Preconstruction Bat Survey Report
Devil's Gate Reservoir Restoration Project
Pasadena, Los Angeles County, California

Prepared for:

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1.0 INTRODUCTION

On behalf of Los Angeles County Department of Public Works (LACDPW), ECORP Consulting, Inc. (ECORP) conducted a series of preconstruction bat surveys for the Devil's Gate Reservoir Restoration Project (Project) located in the City of Pasadena, Los Angeles County, California. The surveys were conducted within the impact areas associated with the Project's initial sediment removal area (ISRA) and access road construction. The surveys were conducted to comply with Condition 2.14a of the Streambed Alteration Agreement (SAA; Notification No. 1600-2015-0263-R5) (CDFW 2017) for the Project, which states:

> "No less than 30 days before scheduled Initial Vegetation Removal and structure removal Permittee shall have the Designated Biologist approved by CDFW, specifically for bats, conduct a preconstruction reconnaissance survey to identify those trees and/or structures proposed for disturbance that could provide hibernacula, roosting, or nursery colony habitat for bats."

Three bat species were also included as protected species under the SAA: pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis californicus*), and western yellow bat (*Lasiurus xanthinus*). The surveys were also conducted to comply with Condition 2.10 of the SAA which states:

> "The Permittee shall have a Designated Biologist survey the proposed work area to verify the presence or absence of protected species. The results of these surveys shall be provided to CDFW, along with copies of all field notes, prior to Project Initiation."

In addition, the surveys were conducted to comply with Mitigation Measure BIO-5 (MM-BIO-5) of the Final Environmental Impact Report (ECORP 2017) for the Project which states:

> "Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula."

Finally, the surveys were conducted to comply with Best Management Practice G2 of the Clean Water Act Section 401 Water Quality Certification (4WQC40115053) (LARWQCB 2018) which states:

> "Within 30 days prior to commencement of vegetation or sediment removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. If either a maternity roost or hibernacula

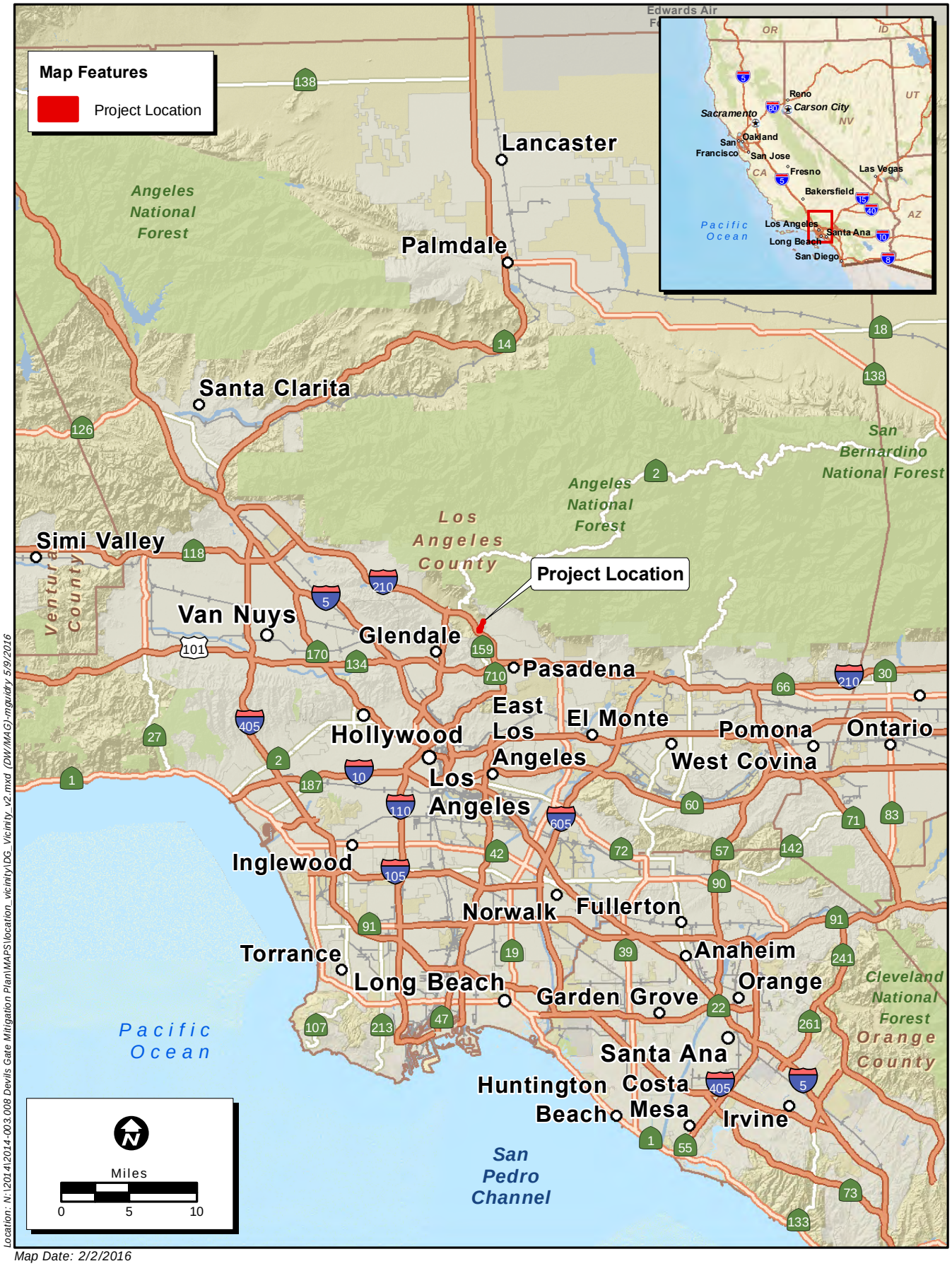
(structures used by bats for hibernation) is present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting nonbreeding bat, establishment of avoidance buffers, or replacement of roosts at a suitable location."

