



SCIENCE TO SOLUTIONS



Sustainably Managing Forests Creates Golden-winged Warbler Breeding Habitat

In Brief:

Populations of the golden-winged warbler, a North American migratory songbird, are declining throughout the species' range. Conservation efforts are currently underway in the Appalachian and Great Lakes regions of the United States to create and restore the young-forest systems that serve as nesting habitat for the bird. Recent studies have provided land managers and landowners with targeted, science-based recommendations that rely on sound forestry practices to sustainably manage forests and aid in the recovery of this vibrant songbird.

A Songbird in Decline

The vast forested landscapes of the Appalachian Mountains were once considered a population stronghold for the golden-winged warbler (*Vermivora chrysoptera*). Over the past 50 years, scientists have documented a decrease in the range of this species within the region and annual population declines of 8.5 percent (Sauer et al. 2014). These trends are, in part, the result of the loss and degradation of early successional forests, which are critical nesting locations for the bird.

Early successional habitat, such as patches of young, regenerating forest, develop naturally after a disturbance. Several factors have contributed to the decline of these habitats in the Appalachian region, including suppression of natural fires, reduction in beaver populations, urban development and re-forestation of abandoned farmland. Experts believe that the availability of nesting habitat in highly forested landscapes must increase to recover golden-winged warbler populations (Roth et al 2012). As such, conservation efforts for the bird rely on sound forestry practices that mimic natural disturbances to improve the quality of existing breeding habitat and create new high-quality habitats.

Natural Resources Conservation Service



Deciduous residual trees are important for golden-winged warblers as sources of food and as song perches from which males defend their territories.

Using Science to Guide Conservation

Forest Inventory Analysis data from USDA's Forest Service showed that young forests in Pennsylvania declined from 19 percent to less than 10 percent between 1978 and 2012 (U.S. Forest Service 2015). Unfortunately, golden-winged warbler populations in this state have followed the same trend. Recognizing similar

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patterns across much of the bird's entire breeding range, conservation partners have been working to develop forest management recommendations that are based on the best available science and ongoing research on the warbler and how it responds to forest management.

Number of Forest Patches

In one such study, funded by the National Fish and Wildlife Foundation and the American Bird Conservancy, Marja Bakermans and colleagues (2015) studied recently harvested timber stands in Pennsylvania and western Maryland. They found that distance to the nearest young forest stand, percent young forest cover in the landscape, and number of residual trees within a harvest area were some of the most important factors in predicting golden-winged warbler abundance.

The authors recommend that during timber harvests, forest managers retain an appropriate number of canopy trees so as the younger trees grow, there is a mix of young and old trees. Additionally, they suggest that conservation efforts maintain a minimum acreage of young forest patches that are clustered together in the landscape. This way, when one young forest patch grows too old for nesting golden-winged warblers, another nearby patch is ready for their use.

Size of Forest Patches

Another study by Amber Roth and colleagues examined golden-winged warbler territory density and pairing success in Wisconsin timber harvests with varying amounts of residual trees (Roth et al. 2014). They found that habitat quality was dependent on whether live residual trees of an appropriate size were retained after timber harvest. This study also found that males were more successful in acquiring mates when three or more males were in the same patch of young forest, so creating enough habitat in a forest stand for several pairs of golden-wings is important.

Disturbance Dependent

Golden-winged warblers depend on disturbance events to create appropriate nesting habitat. Like other wildlife that depend on young forests, the bird uses openings created by natural or human-induced disturbances. These habitat patches, or early successional communities, generally contain scattered live trees as well as standing dead trees called snags. Population declines of this bird have been blamed in part on changes in land-use patterns and timber harvest methods in eastern North America, which have created a disproportionate amount of mature forest relative to young forests.



Popularly known as ecosystem engineers, beavers often occupy and then abandon their dams. The resulting meadows provide high-quality habitat for golden-winged warblers and many other species.

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Management Recommendations

From Bakermans et al. 2015

- Create habitat in forested landscapes. Young forest stands should be in landscapes with more than 70 percent forest cover.
- Maintain 15 percent of the landscape in young forest habitat.
- Cluster young forest stands within approximately a mile of one another.
- Retain 10 to 15 dominant or co-dominant crown class trees per acre. At least 40 percent of these trees should be greater than 15 inches in diameter.

From Roth et al. 2014

- Retain at least five, but ideally 10 to 15, trees per acre. At least 70 percent of these trees should be hardwood species that are greater than 6 inches in diameter.
- Create at least 22 acres of continuous nesting habitat. A minimum of 50 acres may be required in landscapes where densities of the birds are low.

Putting It All Together

Large-scale implementation of science-based habitat guidelines is necessary to stabilize and reverse golden-winged warbler population declines. Interagency efforts, such as USDA's Natural Resources Conservation Services' Working Lands for Wildlife (WLFW) partnership and the Regional Conservation Partnership Program (RCPP) provide technical and financial assistance to land managers and landowners to implement sustainable forest management practices that also improve wildlife habitat. Recent analyses funded by the USDA's Conservation Effects Assessment Project and partners have shown that through WLFW, RCPP and other efforts, thousands of acres of young forest habitat have been created throughout the Appalachian and Great Lakes regions benefiting the golden-winged warbler and other wildlife species that depend on this ephemeral habitat.



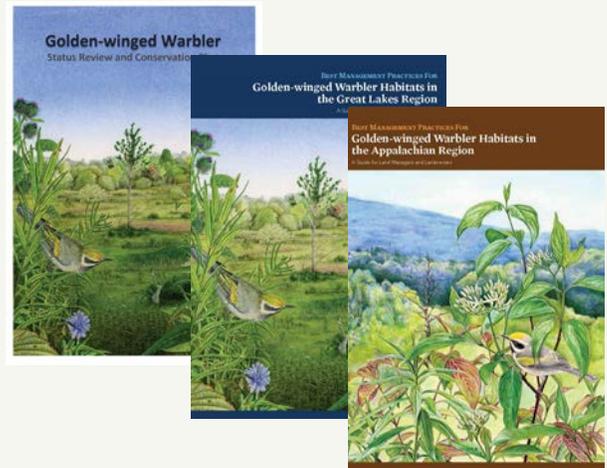
Residual trees can be evenly spaced throughout the forest stand, as seen in the northernmost area of the photo to the left or reserved in clusters as seen in the southernmost area to the left and in the photo below.



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Management Guidelines

Science-based habitat management guidelines are outlined in the Golden-winged Warbler Working Group's Golden-winged Warbler Status Review and Conservation Plan (Roth et al. 2012) and Golden-winged Warbler Habitat Best Management Practices for Forestlands (Bakermans et al. 2011). Regional guides are also available and provide best management practices specific to the Great Lakes and Appalachian regions. To learn more visit www.gwwa.org/plan.



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Dr. Larkin and his research team study a variety of applied science topics, including forest songbird ecology and conservation. He is also a science advisor for WLFW. Emily Bellush is a golden-winged warbler biologist and conservation planner. Both work directly with partner foresters, private landowners, and NRCS field offices through WLFW.

Cite as

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Additional Resources

To learn more about the Natural Resource Conservation Service's Working Lands for Wildlife partnership, visit nrcs.usda.gov/wildlife.

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Photo credits: Steven Jenear, NAIP 2015 Imagery, D.J. McNeil and Corinne Campbell.

Primary Sources

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