

Going Batty

in Ventura

Acoustic Recordings and New Condos Track and Settle Bat Population

Naval Base Ventura County (NBVC), Point Mugu, California is making possible the co-existence of bats and Navy personnel by identify the buildings currently occupied by bats, assessing the seasonality of bat movement, inventorying the bat species and relocating bats to newly constructed “bat condos” on the base.

For many years, the buildings at NBVC have sheltered Mexican (a.k.a Brazilian) free-tailed bats (*Tadarida*

brasilienis). These are the “fighter jets” of the bat world, capable of reaching speeds of 40 miles per hour (mph), migrating over a thousand miles and flying up to 10,000 feet above the ground. Mexican free-tailed bats forage over large areas each night, ranging as far as 25 miles from their roosts. They roost in crevices in cliff faces or manmade structures such as bridges and buildings. Therefore, because of their propensity to roost in proximity to man, Navy personnel at NBVC Point Mugu are faced with the challenge of co-

existing with bats entering their work areas. The older buildings at Point Mugu support extensive bat roosts, and bat exclusion is an ongoing maintenance chore. Without tearing down buildings, or major renovation, the exclusion of all bats on the base is unrealistic. In fact, bats play a valuable role in the biological control of mosquitoes and other pest insects. Therefore, it has become necessary to establish a balance between the positive and negative contributions of the Point Mugu bats.

A Bat Management Plan

A comprehensive bat management plan was recently completed to identify the buildings currently occupied

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by bats and assess the seasonality of bat movement throughout the base. A secondary objective of the study was to inventory the bat species at Point Mugu. The management goal is to facilitate the co-existence of bats and Navy personnel on base.

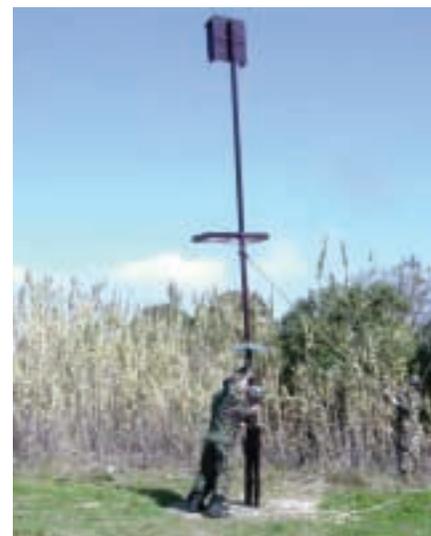
The year-long study involved observing those buildings with documented bat activity, such as fresh guano (bat droppings) or complaints filed with the Public Works department. Bat activity in suspect buildings was verified through visual observations of bat emergence, mist netting, and acoustic recordings. This enabled identification of roost locations, approximation of population size, and identification of species, sex, and reproductive condition.

Acoustic Recordings Using Ultrasonic Detectors

Since the capture of bats was not feasible in most cases, acoustic recordings using ultrasonic detectors and associated analysis systems were the principal method for species identification. Echolocation signals recorded via an ultrasonic detector on laptop computers and/or storage modules were used for identification of bat species and to document general bat activity. Species identification is made

possible by comparing the acoustic recordings with “voucher” calls from known bats. There is some error margin. The most definitive calls for a species are “search phase” calls, characteristic of bats foraging, and these might be different from hand-released bat voucher calls. Different bat species can at times use similar signals, and the same species can employ a variety of sounds based on the perceptual task and the surrounding habitat. A knowledge of which bats are common to the area, as well as bats that may be present but uncommon, is essential to the acoustic identification process. All bat species identified acoustically during this study are known to occur in the Los Angeles or Ventura Counties.

Several factors influence the recording of acoustic data. The position of the bat relative to the detector and the intensity of the bat’s call have a profound affect on whether or not the acoustic system will record the sound. Moisture in the air affects the detectability of a signal. At times, certain bats will orient visually and emit no echolocation calls at all. Pallid bats (*Antrozous pallidus*) see very well in moonlight and may not bother to echolocate, although their distinctive communication signals can indicate their presence. Mexican free-tailed bats (*Tadarida brasiliensis*)



Seabees raising and welding various bat houses.

The larger “bat condo” will be installed on top of one of the warehouses close to an existing Mexican free-tailed bat colony.



Bat house number 9.

and western mastiff bats (*Eumops perotis*) emit such loud, low frequency calls that they can be recorded from hundreds of feet away, whereas Townsend’s big-eared bats (*Corynorhinus townsendii*) emit such faint calls that they are seldom detected from over ten feet away. Often the signals of *Eumops* are not recorded because the frequencies are too low for the microphone to capture. Their calls are audible to most people with good hearing, and the bats may be heard long before being recorded with an ultrasonic detector.

