

Utility of Ecological Site Descriptions for the Management and Conservation of Endangered Species



of Endangered Species

Michael E. Marshall

Institute of Renewable Natural Resources, Texas A&M University



Introduction

- Many habitat selection studies for golden-cheeked warblers and black-capped vireos have focused on issues of canopy cover.
- However, tree species composition has a variety of implications for avian habitat selection (i.e. nest sites, roost sites, song perches, water availability, and food availability).
- ESDs can be a unique tool that operate as a proxy for tree species composition.
- If ESDs are correlated with abundance and habitat quality for the vireo and warbler, land managers can use ESDs for prioritization, conservation, and restoration of breeding habitat.

Objectives

- Examine the link between ESDs and habitat quality for the golden-cheeked warbler by investigating food availability and foraging behavior as key mechanisms.
- Integrate ESDs into an impact assessment addressing the potential effects of understory thinning and infantry training on the warbler.
- Investigate the utility of ESDs as a predictor of vireo and warbler density for a spatially explicit habitat model.

Study Area

Research was conducted during the 2008-2011 breeding seasons on Fort Hood, Texas.

Methods

- For objectives 1 and 2, fledging and pairing success metrics were obtained by territory mapping and monitoring and fledgling searches.
- For objective 1, tree species composition was obtained by visiting 20m regularly spaced points within territories, and recording canopy cover and tree species at each point.
- For objective 1, foraging data was collected via behavioral observations, while food availability was measured by sampling arthropods from branch clippings.
- For objective 2, warblers were monitored in a woodland patch that received understory thinning, and 2 adjacent controls where no thinning had occurred.
- For objective 3, density of warblers and vireos were obtained by performing 3 point counts at > 400 random locations during the breeding season.

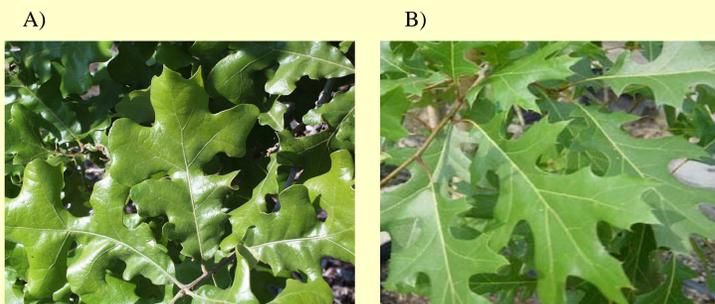


Figure 1. Dominant oaks for each ecosite: A) Post oak (Redlands) and B) Texas oak (Low Stony Hill)

Objective 1: Linking ESDs to Habitat Quality

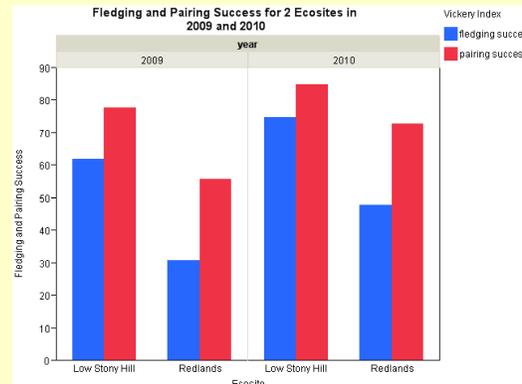


Figure 2. Pairing and fledging success was much lower in the Redlands site in 2009 and 2010.

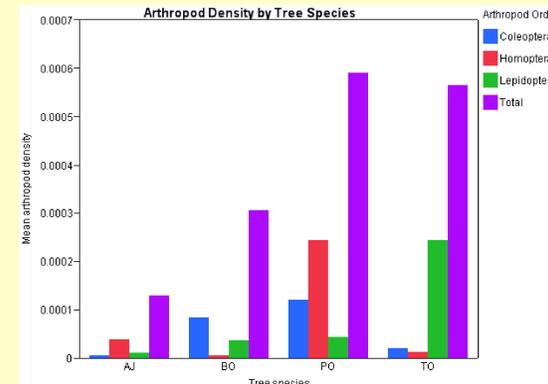


Figure 3. Lepidopteran density (a preferred food item) was significantly greater on Texas oak ($p < .001$); a common oak in the low stony hill ecosite.

Objective 2: Impact Assessment

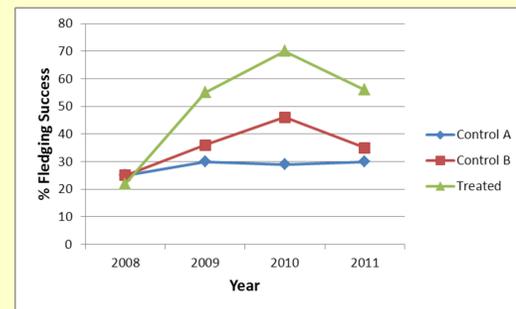


Figure 4. Warblers were more successful in areas where understory was thinned (green triangles) for 3 of 4 years.

