Appendix H

Biological Resources

Biological Resources Technical Report

BIOLOGICAL RESOURCES TECHNICAL REPORT
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Prepared for
DESERT SUNLIGHT HOLDINGS, LLC
1111 Broadway St, 4th Floor
Oakland, CA 94607

Prepared by:
IRONWOOD CONSULTING INC.
20 Nevada Street, Suite 300
Redlands, CA 92373

Revised
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Summary

Desert Sunlight Holdings, LLC (Sunlight) has requested a right-of-way grant from the U.S. Bureau of Land Management (BLM) to construct and operate a new solar photovoltaic (PV) energy generating facility in an unincorporated part of Riverside County, California near the community of Desert Center (BLM Case File Number CACA-48649). The solar facility, associated generation interconnection line (Gen-Tie Line), and Southern California Edison's (SCE) Red Bluff Substation are collectively referred to in this report as the Desert Sunlight Solar Farm Project (DSSF or Project).

This report presents information regarding biological resources that occur on lands associated with the Project, along with a summary of the methods and results for biological surveys and investigations that have been conducted at the DSSF Study Area. The purpose of the surveys is to provide information supporting formal consultation between BLM and U.S. Fish and Wildlife Service (USFWS) under Section 7 of the federal Endangered Species Act (ESA), and any necessary incidental take authorization from the California Department of Fish and Game (CDFG) with respect to the California Endangered Species Act (CESA). The data contained within this report also provides information to promote compliance with requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

Beginning in 2007, initial background literature and database searches were conducted for the Project, and initial vegetation mapping and a biological constraints analysis were prepared. Between 2008 and 2010, several focused wildlife and botanical surveys were conducted throughout the Study Area, which encompasses the entire areas of potential impact associated with the Solar Farm, Gen-Tie Line, Red Bluff Substation, and all considered alternatives. Biologists from BLM and USFWS were consulted prior to conducting surveys.

These surveys confirmed the presence of a low-density desert tortoise population within the overall Study Area. Distinct concentrations of active desert tortoise sign were observed in specific portions of the Study Area. Eleven other special status wildlife species were detected during the surveys:

- American badger
- Burrowing owl
- Burro deer
- Chuckwalla
- Ferruginous hawk
- Golden eagle
- Le Conte's thrasher
- Loggerhead shrike
- Northern harrier
- Palm Springs round-tailed ground squirrel
- Swainson's Hawk

The botanical surveys revealed the presence of six special status plants species within the Study Area including:

- California ditaxis
- Crucifixion thorn
- Desert unicorn plant
- Foxtail cactus
- Las Animas colubrine
- Slender-spined althorn (crown-of-thorns)

Sensitive habitat types were identified in the Study Area including Desert Dry Wash Woodlands and unvegetated dry washes. Portions of the Study Area, associated with the Gen-Tie Line and Red Bluff Substation alternatives, overlap with the Chuckwalla Desert Wildlife Management Area (DWMA) and the Chuckwalla critical habitat unit (CHU) for desert tortoise

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List of Acronyms

amsl	above mean sea level
BA	Biological Assessment
BLM	U.S. Bureau of Land Management
BRTR	Biological Resources Technical Report
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CHU	Critical Habitat Unit
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNPSEI	California Native Plant Society's Electronic Inventory
DSSF	Desert Sunlight Solar Farm
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
ESA	Endangered Species Act
NECO	Northern and Eastern Colorado Coordinated Management Plan
NEPA	National Environmental Policy Act
ORV	Off-road vehicle
PV	Photovoltaic
RBSS	Red Bluff Substation
SBBM	San Bernardino Base and Meridian
SCE	Southern California Edison
SSC	Species of Special Concern
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

1.1 Purpose of the Biological Resources Technical Report

This Biological Resources Technical Report (BRTR) provides a comprehensive summary of methods and results of biological resource surveys and investigations conducted between 2007 and 2010 within the Study Area for the Desert Sunlight Solar Farm Project (DSSF or Project) as proposed by Desert Sunlight Holdings, LLC (Sunlight). The purpose of the surveys is to support formal consultation between BLM and U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act (FESA), and any necessary incidental take authorization from the California Department of Fish and Game (CDFG) with respect to the California Endangered Species Act (CESA). The data contained within this report also provides information to promote compliance with requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

1.2 Organization of Project Components

The Project includes components that would be independently constructed and maintained by Sunlight and Southern California Edison (SCE). In short, Sunlight components would include the Solar Farm, and the generation interconnection transmission line (Gen-Tie Line), and associated facilities; SCE components would include the Red Bluff Substation and associated facilities, including the telecommunications site. This report addresses all Project components and alternatives, while presenting Sunlight and SCE components separately.

1.3 Project Location

1.3.1 Sunlight Components

The Solar Farm site is located on the Victory Pass and East of Victory Pass 7.5 Minute U.S. Geological Survey (USGS) quadrangles. Elevations at the Solar Farm site range from approximately 189 to 269 meters (619 to 882 feet) above mean sea level (amsl). The Gen-Tie Line is located on the Victory Pass, Desert Center, and Corn Spring 7.5 Minute USGS quadrangles. Elevations within the Gen-Tie Line range from approximately 210 to 254 meters (690 to 833 feet) amsl.

The Solar Farm site is approximately six miles north of the rural community of Desert Center and four miles north of Lake Tamarisk, between the cities of Coachella (to the west) and Blythe (to the east) (Figure 1). The Project area contains existing transmission lines, telephone lines and pipelines, as well as dirt roads. Joshua Tree National Park is located to the north, east, and west of the area; at its closest point, the Solar Farm site is approximately 1.4 miles southwest of the national park boundary. The inactive Eagle Mountain Mine is located approximately one mile to the west of the Solar Farm site.

N

0 45 90 180
Miles

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Figure 1
Regional Location

Prepared by Ironwood Consulting, Inc. - May 2010

None of the Sunlight components are located within the boundaries of an Area of Critical Environmental Concern (ACEC) or designated Wilderness Area. The Solar Farm alternatives are not located within a BLM Desert Wildlife Management Area (DWMA) or USFWS-designated Critical Habitat Unit (CHU). However, three of the four Gen-Tie Line alternatives are partially located within the Chuckwalla DWMA and all four are partially located within the Chuckwalla CHU (Figure 2).

1.3.2 SCE Components

The majority of the SCE components (except the planned telecommunications site) are found south of Interstate 10 (I-10) in a rocky, undeveloped, and relatively flat land area located in the Chuckwalla Valley between I-10 and the Chuckwalla Wilderness (Figure 2). Existing transmission lines (including the Devers-Palo Verde [DPV1] line), telephone lines, gas pipelines, and dirt roads are situated in the immediate vicinity of the SCE components. The telecommunications site is a small, largely vacant, undeveloped, and relatively flat land area located along Highway 177 in the Chuckwalla Valley.

The Red Bluff Substation and associated facilities, except for the telecommunications site, are located on the Corn Spring 7.5 Minute USGS quadrangle. Elevations within the Red Bluff Substation, its distribution line and its access road range from approximately 233 to 257 meters (765 to 844 feet) amsl. The telecommunications site is located on the East of Victory Pass 7.5 Minute USGS quadrangle. The elevation of the telecommunications site is approximately 170 meters (560 feet) amsl.

The Red Bluff substation, distribution line and access road are not located within the boundaries of an ACEC or Wilderness Area; however, they are located within the Chuckwalla DWMA and CHU (Figure 2). The telecommunications site is not within an ACEC, Wilderness Area, DWMA, or CHU.

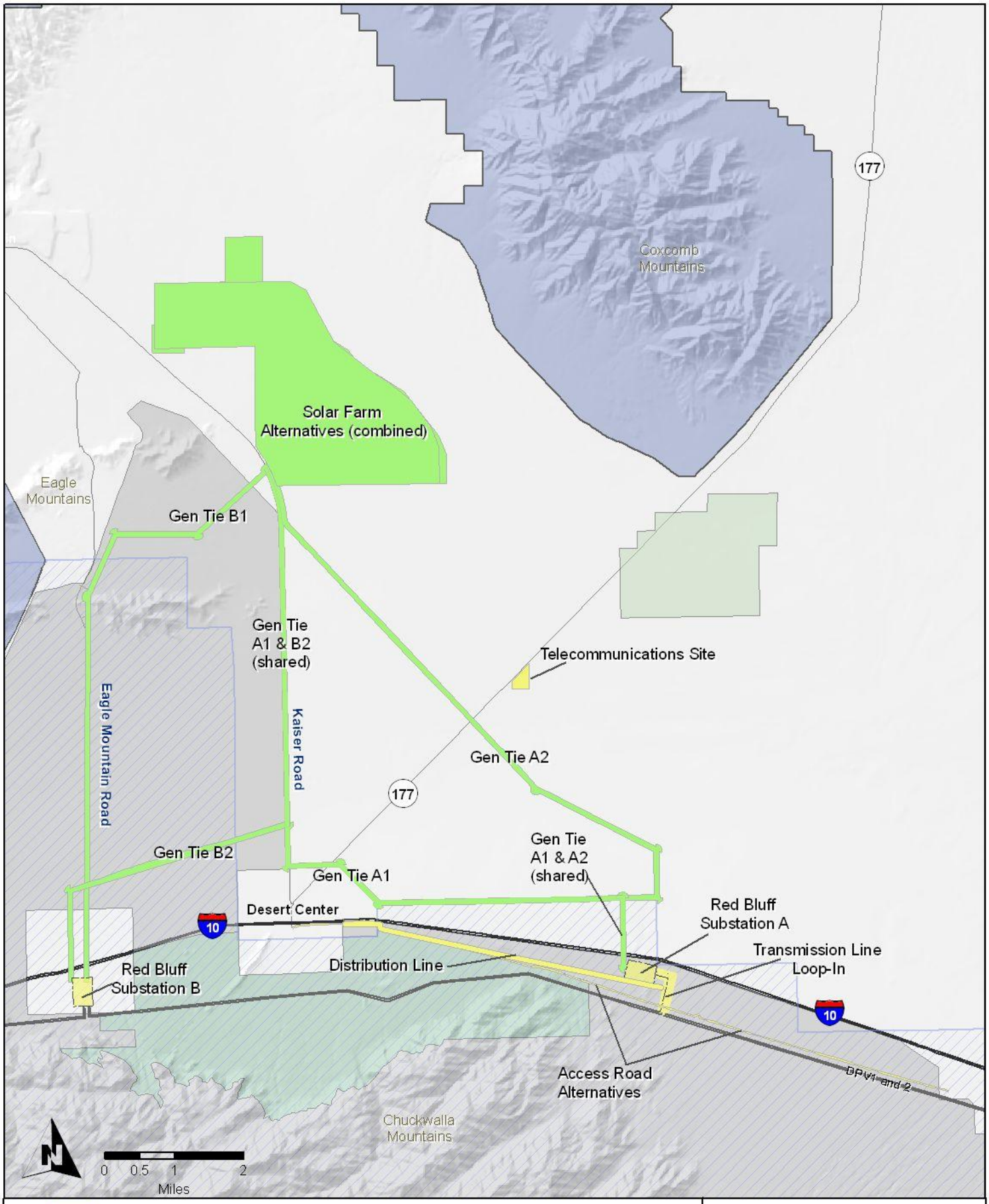
1.4 Project Summary

The Project is described in general terms below. Specific details of the Project description are included in other related documents including the Draft Environmental Impact Statement.

1.4.1 Sunlight Components

Sunlight components would include the Solar Farm and 220-kilovolt (kV) transmission line (Gen-Tie Line). The Solar Farm would consist of several main components, all located within the Project security fencing and permanent desert tortoise fencing:

- Main Generation Area - PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- Solar Energy Visitor's Center;
- On-site substation; and
- Site Security, Fencing, and Lighting.



Sunlight Components*

Southern California Edison (SCE) Components*

Desert Tortoise Critical Habitat

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Chuckwalla DWMA

Alligator Rock DWMA

Desert Lily Preserve

Joshua Tree National Park

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Figure 2
Project Components
All Alternatives

Prepared by Ironwood Consulting, Inc. - July 2010

At the on-site Substation, the Solar Farm output would be stepped up to the proposed transmission system's voltage of 220 kV. The Project would interconnect with the regional transmission system via a 220-kV single-circuit Gen-Tie Line that would exit the southwestern portion of the Solar Farm Site and follow a 160-foot-wide transmission right of way (ROW) to SCE's planned Red Bluff Substation to be located south of I-10.

The Gen-Tie Line would transmit the electricity generated at the Solar Farm to the regional transmission system, via the Red Bluff Substation where the power generated at the Solar Farm would feed into SCE's existing DPV1 500-kV transmission line. Sunlight plans to use self-weathering steel monopoles for the transmission line. Poles are expected to be 135 feet tall and spaced approximately 275 to 335 meters (900 to 1,100 feet) apart.

Several alternative configurations of the Project are currently being considered, including three alternative Solar Farm layouts (A, B, and C) and four alternative Gen-Tie Line routes (A1, A2, B1, and B2) (Figure 2).

1.4.2 SCE Project Components

SCE proposes to construct the Red Bluff Substation Project to interconnect the 550-MW DSSF Project to SCE's existing DPV1 500-kV transmission line. Red Bluff Substation would consist of a 1,120 mega-volt ampere (MVA), 500/220-kV substation on approximately 30 hectares (75 acres) of land. It would interconnect the power from the Solar Farm (via the Gen-Tie line) to SCE's DPV1 transmission line, which passes near the substation site. Substation features include:

- 500/220-kV Red Bluff Substation;
- Access road to the Red Bluff Substation ;
- Transmission lines to connect the substation to the DPV1 line;
- Connection of the Gen-Tie Line into the substation;
- Modification of some existing DPV1 structures (towers) near the substation;
- Electric distribution line for substation light and power; and
- Telecommunications facility associated with the substation
- Drainage Facility.

Currently, there are two alternative Red Bluff Substation locations (A and B) (Figure 2). Red Bluff Substation A is located east of Desert Center. There are two access road alternatives under consideration for Substation A. One located between the Desert Center exit off I-10 and the substation to the east and the other located between the Corn Springs Road exit off I-10 and the substation to the west. Red Bluff Substation B is located at the southern end of Eagle Mountain Road.

At the Red Bluff Substation, surface storm water runoff would need to be redirected around the substation, resulting in approximately 20 acres of additional land disturbance. The proposed substation would be enclosed on four sides by an eight-foot-high wall with two 24-foot-wide rolling gates. A band of at least three strands of barbed wire would be affixed near the top of

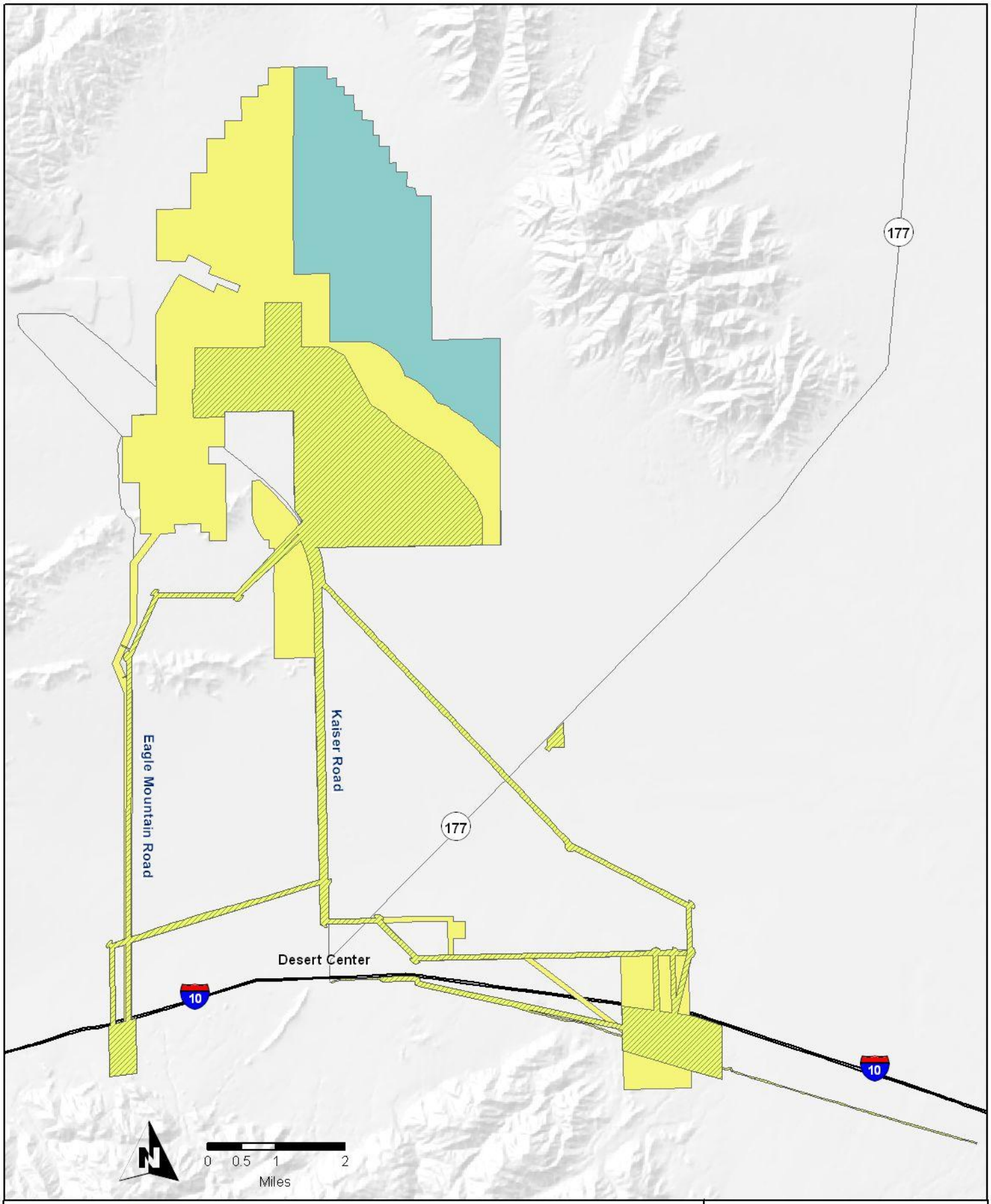
the perimeter wall inside the substation and would not be visible from the outside. Once constructed, the Red Bluff Substation would be unmanned, and electrical equipment within the substation would be remotely monitored. SCE personnel would visit the Substation three to four times a month for routine maintenance purposes. Routine maintenance would include equipment testing, monitoring, and repair.

An extension of the Desert Center 12 kV circuit (Distribution Line) would be required to provide light and power for the Red Bluff Substation. Poles for the Distribution Line would be single wooden poles approximately 9 to 12 meters (29 to 39 feet) tall. The proposed access road alternatives will require approximately 1.3 acres, 14 acres, or 21 acres of disturbance, depending on the alternative selected.

A Telecommunication Site would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at Red Bluff Substation, and transmission line protection. Around the Telecommunications Site, an 8-foot high berm would need to be constructed on three sides.

1.5 Study Areas

For the purpose of this report, Study Areas are defined by the area of land subjected to biological resource surveys. The Study Area for individual biological resources (e.g., vegetation communities, desert tortoise, and special status plants) varied due to changes in the proposed disturbance area as the Project evolved from 2007 to 2010. As additional Project components were designed, additional surveys were often warranted. Regular coordination among Ironwood Consulting, Inc. (Ironwood), Sunlight, and SCE ensured that all potential disturbance areas were included in the scope of surveys. All Study Areas for the Project encompassed a larger area than the proposed disturbance area. Survey buffers were applied to Project components (e.g., Gen-Tie Lines contained a 400-foot wide study corridor). This approach allowed for some degree of flexibility during final engineering design with the assurance that the final disturbance area would be covered by the respective Study Areas. As the site design became finalized, supplemental surveys were conducted in those areas likely to be affected by the Project, including both Sunlight and SCE components. Figure 3 provides the boundaries of biological resource Study Areas. Table 1 provides size and description data for the Study Areas for each biological resource and Project component.



