

Bats in Swallow Nests

A Summary Created by the California Bat Working Group

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Issue and Threat

Year-round occupancy of cliff swallow (*Petrochelidon pyrrhonota*) mud-nests by several bat species has been observed throughout California, but formal documentation of these observations is limited to project reports. Peer-reviewed publications on this topic are lacking. Bats roosting in cliff swallow mud-nests will be subject to direct impacts if they are present when these nests are removed to prevent swallows from nesting.

Purpose

Here we compile records from members of the California Bat Working Group (CBWG) to share information on bat roosts in cliff swallow mud-nests and provide CBWG recommendations for take avoidance, including nest inspections and habitat modification to discourage occupancy. Take (hunt, pursue, catch, capture, or kill, or attempt to do so; Fish & G. Code §86) of nongame mammals is prohibited by Fish and Game Code §4150. Where this code applies, to avoid potential mortality of bats, nest inspections should occur prior to the destruction of any cliff swallow mud-nests.

Application of this guidance may provide for avoidance of direct take but does not assess potential indirect effects of roost removal. This guidance does not provide mitigation for loss of roost habitat.

The take avoidance measures described here should be considered a starting point when assessing risk of take in any particular situation. Differences in species and local conditions may require modified or additional measures to ensure that take is avoided. When in doubt, the California Department of Fish and Wildlife (CDFW) should be consulted to ensure that unauthorized take is avoided.

This guidance focuses on colonially nesting cliff swallows due to the high number of bats that could be roosting in colonial nests and the potential population-level effects of direct mortality due to removal of bat-occupied swallow nests. It could also be applied to bats roosting in other bird nests; CBWG members have observed bats roosting in other bird nests (e.g., barn swallow (*Hirundo rustica*) or Say's phoebe (*Sayornis saya*)).

Species Observed

- Yuma myotis (*Myotis yumanensis*)
- *Myotis* sp. (unidentified to species level)
- Big brown bat (*Eptesicus fuscus*)
- Mexican free-tailed bat (*Tadarida brasiliensis*)
- Pallid bat (*Antrozous pallidus*)

Habitat Use Observed to Date

- Mud nests located in or on bridges, cliffs, culverts, probably buildings, and other structures with a vertical surface protected by an overhang near a source of mud and with a nearby open area for foraging
- Observed inside the nest and in the interstitial crevices between nests or between the nest and the structure

Observation Details

- Direct observations of bats roosting inside and between swallow nests, sometimes using an inspection or borescope camera
- Direct observations of bats roosting inside swallow nests that are not intact or completely enclosed
- Guano observed inside swallow nests, sometimes between layers of nesting material suggesting repeated annual use by both swallows and bats at different times of year (Figure 1)



Figure 1. Bat guano layered inside the bottom of a cliff swallow mud-nest removed from a structure. Photo by Jill Carpenter.

Seasonal Observation Records

- January: Corona (Riverside County)
- February: Corona (Riverside County; 2014), Eastvale (Riverside County; 2018), Victorville (San Bernardino County; 2016)
- March: I-80 Suisun Creek bridge (2021)
- June: Railroad crossing over U.S. HWY 101 south of Gilroy (2008)
- August: Irvine (Orange County; 2020)
- September: Anaheim (Orange County; 2019), Yorba Linda (Orange County; 2019)
- October: San Joaquin River Bridge (Stanislaus County; 2021), Irvine (Orange County), Folsom (Sacramento County; 2019), Kerckhoff Lake (Fresno County)
- December: Norco (Riverside County)

Frequency of Use

- Most bat-occupied nests contain 1-3 individual bats, but up to 7 individual bats have been observed inside a single swallow nest
- Bat guano, indicating use, has been observed at 15-90% of nests examined at a bridge or culvert
- Specific examples
 - During a single-day inspection at one culvert location, bats were present within 20-25% of nests examined
 - 64 bats observed in 45 swallow nests out of a total of 160 swallow nests inspected on a bridge in the Central Valley (occupied nests contained 1-6 bats comprising two species, but most nests contained multiple bats)
 - Bat guano observed in 67 of 202 swallow nests on the I-80 Suisun Creek Bridge
 - Bat guano observed in over 80% of abandoned swallow nests at a bridge in San Joaquin County
 - 25 bats observed in approximately 100 swallow nests in a culvert in Orange County, with occupied nests containing 1-7 bats
 - 6 or 7 *T. brasiliensis* visible in a single partially opened swallow nest and 1 female *M. yumanensis* with a pup under a concrete bridge at Vandenberg Air Force Base (late 1990s); in report tabular data Pierson et al. 2002 Distribution, Status and Habitat Associations of Bat Species on Vandenberg Air Force Base, Santa Barbara County, California. Technical Reports Number 1 Santa Barbara Museum of Natural History)

Data Gaps

Many observations listed here are from surveys completed in compliance with Lake and Streambed Alteration (LSA) Agreements (Fish and Game Code § 1600). While information on bat occupancy in swallow nests on buildings and other structures is lacking, consideration should be given to these sites during project planning. Distance to water is an unknown correlate with bat occupancy in swallow nests, but many bat species such as Yuma myotis are known to forage near water.

