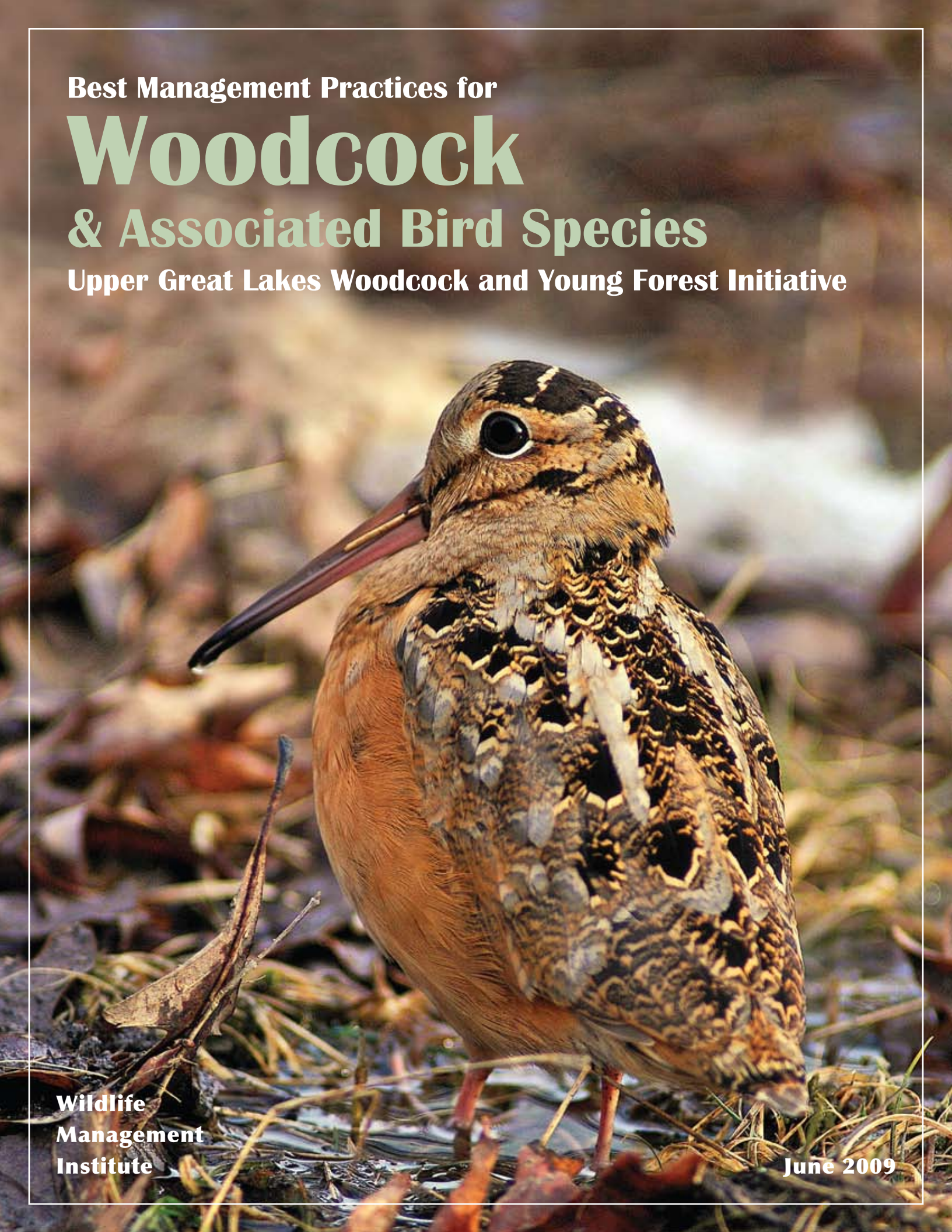
Best Management Practices for

Woodcock

& Associated Bird Species

Upper Great Lakes Woodcock and Young Forest Initiative



Wildlife
Management
Institute

June 2009

Acknowledgments

Information in this publication was developed through the Upper Great Lakes Woodcock and Young Forest Initiative, a collaboration of state, federal, and private wildlife conservation entities dedicated to the restoration of woodcock and other species that need early successional habitat. Contributors include Dr. David Anderson, USGS MN CFWRU; Pat Ruble, WMI; Tom Cooper, USFWS; Bill Bartush, USFS; Al Stewart, MI DNR; Dan Dessecker, RGS; Gary Zimmer, RGS; Scott Hull, WI DNR; John Huff, WI DNR; Andy Paulios, WI DNR; Kim Kreitinger; Noel Cutright, WE Energies; Bob Howe, UW-Green Bay; Ursula Petersen, WI DATCP; Cynthia Osmundson, MN DNR; Earl Johnson, MN DNR; Jodie Provost, MN DNR; Rick Horton, MN DNR; Amber Roth, WMI; Steve Wilds, WMI; Gary Donovan, WMI; Dan McAuley, USGS; and Scot Williamson, WMI. Funding for this project was provided by a U.S. Fish and Wildlife Service Webless Migratory Game Bird Management Grant, the U.S. Geological Survey, the Wildlife Conservation Society, the Doris Duke Charitable Foundation, the National Fish and Wildlife Foundation, the Ruffed Grouse Society, and the Wildlife Management Institute.