Full Coverage - Desert Tortoise
(including other special status wildlife species)

Full Coverage - Botanical Survey

Additional Preliminary Assessment Area
(habitat assessment and vegetation mapping)

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Figure 3
Study Areas

Prepared by Ironwood Consulting, Inc. - June 2010

Table 1. Description of Study Areas

Project Component	Preliminary Assessments & Vegetation Mapping	Full Coverage Desert Tortoise Surveys[1]	Other Sensitive Wildlife Surveys	Full Coverage Botanical Study
Sunlight Components				
Solar Farm Alternatives	16,330 acres (full Study Area)	12,510 acres (original Study Area - east of Pinto Wash; and potential tortoise recipient sites)	12,510 acres (original Study Area - east of Pinto Wash; and potential tortoise recipient sites)	4,494 acres (combined footprint of Solar Farm Alternative A and B)
Gen-Tie Line Alternatives[2]	2,745 acres (400'-wide study corridor)	2,745 acres (400'-wide study corridor)[3]	2,745 acres (400'-wide study corridor)[3]	2,073 acres (400'-wide study corridor)
SCE Components				
Red Bluff Substation A[2]	1,517 acres	1,517 acres	1,517 acres	702 acres
Red Bluff Substation B[2]	199 acres	199 acres	199 acres	199 acres
Distribution Line for Red Bluff Substation A[2]	230 acres (400'-wide study corridor)	230 acres (400'-wide study corridor)	230 acres (400'-wide study corridor)	230 acres (400'-wide study corridor)
Access Roads for Red Bluff Substation A[2]	138 acres (124'-wide study corridor)	138 acres (124'-wide study corridor)	138 acres (124'-wide study corridor)	138 acres (124'-wide study corridor)
Telecommunications site	41 acres	41 acres	41 acres	41 acres

[1] Zone-of-influence transects not included in totals.

[2] Gen-Tie Line, Substation, Distribution Line, and Access Road Study Areas include small degree of overlap.

2.0 Methods

The following section describes the methods used to determine the need for focused surveys and the methods used to conduct focused biological surveys for special status species and habitats.

2.1 Special Status Species Definition

For assessment purposes in this report, a special status species has been defined as a plant or wildlife species that meets the following criteria:

- designated as either rare, threatened, or endangered by CDFG or the USFWS, and are protected under either the California or Federal Endangered Species Acts;
- candidate species being considered or proposed for listing under these same Acts;
- addressed in the Northern and Eastern Colorado Coordinated Management (NECO) Plan and Final Environmental Impact Statement (EIS) (BLM/CDFG 2002);
- State Species of Special Concern as designated by CDFG; or
- considered endangered, threatened, or rare pursuant to California Environmental Quality Act (CEQA) Guidelines, Section 15380.

2.2 Preliminary Assessment

Prior to conducting site surveys, a literature search was performed, which included a review of regional documents including the NECO Plan/EIS (BLM/CDFG 2002), the Biological Opinion (BO) for the NECO Plan/EIS (USFWS 2005), and line distance sampling data for desert tortoise collected between 2001 and 2009 in the region. Searches of the CDFG's California Natural Diversity Data Base (CNDDB) and the California Native Plant Society's Electronic Inventory (CNPSEI) were conducted to determine the special status species that have been documented in the Project vicinity. These searches included a radius of 5 miles surrounding the Study Area.

Preliminary surveys of the original Study Area were conducted on January 5 and 8, and June 14, 2007. Preliminary site visits were conducted by Kathy Simon and Kent Hughes, biologists with Ironwood Consulting, Inc (Ironwood). These field surveys collected information including:

- Characterization of plant communities;
- Assessment of listed and special status plant and animal species with potential to occur; and
- Photograph documentation of existing habitat types.

No focused surveys for special status species were conducted during the 2007 preliminary site visits. The results of the 2007 site visit were used to develop a list of species for which later focused surveys would be necessary. This list was refined through coordination with biologists at the BLM Field Office in Palm Springs and the Desert District Office in Moreno Valley (Massar 2009 and LaPre 2008).

After the 2007 preliminary surveys, environmental documents that included extensive biological survey information became available for two nearby proposed renewable energy projects, the Palen Solar Power Project and the Genesis Solar Energy Project. These projects are approximately 10 miles (Palen) and 17 miles (Genesis) southeast of the Project. These reports were reviewed to determine whether any special status species found during surveys of those project sites might be relevant to Sunlight (Solar Millennium 2009; Genesis Solar 2009). Using this information and observations in the field, a comprehensive list was generated of special status plant and animal species that have the potential to occur within the Study Area.

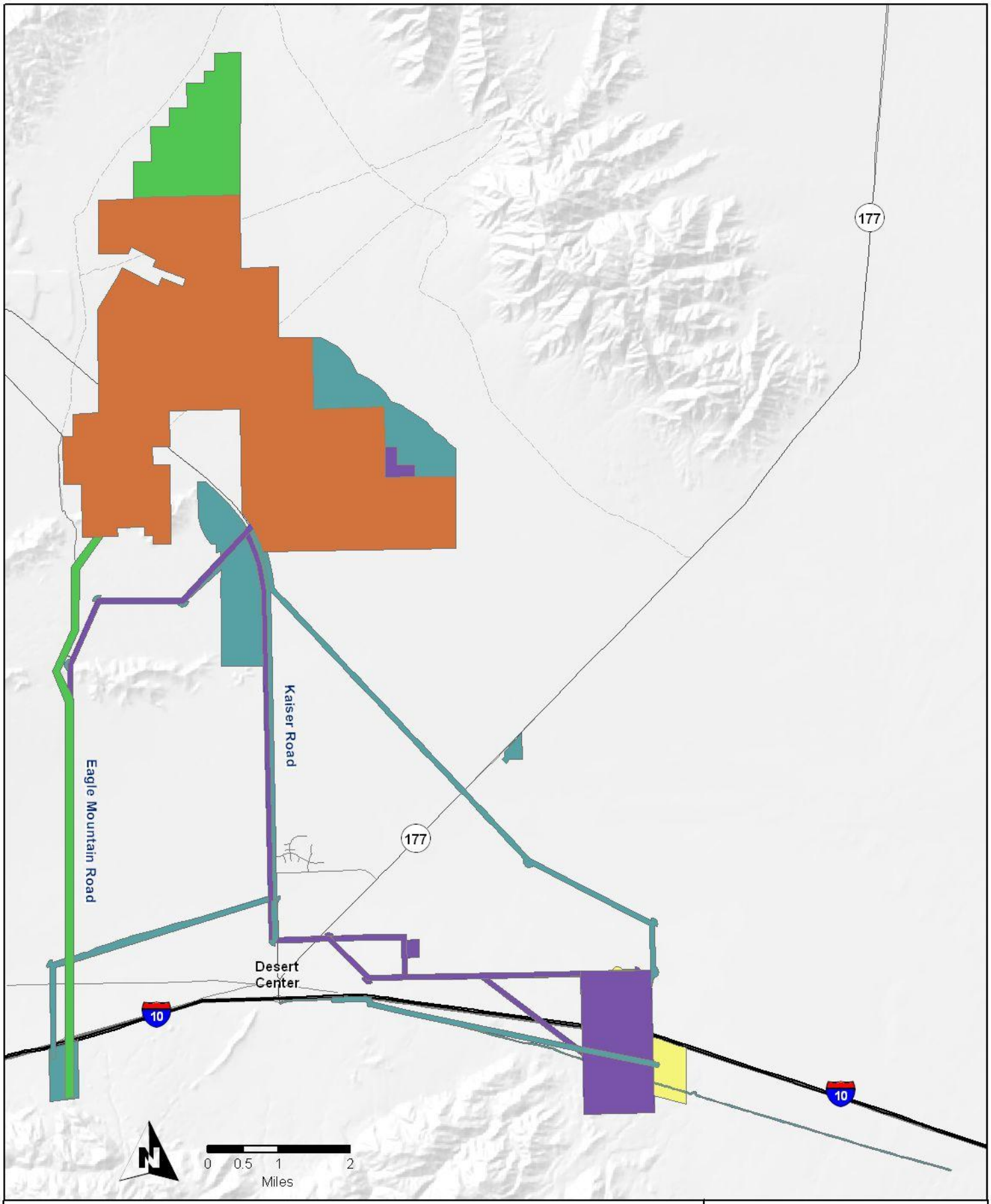
2.3 Desert Tortoise Focused Surveys

Focused desert tortoise surveys were conducted in 2008 that followed the presence-absence survey protocols described in the *Field Survey Protocol for Any Federal Action that May Occur within the Range of the Desert Tortoise* (USFWS 1992). In spring of 2009 and 2010, the USFWS issued revised survey protocols (USFWS 2009 and 2010). The full coverage survey option described in each of the protocols was essentially unchanged from the 1992 protocol, with the exception of the definition of the "action area". This concept was used by the survey team and Sunlight personnel when determining the Study Area. The revised protocols were designed to estimate the abundance and distribution of tortoises that occur within the survey area. These surveys employed belt transects approximately 10 meters (32.8 feet) wide in order to provide 100 percent (full) coverage of the entire Study Area. In addition, per the 1992 protocol, zone of influence transects were conducted at 100, 300, 600, 1200, and 2400-foot intervals from and parallel to the Study Area. Desert tortoise focused surveys were conducted by Ironwood Consulting, Inc. and associated contractors during five survey periods (Figure 4):

- March 18 and April 5, 2008;
- October 1 and 12, 2008;
- October 26 and 31, 2009;
- March 15 to April 17, 2010, and
- July 7 to 12, 2010[1].

All biologists were either highly-experienced desert tortoise surveyors or field technicians who attended field and classroom training sessions prior to conducting surveys. The BLM reviewed the resumes of all survey personnel, and approved them to conduct these surveys (LaPre 2008). The larger survey crew was divided into smaller crews of 4-6 people, with a greater number of highly-experienced people than field technicians on each crew. Each smaller group typically surveyed one square-mile section or two linear miles of proposed transmission line right-of-way until the entire surveyed portion of the Study Area was covered.

[1] Surveys were performed outside of typical spring/fall survey period due to unanticipated SCE project modifications. These surveys will be performed again during the fall 2010 or spring 2011 survey period.



Spring 2008

Fall 2008

Fall 2009

Spring 2010

Summer 2010

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Figure 4
Desert Tortoise Survey Periods

Prepared by Ironwood Consulting, Inc. - July 2010

All tortoise sign (e.g., live tortoises, shell/bone/scutes, scats, burrows/pallets, tracks, egg shell fragments, and courtship rings) were recorded. The location of all tortoise sign was recorded on a Garmin GPS unit (GPS 72, 76, or 60CSx) using a unique identification code. The code included a two-character acronym for the type of sign (e.g., TO-live tortoise, BU-burrow, SC-scat), two-character initials for the lead surveyor of the crew, and a unique sequential number. In addition to recording sign with the GPS unit, standardized paper datasheets were completed. Information for tortoise sign was recorded as shown on Table 2. All data were entered from these data sheets into a Microsoft Access database, compared with GPS data and rectified before these data were used in GIS to determine approximate abundance and distribution of desert tortoise. All records of live desert tortoise were submitted to the CDFG's CNDDB. Due to the volume of data, observations were submitted to the CNDDB in GIS shapefile format with relevant metadata and attribute information consistent with the fields found on the California Native Species Field Survey Form.

Table 2. Desert Tortoise Data Recorded

Type of Sign	Measurements	Estimates	Other
Live tortoise		Sex, age class	Location, activity
Cover site (burrow, pallet)	Width, height	Depth	Condition (active, inactive [good, fair, or poor]) and location. Each burrow was investigated by using a handheld mirror and/or flashlight to detect if a tortoise was present
Scat	Number of scats	Age class	Condition (this year or not this year), location
Shell or bone (carcass or fragments)		Sex, age class, time since death	Location
Tracks		Age	Location
Eggs or fragments		# of eggs	Condition, location
Courtship rings		Width	Location

2.4 Western Burrowing Owl Surveys

Surveys for the presence of western burrowing owls followed the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium 1993). The methodology includes four phases of study, as follows:

- Phase 1 - assessment of suitable habitat and potential presence of burrowing owl habitat within the site and 150-meter buffer;
- Phase 2 - burrow survey to assess and record burrows suitable for nesting;
- Phase 3 - burrowing owl surveys, census, and mapping of individual and pairs; and
- Phase 4 - summary of results and findings from the previous phases.

The Phase 1 preliminary assessment conducted in 2007 concluded that suitable habitat for western burrowing owl was present throughout the full Study Area. Phase 2 burrow surveys were conducted concurrently with full coverage desert tortoise surveys (Figure 4). The width of

pedestrian transects used during the full coverage tortoise surveys were narrower than those recommended for burrowing owl surveys, resulting in more comprehensive coverage. All burrows suitable for burrowing owl use were recorded during the survey. All visual or audible detections of burrowing owls and burrowing owl sign (i.e.; active burrows, tracks, feathers, pellets, prey remains, and white-wash) were recorded on standardized datasheets. The physical location of each observation was recorded by GPS. Phase 3 surveys and final Phase 4 reporting would be conducted prior to the commencement of ground disturbing activities associated with the Project.

2.5 Special Status Wildlife Species

In addition to recording desert tortoise, surveyors recorded all wildlife species, regardless of status, that were encountered during the survey. All special status species recorded as incidental data were also recorded by GPS and assigned a unique identifier. All other species were tallied at the end of each transect and recorded throughout each day by each crew. All data was entered from these datasheets and was incorporated into the GIS system.

2.6 Habitat Mapping

In September 2009, Ironwood biologists mapped areas of dry desert wash woodlands within and adjacent to the Solar Farm site and within the Gen-Tie Line alternatives. Biologists walked the boundary of the tree line and/or high-water mark of the Pinto Wash central drainage mapping the route with GPS units. Along the Transmission Corridor alternatives, areas were mapped using GPS technology by either walking or driving these routes. GPS data and notes were combined to define an accurate representation of the width and location of Pinto Wash and additional locations of desert dry wash woodland within the Study Area.

2.7 Botanical Study

The purpose of the botanical study was to provide sufficient information on all special status plants and natural communities to meet the requirements of CEQA, CESA, and FESA. Surveys were performed to maximize the likelihood of locating special status plant species or special status natural communities within the Study Area. The primary objective was to identify all plant species within the Study Area to the taxonomic level (i.e., species, subspecies, or variety) necessary to determine rarity status. The botanical study followed the guidelines set forth by:

- Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009);
- Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species (BLM 2009); and
- Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2000).

Surveys were conducted from March 15 to April 17, 2010. The survey period was scheduled to coincide with the primary blooming period for targeted special status species. The spring of 2010 followed a winter season with above-average rainfall, resulting in an increased rate of

annual plant production from previous drought years. Monthly precipitation totals obtained from the Western Regional Climate Center Cooperative Observer Program for the Eagle Mountain, California station averaged for winter months October through March for the last ten years indicate that from 2007 to 2010 average precipitation amounts have been increasing every year (Figure 5). In the winter of 2009-2010, the average precipitation was 5.15 inches. However, it was evident that plant phenology was not sufficiently developed for several plant species during the initial phase of the survey period. To address this factor in plant identification, all uncertain specimens were vouchered and location data was collected for the record. All plants were eventually identified and previously uncertain specimens were confirmed.

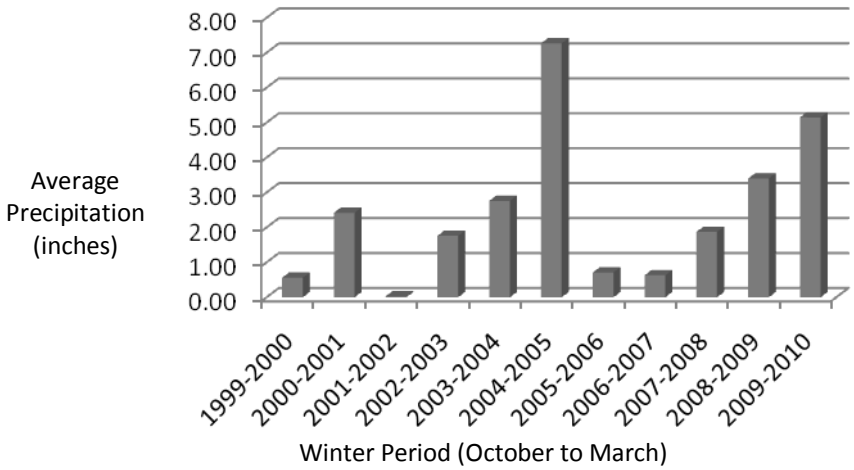


Figure 5. Precipitation Averages for Winter Months
(Source: Western Regional Climate Center - Eagle Mountain Station)

The survey team included personnel familiar with the identification of flora in the Colorado Desert of California. Assistants were trained in species identification during the early phase of the study. Resumes of all surveyors were reviewed and approved by the BLM District Biologist (LaPre 2010). Information on potential special status species was reviewed by the survey team to obtain an effective search image. Records of all plants species observed were maintained daily. A checklist was developed based on previous surveys and reviewed during each subsequent day of survey. On average, linear pedestrian transects were walked at 15-meter spacing. In areas of lower cover and diversity (e.g., desert pavement), transects were spaced further apart. In areas of greater cover and diversity, transects were spaced closer to one another. This allowed for a comprehensive survey of the Study Area. Surveyors walked at a rate of approximately 1 mile per hour. At this rate, the resulting level of effort averaged 1 person-hour per 6 acres survey area. Additional time was spent in the field and after the day survey keying plant taxonomy. If a plant of unknown identification was found, a GPS record was taken and a unique identification number was assigned so that if after proper identification, it was determined to be a special status species, the population could be revisited to collect additional data.

2.8 Baseline Sampling

Plant and wildlife sampling were performed to provide additional details of species composition and provide baseline quantitative data for future monitoring primarily associated with the Solar Farm site.

2.8.1 Selection of Sampling Locations

Fifteen sampling locations were established within and adjacent to the Solar Farm site boundaries (Figure 6). Sampling locations were randomly generated and stratified based on existing habitat types to obtain a sufficient representation of the area. The point for each sampling location represented the center or corner point of larger linear transects or grids depending on the specific methodology.