The purpose of the preconstruction bat surveys was to identify and assess potential roosting habitat in the trees and structures located within the ISRA and adjacent areas. The areas investigated during the survey included those that would be directly and indirectly affected by the construction of the access roads into and out of the reservoir and those that would be removed or potentially impacted during the initial sediment removal process (hereafter "study area"). In addition, the assessment was also conducted to determine the roosting purpose served by the trees and/or structures. This report documents the results of the preconstruction bat surveys.

2.0 SITE DESCRIPTION

The Project is located within the City of Pasadena in the upper portion of the Arroyo Seco Watershed and within the City's Hahamongna Watershed Park. Downtown Los Angeles is approximately 14 miles to the south of the Project, the San Gabriel Mountains are located just north of the Project, and the City of La Cañada Flintridge and the unincorporated community of Altadena are located to the west and east, respectively (Figure 1. *Project Vicinity*, Figure 2. *Project Location*). The Project is located within the "Pasadena, California" 7.5-minute quadrangle (U.S. Geological Survey [USGS] 2015).

The topography in the vicinity of the Project consists of rolling terrain with a decline into the Arroyo Seco basin. The San Gabriel Mountains are located to the north of the Project and are characterized by both the foothills and steep slopes associated with mountainous terrain. Vegetation within the ISRA is primarily composed of black willow thickets (*Salix gooddingii* Woodland Alliance) and mulefat thickets (*Baccharis salicifolia* Shrubland Alliance) towards the southern end and scalebroom scrub (*Lepidospartum squamatum* Shrubland Alliance) towards the northern end. Additionally, some areas towards the southern end of the ISRA were classified as disturbed and/or dominated by weedy species. Vegetation in the access road impact area primarily consists of black willow thickets, coast live oak woodland (*Quercus agrifolia* Woodland Alliance), and disturbed or developed areas.



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Map Date: 2/2/2016

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Figure 1. Project Vicinity

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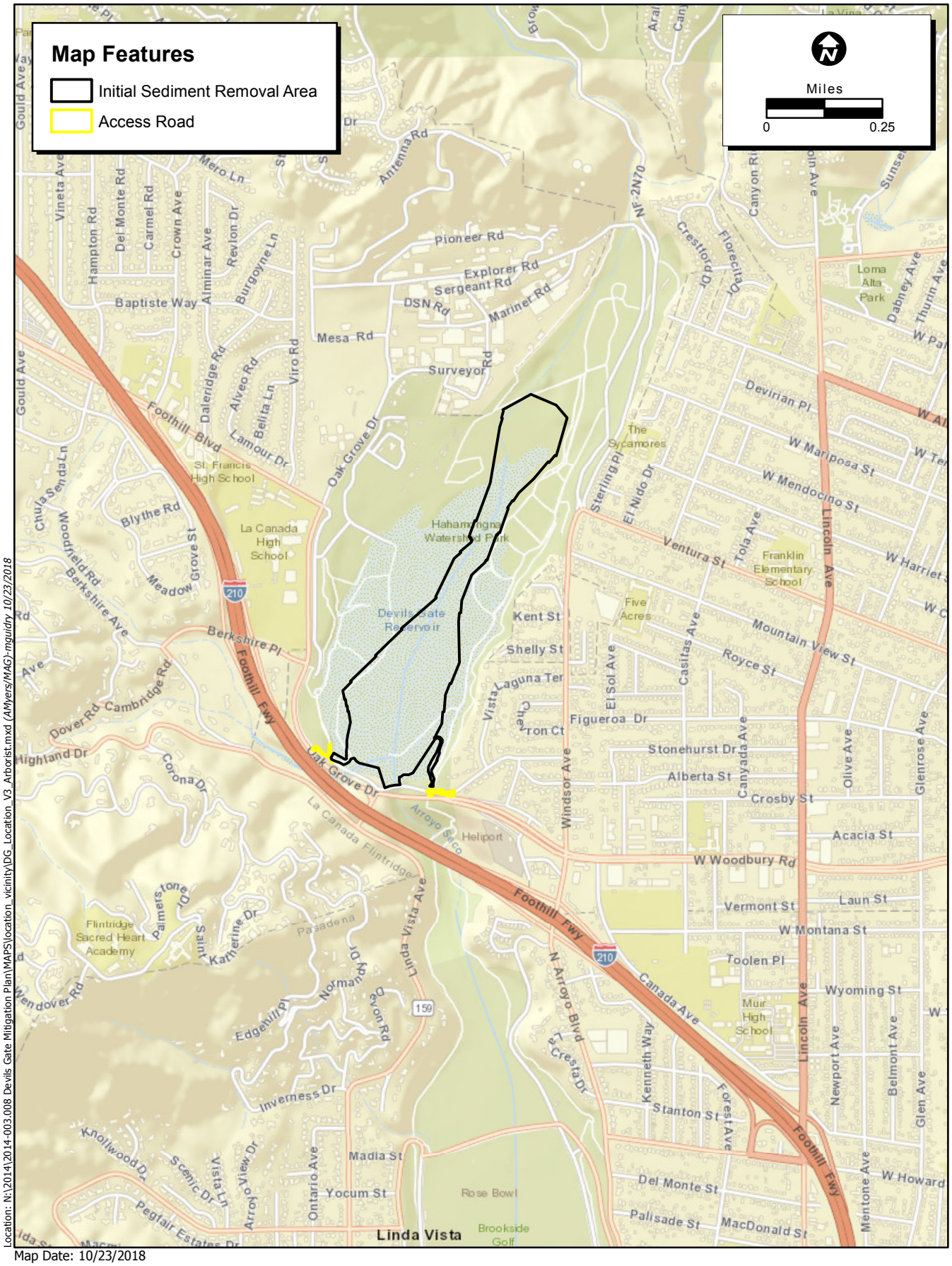

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Map Date: 10/23/2018
Source: ESRI

Figure 2. Project Location

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2018-047.006 Devil's Gate Reservoir Restoration Project

3.0 TREE-ROOSTING BATS NATURAL HISTORY

Bats that utilize trees as roosts can be separated into two categories: cavity-roosting bats and foliage-roosting bats. For the purposes of this survey, cavity-roosting bats will include those species which roost under exfoliating bark or in cavities of snags and trees (Vonhof and Barclay 1996, Brigham et al. 1997, Ormsbee and McComb 1998, Rabe et al. 1998). Foliage-roosting bats utilize the open foliage of deciduous and coniferous trees, shrubs, and vines as roosts (Barbour and Davis 1969; Constantine 1959).

