

BEST MANAGEMENT PRACTICES FOR Golden-winged Warbler Habitat in Deciduous Forests of the Great Lakes

REVISED 2019

A publication of the Golden-winged Warbler Working Group, www.gwwa.org



This supplement for Deciduous Forests accompanies *Best Management Practices for Golden-winged Warbler Habitats in the Great Lakes Region*, which includes general information that applies to all habitat types in this area. Users should refer to both documents to develop a comprehensive management strategy for Golden-winged Warblers. The following are guidelines and not absolute rules for the creation of nesting habitat, thus prescriptions that fall outside the numerical ranges presented can provide habitat, too. Consult a Golden-winged Warbler or young forest habitat expert for assistance in tailoring a management plan to your property, and, if available, follow forest management guidelines for your state or province.

Historically, young forest in this region was generated by natural disturbances such as wind, ice, insect outbreaks, flooding, beaver activity, and fire. Today, much habitat is created through commercial management of deciduous forests, which is the focus of this habitat guide. Deciduous forest management opportunities exist throughout the Great Lakes on public, private, and tribal lands.

Key Landscape and Stand Features

- Work within defined focal areas or < 5 miles (preferably < 1 mile) from known breeding populations and < 1 mile from other early successional patches (e.g., young deciduous forest or shrub wetlands).
- > 50% forest cover composed of at least 70% deciduous trees within 1.5 miles of the site (Figure 1)
- Multiple, manageable forest stands each ≥ 5 acres where you can rotate management among stands such that at least 15–20% of the area is available as nesting habitat in any one year (Figure 1).
- ≥ 5 acres when < 1,000 ft from other early successional habitat and ≥ 25 acres when > 1,000 ft from other early successional habitat.



Figure 1. A 1,000-acre site of primarily aspen forest (hatched areas with stand ages in bold font) managed to maintain at least 15% in nesting habitat.

Stand-scale Characteristics for Nesting Habitat

Even-aged forest management generally creates suitable forest conditions for breeding Golden-winged Warblers. Habitats produced through even-aged techniques are ephemeral and typically occupied for 10–12 years post-harvest unless they have low regenerating tree seedling densities (i.e., poorly stocked), have large maintained openings (e.g., utility rights-of-way), have conditions that slow stand development (e.g., poor soils), or have noncommercial treatments to extend suitability. Logging roads, skidder trails, log landings, areas of soil compaction, and natural openings create patchiness that can be incorporated into stand-scale management to improve habitat for Golden-winged Warblers. The birds will use regenerating stands that range from 1,300–26,000 seedling stems/acre, thus objectives for regeneration density can accommodate considerations of commercial viability (high stem densities) or habitat needs of associated wildlife species (e.g., low stem densities for Field Sparrow, *Spizella pusilla*). If Golden-winged Warblers do not occupy regenerating stands by four years post-harvest, then the prescription should be evaluated to adjust distribution and density of important habitat components: retained canopy trees, saplings, patches of shrubs, and patches of herbaceous cover.

Forest Management Guidelines

Silvicultural Systems:

Even-aged and two-aged silviculture treatments (clear-cutting, seed tree harvests, green-tree retention, and shelter-wood harvests) can provide the necessary structural conditions for breeding habitat. Noncommercial treatments such as prescribed burning and brush-hogging can extend the suitability of stands.

Canopy-tree Retention Guidelines:

Retention of live canopy trees is important for attracting breeding pairs of Golden-winged Warblers (Figure 2). Males use these dispersed canopy trees as song perches and for foraging. Absence of residual trees is correlated with low male densities and poor mating success.

Retain:

- a minimum of 5 trees/acre with at least 4 trees being deciduous hardwood species (Figure 3).
- preferably 5–15 trees/acre (10–30% residual canopy cover) but higher densities are acceptable (Figure 3).
- trees > 9 inches in diameter.

If there are no canopy trees to retain:

- increase the amount of young-mature forest edge by creating an irregular margin to the harvest area's perimeter.
- thin or cut 150 ft into an adjacent stand to promote a gradual transition, or feathered edge, from mature to young forest.
- foster small trees for future retention.



LAURIE JOHNSON

Figure 2. A young aspen forest with the optimal density of residual canopy trees, saplings, shrubs, and herbaceous vegetation dispersed throughout the stand. Both conifer and hardwood canopy trees were retained and met the required minimum density of hardwoods.