2.8.2 Plant Surveys

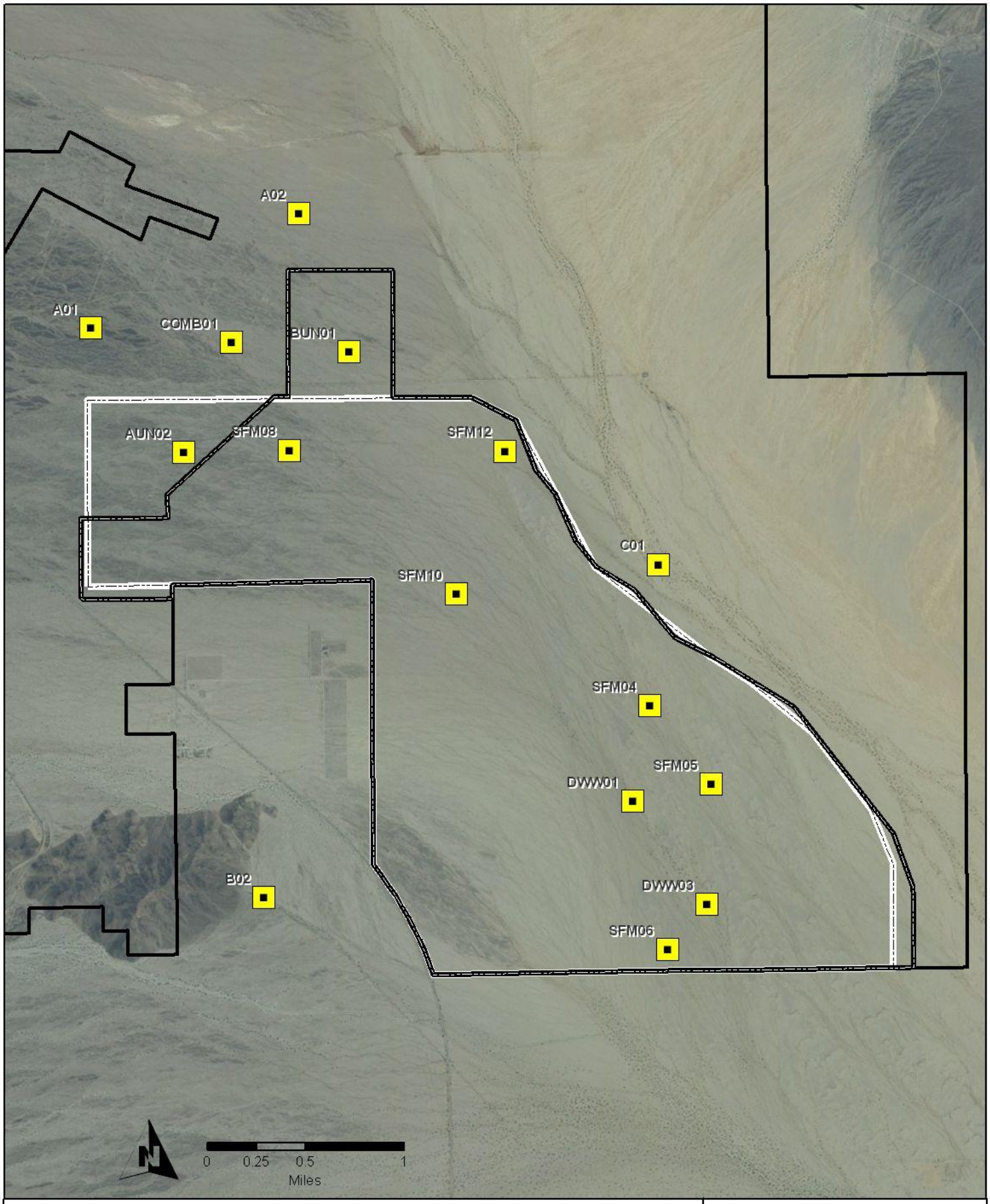
Plant surveys were conducted at all sampling locations during the peak of the blooming season in spring 2010. A point-intersect survey method was used along a 150-meter linear transect. Along this line, 100 points approximately 1.5 meters apart were observed and the species rooted at that point were recorded. This method provides an estimate of community composition and was used to estimate cover.

2.8.3 Avian Point Counts

Bird point counts were conducted at all sampling locations between April 7 and 20, 2010. Birds were sampled using point count methodology as described in Monitoring Bird Populations by Point Counts (Ralph et al. 1995). Four stations were surveyed at each sampling location, for a total of sixty stations. Avian detections were divided into three survey intervals consisting of the first three minutes, minutes 3 to 5, and minutes 5 to 10. Research suggests that the amount of time spent at a sampling location increases standard error especially at times greater than 10 minutes (Smith et al. 1997). Incidental flyovers were recorded separately from typical observations. Fall season 2010 avian point counts are scheduled to supplement the existing data.

2.8.4 Small Mammal Surveys

Trapping grids were established at all sampling locations. Narrow grids consisting of 100 large (12-inch-long) Sherman live-traps were set at each location. For most sampling locations, the sampling location point represented the southwest corner of the trapping grid. Depending on the width of the habitat being sampled, either a 4x25 or a 2x50 trap configuration was used. All traps were spaced approximately 10 meters apart. Traps were set and checked for three consecutive nights at all sampling locations. Traps were opened near sunset and checked and closed at sunrise. Traps were baited with standard small mammal bait, which includes seed and mill. All individuals captured were identified to species and released unharmed where trapped.



Study Plot

Solar Farm A

Solar Farm B

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Figure 6
Baseline Study Plots

Prepared by Ironwood Consulting, Inc. - June 2010

2.9 Golden Eagle Surveys

Golden eagle surveys were conducted by Wildlife Research Institute, Inc. (WRI) for four proposed energy development projects. The Study Area included 1,600 square miles and was located in the Big Maria, Chuckwalla, Coxcomb, Eagle, Hodges, Little Chuckwalla, Little Maria, McCoy, Orocopia and Palen mountain ranges as well as the Chuckwalla Valley. Phase 1 and Phase 2 surveys for golden eagles were conducted within 10 miles of project boundaries in order to comply with the *USFWS Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance* (Pagel et al. 2010). Surveys were conducted by helicopter to confirm Golden Eagle activity, occupancy, breeding status of the pairs, and fledging success. Additionally, ten other species (i.e., barn owl, bighorn sheep, common raven, Cooper's hawk, great horned owl, long-eared owl, prairie falcon, red-tailed hawk, Swainson's hawk, and turkey vultures) were recorded with GPS locations. The results of the surveys relevant to the Sunlight Project are summarized in this report.

2.10 Bat Assessment

A bat assessment was performed by Patricia Brown, Ph.D. (Brown-Berry Biological Consulting) on February 17, 2010 to assess potential bat habitat within the Solar Farm alternatives and proposed Gen-Tie Lines. Dr. Brown had previously conducted extensive bats surveys in the vicinity of the project near the Eagle Mountain Mine. Suitable habitat for several bat species (specifically those that are known to occur in the vicinity including pallid bats, western pipistrelles, and California leaf-nosed bats) was reviewed in the field. General areas that may serve as potential roosts and foraging sites were identified.

3.0 Results

3. 1 Soils and Topography

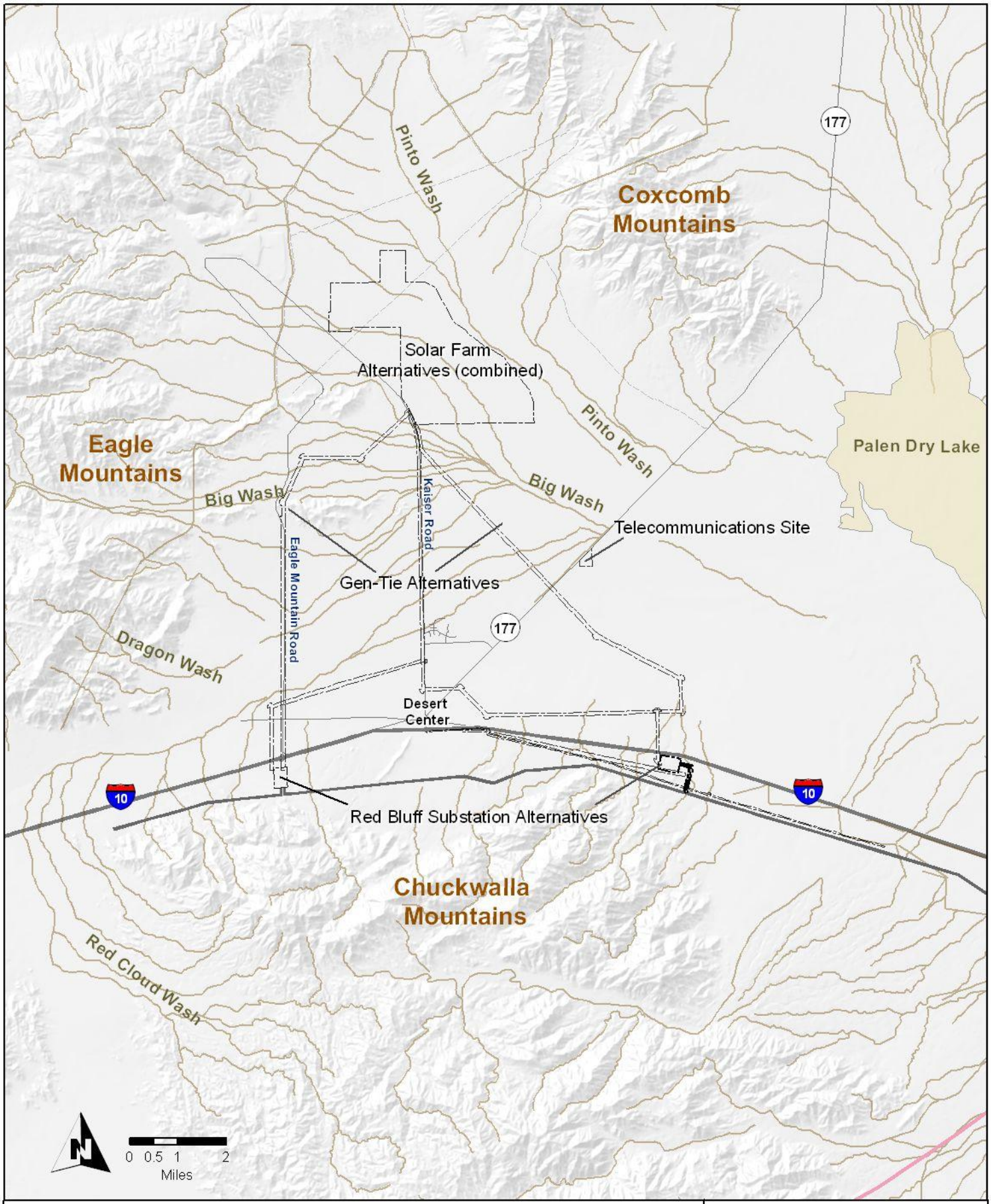
Soil mapping from Natural Resources Conservation Service (NRCS) was not available for the Study Area; however, field observations made by biologists and results of separate geotechnical studies have been summarized. Soils primarily consist of undifferentiated younger alluvium, younger alluvium with interspersed areas of weak desert pavement, and older alluvium with moderate to strong desert pavement (Earth Systems Southwest 2010). Older alluvial fan deposits are relatively diverse in soil and vegetation structure. These areas supported elevated uplands with desert pavement (manganese and iron oxidized coatings on cobbles and sand) blanket the top three to six inches of the older alluvial fan material. Drainages that occur within the older alluvial fans are relatively well-defined with well-formed banks up to several feet deep. Active younger sediments are of Holocene age and consist of fine to coarse sand, interbedded with clay, silt and gravel with no evidence of desert pavement. Topography in these areas tends to be uniform, with channel depths generally less than one foot. Slope within the Study Area ranges from 0 to 5 percent.

<u>Sunlight Components</u>

Multiple alluvial fans originate from the Eagle Mountains in the west and the Coxcomb Mountains in the east and flow into Big Wash and Pinto Wash terminating shy of Palen Dry Lake (Figure 7). Pinto Wash is located immediately east of the Solar Farm site. Big Wash runs south of the Solar Farm site crossing the Gen-Tie Line alternatives. Stabilized sand sheets and pockets of sand dune deposits are located east of the Solar Farm site, east of Pinto Wash. The Solar Farm site lacks aeolian (wind-blown) sand formations. The western extent of the Chuckwalla Valley is defined by a broad alluvial system that originates near Red Cloud Wash between the Orocopia and Chuckwalla Mountains and flows eastward through the Study Area. This system is fed by numerous alluvial fans (e.g., Dragon Wash) originating from the north and south and crosses the Gen-Tie Line alternative alignments prior to joining with the lower reaches of Big Wash.

<u>SCE Components</u>

The Red Bluff Substation A (eastern of the two substation alternatives) and related components are located at the base of the north-facing bajada of the Chuckwalla Mountains. Topography is highly varied along in this region. Broad active alluvial fans dominated by larger rock and gravelly soils are juxtaposed with upland mounds with well developed desert pavement. Several incised washes with banks up to twenty feet high and widths greater than 100 feet occur in this region. Red Bluff Substation B (the western substation alternative) Study Area consists of two distinct soil conditions: sandy soils emanating from an active alluvial fan in the southern half and a caliche outcrop in the southern half. The channels from the alluvial fan persist through the caliche outcrop resulting in well developed narrow washes, which range from only a few feet wide to over twenty feet wide. The channels flow into flood control dykes built to protect the I-10 from flooding.



Project Alternatives*

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Hydrograph Line
(USGS National Hydrography Dataset)

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Figure 7
Project Alternatives
Topographical Features

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3.2 Vegetation Communities

Two native vegetation communities occur within the Study Area: Sonoran Creosote Bush Scrub [Holland 1986; analogous to Creosote Bush-White Bursage Series (Sawyer and Keeler-Wolf 1995)] and Desert Dry Wash Woodland [Holland 1986; analogous to Blue Palo Verde-Ironwood-Smoke Tree Series (Sawyer and Keeler-Wolf 1995)]. Areas of disturbed, developed, and agricultural land also occur within the Study Area. A complete list of plant species occurring in these communities has been summarized by Project component (Appendix A).

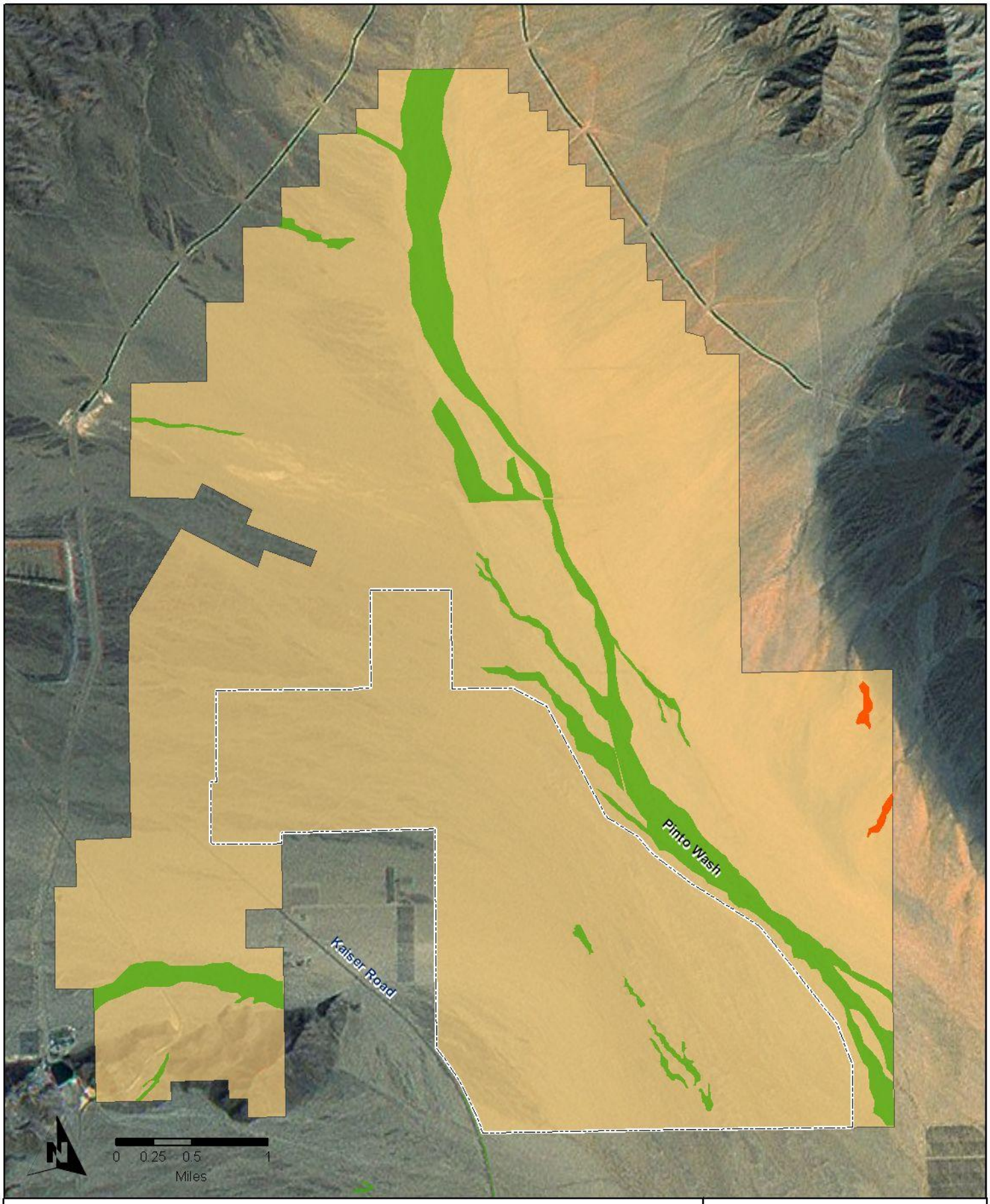
The majority of the Study Area supports a Creosote Bush Scrub community. Dominant plant species associated with this community include creosote bush (*Larrea tridentata*), burro bush (*Ambrosia dumosa*), boxthorn (*Lycium* sp.), brittlebush (*Encelia farinose*), indigo bush (*Psorothamnus* spp.), and cheesebush (*Hymenoclea salsola*). Local diversity of creosote scrub varied throughout the Study Area. This community was relatively more structurally diverse within the stable, older alluvial fan systems located in the northwestern and southwestern portions of the Solar Farm alternatives than in active alluvial fan systems located in the middle and southern extent of the Solar Farm alternatives.

The Desert Dry Wash Woodland community consists of drought-deciduous, small-leaved (microphyllous) trees, often leguminous, in association with sandy or gravelly washes with braided channels in active alluvial fans. Dominant plants species associated with this community include ironwood (*Olneya tesota*), blue palo verde (*Cercidium floridum*), and smoke tree (*Psorothamnus spinosa*). This community is considered sensitive by the California Resource Agency due its limited distribution, value to wildlife, and susceptibility to disturbance (BLM 2002 and CDFG/CWHRS 2010). The presence of water at least on a seasonal flow regime is vital for this community to persist. Dead ironwood trees can be found in the Study Area where previous disturbances, such as paved or dirt roads, have altered the natural surface flow regime.

Disturbed and developed areas either unvegetated or dominated by ruderal vegetation, are found in association with Kaiser Road, Eagle Mountain Road, Highway 177, and the I-10. Agricultural areas, mostly fallow jojoba farms, are located southeast of the Solar Farm alternatives and are crossed by Gen-Tie Line A1.

<u>Sunlight Components</u>

Vegetation communities mapped within the Study Area of the Sunlight components are shown in Figures 8 and 9. The area of each community within each Sunlight component is found in Table 3. The major alluvial systems associated with the Upper Chuckwalla Valley, Big Wash, and Dragon Wash support broad floodplains dominated by desert dry wash woodland (primarily *Olneya tesota*), which are crossed by the northern extents of the Gen-Tie Line alternatives. Pinto Wash supports dense, mature Desert Dry Wash Woodland (primarily *Cercidium floridum*), which is located outside the Solar Farm alternative eastern boundary.



