Bat Inventory of Eugene O'Neill National Historic Site, John Muir National Historic Site, and Point Reyes National Seashore

The Question: *What bat species are present at the John Muir National Historic Site, Eugene O'Neill National Historic Site, and Point Reyes National Seashore? Which bat species utilize different habitats within Point Reyes National Seashore?*

Sample vocalization of a silver-haired bat (Lasionycteris noctivagans) collected through the Anabat II Detector System.

Bats are economically and ecologically important animals. They provide ecosystem services such as pollination and predation of insects. Bats are nocturnal and use cryptic, inaccessible roost sites making them difficult to study in the wild. In general, bat populations are believed to be declining. Most species have very low reproductive rates (1 young per year) making recovery a very slow process. Many are also constrained by a limited number of specific roosting sites for a large number of individuals in a population. The causes of the declines are likely due to direct and indirect human impacts, primarily through destruction of foraging and roosting sites. The wildland-urban interface is an important location to inventory and monitor bat populations to determine what impacts human development may have on the populations.

Biodiversity of bats in the U.S. is relatively low (45 species) in comparison to other taxa. The central coast of California is known to support 17 species from two families. Nine of the 17 species have special status and all are insectivorous.

The Project: Use acoustic sampling to conduct bat inventories at parks in the San Francisco Bay Area Network of Parks.

Acoustic sampling was conducted at Eugene O'Neill National Historic Site (EUON), John Muir National Historic Site (JOMU), and Point Reyes National Seashore (PORE); all of which are parks on the wildland-urban interface. One station was installed at both JOMU and EUON and eight stations were installed at PORE with one on the Golden Gate National Recreation Area North Unit (administered by PORE) to target a range of habitats. Acoustic sampling utilizes an Anabat II Detector System which detects the ultrasonic echolocation calls and converts the signals into graphs on a computer. Sampling location was constrained by the need for 24-hour access to 110v power, thus all sample sites were on or near structures. Anabat II Detector Systems were installed and connected to a computer to collect data every night. Data was downloaded and the units checked at least once each month. One station at PORE, the Bear Valley monitoring station, has been operating since 1999. All other stations were installed in 2002. Some stations are still collecting data as of April 2006.

The graph of each call is unique and can often be used to determine the species based on the frequency, call shape, call duration and time intervals. Knowledge of the local bat fauna and ecology is necessary when analyzing acoustic data.
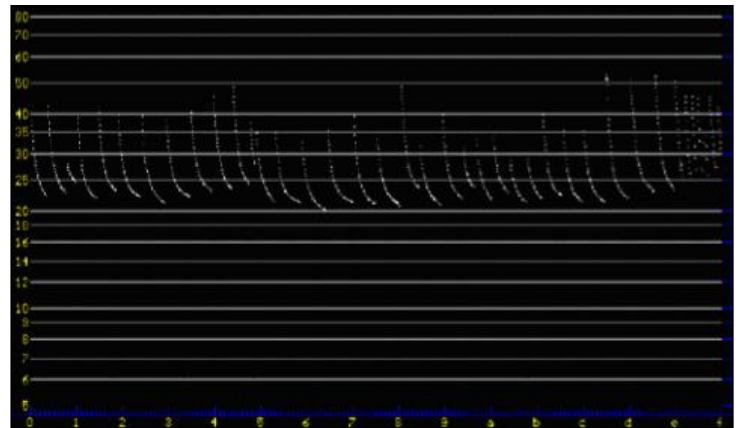
The Results: Nine bat species were detected at JOMU, EUON, and PORE using acoustic monitoring techniques. More species may be detected through alternate sampling methods. There are large differences between the numbers of calls at different sampling locations.

The differences in numbers of calls at different locations are likely due to 1) the number of individual bats in the vicinity of the detector, and 2) the activity of a few bats that might be foraging (e.g., flying back and forth) in the vicinity of the detector. There are known bat roosts in the vicinity of the detectors at the Clem Miller Education Center (PORE), PRBO Conservation Science (Palomarin), and the Wilkins Ranch sites (Bolinas). Interestingly, there is almost certainly not a roost in the vicinity of the detector at Olema Marsh, one of the sites where a fairly large number of bats were detected.

Park	Location	Days	Total # of Calls	Calls/Day
EUON	Maintenance barn	386	327,640	848.8
JOMU	Maintenance building	423	223,960	529.5
PORE	Bear Valley	714	552,367	773.6
PORE	Education Center	472	1,849,923	3919.3
PORE	Learning Center	299	93,023	311.1
PORE	North District Operations Center	333	64,890	194.9
PORE	Olema Marsh	424	459,052	1082.7
PORE	PRBO Conservation Science (Palomarin)	317	749,260	2363.6
PORE	Pt. Reyes National Seashore Association	393	174,212	443.3
PORE	Shallow Beach	383	208,728	544.9
PORE	Wilkins Ranch	480	620,302	1292.3

Table 1. 2002–2003 sampling locations for bat inventories.

Scientific Name	Common Name	Special Status	Park
Myotis lucifugus	Little brown myotis	----------	EUON, JOMU, PORE
Myotis yumanensis	Yuma myotis	----------	EUON, JOMU, PORE
Myotis thysanodes	Fringed myotis	FS, BLM, WBWG	EUON, JOMU, PORE
Myotis californicus	California myotis	----------	EUON, JOMU, PORE
Lasionycteris noctivagans	Silver-haired bat	----------	EUON, JOMU, PORE
Eptesicus fuscus	Big brown bat	----------	EUON, JOMU, PORE
Lasiurus blossevillii	Western red bat	FS, WBWG	EUON, JOMU, PORE
Lasiurus cinereus	Hoary bat	----------	EUON, JOMU, PORE
Tadarida brasiliensis	Mexican free-tailed bat	----------	EUON, JOMU, PORE

Table 2. Table of bat species detectable by acoustic monitoring at each park. Special status codes: FS = Forest Service Sensitive species; BLM = Bureau of Land Management Sensitive species; and WBWG = Western Bat Working Group High Priority species.

Additional Resources

San Francisco Bay Area Inventory and Monitoring Program: www1.nature.nps.gov/im/units/sfan/index.htm
USGS Western Ecolgoical Research Center: http://www.werc.usgs.gov/bats

For More Information

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