

Monitoring Response of Early-successional Birds to Habitat Creation and Management in Northern Wisconsin

Annual Report (2015-17 Preliminary Research Results)



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Introduction

The Golden-winged Warbler (*Vermivora chrysoptera*) is one of the most critically threatened, non-federally listed vertebrates in eastern North America. In 2010, the Golden-winged Warbler was petitioned to be listed under the Federal Endangered Species Act and the U.S. Fish and Wildlife Service reviewed the petition and determined that it had substantial merit. As such, the Golden-winged Warbler Status Review and Conservation Plan was produced in 2012 to outline how best to create habitat for Golden-winged Warblers across the Appalachian and Great Lakes portions of the species' breeding range. This science-based document provides detailed prescriptions for different habitat types that allow the creation or maintenance of Golden-winged Warbler nesting habitat. Over the past several years, management actions have occurred on private and public lands across northern Wisconsin to enhance Golden-winged Warbler nesting habitat using timber harvest and shrub management. The primary goal of

these management actions is to arrest succession (shrub management) or revert mature forest to younger age classes (timber harvest) in a manner that promotes woody regeneration of the understory.

The primary goal of our biological survey effort was to initiate an inventory and monitoring program for Golden-winged Warbler, American Woodcock, and associated bird species across private and public lands of northern Wisconsin. Herein we present only results from private and public lands managed with shrub management and timber harvest. Although the management efforts are *targeted* at Golden-winged Warbler habitat and subsequent conservation, it seems likely that other early-successional specialist bird species (*e.g.*, American Woodcock *Scalopax minor*, other songbirds) may benefit from management. As such, we report results from all-species point counts which evaluate the extent to which non-target bird species may benefit from the management. Standardized monitoring protocols are used across all point surveys included in this project such that basic demographic data (*e.g.*, singing male densities) and relevant habitat features (*e.g.*, residual trees, shrub/sapling cover, and herbaceous cover) can be consistently collected and compared across a suite of managed sites across northern Wisconsin, Minnesota, and other states as future opportunities arise.

Objectives

- 1.** Quantify Golden-winged Warbler naïve occupancy and abundance in recently-managed areas across private- and public lands across northern Wisconsin.
- 2.** Describe the community of non-target (*i.e.*, non-Golden-winged Warbler) species occurring within habitats managed for Golden-winged Warblers within northern Wisconsin.
- 3.** Quantify American Woodcock naïve occupancy on recently-managed areas across northern Wisconsin.
- 4.** Quantify structural vegetation conditions relevant to Golden-winged Warblers on recently-managed areas across northern Wisconsin.

Methods

Survey location placement

To generate point locations for vegetation sampling and associated avian monitoring, we used the ‘*create random points*’ function in the geographic information system, ArcGIS. Whenever possible, we placed survey locations at least 80 m from an un-managed forest edge. Our final sample size of survey locations was n=40 locations across private and public lands in Wisconsin (Figure 1).

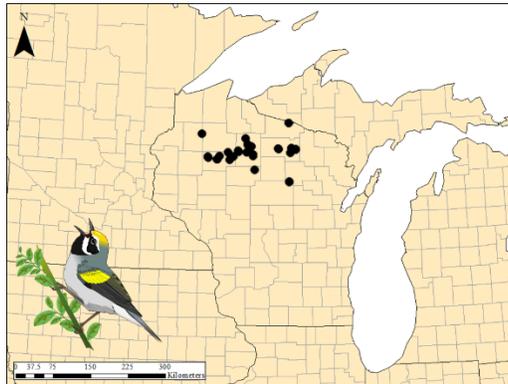


Figure 1. A map of Wisconsin depicting approximate locations of Golden-winged Warbler survey locations across the state. For privacy reasons, points on map show only approximate locations and have been adjusted slightly to obscure locations.

Vegetation sampling

In order to quantify the microhabitat variables among sites managed using conservation practices targeted toward Golden-winged Warblers, we conducted a vegetation survey at each point location. We surveyed vegetation from 15 June – 15 July, 2015-17. All vegetation data were collected along three radial transects, each 100 m in length and oriented at 0°, 120°, and 240° from the point count location. Along each transect plant strata measurements were taken at 10 “stops” (10 m apart; n=30/point count location). Vegetation strata recorded at each stop consisted of the presence/absence of sapling, shrub, *Rubus*, fern, forb, sedge, leaf litter, and bare ground. Trees were quantified using a basal area prism at the 0m, 50m, and 100m locations along each transect (n=7 total/point). Plant strata values were analyzed as percentages (*i.e.*, % cover) as some sites had outer portions of transects truncated due to irregularly-shaped management boundaries.