Cavity-Roosting Bats

Several studies on cavity-roosting bat species have demonstrated the importance of large diameter, tall trees or snags as roosting sites, especially those in more open areas of upland habitat near water sources (e.g., Kurta et al. 1993, Vonhof and Barclay 1996, Brigham et al. 1997, Ormsbee and McComb 1998, Rabe et al. 1998). Tree species and state of decay determine the type of roost features available (e.g., number of natural cavities, amount of peeling bark, presence of woodpecker holes). Tree cavities can be occupied by a single bat (typically males and non-reproductive females) or many bats (maternity colonies). Other structural factors can also affect the suitability of a tree cavity as a roost. Vegetation surrounding the roost can affect risk of predation, solar exposure to the roost tree, and can influence flight performance (Vonhof and Barclay 1996). Bats are vulnerable to predation while roosting during the day, and presumably must choose roosts that minimize predator access. Therefore, bats may require roosts high in tall trees to minimize exposure to ground predators.

Foliage-Roosting Bats

Foliage-roosting bats use leaf petioles as roosting sites (Dalquest and Walton 1970). Foliage-roosting bats are known to select sites primarily in medium to large deciduous trees (Barbour and Davis 1969, Shump and Shump 1982a, Shump and Shump 1982b) at the edge of hardwood forest canopies (Barbour and Davis 1969, Constantine 1966, McClure 1942). These bats roost by hanging from a leaf petiole. Foliage roost sites are typically considered to consist of a void space within the tree canopy, which is sheltered from above and has an open flyway from underneath.

Tree-roosting (both foliage- and cavity-roosting) bats frequently switch roosts for a variety of reasons, including decreasing commuting costs to foraging areas, seeking out alternate microclimates, avoiding predation, and reducing parasite exposure (Lewis 1995). However, roost-switching in tree bats usually occurs between relatively proximate trees suggesting a degree of faithfulness to a particular forest area (Vonhof and Barclay 1996).

4.0 METHODS

The preconstruction bat surveys entailed daytime field surveys consisting of roost tree and structure assessments followed visual and acoustical surveys of the area for bat species. These steps are described below.

4.1 Habitat Assessment

A habitat assessment was performed during the daytime portion of the surveys. Biologists visually examined the external physical features of the trees and structures located within the study area for evidence of bat use (e.g., presence of guano, evidence of day roost use, culled insect parts, urine staining, odors associated with bats). Biologists used binoculars to assist with the visual assessment. Biologists also listened for chatter indicative of roosting bats at each tree and structure. During the habitat assessment, trees and structures within the Project area were examined for the presence of roosts and classified for their potential as roosting habitat. These roosting types are described below:

Maternity roosts – Most sensitive. Larger tree cavities, caves, and other types of shelter used by bats during the maternity season to give birth to, nurse, and rear young. They are the most uncommon and sensitive type of bat roost and are only present during the bat maternity season (generally March 1 through September 30).

Day roosts – Any location that provides routine protection and shelter for bats during their inactive daylight hours. These roosts include hibernacula used during colder periods.

Night roosts – Temporary resting locations for food digestion between nocturnal foraging bouts, often located adjacent to high-quality foraging habitat.

The surveys were conducted outside of the maternity roosting period, so no maternity roosts could be identified. Most trees within the study area are suitable for night roosting because this type of roosting is temporary. Day roosting requires more protection from the weather and from daylight than what is typically provided by a given tree, because bats generally spend more time in these roosting locations. Tree features considered suitable as colonial day-roosting habitat only include very large cavities or crevices, trees with suspected heart rot (hollow inside), and heavily fissured bark with deep internal spaces.

All trees in the study area were inspected for roosting potential. The roosting suitability of each tree was classified based on the following characteristics:

- Tree Type 1 – Most Suitable. Tree that is most suitable as cavity-roosting habitat. Presence of loose bark and abundant cavities within the trunk and limbs. Tree is most likely a hollow snag but can also be alive but with significant amount of decay. Tree is typically large in diameter with good sun exposure (i.e., exposed on the southeastern aspect, or taller than the surrounding canopy). Colonial roosting would be possible in a tree with such features.

- Tree Type 2 – Moderately Suitable. Tree with loose bark and large cavities within the trunk and limbs. Tree is typically still alive. Trunk is typically not hollow. Tree is typically large in diameter. Available features may be present but are less likely to support colonial roosting. Solitary roosting in a tree with such features could be possible. Tree has potential for use by foliage-roosting bats.

- Tree Type 3 – Least Suitable. Tree that is least suitable as roosting habitat. Minor amounts of loose bark and small trunk and limb cavities are present. Tree is typically smaller in diameter. Available features are unlikely to support cavity or colonial roosting. Solitary roosting (particularly by foliage-roosting species) in a tree with such features would still be possible.

In addition to the assessment of trees within the study area, manmade structures (including bridges) within the study area were inspected during the habitat assessment for evidence of roosting bat use.

4.2 Visual Observations and Acoustic Monitoring

Approximately 30 to 60 minutes before sunset, acoustic bat monitoring systems and visual sampling stations were set up within the study area. Monitoring was focused on Type 2 trees within the ISRA and access road impact areas and Type 1 trees in the study area outside of the impact area in order to observe the most suitable roosting-tree habitat. The visual surveys were conducted from 30 to 60 minutes before sunset to approximately 60 to 90 minutes after twilight, after no more out-flight of bats were observed. Visual surveys were performed by two biologists assisted by the use of night-vision goggles. During the surveys, each observer was positioned so that they could observe and count bats as the bats exited the potential roost trees and nearby survey area. The total number of bats observed emerging from the vicinity of the survey area was tallied immediately.