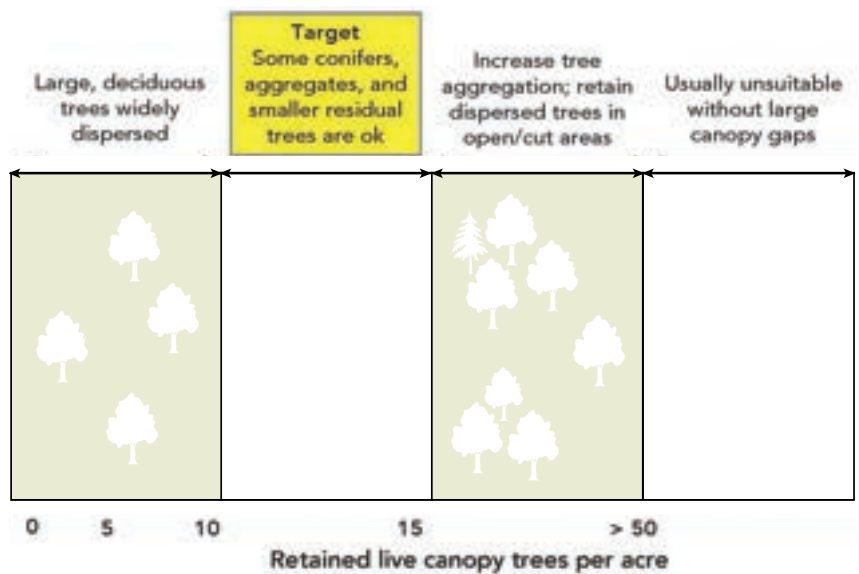


Figure 3. Guidelines for canopy-tree retention patterns with varying tree density.

Other Management Considerations

Invasive Plants:

Prior to forest management, identify invasive plant species on-site or nearby. Pre-harvest treatment of invasive plants may be necessary to prevent their spread and competition with desired regenerating tree species. Minimize the spread of invasive plants by harvesting in winter and routinely cleaning machinery between sites.

Riparian Zone Management:

Young forests in riparian zones, especially where adjacent to or intermixed with wetland shrubs can be managed for Golden-winged Warblers. Harvest timber on sites where soil erosion will not occur and in winter to protect wet soils.

Resources

- Golden-winged Warbler Status Review and Conservation Plan, www.gwwa.org
- Your state/provincial silvicultural guidelines for even-aged forest management and green-tree retention. In most cases, Golden-winged Warbler breeding habitat can be managed within these guidelines.
- Site-level forest management guidelines developed by the Minnesota Forest Resources Council, <http://mn.gov/frc/site-level-management-program.html>

BEST MANAGEMENT PRACTICES FOR Golden-winged Warbler Habitat in the Aspen Parkland Transition Zone of Canada

REVISED 2019

A publication of the Golden-winged Warbler Working Group, www.gwwa.org



This supplement for the Aspen Parkland Transition Zone accompanies *Best Management Practices for Golden-winged Warbler Habitats in the Great Lakes Region*, which includes general information that applies to all habitat types in this area. Users should refer to both documents to develop a comprehensive management strategy for Golden-winged Warbler.

The Aspen Parkland Transition Zone comprises the contact zone between the prairie parkland and the greater boreal ecosystems (Figure 1). Whereas the prairie biome is dominated by grasses and the boreal biome by coniferous tree species and mixed woods, the Aspen Parkland Transition Zone is dominated by deciduous trees, especially Trembling Aspen (*Populus tremuloides*) and Bur Oak (*Quercus macrocarpa*), in complex mosaics with grassland and wetlands.

Threats to the Aspen Parkland Transition Zone

Golden-winged Warbler habitat in this region is threatened mostly by human uses, especially land clearing for exurban development. Grazing within forested landscapes can also be a threat, when it reduces shrub density below 15% cover and hence renders habitat ecotones less suitable for Golden-winged Warbler nesting.

Aspen Parkland Transition Zone landscapes comprise a mosaic of deciduous woodlands, prairie openings, forested wetlands, and marshes maintained by ecosystem processes like fire, natural succession, and soil hydrology. Fire suppression close to human settlements can result in more contiguous forest stands with fewer openings and less variation in tree age classes — cover types that are less suitable for Golden-winged Warbler. Fire suppression is also detrimental to the maintenance of remnant native prairie. Management techniques including burning, cutting, and planting have the potential to benefit Golden-winged Warbler.

