Oak Regeneration Under Varying Treatment Regimes: Management Guidelines and Implications for At-risk Avian Species

Project # SAP-GCWA-20

Background:

Numerous North American oak (*Quercus*) species are experiencing recruitment failure, with potentially dire consequences for wildlife species dependent on oak forests. The golden-cheeked warbler (*Setophaga chrysoparia*) is one such species, dependent on oak forests for breeding and experiencing habitat loss throughout its range, including on Fort Hood, Texas. Little is known about how military land management practices influence oak recruitment and, therefore, long-term maintenance of oak habitats and the species that depend on them.

Golden-cheeked warbler on Fort Hood, Texas.
Photo credit Gil Eckrich.

Objective:

The objectives of this project were to 1) conduct a review of current literature on oak recruitment failure and best management practices to facilitate oak regeneration and 2) empirically evaluate the effects of forest management practices on oak recruitment in oak-juniper habitats with a focus on military land management. Fort Hood military reservation provides a unique opportunity to examine this question as Fort Hood has conducted forest management over many decades, creating a patchwork of treatments of various ages, facilitating long-term and short-term analyses. In addition, Fort Hood is home to the endangered golden-cheeked warbler.

Summary of Approach:

The first objective was to conduct a literature review of current information on oak recruitment that would be relevant to Department of Defense (DoD) natural resource managers. We focused specifically on studies that examined either mechanisms behind recruitment failure or management strategies that influence oak regeneration.

For the second objective, oak recruitment was evaluated in woodland plots at Fort Hood that had experienced mechanical thinning or wildfire or was unmanaged (control). Within these plots, we assessed ground cover, herbivore browsing, and stem density of all seedlings, shrubs, saplings and trees. We also categorized use of plots by herbivores using game cameras.

Benefit:

Understanding the impacts of military land management on oak recruitment is critical for DoD land managers when developing appropriate forest management programs on installations that harbor at-risk and endangered wildlife species that are dependent on oak habitats. Maintenance of habitat for at-risk avian species helps to ensure that installations are in compliance with the Migratory Bird Treaty Act, Endangered Species Act, and Sikes Act. A large number of installations employ forest management strategies and the information garnered from this project inform the conservation of wildlife habitat while maintaining habitats for military training and testing.

Accomplishments:

Habitat assessments were conducted at 175 plots that had been mechanically thinned with mulch application, 49 plots that had been mechanically thinned and slash removed, 455 plots that had experienced wildfire and 308 unmanaged (control) plots. We found that seedling density was lower on thinned plots compared to control or wildfire plots and that the proportion of stems browsed was higher. We documented extensive use of thinned plots by ungulates, particularly white-tailed deer and domestic cattle.

The results, in combination with a literature review of the current state of knowledge, suggest that oak regeneration on military installations will likely require a suite of management strategies. Mechanical thinning prescriptions would benefit from secondary management strategies including prescribed fire, herbivore control and/or shrub management.

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