Observers operated handheld active bat detectors (Echo Meter Touch 2 Pro) to assess bat activity during surveys. Two acoustic stations (Anabat™ Express passive bat detectors) were also set up on each night at various locations throughout the study area to capture echolocation calls from bats as they exited any nearby trees or foraged through the reservoir to assess the presence of bat species across habitat types (Figure 3. *Anabat™ Unit 1 and Unit 2 Placement*, Figure 4. *Example Anabat™ Unit Placement*). Acoustic surveys were the primary source of data for determining if foliage-roosting species were present within the study area, as visual inspection of trees is not a viable survey technique for these types of bats.

Figure 3.
Anabat™ Unit 1 and Unit 2 Placement

Map Features

- Initial Sediment Removal Footprint [1]
- Access Road [1]
- Anabat Location

Anabat 1 placement 11/7/18

Anabat 2 placement 11/8/18

Anabat 2 placement 11/7/18

Anabat 1 placement 11/8/18

Anabat 1 placement 11/6/18

Anabat 2 placement 11/6/18

Berkshire Pl

Oak Grove Dr

La Canada Verdugo Rd

I-210 Foothill Fwy

N Arroyo Blvd

Sterling Pl

W Calaveras St

el Nido Dr

W Harriet St

Windsor Ave

Mountain View St

Ventura St

Casitas Ave

Lehigh St

W Kent St

W Shelly St

Vista Laguna Ter

Chevron Ct

Neldome St

Figueroa Dr

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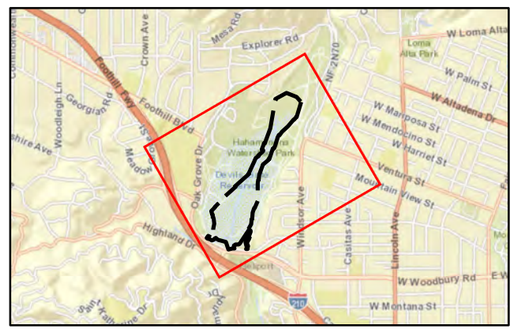

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2014-003.008 Devil's Gate Sediment Removal Project

Scale in Feet
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Photo Source: NAIP 2016
[1] LADPW

Map Date: 11/14/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\sss_survey_and_mapping\Bat_Survey\V2\DG_Anabat_20181114.mxd (MAG)-mguidry 11/14/2018

Figure 4. Example Anabat™ Unit Placement

The acoustic monitoring was timed to capture the window of bat emergence from roosting areas. The monitoring time from 30 minutes before sunset to 90 minutes after sunset was considered sufficient to conduct out-flight counts, since most roosting bats typically exit their roosts shortly after sunset. Survey evenings were selected to avoid evenings when the moon phase was full or nearly full as some bats are known to be "lunar phobic" and will avoid emergence or reduce activity levels on evenings when the moon is bright (Lang et al. 2006).

Active collection of echolocation calls during surveys allows for the best quality of diagnostic calls and, in combination with passive monitoring (i.e., Anabat™ units), provides context for the investigator (O'Farrell et al. 1999). For analyses, only the best representative calls per unit per night were used for identification to species level. Qualitative call characteristics (inflection, shape), known call frequency parameters, and a reference library were used to identify calls to the species level or "phonic group" (a species pair or group of species with similar characteristic call frequency that could not be distinguished to species level due to call similarity or quality of the call sequence, respectively) (O'Farrell et al. 1999, USGS 2005). There are generally three groups of bat species that are grouped into phonic groups for the purposes of acoustic analysis due to the high degree of similarity of their echolocation calls. These groups are the 50kHz *Myotis* group (50kMyo) which includes California myotis (*Myotis californicus*) and Yuma myotis (*Myotis yumanensis*), the 40kHz *Myotis* group which includes little brown myotis (*Myotis lucifugus*), long-legged myotis (*Myotis volans*), and small-footed myotis (*Myotis ciliolabrum*), and the Q25 phonic group which includes

the silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), and Mexican free-tailed bat (*Tadarida brasiliensis*).

5.0 RESULTS

5.1 Habitat Assessment

A team of ECORP biologists (led by the CDFW-approved Designated Biologist for bats) conducted the habitat assessment on November 6 and 7, 2018. Trees throughout the entire study area were evaluated for bat roosting potential. Three Type 1 trees were identified within the study area during the surveys but were located outside of the impact areas (ISRA or access road impact areas) (Table 1). Fourteen Type 2 trees were identified within the study area, seven of which were within the impact areas (Figure 5). Due to the density of large trees throughout the study area, it was determined that trees with dense foliage and diameter-at-breast-height (DBH) of 8 inches or greater and height of at least 15 feet could be classified as a Type 3 tree suitable for individual foliage roosting bats; individual Type 3 trees were not marked during the survey. Evidence of bat presence was not detected on or in the vicinity of any of the trees inspected for roost suitability.

Table 1. Tree-Roost Habitat Assessment Results

Tree ID Point	Number of Trees	Species	Ranking
Inside Impact Area*			
001	1	Black willow (*Salix gooddingii*)	2
002	1	Fan palm (*Washingtonia* sp.)	2
012	2	Black willow (*Salix gooddingii*)	2
013	1	Black willow (*Salix gooddingii*)	2
014	1	Black willow (*Salix gooddingii*)	2
015	1	Black willow (*Salix gooddingii*)	2
Outside Impact Area			
003	1	Coast live oak (*Quercus agrifolia*)	2
004	1	Unknown species (dead tree snag)	2
006	1	Eucalyptus (*Eucalyptus* sp.)	1
007	2	Eucalyptus (*Eucalyptus* sp.)	1
008	1	Black willow (*Salix gooddingii*)	2
009	1	Black willow (*Salix gooddingii*)	2
010	1	Black willow (*Salix gooddingii*)	2
011	2	Black willow (*Salix gooddingii*)	2

*Tree ID 005 was taken to represent numerous Type 3 Eucalyptus trees discussed above and is not included in this table.

