BASELINE BIOLOGICAL REPORT

FOR

INTERIM MITIGATION MONITORING FOR CALIFORNIA TIGER SALAMANDER HABITAT ON COUNTY-OWNED PROPERTY ON THE FORMER FORT ORD

April 2016

Prepared For

County of Monterey
Resource Management Agency
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1 PROJECT INITIATION AND BASELINE SURVEY

Denise Duffy and Associates, Inc. (DD&A) was contracted by the County of Monterey Resource Management Agency (County) to assist with the implementation of the *East Garrison CTS Interim Mitigation Monitoring Plan* (Interim MMP) (prepared by Live Oak Associates, Inc., September 2, 2014) and to satisfy California Department of Fish and Wildlife (CDFW) permit requirements over a five year period for the 134-acre[1] California tiger salamander (*Ambystoma californiense*) (CTS) Preservation and Habitat Restoration Area on former Fort Ord (Property) (Figure 1). The services will be provided on an interim basis until the Fort Ord Reuse Authority (FORA) adopts the Fort Ord Multispecies Habitat Conservation Plan (Fort Ord HCP) and the CDFW issues its Incidental Take Permit (ITP) under Section 2081 of the California Endangered Species Act (CESA). Adoption of the HCP and permit issuance is expected to occur within five years of this Report. The conservation goal for the 134-acre Property is to maintain suitable upland habitat for CTS through implementation of management specified in the Interim MMP.

1.1 PROJECT INITIATION

DD&A met and coordinated with County staff to finalize the Scope of Work (SOW), to collect all project and relevant site information, discuss timing of surveys and reports, and determine appropriate paths of communication. Additionally, DD&A contacted Deborah Hillyard at CDFW and discussed the approach to conducting the work in satisfaction of CDFW's expectations and permit compliance.

The SOW included developing a biological baseline for the Property by conducting on-site surveys. The baseline surveys will guide future monitoring of the Property, including maintenance and monitoring activities as well as the timing of activities. This report describes the methods and results of baseline surveys, and summarizes the baseline biological conditions of the Property.

