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To: Mark Snyder
Solano County Water Agency

From: Heather L. Johnson, M.S.

Date: September 15, 2018

RE: North American Wetlands Conservation Act – 3 (NAWCA-3)
Lower Putah Creek Floodplain Restoration Project
Pre-construction Bat Habitat Assessment

SUMMARY

On September 14, 2018 Garcia and Associates (GANDA) conducted a pre-construction survey in fulfillment of Lake or Streambed Alteration Agreement (LSAA) No. 1600-2015-0130-R3 for the North American Wetlands Conservation Act – 3 (NAWCA-3) Lower Putah Creek Floodplain Restoration Project. A number of trees support temporary crevices, for example underneath exfoliating bark, and some cavities that may provide bat roosting habitat. At least three species of bats were detected in the project area soon after sunset however we found evidence indicating that these bats are roosting in the I-505 bridge on the project area's eastern border. Potential habitat for two species of foliage roosting bats is present in tree foliage throughout the project area; these two species have been detected on Putah Creek but none were detected during the survey. This report provides recommendations to protect roosting bats including a procedure to promote passive escape of any bats present in trees with potential roosting features that will be trimmed or removed.

METHODS

Daytime Habitat Assessment

GANDA bat specialist Heather L. Johnson and wildlife biologist Eric Jepsen, who is the biological monitor during construction, conducted the survey from 4 p.m. to 8 p.m. on September 14, 2018 in calm, warm weather (temperature range 70-79 degrees Fahrenheit). They accessed work areas during the day to inspect natural features from vantage points on the ground, as accessibility and safety allowed, for roosting bats.

Emergence Survey and Acoustic Monitoring

They acoustically monitored bat echolocation with ultrasonic detectors (Anabat, Titley Scientific, New South Wales, Australia) for one hour around the time of sunset, and visually and

acoustically monitored (i.e., conducted an emergence survey) near two trees that were considered to have potential bat habitat, and placed an additional detector on the shore of Putah Creek.

RESULTS AND DISCUSSION

Daytime Habitat Assessment

Bat roosting habitat may be present in a number of trees that support temporary crevices underneath exfoliating bark, and a limited number of cavities (Photo 1 and 2). Cavities and exfoliating bark resulting from decay and bird activity in live and dead trees could provide bat habitat for individual bats or small (<10) groups. One potential cavity was of significant size but it was accessible to predators and humans (Photo 3) therefore unlikely to be occupied by bats. In groups of snags resulting from a past fire, pieces of exfoliating bark were relatively small on comparatively small limbs. Exfoliating bark of eucalyptus trees may provide temporary roosts for individuals or small groups.

Emergence Survey and Acoustic Monitoring

Mr. Jepsen watched for bat emergence from a partially dead tree (Photo 2) and Ms. Johnson watched for bat emergence from two broken branch cavities in live trees; no bats emerged. Shortly after sunset both biologists observed bats entering the project area overhead from the direction of the nearby I-505 bridge. At least three species were identified from acoustic recordings (Photo 4): *Myotis* sp. with a characteristic frequency of 50 kiloHertz, Yuma myotis (*Myotis yumanensis*) and or California myotis (*Myotis californicus*), Mexican free-tailed bat (*Tadarida brasiliensis*), and pallid bat (*Antrozous pallidus*). The pallid bat is a California Department of Fish and Wildlife (CDFW) Species of Special Concern.

In addition to tree crevices and cavities, tree foliage may provide roosting habitat for the western red bat (*Lasiurus blossevillii*; CDFW Species of Special Concern) or hoary bat (*Lasiurus cinereus*), especially where grape liana were present on older trees. These species were not detected during the survey although Ms. Johnson has acoustically detected both species on Putah Creek during previous surveys. Because these bats are so cryptic the only avoidance and minimization measure to prevent mortality is to perform trimming and removal outside of the reproductive season (April through August) and create sufficient disturbance causing roosting bats to awaken and escape the tree (as recommended below).

CONCLUSION AND RECOMMENDATIONS

The I-505 bridge on the project area's eastern border is occupied by bats; visual and acoustic observations were conducted during the emergence period of bats entering the project area from the bridge. The three species detected on the project are likely roosting in the bridge. However, because cavities and exfoliating bark in live and dead trees in the project area could provide bat habitat for individual bats or small (<10) groups, care should be taken when removing trees with potential roosting features.

No impacts to reproductive bats are expected because construction is occurring after the bat reproductive season. Mortality of any individuals present should be avoided by taking care to allow passive escape during tree removal. Below are recommendations to protect any bats that may be present during trimming and removal:

1. Do not trim or remove snags or trees with potential habitat during the bat reproductive season (April through August).
2. Trimming should avoid limbs with potential habitat.
3. Cut down or remove snags and trees on warm (70 degrees or higher) days in late morning to afternoon when any bats present are likely to be awake and mobile.
4. For removal of trees or snags with potential habitat, create noise and vibration disturbance (e.g., concussive hitting with equipment and/or chainsaw cutting) for at least 15 minutes before carefully opening up potential crevices and cavities for inspection and clearance.
5. For removal of trees or snags with potential habitat, the monitoring biologist should inspect crevices and cavities to the extent possible, and offer guidance to the vegetation crew as limbing and sectioning occurs. If removing a branch crevice or cavity, remove the branch intact, set it outside the work area on-site, and leave it overnight. If a branch cannot be cut off intact, personnel should attempt to expose the cavity or crevice and any bats present should be allowed to escape. For example, if the cavity cannot be investigated by the monitoring biologist, then personnel should carefully cut successive sections nearby to open it, waiting up to 10 minutes in between each cut, and determine if it is empty or allow any bats inside to crawl or fly out.