Key Features or Issues

The key to productive Golden-winged Warbler habitat in this region is maintaining a forested mosaic that includes gaps with shrubs and forbs (Figure 2), whether or not these are fixed in position or shift over time. Forest edges should be “feathered”, i.e., without sharp transitions but irregular and with shrubs and forbs mixed with trees (Figure 3). Linear features such as trails with soft edges can produce Golden-winged Warbler habitat if human use is not excessive. Evidence suggests that Golden-winged Warblers are much less likely to occupy patches of apparent nesting habitat when agriculture constitutes > 30% of the surrounding landscape.



Figure 1. The Aspen Parkland Transition Zone in Canada. For Bird Conservation Region descriptions, see www.nabci-us.org/resources/bird-conservation-regions-map/.



Figure 2. Post-burn regeneration in aspen woods. Note forest edge, dense shrubs, and some open areas with forbs. Tall trees within openings provide excellent song perches.

How to Manage for Nesting Habitat

In Aspen Parkland Transition Zone forested landscapes, the Golden-winged Warbler occupies a mix of relatively “permanent” upland scrub (where growing conditions prevent formation of closed canopy forests) and forested sites where small-scale disturbance creates openings and permits the growth of shrubs and forbs. These small-scale disturbances typically result in habitat for approximately 5–20 years after the disturbance (once the shrub layer is re-established and through various stages of regrowth). Common disturbance types include fire, logging, wind throw, tree mortality, linear disturbances (e.g., trails or rights-of-way when not frequently mowed or grazed), and sometimes resource extraction activities. Some wetland types in wooded areas also create a suitable ecotone.

Key requirements:

- within defined focal areas or < 8 km or 5 miles (preferably < 1.6 km or 1 mile) from known breeding populations.
- ideally 70% forested (< 30% agriculture) within a 2 km (1.2-mile) radius of the site and within 5 km (3 miles) of known populations.
- most territories found in forest landscapes containing Trembling Aspen and Bur Oak; sometimes Balsam Poplar (*Populus balsamifera*) and mixed woods.
- most common understory: Beaked Hazel (*Corylus cornuta*) and Saskatoon (*Amelanchier alnifolia*); also Red-osier Dogwood (*Cornus sericea*), Hawthorn (*Crataegus* spp.), Prickly Wild Rose (*Rosa acicularis*), Beaked Willow (*Salix bebbiana*), High-bush Cranberry (*Viburnum trilobum*).
- most common forbs: Field Horsetail (*Equisetum arvense*), Canada Violet (*Viola canadensis*), Canadian Bunchberry (*Cornus canadensis*), Strawberry (*Fragaria* spp.), and Wintergreen (*Gaultheria procumbens*).
- ideal conditions consist of a mosaic of forest and early successional patches.

To Promote Reforestation:

- first consider nearby tall-grass prairie and opportunities for prairie restoration over and above reforestation.
- plant a combination of easily established and fast-growing native trees and shrubs.
- incorporate patches of herbaceous ground cover along with reforestation.
- herbaceous layer needs to be planted with the goal of restoring a native plant community rather than monotypic grass cover; individual species selected need to match site and soil characteristics.

Management techniques including planting, ripping the substrate, prescribed burning, and brush-hogging may speed up succession and the process of generating Golden-winged Warbler habitat.

Table 1. Management options to restore Golden-winged Warbler habitat.

Symptom	Management Technique	Description of Technique
Maturing trees, excessive canopy cover	Timber Management	Create irregular patch margin
	Mechanical Treatment	Use brush-hog to create irregular patch margins
	Prescribed Burning	Create small, irregular openings and stimulate shrub regeneration
Deforestation: Too much herbaceous cover, too little woody cover, soil compaction, gravel piles	Mechanical Treatment	Use ripping and disking
	Prescribed Burning	Create small, irregular openings and stimulate shrub regeneration
	Plant Desired Species	Plant trees/shrubs to foster regeneration around larger disturbances such as gravel piles
Forest edge damaged by grazing or limited edge	Timber Harvest	Create irregular patch margin
	Mechanical Treatment	Install fencing to prevent grazing edge; use brush-hog to create irregular patch margins
	Prescribed Burning	Create irregularly shaped or feathered edges or small openings
	Plant Desired Species	Plant native shrubs and forbs



CHRISTIAN ARTUSO

Figure 3. Leaving legacy trees and feathered edges in cutovers, greatly increases the likelihood Golden-winged Warblers will use a site after sufficient shrub regeneration.

