Department of Defense
Legacy Resource Management Program

PROJECT NUMBER (10-143)
MIPR NUMBER (W9132T-10-2-0033)

Identification and Status of Sensitive Bat Habitat Resources on the Marine Corps Air Station Yuma, Barry M. Goldwater Range, and Yuma Proving Ground

Year 1 – Factsheet

REVISED 9/24/2014

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Background:

The importance of abandoned mines and caves for bats lies in their potential to provide a variety of roosting sites including maternity, hibernacula, day, night, and interim roosts driven by specific micro-climates. Maternity roosts provide a secure location for females to give birth and rear their young throughout the summer season. Hibernacula provide a winter refuge for non-migratory bats. Day roosts are used by non-reproductive individuals of both sexes while night roosts are utilized by all bats, regardless of reproductive status, as a place to rest and to digest their prey between foraging bouts. Night roosts are generally in different locations than day roosts and are used primarily at dawn and dusk.

Some species of bat utilizing these features include at-risk species such as California leaf-nose and Townsend big-eared bats. Given the possibility for Endangered Species Act listing and the challenges that such a decision would impose upon the Department of Defense (DoD), it is prudent to understand the distribution and habitat associations of sensitive bat resources on military ranges in the Southwest.

Photo: Arizona Game and Fish Department.

Objective:

Our objective was to identify potential bat roost structures on the three southwestern DoD installations (i.e., Barry M. Goldwater Range East and West, Yuma Proving Ground) by developing a landscape-scale Geographic Information System (GIS) model that identifies areas of potential subterranean features (i.e., caves and mines; hereafter features). We surveyed for and then documented all features and applied a random sampling protocol throughout areas identified in the GIS model as high likelihood of features present.

Summary of Approach:

We developed a remotely-sensed GIS-based model that utilizes geo-referenced macro-variables to predict areas of potential bat roosting features on the three DoD installations.

To systematically survey the three DoD installations, we overlaid the State of Arizona Township, Range and Section grids with the model output in all three DoD installations. Ground searches consisted of two-person crews walking canyons and ridgelines with Global Positioning System (GPS) units and detailed model outputs. Surveyors conducted ground searches and visually scanned adjacent slopes for mine and cave openings. When a feature (cave, crevice, or mine) was located, we recorded the geographic location and evidence of bat use (i.e., guano, ceiling staining and remaining insect parts).

Benefit:

Caves and mines are important habitats for many bat species that occupy DoD installations in southern Arizona. Military exercises and munitions testing in proximity to features (i.e., caves and mines) have increased in recent years throughout these military installations. Combined with training area maps, identification of roost site locations can reduce conflicts between at-risk bat species and military missions.

Accomplishments:

We developed a potential feature-predicting model using six GIS layers describing terrain and landform characteristics. We randomly selected areas with the highest model rankings (8, 9 and 10) and surveyed these areas throughout the field season. We identified 147 features consisting of caves and mines that contained sign of bat occupancy. When bats were found, we identified what species and approximately how many were utilizing the feature when possible.

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