Solar Farm Alternatives (combined)

Desert Dry Wash Woodland (Blue Palo Verde-Ironwood-Smoke Tree Series)

Sonoran Desert Scrub (Creosote Bush-White Bursage Series)

Aeolian Sand Dunes

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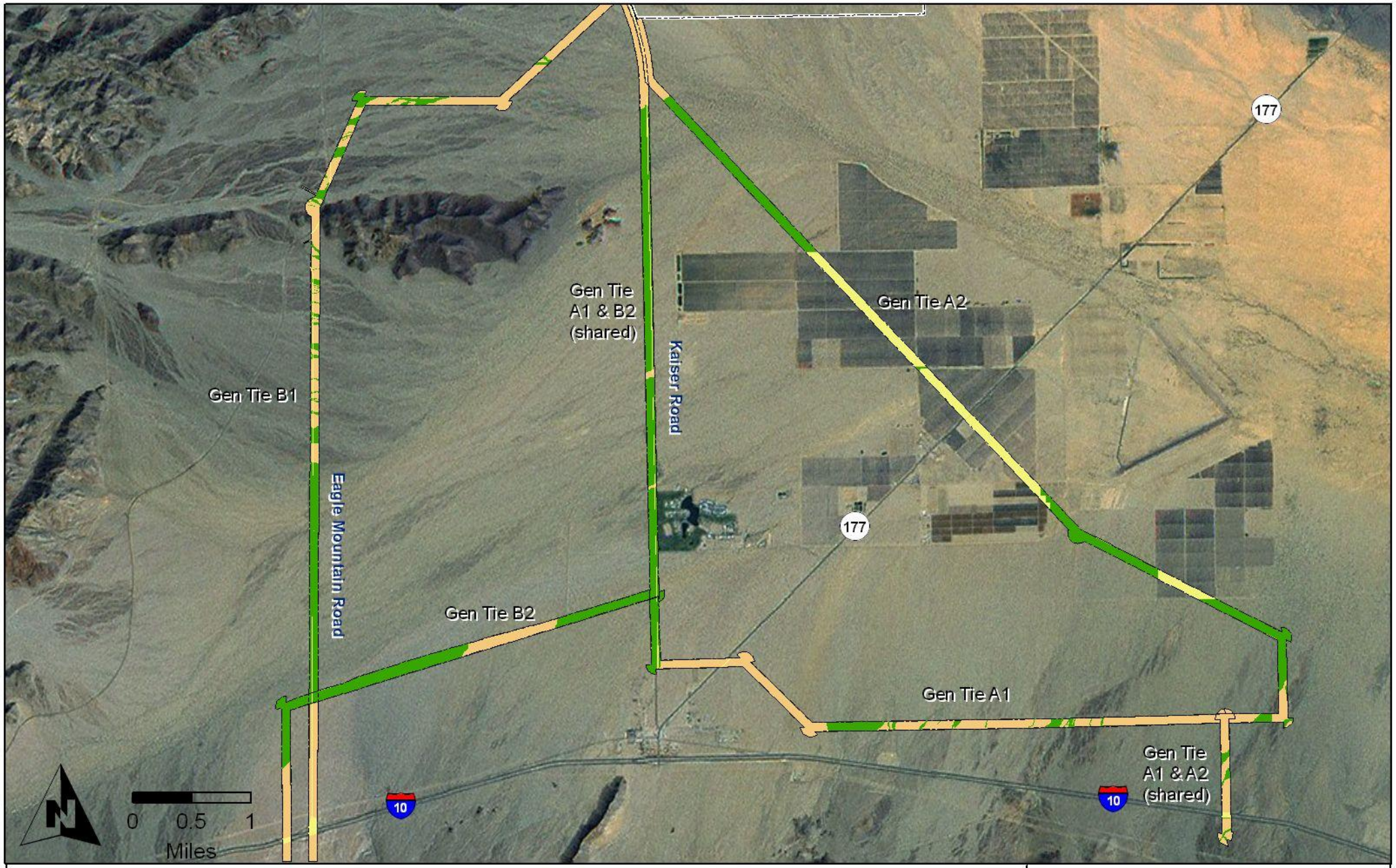
DESERT SUNLIGHT HOLDINGS, LLC

Figure 8
Vegetation Communities
Sunlight Components
Solar Farm Alternatives

Prepared by Ironwood Consulting, Inc. - June 2010



Project Alternatives*

* Disturbance areas for linear components are less than area depicted in map.

Desert Dry Wash Woodland (Blue Palo Verde-Ironwood-Smoke Tree Series)

Sonoran Desert Scrub (Creosote Bush-White Bursage Series)

Developed/Disturbed/Agricultural

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Figure 9
Vegetation Communities
Sunlight Components
Gen-Tie Line Alternatives

Prepared by Ironwood Consulting, Inc. - July 2010

Table 3. Vegetation Communities – Sunlight Study Area

Project Component Study Area*	Vegetation Community (acres)				
	Sonoran Desert Scrub	Desert Dry Wash Woodland	Developed Disturbed Agriculture	Aeolian Sand Dunes	Total
Solar Farm - preliminary Study Area	15,149	1,161	0	20	16,330
Solar Farm A	4,150	35	0	0	4,185
Solar Farm B	4,208	35	0	0	4,243
Solar Farm C	3,010	35	0	0	3,045
Gen-Tie Line A1	276	289	25	0	590
Gen-Tie Line A2	126	218	162	0	506
Gen-Tie Line B1	273	160	25	0	458
Gen-Tie Line B2	120	361	21	0	502

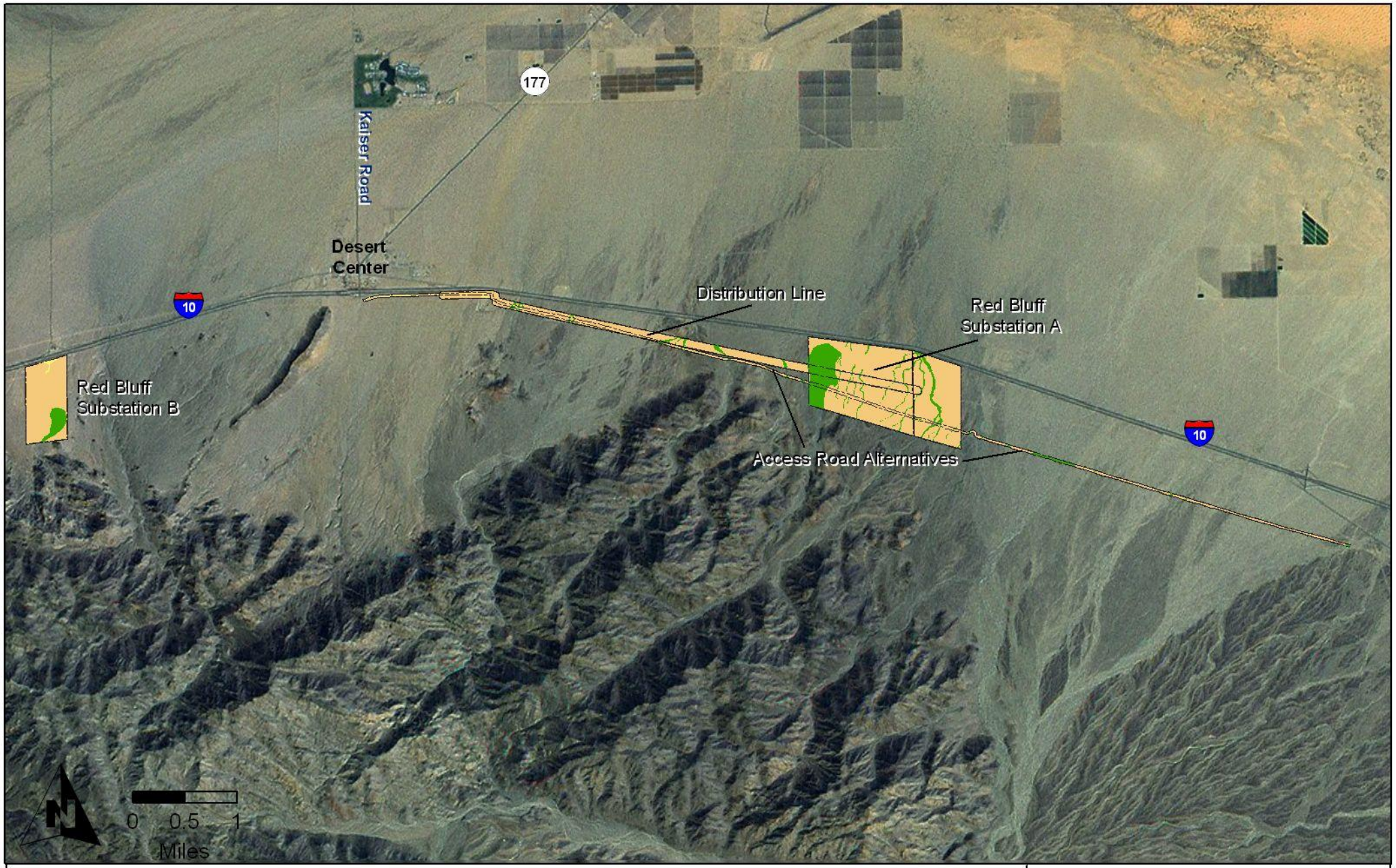
The eastern portion of the preliminary assessment area (east of Pinto Wash), supports pockets of Sonoran desert scrub on aeolian sand deposits that have been stabilized by shrub and herbaceous vegetation. Approximately 20 acres of active sand dune deposits, which are relatively barren expanses of moving sand and do not support extensive stabilizing vegetation, are located approximately one mile east of the Solar Farm alternatives. These dunes are located at the base of the southwest-facing bajada below the Coxcomb Mountains.

SCE Components

The SCE components consist primarily of Creosote Bush Scrub with active alluvial fans and prominent washes supporting Desert Dry Wash Woodland (Table 4 and Figure 10). Desert dry wash woodland is located within the broad alluvial system in the eastern third of the Red Bluff Substation A Study Area. Several deeply incised large washes with dry wash woodland occur in the western third of the Red Bluff Substation A Study Area. Vegetation communities along the access road alternatives and Distribution line were relatively disturbed and sparse as a result of historical land disturbance. The presence of existing dirt roads, utility lines, and flood control dykes has had a substantial impact on the vegetation density and diversity. Ironwood trees within this region displayed signs of poor health where surface flow had been diverted as a result of these disturbances.

Table 4. Vegetation Communities – SCE Study Area

Project Component Study Area*	Vegetation Community (acres)				
	Sonoran Desert Scrub	Desert Dry Wash Woodland	Developed / Disturbed / Agriculture	Aeolian Sand Dunes	Total
Red Bluff Substation A	564	138	0	0	702
Red Bluff Substation B	172	23	4	0	199
Access Road A (west)	56	7	5	0	68
Access Road B (east)	61	9	0	0	70
SCE Telecom Site	41	0	0	0	41
SCE Distribution Line	200	27	3	0	230



Project Alternatives*

* Disturbance areas for SCEcomponents are less than area depicted in map.

Desert Dry Wash Woodland (Blue Palo Verde-Ironwood-Smoke Tree Series)

Sonoran Desert Scrub (Creosote Bush-White Bursage Series)

Developed/Disturbed/Agricultural

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Figure 10
Vegetation Communities
SCE Components

Prepared by Ironwood Consulting, Inc. - July 2010

3.3 Special Status Plant Species

The spring 2010 botanical study followed above-average winter rainfall for the region (Figure 5). Over 190 plant species were detected during the botanical study (Appendix A). No federal- or state-listed (threatened or endangered) plant species were found within the Study Area. A total of six special status (CNPS listing status and NECO-covered) plant species were found within the Study Area (Figure 11). Five of these special status plant species were found occupying an area of approximately 3,700 acres within and adjacent to the Sunlight Study Area. Three were found occupying an area of approximately 150 acres within and adjacent to the SCE Study Area (Tables 5 and 6, respectively). A description of each species follows the tables and figure.

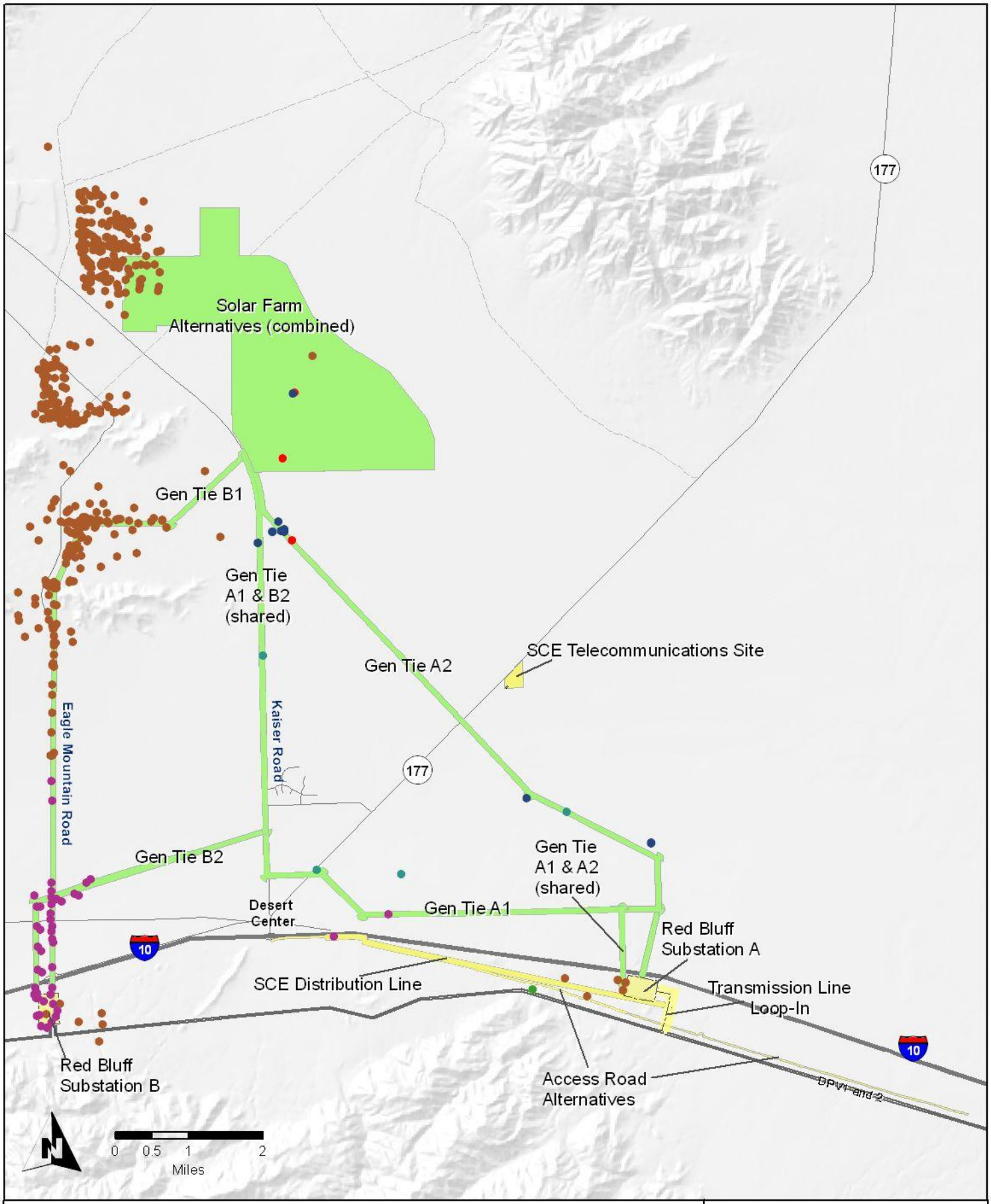
Table 5. Special Status Plant Species Occurrence – Sunlight Study Area

Scientific Name **Common Name**	**Status**[1]		**Sunlight Components (approximate number of plants)**						
			Solar Farm A	**Solar Farm B**	**Solar Farm C**	**Gen-Tie Line A1**	**Gen-Tie Line A2**	**Gen-Tie Line B1**	**Gen-Tie Line B2**
Castela emoryi **Crucifixion thorn**	Federal: State: CNPS: BLM:	none none 2.3 NECO	**1**	**1**	**1**	**2**	**32**	-	**2**
Coryptantha alversonii **Foxtail cactus**	Federal: State: CNPS: BLM:	none none 4.3 NECO	**18**	**3**	**1**	-	-	**250**	-
Ditaxis serrata var. *californica* **California ditaxis**	Federal: State: CNPS: BLM:	none none 3.2 NECO	-	**-**	**-**	**1**	-	**575**	**1,475**
Koeberlinia spinosa ssp. tenuispina **Slender-spined allthorn (Crown-of-thorns)**	Federal: State: CNPS: BLM:	none none 2.2 NECO	**5**	**5**	**5**	**-**	**-**	**-**	**-**
Proboscidea althaeifolia **Desert unicorn plant**	Federal: State: CNPS: BLM:	none none 4.3 NECO	-	**-**	**-**	**4**	**1**	-	**1**

[1] California Native Plant Society (CNPS) designations:
1A: Plants presumed extinct in California
1B: Plants rare and endangered in California and throughout their range.
2: Plants rare, threatened or endangered in California but more common elsewhere in their range.
3: Plants about which more information is needed; a review list.
4: Plants of limited distribution; a watch list.

Threat Code Extensions:
.1: Seriously endangered in California.
.2: Fairly endangered in California.
.3: Not very endangered in California.

BLM designation:
NECO: Species is addressed in the Northern and Eastern Colorado Desert Plan (NECO).



Sunlight Components*

SCE Components*

* Disturbance area of linear components and telecommunications site are less han area depicted in map.

- Crucifixion Thorn (Castela emoryi)
- Las Animas Colubrine (Colubrina californica)
- Foxtail Cactus (Coryphantha alversonii)
- California Ditaxis (Ditaxis serrata var. californica)
- Slender-spined allthorn (Koeberlinia spinosa ssp. tenuispina)
- Desert Unicorn Plant (Proboscidea althaefolia)

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Figure 11
Project Alternatives
Special Status Plants

Prepared by Ironwood Consulting, Inc. - July 2010

Table 6. Special Status Plant Species Occurrence – SCE Study Area

Scientific Name **Common Name**	**Status**[1]		**SCE Components (approximate number of plants)**				
			Red Bluff Sub A	**Red Bluff Sub B**	**Dist Line**	**Access Roads**	**Telecom site**
Coryptantha alversonii **Foxtail cactus**	Federal: State: CNPS: BLM:	none none 4.3 NECO	**4**	**2**	**1**	**1**	**-**
Ditaxis serrata var. *californica* **California ditaxis**	Federal: State: CNPS: BLM:	none none 3.2 NECO	**-**	**522**	**2**	**2**	**-**
Colubrina californica **Las Animas colubrine, snakebush**	Federal: State: CNPS: BLM:	none none 2.3 NECO	**1**	**-**	**1**	**-**	**-**

[1] California Native Plant Society (CNPS) designations:
1A: Plants presumed extinct in California
1B: Plants rare and endangered in California and throughout their range.
2: Plants rare, threatened or endangered in California but more common elsewhere in their range.
3: Plants about which more information is needed; a review list.
4: Plants of limited distribution; a watch list.

Threat Code Extensions:
.1: Seriously endangered in California.
.2: Fairly endangered in California.
.3: Not very endangered in California.

BLM designation:
NECO: Species is addressed in the Northern and Eastern Colorado Desert Plan (NECO).

[2] Within 400 feet of access road and 600 feet of Distribution Line

Crucifixion thorn *(Castela emoryi*) is a CNPS List 2.3 perennial deciduous shrub belonging to the Simaroubaceae (Quassia) family. It is historically known to occur in Mojavean desert scrub, playas, and gravelly Sonoran desert scrubs at elevations ranging from 300 to 2,200 feet (90 to 670 meters) amsl. It typically prefers fine, slightly alkaline or gravelly soils along playa margins. This species blooms in June and July, but may flower as early as April. The majority of crucifixion thorn shrubs were observed in the northern reaches of the Gen-Tie Line A1/B2 (two plants) and Gen-Tie Line A2 (approximately thirty-two plants), which cross the broad active alluvial fan associated with Big Wash. One crucifixion thorn shrub was found within the Study Area of the Solar Farm site. This species was not found within the Study Area of the SCE components.