Cover photo by Tim Flanigan.

Tim Flanigan

Table of Contents

Introduction 1

Woodcock Habitat Needs 2
Feeding Areas 2
Singing Grounds 3
Nesting and Brood-Rearing Habitats 3

Woodcock Management Units 4

Specific Habitat Management Practices 8
Feeding Areas 8
Roosting Fields 12
Singing Grounds 15
Nesting and Brood-Rearing Habitat 16
Prescribed Burning 16
Commercial Forest Management 17

Online Resources 18
Wetlands and Soils Mapping Tools 18

Species of Greatest Conservation Need 19

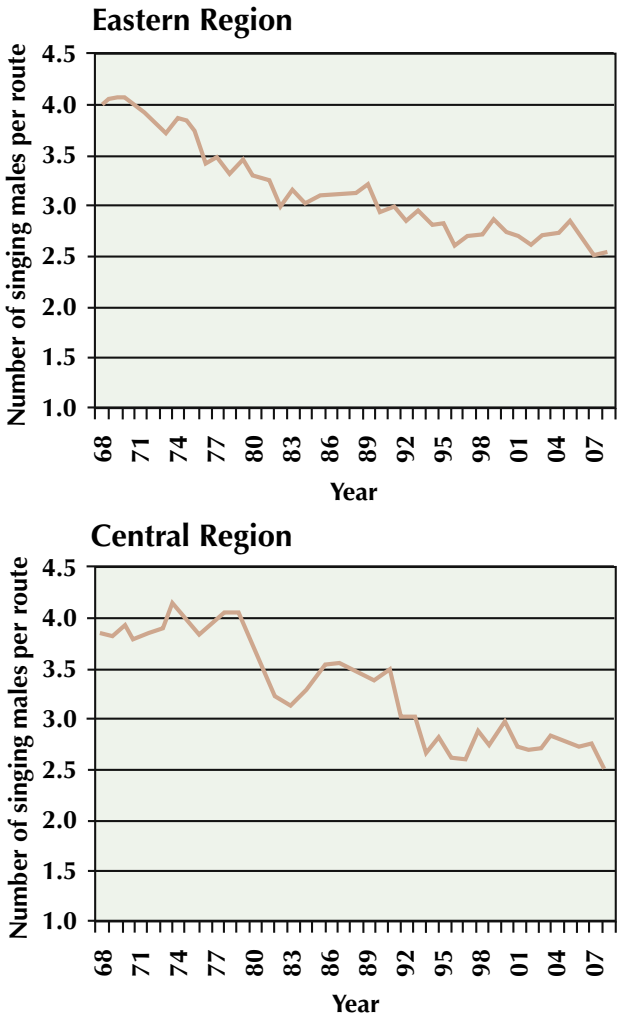
Woodcock Management in Context with Other Wildlife and Cultural Values 20

Charles Fergus

Introduction

American Woodcock/Eric Dresser

Figure 1: Long-term trends of the number of woodcock heard on the annual Singing Ground Survey, 1968-2008 (Cooper et al. 2008)



The spiraling spring courtship flights, forest-dwelling habits, and striking appearance of the American woodcock make it one of the most readily recognizable shorebirds in the eastern United States. This migratory bird has a stocky body, camouflage feather coloration, and a long prehensile bill with which it probes in moist soils for earthworms, its main food.

Unfortunately, woodcock populations have been gradually falling over the past 40 years. The dwindling of woodcock numbers stems from the loss of their preferred habitat to development; a lack of management of their remaining habitat; and an absence of natural events, such as wildfires, to create new habitat.

The Upper Great Lakes Woodcock and Young Forest Initiative has developed and begun implementing land-management practices that best create the kind of habitat that woodcock – along with many other wild creatures that live in or use young forest – need to survive and thrive. The Best Management Practices outlined in this publication pertain to the Great Lakes Region of northern Michigan, Wisconsin, and Minnesota and adjacent parts of Canada. The publication summarizes work now underway to develop a regional network of demonstration areas, and to monitor the response of the woodcock population to creating and improving woodcock habitat. Many of the habitat-improvement practices also apply elsewhere in the woodcock's range.

By using the following guidelines, YOU can help woodcock and other young-forest wildlife species thrive on your property.

Woodcock Habitat Needs

Woodcock need forested habitats – specifically, young or "early successional" forests. As forests mature, their value to woodcock declines. In the Upper Great Lakes region, most regenerating forested habitats are suitable for woodcock only during the first 20 years following cutting. Therefore, in landscapes to be managed for woodcock, young forests must be continually regenerated to keep them producing woodcock. Woodcock require several distinct habitat components within their territories: feeding areas, roosting fields, singing grounds, and nesting and brood-rearing habitat.

Woodcock need diverse habitats./Scot J. Williamson

Feeding Areas have rich, moist soils that support abundant soft-bodied invertebrates, especially earthworms, a favorite food of woodcock. These areas are stocked with young regrowing trees whose high woody stem densities protect the birds from predators.

Woodcock feed among young, densely regrowing trees./Scot J. Williamson

Abandoned farmland provides good feeding habitat for woodcock./Scot J. Williamson

Singing Grounds (courtship areas) and **roosting fields** are relatively open habitat components with sparse cover, lying close to feeding and nesting areas.

