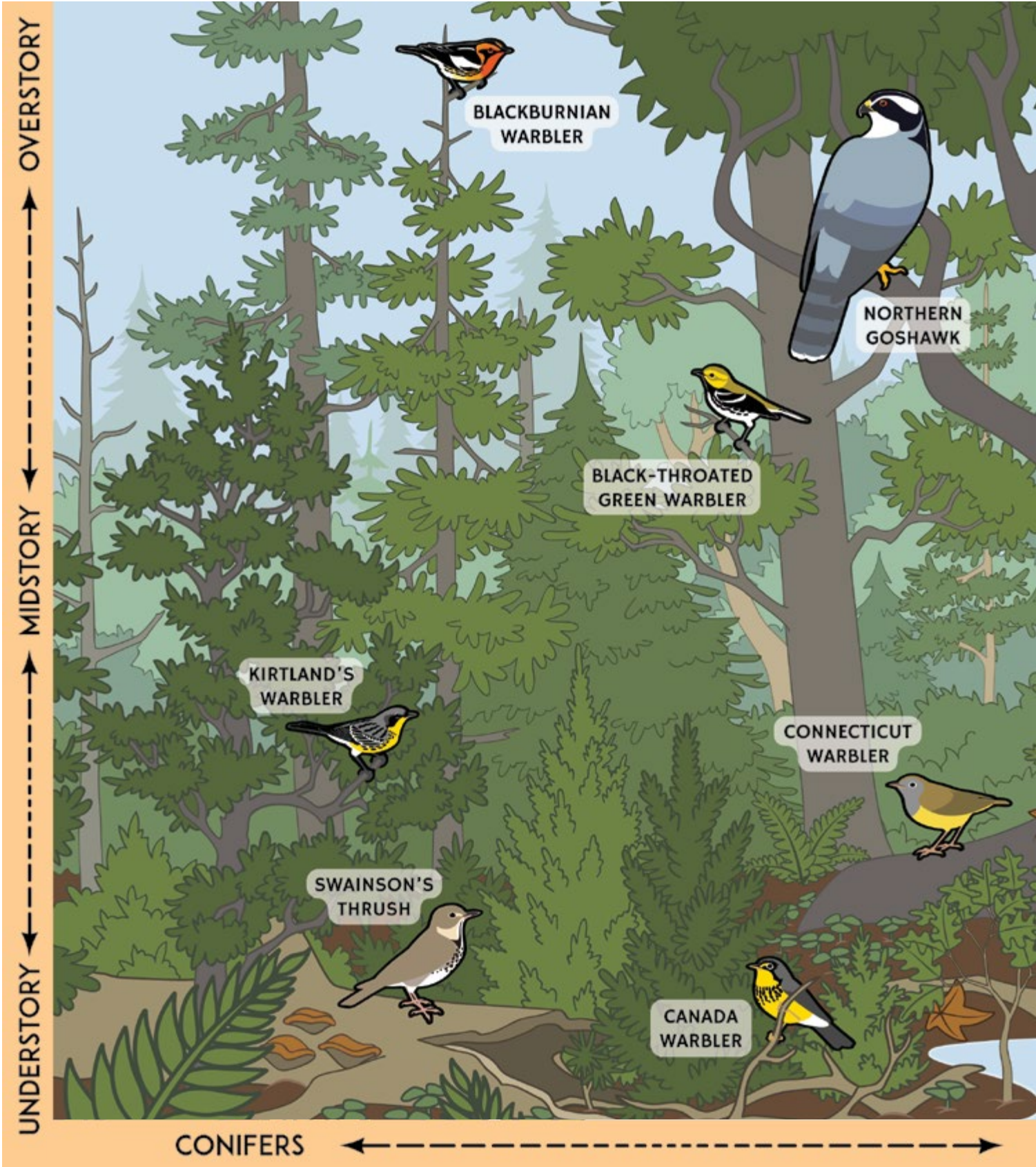
SONG: Best known for its distinctive, fluting song, with an upward-spiraling melody. Its whistling, constantly ascending quality is very recognizable.

HABITAT FEATURES: Coniferous forests with dense understory and native fruit-bearing plants. Nests are placed on a branch below 10 feet in height, in shaded thickets.