Foxtail cactus *(Coryphantha alversonii*, formerly *Escobaria vivipera* var. *alversonii*) is a CNPS List 4.3 species belonging to the Cactaceae (Cactus) family. This low-lying cactus is typically found in rocky soils on hills, mountains, margins of washes, and bajadas dominated by Sonoran desert scrub. Three distinct concentrations of foxtail cactus were located along the rocky margins of older alluvial systems within the Study Area. One concentration was located northwest of the Solar Farm site on the east site of Kaiser Road. A portion of this concentration was located within the Solar Farm site alternatives. Another concentration was located west of Kaiser Road and north of the Eagle Mountain Pumping Station, which is not currently associated with any Sunlight components. The third concentration was located within and adjacent to Gen-Tie Line B1, associated with Big Wash north of Victory Pass and the rocky alluvial system south of Victory

Pass. Approximately 250 foxtail cactus plants were found within the Gen-Tie Line B1 Study Area. In total, over 830 individual plants were recorded by GPS and/or tallied during all surveys within and adjacent to the Study Area for the Sunlight components. Outside of these populations, foxtail cactus occurred individually or in small groups. Four foxtail cactus were detected within the Red Bluff Substation A Study Area and two were found within the Red Bluff Substation B Study Area. One cactus was found within the shared alignment of the access road (west) and the Distribution line.

California ditaxis (*Ditaxis serrata* var. *californica,* formerly *Ditaxis californica*) is a CNPS List 3.2 perennial herb belonging to the Euphorbiaceae (Spurge) family. It is typically known to occur in rocky, gravelly soils of washes, mountains, hills, and canyons that support Sonoran desert scrub and Desert Dry Wash Woodland vegetation communities at elevations ranging from 100 to 3,300 feet (30 to 1,000 meters) amsl. This species' distribution is not well understood and most records within the NECO plan area are within, and immediately south of, Joshua Tree National Park (BLM 2002). The majority of California ditaxis were observed in the southern reaches of the Gen-Tie Line B1 (approximately 575 plants) and Gen-Tie Line B2 (approximately 1,475 plants). Five-hundred and twenty-two California ditaxis were found within the Red Bluff Substation B Study Area and two were found within the shared alignment of the access road (west) and the Distribution line.

Slender-spined allthorn (*Koeberlinia spinosa* ssp. *tenuispina*), also known as crown-of-thorns, is a CNPS List 2.2 deciduous shrub belonging to the Koeberliniaceae family. This species typically blooms from May to July. It is historically known to occur in rocky or gravelly soils in washes and ravines in Desert Dry Wash Woodlands and Sonoran desert scrub at elevations ranging from 500 to 1,700 feet (150 to 510 meters) amsl. Slender-spined allthorn may form small colonies by root-sprouting. Records of this species range from the Sonoran Desert of California to Texas and Central Mexico. Previously, known occurrences of this species within have been located in the vicinity of the Chocolate Mountains, primarily in the Chocolate Mountains Aerial Gunnery Range in Imperial County (BLM 2002). Two records (five plants) of crown-of-thorns were found within the Solar Farm site and another record (two plants) was recorded approximately 600 feet outside the Gen-Tie Line A2 Study Area. This species was not found within the Study Area of the SCE components.

Desert unicorn plant *(Proboscidea althaeifolia)* is a CNPS List 4.3 perennial herb belonging to the Martyniaceae family. This species typically blooms from May to August. It is historically known to occur in sandy soils along washes in Sonoran desert scrub at elevations ranging from 500 to 3,300 feet (150 to 1,000 meters) amsl. Records of this species range from Sonoran Desert of California to Texas, with most records occurring outside of California. In the NECO planning area, records occur in Milpitas Wash, and the Chuckwalla and Chemehuevi Valleys (BLM 2002). Five records of this species were found within the Sunlight Study Area. One desert unicorn plant was found along the shared alignment of Gent-Tie A1 and B2, on the west side of Kaiser Road approximately 3.5 miles north of the community of Lake Tamarisk. Also associated with the Gen-

Tie Line A1 Study Area, another individual plant was found just east of where it crosses Highway 177 and two other plants were found approximately 1.2 miles east of the aforementioned individual plant. One individual plant was found within the Gen-Tie Line A2 Study Area approximately 2 miles southeast of where it crosses Highway 177. This species was not found within the Study Area of the SCE components.

Las Animas colubrine (*Colubrina californica*) is a CNPS List 2.3 perennial deciduous shrub belonging to the Rhamnaceae (Buckthorn) family. It is historically known to occur in both Mojavean and Sonoran desert scrub communities at elevations ranging from 30 to 3,200 feet (10 to 1,000 meters) amsl. This species typically occurs in dry canyons with sandy, gravelly soils (BLM 2002). Most records of Las Animas colubrine within the NECO planning area are located in the vicinity of the Chocolate Mountains (BLM 2010). One individual plant was found approximately 400 feet south of the access road (west) alignment and 600 south of the Distribution line within the SCE Study Area. This species was not found within the Study Area of the Sunlight components.

Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) is a federally listed endangered, CNPS List 1B.2, annual or perennial herb belonging to the Fabaceae (Pea) family. It is historically known to occur in sandy Sonoran desert scrub and windblown sand dunes at elevations ranging from 100 to 2,200 feet (40 to 655 meters) amsl. A record of this species was located approximately 2.5 miles southeast of the Solar Farm Site (CDFG 2009). No suitable sandy habitats for this species are found within the Sunlight or SCE components; however, the eastern portion of the preliminary assessment area (east of Pinto Wash), supports pockets of Sonoran desert scrub on aeolian sand deposits, which are mostly stabilized by shrub and herbaceous vegetation but include approximately 20 acres of active sand dune deposits located approximately one mile east of the Solar Farm alternatives. The stabilized and active sand dunes east of Pinto Wash are suitable habitat for Coachella Valley milk-vetch. Based on the presence of suitable habitat, surveys were conducted within this area in the spring of 2008, ancillary to the desert tortoise surveys conducted during the same period. Several specimens suspected to be the more common freckled milk-vetch (*A. l.* var. *variabilis*) were found. These two varieties are very similar and are typically characterized by slight morphological differences. Recent taxonomical investigations of herbarium specimens have suggested that records previously annotated as *A. l.* var. *coachellae* were more likely to be *A. l.* var. *variabilis.* Based on the recent findings in *Astragalus lentiginosus* varieties within the Chuckwalla Valley, the potential for Coachella Valley milk-vetch to occur with the Study Area is lower than originally considered. Furthermore, the Study Area for the Sunlight and SCE components do not support aeolian sand deposits and therefore are not expected to support this species.

3.4 Cactus

For the purpose of estimating the level of effort that might be required for salvaging cactus prior to ground disturbance, general distribution data was collected during the botanical study (Table 7). A count of each species occurrence within the Sunlight components would be performed during pre-activity surveys to quantify the number of individual cactus requiring salvage.

Table 7. Cactus Distribution – All Project Alternatives

Scientific Name	Solar Farm Alts	Gen-Tie Line A1	Gen-Tie Line A2	Gen-Tie Line B1	Gen-Tie Line B2	Red Bluff Sub A	Red Bluff Sub B	Access Road	Dist Line	Telecom site
Coryphantha vivipara **foxtail cactus**	P	-	-	P	-	P	P	P	P	-
Echinocactus polycephalus **cottontop cactus**	P	P	-	P	-	-	-	-	-	-
Echinocereus engelmannii **hedgehog cactus**	-	P	-	P	P	-	P	P	P	-
Ferocactus cylandraceus **barrel cactus**	P	-	-	P	P	-	-	P	P	-
Mammalaria spp. **fish-hook cactus**	P	P	P	P	P	P	P	P	P	-
Opuntia basilaris basilaris **beavertail cactus**	P	P	P	P	-	-	-	P	P	-
Opuntia echinocarpa **golden cholla**	P	P	P	P	P	P	P	P	P	-
Opuntia ramosissima **pencil cholla**	P	P	P	P	P	P	P	P	P	-

P – Present within Project component.

3.5 Non-Special Status Wildlife Species

A list of all wildlife species detected within the surveys can be found in Appendix B. At the request of BLM District Office, all wildlife incidentally observed during full-coverage tortoise surveys were recorded and tallied (LaPre 2008). No native fish species are expected to inhabit the Study Area due to the absence of adequate surface water. The Study Area is not expected to support any amphibian species due to its distance and isolation from hydrological units within the Sonoran Desert that support extant amphibian populations [i.e., Couch's spadefoot toad (*Scaphiopus couchii*)]. Thirty-four bird species were observed in the Solar Farm Study Area. The bird species most commonly observed included black-throated sparrow (*Amphispiza bilineata*), Gambel's quail (*Callipepla gambelii*), turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), and mourning dove (*Zenaida macroura*). The cumulative number of observations for each bird species is shown in Figure 12.

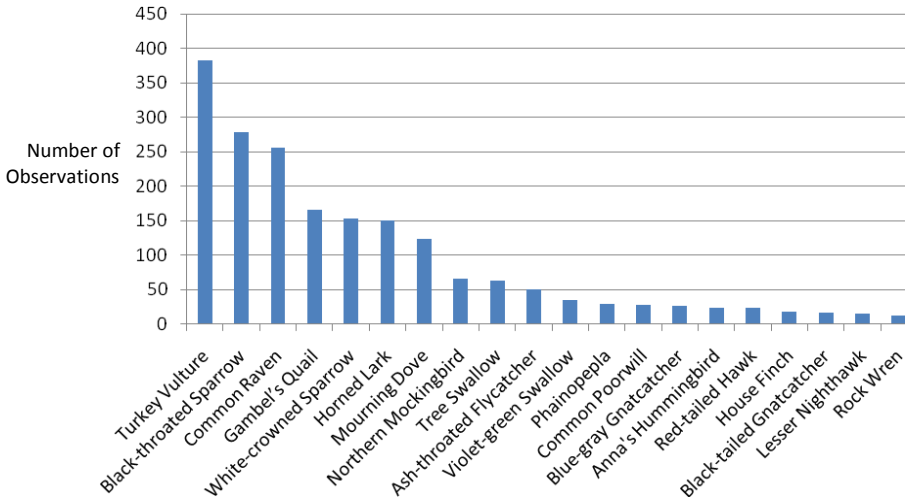


Figure 12. Incidental Observations of Bird Species
(Bird species with ten or more observations shown)

Four mammal species were regularly detected as incidental sightings including black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*). Other small mammals detected during baseline small mammal trapping included long-tailed pocket mouse (*Chaetodipus formosus*), Merriam's kangaroo rat (*Dipodomys merriami*), spiny pocket mouse (*Perognathus spinatus*), little pocket mouse (*Perognathus longimembris*), and desert woodrat (*Neotoma lepida*). The cumulative number of observations for each mammal species is shown in Figure 13.

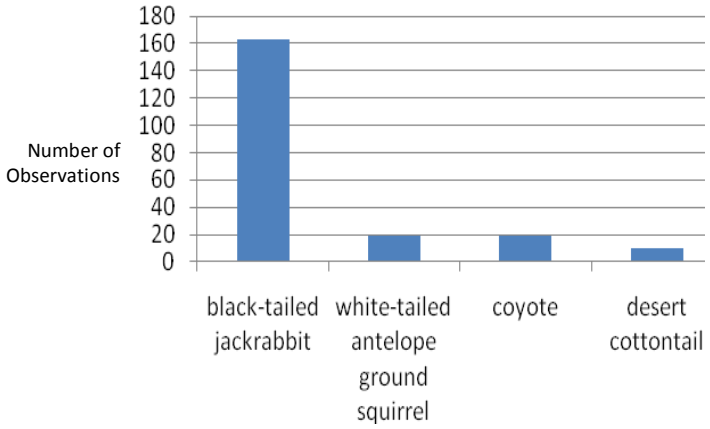


Figure 13. Incidental Observations of Mammal Species

Fourteen species of non-special status reptiles were observed in the Study Area. The most common reptiles observed included zebra-tailed lizard (*Callisaurus draconoides*), western whiptail (*Cnemidophorus tigris*), side-blotched lizard (*Uta stansburiana*), and desert iguana (*Dipsosaurus dorsalis*). The cumulative number of observations for each reptile species is shown in Figure 14.

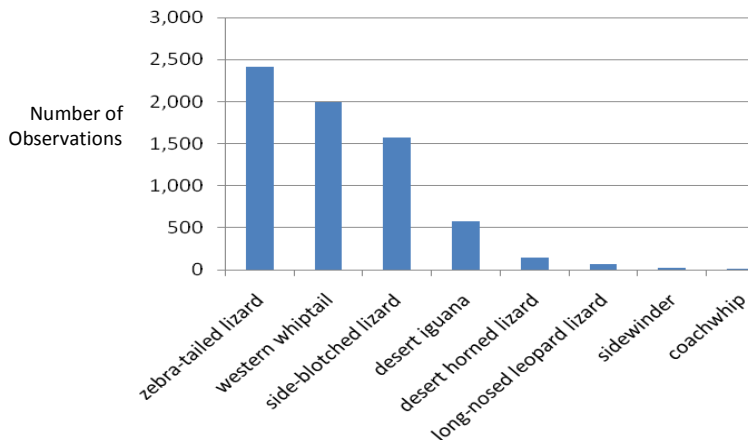


Figure 14. Incidental Observations of Reptile Species

3.6 Special Status Wildlife Species

3.6.1 Desert Tortoise

Desert tortoise *(Gopherus agassizii*) is federal- and state-listed threatened species. This species occurs in desert scrub, desert wash and Joshua tree habitats with appropriate soils for burrowing, and prefers areas of creosote scrub with abundant annual wildflowers. The entire Sunlight Study Area is located in Category III desert tortoise habitat as classified by BLM, which generally includes lands in the Chuckwalla Valley north of I-10 (NECO Plan/EIS, Appendix A, Map 2-3). This area is also classified as BLM Moderate Use Class in the (NECO Plan/EIS, Appendix A, Map 2-2). Category III habitat is defined as areas that are not essential to maintenance of viable populations, that contain low to medium densities, and that are not contiguous with medium- or high-density areas and in which the population is stable or decreasing (BLM 1992).

The Chuckwalla Desert Wildlife Management Area (DWMA) and Chuckwalla Critical Habitat Unit (CHU), both protected management areas for desert tortoise, are located immediately west of Kaiser Road. Portions of Gen-Tie Lines A1, B1, and B2 intersect the Chuckwalla DWMA. Portions of all four Gen-Tie Lines intersect the CHU (Figure 2).

The entire SCE Study Area is located in BLM Category II desert tortoise habitat, which includes lands in the Chuckwalla Valley south of I-10 (NECO Plan/EIS, Appendix A, Map 2-3). This area is also classified as BLM Limited Use Class in the (NECO Plan/EIS, Appendix A, Map 2-2). Category II

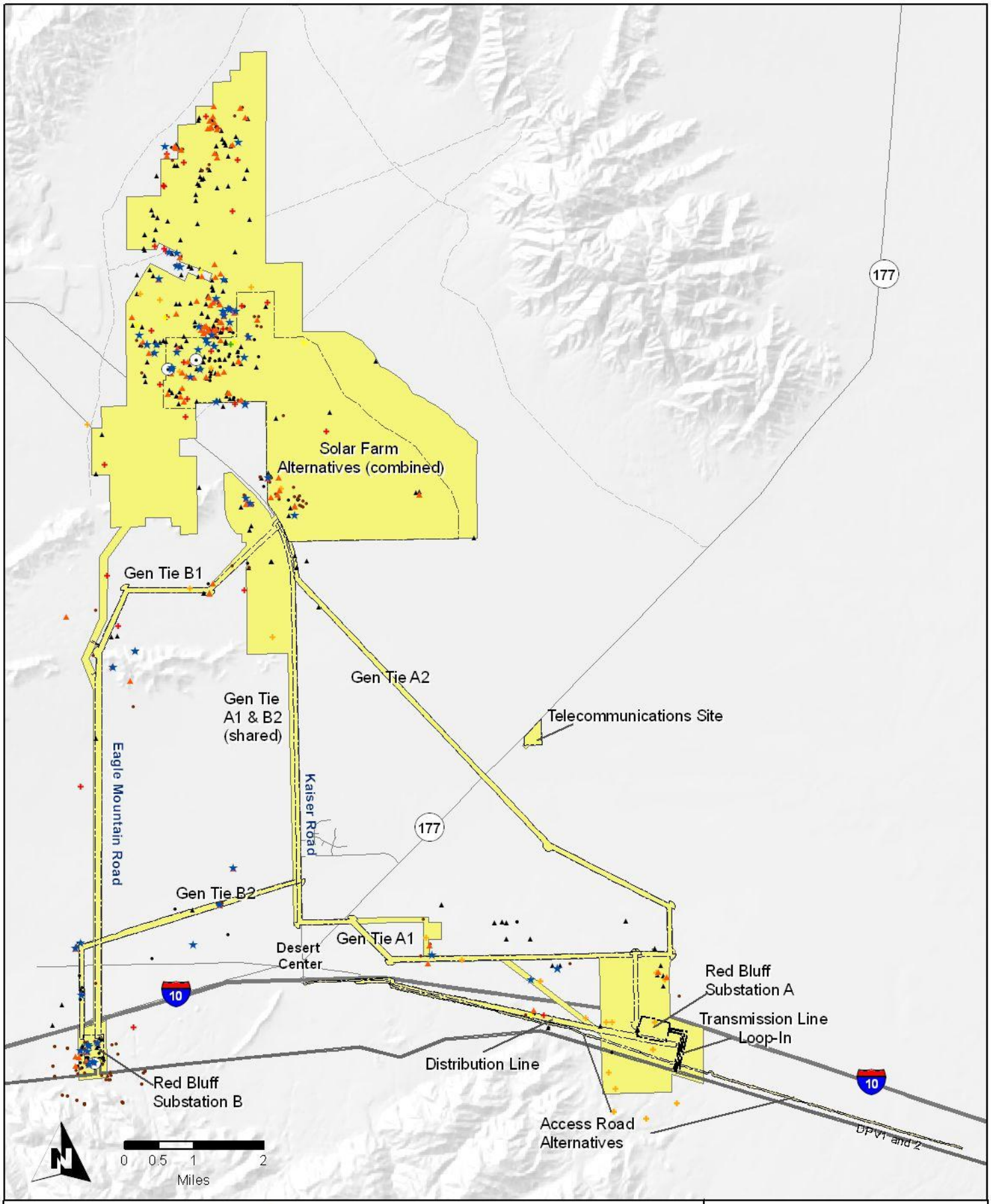
habitat is defined as areas that may be essential to the maintenance of viable tortoise populations, that contain medium to high density habitat or low density habitat contiguous with medium or high density habitat and in which the population is stable or decreasing (BLM 1992). The Red Bluff Substation B is the only SCE component not located within the Chuckwalla CHU because it is located on private land. The entire SCE Study Area is located within the Chuckwalla DWMA (Figure 2).

Desert tortoise sign (i.e., live tortoises, burrows, pallets, scat, courtship rings, and carcasses) were found throughout the full Study Area, but were not uniformly distributed (Figure 15). Total active sign included sixty-two tortoises, 103 burrows, and seven pallets. Additional sign attributable to desert tortoise but not indicating recent activity included 202 burrows (poor to good quality), 16 pallets, and seventy-four carcasses.

The US Geological Survey (USGS) published a desert tortoise model for portions of the Sonoran Desert of California (Nussear et al. 2009). The model involved merging historical desert tortoise presence data with sixteen environmental data variables relating to soils, landscape, biota and climate. These data were converted into a grid and inputted into the Maxent habitat-modeling algorithm. The resulting dataset is a statistical probability of desert tortoise habitat potential. The USGS model within the Sunlight Study Area was consistent with the distribution of tortoise sign observed during the focused surveys conducted by Ironwood (Figure 16).

Tortoise sign was more abundant in older, inactive alluvial fan systems where drainages were well defined and vegetation was relatively more diverse than younger alluvial fan systems. These occupied areas typically contained well-developed desert pavement within the upland mounds between slopes leading to ephemeral washes. Areas of younger, active alluvial deposits contained minimal tortoise sign, which was a characteristic of most of the land within the Solar Farm alternatives. These areas are not expected to be within core territories of resident tortoises.