Figure 5.
Bat Habitat Assessment Results

Map Features

- Initial Sediment Removal Footprint [1]
- Access Road [1]
- Rank 1 Roost Location
- Rank 2 Roost Location
- Bridge Roost Location

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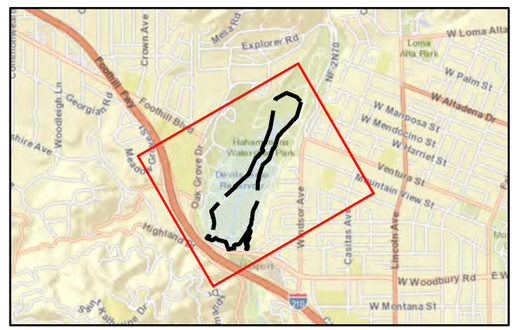

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2014-003.008 Devil's Gate Sediment Removal Project

Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 11/14/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\sss_survey_and_mapping\Bat_Survey\V2\DG_Bat_Hab_Assmt_20181114.mxd (MAG)-mguidry 11/15/2018

In addition to the evaluation of potential bat-roost trees, two bridges within the study area were identified as having bat roosting habitat: the bridge that carries Oak Grove Drive over the Arroyo Seco and the bridge that carries Interstate 210 (I-210) over the Arroyo Seco. Guano was located on the ground and walls beneath abutments of both bridges and concentrated piles were located in two locations (Figure 6). The Oak Grove Drive bridge did not appear to have crevice features suitable for day-roosting. Expansion joints beneath the I-210 bridge provide day-roosting bat habitat, but no evidence of day roosting was visible during the habitat assessment. Both bridges contained features for night roosting and are likely primarily used for that purpose. Both bridges are within the study area but at least 150 feet outside of any impact areas.

Figure 6. Guano accumulation beneath Oak Grove Drive bridge

5.2 Visual Observations and Acoustic Monitoring

The acoustic surveys were conducted in the evenings following the daytime habitat assessment. Environmental conditions encountered during the survey were optimal with clear skies, mild winds, and appropriate temperatures to observe bat activity (Titley Scientific 2012) (Table 2). Field Datasheets are included in Appendix A.

Table 2. Bat Survey Conditions

Date	Surveyors*	Time	Temperature (°F)	Cloud Cover (%)	Wind (mph)	Moon Phase
11/6/2018	LS, TD	1625-1840	70-62	0	0-3	1% Waning crescent
11/7/2018	LS, TD	1630-1815	65-60	0	1-4	New moon
11/8/2018	LS, TR	1625-1824	69-68	0	0-10	1% Waxing crescent

*LS= Lauren Simpson, TD = Taylor Dee, TR = Torrey Rotellini

Visual out-flight observations were performed on a total of six of the Type 2 trees in the impact area and the three Type 1 trees outside of the impact area. No bats were observed emerging from any of the identified potential roost trees during emergence surveys. During the survey conducted on November 8, 2018, observers noted a single hoary bat (*Lasiurus cinereus*) (confirmed visually and acoustically) emerge from the foliage of a large Type 3 eucalyptus tree adjacent to the Type 1 tree targeted for the survey (Figure 7).

Figure 7. Type 1 snag observed on November 8, 2018. Hoary bat emerged from live adjacent tree.

Observers noted nightly bat foraging activity above the study area with observations of approximately five to ten individuals visually observed flying overhead each night. Echolocation calls were picked up by both passive detectors over all three nights. Additionally, handheld active detectors recorded bat activity during the out-flight observations. Overall, bat activity was observed to be low across all three survey nights despite favorable weather conditions and moon phase.

After the out-flight period, observers inspected the two identified roost bridges (Oak Grove Drive bridge and I-210 bridge) for the presence of night-roosting bats. A single night-roosting Myotis species was observed beneath an abutment of the Oak Grove Drive bridge, confirming its use as a night-roosting bridge.

Analysis of the echolocation recordings found that two species were confirmed to be present during the nighttime surveys: hoary bat and Mexican free-tailed bat. Of these, only the presence of the hoary bat was confirmed by visual observation as this species is distinct in low light due to its large size, coloration, and flight pattern. Several recordings were unable to be identified to the species level, and instead were grouped into two phonic groups based on the characteristic frequency of the calls: Q25 phonic group and 50kMyo phonic group. Phonic groups were used to group species that have similar ambiguous call characteristics and require visual "in hand" confirmation for identification, which was not possible during the survey. The potential species that belong to each phonic group, as well as their roosting preference are summarized below (Johnston et al. 2004) (Table 3. *Potentially Present Species Based on Phonic Group*).

Table 3. Potentially Present Species Based on Phonic Group

Phonic Group	Species	Roosting Preference
Q25	Big brown bat (*Eptesicus fuscus*)	Bridge/Building/Tree
Q25	Silver-haired bat (*Lasionycteris noctivagans*)	Tree (Foliage)
Q25	Mexican free-tailed bat (*Tadarida brasiliensis*)	Bridge/Building
50kHz	Yuma myotis (*Myotis yumanensis*)	Bridge/Building
50kHz	California myotis (*Myotis californicus*)	Building/Cliff/Crevice

Any of the species listed in Table 3 may be considered potentially present in the Project study area. These species are likely to use the Project study area for foraging due to its dense vegetation and proximity to an intermittent stream. The potentially present species with bridge/building roosting preferences may use the nearby bridges, such as the Oak Grove Drive bridge and I-210 bridge for roosting.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The study area was occupied by bats during the survey period and bats were observed making out-flights from the vicinity of the trees within the study area. Only one individual tree could be confirmed as being actively used as a day roost for hoary bat. A total of approximately 15 to 30 bats were visually observed at emergence across the three survey evenings with approximately five to ten individuals observed each night. Several bats were recorded acoustically foraging throughout the study area after the initial out-flight period. Acoustic recordings identified two bat species (hoary bat and Mexican free-tailed bat) as present, as well as recordings of bats present from two phonic groups (Q25 and 50kHz).

