
**Johnson, H.L., "Bat Survey; August 7–10, 2006 for the Newhall Ranch,
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Bat Survey August 7-10, 2006 for the Newhall Ranch, Valencia, California

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Summary

A bat species inventory and habitat use study was conducted August 7-10, 2006 on the Newhall Ranch (project) in Valencia, California. Eight species were detected during this study including three special status species: pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), and Yuma myotis (*Myotis yumanensis*). The pallid bat was determined to have a reproductive population on the project. Four species were captured and at least four species were acoustically detected. Bats were detected at six localities and in at least two roost types: buildings and bridges. Rock crevices are likely used as roost sites, for example they are the usual roost type for the western pipistrelle (*Pipistrellus hesperus*). Management recommendations are included to minimize impacts to roosting bats.

Purpose

The purpose of this study was to investigate species occurrence and habitat use. Surveys were conducted by Heather Johnson, Greg Ainsworth, and Jeff Sakowicz.

Bat Ecology

Bats use a wide variety of roost sites which fall into three general categories: crevices, cavities, and foliage. Bats usually occupy one site during the day (day roost) and one or more sites at night in between foraging bouts (night roost). During the reproductive season (May through September), females gather in maternity colonies to give birth, and their roost sites are especially important refuges during pregnancy and lactation. Mother bats leave the flightless young behind in the roost while foraging; but return periodically to nurse. Males may be solitary during the reproductive season. In the fall, the young are independent and the colonies usually disperse. Bats may remain active year round, migrate, or hibernate.

Potential roosting habitat in the project area includes crevices and cavities found in rocks, cliffs (Figure 1), buildings, bridges, and trees (Figure 2). Trees provide potential roosting habitat under exfoliating bark and in bole and branch hollows; also several bat species roost hanging pendant in the foliage of trees and shrubs. All the bat species expected to occur on

the project are insectivorous and will forage for insects amongst vegetation, over water surfaces, in the open air, and on the ground. Foraging habitat includes the surface of still or slow-moving open water in the river and creeks, riparian corridors, open grassland, oak woodland, canyons, and edge habitats where trees and shrubs border water bodies or meadows.

Methods

Standard visual, acoustic, and capture sampling methods were used to survey bats. Sampling was conducted near roosting sites and in potential foraging areas identified as likely to concentrate activity, usually near a water feature. Acoustic and capture devices were deployed where bats were expected to fly low or in a somewhat defined air space while drinking and/or pursuing insects, or entering/exiting roost sites. Visual surveys were conducted during the day and night at potential roost sites, and at dusk while observing bats in flight.

Daytime

The daytime surveys consisted of visually inspecting structures on and near the project with the aid of flashlights and spotlights. Bat roost sites were located by the presence of bats or their sign, which includes guano deposits, urine stains, audible vocalizations, carcasses, and discarded prey remains. Roost site locations were noted and accessible roosts were investigated to identify species if possible.

Nighttime

The nighttime surveys consisted of visual observations, capture with mist nets, and acoustic monitoring of free-flying bats. Mist nets (Avinet, Dryden, New York, USA) were erected in a building, in a riparian corridor, and by a wetland (Figure 3). On each night two nets were deployed that ranged in length from 2.6 to 12 meters by 3 meters high. Nets were regularly attended. Captured bats were examined in the hand to assess species, relative age, sex, and reproductive condition; measured for forearm length; and immediately released.

The echolocation calls of free-flying bats were acoustically monitored in three ways: 1) active (attended) recording by a stationary surveyor near the netting site, 2) active recording by a mobile surveyor in a vehicle, and 3) passive (unattended) recording. Visual observations of passing bats were attempted to note size and behavior. Acoustic monitoring was conducted using one or two Anabat ultrasonic detectors (Titley Electronics, New South Wales, Australia) combined with computer storage, either a laptop or flash card disk. The detectors digitally convert bat echolocation into human-audible ticks or tonal chirps that alert the surveyor when a bat is passing by; and the detectors are connected to electronic units that create computer recordings, usually one file per bat "pass". The computer files can be viewed as sonograms in real-time on the laptop screen and/or stored for later analysis. The sonograms are graphs of the calls with frequency in kilohertz (kHz) on the y-axis and time in milliseconds on the x-axis. Some echolocation calls are recognizable to species and others are reported as phonic types. Capture and acoustic methods compliment one another and are used concurrently to investigate bat species occurrence.