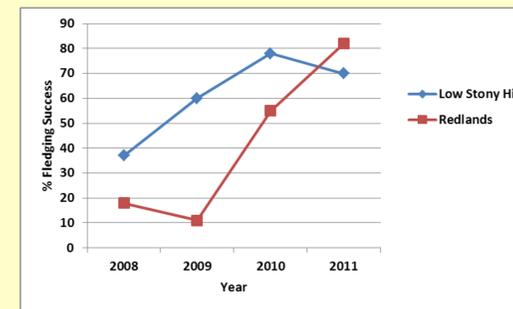


Figure 5. Regardless of whether a territory was in a thinned area or a control, ecosite was a good predictor of fledging success.

Objective 3: ESDs as Density Predictors

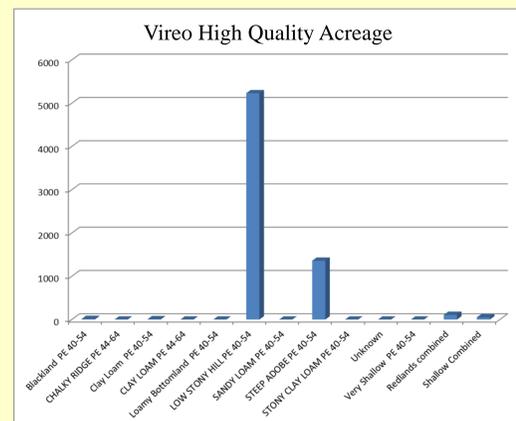


Figure 6. Although vireos occupy many ecosites, 97% of all high quality habitat can be found in low stony hill or steep adobe ecosites.

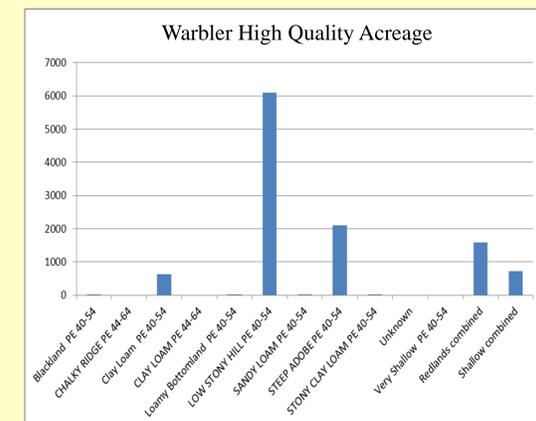


Figure 7. Although warblers occupy many ecosites, 77% of all high quality habitat can be found in low Stony hill or steep adobe ecosites.

Results

- The major difference in tree composition between Low Stony Hill and Redlands was abundance of Texas and post oaks (fig 1).
- Fledging and pairing success were much higher in Low Stony Hill sites compared to Redlands sites (fig 2).
- Texas oak has a significantly higher density of Lepidoptera compared to other common tree species (fig 3).
- Warblers responded positively to the understory thinning treatment (fig 4).
- Ecosite was a good predictor of reproductive success; whether a territory had received thinning or not (fig 5).
- 97% of all high quality vireo habitat is predicted to be found in low stony hill or steep adobe ecosites on Fort Hood (fig 7).
- 77% of all high quality warbler habitat is predicted to be found in low stony hill or steep adobe ecosites on Fort Hood (fig 8).

Discussion

- Golden-cheeked warblers prefer Texas oak as a foraging substrate, and Redlands has significantly less Texas oak compared to Low Stony Hill.
- There is a strong link between ecosite and reproductive success for the warbler, and this appears correlated with food availability.
- Thinning of understory vegetation in warbler habitat increases training flexibility, and appears to have a positive effect on warbler productivity.
- ESDs were critical in creating a spatially explicit habitat model for both species, as ecosite was a good predictor of density on Fort Hood.
- There needs to be more cross-pollination of the range and wildlife fields, especially in endangered species research.

Management Implications

- Ecosite is a unit that is useful for management (i.e. GIS products).
- Link between ESDs and habitat quality can help to increase military training and operational flexibility.
- Restoration and management in general can benefit by knowing what habitat types should be targeted for conservation based on habitat quality.

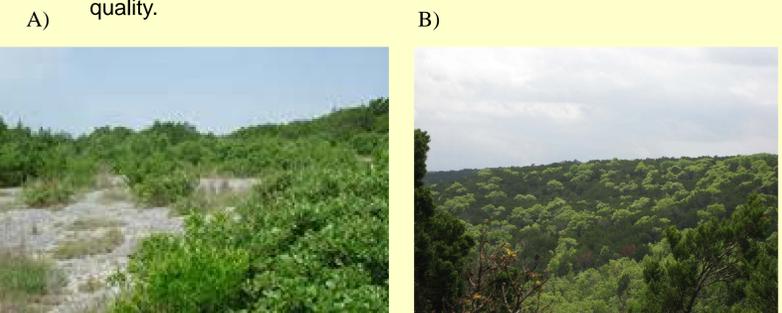


Figure 8. Typical habitat for A) black-capped vireo and B) golden-cheeked warbler on Fort Hood, Texas.

Acknowledgements

- Dr. Roel Lopez, Institute of Renewable Natural Resources
- Dr. Neal Wilkins, Institute of Renewable Natural Resources
- Dr. Michael Morrison, Texas A&M University
- Brian Hays, Institute of Renewable Natural Resources
- Todd Snelgrove, Institute of Renewable Natural Resources
- US Army Intensive Training Area Management Program