Woodcock singing ground./Scot J. Williamson

Woodcock can roost in blueberry barrens./Scot J. Williamson

Nesting and Brood-Rearing Habitats are often brushy and dense, or they may have some small pole-sized trees rising above a dense shrub layer. In general, nesting cover is somewhat drier than typical daytime feeding areas, but the two are often one and the same.

The American woodcock is not the only species that requires these kinds of habitat. Many birds found throughout the Upper Great

Small pole-sized stands with dense understory may be used for nesting./Tim Flanigan

Lakes region also need young forest, including the golden-winged warbler, ruffed grouse, black-billed cuckoo, and white-throated sparrow. Like the woodcock, many of these species are declining across their range from lack of suitable habitat; 38 are considered Species of Greatest Conservation Need in Minnesota, Wisconsin, and/or Michigan (see Table 1, page 19). Recent research also indicates that some birds of the mature-forest interior (for example, the ovenbird) use young forest during the spring and summer breeding season. And other wildlife, such as moose, elk, white-tailed deer, and snowshoe hare, can benefit from the ongoing management of young forest, wetland shrub, and old-field habitats.

Providing a mix of different-aged habitat conditions will benefit not only woodcock but a whole suite of wildlife species. Remember, each management practice will not benefit all species equally, and some practices may produce conflicting outcomes: what helps one species may harm another, even among species associated with young forests. Each property owner will need to decide which species are the highest priority on their land and which management practices will be most beneficial.

Many songbirds, including the golden-winged warbler, are more abundant in young, brushy forest than in older woods. /Laurie Johnson

Woodcock Management Units

Charles Fergus

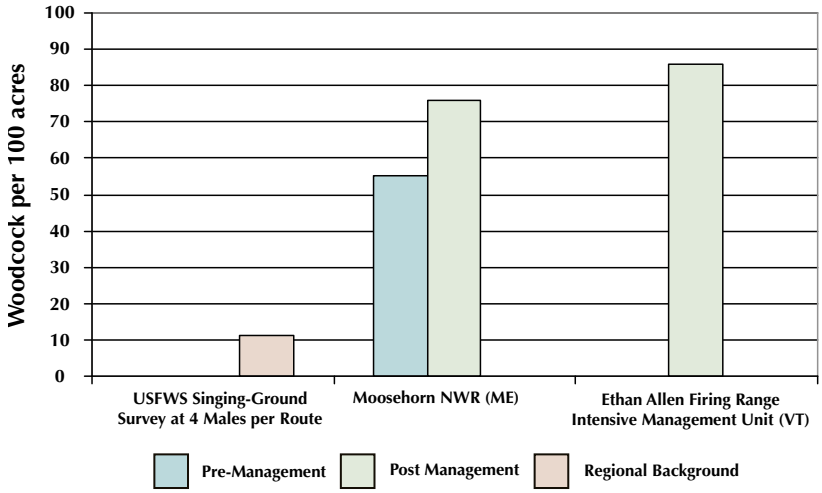
Woodcock need several different types of habitat. We can manage relatively small acreages for woodcock by creating all of those required habitat components - or if they occur on neighboring tracts of land.

The American Woodcock Conservation Plan recommends, where possible, a landscape-level approach using management units of 500 to 1,000 acres; tracts of this size should support an autumn population of approximately 500 woodcock. On tracts smaller than 500 acres, woodcock populations will probably not be self-sustaining without consideration of the surrounding landscape. Thus, smaller tracts should be managed to expand the size and enhance the quality of habitat existing on surrounding lands.

Figure 2, page 5 compares woodcock densities from the Moosehorn National Wildlife Refuge (Maine) before and after woodcock habitat management; the Ethan Allen Firing Range (Vermont) following intensive habitat management; and the national Singing-Ground Survey (Upper Great Lakes region, northeast U.S., and southern Canada) representing the estimated population density across most of the woodcock's breeding grounds. The table shows how intensive habitat management can dramatically increase local woodcock populations.

Within a woodcock management unit, the following habitat configuration should result in the highest densities and productivity:

Figure 2: Theoretical woodcock densities at different management intensities.



- Locate the unit so that its center or core is an alder swale or other forested wetland, especially in areas where wetlands and other moist-soil habitats are not abundant. In landscapes with abundant moist-soil habitats, it may not be necessary to center the management unit on a wetland. (See Online Resources for wetlands and soils information.)

Five years after strip cutting, alder stem density is again high enough to provide excellent feeding cover./Scot J. Williamson

- Dedicate more than 80 percent of the management unit to **feeding areas** and **nesting and brood-rearing habitat.** If the management unit is centered on a core wetland, manage the wetland and surrounding vegetation to yield dense sapling growth. Because soils in these areas are most likely to stay moist even during drought conditions, the core wetland or other moist-soil areas in the management unit will be the most reliable habitats to support woodcock populations through time. Create other feeding areas in adjacent upland habitats using even-aged forest cuttings of ≥5 acres. These cuts will stimulate the sprouting of shade-intolerant tree species such as aspen. In preferred forest types managed for commercial timber harvest (see Feeding Areas section), manage for a mosaic of feeding areas so that 25 percent of the unit is in each of the following four age classes: 0-10, 11-20, 21-30, and 31-40 years post-harvest.

