

Golden-winged warbler, *Vermivora chrysoptera*

Status: State: Endangered

Federal: Migratory Nongame Bird of Conservation Concern, Petitioned for listing

Identification

The golden-winged warbler is a gray bird, about 13 cm long and weighing around 9 grams, with a white belly, yellow forehead, and yellow wing patches. The male has a broad black eye patch and throat outlined in white. The female has a broad gray eye patch and throat outlined in white and her yellow forehead and wing patches are duller than the male's.



Male Golden-winged Warbler
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The main song, or Type I song of the golden-winged warbler is a buzzy “bee buzz buzz buzz”. Each “buzz” is at the same frequency, which is a slightly lower than the “bee”, and the number of buzzes following the “bee” commonly vary between 1 and 4 but can go up to 6 repetitions. The alternate song, or Type II song, is variable and generally consists of rapid stutters followed by a buzzy trill. Blue-winged warblers (*V. cyanoptera*) also sing a Type II song similar to golden-winged warblers, and often times golden-winged and blue-winged warblers will sing each other's Type I songs. The call notes of golden-winged and blue-winged warblers are also a similar “tzip”.

Habitat

Breeding: Golden-winged warblers breed in early successional shrub/young forest habitat in northwestern New Jersey (north of Route 80 and west of Route 287). Unlike other shrub-dependent birds, however, golden-winged warblers are not likely to be found breeding adjacent to active farms or residential communities. Instead they are forest-interior, disturbance-dependent species, meaning they require large contiguous areas of forest (>75% forest cover) that contain large patches (>10 acres) of open-canopy forest (approx. 10-30% canopy cover). To be suitable breeding habitat, these canopy openings need a moderate amount of shrub and herbaceous vegetation cover with interspersed trees, or shrubby clearings relatively close (<80 m) to a forest edge, such as high-tension powerlines. Elevation does not play a key role in habitat suitability in New Jersey.

Within these predominately forested areas in northwestern New Jersey, golden-winged warbler breeding territories can be found in forested and shrubby wetlands, beaver wetlands, upland shrubby fields, silvicultural practices resulting in regenerating forests and powerlines, preferably in or near mesic or hydric soils. In New Jersey, golden-winged warblers are found in the wetland areas of high-tension powerlines and beaver wetlands more than other habitat types, including shrubby wetlands. Upland shrubby habitats/regenerating forests with breeding golden-winged warblers tend to be between 3 and 18 years post-disturbance, depending on land use history and the predominant tree and shrub species in the area. Golden-winged warblers have high site fidelity and will return to the same breeding site each year, even if the habitat is altered due to mowing a part of the territory. Upon complete devastation of the habitat, however, golden-winged warblers will try to find a new breeding territory in close proximity (within ½ mile when possible) of the former one.

Structure is as important as species composition – golden-winged warblers need tall trees (song perches, territory defense, and foraging), shrubs and saplings (foraging, protection), and herbaceous vegetation (nesting). They prefer to be in areas with a patchy, or clustered, distribution of trees and shrubs, and to forage for caterpillars on cherries, white oaks, and a variety of shrub species, especially willows and alder.

Post-Breeding: After leaving the nest, golden-winged warbler chicks will use a variety of forested areas with dense shrubs and saplings but will avoid coniferous forests, grasslands, agricultural fields, and development.



Female golden-winged warbler on nest
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History

The first known records of golden-winged warblers in the Northeast were from the 1800s. Surveys done in the early 1900s in the Wyanokie (now the Wanaque Reservoir) noted golden-winged warblers to be the 15th most common bird, more than twice as common as the blue-winged warbler. By the 1980s blue-winged warblers were more common than golden-winged warblers while golden-winged warblers continued to decline. The breeding population was estimated to be around 100 pairs in 2000, and by 2008, the golden-winged population breeding in NJ had decreased to one-quarter of that population. Breeding Bird Survey (BBS) data show that golden-winged warbler population trends have been decreasing 10.1% per year in New Jersey since 1966. In 2009 golden-winged warblers were no longer detected on any BBS routes

in New Jersey. Due to the severe population declines the golden-winged warbler breeding population status in New Jersey was changed from special concern to endangered in 2012. Partners in Flight (PIF) considers the golden-winged warbler a species of high continental concern, meaning that conservation in this region is critical to the overall health of the species. Golden-winged warblers are also considered as a bird of conservation concern (FWS 2008) and near threatened (IUCN 2009). Targeted survey results in New Jersey indicate a 6.4% annual decline from 2012 – 2021 with a patchier distribution, and models estimate probable extirpation by 2030 if nothing changes.