Resources/References

- Golden-winged Warbler Status Review and Conservation Plan, www.gwwa.org
- Bird Species At Risk in Manitoba’s Aspen Parkland (Pamphlet by Bird Studies Canada – Manitoba) www.gwwa.org/outreach.html

BEST MANAGEMENT PRACTICES FOR Golden-winged Warbler Habitat in Shrub Wetlands of the Great Lakes

REVISED 2019

A publication of the Golden-winged Warbler Working Group, www.gwwa.org



This supplement for Shrub Wetlands accompanies *Best Management Practices for Golden-winged Warbler Habitats in the Great Lakes Region*, which includes general information that applies to all habitat types in this area. Users should refer to both documents to develop a comprehensive management strategy for Golden-winged Warbler. The following are guidelines and not absolute rules for the creation of nesting habitat, thus prescriptions that fall outside the numerical ranges presented can provide habitat, too. Consult a Golden-winged Warbler or young forest habitat expert for assistance in tailoring a management plan to your property.

Shrub wetlands are extensive in the region, particularly in the western Great Lakes. Not all shrub wetlands are occupied by Golden-winged Warbler for a variety of reasons including high water levels, lack of desired woody and herbaceous vegetation patchiness, lack of scattered canopy trees, and distance to upland deciduous forest. Dense mature stands of unbroken woody shrub cover over large areas often are unsuitable. Reduced flooding and beaver activity may be partially responsible for these conditions and restoration of these natural disturbance regimes could improve habitat quality. In other cases, mechanical treatments provide the mechanism for creating or restoring nesting habitat (Figure 1) and are the focus of the included guidelines.

For this insert, shrub wetlands are defined as palustrine wetlands dominated by broad-leaved deciduous woody vegetation less than 20 feet tall. See Table 1 for common dominant shrub and tree species.



Figure 1. Five-year old alder cut in Marathon County, Wisconsin.

Key Landscape and Stand Features

Select sites:

- within defined focal areas or < 5 miles (preferably < 1 mile) from known breeding populations and < 1 mile from other early successional patches.
- with > 50% forest cover composed of at least 70% deciduous trees within 1.5 miles of the site.
- with shrub wetlands \geq 5 acres in size where rotational management can be applied so that at least 20% of the area is cut every 4–5 years.

Is Management Necessary?

Wetland shrub communities might not need management if they have **1**) many small open herbaceous patches with either dry ground or sedge tussocks for nest sites, **2**) scattered patches or clumps of woody shrubs that are not continuous in large blocks, **3**) scattered trees throughout, and **4**) natural processes that regularly disturb the area (e.g., flood, beaver). The absence of any of these characteristics suggests that there is a current or future management opportunity to improve habitat. Certainly not all wetland shrub communities should be managed, particularly those that are not accessible with the necessary equipment, have rare plants or animals that may be harmed by the management activities, or where soils remain wet or are sensitive even in winter.

Table 1. Dominant shrub and tree species associated with Golden-winged Warbler shrub wetland habitats in the Great Lakes.

Dominant Shrub Species
alders (<i>Alnus</i> spp.)
willows (<i>Salix</i> spp.)
buttonbush (<i>Cephalanthus occidentalis</i>)
red osier dogwood (<i>Cornus stolonifera</i>)
spireas (<i>Spirea</i> spp.)
bog birch (<i>Betula pumila</i>)
Dominant Tree Species
red maple (<i>Acer rubrum</i>)
tamarack (<i>Larix laricina</i>)
balsam poplar or aspen (<i>Populus</i> spp.)

Shrub Wetland Management Guidelines

Treatment Practices:

Shrub management is needed when shrub cover is continuous in large blocks with few large patches of herbaceous vegetation (> 70% shrub cover). Use small machinery to shear, cut, or chip woody shrubs to open patches of herbaceous vegetation, regenerate decadent patches of mature shrubs, and to create a more balanced mix of shrub and herbaceous patches (Figure 2). Hand-cutting woody vegetation is an option for small areas. In most places, wetland shrub treatment will be noncommercial so material can be left scattered on-site or used by landowners for firewood. For private landowners, cost-share programs (e.g., Natural Resources Conservation Service) are available to reduce the expense of management.