Results and Discussion

Roosting and foraging habitat for bats is present in the project area. Roost sites were confirmed in four of the six buildings surveyed, and in one of the three bridges surveyed. A total of eight species were captured and/or acoustically detected in the project area (Table 1). Survey locations are mapped in Appendix A.

Table 1. Bat species detected on the project, status, and habitat requirements.

Species	Status	Habitat Requirements
Pallid bat <i>Antrozous pallidus</i>	CSC, USFS, BLM	Captured Roosts in small colonies in rock crevices and cavities, caves, mines, tree hollows, buildings, and bridges; forages in open woodlands, grasslands, and in wooded canyons often on the ground
Western pipistrelle <i>Pipistrellus hesperus</i>		Acoustically detected Roosts singly or in small groups in rock crevices and rarely in buildings; forages in woodlands, wooded canyons, and along riparian corridors
Western mastiff bat <i>Eumops perotis californicus</i>	FSC, CSC, BLM	Audibly detected Roosts in crevices in cliffs and sometimes in buildings; forages high above the ground in all habitats
Pocketed free-tailed bat <i>Nyctinomops femorosaccus</i>	CSC	Acoustically detected Roosts in crevices in cliffs; forages in open air in all habitats
Mexican free-tailed bat <i>Tadarida brasiliensis</i>		Captured Day roosts in crevices in buildings, bridges, rocks, and trees; forages in all habitats
Big brown bat <i>Eptesicus fuscus</i>		Captured Day roosts in colonies in crevices and cavities in buildings, caves, trees, and rocks; generalist forager over water and land
Western red bat <i>Lasiurus blossevillii</i>	CSC*, USFS	Acoustically detected Roosts singly or in small groups under leaves often in riparian trees; generalist forager
50 kHz myotis		
Yuma myotis <i>Myotis yumanensis</i>	FSC, BLM	Captured Day roosts in colonies in crevices and cavities in buildings, caves, mines, and in trees hollows and under exfoliating bark; forages low over the surface of water
California myotis ¹ <i>Myotis californicus</i>		Roosts in small colonies in rock crevices, buildings, and tree hollows and beneath bark; forages in oak woodland, edge habitats, and along riparian corridors often near vegetation
40 kHz myotis		
Long-legged myotis ¹ <i>Myotis volans</i>	FSC, CSC*	Day roosts in snags and trees under bark, rock crevices, and buildings; found on the coast in northern California usually in conifer habitats; generalist forager
Small-footed myotis ¹ <i>Myotis ciliolabrum</i>	FSC, BLM	Typically roosts in rock crevices and is associated with cliff habitat; more commonly found inland from the coast; generalist forager

¹ Presence not confirmed

BLM: Bureau of Land Management Sensitive Species

CSC: California Department of Fish and Game Species of Special Concern

CSC*: Proposed California Department of Fish and Game Species of Special Concern

FSC: U.S. Fish and Wildlife Service Species of Concern

USFS: U.S. Forest Service Sensitive Species

August 7, 2006

Survey Location #3

A trio of buildings (barn, garage, and a metal-clad irrigation pipe storage building) were inspected during a daytime survey and identified as providing bat night roosts based on the urine stains and guano deposits present. The guano size and appearance indicated that myotis bats (*Myotis* sp.) and pallid bats use the roosts. The discarded legs and heads of crickets were deposited in the guano which confirms the presence of pallid bats. This species carries large arthropod prey, such as crickets, scorpions, and beetles, back to the roost for consumption and discarded remains are left on the ground. Suitable day roost habitat appears to be available and surveys would be necessary to determine if these buildings are used during the day or by additional species.