Overall, bat activity within the study area was classified as low. A high degree of artificial lighting was observed coming from the adjacent Jet Propulsion Laboratory (JPL) parking lot and La Cañada High School sports field as well as from nearby city streetlights that illuminated the study area. The substantial artificial night-lighting in the study area increases the predation risk for bats in the study area. Further, great horned owls (*Bubo virginianus*) were observed on all three survey evenings which may pose a perceived predation risk to foraging bats.

All of the trees within the study area were evaluated during the habitat assessment, of which 14 were determined to be Type 2 trees that may support cavity roosting tree bats. Of these 14, seven are proposed to be removed as a part of the Project. No colonial roost trees were identified during the survey. Individual bats may, however, be using the trees within the Project study area for day or temporary night roosting. The survey was conducted outside of the bat maternity season, so no maternity roosts were present in the study area. However, if tree removal is not completed by the next bat maternity season (March 1 through September 30, 2019), this finding may need to be re-evaluated.

Echolocation recordings captured combined with visual observations confirmed that the hoary bat is present in the study area and using the trees in the study area for day roosting. The hoary bat is a Western Bat Working Group Medium Priority species, but it is not a California Species of Special Concern. This species is a foliage-roosting species and may utilize any medium-large densely foliated trees in the study area for day or night roosting.

Due to the solitary nature of tree-roosting bats and the relative difficulty in assessing active day roosts in trees, cavity-roosting bats may still be present in all Type 1 and Type 2 trees identified during the surveys. Further, due to the detection of hoary bat in the study area, numerous additional trees within the study area provide potential roosting habitat for foliage roosting species (Type 3). Hoary bats prefer medium to large trees along edge habitats with minimal to no lower branches (Perry and Thill 2007, Willis and Brigham 2005, Constantine 1966, Constantine 1959). The following tree removal methods (indicated in MM-BIO-5 of the FEIR and 2.14 of the SAA) should be used during the removal of the identified Type 2 trees as well as foliated trees with DBH of 8 inches or greater and height of 15 feet or greater that are isolated or located along habitat edges (suitability of trees will be determined during monitoring at the discretion of the CDFW-approved Designated Biologist for bats):

- Slowly push the tree down with heavy machinery under operator's control instead of felling the tree with a chainsaw.
- In order to ensure the optimum warning for any roosting bats that may still be present, first push the tree lightly 2 to 3 times with a pause of 30 seconds in between each nudge to allow bats to become active, then push the tree to the ground slowly. Tree shall remain in place until inspected by the Designated Biologist.
- Potential bat roost trees shall not be sawed up or mulched immediately. A period of at least 24 hours, and preferably 48 hours at discretion of Designated Biologist and/or CDFW, shall elapse prior to such operations to allow bats to escape.

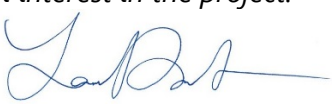
Evidence of roosting was identified beneath two bridges in the study area that were outside of the impact areas (Oak Grove Drive bridge and I-210 bridge) and an individual night-roosting bat was observed beneath the Oak Grove Drive bridge. The follow measures outlined in the SAA shall be implemented during project activities to prevent impacts to bats roosting beneath the bridges:

- No tree removal activities or work activities allowed within 100 feet of bridges between 0700 hours and 1800 hours Standard Time (1900 hours during Daylight Saving Time) at any time of the year work is conducted.
- Bird exclusion netting shall not be used on underside of bridges, unless agreed to in writing (email, letter, fax) by CDFW.
- Lights shall not be used under bridges.
- Combustion equipment, such as generators, pumps, and vehicles, shall not be parked or operated under bridges.
- Personnel shall not be present under bridges from a half hour before sunset to a half hour after sunrise.

No bat species defined as protected species in the SAA (pallid bat, western mastiff bat, western yellow bat) were identified during the surveys and should be considered absent from the study area at this time.

7.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or the applicant's representative and that I have no financial interest in the project.

DATE: 11/16/18 SIGNED: 

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APPENDIX A

Field Survey Datasheets

2018-047.006

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Devil's Gate Reservoir Project Protected Species Preconstruction Survey

Date: 2018-11-06

Surveyor Names: Lauren Simpson, Taylor Dee

Location(s): Project Impact Area (sediment removal + access roads) +300ft buffer

Targeted Species: Roosting Bats (sp. Pallid Bat, western mastiff bat, western yellow bat)

SURVEY CONDITIONS				
	Time	Temp (F)	Wind (mph)	% Cloud Cover
START	1100	72	0-2	0
END	1500	73	1-4	0

SUITABLE HABITAT/SPECIES OBSERVATIONS?	
TARGET SPECIES	NOTES (coordinates, photo numbers, # individuals, sex, age/size class behaviors)
-No Targeted species observed	- 1 fan palm observed (potential yellow bat habitat) within impact area. -no cliff faces / boulder crevasses on site
Roost Bridge 1 34.185875 -118.177658	carries Oak Grove drive over Arroyo Seco. Abutments accessible from south side of bridge. concentrated guano piles present but no apparent day roosting features in bridge. No bats/chatter observed. Likely night roost location. odor present.
Roost Bridge 2 34.136098 -118.178705	carries I-210 over arroyo seco. Can only access northern abutment. scattered guano present & features for day-roosting available (crevices in expansion joint) but no bats / Chatter observed.