Three concentrations of tortoise activity were evident within the Sunlight Study Area . The northernmost concentration was located within the Study Area, but approximately 1.5 miles north of the Solar Farm alternatives. This concentration consisted of two observed tortoises and approximately eighteen burrows with indication of recent use. The second and largest tortoise concentration was located immediately north of the MWD transmission line and east of Kaiser Road. This concentration consisted of thirty-five observed tortoises and approximately sixty burrows with indication of recent use. Sign of mating was observed in this area. This concentration overlaps with the northeastern reaches of the Solar Farm A and B sites (Figure 17). The third concentration was located immediately east of Kaiser Road, near the bend in the road as it transitions to a north-south alignment. This concentration consisted of two observed tortoises and approximately six burrows with indication of recent use. This concentration was located in the southwestern extent of the Solar Farm alternatives.



Project Alternatives*

Full Coverage Survey Area

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Tortoise

Mating Ring

Active Burrow/Pallet

Inactive Burrow/Pallet

Scat - Fresh

Scat - Old

Carcasses
(estimated time since death)

<1 yrs

1-2 yrs

2-4 yrs

>4 yrs

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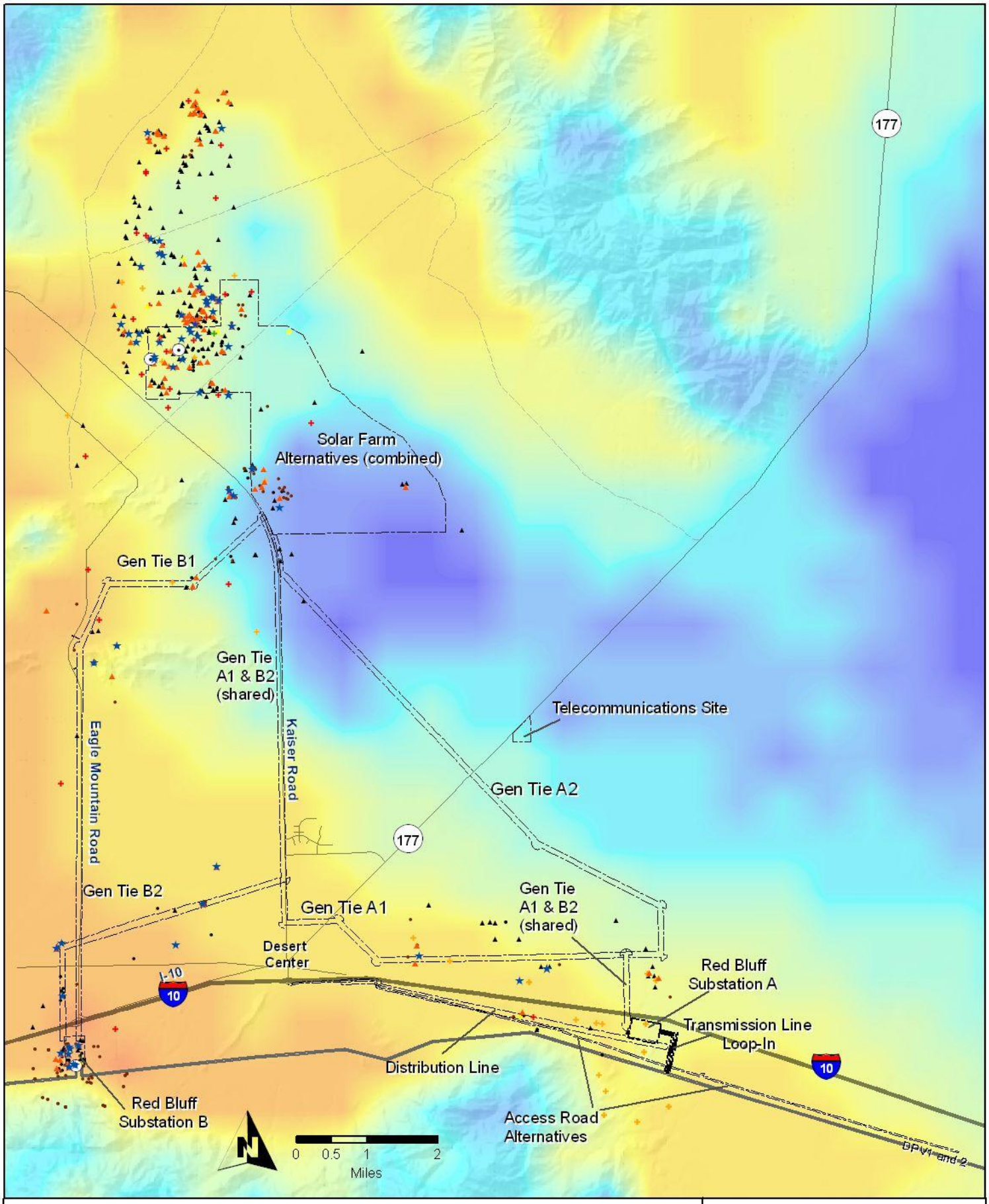
Figure 15
Project Components
All Alternatives
Desert Tortoise Sign

Prepared by Ironwood Consulting, Inc. - July 2010



Project Alternatives*

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Observed Active Sign

- Tortoise
- Mating Ring
- Active Burrow/Pallet
- Scat - Fresh

Desert Tortoise Habitat Value

High — Low

Source: Nussear et al. 2009

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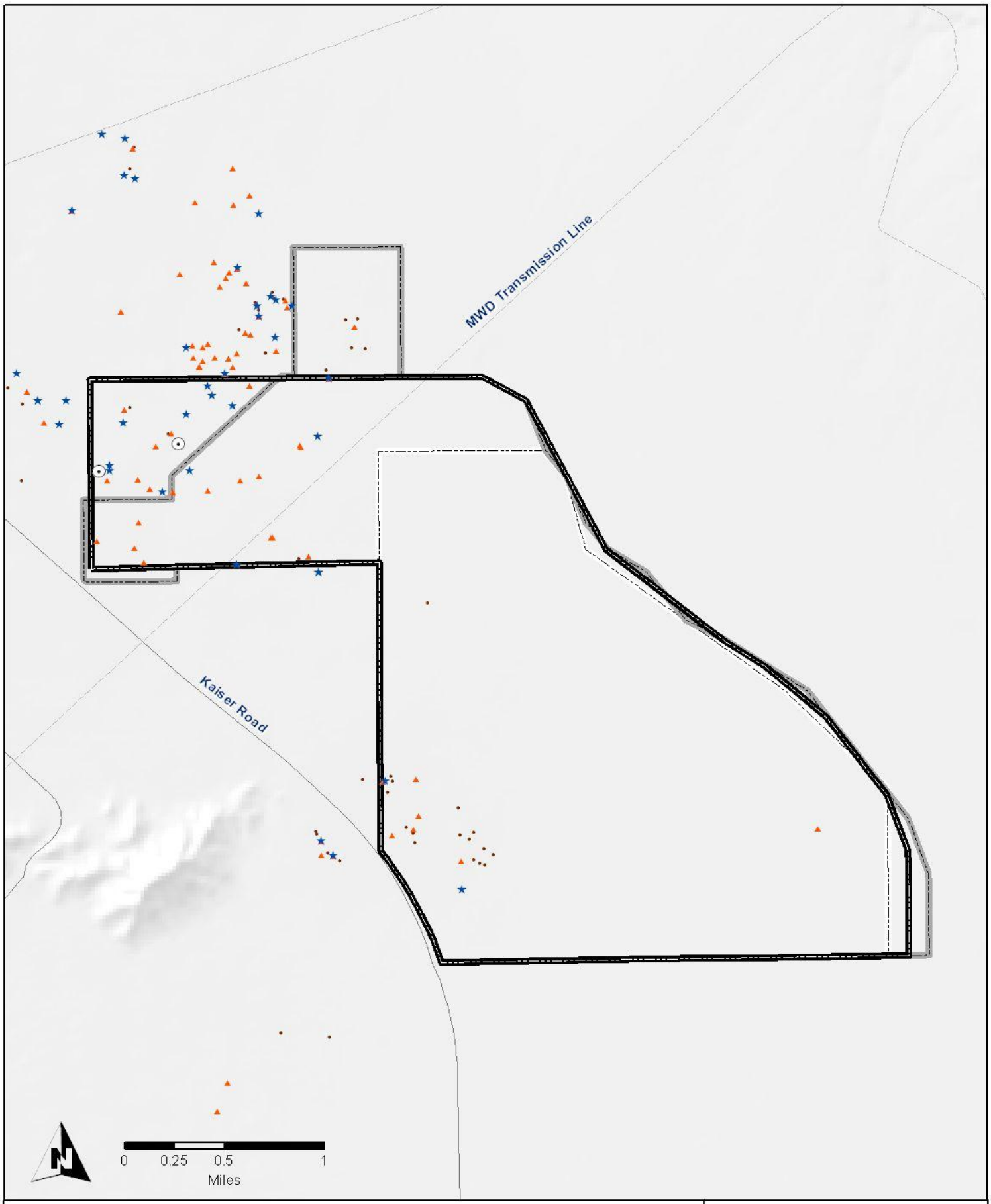
Figure 16
Project Alternatives
USGS Habitat Model
Active Tortoise Sign

Prepared by Ironwood Consulting, Inc. - June 2010



Solar Farm A
Solar Farm B
Solar Farm C

Tortoise
Mating Ring
Active Burrow/Pallet
Scat - Fresh

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Figure 17
Solar Farm Alternatives
Active Desert Tortoise Sign

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The number of active burrows and live tortoises observed during surveys were totaled for each Sunlight component (Table 8). The estimated number of tortoises was subsequently calculated using the formula described in the revised protocol (USFWS 2010):

$$\begin{pmatrix}\text{Estimated number of tortoises}\\ \text{within action area}\end{pmatrix} = \frac{\begin{pmatrix}\text{Number of tortoises}\\ \text{observed above ground}\end{pmatrix}}{\begin{pmatrix}\text{Probability that}\\ \text{a tortoise is}\\ \text{above ground } (P_a)\end{pmatrix}\begin{pmatrix}\text{Probability of}\\ \text{detecting a tortoise,}\\ \text{if above ground } (P_d)\end{pmatrix}}\begin{pmatrix}\dfrac{\text{Size of action area}}{\text{Size of area surveyed}}\end{pmatrix}$$

A value of 0.80 was used for the P_a (probability that a tortoise is above ground) because annual winter rainfall averages were above 1.5 inches from 2008 to 2010 (Figure 5). P_d (probability of detecting a tortoise, if above ground) is a constant value of 0.63 based on regional sampling data (USFWS 2010). The size of the action area is equivalent to the size of the area surveyed. The resulting equation is the number of observed tortoise multiplied by a factor of two. The predicted range was based on a fifteen percent possible margin of error.

Table 8. Active Tortoise Sign and Estimated Number of Tortoises

Project Component	Active Burrows	Live Tortoises Observed	Estimated Live Tortoises[1]	Predicted Range of Live Tortoises[2]
Solar Farm A	29	14	28	24-32
Solar Farm B	22	6	12	10-14
Solar Farm C	7	2	4	3-5
Gen-Tie Line A1	2	1	2	0-4[3]
Gen-Tie Line A2	1	0	0	0
Gen-Tie Line B1	2	0	0	0
Gen-Tie Line B2	0	2	4	3-5
Red Bluff Sub A	0	0	0	0
Red Bluff Sub B	6[4]	8[5]	16	14-18
Access Road	0	0	0	0
Distribution Line	1[6]	0	0	0
Telecom Site	0	0	0	0

[1] Calculated from formula from revised protocol (USFWS 2010).
[2] Predicted Range based on 15% error.
[3] Represents minimum range.
[4] Two active burrows immediately west of Study Area.
[5] May include recounts of same tortoise.
[6] Located 200 feet north of Study Area.

3.6.2 Western Burrowing Owl

***Athene cunicularia* (western burrowing owl)** is a State Species of Special Concern and addressed in the NECO Plan/EIS. Burrowing owls inhabit open dry grasslands and desert scrubs, and typically nests in mammal burrows although they may use man-made structures including culverts and debris piles. They exhibit strong nest site fidelity. Burrowing owls eat insects, small mammals and reptiles. Burrowing owls can be found from California to Texas and into Mexico. In some case, owls migrate into southern deserts during the winter.

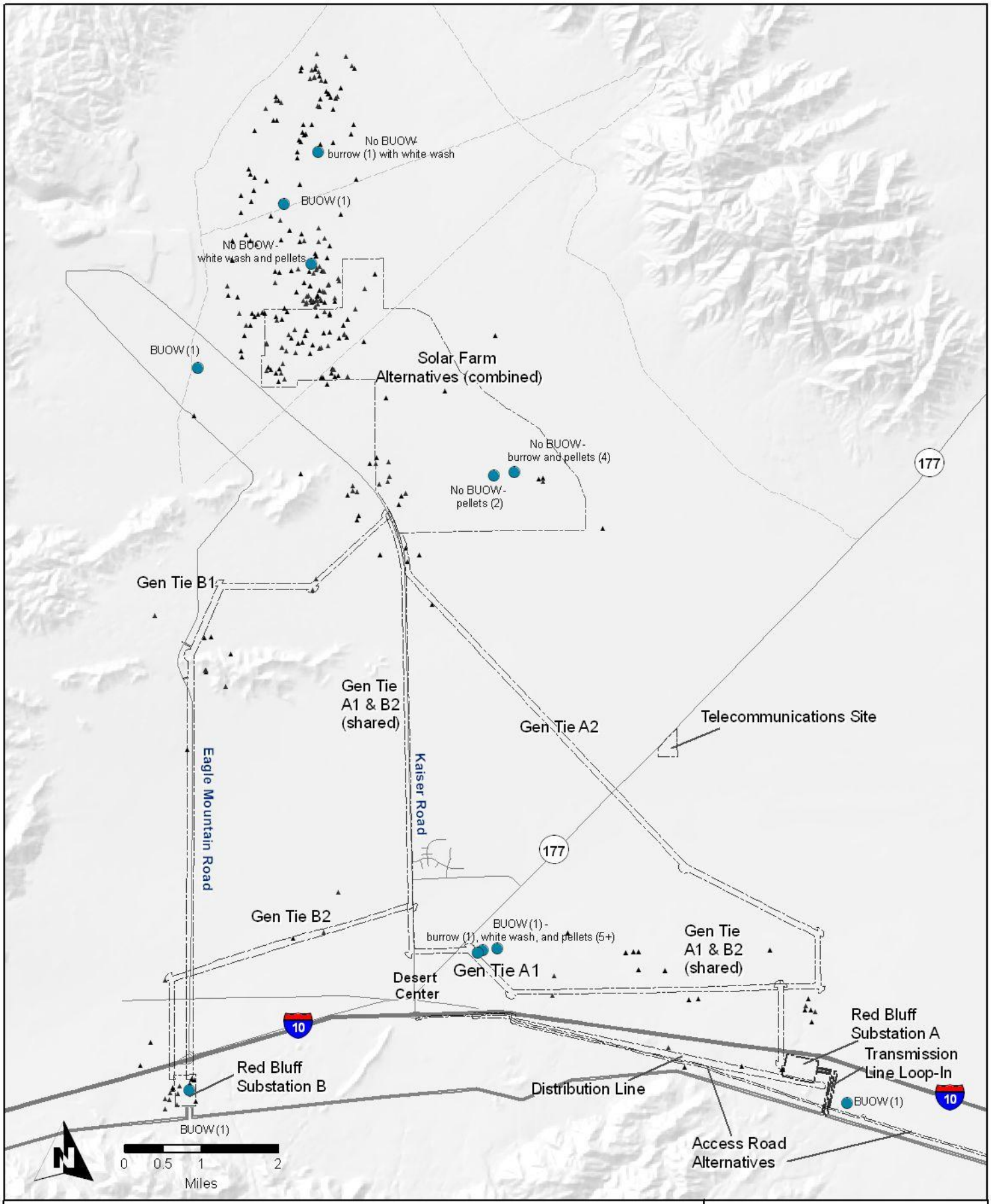
The Phase 1 assessment concluded that suitable habitat for burrowing owls existed throughout the Study Area. During the Phase 2 burrow surveys, nine records of burrowing owl sign, including three individual owl sightings were observed within the Study Area of the Sunlight components (Figure 18). The Solar Farm alternatives support numerous suitable burrows, mainly old tortoise burrows; however, only two records of burrowing owl sign (i.e., burrow, white wash and pellets) were observed. One group of observations, which included one individual owl and two burrows with white wash and pellets, occurred approximately 1,500 feet east of the intersection of Gen-Tie Line A1 and highway 177, neither of which was within any Project component area. The two other individual owl sightings occurred approximately one mile north and 0.8 mile west of the Solar Farm alternatives. Owls observed were all individual adults and observations occurred during both spring and fall seasons. It is expected that the owls reside within the Study Area year-round and there is a high potential for pairs to occur within the Study Area. Phase 3 surveys would be performed prior to ground disturbing activities to determine the number of resident owls potentially affected by construction.

3.6.3 Other Special Status Wildlife Species

BIRDS

Loggerhead shrike (*Lanius ludovicianus*) is a State Species of Special Concern and a year-round resident in parts of the Southern California desert. As a predatory bird its diet consists of insects, amphibians, small reptiles, small mammals, and other birds. Loggerhead shrikes occur across much of California excluding the far northern limits. In Southern California, they are more numerous in the desert regions than along the coast. Shrikes typically build nests one to three meters above the ground depending on the height of the vegetation.

Within the Study Area, 47 observations of loggerhead shrikes were recorded (Figure 19). Two pairs were observed during the surveys outside the Project components. One pair was located 1,200 feet northwest of the Solar Farm alternatives and the other was over 1.5 miles west of Gen-Tie Line B1. Observations of adults were made in both spring and fall, and one first-year plumage was recorded in the fall. Loggerhead shrikes were often observed perching on palo verde and ironwood trees as well as larger creosote bush shrubs and other structures including utility poles.