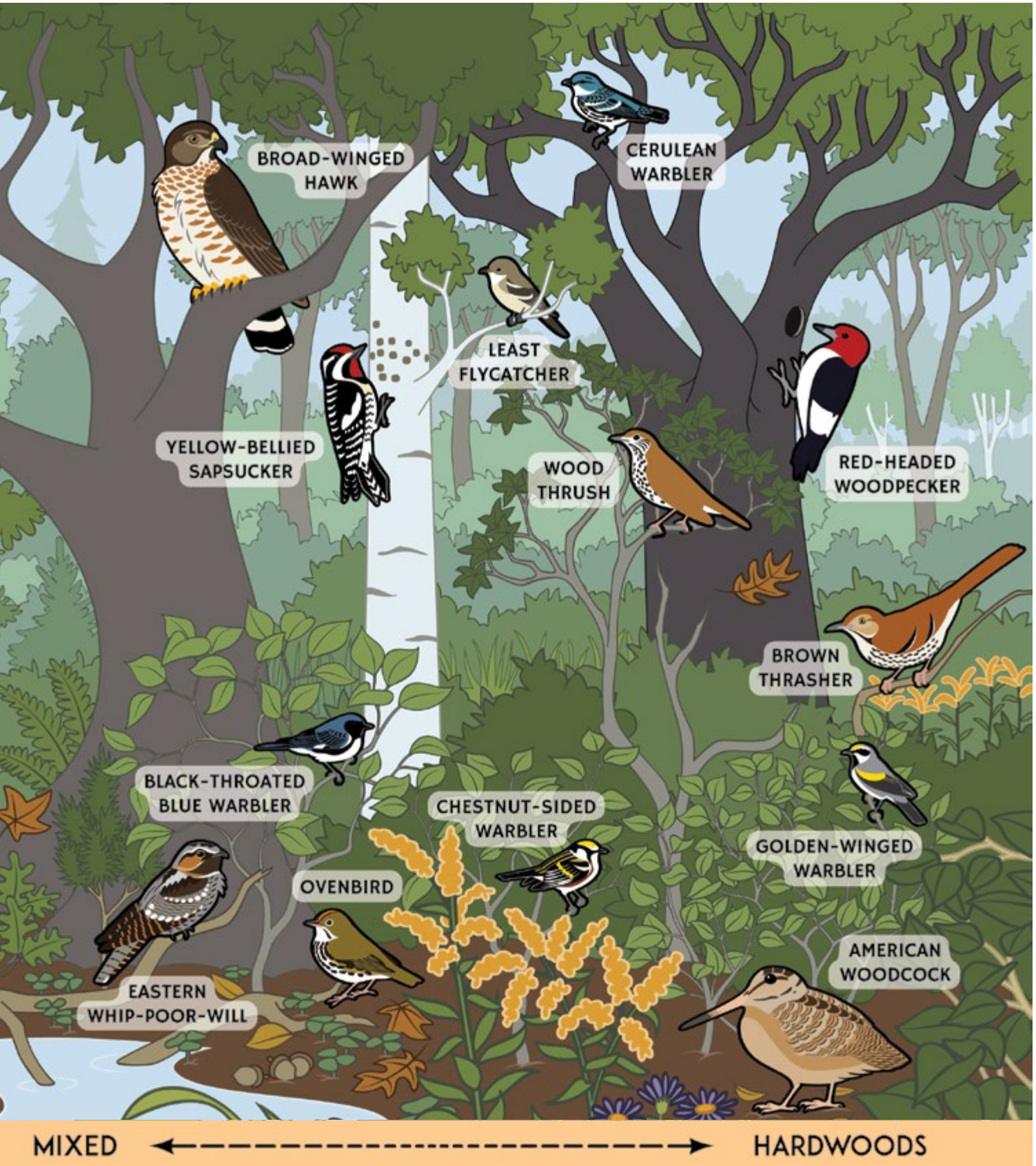


Forest Habitats with Birds in Mind

Each bird species uses slightly different habitat features, even if the same acre (or tree!) within a forest is shared. Resource partitioning, a division of limited resources within the same ecological niche, is a way for wildlife to co-exist. For example, Cerulean Warblers nest in the uppermost third of the forest, whereas Black-throated Blue Warblers nest within six feet of the ground in a well-developed shrub layer. Both warblers are insectivorous but easily co-exist, each foraging at different heights in the forest.



Other species have different requirements – some may need an older forest with little understory growth, such as the Northern Goshawk. Others, like the American Woodcock, need areas with dense, brushy understory as well as wide open areas for their breeding displays. Forest age class is also a factor. Kirtland's Warblers only use jack pine forest when it is young and trees are <30 feet tall. Let's take a look at forest habitat associations and where you can expect to find our priority bird species.



Forest Habitat Associations

Knowing the trees in your forest is a good first step when managing for birds. When choosing where to nest and breed, birds and other wildlife focus on the habitat characteristics of individual tree species (e.g., nut production, conifer cover) and on the broader habitat provided by groups of trees that generally occur together in forest types. Not all forest types fit neatly into categories; the forest habitat associations below are very broad to allow for practical use and interpretation.

HARDWOODS



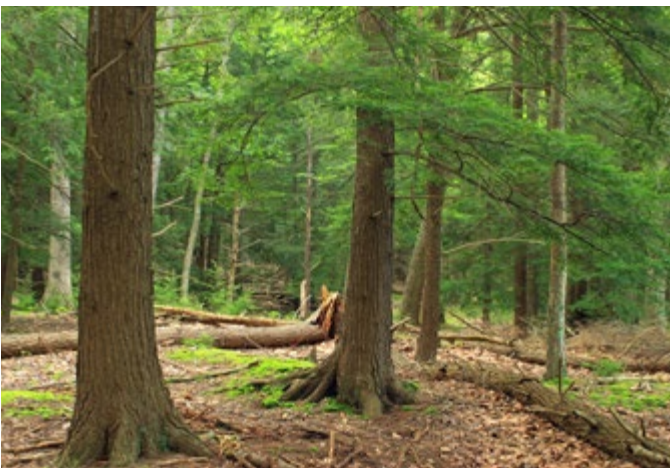
© Josh Shields

COMMON FOREST TYPES: Mixed hardwood, aspen/paper birch and deciduous swamps and floodplain forests.

DECIDUOUS TREES INCLUDE: American beech, balsam poplar, American basswood, black walnut, northern red oak, hickories, red maple, sugar maple, yellow birch and quaking aspen.

BIRD SPECIES: American Woodcock, Black-throated Blue Warbler, Black-throated Green Warbler, Broad-winged Hawk, Brown Thrasher, Canada Warbler, Cerulean Warbler, Chestnut-sided Warbler, Eastern Whip-poor-will, Golden-winged Warbler, Least Flycatcher, Northern Goshawk, Ovenbird, Red-headed Woodpecker, Wood Thrush, Yellow-bellied Sapsucker

SOFTWOOD



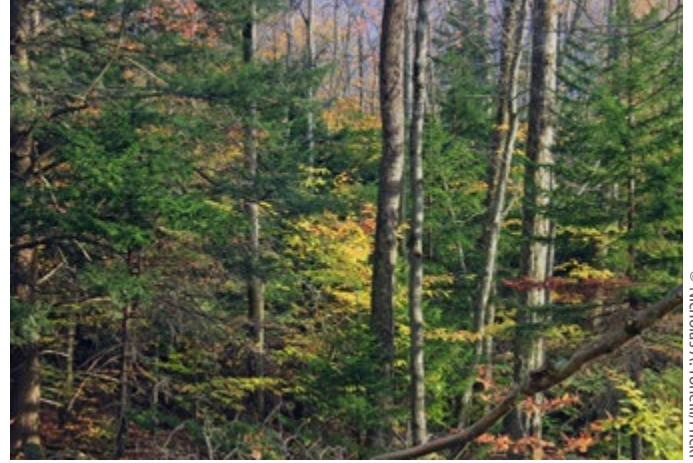
© Nicholas A. Tonelli/Flickr

COMMON FOREST TYPES: Northern cedar swamps/tamarack, spruce-fir, hemlock dominated.