1.2 BASELINE SURVEY METHODOLOGY

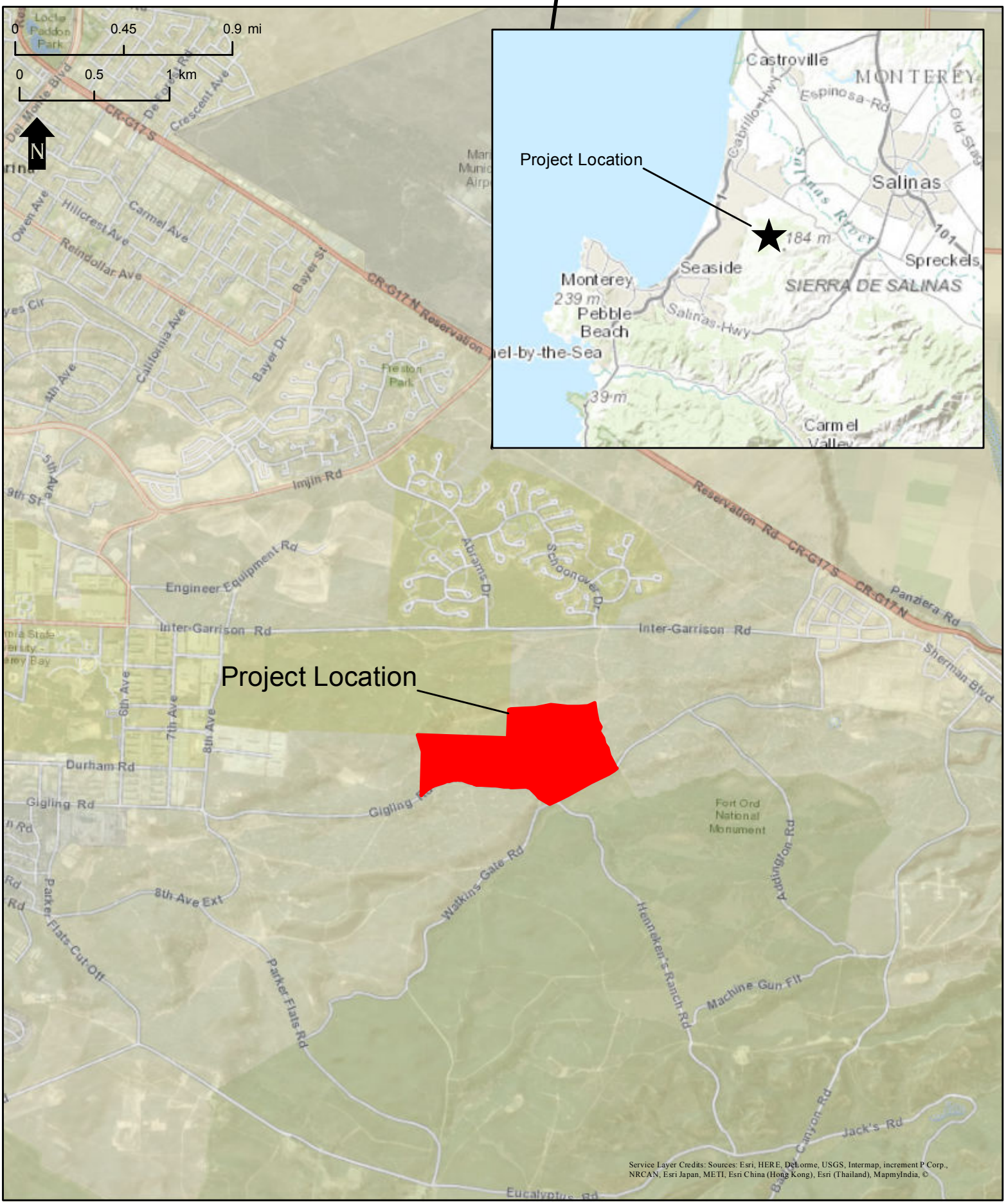
1.2.1 TRAILS AND FUEL BREAKS

DD&A Environmental Scientists walked the Property and assessed the baseline condition of trails and fuel breaks. As part of the baseline survey, DD&A assessed and mapped the following using a Trimble® Geo 7 Series global positioning system (GPS) with an external Zephyr Model 2 antenna:

- Conditions and locations of existing barriers and signage;
- Locations for future signage to restrict access by off-road vehicles and pedestrians;
- Conditions and locations of existing fuel-breaks and access roads;
- Erosion features[2] within the site, along trails and fuel-breaks;

[1] The total acreage of the site as identified in the scoping materials provided by the County. Acreage used for analysis of the Property is based upon available GIS data and differs by a total of 2.3 acres.

[2] For the purpose of this study, an erosion feature is defined as areas identified in the field, exhibiting signs of existing erosion and/or potential for erosion, including, but not limited to, bare ground, gullying, and exposed tree roots.



Project Location Map

C:\GIS\GIS_Projects\2015-26 EG CTS Mitigation\Map Products\Figure 1 Project Location.mxd

Date: 2/19/2016
Scale: 1 inch = 0.5 miles
Project: 2015-25

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Figure
1

- Areas along trails and fuels breaks with populations of invasive non-native plant species, focusing on jubata/pampas grass (*Cortaderia jubata*), iceplant (*Carpobrotus edulis*), and French broom (*Genista monspessulana*) potentially in need of removal; and
- Volunteer trails that should be signed and monitored for trespass and erosion issues.

1.2.2 CTS HABITAT AND CTS NIGHTTIME SURVEYS

Baseline surveys were conducted to monitor CTS habitat conservation value. Site visits were conducted on February 4, and 8, 2016. Additionally, DD&A Senior Environmental Scientist, Mathew Johnson, and Assistant Environmental Scientist, Shaelyn Hession, conducted CTS walking nighttime surveys on January 8, and February 17, 2016.

Parameters evaluated during survey efforts included the following:

- Vegetation/Habitat
  - a list of dominant plant species in the three natural communities present on the property;
  - soil erosion noting the extent and location;
  - non-native invasive plant species noting extent and location; and
  - natural disturbances such as fire or significant soil shifts.
- Wildlife
  - wildlife species observed during monitoring events;
  - nighttime surveys for CTS during the rainy season;
  - distribution status (if any) of listed species; and
  - approximate distribution of small mammal burrows.