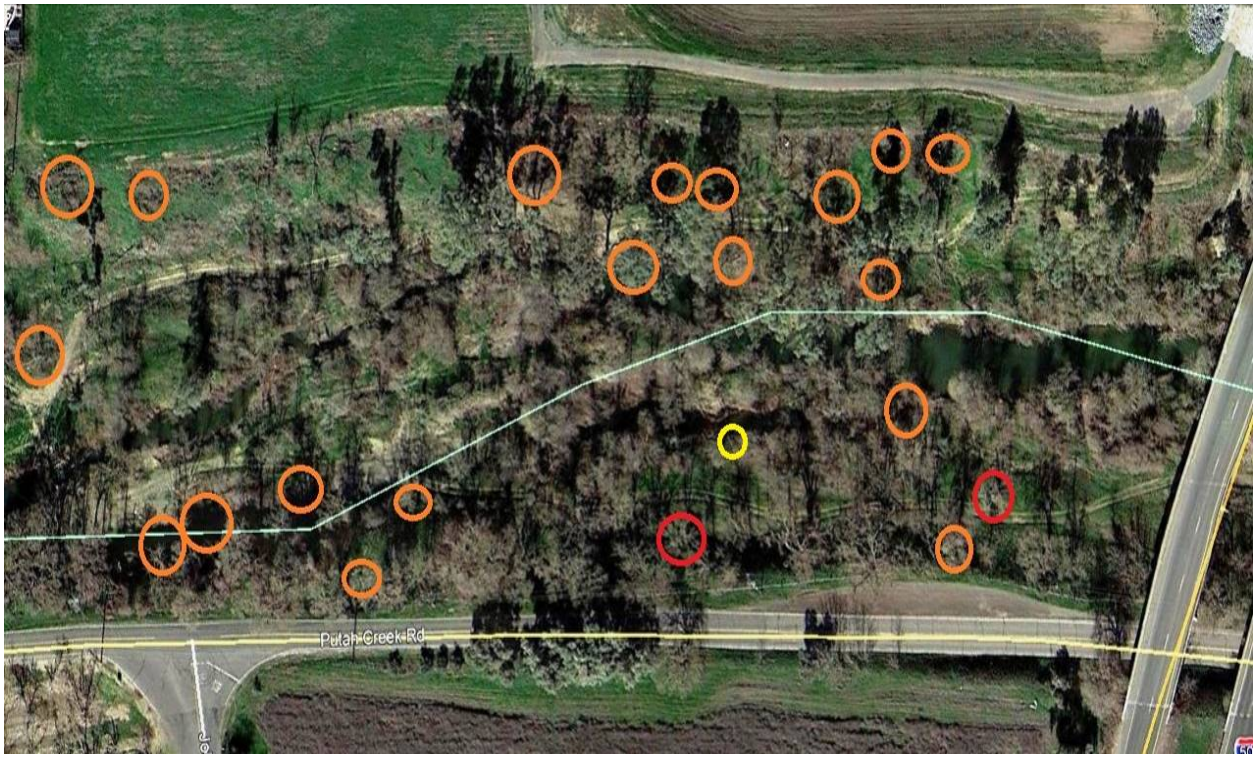

Photo 1 **Google Earth aerial imagery of snags and trees that have potential roost features (orange), two emergence survey/acoustic monitoring locations (red), and a third acoustic monitoring location with no biologist present (yellow).**