Treatment Patterns:

Cut shrub wetlands as strips or blocks on a rotational schedule (Figure 3). Ideally cut 20–25% of the wetland area every four to five years such that the entire area receives treatment every 20 years. If frequent entry is not possible, then a larger percent of the area can be cut but retention of shrub patches will be more important. Areas smaller than 5 acres can be treated as a block where all acreage is mowed, or strips or shrub clumps can be retained (Figure 3). Within treatment blocks > 5 acres, retain 50% of the shrubs in patches to create a patchwork of shrub and herbaceous vegetation throughout the managed area (Figure 3). Deciding which shrub patches to cut and which to retain is as much art as science. Follow the topography and retain trees and other features that increase vegetation structural diversity.

Canopy-tree Retention Guidelines:

Retention of live canopy trees is important for nesting habitat. Retain 5–15 trees/acre, especially deciduous trees that are > 9 inches diameter. Where there are less than 10 trees/acre, retain all trees including saplings that can be fostered for future retention. Cut shrubs and small trees in adjacent deciduous forest to create a more gradual, feathered transition from forest to shrubs.

Other Management Considerations

Invasive Plants:

Prior to wetland shrub management, identify invasive plant species on-site or nearby. Pre-treatment of invasives may be necessary to prevent their spread or potential competition with desired regenerating species. Cut sites in winter and routinely clean machinery between sites to minimize the spread of invasive plants.

Riparian Zone Management:

Wetland shrubs in riparian zones, especially where adjacent to or intermixed with deciduous forests can be managed for Golden-winged Warbler. Follow riparian zone management guidelines for your area.

Resources/References

- Golden-winged Warbler Status Review and Conservation Plan, www.gwwa.org
- Managing Your Brushland for Wildlife (from Minnesota DNR) at <http://files.dnr.state.mn.us/assistance/backyard/privatelandhabitat/brushlandmgmt.pdf>
- NRCS Working Lands for Wildlife provides technical and financial assistance to private landowners in the Appalachian region, www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=stelprdb1046990
- Refer to state breeding bird atlases, eBird (www.ebird.org), and the *Golden-winged Warbler Status Review* for distribution of Golden-winged and Blue-winged Warbler in your area



Figure 2. Alder wetland treatment in progress during winter. Note adjacent deciduous forest and retention of scattered trees in the background.

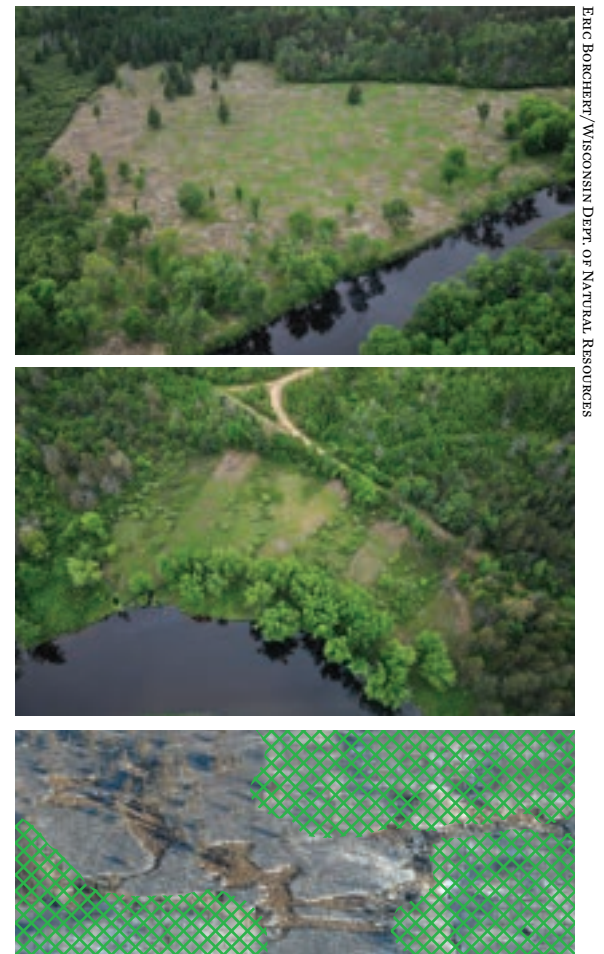


Figure 3. Aerial photos of shrub wetlands treated as a block (top), in strips (middle), and with 50% retention of shrubs within a block (bottom). All trees were retained in the cut areas. Note hatched area covers aspen forest that surrounds the wetland block.