Mist nets were set inside the metal-clad building and a total of 10 pallid bats (Figure 4) were captured: one male, seven reproductive females, and two juvenile females. The reproductive females and juveniles compose a maternity colony. Eight bats were captured in quick succession in the first half hour after sunset indicating proximity of this building to the maternity (day) roost. Evidence of reproduction in the adult females consists of enlarged nipples and the absence of hair around the area (Figure 5).

The western mastiff bat (*Eumops perotis californicus*) was audibly detected as this species has a recognizable, low frequency call within the range of human hearing. Twenty-two acoustic files were recorded by a mobile surveyor monitoring near a cattle trough and in the open grassland. Forty-two acoustic files were recorded by a stationary surveyor (Figure 6) positioned in an open area near the three buildings. Echolocation calls from pallid bats and western pipistrelles were identified. Additional recordings were not immediately recognizable and are categorized as phonic types based on their characteristic frequency: 25 kHz, 40 kHz myotis, and 50 kHz myotis. Capture of the bats is necessary for further identification.

Three species that may occur in the project area have 25 kHz phonic type calls that overlap in character depending on the physical setting and the bat's behavior. The 25 kHz recordings were probably from both the big brown bat (*Eptesicus fuscus*) and the Mexican free-tailed bat (*Tadarida brasiliensis*) based on some characteristic calls (Figure 7); however, they could also be from the silver-haired bat (*Lasionycteris noctivagans*). Three species that may occur in the project area comprise the 40 kHz myotis phonic type: the long-legged myotis (*Myotis volans*), the small-footed myotis (*Myotis ciliolabrum*), and the little brown bat (*Myotis lucifugus*). Two species, the California myotis (*Myotis californicus*) and the Yuma myotis, compose the 50 kHz myotis phonic type. Both species are common and are likely to be present in the area.

August 8, 2006

Survey Location #4

Access roads throughout the project area were driven during the day to assess bat habitat. The Wolcott Road crossing of the Santa Clara River was chosen for the night survey due to the presence of a detainment pond on the margin of the channel. The calm water of the pond is likely to be preferred by foraging bats. One mist net was set on the edge of the pond, which was too deep for a preferred net set across the water surface. A second net was set across a wide, shallow section of the river near the shore where bats are expected to forage along the vegetation. The open structure of the river reduces the chances of netting unwary bats and none were captured. A high level of foraging activity was observed over the detainment pond.

Active acoustic monitoring was conducted from the sand berm (vehicle crossing) by the pond and 323 files were recorded. Calls from the western pipistrelle were identified and additional recordings were from three phonic types: 25 kHz (probably both big brown bat and Mexican free-tailed bat), 40 kHz myotis, and 50 kHz myotis (Figure 8).

Survey Location #5

A passive (unattended) detector and recorder unit was placed at the mouth of a steep canyon approximately one mile up in the hills from the net site. Only two bat passes were recorded and the remaining 1,018 files were filled with ultrasonic insect noise. Insect interference is common in these habitats and is an obstacle for passive acoustic surveys. One pass was from a western pipistrelle and the other from a 40 kHz myotis bat.

August 9, 2006

Survey Location #1

The daytime survey consisted of assessing potential tree roosting habitat, inspecting buildings, and searching a creek for a potential capture site. A pallid bat night roost was located in a wooden shed as evidenced by urine stains, guano deposits, and discarded prey remains. Mist nets were set in two locations along the creek: 1) on an embankment where the creek bed widens into a wetland, and 2) below the wetland where the creek bed narrows again on its path to the Santa Clara River. One juvenile female pallid bat was captured and a recording of her echolocation calls was made upon release (Figure 9).

An active acoustic survey was conducted on a hill somewhat above the wetland and 81 files were recorded. Recognizable calls were attributed to the pallid bat, western pipistrelle (Figure 10), and the pocketed free-tailed bat (*Nyctinomops femorosaccus*) (Figure 11). The northernmost published record on the coast for the pocketed free-tailed bat is Inglewood, California (Constantine 1998), which is approximately 34 miles south of the project area. Additional recordings were 25 kHz and 40 kHz myotis (Figure 12) phonic types. The 25 kHz calls were likely from both the Mexican free-tailed bat and the big brown bat (Figure 13) based on some recognizable characteristics in the calls.