CONIFER SPECIES INCLUDE: Northern white cedar, black spruce, tamarack, and balsam fir.

BIRD SPECIES: Blackburnian Warbler, Swainson's Thrush

MIXEDWOOD



© Nicholas A. Tonelli/Flickr

COMMON FOREST TYPES: Hardwood/conifer uplands and hardwood/conifer swamps.

DECIDUOUS AND CONIFER TREES INCLUDE: Red maple, white and yellow birch, American basswood, Eastern hemlock, Eastern white pine, quaking aspen, and balsam fir; black spruce, and white spruce are common. Also includes areas where hardwood mixes with softwood.

BIRD SPECIES: Black-throated Blue Warbler, Black-throated Green Warbler, Canada Warbler, Northern Goshawk

OAK-PINE



© Julie Crick

COMMON FOREST TYPES: Oak-dominated hardwood, softwood plantations, natural red and white pine and jack pine.

CONIFER AND DECIDUOUS MIX OF SPECIES INCLUDE: Black oak, white oak, red oak, northern pin oak, white pine, red pine, and jack pine. Dominant species vary by latitude and soils.

BIRD SPECIES: Kirtland's Warbler, Connecticut Warbler, Wood Thrush



Wildlife Habitat Elements

Wildlife habitat elements can be created or enhanced over time, providing structure for nesting, roosting, feeding, and increasing the availability of food and water. As you read through this section, follow along with the Habitat Assessment Scorecard, which can be found in the appendices.

VERTICAL STRUCTURE DIVERSITY

Refers to the density and arrangement of vegetation, including twigs, branches, tree trunks, and cavities that occur from the forest floor to the tops of the trees. The structure determines the habitat available for bird nesting, feeding, and roosting. Vertical structure is divided into three groups: overstory, midstory, and understory.

OVERSTORY

Includes the crowns of living trees and snags in the uppermost layer of the forest. Of particular importance are tall mature trees near forest openings that provide hunting perches for Broad-winged Hawk and Northern Goshawk. The density of the overstory affects the amount of sunlight reaching the vegetation growing in layers below.

Assessing the overstory

Identify the species of the tallest trees in your forest. Which tree species are the most common?

To measure percent of canopy cover, look up at the leaves in the uppermost forest layer, or forest canopy, through a circle made with your thumb and fingers. Imagine an 'X' dividing the space into four quadrants. How many quadrants have leaves blocking the sunlight from penetrating the overstory?



Increasing vertical structure through gap creation. © Kayla Knoll

MIDSTORY

Includes a mixture of young trees and mature shrub species that grow below the tallest trees in the forest. The midstory structure can provide beneficial nesting habitat to certain birds, like Least Flycatcher and Wood Thrush. A congested midstory creates challenges for birds that feed on the wing (e.g., Eastern Whip-poor-will). A patchwork of both open and dense midstory vegetation in a forest is ideal for providing habitat structure for the largest variety of species.

Assessing the midstory

Identify the species of trees and shrubs growing under the overstory. Which tree and shrub species are most common? Measure canopy cover as described for the overstory, this time focusing on the leaves growing on the trees and shrubs in the midstory.

UNDERSTORY

Includes seedling- and sapling-sized trees, small shrubs, and non-woody vegetation. Birds like the Brown Thrasher prefer building nests in understory vegetation for the protection it provides. Grasses and herbaceous vegetation in this layer provide nest-building material and may attract insects; vegetation may produce berries or seeds.

Assessing the understory

Identify the species of trees and shrubs growing under the midstory. Which tree and shrub species are most common? Also note herbaceous vegetation that produce insect attracting flowers as well as grasses and vegetation that produce seeds or berries.

Measure canopy cover as described for the overstory, this time focusing on the leaves growing on the small trees and shrubs in the understory. An estimate may be necessary depending on the lower height of the small trees and shrubs.



Low vertical structure. © Kayla Knoll

GAPS

Gaps are areas in the forest canopy where sunlight can easily reach the ground, and are important feeding habitat for birds as well as regeneration opportunities for trees and shrubs. The ideal gap size depends on the forest type, and are typically one quarter to two acres in size. The absence of vegetative structure within the gap allows birds to fly freely to feed on insects on the wing. The increased sunlight stimulates seed production, which means berries for birds and other wildlife. Over time, gaps fill in with trees and shrubs, adding diversity to the forest structure.

Assessing gaps

Are there any gaps in your forest's canopy? How many are at least 1,000 square feet in size? Are any larger? Estimate size.



Canopy gap. © Michael Palling

NATIVE BIODIVERSITY AND INVASIVE PLANT SPECIES

Birds, wildlife, and pollinators in North America co-evolved with and depend on native plants for food and habitat. When non-native, invasive plant species become established in an area, habitat is negatively impacted as the invasive species outcompete and aggressively replace native vegetation. Invasive plants can spread by producing copious amounts of seed, or vegetatively by rhizomes (roots) or stolons (stems running across the surface of the ground). Seeds may be dispersed by the wind, or by birds and other wildlife through droppings or direct transport of seeds temporarily adhering to feathers or fur. This throws a wrench into the survival of birds and other wildlife by replacing evolutionary habitat and food with inferior and sometimes detrimental non-native invasive species. While some birds may find the structure provided by invasive shrubs desirable for nesting,⁸ the fruits produced contain less nutritive value than those of native shrubs.³ Nest predation can negatively impact bird breeding success when birds nest in invasive shrubs.^{8,9} Likewise, pollinating insect populations (including butterflies and moths) are negatively affected by non-native plants.^{4,10} These pollinators are a primary food source for breeding and migrating birds, and declining insect populations means less food for birds.⁶ Furthermore, native pollinators are attracted to the flowers of invasive plants, unwittingly fertilizing them while searching for nectar. Whenever possible, eliminate non-native, invasive vegetation in your landscape, and replace it with native, fruit bearing plants.