ADDITIONAL NOTES: (e.g., site description, existing disturbances, other sensitive species identified?)
-Both bridges observed are potential night roosts, I-210 bridge has day-roost features but no bats were observed. Both bridges are outside of the project impact area and would experience no direct impacts from the project. Both are above arroyo seco. -will check bridges for night-roost use during nighttime survey. * See attached tree roost survey datasheet for potential tree roost observations *

INCIDENTAL SPECIES OBSERVED (include sign: tracks, carcass, feathers, scat, etc.)				
Oak Titmouse	Acorn woodpecker	Bushtit	Cooper's Hawk	
Black phoebe	Cassin's kingbird	House Finch	American kestrel	
Western fence lizard	white-crowned sparrow	Mourning Dove	Eurasian Collared-Dove	
Common raven	Lesser goldfinch	Turkey vulture	Red-shouldered hawk	
California Scrub jay	Anna's hummingbird	European Starling	Parrots sp.	
California Towhee	Bewick's wren	Yellow-rumped warbler		
California Ground Squirrel	Ruby Crowned kinglet	Nuttall's woodpecker		
	Northern Flicker	Bobcat		

ROOST TREE ASSESSMENT DATASHEET

Project: Devil's Gate 2018-047.006 **Date:** 11/6/18 **Personnel:** Lauren Simpson, Taylor Dee

Tree ID/Coordinates	Notes	Ranking
001 34.18625132 -118.17724606	Salix sp., 40 ft tall, cavities present, exfoliating bark, large snag, DBH 20+ inches, no evident bat sign present. good sun exposure but branches may prevent use	2
002 34.18515417 -118.17291766	fan palm sp., 25 ft tall, DBH 20+ inches, untrimmed palm	2
003 34.18569556 -118.17338412	Coast live oak snag, 15 ft tall, cavities and exfoliating bark present, medium snag, DBH 20+ inches, tag #53	2
004 34.18596377 -118.17647102	unknown sp., small snag, 20 ft tall, exfoliating bark present DBH < 20 inches	2
005 34.18725916 -118.17314146	row of ≈ 15 eucalyptus trees with exfoliating bark. DBH 20+ inches for most. 30-50 ft tall.	3 → will include all EUK
006 34.18888911 -118.17238122	large eucalyptus snag with exfoliating bark, minor crevicing. 40 ft tall. DBH 30+ inches. adjacent eucalyptus of similar size is a class 3.	1
007 34.19212851 -118.17057702	2 large eucalyptus snags with exfoliating bark, crevices, within 30 ft of each other. good exposure. 30-40 ft tall DBH 20+ inches	1
008 34.19204338 -118.17114975	Salix sp, 40 ft tall, DBH 20+ ft. crevice + exfoliating bark present.	2
009 34.19409389 -118.17056704	Salix sp. medium snag. 20 ft tall, DBH 20+ inches crevices and exfoliating bark present. good exposure	2
010 34.19830689 -118.17014837	Salix sp. medium snag. 20 ft tall, DBH <20* inches crevices and exfoliating bark present. fair exposure	2

2018-047.006

ECORP Consulting, Inc.
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Devil's Gate Reservoir Project Protected Species Preconstruction Survey

Surveyor Names: Lauren Simpson & Taylor Dee

Date: 2018-11-06

Targeted Species: Roosting bats (sp. Pallid Bat, western mastiff bat, western yellow bat)

NIGHTTIME SURVEY CONDITIONS					
	Time	Temp (F)	Wind (mph)	% Cloud Cover	Moon Phase
START	1625	70	1-3	0	1% waning crescent
END	1840	62	0-1	0	

Sunset Time: 1655 Type of Equipment Used: Anabat Express (2) Echometer Touch 2 Pro (2), Nightvision (1)

SUITABLE HABITAT/SPECIES OBSERVATIONS?	
OBSERVER LOCATION	NOTES (time of first bat observation, level of bat activity, approximate number of bats observed and where, etc.)
(1) At Tree ID 002 Untrimmed Fan Palm	- No bats observed emerging from palm tree. - 1st bat observed at 1649 approaching from SE direction and flying N. Heard 2nd bat at 1733. - General Bat activity low - Artificial Street-lighting at tree high.
(2) At Tree ID 001 Large Salix Snag	- No bats observed emerging from target tree. - 1st bat observed at 1722 - flying W to E coming from behind observer. 2 bats recorded acoustically near tree. - General activity Low.

ADDITIONAL NOTES:
Anabat 1 placed at 34.18623397, -118.17788264 Anabat 2 placed at 34.18521821, -118.17329594 -After initial emergence period / observers could no longer see out-flights observers checked 2 bridges for night-roosting bats. A single night roosting Myotis sp. was observed beneath the oak grove drive bridge. No bats were observed beneath the I-210 bridge. - Overall insect activity generally low - Myotis heard later in night - Artificial lighting high in study area.

INCIDENTAL SPECIES OBSERVED (include sign: tracks, carcass, feathers, scat, etc.)
WTSW, CALT, Parrot Sp., BUSH, GHOW

2018-047.006

ECORP Consulting, Inc.
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Devil's Gate Reservoir Project Protected Species Preconstruction Survey

Surveyor Names: Lauren Simpson & Taylor Dee Date: 2018-11-07

Location(s): Project Impact Area (Sediment removal + Access Road) + 300-ft buffer

Targeted Species: Roosting Bats (Pallid Bat, W. Yellow bat, W. Mastiff Bat)

SURVEY CONDITIONS				
	Time	Temp (F)	Wind (mph)	% Cloud Cover
START	1200	70	0-1	0
END	1530	68	2-6	0

SUITABLE HABITAT/SPECIES OBSERVATIONS?	
TARGET SPECIES	NOTES (coordinates, photo numbers, # individuals, sex, age/size class behaviors)
No Target species observed.	- continued to survey within survey area for roost trees and roost structures.
- no	bat sign/roosts observed.

ADDITIONAL NOTES:
(e.g., site description, existing disturbances, other sensitive species identified?)

- Most large/medium trees on the project site would be considered Type 3 trees and/or would provide roosting habitat for foliage roosting species (Hoary bat)

* see attached tree roost datasheet for info on potential roost trees *

INCIDENTAL SPECIES OBSERVED
(include sign: tracks, carcass, feathers, scat, etc.)