Per DD&A's discussions with CDFW regarding survey methodology for the small mammal burrow surveys and CTS walking nighttime surveys, the following methods were identified to meet CDFW permit requirements:

- Small mammal burrow surveys: DD&A assessed the distribution of small mammal burrows using a systematic sampling approach. As part of the first data collection event, DD&A conducted a pilot study to determine the sampling design that will be utilized during subsequent assessments. Data collection included documenting small mammal burrows that occur within the sample plot (quadrat) at each sampling point along transects. The location of each sampling point was mapped using a GPS unit. The placement of the transects were determined prior to conducting the field work by haphazardly placing lines approximately 100 meters in scale on an aerial of the Property in ArcMap. The number of transects varied with distance from the known CTS breeding sites to the south of the Property. At least one sample point occurred in each of the three habitat types (i.e., grasslands, oak woodlands, and maritime chaparral) present on the Property. Habitat type was determined using GIS data provided by the Army (Jones and Stokes 1992). For the pilot study, a hierarchical sample design with three quadrat sizes was used. Quadrat sizes were ten by ten meter, five by five meter, and three by three meter. The quadrats were placed at twenty meter intervals, on the northwest side of each transect. Within quadrats mammal burrows were visually

identified and inspected. Entrances of mammal burrows of sufficient depth and size to provide cover for a CTS were marked with a pin flags and the pin flags counted within each quadrat.

A statistical comparison of mammal burrows entrance density per square meter as estimated by the various quadrat sizes were compared using a mixed-design analysis of variance. The analysis included data from the oak woodland and the grassland habitats present on the Property. In the analysis the between subject effect was habitat type, the within subject effect was the different sized quadrats, and the random term were the transects within the habitats. A 95% confidence interval was used to determine if there was a significant difference as a function of habitat type and quadrat size.

- Walking nighttime surveys for CTS: DD&A Environmental Scientists conducted walking nighttime surveys in the rain along Watkins Gate Road. Gigling Road connects with Watkins Gate Road near the southern boundary of the Property, and a small portion of the intersection was included in the nighttime walking survey area (Figure 2). The nighttime walking survey area is located at the southern boundary of the Property, between the upland habitat on the Property and the aquatic breeding sites adjacent to the Property. This section of road was walked during rain events in the breeding season to observe CTS moving from upland habitat, on the County owned property, to the known breeding location. Walking nighttime surveys were conducted in the rain for a period of six (6) hours. Age, sex, total length (mm), snout vent length (mm), and weight (g) were recorded for each CTS observed during the walking nighttime survey effort.

1.3 BASELINE SURVEY RESULTS

1.3.1 TRAILS AND FUEL BREAKS

DD&A identified and mapped 15 volunteer trailheads, four polygons of non-native invasive plant species, four erosion features, and 26 existing sign posts (Figure 2). No existing man-made barriers were identified during the baseline survey efforts. Table 1 provides a summary of the non-native invasive species and erosion features.

Table 1. Summary of non-native invasive plant species and erosion features

Feature	Plant Species	Number of Polygons	Total Area (m^2)
Non-Native Invasive Plant	French broom	3	484.8
Non-Native Invasive Plant	Iceplant	1	103.5
Erosion Features	-	8	1097.4

CTS Preservation and Habitat Restoration Area Boundary

Trails Wiihin Preserve

2 Foot Trail

4 Foot Trail

Existing Sign Post

Volunteer Trailhead

Erosion Feature

French Broom

Iceplant

N

H-07

P-25

P-24

P-21

P-23

P-22

P-20

P-19

P-18

P-17

The Property

Walking Nighttime Survey Area

Known Breeding Location

Gigling Rd

Watkins Gate Rd

Hennekens Ranch Rd

0 250 500 1,000 Feet

Trail and Fuel Break Survey Results

C:\GIS\GIS_Projects\2015-26 EG CTS Mitigation\Map Products\Figure 2 Trail and Fuel Break Survey Results.mxd

Date: 4/5/2016

Scale: 1 in = 300 feet

Project: 2015-26

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Figure 2

1.3.2 CTS HABITAT AND CTS NIGHTTIME SURVEY RESULTS

CTS Habitat Surveys

Three habitat types were idenified by Jones and Stokes (1992) on the property: maritime chaparral (0.8 acres), grassland (18.6 acres), and oak woodland/savanna (112.3 acres). Dominant plant species observed in the maritime chaparral included black sage (*Salvia mellifera*), coyote bush (*Baccharis pilularis*), poison oak (*Toxicodendron diversilobum*), sticky monkey flower (*Diplacus aurantiacus*), and shaggy bark manzanita (*Arctostaphylos tomentosa*). In the grassland, dominant plant species included several non-native annual grasses, purple needle grass (*Stipa pulchra*), and horkelia (*Horkelia* sp.). Coast live oak (*Quercus agrifolia*), poison oak, fusica-flowered gooseberry (*Ribes speciosum*), black sage, monkeyflower, hedge-nettle (*Stachys* sp.), and several non-native annual grasses were the dominant plant species observed in the oak woodland. Wildlife observed during the baseline survey effort included Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*), scrub jay (*Aphelocoma californica*), California towhee (*Melozone crissalis*), wrentit (*Chamaea fasciata),* red shouldered hawk (*Buteo lineatus*), Anna's hummingbird (*Calypte anna*), and American kestrel (*Falco sparverius*).