Assessing the presence of invasive plants

Identify herbaceous invasive plants and estimate the percent of ground covered for each species. Do the same for invasive shrubs. Are native species being crowded out by invasive species?



Northern Cardinal nest in multi-flora rose. © Linnea Rowse



SWAINSON'S THRUSH depends on fruits of low-growing plants and shrubs in spruce-fir/hemlock forests (e.g., blackberries, raspberries, twinberries, huckleberries), especially during the autumn months as they migrate south.



Swainson's eating berries. © Dee Carpenter/Shutterstock

TREE SIZE AND AGE

A forest with trees of various species, ages, and sizes provides the most structurally diverse wildlife habitat. The occurrence of young saplings, intermediate pole-sized, and large older trees throughout the forest indicates that the forest is actively regenerating and fostering a productive and sustainable habitat. The creation of gaps increases forest diversity, and encourages growth of younger and smaller trees in the openings. Note that deer browse of young trees and invasive earthworm activity may affect successful forest regeneration. Work with a forester to determine deer browse impact and mitigation tactics when developing management strategies.

Assessing tree size and age

Estimate the percent of:

- Older trees larger than 10 inches in diameter.
- Intermediate/pole sized trees five to nine inches in diameter.
- Young small trees less than 5 inches in diameter.

DEAD STANDING TREES AND CAVITY TREES

Standing dead trees (snags) provide structural elements for nesting, roosting, and perching. Snags harbor insects, providing a food source for birds. The Red-headed Woodpecker creates cavity nests in snags that have lost their bark, where the smooth surface of the snag deters predation by snakes. In general, retaining six snags or declining trees per acre is ideal, with at least one snag greater than 18 inches in diameter and another less than 12 inches in diameter. If there are not enough snags on your property, you can create one by girdling a tree.

Assessing standing dead trees

Count the number of standing dead trees over six inches in diameter. Are there any over 12 inches in diameter?



Pileated woodpecker. © Sheila Sund/Flickr

SOFTWOOD INCLUSIONS

Softwoods are conifer trees. Their year-round foliage provides shelter for birds and other wildlife. "Inclusions" refer to the presence of softwoods in areas typically dominated by deciduous trees. The Blackburnian Warbler builds its nest near the tip of softwood limbs, dining on caterpillars and insects in the needles. Needles, twigs, and cones are utilized by other wildlife, as well. In addition to increasing habitat diversity, softwood inclusions make the forest more resilient to climate change and other stressors; they should be retained or created whenever possible.

Assessing the presence of softwood inclusions

Are there clusters (more than three) of softwood trees? In which layer (overstory, midstory or understory)?

DOWN WOODY MATERIAL

Think sticks, branches, and logs on the ground. Woody debris is classified as either large (greater than six inches in diameter and over four feet long) or small (less than six inches in diameter and less than four feet long). While down woody debris may be viewed as messy, it provides important habitat structure for birds and other wildlife. Ground-nesting birds use down wood for nesting, perching, and protection. Insects and other invertebrates found within down branches and logs serve as an important food source. Small mammals conceal their nests under the down wood, and also use it to create silent runways to avoid rustling and alerting predators to their location. As the logs rot, they return nutrients back into the forest soil. Retain or create a mix of both large and small woody debris throughout the forest.

Assessing down woody debris

Is large down woody debris (greater than six inches in diameter and over four feet long) abundant or sparse?

Is small down woody debris (less than six inches in diameter and less than four feet long) abundant or sparse?



Down woody material. © Kayla Knoll

LEAF LITTER AND DUFF

Leaf litter is created as the leaves and needles from trees and expired herbaceous vegetation build up on the forest floor. Duff is created as leaf litter breaks down and becomes part of the soil. Birds that nest on the forest floor, like the Ovenbird, use leaf litter for nest building material, while the duff provides the nest insulation from the ground. Duff is also important for seed germination of many forest tree species and harbors a variety of invertebrate and amphibian food sources for birds. Conversely, too much leaf litter in the oak-hickory forest type can inhibit the growth of understory flora and oak acorns, which prefer to germinate in areas of bare mineral soil. Talk to your forester about the ideal depth

and coverage of leaf litter in your forest to provide forest bird habitat and to meet your forest management goals.

Assessing leaf litter and duff

Under hardwood trees, measure the depth of accumulated dead leaves on the ground. Greater than 1.5 inches is suitable; less than 1.5 inches is unsuitable.



Leaf litter. © Michael Pailing

WATER

Water is critical for birds and other wildlife. Water features and the surrounding vegetation provide beneficial habitat elements favored by certain species. For example, riparian habitat (found along creeks, streams, and rivers) is the preferred habitat of Broad-winged Hawks and other wildlife, like mink, otter, and beaver. Wetland areas with mostly shrubs are favored by American Woodcock. Canada Warbler depends on small gaps over vernal pools, which are seasonal wetlands found in northern hardwood stands. Vernal pools are essential breeding grounds for amphibians and provide feeding and resting sites to birds in migration. Where possible, work to maintain or restore wetland areas on your property.

Assessing water for wildlife

Are there any permanent or seasonal water features? A forester can help point out vegetation associated with wet soil.