Threats

Habitat: Habitat loss (breeding and non-breeding) and limited forest disturbance on the breeding grounds are the main causes for the population decline of golden-winged warblers. Prior to European settlement, recurring fire and severe weather events were some of the predominant drivers in creating habitat suitable for breeding golden-winged warblers in northwestern New Jersey, as were beavers. After Europeans settled, many areas were converted to farmland and forests were almost completely cut over. In the early- to mid- 1900s the beaver population was nearly extirpated in New Jersey and elsewhere, wildfires were better suppressed, and windstorms caused less damage because most of the forests were relatively young (<100 years old), dense, and further from the coast. Therefore, most of the golden-winged warbler habitat stemmed from the regeneration of clearcut forests and abandoned farmlands. By the time beaver populations stabilized in the 1970s, the anti-logging movement skyrocketed in the US and, while well-intentioned, limited the amount of forest management in New Jersey and elsewhere. When combined with the suppression of wildfires, the New Jersey housing boom in the 1980s and 2000s, and limited acceptable sites for beavers, breeding habitat for golden-winged warblers began to disappear.

Hybridization: Golden-winged and blue-winged warblers commonly hybridize where they have range overlap, which includes all northwestern New Jersey, and produce the fertile hybrids Brewster's warbler (*V. leucobronchialis*) and Lawrence's warbler (*V. lawrencii*). Golden-winged and blue-winged warblers became separate species approximately 1.5 million years ago, and it once was believed the clearing of forests and subsequent abandonment of farmlands from European settlement in the late 1700-1800s caused the habitat changes that brought the two species back together, thereby allowing for their hybridization. However, when looking into the history of fire regimes and the whole genome of these birds' evolutionary histories, these two species have been intermixing, at least intermittently, for thousands of years. Although they hybridize and are genetically similar, the pure golden-winged warbler gene pool is not being overtaken by blue-winged warbler genes, and vice-versa. Therefore, in the hybrid zone, the recommendation is to focus on managing the genetic and phenotypic diversity within the golden-winged/blue-winged warbler complex as a whole.

Climate Change: Golden-winged warbler populations across the eastern US have been expanding further north and west over the past 150 years, but that is more a factor of increased availability of habitat from abandoned agriculture and silviculture than climate change. Based on the USDA-FS Climate Change Models, the distribution of breeding golden-winged warblers is associated with vegetation type, not temperature. Therefore, changes in distribution as a result of climate change will be slower than those species more associated with temperature. The climate model predicts that, as vegetation changes due to climate change, golden-winged warblers in the Upper Midwest will not move north into the boreal forest but instead move further east and southeast into southern New England and New Jersey, assuming there's habitat for them. There are more immediate impacts of climate change to the golden-winged warbler population, however. Climatologists predict an increase in cold, wet days in the spring followed by warmer temperatures in the summer, warmer winters, increased precipitation during migration, and an increased risk of encountering hurricanes. These changes in weather patterns means an increase in blood parasites, lower adult survival during fall migration, delayed arrival and egg-laying in the spring, followed by heat and drought and torrential rains that will change water levels, food abundance, and possibly delay fledging.

Conservation Efforts

Currently, with limited development in the Highlands region and thousands of acres of preserved forest in northwestern New Jersey, forest succession coupled with a lack of forest disturbance to open the forest canopy has been the main threat to golden-winged warbler breeding habitat. Breeding habitat for golden-winged warblers can be created with silvicultural treatments, prescribed fire, maintenance of old fields, and prescribed grazing. Compared to old field maintenance, silvicultural treatments had higher densities of golden-winged warblers, nesting success and productivity, adult male survival, and juvenile survival. Prescribed fire within young forests had the lowest densities of golden-winged warblers, nesting success and productivity, but had higher adult male survival than old field maintenance. As such, using silviculture to create patches of diverse vegetation structure within otherwise contiguous forest areas is recommended over old field maintenance. Efforts to create breeding habitat for golden-winged warblers in New Jersey using silvicultural treatments are underway, but have been slowed by public resistance, especially in the larger publicly-owned forests.



Male golden-winged warbler in habitat created with a silvicultural treatment

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