Aspen stands respond vigorously to cutting./Charles Fergus

Woodcock chicks./Eric Dresser

Harvest stands in 5-acre or larger blocks on a 40-year rotation, with a 10-year entry period, and 25 percent in the oldest age class being harvested in that 10-year period. In some forest types, especially those with

Tim Flanigan

nutrient-poor soil, the rotation may need to be lengthened and/or age class distribution may need to be changed to yield commercially valuable forest products. On wetter and/or richer soils, the rotation period may be shortened.

- When feeding areas have been created, **roosting field** and **singing ground** habitats need to be considered. These should not cover more than 20 percent of the management unit. They can be provided by natural openings or log landings, or they may already exist adjacent to the woodcock management area in the form of grazed pasture, hayfields, or open bogs. For each 500- to 1,000-acre management unit, plan for:

1. One **roosting field** per 100 acres. Roosting fields should be at least 5 acres in size. (Refer to the Roosting Field section for more details.)

Woodcock fly to open fields or new clearcuts at dusk from late July until migration. Roosting fields provide protection from predators./Scot J. Williamson

Forest openings are frequently used as woodcock singing grounds./Scot J. Williamson

2. Eight **singing grounds** per 100 acres. Singing grounds should be at least 0.5 acres in size. (Refer to the Singing Ground section for more details.)

- Avoid timber harvesting, brush clearing, herbicide application, and other intensive management activities during times when wildlife are breeding. Woodcock begin nesting as early as late March in southern areas of the Initiative and early April in northern areas. For other conservation-priority birds, mid-May to early August is the peak nesting period.

- Before logging, determine if invasive exotic shrubs and trees are on the site. Cutting alder, aspen, or brush, especially if the soil is disturbed, may lead to the invasion and spread of unwanted woody plants such as buckthorn. Clean equipment after use to avoid spreading invasive exotic plants (via seeds and plant parts) to other sites.

As forested habitats mature, their value to woodcock will decrease. In the Upper Great Lakes region, most woodcock use of regenerating forested habitats is limited to approximately the first 20 years following cutting. In landscapes managed for woodcock and other birds that use early successional habitats, young-forest habitats need to be regenerated periodically as they age. Try to provide a mix of different-aged habitats on the landscape by using a variety of management tools that introduce disturbance into forested areas, such as commercial timber harvesting, noncommercial shearing, mowing, controlled burning, and herbicide application.

As forested habitats mature, their value to woodcock will decrease. In the Upper Great Lakes region, most woodcock use of regenerating forested habitats is limited to approximately the first 20 years following cutting.

Avoid conducting management activities when woodcock and other wildlife are breeding./Charles Fergus

Specific Habitat Management Practices

Feeding Areas

Aspen Management

Landowners can make money from forest management while improving woodcock habitat, and agencies may be able to offset management costs through timber sales. Aspen is a commercially important tree that grows on a wide variety of soil types, including rich, moist soils that support woodcock. Aspen responds to cutting by sending up a dense network of saplings that sprout from underground roots; this dense stem growth makes aspen an excellent sylvan species to manage for woodcock. Even if aspen is scarce in a forest stand, it can become dominant if managed correctly: stands with as little as 30 square feet of basal area of aspen per acre can be suitable for aspen management.

- For old or decadent aspen stands, cut a greater percentage of the aspen during the first two harvest cycles to encourage root sprouting.

- For stands with existing aspen, create cuts ≥5 acres to include existing aspen trees, so that seedlings will sprout in the newly created openings. Orient small cutting blocks (1 to 5 acres) on a north-south axis to allow adequate sunlight for maximum sprouting.

- Cut after leaf-fall in autumn, or in the winter, when aspen stands store their energy in their root systems, to ensure maximum sprouting during the following growing

The aspen in this stand are approaching maturity./Charles Fergus

Aspen responds to cutting by sending up a dense network of saplings that sprout from underground roots; this dense stem growth makes aspen an excellent sylvan species to manage for woodcock. Even if aspen is scarce in a forest stand, it can become dominant if managed correctly: stands with as little as 30 square feet of basal area of aspen per acre can be suitable for aspen management.

Aspen patch./Charles Fergus

Aspen regrows densely./Charles Fergus

season. Whenever possible, operate on frozen ground to minimize disturbance to moist soils and wetlands.

- Consider using forest-harvest guidelines specific to the landscape where woodcock management units are to be created. (See state Department of Natural Resources silvicultural and woody biomass harvesting guidelines listed in the Online Resources section for details.)

- For aspen sites managed primarily for woodcock, and where commercial harvesting isn't a priority, consider using non-commercial harvesting or controlled burning techniques, especially in places where fire has historically occurred in the past.

Helping Other Species

- Keep some snags and old hollow trees in regeneration cuts to help out cavity-nesting species such as woodpeckers and chickadees.

- Leaving live, mature conifers during clearcutting will favor species attracted to mixed deciduous-coniferous forests, such as black-throated green warbler, Blackburnian warbler, and least flycatcher. Retaining live, mature hardwoods will benefit golden-winged warblers and canopy-nesting birds such as the eastern wood-pewee and Baltimore oriole. Avoid keeping high densities of canopy trees, which can create substantial shade that will hold the regeneration of aspen below the stem densities needed for good woodcock habitat.