Jordan river. © Josh Shields



Habitat Across the Landscape

“LANDSCAPE” DEFINED

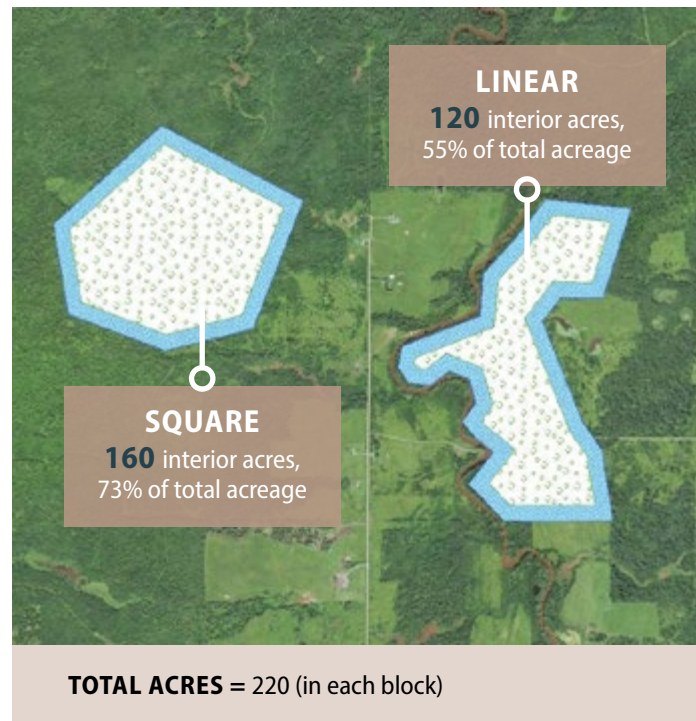
Landscape refers to the greater area in which your property is located. As a forest landowner, you should be generally aware of the landscape features that surround your property and the role they play in providing habitat for forest birds.

Birds and other wildlife traverse the landscape for food, water, protected habitat, and mates. Long, narrow bands of forests provide corridors for travel between larger forest blocks, whereas large forested areas provide for nesting and long-term occupancy. Established territories, or home ranges of birds and other wildlife depend on quality habitat and often cross land ownership boundaries.

To determine the habitat contribution of your forest across the landscape, consider how the land is used within one-half mile in each direction from your property (640 acres). Aerial and/or satellite landscape images may be found using Google Earth or Web Soil Survey. *Is yours the only forest?* If so, your forester can suggest ways to enhance habitat features like fruit producing trees and shrubs, or natural vegetation surrounding water sources. If not, work with a forester to consider the age class and structure of the surrounding forests and take steps to diversify as appropriate.

EDGE VERSUS INTERIOR HABITAT

The size and shape of a forest influences how much of the habitat is considered edge (< 250 feet from the forest edge) and interior (> 250 feet from the forest edge). Picture a forest as a perfect square: a small forest has a higher edge to interior ratio, where a larger forest has a higher interior to edge ratio. Interior habitat is more desirable for forest birds; it offers protection and necessary habitat elements for healthy bird populations, whereas edge habitat leaves forest birds and their young more exposed to weather, disturbance, and predation. Edge effects can be softened with the recruitment or addition of young trees and shrubs outside the forested edge, creating a vegetative structure that gradually thins out, rather than one that abruptly stops. This is called feathering. Talk to your forester about site preparation if you will be planting trees and shrubs to create a feathered edge. Removing trees and shrubs from the existing forest to create a feathered edge negatively affects interior forest habitat.



DISTRIBUTION OF AGE CLASSES

Various age classes across a forested landscape create important habitat elements that provide forest birds with diverse areas for feeding, nesting, and roosting. Age class diversity is created as groups of trees regenerate after natural disturbances or management activities (i.e., planned disturbances) that occur throughout time across the landscape. Groups in early stages of regeneration usually offer dense growth of small trees and shrubs, while older actively managed forests have multiple layers of cover and more established elements, like down woody debris and leaf litter. Work with a forester to determine the age classes across the landscape as well as in your forest, and consider both when developing your forest management plan.



THE WOOD THRUSH diet depends on invertebrates that live under the leaf litter, which is deeper and more developed in the interior of the forest. The Wood Thrush is also negatively impacted by Brown-headed Cowbird nest parasitism, which occurs more frequently in nests built closer to forest edges or in fragmented forests.



Focus on the Habitat in Your Forest

EXPLORE THE MICHIGAN HABITAT MEASUREMENT SCORECARD

Use the Michigan Habitat Measurement Scorecard tool (page 27) to learn more about forest habitat elements and to decipher what's existing and what's missing in your forest. Be sure to measure the habitat elements of your forest from multiple places or points. At each point, record what you observe in each cardinal direction (North, East, South, West). If possible, permanently label each point in your forest so that you can return in each season or at regular intervals to determine what has changed over time. Note any questions that arise, and use them as conversation starters when you meet with your forester. Blank copies of the Michigan habitat measurement scorecard can be found at michiganaudubon.org.

WALK WITH A FORESTER

One of the best ways to learn more about your forested property is to walk it with a service or consulting forester. Service foresters work for a government agency or organization, whereas consulting foresters are privately employed. Both service and consulting foresters help you accomplish the goals you have for your forest.

Find a forester you trust and can work with over time. Resources for locating foresters are provided in the appendices. Interview several foresters for the job, and choose someone who is attentive to your values and defines technical terms so that you fully understand each step of the management process. In addition, you may want to talk to a wildlife biologist or other resource professional who is exceptionally well-studied and experienced with creating good bird habitat.



© USDA NRCS Texas/Flickr

Start with the basics and ask your forester (or resource professional) to identify the species of trees and shrubs on your property. Determine the forest habitat association and discuss how enhancing habitat for birds and other wildlife can be incorporated into your forest management plan. Have your forester keep watch for invasive species. Ask about proper steps for eradication or control of invasives and establishment of native species. Work through the Michigan Habitat Measurement Scorecard together, and discuss options to enhance habitat. Consider surrounding land uses and, if appropriate, work to diversify rather than replicate, habitat elements across the landscape. Remember, even "do nothing" is a management decision, and sometimes a hands-off approach might be best for your particular forest at that time.

SET OBJECTIVES AND MAKE A PLAN (FOREST MANAGEMENT PLAN)

Once you determine the goals for your forested property, work with your forester to create a forest management plan to outline the recommended objectives, or management action items, for the next 20-30 years. Implementing the objectives will create the conditions to facilitate the desired changes over time.

