



# **Department of Defense Legacy Resource Management Program**

PROJECT NUMBER (13-631)

**Status and Distribution Modeling of Golden Eagles  
on Southwestern Military Installations and  
Overflight Areas: Assessing “Take” for this  
Sensitive Species at Risk  
Year 2 – Fact Sheet**



# Status and Distribution Modeling of Golden Eagles on Southwestern Military Installations and Over Flight Areas: assessing "take" for this sensitive species at risk – Year 2

Project # 13-631



Figure 1. Golden eagle nesting on a ledge outcrop.

## Background:

This Department of Defense (DoD) Legacy Program project (13-631) continued to refine and increase the precision of the status and distribution of nesting golden eagle (*Aquila chrysaetos*; GOEA) within and adjacent to DoD managed lands in the southwestern United States (U.S.) to inform acceptable GOEA “take” limits in compliance with the Bald and Golden Eagle Protection Act (BGEPA). Identifying GOEA nesting habitat on a landscape scale has been a challenge (Figure 1), but we built upon the models developed in the first year of this project (12-631). Our challenge from our first year’s models was to reduce variation across such a wide geographic range and improve predictive performance. We did this by using the delineation of Bird Conservation Regions (BCR) to develop suitable models. This is the same management unit used by the U.S. Fish and Wildlife Service (USFWS) which has identified a net-zero take threshold of GOEA under the BGEPA.

## Objective:

Objectives of this project were to develop GOEA nesting distribution and status models with improved predictive power for application across southwestern military installations and their over-flight areas (a.k.a. Military Training Routes [MTRs]; Figure 2). We conducted surveys across the landscape within each BCR, and completed repeated visits to collect demographic parameters

associated with nest occupancy and nesting success. These data can improve information derived from nesting habitat models to help inform both natural resource managers and military personnel on spatial, temporal, and demographic contexts of GOEA status across the southwestern United States.

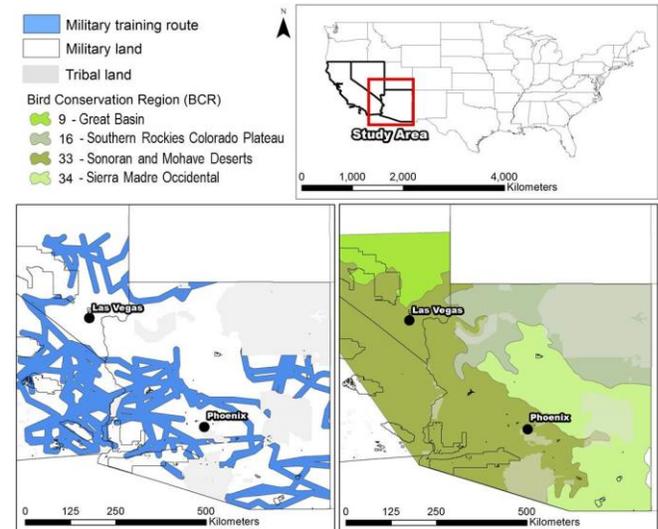


Figure 2. Study area for golden eagle surveys on military lands (black outline) in the southwestern United States, 2014. Military training routes (MTR) and BCR are separated. Tribal lands (gray fill) are included for reference.

## Summary of Approach:

Using a combination of three survey techniques (Figure 3) to maximize efforts, we examined areas in previously under- or non-surveyed areas to identify GOEA nests. We used fixed-wing aircraft to revisit a randomly selected set of nests to track demographic parameters. We partitioned our data by BCR to develop more precise and refined nesting habitat models for GOEA at the same scale as the USFWS assesses take thresholds. Finally, we compared GOEA occupancy and nest success within MTR and outside MTR and modeled nest demographic parameters using a list of *a priori* covariates including topographic and climatic variables.



Figure 3. Three survey methods (ground, helicopter, and fixed-wing) used for identifying golden eagle nests during 2014 in the southwestern United States.