- Save some downed logs and coarse woody debris in logged areas to benefit birds that nest near or on the ground, such as mourning warbler, chestnut-sided warbler, white-throated sparrow, and ruffed grouse. (Male grouse also use downed logs as drumming platforms.) However, too much ground debris will be a detriment to woodcock brood-rearing.

- If management is near open landscapes that support sharp-tailed grouse populations, large clearcuts done on the minimum rotation length can enhance habitat for this area-sensitive species. Large clearcuts also benefit other species that avoid the clearcut edges, such as blue-winged warbler, golden-winged warbler, prairie warbler, yellow-breasted chat, and field sparrow.

Ruffed grouse nest on the ground./Charles Fergus

Alder Management

Alder is an important forest type for woodcock. Young alder stands with high stem densities and sparse understories provide feeding areas for woodcock while protecting the birds from predators. Alder sprouts vigorously from the stump when cut, and will also grow naturally from seed. Alder is a nitrogen-fixing plant, and thus soils in alder stands tend to be very rich, with abundant invertebrates and earthworms. Not all alder stands are suitable for woodcock: those with standing water or heavy sedge growth are likely too wet for woodcock.

When alder stands grow old, their stem density decreases substantially and the understory becomes overgrown with grasses and other ground cover: woodcock cannot feed freely in old alder stands. An alder stand is usually too old to provide high-quality woodcock habitat when the shrubs' limbs grow horizontally instead of vertically. Alder stands showing a lot of horizontal growth should be cut back and allowed to regenerate.

Generally there is no commercial use for alder, although increased interest in using biomass to produce energy may make harvesting alder commercially viable in the future.

- Manage alder by mowing or shearing strips that are 50 to 100 feet wide through the alder stand. Strips should be positioned so that every 5 years an adjacent strip can be cut, and by doing so, all alder strips will be cut once every 20 years. Strips should be oriented perpendicular to streams or other water sources in order to provide a soil-moisture gradient, which will let woodcock find food throughout wet and dry weather cycles. If necessary, alder can be cut in blocks instead of strips.

- The percentage of an alder area to be cut can be increased in overmature stands, which show more horizontal than vertical stem growth.

- Alder is often found growing in wet swales and along the edges of small wetlands within aspen stands. Commercial aspen harvesting specifications can instruct logging operators to regenerate these alder areas by dragging felled trees through them or by using a skidder blade to clip the alders off when the ground is frozen.

- Alder harvest techniques should be implemented with minimal disturbance to the shrubs' root systems. Do not pull the whole alder plant out of the ground.

When mature alder begins to grow horizontal, the stand has outlived its maximum benefit to woodcock./Scot J. Williamson

Strip cutting in alder is the preferred method of regeneration to regain the stem density preferred by woodcock./Scot J. Williamson

Alder sprouts from cut stumps. /Scot J. Williamson

Alder strips may be regenerated by manual cutting./Scot J. Williamson

In some situations, mechanical cutting of alder can be an efficient and economical practice. A brontosaurus has a specially adapted cutting head./Scot J. Williamson

Alder provides important feeding cover, especially during drought./Scot J. Williamson

- On wet sites, conduct alder management in the winter when water and ground are frozen to minimize impact to sensitive wetland soils and to reduce the possibility of introducing exotic invasive plants.

Helping Other Species

- Extensive cutting may discourage the use of alder stands by some species such as golden-winged warbler. Using a strip-cutting rotation can help maintain sufficient habitat to benefit this high-conservation-priority bird species.

- Retain tamarack or scattered trees when present.

Dense young-forest habitats should be created and maintained in riparian management zones (RMZs) along rivers and other watercourses, provided the management can be conducted without harming water quality.

Riparian areas provide a consistent source of earthworms. /Scot J. Williamson

Riparian Zone Habitat Management

Dense young-forest habitats should be created and maintained in riparian management zones (RMZs) along rivers and other watercourses, provided the management can be conducted without harming water quality. This can be particularly important along north-south oriented RMZs, which may represent key migration-stopover feeding sites.

Aspen, like alder, frequently grows with "wet feet": logging aspen on frozen ground will protect non-open-water wetlands and floodplain forests. Leaving filter strips of vegetation will minimize erosion and help protect water quality.

Beaver pond in Minnesota./Charles Fergus

Managing aspen near wetlands can encourage beaver colonization. Timber flooded by beaver activities and openings created by summer beaver cuttings can provide excellent woodcock habitat. However, beaver activity

may not be desirable in all situations or to achieve certain management objectives (for example, maintaining free-flowing high-quality trout streams).

Regenerating alder in RMZs can be one of the best ways to improve woodcock feeding habitat. (See Alder Management section for details.)

Roosting Fields

In forested landscapes with few open areas, woodcock may use vegetated habitats for nighttime roosting, although the birds prefer open areas if they are available. If there are no open areas near dense daytime feeding areas, woodcock may stay in their daytime habitats overnight. Mammalian predation may be higher at night in those places, as overhead cover may make it hard for woodcock to escape land predators such as weasels. Or woodcock may make long flights to roosting fields, exposing themselves to aerial predators. Research conducted in Connecticut suggests that not having all habitat components close to each other increases woodcock mortality.