INVOLVE THE FAMILY

Forest management is a life-long endeavor that is passed down through generations. When creating a forest management plan, be sure to involve your entire family to ensure your long-term goals and objectives for the forested property are understood.



Bill and Betty Perkins. © Kayla Knoll

Continue to share your vision by hosting community-wide bird watching hikes, work days, or by showcasing the Michigan Habitat Measurement Scorecard. Together, you can ensure your sustainable stewardship ethic for the land will continue.

WHAT ARE FOREST MANAGEMENT GOALS?

Forest management goals define the owner's purpose for caretaking the property. Some goals can be accomplished immediately, while others require management and time to achieve. A few example goals include:

- Hunting and/or fishing
- Recreational trails and/or camping
- Timber production
- Sap production for maple syrup
- Enjoy nature and support biological diversity

WHAT ARE YOUR GOALS FOR YOUR PROPERTY?

There is no wrong answer. Take some time to think about it, discuss with family, and talk to a forester to begin making your goals a reality.



Appendices

RESOURCES FOR FINDING A FORESTER

Service Foresters

The Michigan Department of Agriculture and Rural Development manages the grant-funded Forestry Assistance Program (FAP) that employs service foresters who work out of participating Conservation District offices. Focused on Michigan's northern, more forested counties, these foresters work with forest landowners to provide advice and technical assistance in outreach to local forestry professionals for hire. The goal of the program is to help forest landowners set and achieve goals for their forested property.

michigan.gov/mifap

The Michigan DNR also employs service foresters strategically placed throughout the state. michigan.gov/dnr/about/contact/forestry

Professional Consulting Foresters

The Association of Consulting Foresters (ACF) is a professional society for consulting foresters throughout the United States. Member foresters pledge to adhere to a code of ethics and meet stringent educational, experience, and professional requirements. Learn more about the organization and use the search tool to find a forester at the ACF website. acf-foresters.org

Michigan DNR Find a Forester website michigan.gov/dnr/0,4570,7-350-79136_79237_80945_81361-298690--00.html

Consulting and Industry Foresters by County (with training in Qualified Forest Program – QFP)
michigan.gov/documents/mdard/Directory_of_Qualified_Foresters_by_County_428232_7.pdf

Foresters registered with Natural Resources Conservation Service (NRCS) as local Technical Service Providers (TSP) may be found here:
<https://nracs-sites.secure.force.com/FindaTSP>

PROFESSIONAL BIOLOGISTS AND RESOURCE PROFESSIONALS

U.S. Fish and Wildlife Service-Partners for Fish and Wildlife Program

Provides free technical assistance regarding wildlife and habitat management and in some cases offers cost share for practices which benefit federal trust resources, including migratory forest-related birds. Free on-site consultations with landowners are available.

fws.gov/midwest/EastLansing

Natural Resources Conservation Service

Your local Natural Resources Conservation Service (NRCS) office provides technical assistance to farmers, ranchers, and forest landowners. Biologists and American Bird Conservancy Foresters at these offices can help you evaluate your forest habitat elements and decide what steps to take next. NRCS staff can work with you to develop a conservation plan, or may refer you to consulting foresters who are certified as Technical Service Providers for planning assistance. If your next steps include seeking financial assistance, development of a forest management plan may be necessary. Find your local NRCS Service Center here: nracs.usda.gov/wps/portal/nracs/mi/contact/local

Conservation Districts

Conservation Districts are local units of government that utilize state, federal and private sector resources to solve today's conservation challenges. In Michigan, the 75 Conservation Districts are the local providers of natural resource management and frequently have the answers to your natural resource questions. macd.org/find-your-district

Cooperative Invasive Species Management Associations

All Michigan counties are covered by Cooperative Invasive Species Management Areas (CISMA). CISMAs are groups of nonprofits, government agencies, businesses and volunteers that have come together to tackle the issue of invasive species in their regions. CISMAs can offer a range of services for preventing, identifying, reporting and managing invasive species. Some CISMAs provide management assistance to private landowners. Contact your local CISMA if you have questions about invasive species or if you are interested in becoming involved in efforts to prevent and control invasive species in your community. michigan.gov/invasives

COST SHARE PROGRAMS AVAILABLE

Forest Stewardship Program (FSP)

The DNR administers the Forest Stewardship Program (FSP), using United States Forest Service funding to pay certified plan writers a portion of the total cost for writing a management plan for landowners.

michigan.gov/dnr/managing-resources/forestry/private/stewardship

USDA Natural Resources Conservation Service (NRCS) Cost Share

In addition to technical assistance, the NRCS's 52 field offices in Michigan offer several financial assistance programs for landowners to help with the cost of forest management plan development as well as with implementation of planned activities. Programs including the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP) can provide funding for forest management plans, forest stand improvement, invasive species control practices, tree and shrub planting, wildfire mitigation practices, and much more. Find your local NRCS Service Center here: nrcs.usda.gov/wps/portal/nrcs/mi/contact/local

TAX INCENTIVE PROGRAMS FOR FOREST LANDOWNERS

Qualified Forest Program (QFP)

Administered through the Michigan Department of Agriculture and Rural Development (MDARD), the Qualified Forest Program requires active management of commercial timber harvest, wildlife habitat enhancement, and improvement of other non-forest resources in exchange for reduced property taxes. While enrolled, the property is not open to public access. The program is voluntary, however, participating landowners who withdraw must repay up to seven years' value of the foregone taxes. For example, if your property was enrolled in the program for four years and you decided to withdraw it, you would repay four years of the saved taxes. If your property was enrolled in the program for 20 years and you decided to withdraw it, you would repay the maximum of seven years of the saved taxes.

michigan.gov/qfp

Commercial Forest (CF)

The Commercial Forest Program is administered through the Michigan DNR and provides a property tax incentive to private landowners to retain and manage forestland for long-term timber production. While enrolled, the forested property is open to public foot access.