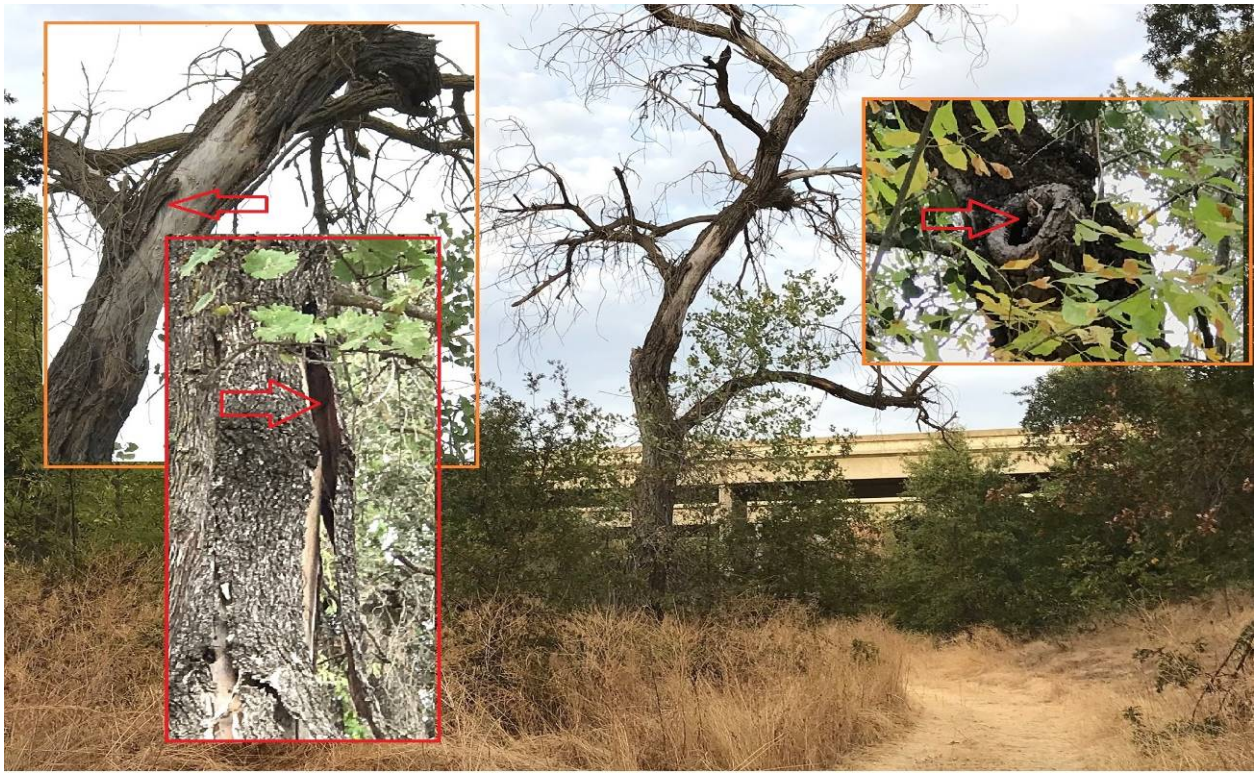

Photo 2 **Looking east at the easternmost emergence survey site (cottonwood) with inset photos of potential crevice and cavity roosting habitat in the survey area.**

Photo 3 A large cavity that is accessible to predators and humans on a trailside.

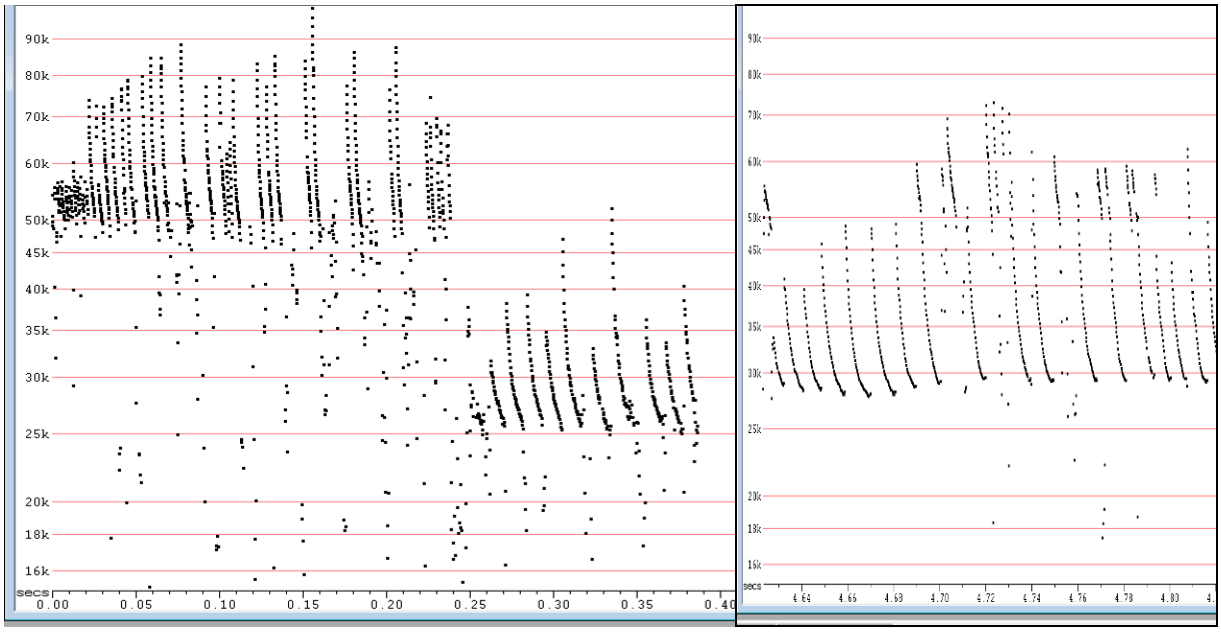

Photo 4 Representative sonograms from two acoustic recordings: the left side echolocation calls are identified as *Myotis* sp. (higher frequency) and Mexican free-tailed bat (lower frequency), and the right side echolocation calls are identified as pallid bat mixed with *Myotis* sp.