In heavily forested areas with active forest management, newly created cuttings can serve as singing grounds for several years, and as roosting fields for at least one year, after the time of cutting. Because cuttings can serve as roosting fields, it may not be necessary to provide roosting habitat in areas with active forest management using even-aged management techniques, especially when a 2- to 4-year entry for harvest of small sites is practiced.

In heavily forested areas without frequent active management, or where management is not even-aged, roosting fields should be created and maintained as part of normal

Newly established forest plantations can serve as woodcock roosting fields in heavily forested landscapes./Scot J. Williamson

Hayfields can to be managed through strip cutting to encourage use by woodcock as roosting fields./Scot J. Williamson

Woodcock roost in areas with sparse vegetation, such as this recent clearcut./Scot J. Williamson

As weeds and brush begin to grow on abandoned gravel pits, woodcock may use these sites for roosting./Scot J. Williamson

timber management. Generally accepted guidelines for creating roosting fields are:

- Cut and maintain 5-acre or greater openings with sparse ground cover (do not plant or revegetate, especially with sod-forming grasses). Let the site grow back in patchy, naturally occurring weeds and forbs. Do not fertilize. If revegetation is desired or necessary for erosion control, broadcast a local-origin, native-grass-and-forb mixture over snow on a sunny warm March day, to create the clumpy, broken, variable-height cover that makes for good woodcock roosting habitat.

- Manage for one roosting field per 100 acres of habitat.

- Maintain sparse ground cover through mowing, controlled burning, herbicides, or grazing.

- In areas with pastures and hayfields or open bogs within about a half mile of feeding areas, creating roosting fields may not be necessary.

- Pastures with light to moderate grazing pressure provide cover suitable for roosting woodcock, and may eliminate the need for the landowner or manager to create dedicated roosting habitat.

- To keep down the dense grass and weed growth that make areas unsuitable for woodcock roosting, hayfields and openings

often must be actively managed. Light disking every two or three years can keep sites functioning as roosting cover.

- Mowing strips in hayfields has proven to be an effective management tool for creating roosting habitat in the northeastern U.S. The mowed strips allow birds to roost in the open, with the unmown edges sheltering the birds from avian predators. Strips 4 to 6 feet wide should be mowed in hayfields starting in late summer. Up to 25 percent of a field can be harvested in strips, beginning no earlier than mid-July and ending at the first frost. Cutting strips can be delayed until early August to keep from disturbing grassland nesting birds.

- Another option is to modify the timing of a hay harvest. The entire first crop of hay can be cut and harvested conventionally. Then after the first crop, cut strips every two weeks through the second and third cuttings.

- Other landscape features that can serve as roosting fields are airstrips, military training grounds, areas mined for topsoil, old brushy gravel pits, newly established forest plantations, and some road ditches.

- Barrens can provide good habitat structure for roosting and displaying woodcock. Some barrens may need to be regularly mowed or burned, usually every year or every other year.

- Do not plant Norway pine or other conifer species in old fields.

- Allow the gradual takeover of old fields by alder, aspen, hazel, or other woody species. In this way, fields will become woodcock singing grounds, then nesting and brood-rearing covers.

Mowing strips in hayfields has proven to be an effective management tool for creating roosting habitat in the northeastern U.S. The mowed strips allow birds to roost in the open, with the unmown edges sheltering the birds from avian predators.

Helping Other Species

- Mowing a hayfield from the center outward will let fledgling birds escape to the edge of the field. Mount flushing bars on harvesting equipment to minimize bird mortality while mowing.

- Delay disking old fields and other open habitats until after August 1 to protect late-nesting species and their fledglings.

- Conduct controlled burns in the fall whenever possible to reduce their impact on nesting birds.

- Old fields with shrubby components will attract golden-winged warblers, blue-winged warblers, prairie warblers, field sparrows, and northern harriers.

- For sharp-tailed grouse, maintain the openness of large fields in open landscapes, so that the fields will continue to be usable as leks.

Log Landings

A log landing is the location in a commercial harvest where the logs are piled before being taken to the mill. These areas often are the slowest to regrow trees, and they may survive as forest openings as other trees mature

If large enough, log landings can serve as roosting fields./Scot J. Williamson

Log landings can serve as both singing grounds and roosting fields if properly sized and managed./Scot J. Williamson

Many landscapes in the Upper Great Lakes region have areas suitable for woodcock singing grounds, such as log landings, bogs and peatlands, pastures, managed openings, and old fields with pioneering aspen, hazel, or other shrub species.

around them. Log landings in a commercial forest may serve as both singing grounds and roosting fields and are a cost-effective way to maintain some open habitats for woodcock.

- Create landings of 1 to 3 acres and larger. The larger the landing, the more likely the landing will support several singing males and will be used later in the year as a roosting field.

- Landings should be smoothed, but little else in the way of site treatment is necessary. Landings should not be planted if you want woodcock to use them. If revegetating is preferred, or necessary to prevent erosion, broadcast a local-origin native-grass-and-forb mixture over snow on a sunny warm March day to yield the clumpy, variable-height cover that woodcock need. Subsequent maintenance as an opening will be needed.

Helping Other Species

Killdeer often nest in log landings on new clearcuts. Log landings can extend the use of a stand by golden-winged warblers when other parts of the stand get too mature.