Data were collected at a total of 38 sampling points along nine transects in the oak woodland; at 10 sampling points along 2 transects in the grassland, and at one sampling point in the maritime chaparral (Figure 2). Grassland had the highest mean burrow density per meter squared of the three habiatat types (Table 2).

Table 2. Mammal burrow entrance density survey results

Habitat	Quadrat Size (m^2)	Number of Sample Points	Mean Burrow Count	Mean Burrow Density Per m^2
Oak Woodland	100	34	4.4	0.04
	25	34	1.4	0.06
	9	34	0.5	0.06
Grassland	100	9	22	0.22
	25	9	4.4	0.18
	9	9	1.3	0.15
Maritime Chaparral	100	1	0	0
	25	1	0	0
	9	1	0	0

The statistical program R was used for preliminary data exploration while JMP (SAS Institute) was used for the final statistical analysis. There was no significant difference in mammal burrow density between oak woodland and grassland habitat types on the Property (DF=1; p=0.0675). Additionally, there was no statistically significant difference in mammal burrow entrance density as a function of quadrat size within each habitat (DF=2; p= 0.9815). As maritime chaparral occupies only 0.8 acre (0.6%) of the 131.7[3] acre property, mammal burrow entrances were counted at only one sample point. No mammal burrows were

[3] As mentioned above acreage for analysis was taken from the GIS data and does not match the acreage amount identified by the County.

Quadrat Locations
Transects

Natural Communities

Grassland
Martitime Chaparral
Coast Live Oak Woodland and Savanna

N

H-07

P-25

P-24

P-21

P-22

P-23

P-19

P-20

P-18

P-17

13 12 11 10 9 8 7 6 5 4 3 2 1

The Property

Nighttime Walking Survey Area

Known Breeding Location

Gigling Rd

Watkins Gate Rd

Hennekens Ranch Rd

Grassland 18.6 Acres
Maritime Chaparral 0.8 Acre
Oak Woodland 112.3 Acres

0 250 500 1,000 Feet

CTS Habitat Transects and Sampling Locations

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Date: 2/19/2016
Scale: 1 in = 300 feet
Project: 2015-26

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Figure
3

observed in any of the quadrat sizes in maritime chaparral; therefore, no statistical analysis was conducted or required for this habitat type.

CTS Nighttime Surveys

Two nighttime walking surveys were conducted on Watkins Gate Road between the Property and the adjacent known breeding location. During these surveys, 16 CTS were observed, measured, and weighed. Please refer to Appendix A for a detailed description of CTS captured during the walking nighttime survey effort.

2 DISCUSSION

DD&A will meet with the County and CDFW to discuss the results and recommendations of this report, and will determine the appropriate recommendations with regard to any habitat enhancement measures deemed to be warranted, recommendations with regard to any problems that need short, and/or long-term attention, and any changes in the monitoring or management program that appear to be warranted based on monitoring results to date.

2.1 TRAILS AND FUEL BREAKS

DD&A will work with Smith and Enright Landscape, Inc (SEL) to implement removal and/or management measures of invasive non-native plant species as may be required in areas identified during the baseline surveys (Figure 2). Such removal and/or management measures will be limited to the areas along firebreaks and/or any existing pedestrian trails within the Property, at the locations identified on Figure 2. Non-native invasive plant species will be removed via hand pull or hand tools only.

DD&A will work with SEL to determine the best locations to install barriers and signs to restrict access by off-road vehicles and pedestrians. The majority of these locations will be at entrances to the Property; however, since several volunteer trailheads were mapped within the Property, DD&A will work with SEL, Inc. to determine additional methods for discouraging the use of volunteer trails. Discouraging the use of volunteer trailheads may include the placement of signs or barriers. Erosion control measures may be installed at the locations identified on Figure 2.

