



# The Bat Grid Inventory and Monitoring Project: A Regional Approach to Inventorying and Monitoring Bat Populations

Project # 10-390

## Background:

Species identification and distribution information are fundamental to effective conservation efforts. The need for baseline data on bat species in the Pacific Northwest (PNW) is particularly crucial in light of potential threats from wind energy development, white-nose syndrome, and climate change.

From 2008 to 2010, the Department of Defense (DoD) Legacy Program teamed-up with over 20 partners in the Pacific Northwest to expand and refine a systematic inventory and monitoring program to establish credible baseline data for 16 species of bats. Partners included the US Forest Service, Bureau of Land Management (BLM), National Park Service, Fish and Wildlife Service, the Confederated Tribes, State wildlife agencies, The Nature Conservancy, Bats Northwest, Portland State University, and Humboldt State University. Personnel from 9 DoD facilities participated in the survey project known as “The Bat Grid”. The Bat Grid provides an interagency standardized approach for collecting acoustic, morphometric, and genetic data in Oregon and Washington during summer surveys. In 2010, data from 2006 through 2009 was analyzed using Bayesian and occupancy statistics to establish baseline data on species occurrence and trends in the Pacific Northwest.

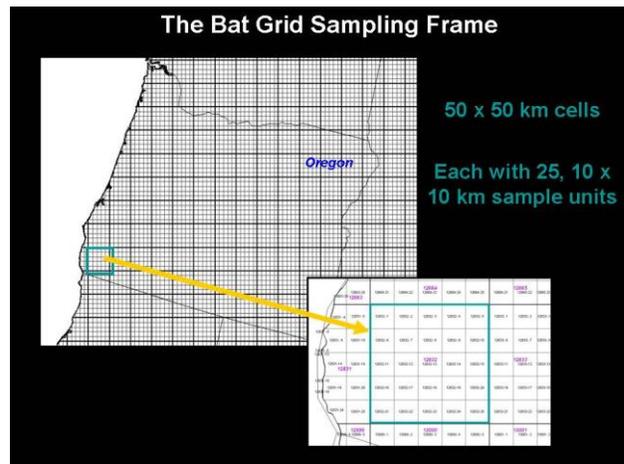


Setting up for a night of bat work.

## Objective:

The specific objectives of The Bat Grid Project are:

- develop better field methods for confirming species identification and distribution,
- inventory bat species across the region and describe within and between species acoustic, morphometric, and genetic variability,
- assess change in species presence and distribution over time,
- collect, manage, and disseminate data to further species and habitat conservation,
- establish strong and meaningful partnerships invested in bat conservation.



**Figure 1: The Bat Grid sampling frame is a wall-to-wall GIS generated grid covering North America. Fifty x fifty km cells are used to distribute sample unit selection across the region. Each cell is comprised of 25 sample units. One to several 10 x 10 km sample units are selected from within each cell.**

## Summary of Approach:

Training, surveys, and technical support were provided for Bat grid participants as has been previously described in reports and fact sheets.

Acoustic and capture data from 2006-2009 was entered in an Access data base. Extracting the data from Access in a binary format across multiple years that could be applied to developing statistical occupancy models required a complex iterative process using Microsoft Excel software. Hierarchical occupancy models were developed for 13 bat



species using WinBUGS 1.4 and R 2.11.0 to implement a Bayesian estimation of model parameters via Markov chain Monte Carlo (MCMC) samples.

**Benefit:**

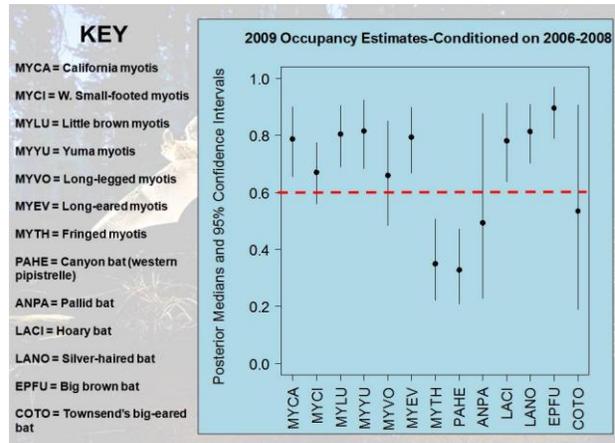
DoD lands and personnel in the PNW are now incorporated into The Bat Grid, including collection of baseline data on species presence at DoD facilities and neighboring properties. For many DoD facilities and their partners, this is the first time bat data have been available to apply to their conservation efforts. Additionally, contributing to and receiving insight on the regional status of bat species expands and enhances the context of locally collected data. Many of the partnerships initiated through The Bat Grid evolve in to long-term collaborations.



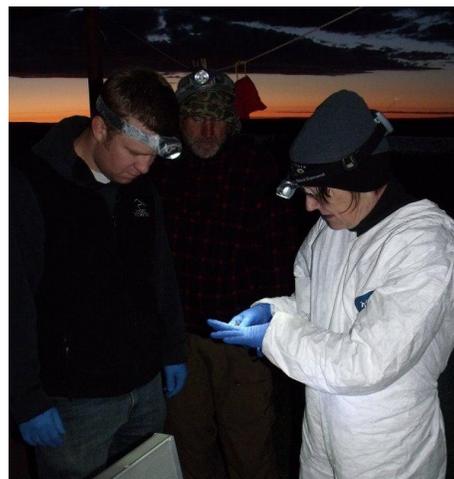
**Dr Joe Szewczak (Humboldt State University) teaches a “Gridder” how to attach the harness of a tether pole to a bat to collect acoustic calls.**

**Accomplishments:**

In 2010, in addition to training and field surveys, we focused on occupancy analysis using acoustic and capture data collected from 2006-2009. The data analysis resulted in occupancy estimates for 13 species of bats that can be used as a baseline for population trends in the Pacific Northwest (Figure 2).



**Figure 2: Probability of occupancy for 13 species of bats in the PNW based on Bat Grid acoustic and capture data collected from 2006 through 2009.**



**Pat Ormsbee teaches proper handling of a bat.**

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