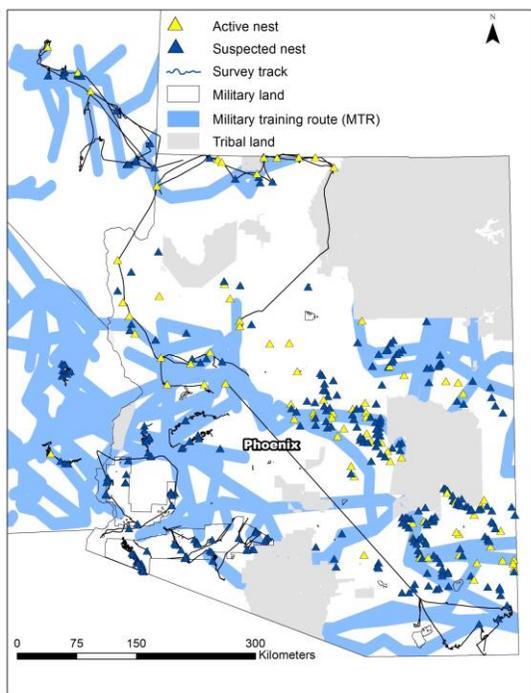


## Benefit:

Documented strengths and limitations of various survey techniques will allow military installations to make informed decisions on rapid assessments of golden eagle status and distribution within specific landscapes. The use of the improved, BCR-specific models will allow natural resource managers to refine and/or prioritize potential GOEA nesting habitats and direct future efforts while maintaining flexibility in military activities with BGEPA compliance.

## Accomplishments:

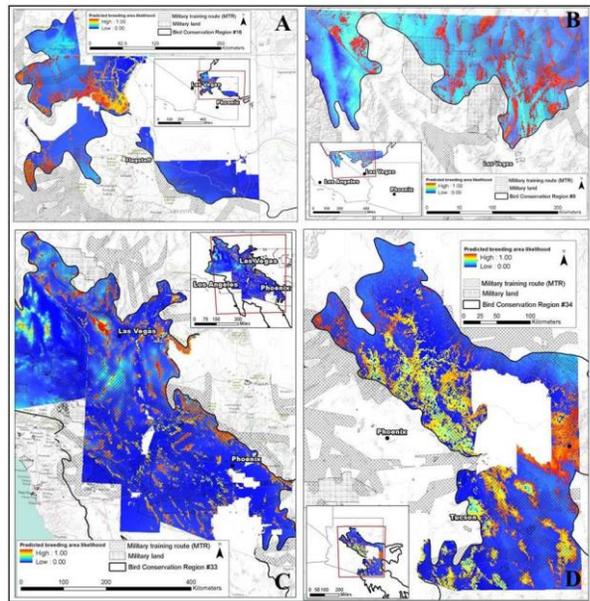
In 2014, we combined efforts by the Nevada Department of Wildlife and the Arizona Game and Fish Department's Nongame Branch with our own (Figure 4) to develop robust GOEA nest habitat models of the four BCRs in our study area. Our surveys consisted of nearly 8,000 km of potential habitat documenting and monitoring 333 potential nest sites with 82 of these active (Figure 4). Along with collaborative efforts we monitored 286 potential nesting locations (153 occupied) with repeated visits to produce demographic models.



**Figure 4.** Summary results of golden eagle nest surveys in Arizona, southeastern California, and southern Nevada, 2014 with collaborative efforts by Arizona Game and Fish Department's Nongame Branch.

By leveraging our data with concurrent, non-duplicated efforts, we identified potential and non-nest sites across the study area and developed BCR-specific predictive models across the

southwestern U.S. using covariates describing potential GOEA nesting habitat (Figure 5). Demographic parameters resulting from revisited nest locations detected no significant difference in GOEA nest occupancy between lands designated as MTR and non-MTR airspace. We detected significantly higher GOEA nest success under MTR-designated airspace. These results suggest compliance with the BGEPA and allude to potential benefits of designating airspace routes for military maneuvers.



**Figure 5.** Predicted golden eagle nesting likelihood in the southwestern United States in 2014 by Bird Conservation Region: BCR-16 (A), BCR-9 (B), BCR-33 (C), and BCR-34 (D).

As current military activities appear not to adversely impact breeding GOEAs under MTRs and supports BGEPA compliance, our management recommendations include: 1) continued monitoring of known and suspected GOEA nests, 2) coordinate with local authorities on current distribution and status, 3) development of avoidance zones around known GOEA nests during the breeding season, and 4) avoid disturbance of suspected GOEA nests and high likelihood nesting habitat during the early breeding season.

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