Project Alternatives*

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Burrowing Owl Sign

Suitable Burrow (no sign)

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Figure 18
Project Components
All Alternatives
Burrowing Owl Sign

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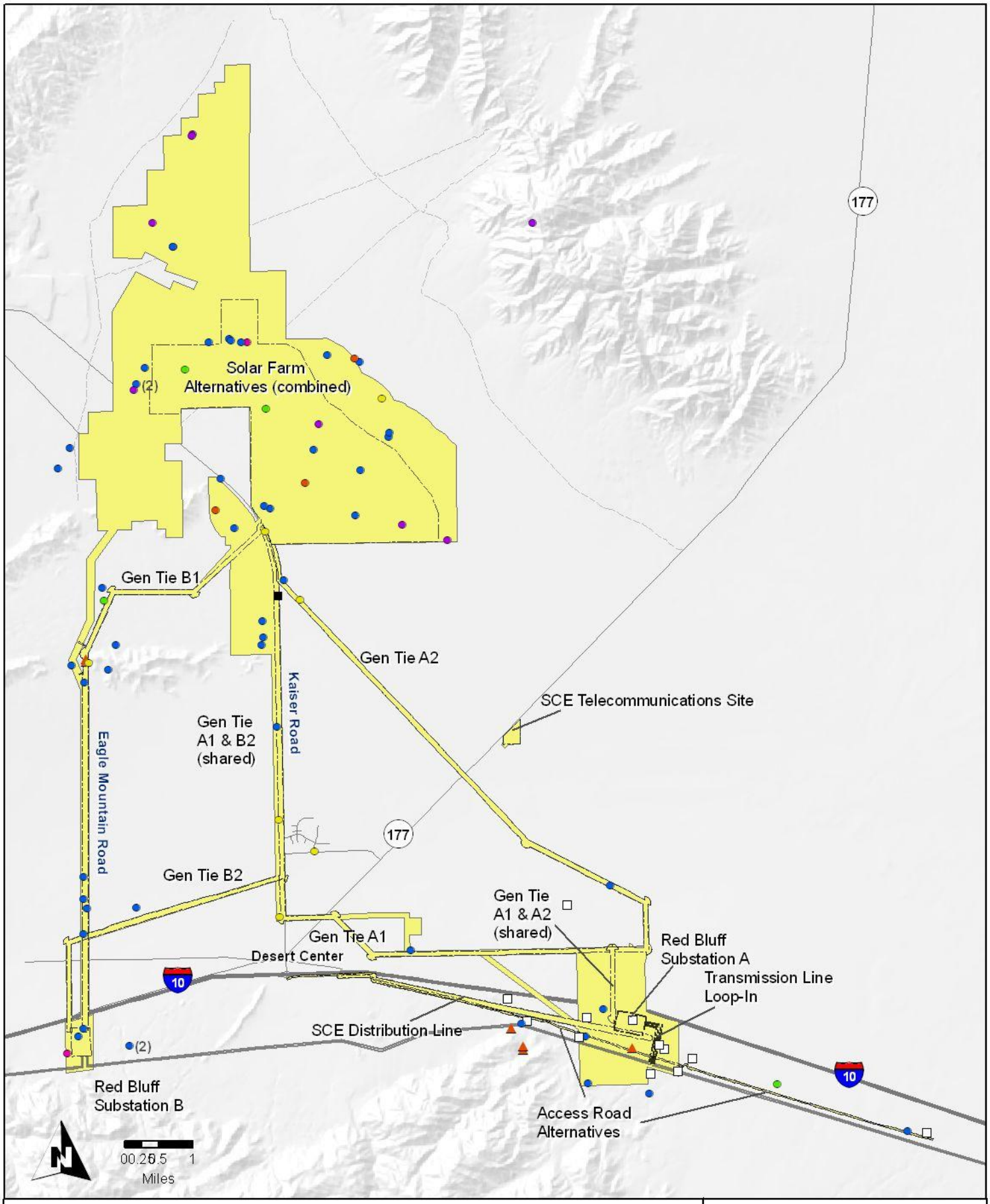

Project Alternatives*

Full Coverage Survey Area

* Disturbance areas for linear components and telecommunications site are less than area depicted in map.

Burro Deer

Round-tail Ground Squirrel

Chuckwalla

Ferruginous Hawk

LeConte's Thrasher

Loggerhead Shrike

Northern Harrier

Prairie Falcon

Swainson's Hawk

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Figure 19
Project Components
All Alternatives
Other Special Status Wildlife

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The number of individual loggerhead shrikes recorded within and adjacent to each Project components are shown in Figure 20. Suitable habitat for this species is found throughout the entire Sunlight and SCE Study Area. Based on the amount and type of observations made during the surveys, loggerhead shrikes are year-round residents within the Study Area.

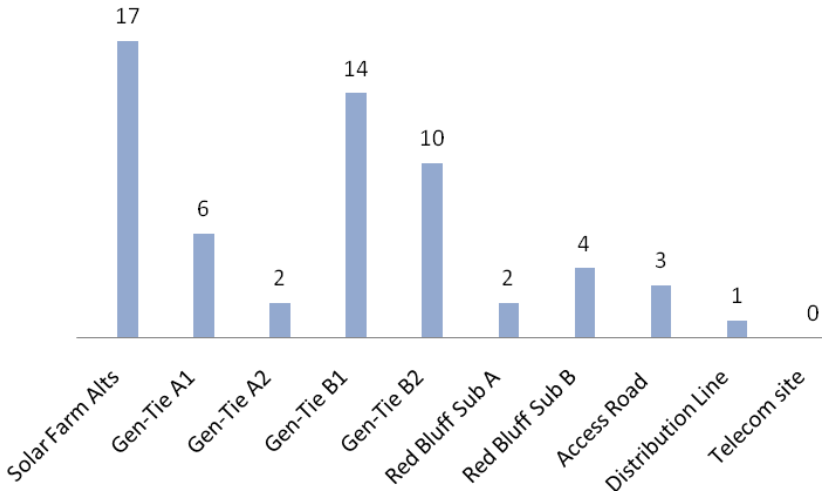


Figure 20. Loggerhead Shrike Observations

Le Conte's thrasher (*Toxostoma lecontei*) is a State Species of Special Concern and year-round desert resident. These species inhabit various desert scrub and wash habitats and typically breeds in desert areas that support cactus, Mojave yucca (*Yucca schidigera*), Joshua trees (*Yucca brevifolia*), and large thorny shrubs such as *Lycium* spp. This species is distributed from the Mojave Desert east into southern Utah and northern Arizona, and south into northern Mexico (BLM 2002). Nine individual observations of this species were recorded during the surveys (Figure 17). Four were located more than one mile north of the Solar Farm alternatives. Two were located just outside the northwest and southeast corners of the Solar Farm alternatives. Two observations were located within the Solar Farm alternatives. No records of Le Conte's thrasher were located within the Gen-Tie Line alternatives. Suitable habitat for this species is found throughout the entire Sunlight and SCE Study Area.

Ferruginous hawk (*Buteo regalis*) is a State Species of Special Concern and addressed in the NECO Plan/EIS. This species typically nests in northern latitudes of North America and overwinter in southern regions of the U.S. from Texas to California. Migrant ferruginous hawks are a regular but uncommon during spring and fall in the California southern desert region. Within the NECO planning area, hawks have been observed overwintering in low numbers in the lower Colorado River Valley, Yuma Basin, West Mesa, and the agricultural areas of Imperial Valley (BLM 2002). Overwintering hawks are often associated with grassland and agricultural areas within Southern California (CDFG 2010). Two sightings of migrating ferruginous hawks

were recorded within the Study Area, one within the Solar Farm alternative near the MWD Transmission line and another within the Red Bluff Substation Study Area. Both observations occurred in March 2010 and consisted of birds in flight overhead. The golden eagle surveys performed by helicopter in spring 2010 did not reveal observation of this species. Based on data reviewed and observations, it is not expected that ferruginous hawks utilize the Study Area for nesting or overwintering. This species may forage within the Study Area during migration.

Swainson's hawk (*Buteo swainsonii*) is state-listed (threatened) raptor species that breeds in much of western North America. Within California, nesting occurs primarily in the Central Valley and northern territories; however, regular nesting occurs in the high desert between the Tehachapi Mountains and Lancaster. This species winters in southern South America with a migration route of over 20,000 miles (Woodbridge 2008). Arrival on breading areas generally occurs from late February to early May depending on geographical characteristics of the breeding area (Woodbridge 2008). Nest sites have not been documented in the Sonoran Desert of California. This species was observed within the Study Area during migration. Three incidental records were documented on April 9, 2010 during botanical and baseline surveys. Two observations were of individual Swainson's hawks and the third observation consisted of a group of over ten birds. All individuals were seen in flight overhead within or near the Solar Farm boundaries. Additionally, Swainson's hawks were observed during golden eagle surveys near Chuckwalla Mountains [two individuals (March 26 and April 3, 2010)], Coxcomb Mountains [fourteen individuals (April 2, 2010)], and Palen Mountains [four individuals (March25, 2010)] (WRI 2010). This species is not expected to nest or overwinter within the Study Area.

Prairie falcon (Falco mexicanus) is State Species of Special Concern that breeds throughout the arid West from southern Canada to central Mexico. The overall distribution appears to be stable. Prairie falcons are found in areas of the dry interior where cliffs provide secure nesting sites. In the desert they are found in all vegetation types, although sparse vegetation provides the best foraging habitat. Prairie falcons were observed in the southwest corner of the Solar Farm Site and approximately one mile east of the eastern boundary as flyovers. They were also observed at all Gen-Tie Line alternatives, but not south of I-10 near the Red Bluff Substation alternatives or related components. During aerial surveys for golden eagles, two prairie falcons were recorded within ten miles of the Solar Farm alternatives near the boundary of Eagle Mountain Mine and Joshua Tree National Park (WRI 2010). One location was an active, reproductive nest in 2010 with unknown nest success (Figure 20). The entire Study Area supports suitable foraging habitat for this species; however, nesting habitat is absent.

Northern harrier *(Circus cyaneus*), a State Species of Special Concern, is a raptor species that occurs in a wide range of habitats throughout North America. It can be found in grassland and shrub communities near the coast up to lodgepole pine and alpine meadow habitats. In Southern California, harriers typically nest and forage in open habitats that provide adequate vegetative cover, suitable prey base, and scattered perches such as shrubs or fence posts (Shuford 2008). This species is often found near bodies of water and wetlands (CDFG 2010).

Harriers are ground-nesting birds. Suitable habitat is limited in the southern California desert (Shuford 2008). Some individuals seasonally migrate into California (CDFG 2010). This species was recorded in recent years in the vicinity of Palen Lake (Solar Millennium 2009; Genesis Solar 2009). Four observations of harriers were recorded within the Study Area: two within the Solar Farm alternatives (recorded March 26, 2008 and April 1, 2010), one along Gen-Tie Line B1 approximately 0.8 miles north of Victory Pass (recorded October 28, 2009), and one along the east access road alternative for the Red Bluff Substation A (recorded March 26, 2010). All sightings were of birds in flight except for the observation along the access road in which the harrier was flushed from a wash dominated by Desert Dry Wash Woodland vegetation.

Mountain plover (*Charadrius montanus*) is a federally proposed (threatened) species and addressed in the NECO Plan/EIS. This species breeds in the high plains east of the Rocky Mountains from Montana to New Mexico and in western Texas and western Oklahoma south to central Mexico (Shuford 2008). Mountain plover winter in central and southern California, with primary wintering grounds located in the Central, Antelope, San Jacinto, Imperial, and Palo Verde Valleys. Wintering grounds are typically associated with agricultural areas (Shuford 2008). They begin to arrive on their wintering grounds in southern California in October (BLM 2002). Appendix A (Map 3-6d) of the NECO Plan identifies an area of suitable wintering habitat northeast of Desert Center along Highway 177. This distribution is likely associated with historical, large-scale active agriculture (i.e., jojoba farms) in this area. These farms have not been in operation since the 1980's. The golf course located at Lake Tamarisk, which is approximately four mile south of the Solar Farm Site and between Gen-Tie Line A1 and A1, may be suitable wintering grounds, although this site would be extralimital and its potential to support plover is not founded on existing occurrence records. Based on current conditions and documented wintering ranges for mountain plover, this species is not expected to occur within the Study Area.

Golden eagle (*Aquila chrysaetos*) is a State Species of Special Concern and addressed in the NECO Plan/EIS. Golden eagles and their primary prey species, jackrabbits, have declined in the California desert regions due to prolonged drought conditions that have persisted since 1998 (WRI 2010). Breeding in Southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November.

No golden eagle nests were found on or adjacent to the Solar Farm Site or other Project components. Phase I occupancy surveys conducted in April 2010 detected 13 potentially-active nests within a ten mile radius of the Solar Farm Site and red Bluff substation, as shown on Figure 3. Of these, nests were within Joshua Tree National Park (JTNP), with an additional three in steep hills west and above Eagle Mountain mine, nearly within the JTNP boundaries. These are located either on BLM lands or lands owned by Eagle Mountain Mine and the Kaiser Corporation. The remaining three potential nests were located south of Interstate 10 in the

Chuckwalla Mountains, approximately 3 miles west and southwest from the proposed Red Bluff Substation. One observation of a golden eagle flyover of the Chuckwalla Valley was recorded during these surveys (WRI 2010).

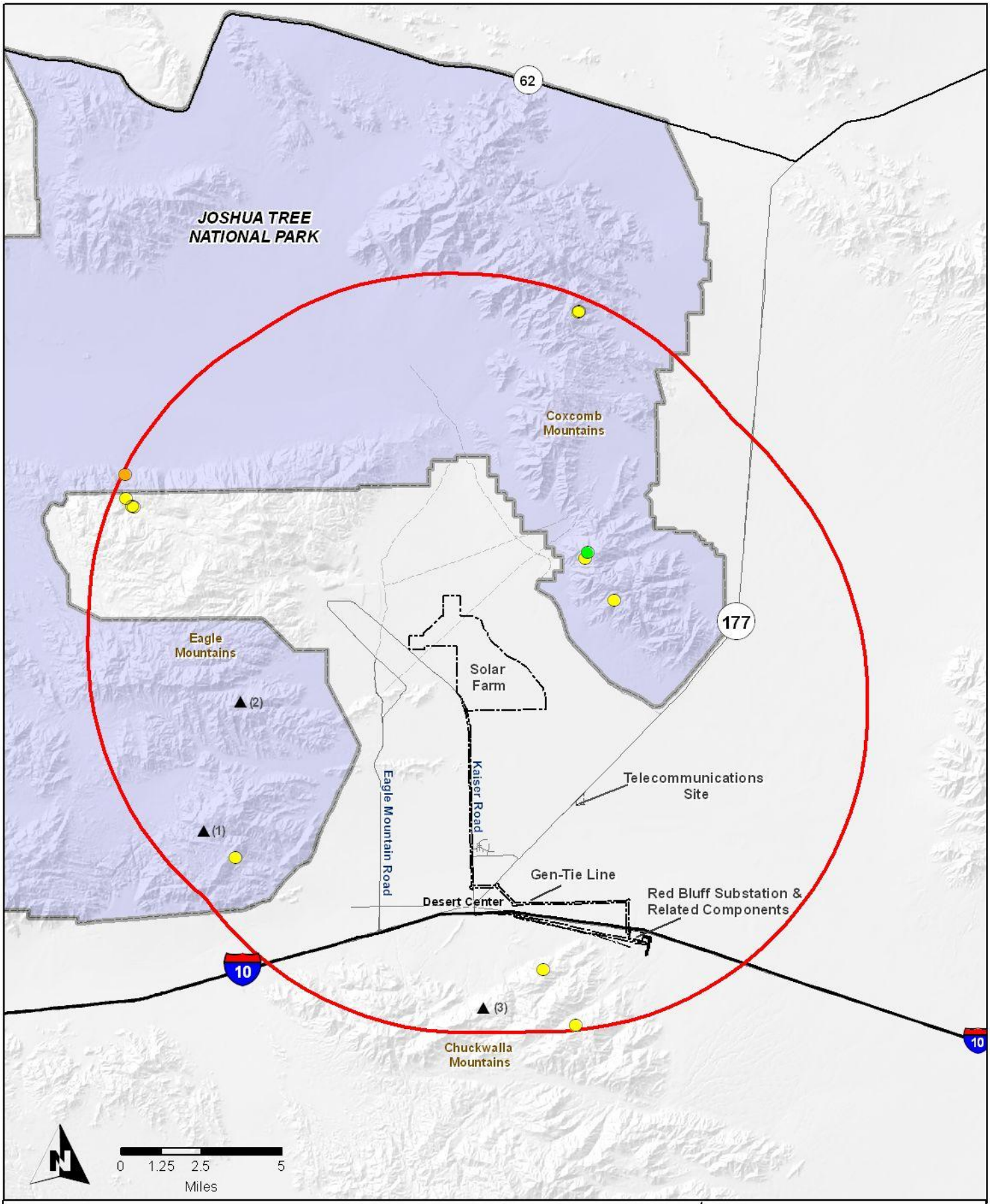
Phase II productivity surveys determined that 12 of these 13 nests were inactive, with one active but non-reproductive nest located in the Joshua Tree Wilderness Area approximately 5 miles from the Solar Farm Site boundary (Figure 21). No reproductive nests were located within the 10-mile radius of the Solar Farm Site and Red Bluff Substation (WRI 2010).

AMPHIBIANS

Couch's spadefoot toad *(Scaphiopus couchii)* is a State Species of Special Concern and addressed in the NECO Plan/EIS. It is very adapted to extremely dry conditions and spends most of its life in subterranean burrows, emerging for short periods only during spring and summer rains. It is typically associated with ephemeral ponds/puddles that persist for a minimum of seven days and contain water temperatures greater than fifteen degrees Celsius. It breeds explosively during scarce rainfall from May through September. Most breeding occurs during the first night after puddles form. Eggs typically hatch in less than one day and tadpoles transform in about one week. Couch's spadefoot toad's diet consists of invertebrates, specifically termites that also emerge during rains. This species is known to occur from the Sonora Desert in California across to Texas and south into Mexico. In California, it occurs in the southeast region of California along the Colorado River western plains, particularly associated with agricultural areas within the Imperial Reservoir Hydrological Unit and Sub-basin. The western range limit is located west of Ford Dry Lake and east of Palen Dry Lake approximately eight miles from the eastern extent of the access road alternative and eighteen miles from the Solar Farm alternatives (CDFG 2010 and BLM 2002). The Study Area, which is located within the Southern Mojave Hydrological Unit and Sub-basin, is disjunct from known populations of Couch's spadefoot toad and therefore not expected to support this species.

REPTILES

Chuckwalla *(Sauromalus obesus*) is addressed in the NECO Plan/EIS. Habitat for this species includes areas that have large rocks and boulders, similar to that of rosy boa. Chuckwallas occur throughout the Mojave and Sonoran Deserts in California, Nevada, Utah, Arizona, and Mexico. They are found in appropriate habitat throughout the NECO planning area (BLM 2002). Chuckwalla scat was observed along Gen-Tie Line B1 near Victory Pass. Approximately 250 acres of suitable habitat occurs within the Gen-Tie Line B1 Study Area. Three live chuckwallas were observed basking in the rocky slopes south of the western access road to Red Bluff Substation A. One observation was approximately 1,000 feet south of the access road and the other two were approximately 2,200 feet south of the access road. Another chuckwalla scat was observed in the rocky outcrop in the southeastern portion of the Red Bluff Substation A Study Area. Approximately 350 acres of suitable habitat occurs within the Red Bluff Substation A Study Area.



Project Area

10-Mile Project Buffer

Golden Eagle Nest, Active

Golden Eagle Nest, Inactive

Prarie Falcon Nest,
Active and Reproductive

Nelson's Big Horn Sheep

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Figure 21
Results of Golden Eagle
Phase 1 and 2 Surveys

Prepared by Ironwood Consulting, Inc. - July 2010

Mojave fringe-toed lizard *(Uma scoparia*) is a State Species of Special Concern and addressed in the NECO Plan/EIS. This species typically occurs in fine, loose, aeolian sand deposits associated with in dunes, dry lakebeds, washes, and sparse shrublands within California and Arizona deserts. Within the NECO planning area, this species is known to occur near Bristol Dry Lake, Cadiz Dry Lake, Dale Dry Lake, Rice Valley, Pinto Basin, Palen Dry Lake, and Ford Dry Lake (BLM 2002). Several individual Mojave fringe-toed lizards were observed during ancillary jurisdictional water surveys approximately 5 miles east of the Project along the western edge of Palen Dry Lake. Additional recent records of this species were found at the Palen and Genesis solar project sites southeast of the Sunlight Study Area (Solar Millennium 2009; Genesis Solar 2009). The eastern portion of the preliminary assessment area (east of Pinto Wash), supports pockets of Sonoran desert scrub on aeolian sand deposits that have been stabilized by shrub and herbaceous vegetation. Approximately 20 acres of active sand dune deposits, which are relatively barren expanses of moving sand and do not support extensive stabilizing vegetation, are located approximately one mile east of the Solar Farm alternatives. These dunes are located at the base of the southwest-facing bajada below the Coxcomb Mountains. The 20 acres of stabilized and active sand dunes east of Pinto Wash are suitable habitat for Mojave fringe-toed lizard. The Study Area for the Sunlight and SCE components, all located west of Pinto Wash, do not support aeolian sand deposits and therefore are not expected to support this species.