Placement of the ultrasonic detector can have a significant effect on the number of calls recorded. The quantity of calls does not usually equate to the number of bats. Acoustic bat activity near a roost or in an active foraging area is often continuous throughout the night because an individual bat

spends considerable time calling in the same general area. Recording along a commuting route between the roost and the foraging area may result in a single call sequence per bat and result in fewer calls but represent more bats. Therefore, several points need to be considered when interpreting the acoustic data: (1) some calls will be misidentified; (2) the louder bats will be over-represented; (3) “whispering” bats such as *Corynorhinus townsendii* may not be recorded; and (4) the number of calls recorded is an index of bat activity and does not equate to the number of bats.

Bat Exclusion From Base Buildings & Replacement Habitats

The results of the study will aid in the implementation and timing of appropriate management methods. The primary recommendation resulting from the bat management plan is bat exclusion from buildings and the installation of bat houses throughout the base to provide replacement habitat for bats evicted from buildings. Bats will be excluded when the bat use is the lowest for a building, as determined by exit surveys prior to a planned exclusion. Without building specific surveys, exclusions will not be attempted during the maternity season to avoid entombment of young or impairment of the reproductive ability of the colony. A “one-way bat valve” that

allows bats to exit a building but not re-enter will be used to exclude the bats. Plastic sheeting or some other slick material taped to exit/entry points is usually effective, if left in place for several nights, and then the exit/entry points are sealed. The buildings at Point Mugu present unique challenges because the areas used by the bats to enter the buildings are difficult both to reach and to attach plastic sheeting. The buildings are large, and logistically the bats cannot be excluded simultaneously from all the access points. Exclusion measures and sealing will be sequentially employed, with the realization that excluded bats may continue to enter the structure through other unsecured holes. In the past, foam has been the exclusion method employed on most buildings at Point Mugu. The foam is relatively easy to apply, but it is a short-term solution due to its UV sensitivity that causes it to disintegrate. Therefore, pre-cut scalloped foam/rubber inserts, which appear to be a more permanent barrier to the bats, will be used. An ongoing maintenance program will be an essential aspect to ensuring the success of bat exclusion efforts. In addition, base personnel are being educated on how they can help prevent the occasional bat from entering work areas and becoming trapped. Holes in office ceilings, such as missing tiles, should be repaired and doors and unscreened windows kept closed at night.

Much research has gone into the design of bat houses. Different designs work best for different species in different geographic locations. In some areas, bat houses have had considerable success as documented by North American Bat House Research Project sponsored by Bat Conservation International. However, no information exists for bat house use near Point Mugu. Therefore, the current project will hopefully contribute to the database. Two styles of bat houses are being erected on Point Mugu. Eleven relatively small houses are being positioned in areas where the bats forage. Temperature dataloggers have been installed in each house to determine if temperature is a factor in roost preference. These houses will probably be most attractive to the smaller bats, such as Yuma Myotis (*Myotis yumanensis*). By strategically locating these bat houses near foraging areas, the base benefits from the biological pest control provided by these consumers of mosquitoes.

The larger “bat condo” (offering diverse temperatures) will be

installed on top of one of the warehouses close to an existing Mexican free-tailed bat colony. The goal is to attract the bats from the adjacent buildings prior to exclusion activities. Exclusion of bats from buildings will be phased to allow time for the bats to discover and use the condo. If a large bat colony was evacuated from a building prior to acceptance of the bat condo, the excluded bats could become a nuisance in other buildings on base. The preferred alternative, therefore, is to allow the bats to discover and relocate to the condo prior to exclusion. All bat houses will need to be monitored periodically for bat use (as evidenced by guano in traps below the houses). Some experimentation may be necessary to design a “bat condo” that is accepted by the bats.

The Bat Management Approach: Mitigating the Presence of Bats in Workspaces

The bat management approach being implemented at NBVC Point Mugu is

intended to mitigate the presence of bats in the workspaces of base personnel. The incidence of rabies in most bat populations is less than one half of one percent. When bats become infected, they become ill with the disease, and the virus is present in their saliva. On the average about one person a year in the United States contracts bat rabies, as identified by having become ill with the strain of the rabies virus associated with certain bat species (Brass 1994). Of sick bats turned into Public Health centers, an average of 10 percent a year test positive for rabies. The only disease associated with bats other than rabies is histoplasmosis, a fungus that causes lung disorders when the spore is inhaled. The occurrence of the disease is geographically localized. For transmission to occur to humans, a very dusty environment combined with dry bird and bat droppings (guano) is necessary. Fresh guano is smelly and unsightly, but no health risks are associated with it. Through a proactive approach, the NBVC Environmental office is attempting to address the concerns of base personnel. In addition, the needs of some valuable species are also being met. ↓

Note: Patricia Brown-Berry from Brown-Berry Biological Consulting made significant contributions to this article.

Bat Housing At Naval Base Ventura County

House	Size	Capacity (in number of bats)
Small	32 inches tall	200+
	18 inches wide	
	4.75 inches deep	
Medium	24 inches tall	up to 300
	16 inches wide	
	6 inches deep	
Largest	24 inches tall	up to 600
	20 inches wide	
	7 inches deep	
“Bat Condo”	4 feet tall	several thousand
	8 feet wide	
	4 feet deep	

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