National Park Service
U.S. Department of the Interior
Pacific Coast Science and Learning Center
Research Project Summary May 2006

Bat Inventory of Pinnacles National Monument

The Question: *What bat species are present at Pinnacles National Monument? Are any sensitive species present?*

Bats are economically and ecologically important animals providing ecosystem services such as pollination and insect predation. Most bat species are difficult to study in the wild because of their nocturnal foraging and cryptic, inaccessible roost sites. On average, bat populations are believed to be declining. Most species have very low reproductive rates (e.g. one offspring 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. Forty-five species of bats are found in the United States and the central coast of California is known to support 17 species from two families (*Vespertilionidae* and *Molossidae*). Nine of the 17 species have special status and all are insectivorous.



Titley Electronics, Australia, http://www.titley.com.au/tanabat.htm

The AnaBat II Detector System was used to record ultrasonic echolocation calls of bats at Pinnacles National Monument.

Since Pinnacles National Monument (PINN) provides important and unique habitat for bats, baseline information on populations is critical to management needs. The talus caves of Pinnacles were formed when steep, narrow canyons filled with rocks and boulders from the cliffs above and were supported in place by rocks and sand. These features are seen within the park at the Bear Gulch Cave and the Balconies Cave.

The Project: *To use multiple surveys for bat inventory at PINN.*

To characterize the diversity of bat species at Pinnacles National Monument, researchers used multiple survey techniques, including acoustic sampling, mist-nets, and roost sampling from August 2004 through July 2005. Each method had inherent biases and different detection likelihood for each bat species.

Acoustic sampling involved the use of an AnaBat II Detector System to detect the ultrasonic echolocation calls and convert the signals into graphs on a computer. 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. Acoustic sampling was conducted at eight sites within PINN and operated between 7:30 pm and 6:30 am. This method detected 11 of the 17 bats expected to be in this area.

Mist-nets similar to those used to capture birds were set over water, trails and other known flyways. After capture in the mist-net, the bats were handled to collect data on the reproductive condition, sex, age and body measurements. Bats were immediately released on-site once the data were collected.

Roost sampling was also used to inventory bats. Multiple sites, including the Bear Gulch Cave, were surveyed to determine their use as roost sites by bats.

The Results: *A total of 13 of species have been documented at PINN. Seven species have special status. An additional three species are likely to occur but were not positively identified during the inventory. Species were detected throughout the year, with reproductive populations present during the summer months. Species were observed foraging in riparian habitats and roosting in cave features.*

Scientific name	Common name	Special Status	Method of detection
Myotis lucifugus	Little brown myotis	----------	***
Myotis yumanensis	Yuma myotis	----------	Ac, Mn, V
Myotis evotis	Western long-eared myotis	FS, BLM	Ac
Myotis thysanodes	Fringed myotis	FS, BLM, WBWG	Ac, Mn
Myotis volans	Long-legged myotis	----------	***
Myotis californicus	California myotis	----------	Ac, Mn, V
Myotis ciliolabrum	Western small-footed myotis	FS, BLM	Mn
Lasionycteris noctivagans	Silver-haired bat	----------	***
Pipistrellus hesperus	Western pipistrelle	----------	Ac, Mn, V
Eptesicus fuscus	Big brown bat	----------	Ac, Mn, V
Lasiurus blossevillii	Western red bat	FS, WBWG	Ac, Mn
Lasiurus cinereus	Hoary bat	----------	Ac, Mn
Corynorhinus townsendii	Townsend's big-eared bat	FSC, CDFG, FS, BLM, WBWG	Ac, Mn, V
Antrozous pallidus	Pallid bat	CDFG, FS, CLM, WBWG	Ac, Mn, V
Tadarida brasiliensis	Mexican free-tailed bat	----------	Mn, V
Eumops perotus	Western mastiff bat	FSC, CDFG, BLM, WBWG	Ac, V

Table of bat species occurring or presumed to occur at Pinnacles National Monument. Special Status Codes: FSC = Federal Special Concern species; CDFG = California Department of Fish and Game's California Special Concern species; FS = Forest Service Sensitive species; BLM = Bureau of Land Management Sensitive species; and WBWG = Western Bat Working Group High Priority species. Method of detection codes: Ac = Acoustic detection; Mn = Mist net capture; V = Visual detection; and * = not detected but presence possible.**

Additional Resources

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

For More Information

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The Pacific Coast Science and Learning Center is one of 15 centers across the country working to increase the effectiveness and communication of research and science results in the national parks by facilitating the use of parks for scientific inquiry, supporting science-informed decision making, communicating relevance and providing access to research knowledge, and promoting resource stewardship through partnerships.