BEST MANAGEMENT PRACTICES FOR Golden-winged Warbler Habitat on Abandoned Farmlands in the Great Lakes

REVISED 2019

A publication of the Golden-winged Warbler Working Group, www.gwwa.org



This supplement for Abandoned Farmlands accompanies *Best Management Practices for Golden-winged Warbler Habitats in the Great Lakes Region*, which includes general information that applies to all habitat types in this area. Users should refer to both documents to develop a comprehensive management strategy for Golden-winged Warblers. The following are guidelines and not absolute rules for the creation of nesting habitat, thus prescriptions that fall outside the numerical ranges presented can provide habitat, too. Consult a Golden-winged Warbler or young forest habitat expert for assistance in tailoring a management plan to your property.

Since the early 20th century, abandoned farmland has become an important component of the Great Lakes landscape. When crop and pasture lands become inactive, they begin succeeding into their pre-agricultural state, which is often deciduous forest. The span of time from field to forest takes decades, during which there is a period of years where the ratio of herbaceous vegetation, shrubs, and young trees on a given site can potentially create habitat for nesting Golden-winged Warblers (Figure 1). Without active management, this is a temporary condition that typically persists for less than a decade.

Throughout the region there is an excellent opportunity, especially on private lands, to create habitat for Golden-winged Warblers on abandoned farmlands. Perhaps the best opportunities exist on poorly drained soils that are too wet for pasture or crops.

Key Landscape Scale Requirements

Abandoned farmland is found throughout the region, but much of it is not suitable for Golden-winged Warblers because it lacks a primarily forested habitat matrix.

Select sites:

- within defined focal areas or < 5 miles (preferably < 1 mile) from known breeding populations and < 1 mile from other early successional patches.
- with > 50% forest cover composed of at least 70% deciduous trees within 1.5 miles of the site (Figure 2).
- with multiple, manageable patches each \geq 5 acres in size that lack adjacent active agriculture, such as row cropping.



Figure 1. Typical early successional abandoned field in the eastern Great Lakes.



Figure 2. Management sites should be surrounded by mostly deciduous forest and other idle farmland.

Key Site Scale Requirements

Much Golden-winged Warbler habitat is intentionally created from existing forest by setting back ecological succession through specific timber harvesting practices. In the case of abandoned farmland, agriculture has already “reset succession” to an earlier state so the first goal in managing abandoned farmland is to evaluate that state relative to the habitat needs of nesting Golden-winged Warblers.

Characteristics of patches within management sites

(Figure 3):

- 30–70% tall shrubs and saplings (3–13 ft) unevenly distributed as clumps.
- Shrub and sapling clumps interspersed with small herbaceous openings dominated by forbs, with both clumps and openings no larger than 30 ft in diameter.
- Overstory deciduous trees (5–15/acre) resulting in 10–30% canopy cover.

Advancing or retarding succession to achieve appropriate nesting habitat can be difficult, and, in some cases, impractical. If a given patch is in a primarily herbaceous state or has become a closed canopy forest, then the site might be better managed as grassland or forest (see Deciduous Forests Great Lakes supplement).



AMBER ROTH

Figure 3. High quality nesting habitat with clumped shrubs, herbaceous openings, and scattered trees bordering older forest. Photo taken during spring leaf-out.

How to Manage for Nesting Habitat

The three most common problems in abandoned farmlands are **1)** lack of a prominent forest edge, **2)** habitat elements (often shrubs) too evenly distributed, and **3)** too few overstory trees within the site (Table 1). When possible, on large sites, select abandoned fields adjacent to mature forest as opposed to those surrounded only by other fields. If this is not possible, develop an “interior feathered forest edge” by planting fast growing, native trees and shrubs on each side of existing fencerows. Another way to increase edge habitat is to harvest trees in an irregular, feathered buffer along the existing forest edge. Mowing and brush-hogging in serpentine-like rows or small patches can be used to create a pattern of clumped shrub cover interspersed with herbaceous openings. A selective herbicide application might be necessary to reduce re-sprouting of woody plants and eliminate undesired invasive plant species. Habitat can be improved on sites with too few overstory trees by planting fast growing native trees in clumps or scattered throughout the plot.