Diurnal songbird surveys

To quantify Golden-winged Warbler (and associated songbird) use of sites managed using timber harvest within northern Wisconsin, we conducted passerine point counts from 25 May through June 2015-17. Point counts locations were surveyed twice, annually, for songbirds. Points were each conducted by a single observer during fair weather and took place from 0.5 hr pre-sunrise and continued for 4.5 hours daily. Each point count survey consisted of a 10-minute

passive period, followed by a 2-minute Golden-winged Warbler playback, and a final 1-minute passive period.

Woodcock surveys

We conducted American Woodcock singing ground surveys at 12 sites that had been recently managed to create habitat for Golden-winged Warblers across northern Wisconsin. Surveys were conducted within the dates and time period permitted under the USFWS American Woodcock Singing Ground Survey protocol: 25 April - 15 May within the northern Great Lakes. The survey period each evening is only 38 minutes in duration. As such, sites were only surveyed once, annually, for American Woodcock in order to maximize the number of sites surveyed across the study area.

Results

Vegetation structure

We measured vegetation characteristics at 40 locations within northern Wisconsin (20 shrub management on public lands and 20 timber harvests on private lands). Figure 2 provides a summary for the vegetation characteristics results in each management type in Northern Wisconsin for Golden-winged Warbler nesting habitat. Among sites managed for Golden-winged Warblers, basal area was lower than recommended. Among these locations, 100% hosted woody regenerating stems. Woody regeneration was irregularly dense at the microhabitat scale though fairly even across stands (*i.e.*, few portions of the stand with sparse/no regenerating stems).

Although these vegetation characteristics were not entirely within the recommended values prescribed by the Golden-winged Warbler Status Review and Conservation Plan, sites were relatively young and (0-3 years old) and will continue to change as ecological succession continues.

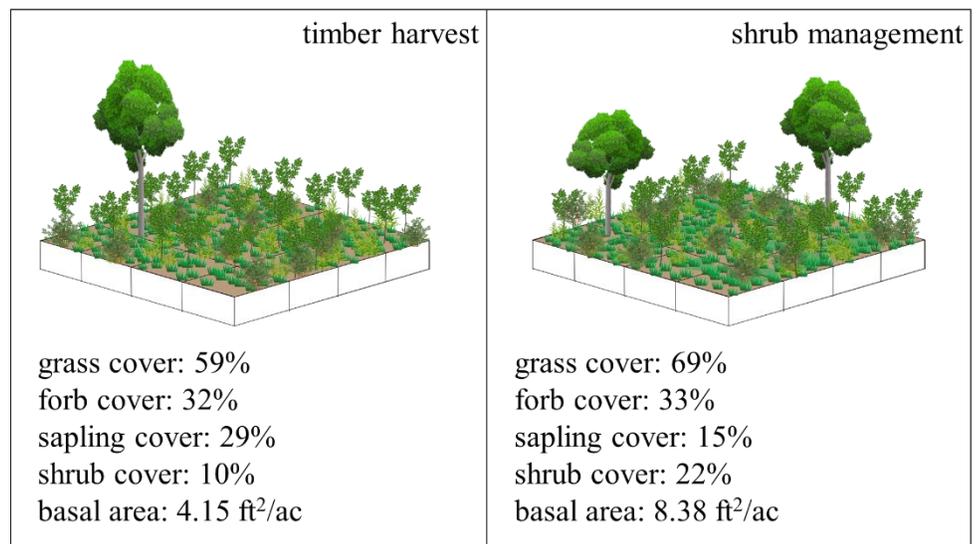


Figure 2. A graphical depiction of habitats managed in northern Wisconsin for Golden-winged Warbler nesting habitat. Left depicts a timber harvest with the average levels of vegetation measured in our study. Likewise, the right panel depicts a typical shrub management site.

Avian response

Woodcock surveys revealed a naïve occupancy of 67% among managed sites in Wisconsin. Average woodcock surveys had an average of 1.25 singing males/point and those with confirmed occupancy (≥ 1 male detected) hosted an average of 1.87 males/point. Ongoing modeling efforts are underway to evaluate the drivers behind patterns of occupancy of sites by woodcock to describe the extent to which occupancy could be increased through strategic management implementation. Golden-winged Warblers were more common yet: naïve occupancy for the species was 70%. Detection adjusted estimates of occupancy typically increase naïve counts +5-10%.

In addition to the target species (Golden-winged Warbler and American Woodcock), we observed 68 additional bird species during our surveys. These included common generalist bird species like Blue Jay, and Song Sparrow, mature forest nesting birds like Ovenbird, and early-successional nesting birds such as Chestnut-sided Warbler. Many of the birds detected within the managed habitat of northern Wisconsin were species in population decline as described by the North American Breeding Bird Survey (*e.g.*, Common Yellowthroat, Chestnut-sided Warbler, Indigo Bunting). This suggests that the management efforts yield habitat for a variety of species that are understood to be limited chiefly by the availability of breeding habitat.