Survey Location #2

An active acoustic survey was conducted near the wooden shed night roost and recorded 25 files. The calls were from pallid bats, western pipistrelles, 25 kHz bats, and 40 kHz myotis. About eight pallid bats were observed night-roosting inside the shed and additional species are likely to use it.

August 10, 2006

Survey Location #6

The two bridges over the Santa Clara River were assessed for roosting habitat during a daytime survey. At least three species are roosting in the I-5 bridge based on the guano types present (Figure 14). Mexican free-tailed bats, big brown bats and/or pallid bats, and myotis bats (*Myotis* sp.) are day roosting in a crevice designed for bat habitat and potentially roosting in other crevices on the underside of the bridge deck. Visual observations and audible vocalizations heard within the crevice indicated that several hundred bats were present on the day of the survey. Available roosting space, urine stains below the crevice, and the distribution of guano piles on the ground indicate twice as many bats or more have been present. In addition, potential roosting habitat is available inside internal cavities of the deck where birds and bats access them through weepholes. These internal cavities were inaccessible to surveyors. Bats are also night roosting under the I-5 bridge deck at both abutments, primarily at the south end, where there are recessed areas that trap warm air and protect them from wind. The adjacent Old Road bridge did not appear to provide bat roosting habitat and no sign or emerging bats were observed.

The nighttime survey consisted of active acoustic monitoring and mist netting under the Old Road bridge. Three female bats were captured: a Mexican free-tailed bat (Figure 15), a big brown bat (Figure 16), and a Yuma myotis (Figure 17). The Yuma myotis is a U.S. Fish and Wildlife Service Species of Concern. Three hundred and sixty-one files were recorded and calls from the Mexican free-tailed bat, big brown bat, 50 kHz myotis, and the western red bat were identified (Figure 18). The western red bat is a proposed California Department of Fish and Game Species of Special Concern and a U.S. Forest Service sensitive species. Calls categorized as 50 kHz myotis are obviously from the Yuma myotis but could include the California myotis.

Conclusions

At least eight species of bats were detected over four nights of surveys on Newhall Ranch. It should be noted that bat presence and activity is highly variable both seasonally and on a daily basis.