Table 1. Suggested management techniques to manipulate habitat conditions for Golden-winged Warbler.

Symptom	Management Technique	Description of Technique
Lack of prominent forest edge	Plant Desired Species	Plant fast growing native trees and shrubs in large clumps or adjacent to existing fencerows.
Shrubs too evenly distributed or too many exotic shrubs	Mechanical Treatment	Mow within larger patches to create clumps with herbaceous openings; target and kill exotic shrubs.
	Prescribed Burning or Grazing	Use fire or graze cattle to reduce shrub density.
	Herbicide Spot Treatments	Treat individual or groups of shrubs to create smaller clumps, target and kill exotic species when present.
	Restore Natural Disturbances	Restore hydrology on former wetland sites to kill shrubs and retard re-growth.
Too few canopy trees	Timber Management	Create feathered edge through thinning into adjacent forest; retain select saplings and poles as future canopy trees.
	Plant Desired Species	Plant fast growing native trees scattered or in clumps throughout the patch.
Too much herbaceous cover, too little shrub cover	Mechanical Treatment	Use ripping and disking; reduce frequency and/or intensity of mowing.
	Prescribed Burning or Grazing	Reduce frequency and/or intensity of burning/grazing/herbicide.
	Plant Desired Species	Plant fast growing native shrubs in clumps; use multiple species that vary in height when mature.

Resources/References

- Golden-winged Warbler Status Review and Conservation Plan, www.gwwa.org
- Natural Resources Conservation Service EQIP provides technical and financial assistance to private landowners, www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=stelprdb1046990

BEST MANAGEMENT PRACTICES FOR Golden-winged Warbler Habitat on Utility Rights-of-way in the Great Lakes

REVISED 2019

A publication of the Golden-winged Warbler Working Group, www.gwwa.org



This supplement for Utility Rights-of-way (ROWs) accompanies *Best Management Practices for Golden-winged Warbler Habitats in the Great Lakes Region*, which includes general information that applies to all habitat types in this area. Users should refer to both documents to develop a comprehensive management strategy for Golden-winged Warbler. The following are guidelines and not absolute rules for the creation of nesting habitat, thus prescriptions that fall outside the numerical ranges presented can provide habitat, too. Consult a Golden-winged Warbler or young forest habitat expert for assistance in tailoring a management plan for utility companies and landowners to manage ROWs using methods that create habitat for Golden-winged Warbler.

Utility ROWs consist of long, linear corridors that are often managed in a way that can provide habitat for Golden-winged Warbler and other shrubland birds. Many landscapes within the Great Lakes region are traversed by extensive and growing networks of electric transmission lines and gas pipelines (Figure 1), and in some of these the utility corridors are the principal sites of extensive shrubland habitat. Only a small proportion of these utility ROWs are managed for Golden-winged Warbler; therefore, substantial opportunities exist to benefit this species while still meeting the vegetation management goals of utility companies and working within acceptable budgets.

Select and Manage ROWs in Landscapes:

- within defined focal areas or < 5 miles (preferably < 1 mile) from known breeding populations and < 1 mile from other early successional patches (e.g., timber harvests, old fields).
- with > 50% forest cover composed of at least 70% deciduous trees within a 1.5-mile radius of the site.
- > 1 mile from residential areas and active croplands (to minimize disturbance by ATV operators, brown-headed cowbirds, and human-associated predators).
- > 165 ft wide unless they occur within or adjacent to larger areas of early successional habitat (Figure 2).
- with moist or unproductive soils, when possible, to help sustain nesting habitat with minimal maintenance.

Other Issues to Consider

- Invasive plant species are often prevalent in utility ROWs, particularly *Phragmites* spp., reed canarygrass (*Phalaris arundinacea*), honeysuckles (*Lonicera* spp.), spotted knapweed (*Centaurea stoebe*) and common buckthorn (*Rhamnus cathartica*). Eradication of invasive plants is recommended when possible.
- Management of utility ROWs should be conducted in cooperation with the managing utility company and the owners of the properties within and bordering the ROW. Landowner incentive programs, such as those implemented by USDA Natural Resources Conservation Service, are available in many areas to encourage landowners to manage lands for conservation. These programs can be used to expand the area of appropriate habitat along the border of the ROW.



Figure 1. Gasline ROW with appropriate habitat for breeding Golden-winged Warbler.



Figure 2. Narrow ROW adjacent to early successional habitat.