Acorn woodpecker
Red-shouldered hawk
CA Ground Squirrel
Side-blotched lizard
California Scrub Jay
Nuttall's woodpecker
Common raven
Cassin's kingbird
California towhee
Northern Flicker
Bewicks wren
Annas hummingbird
Blue-gray gnatcatcher
Bushtit
Yellow rumped warbler
White-crowned sparrow
Song Sparrow
Lesser goldfinch
European Starling
House Finch
Wrentit
Cottontail
Spotted Towhee
Parrot sp.

ROOST TREE ASSESSMENT DATASHEET

Project: Devil's Gate **Date:** 11/7/18 **Personnel:** Lauren Simpson, Taylor Dee

Tree ID/Coordinates	Notes	Ranking
011 34.19410789 -118.17239556	2 medium Salix sp. snags 25ft tall. DBH < 20 inches crevices and exfoliating bark. good exposure and minimal obstructions. same size & features	2
012 34.19651693 -118.17071892	2 medium Salix sp. snags. 1 is 15ft tall and other is 8ft. both have DBH < 20 inches. both have exfoliating bark and crevices. good exposure & no obstructions	2
013 34.19226203 -118.17230972	1 medium Salix sp. snag. 15ft tall. DBH < 20 inches no evident crevices but exfoliating bark present. good exposure	3
014 34.19074865 -118.17360089	1 medium Salix sp. snag. 15ft tall. DBH < 20 inches exfoliating bark and crevices. good exposure and minimal to no obstructions	2
015 34.19047920 -118.17341278	1 medium-large Salix sp. snag. 25ft tall. DBH < 20 inches good crevicing, exfoliating bark, good exposure and drop down space. minor obstructions	2

2018-047.006

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Devil's Gate Reservoir Project Protected Species Preconstruction Survey

Surveyor Names: Lauren Simpson + Taylor Dee

Date: 2018-11-07

Targeted Species: Roosting Bats (sp. Pallid bat, w. mastiff bat, w. yellow bat)

NIGHTTIME SURVEY CONDITIONS					
	Time	Temp (F)	Wind (mph)	% Cloud Cover	Moon Phase
START	1630	65	1-4	0	~~approaching~~ new moon
END	1815	60	1-4	0	~~receding~~

Sunset Time: 1654 Type of Equipment Used: ~~Anabat Express~~ (2), ~~Gehometer Touch 2 pro~~ (2), Night vision (1)

SUITABLE HABITAT/SPECIES OBSERVATIONS?	
OBSERVER LOCATION	NOTES (time of first bat observation, level of bat activity, approximate number of bats observed and where, etc.)
Tree ID 012 Salix Snags	- No bats observed emerging from target trees - 1st bat heard at 1735 - 2 additional bats detected (1739+1747) - General bat activity very low
Tree ID 014+015 Salix Snags	- No bats observed emerging from target trees - 1st bat observed/heard at 1658 emerged from tall eukalyptus tree forest west of observer and flew east (LAC1) - approximately 4 to 5 additional bats observed foraging overhead within 15-20 mins after sunset

ADDITIONAL NOTES:
- Insect activity generally low. - Artificial light level in the reservoir is extremely high due to adjacent lighting of JPL parking lot and High School Field. Although no moon observers could see very well without use of flashlights. Anabat 1 at: 34.196122647, -118.170686736813 - Myotis heard later in night Anabat 2 at: 34.19062013 74, -118.173657669604

INCIDENTAL SPECIES OBSERVED (include sign: tracks, carcass, feathers, scat, etc.)
California Towhee Great Horned Owl (Heard) Cottontail Bushtit Spotted Towhee Coyote

2018-047.006

ECORP Consulting, Inc.
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Devil's Gate Reservoir Project Protected Species Preconstruction Survey

Surveyor Names: Lauren Simpson + Torrey Rotellini; Date: 2018-11-08

Targeted Species: Roosting Bats (sp. Pallid bat, W. yellow bat, W. mastiff Bat)

NIGHTTIME SURVEY CONDITIONS					
	Time	Temp (F)	Wind (mph)	% Cloud Cover	Moon Phase
START	~~1625~~ 1625	69	0-3	0	1% waxing crescent
END	1824	68	4-10	0	

Sunset Time: 1653 Type of Equipment Used: ~~Anabat Express (2)~~, SchometerTouch 2 Pro (2), Night Vision (1)

SUITABLE HABITAT/SPECIES OBSERVATIONS?	
OBSERVER LOCATION	NOTES (time of first bat observation, level of bat activity, approximate number of bats observed and where, etc.)
Tree ID 006 Large Eukalyptus Snag	- NO bats observed emerging from ~~targeted tree~~ - 1st bat observed emerging from Live Eukalyptus tree immediately behind ~~target tree~~ (Class 3) before sunset (1626) - hoary bat (acoustic+visual) - one individual observed to return to same tree appx 1hr later - additional ~ ~~5~~ 4 to 5 bats observed foraging in area
Tree ID 007 Two Large Eukalyptus Snags	- NO bats observed emerging from ~~targeted trees~~ - 1st bat heard/observed flying ~~west~~ to ~~East~~ at 1635 - Appx 3 additional individuals detected acoustically - ~ 1730 one great-horned owl landed on branch of one ~~target~~ tree

ADDITIONAL NOTES:
- Hoary bats emerged very early (~ 30 mins before sunset) appear to be roosting in Eukalyptus trees. - Artificial lighting is high and great horned owls have been present on each survey night. Bat predation risk in the reservoir is likely high. Anabat 1: 34.188360341, -118.174181475 Anabat 2: 34.192304103 67, -118.172305030858

INCIDENTAL SPECIES OBSERVED (include sign: tracks, carcass, feathers, scat, etc.)	
Bushtit	Coyote (heard)
American kestrel	Red-shouldered hawk
Cooper's Hawk	Great-horned owl
Acorn woodpecker	Common poorwill
Yellow-rumped warbler	