Where volunteer trailheads and erosion features are co-occurring within the property, signage may be beneficial. The baseline survey information will serve to inform DD&A and SEL where to focus maintenance efforts. The final determination of where to install barriers and/or signs will be part of the summer survey, following the initial land management assessment discussions with the County and CDFW. The Annual Report will include a list of management activities preformed. DD&A and SEL will biannually (once in the summer and once in the winter) assess the need for erosion control along the firebreaks, trails, and other bare-earth areas on the property. These monitoring activities would likely include the monitoring of volunteer trailheads as these areas are often bare-earth or occur along existing trails.

2.2 CTS HABITAT AND CTS NIGHTTIME SURVEYS

CTS Habitat Surveys

Plant cover or ground cover can preclude the inclusion of mammal burrow entrances in survey data; this issue is further exacerbated in areas covered by dense brush or duff. Obstruction of mammal burrows by vegetation or other material can lead to an underestimation of mammal burrow entrances at a sampling location. This limitation occurs in all habitat types; however, the nature of the plant/groundcover in sampling locations within oak woodland and maritime chaparral increases the potential to underestimate mammal burrow entrances at some locations. Furthermore, DD&A Environmental Scientists were unable to access some sample points along transects in the oak woodland where poison oak was dense in the understory. Transect numbers five and seven were not sampled during the baseline survey due to access constraints. Inability to sample in areas where poison oak is dense may lead to an underrepresentation of these areas within the dataset.

A goal of the pilot study was to determine the sampling design that will be utilized during subsequent assessments. A three by three meter quadrat is optimal in the oak woodland and maritime chaparral as this quadrat size is more efficient and yields an average mammal burrow density per meter squared that does not differ significantly from the ten by ten meter or five by five meter quadrats. While there is no statistical difference between the average mammal burrow density per meter squared between quadrats in the grassland, a five by five meter quadrat is optimal in this habitat type as the mean number of mammal burrow per meter squared falls between that of the ten by ten meter and three by three meter quadrats (Table 2). Using a five by five meter quadrat in the grassland will reduce the potential to overestimate or underestimate mammal burrow density. The quadrats will be placed at the same location each year for the duration of the contract, and a repeated-measure ANOVA will be used to analyze data collected to assess if there is a change in mammal burrow entrance density between years.

CTS Nighttime Surveys

The method of walking Watkins Gate Road was successful as DD&A Environmental Scientists were able to safely identify individual CTS as they migrated between the breeding habitat adjacent to the Property and the Property. Photos were taken of each individual and compared to avoid repeated counts of the same individual.

3 REFERENCES

Jones and Stokes Associates. 1992. Flora and fauna baseline study of Fort Ord, California.

Live Oak Associates, Inc. 2014. East Garrison CTS Interim Mitigation Monitoring Plan. [September 2, 2014]

ATTACHMENT A

WALKING NIGHTTIME CTS SURVEY DATA

Project: East Garrison Interim Mitigation Observer(s):MJ, SH
Date: 1/8/2016 Time Begin: 1700 Time End: 2300
Rain Last 24 HR: Yes Weather (Current):Raining

Species	New/ Recap	Age	Sex	TL (mm)	SVL (mm)	WT (g)
CTS1		J	UNK	135	78	18.3
CTS2		J	UNK	150	80	19
CTS3		J	UNK	160	85	19.5
CTS4		J	UNK	135	72	--
CTS5		J	UNK	125	63	12
CTS6		A	M	192	95	27.5
CTS7		J	UNK	145	83	26
CTS8		J	UNK	131	73	11
CTS9		A	M	195	100	27
CTS10		J	UNK	150	79	15.3
CTS11		J	UNK	165	80	15.8
CTS12		J	UNK	145	80	16

Notes:

Continued Next Page ☐

Project: East Garrison Interim Mitigation Observer(s):MJ, SH

Date: 2/17/2016 Time Begin: 1830 Time End: 2330

Rain Last 24 HR: Yes Weather (Current):Raining

Species	New/ Recap	Age	Sex	TL (mm)	SVL (mm)	WT (g)
CTS1		J	UNK	169	85	22.4
CTS2		A	M	192	110	29
CTS3		J	UNK	170	85	18.9
CTS4		J	UNK	154	85	20.0

Notes:

Continued Next Page ☐

ATTACHMENT B
SITE PHOTOS

Quadrat With Pin Flags - Oak Woodland

Erosion Feature - Gullying

Typical Volunteer Trailhead

CTS Capture (1-8-2016)

CTS Capture 2-17-2016

Attachment	Site Photos	Figure
B		1