ROW Characteristics

- At least one side of the ROW must be bordered by intact deciduous forest; ideally, this should be managed as Golden-winged Warbler habitat.
- Patches of woody-plant cover should be 30–70% of the total area within the ROW (Figures 3 and 4).
- Patches of grasses and forbs should be 30–60% cover, be fairly distinct from shrubby patches, and also contain several woody plant stems.



Figure 3. ROW with minimum shrub cover for Golden-winged Warbler.



Figure 4. ROW with maximum shrub cover for Golden-winged Warbler.

How to Manage for Nesting Habitat in ROWs

1. Allow for growth of low woody vegetation within the ROW (Table 1). Growth of dense shrub thickets slows the establishment of trees, thus reducing vegetation management costs. To minimize the risk of arcs in the wire zone of power lines, allow woody vegetation to grow < 330 ft from the towers where electrical wires are farthest from the ground (depending on topography), and maintain grasses/forbs under the wire zone where the lines sag.
2. Maintain taller woody vegetation along the ROW edges for a feathered effect. When practical, thin adjacent forest along the ROW edge(s) to help widen the corridor of open habitat.
3. The type of management, timing, and resulting slash can impact Golden-winged Warbler (Table 2). Creating slash piles from cuttings may protect woody vegetation from deer while allowing grasses to grow where slash is cleared.
4. Maximize diversity in habitat structure and species composition within the ROW (Table 3), and stagger maintenance activities in space and time. Please consult the Great Lakes BMP guide for additional information.

Table 2. Suggestions for ROW maintenance for Golden-winged Warbler.

	Management	Timing*	Suggestions
Herbicide	Basal	-	not recommended
	Radiarc	-	not recommended
	Selective Foliar	Aug 16–Apr 30	retain shrubs and small trees
	Stump Treatment	Aug 16–Apr 30	retain shrubs and small trees
Mowing	Grass	Aug 16–Apr 30	retain shrubs and small trees; stagger mowing of adjacent spans
	Brush	Aug 16–Apr 30	retain shrubs and small trees; stagger mowing of adjacent spans
Other	Hand Cutting	Aug 16–Apr 30	retain shrubs and small trees; stack slash; stagger cutting of adjacent spans
	Hazard Tree Removal	as needed	retain shrubs and small trees
	Tree Pruning	as needed	retain shrubs and small trees
	Light Grazing	as needed	retain some tall herbaceous ground cover

* avoid management during nesting and post-fledging periods

Table 1. Suggested low woody plant species for Golden-winged Warbler in ROWs.

Shrubs and Small Trees
hawthorn (<i>Crataegus</i> spp.)
dogwood (<i>Cornus</i> spp.)
willow (<i>Salix</i> spp.)
viburnums (<i>Viburnum</i> spp.)
alders (<i>Alnus</i> spp.)
raspberries (<i>Rubus</i> spp.)
elderberry (<i>Sambucus</i> spp.)
hazel (<i>Corylus</i> spp.)
prickly-ash (<i>Zanthoxylum</i> spp.)

Table 3. Management options to restore Golden-winged Warbler habitat on ROWs.

Symptom	Vegetation Management
Adjacent or wide ROWs > 820 ft with few trees	Change from mowing to hand cutting or selective herbicide to maintain larger, non-hazard trees.
	Plant appropriate fast-growing trees along the edge or between corridors.
Shrubs evenly distributed	Mow in patches to create clumps with herbaceous openings.
	Restore hydrology on wetland sites to kill shrubs and slow re-growth.
< 30% shrub cover	Reduce mowing/herbicide frequency, stagger cutting of adjacent spans.
	Plant patches of shrubs to initiate establishment of shrub cover.

Resources/References

- Golden-winged Warbler Status Review and Conservation Plan, www.gwwa.org
- Best Management Practice Guides for managing invasive plants in utility ROWs: <https://councilonforestry.wi.gov/Documents/InvasiveSpecies/TransportationRoW-BMPs.pdf>
- Confer, J.L. and S.M. Pascoe. 2003. Avian communities on utility rights-of-ways and other managed shrublands in the northeastern United States. *Forest Ecology and Management* 185:193-205.
- Kubel, J.E. and R.T. Yahner. 2008. Quality of anthropogenic habitats for golden-winged warblers in central Pennsylvania. *Wilson Journal of Ornithology* 120:801-812.