Singing Grounds

Singing ground openings can be small (0.5 acre) or large (edges of large open areas such as fields, bogs, peatlands, etc.). They can have some patches of sparse ground cover. Many landscapes in the Upper Great Lakes region have areas suitable for woodcock singing grounds, such as log landings (see above), bogs and peatlands, pastures, managed openings, and old fields with pioneering aspen, hazel, or other shrub species.

Woods roads adjacent to young forest can be used as singing grounds./Scot J. Williamson

Woodcock use grazed pastures as singing grounds. /Scot J. Williamson

Male woodcock may use areas as small as a quarter acre if the surrounding habitat is not dominated by trees over 25 feet tall – for example, barren areas in shrub-dominated wetlands. Trails through forested areas, with wide spots (two to three times as wide as the trail by about 50 feet long) spaced 200 to 300 feet apart, can also function as singing grounds.

In landscapes without abundant singing grounds, create this type of habitat through active management. Forest openings can be created and maintained in sparse cover by mowing, grazing, haying, or the use of fire (see Roosting Field Habitats).

Based on research conducted in the northeastern U.S., approximately eight singing grounds per 100 acres will yield high woodcock densities.

Nesting and Brood-Rearing Habitat

Nests are typically in thick brush or young aspen within 50 yards of an edge and within 300 feet of a singing grounds, which highlights the importance of locating forest openings close to nesting and brood-rearing habitat. Nesting and brood-rearing cover is generally dry, with a low risk of being flooded by storm waters or snowmelt, and is within a half mile of typical damp daytime feeding cover. Where forest and field habitats meet, create a shrubby transition zone to provide nesting habitat.

Prescribed Burning

Controlled burning can be a cost-effective tool for maintaining tracts in early successional forest stages. Fire has influenced plant and wildlife communities in the Upper Great Lakes for centuries. Many of the species targeted by this Initiative evolved in the presence of periodic fires. Along with being a great natural tool to manage and maintain habitats, prescribed fire has the

Annual burning of roosting fields increases their use by woodcock./Scot J. Williamson

added advantage of lowering fuel loads in a controlled manner, which reduces the risk of catastrophic wildfires. Controlled burning should only be done in a safe manner and when conditions are appropriate. The following internet sites offer information for landowners who wish to learn more about using fire as a management tool:

http://www.firecouncil.org/
http://www.dnr.state.mn.us/rxfire/links.html
http://www.prescribedfire.org/index.html
http://www.prescribedfire.org/assets/documents/oakWoodlandFactsheet.pdf

Commercial Forest Management

Assistance from a professional wildlife biologist is the first step in managing land for woodcock./Scot J. Williamson

Charles Fergus

Commercial forestry can be an excellent way to improve woodcock habitat at no cost to the landowner. Various forestry guides are available (see Online Resources). Forest managers will find the habitat composition goals listed in Degraaf et al. (2005) to be an excellent approach to integrating early successional habitat needs into forest management.

- DeGraaf, R. M., M. Yamasaki, W. B. Leak, and A. M. Lester. 2005. Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region. Hanover, N. H. : University Press of New England.

- Where possible, use federal, state, and county cost-sharing programs – including CRP, CREP, RIM and Green Acres programs – to reduce landowner costs for noncommercial woodcock management activities.

- Minnesota has two tax-reduction programs for managed-forest landowners:
  -"Sustainable Forestry Initiatives Act" (SFIA) (http://www.taxes.state.mn.us/taxes/property/publications/fact_sheets/html_content/sust_forest_fact_sheet.shtml)
  -"2c Tax Class" - Managed Forest Land Program (http://myminnesotawoods.wordpress.com/2008/08/11/2c-tax-class/)

- Wisconsin has two tax-reduction programs and a cost-sharing program for private landowners:
  -Wisconsin DNR's "Wisconsin Forest Landowner Grant Program" (http://www.dnr.wi.gov/forestry/private/financial/#costshare)
  -"Managed Forest Law" and "Forest Crop Law" (http://www.dnr.wi.gov/forestry/ftax/)

- Michigan has two tax-reduction programs and two cost-sharing programs for developing private forest management plans:
  -Commercial Forest Program and the Qualified Forest Property Program (http://michigan.gov/dnr/0,1607,7-153-30301_30505_34240---,00.html)
  -The Forest Legacy and Forest Stewardship Programs can provide assistance with developing a forest-management plan.

- Federal cost-sharing programs include: U.S. Fish & Wildlife Service (Partners for Fish & Wildlife Program), the Natural Resources Conservation Service (WHIP/EQIP Programs), and the Farm Services Agency (Conservation Reserve Program and Wetland Reserve Program).

Online Resources

Wetlands and Soils Mapping Tools

National:

USFWS Wetlands Mapper: http://www.fws.gov/wetlands/Data/Mapper.html
NRCS Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Wisconsin Wetlands:

http://dnrmaps.wisconsin.gov/imf/imf.jsp?site=SurfaceWaterViewer.wetlands

DNR Silviculture Handbooks:

Wisconsin: http://dnr.wi.gov/forestry/Publications/Handbooks/24315/
Minnesota: http://www.dnr.mn.gov/forestry/ecs_silv/index.html

Woody Biomass Harvesting Guidelines:

Wisconsin: http://council.wisconsinforestry.org/biomass/
Minnesota: http://www.frc.state.mn.us/Info/MFRCdocs/forest%20biomass%20harvesting.pdf

Other Michigan Resources:

Information for landowners about managing habitat for wildlife including American Woodcock, Ruffed Grouse, and other species: http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/index.htm.