Recommendations

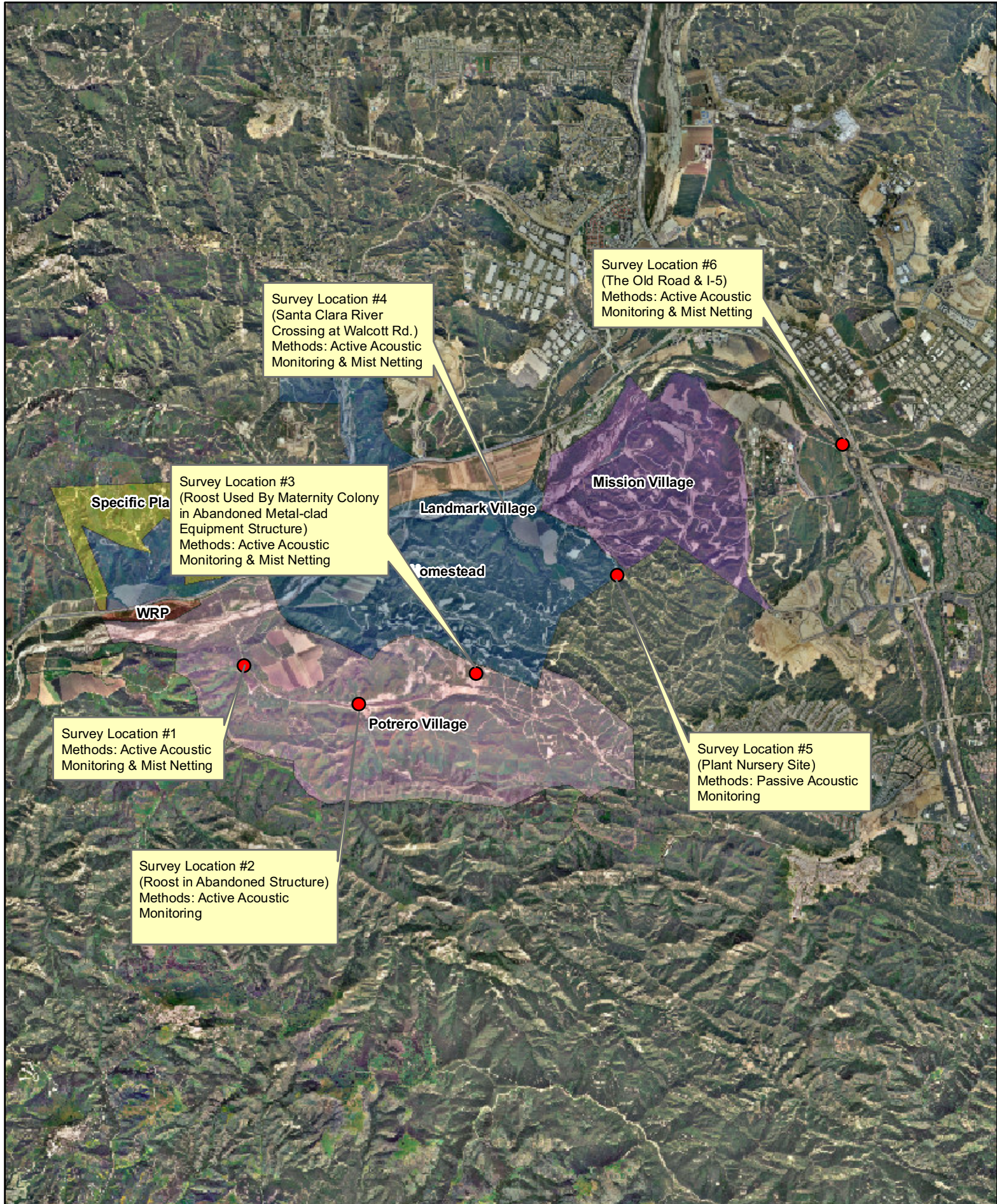
Management of Bat Roosts in Buildings, Bridges, and Trees:

- Bats should not be evicted from roost sites during the reproductive period (May-September) to avoid direct mortality of the young.

- Buildings scheduled for demolition should be assessed for roosting habitat by an experienced surveyor using techniques described in this report. Day roost buildings may be demolished at night after bats have emerged; humane exclusion techniques may be used as appropriate. Buildings used solely as night roosts can be demolished during the day.
- Mature trees, especially those in an intermediate stage of decay, should be assessed for potential bat roosting habitat (e.g., cavities in the bole or branches, crevices under exfoliating bark, or foliage-roosting bats) and bats determined to be absent or flushed out prior to pruning or felling.

References

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Survey Location #4
 (Santa Clara River
 Crossing at Walcott Rd.)
 Methods: Active Acoustic
 Monitoring & Mist Netting

Survey Location #6
 (The Old Road & I-5)
 Methods: Active Acoustic
 Monitoring & Mist Netting

Survey Location #3
 (Roost Used By Maternity Colony
 in Abandoned Metal-clad
 Equipment Structure)
 Methods: Active Acoustic
 Monitoring & Mist Netting

Specific Pla
 WRP

Survey Location #1
 Methods: Active Acoustic
 Monitoring & Mist Netting

Survey Location #2
 (Roost in Abandoned Structure)
 Methods: Active Acoustic
 Monitoring

Survey Location #5
 (Plant Nursery Site)
 Methods: Passive Acoustic
 Monitoring

0 0.5 1 Miles
 1 inch equals 1 miles



2006 Bat Survey Locations, Newhall Ranch, Valencia, CA.