The program is voluntary, however, participating landowners who withdraw must repay up to seven years' value of the foregone taxes in addition to a withdrawal administrative fee. For example, if your property was enrolled in the program for four years and you decided to withdraw it, you would repay four years of the saved taxes. If your property was enrolled in the program for 20 years and you decided to withdraw it, you would repay the maximum of seven years of the saved taxes in addition to a withdrawal administrative fee.

michigan.gov/documents/dnr/IC4171_CommercialForestSummary_185969_7.pdf

NATURAL RESOURCE INFORMATION

Web Soil Survey: Know Your Soils

Web Soil Survey can be used to learn more about the soils and associated tree, shrub, and vegetative species on your forested property. It also provides the opportunity to view satellite images of your property in relation to the surrounding landscape:

websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Audubon Native Plants Database

Find the best native plants to support birds in your local area. When you enter your zip code this tool provides information on bird-friendly native plants suited to your geographic area, as well as local resources and information. audubon.org/native-plants

BIRD IDENTIFICATION RESOURCES

All About Birds Online Guide by the Cornell Lab

An online guide to birds and birdwatching. Includes information on: Bird ID Skills; Feeding Birds; FAQs and Common Problems; Bird Friendly Homes and more. allaboutbirds.org

Merlin Smartphone App by Cornell Lab

Answer three simple questions about a bird you are trying to identify and Merlin will come up with a list of possible matches. Merlin offers quick identification help for all levels of bird watchers to learn about the birds across the Americas, Europe, Asia, Africa and Oceania. This app is free to download. merlin.allaboutbirds.org



Sibley Birds V2 Smartphone App

The app based on the *Sibley Guide to Birds* includes all of the content in the printed guide as well as over 2,800 audio recordings, additional text, complete seasonal status data for every species in every state and province, hundreds of searchable criteria, and much more. There is a cost associated with this app. sibleyguides.com/product/sibley-birds-v2-app

Audubon Online Guide to North American Birds

Features a catalog of North American bird species information, songs, climate vulnerability and more. audubon.org/bird-guide

Bird Watcher's Digest

What bird is that? Consult this bird identification guide to ID mystery birds in the backyard and beyond. Photos, song recordings, in-depth entries, and more help bird watchers correctly identify the birds they spot.

birdwatchersdigest.com/bwdsite/learn/identification.php

CLIMATE CHANGE RESOURCES

Climate Change Atlas for both Birds and Trees

Examine distributions of current and modeled future habitat quality for many individual tree species within the eastern United States.

Explore regional species summary tables to see how tree species habitat quality may change. fs.fed.us/nrs/atlas

Audubon Climate Change

Audubon scientists used more than 140 million observations, recorded by birders and scientists, to describe where 604 North American bird species live today—an area known as their “range.” The latest climate models were then used to project how each species’ range will shift as climate change and other human impacts advance across the continent. audubon.org/climate/survivalbydegrees

Forest Climate and Action Scorecards for Private Landowners

The USDA Northern Forests Climate Hub and the Northern Institute of Applied Climate Science (NIACS) have developed brochures to help private landowners consider climate change in the context of their woods. Each contains four separate “Scorecards” to help landowners think about forests at a property-level, focused on topics such as forest diversity, structure, regeneration, and other factors. Each Scorecard also includes a list of Climate-informed Actions that might help landowners address the greatest risks.

climatehubs.usda.gov/hubs/northern-forests/topic/forest-climate-and-action-scorecards

Michigan Climate Change Bulletins

NIACS and Michigan State University Extension worked together to produce “Forest Management in a Changing Climate,” a five-part bulletin series for foresters and natural resource managers in Michigan.

forestadaptation.org/learn/resource-finder/michigan-climate-change-bulletins

Protect Your Land in Perpetuity

A conservation easement is a legal agreement that stays with your land through time. Heart of the Lakes is a statewide association that strengthens the collective efforts of the organizations dedicated to the conservation of Michigan’s environmentally and economically significant land and water. heartofthelakes.org

ADDITIONAL THREATS TO BIRDS

There are many additional human-caused threats to birds, driving overall declines in bird populations across North America.

The primary human-caused threats to birds include:

- Cats outdoors (both feral and pet cats)
- Glass collisions
- Communications tower collisions
- Wind turbines (collisions and habitat fragmentation)
- Vehicle collisions

Other threats that are harder to quantify, yet have direct impacts to birds include:

- **Pesticides**
 - Direct toxicity to birds ingesting coated seeds
 - Indirectly impacts birds by reducing critical bird food supplies (insects)
 - Impact predatory birds who capture and eat a poisoned rodent

- **Heavy metal contaminants**
 - Lead shot or fishing sinkers are toxic to birds consuming fragments of lead in their prey (e.g., Bald Eagles and Common Loons consuming fish, or Turkey Vultures consuming carcasses)
 - Mercury bioaccumulates through the food chain and harms breeding success of birds such as Tree Swallows, which may ingest mercury by eating insects that emerged as adults from wetlands, lakes, ponds, or rivers
- **Impacts of burning fossil fuels and other environmental pollution (e.g., water pollution)**

Resources to better understand these additional threats, and how you can help protect birds:

- Bird-friendly Communities - Ideas to help transform your community into a healthier place for birds and people: michiganaudubon.org/bfc
- Seven Simple Actions to Help Birds: birds.cornell.edu/home/seven-simple-actions-to-help-birds
- Impacts of outdoor cats on birds: abcbirds.org/program/cats-indoors/cats-and-birds
- Safe Passage
 - Safe Passage Great Lakes: michiganaudubon.org/bfc/safe-passage-great-lakes
 - Preventing window collisions
 - American Bird Conservancy's guide to window collision causes and solutions: abcbirds.org/glass-collisions
 - National Audubon Society's Lights Out program: audubon.org/lights-out-program
 - Preventing bird-window collisions in Michigan: michiganaudubon.org/bfc/bird-window-collisions
 - Michigan Dark Skies: sites.lsa.umich.edu/darkskies
- Contaminants
 - Lead in Michigan wildlife: michigan.gov/dnr/0,4570,7-350-79136_79608_85016-26676--,00.html
 - Mercury impacts to loons in Michigan: blog.nwf.org/2011/12/mercury-impacts-to-loons-michigan-lakes-draws-thousands-of-conservationists-anglers