Best Practices

This guidance is based on avoidance measures which have been used successfully in the past to avoid direct take of bats roosting in swallow nests.

Timing

Mud-nest inspection and removal should be performed after young are volant (flying) but before expected onset of seasonal torpor to the greatest extent feasible to avoid direct impacts to bats. In many areas of the state, this removal window occurs between September 1 and October 31, but local conditions could dictate otherwise and communication with an experienced bat biologist is highly recommended. Removal of previously occupied nests should only occur if that night's weather conditions are conducive to bat activity, that is, the conditions exclude severe winds, precipitation, or low nighttime temperatures (typically below 45°F). If any of these conditions are present, then no removal can occur.

Due to a higher potential for mortality, no removal should occur during the hibernation season, which typically begins in November or December (depending on weather conditions) and continues through mid-February. However, dependent upon weather conditions and at a CDFW-approved bat biologist's discretion, it may be possible to perform removal during winter if the forecast excludes the weather conditions described above.

Mud-nests may be inspected and removed at night (i.e., beginning approximately 1.5 hours after sunset to avoid disrupting the emergence) when bats typically leave the roost to forage. This may decrease the chances of bat occupancy in the mud-nests at the time of survey and therefore increase the chances of being able to remove most or all the mud-nests in a single visit.

Inspection and Removal

Depending on site characteristics, access to swallow nests can be attained using a snoop truck, platform truck, scaffolding, man lift, bucket truck, or ladder. Safety reviews of access activities are strongly encouraged.

Outside of bat maternity or hibernation season, prior to nest removal, a CDFW-approved biologist (with experience inspecting a range of structures for the presence of roosting bats) inspects each nest with a borescope inspection camera (or similar device) or by gently and carefully breaking open a small part of the nest to see inside.

If bats are not present, the entire nest may be immediately removed so that it cannot be occupied or re-occupied. If any bats are present, a small portion of the nest may be removed to create more light and additional airflow rendering the nest less desirable for roosting without making any bat(s) inside the nest visible to predators. The bat should depart the nest that evening. The altered roost conditions are intended to minimize the likelihood of a bat returning to that roost.

Any swallow mud-nests where bats were observed will be inspected again the following day and can be removed if absence of roosting bats is confirmed at that time. If the bat has not

departed on its own, then additional pieces of the nest should be removed to make it more unsuitable, followed by additional inspections on subsequent days until the bat leaves.

If bats are present during inspections and do not depart on their own after partial removal of nests (or if partial removal of nests is infeasible), additional options may be considered in consultation with CDFW and experienced bat biologists (e.g., those with a Scientific Collecting Permit to handle bats and relevant experience implementing bat-related minimization and mitigation measures) on a case-by-case basis.

Emergence surveys that involve watching a roost site with appropriate effort (i.e., using methods and equipment to confidently detect emerging bats shortly prior to the removal of mud-nests) are not appropriate during the fall and winter months because bats infrequently emerge from their roosts at this time of year. At any time of year, bats may emerge later than expected or not at all on a given night. Moreover, mud-nests observed for bat emergence may become occupied later in the night after the emergence survey, as bats select the next day's roosts. Consequently, the absence of bat activity on a given night cannot be construed as the absence of roosting bats.

Exclusion Netting

Bird exclusion netting is strongly discouraged because of common entanglement of birds, bats, and other wildlife in the netting. Even with best practices, which are described below, entanglement has still been an issue.

If no other alternatives to netting are possible, then inspections should be performed prior to installing the netting to ensure no bats are roosting in the mud-nests or interstitial crevices between the mud-nests and the structure. The bird exclusion netting should have a mesh size no greater than 0.25-inch and should be secured tightly to prevent potential entanglement of bats in the netting. Daily inspections of bird exclusion netting should also be performed after its installation to identify and repair damaged sections that could create entrapment hazards for bats and birds.