Questions and Answers about Clearcutting in Michigan:

http://www.michigan.gov/documents/IC4270_48581_7.pdf
Michigan's Forest Stewardship Outreach and Education Program (cost-sharing): http://www.michigan.gov/dnr/0,1607,7-153-10366_37984_37985-125030--,00.html

Tim Flanigan

Species of
Greatest Conservation Need

Table 1. Species of Greatest Conservation Need that may benefit from the preceding Best Management Practices. General habitat associations for each species are included. Early successional habitat may not be the optimal habitat for all species listed here, but all should enjoy some benefits under appropriate conditions and locations within the range of each species. 26 species are likely to respond well to young-forest management, and an additional 12 will respond, depending on the landscape and habitat context of management activities.

		States where listed as a Species of Greatest Conservation Need		
Common Name	**Habitat Association**	**MI**	**MN**	**WI**
Likely to Respond to Management:				
American Woodcock	ESH*	X	X	X
Black-billed Cuckoo	ESH	X	X	X
Blue-winged Warbler	ESH	X	X	X
Brown Thrasher	ESH	X	X	X
Common Nighthawk	ESH	X	X	
Eastern Kingbird	ESH	X		
Eastern Wood-pewee	Forest		X	
Eastern Towhee	ESH	X		
Field Sparrow	ESH	X	X	X
Golden-winged Warbler	ESH	X	X	X
Least Flycatcher	ESH	X	X	X
Northern Flicker	ESH	X		
Northern Mockingbird	ESH	X		
Ovenbird	Forest/ESH		X	
Red-headed Woodpecker	ESH/Savanna	X	X	X
Rose-breasted Grosbeak	ESH/forest		X	
Sedge Wren	Alder Feeding Areas	X	X	
Swamp Sparrow	Alder Feeding Areas		X	
Veery	ESH		X	X
Whip-poor-will	ESH	X	X	X
White-throated Sparrow	ESH		X	
Willow Flycatcher	Alder Feeding Areas		X	X
Wilson's Snipe	ESH (w/some water)	X		
Yellow-bellied Sapsucker	ESH/Forest		X	
Yellow-billed Cuckoo	ESH	X		X
Yellow-breasted Chat	ESH	X		
Variable Response to Management (Context Dependent)				
Bell's Vireo	ESH		X	X
Blackburnian Warbler	Forest (conifer retention)	X		
Canada Warbler	ESH	X	X	X
Connecticut Warbler	Forest	X	X	X
Hooded Warbler	ESH	X	X	X
Kentucky Warbler	ESH/Forest	X		X
Killdeer	Roosting Fields, Log Landings (wet sites)	X		
Northern Goshawk	Forest	X	X	X
Northern Harrier	ESH	X	X	X
Northern Shrike	ESH (winter)	X		
Prairie Warbler	ESH	X		
Sharp-tailed grouse	Large Roosting Fields, Singing Grounds	X	X	X

*Young forest, shrublands, and other early successional habitats (ESH).

Woodcock Management

in context with other wildlife and cultural values

To boost populations of woodcock, golden-winged warblers, and other species associated with early successional habitat, we can cut trees to encourage the growth of young forest and shrubland. But managing some areas in this manner may not be the best plan. Protecting the following resources may be more important than creating new early successional habitat:

- **Endangered and threatened species** must be protected. To learn if an area contemplated for managing woodcock hosts any endangered or threatened plants or animals, consult with state wildlife agencies or the U.S. Fish and Wildlife Service.

- **Key wildlife habitats** such as deer yards, beech stands used by bears as feeding areas, and other important sources of mast (the nuts of forest trees eaten by wildlife) may be more important to the biodiversity of an ecosystem than young forest.

- **Natural areas or ecological reserves** are set aside to protect key ecological values. Although creating young forest may not harm the natural resources in these sites, expert advice should be sought before working in or near protected areas.

- **Large blocks of unfragmented forest** in landscapes with abundant agricultural and/or developed lands may need to be preserved as mature woodland.

- **Vernal pools and ephemeral wetlands** are critical breeding and feeding habitats for amphibians and other wild creatures. Such microhabitats can be harmed by an increase in water temperature caused by removing the tree canopy shading the wetlands.

- **Water quality** must always be protected. Cutting trees on steep slopes can cause erosion and deposit silt in waterways. State forestry and fish and wildlife agencies and the U.S. Natural Resources Conservation Service can provide guidance on where and where not to cut.

Vernal pool/Charles Fergus

- **Natural Heritage Programs** collect, analyze, and distribute detailed scientific information about biological diversity. State or provincial natural heritage programs can provide information on the locations and conditions of rare and threatened species and important ecological communities.

- **Historic and cultural heritage sites** are the physical remains and objects that link us to our past. The governments of each state and province have historic preservation offices that can determine where cultural resources exist and whether habitat management activities will affect them.

- **Too much of anything** is usually a negative. In a landscape that already has abundant young forest, consider the needs of species that need older, mature forests before creating more early successional habitat.

Tim Flanigan