Glossary¹¹

- **Biodiversity:** The variety of life forms and relative complexity of species and ecosystems.
- **Bioaccumulation:** A process of accumulation of chemicals in an organism that takes place if the rate of intake exceeds the rate of excretion.
- **Down woody material:** Logs and limbs on the forest floor.
- **Duff:** The partially decomposed organic material of the forest floor beneath the litter of freshly fallen needles, leaves, and twigs.
- **Feathered edge:** A gradual transition between two habitat types that is accomplished by planting shrubs and grasses of varying heights.
- **Forest age class:** A distinct grouping of trees originating from a single natural event or regeneration activity.
- **Forest habitat association:** Broad grouping of forest types that provide similar habitat features.
- **Forest management:** The practical application of biological, physical, quantitative, managerial, economic, social and policy principles to the regeneration, management, utilization and conservation of forests to meet specified goals and objectives.
- **Gaps:** Openings in the forest canopy that allow light to reach the mid- and understory layers.
- **Habitat fragmentation:** The process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership, negatively affecting the movement and dispersal of animals.
- **Hardwoods:** Broadleaved deciduous trees that lose leaves in autumn.
- **Invasive species:** A non-native species that causes ecological or economic harm.
- **Leaf litter:** The surface layer of the forest floor that is not in an advanced stage of decomposition, usually consisting of freshly fallen leaves, needles, twigs, stems, bark and fruits.
- **Pesticides:** A chemical preparation used to control individual or populations of injurious organisms.
- **Snags:** Standing dead trees.
- **Softwoods:** Coniferous trees with needles.
- **Forest stand:** A contiguous group of trees sufficiently uniform in age-class distribution, composition and structure, and growing on a site of sufficiently uniform quality to be a distinguishable and manageable unit.
- **Forest structure:** Arrangement of woody vegetation in the forest; may be classified as the following layers:
 - **Overstory:** Uppermost layer of forest vegetation including twigs, branches, cavities and trunks in the tallest trees.
 - **Midstory:** Intermediate layer of forest vegetation including young trees and shrubs as well as mature shrubs.
 - **Understory:** Lower layer of forest vegetation including small shrubs, grasses and herbaceous vegetation.



HABITAT WORKSHEET MOCK UP

**Forestry for Michigan Birds
Michigan Habitat Assessment Scorecard**

6/1/2022 Date

1 Plot ID

North East South West Direction Facing
(Circle One)

Gaps	<u>1</u> # at least 1,000 ft ²	<u>0</u> # > 1,000 ft ²	
Snags	<u>3</u> # 6-12 inch diameter	<u>1</u> # > 12 inch diameter	
Tree size/age	<u>30</u> % younger, smaller trees (<5 inch diameter)	<u>50</u> % intermediate, pole sized trees (5-10 inch diameter)	<u>20</u> % older, larger trees (>10 inch diameter)
Large woody debris (6" diameter, 4' long)	Abundant	<u>Sparse</u>	
Small woody debris (< 6" diameter)	<u>Abundant</u>	Sparse	<u>2</u> # of Piles
Leaf litter depth	> 1.5 inches Suitable	<u>< 1.5 inches</u> Unsuitable	
Water	Present <u>Absent</u> Permanent water	<u>Present</u> Absent Seasonal water	

Cover	Common tree, shrub, and herbaceous species	% Cover
Overstory	sugar maple, American beech, yellow birch, black cherry, eastern hemlock	75%
Midstory	sugar maple, balsam fir, white pine	25%
Understory	Sugar maple, American beech, eastern hemlock, balsam fir	25%
Herbaceous Vegetation	grasses and sedge, raspberries, large-leaf aster	25%

Forest Habitat Association Hardwood Mixedwood
(circle one) Softwood Oak - Pine

REFERENCES

1. Rosenberg, K. V., Dokter, A. M., Blancher, P. J., Sauer, J. R., Smith, A. C., Smith, P. A., . . . Marra, P. P. (2019). Decline of the North American Avifauna. *366*(6461), 120-124. doi:10.1126/science.aaw1313
2. North American Bird Conservation Initiative. (2019). *State of the Birds 2019*. stateofthebirds.org/2019
3. Smith, S. B., DeSando, S. A., & Pagano, T. (2013). The Value of Native and Invasive Fruit Bearing Shrubs for Migrating Songbirds. *Northeastern Naturalist*, 20(1), 171-184. doi:10.1656/045.020.0114
4. Tallamy, D. W., & Shriver, W. G. (2021). Are declines in insects and insectivorous birds related? *Ornithological Applications*, 123(1). doi:10.1093/ornithapp/duaa059
5. Narango, D. L., Shropshire, K. J., & Tallamy, D. W. (2020). Few keystone plant genera support the majority of Lepidoptera species. *Nature Communications*, 11, 5751. doi:10.1038/s41467-020-19565-4
6. Tallamy, D. W. (2009). *Bringing nature home: how you can sustain wildlife with native plants*. United States: Timber Press.
7. Cornell Lab of Ornithology. (2021). *All About Birds*. allaboutbirds.org
8. Schmidt, K. A., & Whelan, C. J. (1999). Effects of Exotic Lonicera and Rhamnus on Songbird Nest Predation. *Conservation Biology*, 13, 1502-1506. doi:10.1046/j.1523-1739.1999.99050.x
9. Borgmann, K. L., & Rodewald, A. (2004). Nest Predation in an Urbanizing Landscape: The Role of Exotic Shrubs. *Ecological Applications*, 14(6), 1757-1765. doi:10.1890/03-5129
10. North American Pollinator Protection Campaign. (n.d.). *Wildlife Fact Sheet: Invasive Species*. pollinator.org/pollinator.org/assets/generalFiles/NAPPC-Invasive-Species-Fact-Sheet.pdf
11. Deal, R. (Ed.). (2018). *The Dictionary of Forestry*. The Society of American Foresters.

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