Rosy boa *(Lichanura trivirgata*) is a species protected in the NECO Plan/EIS and has no other special state of federal status. The rosy boa is widely but sparsely distributed in desert and chaparral habitats throughout southern California (CDFG 2010). In the desert it is typically found in areas with moderate to dense vegetation and rock cover (CDFG 2010). Suitable habitat for this species occurs in the rocky washes (e.g., Big Wash) east of the Solar Farm alternatives and in the rocky foothills of the surrounding mountains. Rosy boas were not observed during the surveys; however, this species may occur along Gen-Tie Line B1 within Big Wash (approximately 250 acres of suitable habitat), near Victory Pass, and within the rock outcroppings (approximately 350 acres of suitable habitat) within the Red Bluff Substation A Study Area.

MAMMALS

Palm Springs round-tailed ground squirrel *(Spermophilus teriticaudus chlorus*) is listed by USFWS as a candidate species and is covered under the NECO Plan/EIS. Primary habitat for the Palm Springs round- tailed ground squirrel includes dunes and sand hummocks associated with honey mesquite (*Prosopis glandulosa* var. *torreyana*) and to a lesser extent those dunes and hummocks associated with creosote bush or other plant species. Recent research has determined that this subspecies of the round-tailed ground squirrel is much more widely distributed than previously thought (Federal Register 2009). The *chlorus* subspecies was originally thought to be restricted to the Coachella Valley and nearby areas, but has been found as far south as Imperial County and as far north as Death Valley National Park (Douglas 2009). Although this subspecies is currently listed as a candidate species, reviews of its status are ongoing within USFWS due to this new information about its range. This species has been observed within the Solar Farm alternative and Gen-Tie Line A1 Study Areas.

Nelson's bighorn sheep *(Ovis Canadensis nelsoni*) is addressed in the NECO Plan/EIS and holds no additional special status. Bighorn sheep habitat requirements include steep, rugged terrain used for escape from predators and lambing areas, boulder-strewn slopes used for protection against the sun or wind; alluvial fans and/or washes that may provide higher quantities and qualities of forage than that found in the rocky terrain; and water availability. In some areas, the valley floor could serve as important linkages between neighboring mountainous regions and allow gene flow to occur between subpopulations (USFWS 2000). This species is known to live in the mountainous rocky areas of Joshua Tree National Park west and northwest of the Solar Farm alternatives and in the Chuckwalla Mountains south of I-10. The bighorn sheep population in the Chuckwalla area is estimated at between 25 and 50 individuals (Epps 2004) and the populations in JTNP is estimated at 200 individuals throughout the park (NPS 2010). This population is known to cross the very northern extreme of the Chuckwalla Valley between Joshua Tree National Park and the Coxcomb Mountains. Although this population crosses the northernmost part of the Chuckwalla Valley, there is no evidence that the valley floor is used for movement or foraging (Cipra 2009). The area most likely to be used would be Pinto Wash, which provides nearly continuous tree canopy cover between the northern and south portions of the valley. No sighting or tracks of this species were observed over several years of pedestrian surveys conducted in the wash area. During golden eagle aerial surveys the crew also noted sightings of bighorn sheep, particularly lambing areas. Six individual bighorn sheep were observed at three locations within the ten mile radius of the Solar Farm Alternatives (Figure 21). These sightings were not identified by the surveyors as lambing areas where bighorn sheep give birth and protect their young. Two locations were within JTNP within the Eagle Mountains, and one in the Chuckwalla Mountains.

American badger *(Taxidea taxus*) is a State Species of Special Concern that inhabits open shrub areas throughout the California desert. They require friable soils for building burrows and sufficient rodent population. Badgers eat small and medium-sized mammals, terrestrial insects, invertebrates, reptiles, small and medium-sized birds, and eggs (CDFG 2010). This species was observed during recent surveys about ten miles southeast of the Sunlight Project (Solar Millennium 2009). One badger dig was noted during the surveys within the Sunlight Study Area. Suitable habitat for badger is found throughout the entire Study Area, therefore this species has a high potential to occur in association with both Sunlight and SCE components.

***Odocoileus hemionus eremicus* (burro deer)** is addressed in the NECO Plan/EIS and holds no additional special status. Burro deer is a subspecies of mule deer found in the Colorado Desert of Southern California. This species is most often associated with Desert Dry Wash Woodland habitat where water and cover are available. Within the NECO planning area, they are primarily found along the Colorado River with some individuals migrating into other portions of the desert in search of water and food (BLM 2002). Two individuals and numerous tracks of this species were observed in and around the Red Bluff Substation A Study Area, near the base of the Chuckwalla Mountains. Several large washes with relatively dense overstory of ironwood and palo verde trees occur in this area. Approximately 138 acres of Desert Dry Wash Woodland,

which may provide suitable cover for burro deer, are located within the Red Bluff Substation A Study Area.

Yuma mountain lion (*Felis concolor browni)* is a NECO Plan/EIS species that is known to inhabit the low mountains and use the Desert Dry Wash Woodlands in the Project vicinity following the trails of burro deer. Burro deer typically make up the majority of their diet throughout year (CDFG 2010). Mountain lions in the Colorado Desert of California are generally associated low mountains and washes supporting Desert Dry Wash Woodland near Chuckwalla Bench, Chuckwalla Mountains, Chocolate Mountains, Picacho Mountains, Milpitas Wash, and Vinagre Wash, primarily in Imperial County (BLM 2002). They are more common along the riparian zone of the Colorado River and in densely vegetated woodlands near the Coachella Canal. Sign of mountain lion were not observed during the surveys of the Study Area. Burro deer were detected in and around the Red Bluff Substation A Study Area, near the base of the Chuckwalla Mountains. Several large washes with relatively dense overstory of ironwood and palo verde trees occur in this area. Mountain lions may be attracted to this area due to the presence of prey and suitable refuge within the washes. Additionally, Pinto Wash may serve as a suitable movement corridor for mountain lions (Figures 7 and 8). Pinto Wash averages approximately 1,000 feet wide and occupies approximately 900 acres within the preliminary assessment Study Area. Although this species was not detected during the Project surveys, it has a moderate potential to occur within the previously described portions of the Study Area.

Colorado Valley woodrat *(Neotoma albigula venusta*) is addressed in the NECO Plan/EIS species and holds no additional special status. This species is a California subspecies of white-throated woodrat (*Neotoma albigula*) that occurs in Arizona. This species is found in low-lying desert areas (washes and rock outcroppings) with beavertail cactus (*Opuntia basilaris*) and mesquite (*Prosopis* sp.) (BLM 2002). A different species of woodrat, desert woodrat (*Neotoma lepida*) was incidentally detected during baseline small mammal trapping surveys within the Solar Farm Study Area, suggesting that the Colorado Valley woodrat is not present within this area. Habitat more suitable for the Colorado Valley woodrat occurs along the northern bajada of the Chuckwalla Mountains. This species has a moderate potential to occur within the SCE Study Area.

Eleven bat species potentially occur within the Study Area (Table 9; Brown 2010). Five of these species are State Species of Special Concern including **California leaf-nosed bat (*Macrotus californicus*), western mastiff (*Eumops perotis californicus*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), pallid bat (*Antrozous pallidus*), and Townsend's big-eared bat (*Plecotus townsendii*).** Southern yellow bat (*Lasiurus xanthinus*) is a proposed State Species of Special Concern and potentially occurs within the Study Area. Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (southern California population, *Eptesicus fuscus pallidus*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), and western pipistrelle (*Parastrellus hesperus*) are non-special status species with the potential to occur within the Study Area.

Table 9. Bat Species Potentially Occurring within the Study Area

Species		Status	
		State	Federal
FAMILY PHYLLOSTOMIDAE (LEAF-NOSED BATS)			
Macrotus californicus	California leaf-nosed bat	SSC	FSOC
FAMILY MOLOSSIDAE (FREE-TAILED BATS)			
Eumops perotis	Western mastiff bat	SSC	FSOC
Nyctinomops femorosaccus	Pocketed free-tailed bat	SSC	-
Tadarida brasiliensis	Mexican free-tailed bat	-	-
FAMILY VESPERTILIONIDAE (MOUSE-EARED BATS)			
Antrozous pallidus	Pallid bat	SSC	-
Corynorhinus townsendii	Townsend's big-eared bat	SSC	FSOC
Eptesicus fuscus pallidus	Big brown bat (So. CA)	-	-
Lasiurus cinereus	Hoary bat	-	-
Lasiurus xanthinus	Southern yellow bat	P	-
Myotis californicus	California myotis	-	-
Parastrellus hesperus	Western pipistrelle	-	-

SSC - California Department of Fish and Game, Mammal of Special Concern or Sensitive Species (MSSC)
FSOC - Former Candidate (Category 2) for listing under U.S. Endangered Species Act; Species of Concern
P - Proposed for addition to CDFG, MSSC list
E - Listed under FESA as Endangered

Pallid bats and western pipistrelles roost in small rocks on the ground. Suitable habitat for these species occurs within approximately 250 acres of the Gen-Tie Line B1 Study Area (Big Wash and in the vicinity of Victory Pass) and 350 acres of the Red Bluff Substation A (rocky outcrops situated along the base of the Chuckwalla Mountains). Desert dry wash (microphyll) woodland areas have been documented as important habitat to several bat species (Brown 2010). Hoary bats will roost in palo verde trees and ironwoods. During the warmer months, California leaf-nosed bats night roost in ironwood trees between foraging bouts. Desert dry wash woodland vegetation attracts foraging bats due to increased insect concentration. This is especially true for California leaf-nosed bats and pallid bats (both State Species of Special Concern) that feed on large arthropods which they glean off of the foliage. The acreage of Desert Dry Wash Woodland associated with the Study Area is found in Tables 3 and 4. Roosts for California leaf-nosed bats and pallid bats have been identified in existing mines in the Eagle and Coxcomb Mountains. The entire Study Area could be used for foraging by bats.

3.7 Sensitive Habitats

Sensitive habitats discussed in this report include:

- Plant communities listed as sensitive by BLM, CDFG and other resources agencies, or listed in the NECO plan are described in Section 3.2,
- USFWS-designated critical habitat (CHU) for a listed species,
- Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs), or other special designations by the BLM, and
- Wildlife movement corridors.

The NECO Plan/EIS designates Desert Dry Wash Woodland habitats as a sensitive habitat subject to 3:1 mitigation for any disturbance within that habitat. The Sunlight Study Area supports Desert Dry Wash Woodland in the large central drainage (Pinto Wash), in one narrow drainage along the edges of the Solar Farm alternatives, and within the Gen-Tie Line alternatives (Figures 8 and 9). The SCE Study Area supports Desert Dry Wash Woodland located in washes that flow north from the Chuckwalla Mountains (Figure 10). Acreages of these sensitive vegetation communities are found in Tables 3 and 4.

The Solar Farm alternatives are not located within a DWMA or CHU. However, three of the four Gen-Tie Line alternatives are partially located within the Chuckwalla DWMA and all four are partially located within the Chuckwalla CHU (Figure 2). The Red Bluff substation, distribution line and access road are not located within the boundaries of a Wilderness Area; however, they are located within the Chuckwalla DWMA and CHU (Figure 2). The telecommunications site is not within an ACEC, Wilderness Area, DWMA, or CHU.

Pinto Wash, which is located east of the Solar Farm Alternatives in the central part of the preliminary assessment Study Area, may provide a movement corridor for numerous large mammal species including several special status species including mountain lion, bighorn sheep, and burro deer (Figures 7 and 8). Pinto Wash averages approximately 1,000 feet wide and occupies approximately 900 acres within the preliminary assessment Study Area.

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4.2 Agency Personnel/Specialists Contacted

Bureau of Land Management (BLM)
Dr. Larry LaPre, District Wildlife Biologist
California Desert District
22835 Calle San Juan de los Lagos
Moreno Valley, CA 92553
Phone: (951) 697-5218
Fax: (951) 697-5299

Mr. Mark Massar, District Biologist
Palm Springs-South Coast Field Office
90 West Garnet Avenue
North Palm Springs, CA 92258-1260
Phone: (760) 251-4800
Fax: (760) 251-4899

U.S. Fish and Wildlife Service (USFWS)
Peggy Bartels
Tannika Engelhard
Pete Sorenson
Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011
Phone: (760) 431-9440

Ray Bransfield
Brian Croft
Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003
Phone: (805) 644-1766
Fax: (805) 644-3958

Roy Averil-Murray
Linda Alison
Desert Tortoise Recovery Office
1340 Financial Blvd., #234
Reno. NV 89502
Phone: (775) 861-6324

Alice Karl, PhD
PO Box 74006
Davis, CA 95617
Phone: (530) 666-9567
Fax: (612) 465-4822

California Department of Fish and Game (CDFG)
78078 Country Club Drive, Suite 109
Bermuda Dunes, CA 92203
Phone: (760) 200-9158
Fax: (760) 200-9358

Granite Mountain Research Station
Jim André
Sweeney Granite Mountains
Desert Research Center
P.O. Box 101
Kelso, CA 92351
Phone: (760) 733-4222

Joshua Tree National Park
Tasha LaDoux
74485 National Park Drive
Twentynine Palms, CA 92277-3597
Phone: (760) 367-5502
Fax: (760) 367-6392

National Parks Conservation Association
Mike Cipra, California Desert Program Manager
61325 Twentynine Palms Highway, Suite B
Joshua Tree, CA 92252

Rancho Santa Ana Botanical Garden (RSABG)
1500 North College Avenue
Claremont, CA 91711-3157
Phone: (909) 625-8767
Fax: (909) 626-7670

Illinois Natural History Program
Marlis Douglas, Principal Investigator for round-tailed ground squirrel genetic studies
Commissioned by the USFWS Carlsbad Office
Date not yet published

Appendix A

Plant List from Desert Sunlight Surveys

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Abronia villosa	sand verbena	Nyctaginaceae	x	x	x	x	x		x			
Acacia greggii	catclaw acacia	Fabaceae	x		x	x	x	x			x	x
Achyronychia cooperi	frost mat	Caryophyllaceae	x	x	x	x	x	x	x			x
Allionia incarnata	windmills	Nyctaginaceae			x		x	x		x		x
Ambrosia dumosa	burro bush	Asteraceae	x	x	x	x	x	x	x	x	x	x
Ambrosia ilicifolia		Asteraceae			x							x
Amsinckia tessellatta	fiddleneck	Boraginaceae	x	x	x	x	x	x		x	x	x
Antirrhinum filipes	twining snapdragon	Scrophulariaceae	x	x	x	x	x	x		x	x	x
Argemone munita	prickly poppy	Papaveraceae					x					
Aristida adscensionis	six-weeks three awn	Poaceae					x					
Aristida purpurea	three awn	Poaceae	x				x	x			x	
Asclepias erosa	desert milkweed	Asclepiadaceae	x	x			x	x	x			
Asclepias subulata	rush milkweed	Asclepiadaceae	x	x			x	x			x	x
Atrichoseris platyphylla	gravel ghost	Asteraceae				x	x	x				x
Atriplex polycarpa		Chenopodiaceae				x						
Bebbia juncea	sweetbush	Asteraceae	x	x	x	x	x	x		x	x	x
Brandegea bigelovii	brandegea	Cucurbitaceae	x	x	x	x	x	x		x		x
*Brassica tournefortii**	Asian mustard	Brassicaceae	x	x	x	x	x	x	x	x	x	x
*Bromus madritensis rubens**	red brome	Poaceae					x					x
Calycoseris wrightii	white-tack stem	Asteraceae	x	x	x	x	x	x	x	x	x	x
Calyptridium monandrum		Portulacaceae		x								
Camissonia boothii	Booth's primrose, woody bottlewasher	Onagraceae	x	x	x	x	x	x	x		x	x
Camissonia boothii		Onagraceae	x									

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
desertorum												
Camissonia brevipes	golden evening primrose	Onagraceae	x	x	x	x	x	x	x	x	x	x
Camissonia californica		Onagraceae		x	x		x	x				x
Camissonia chamaenerioides		Onagraceae	x									
Camissonia claviformis	brown-eyed evening primrose	Onagraceae	x	x	x	x	x	x	x		x	x
Camissonia pallida		Onagraceae	x	x								
Camissonia refracta	narrow-leafed suncup	Onagraceae			x	x	x	x			x	x
CASTELA EMORYI	**CRUCIFIXION THORN**	Simaroubaceae		x	x	x		x				
Cercidium floridium	palo verde	Fabaceae	x	x	x	x	x	x	x	x	x	x
Chaenactis carphoclinia	pebble pincushion	Asteraceae	x	x	x	x	x	x		x	x	x
Chaenactis fremontii	desert pincushion	Asteraceae	x	x	x	x	x	x		x	x	x
Chaenactis stevioides	stevia pincushion	Asteraceae	x	x	x	x	x	x	x			x
Chamaesyce setiloba		Euphorbiaceae	x				x	x				x
Chamaesyce polycarpa		Euphorbiaceae	x	x	x	x	x	x		x	x	x
Chenopodium murale	pigweed	Chenopodiaceae		x	x	x	x	x				x
Chenopodium sp.		Chenopodiaceae				x						
Chorizanthe brevicornu	brittle spineflower	Polygonaceae	x	x	x	x	x	x		x	x	x
Chorizanthe corrugata		Polygonaceae	x	x	x	x						x
Chorizanthe rigida	spiny-herb	Polygonaceae	x	x	x	x	x	x		x	x	x
COLUBRINA CALIFRONICA	**LAS ANIMAS COLUBRINE**	Rhamnaceae										x
CORYPHANTHA VIVIPARA	**FOXTAIL CACTUS**	Cactaceae	x				x					

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Crassula cornata		Crassulaceae	x									
Croton californicus	california croton	Euphorbiaceae		x		x						
Cryptantha angustifolia	narrow leaved forget me not	Boraginaceae	x	x	x	x	x	x	x		x	x
Cryptantha barbigera	bearded forget me not	Boraginaceae	x	x	x	x	x	x			x	x
Cryptantha dumetorum	flexuous forget me not	Boraginaceae	x	x	x	x	x	x	x		x	x
Cryptantha maritima	white haired forget me not	Boraginaceae	x	x	x	x	x	x	x	x	x	x
Cryptantha nevadensis	Nevada forget me not	Boraginaceae	x	x	x	x	x	x			x	x
Cryptantha pterocarya	wing nut forget me not	Boraginaceae	x	x	x	x	x	x			x	x
Cryptantha sp.		Boraginaceae		x	x	x	x	x				x
Cucurbita palmata	coyote melon	Cucurbitaceae	x									
Cuscuta denticulata	dodder	Cuscutaceae		x	x	x		x			x	x
Cynanchum utahense	Utah cynanchum	Asclepiadaceae	x	x								
*Cynodon dactylon**	burmuda grass	Poaceae					x	x				
*Dactylis glomerata**	orchard grass	Poaceae										
Dalea mollissima	silky dalea	Fabaceae	x	x	x	x	x	x		x	x	x
Datura discolor		Solanaceae		x	x	x	x					
Datura wrightii	Jimson weed	Solanaceae				x	x	x				x
Descurainia pinnata	tansy mustard	Brassicaceae				x	x	x			x	x
Dimorphotheca sinuata		Asteraceae	x									
DITAXIS CALIFORNICA	**CALIFORNIA DITAXIS**	Euphorbiaceae			x		x	x			x	x
Ditaxis lanceolata		Euphorbiaceae	x	x	x	x	x	x		x		x
Ditaxis neomexicana		Euphorbiaceae	x	x	x	x	x	x		x	x	x

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Dithyrea californica	spectacle pod	Brassicaceae	x	x	x	x	x	x				x
Echinocactus polycephalus	cottontop	Cactaceae	x	x	x		x					
Echinocereus engelmannii	hedgehog cactus	Cactaceae			x		x	x			x	x
Emmenanthe penduliflora	whispering bells	Hydrophyllaceae					x	x				
Encelia farinosa	brittlebush	Asteraceae	x	x	x	x	x	x	x	x	x	x
Encelia frutescens	rayless encelia	Asteraceae	x	x		x	x	x				x
Ephedra nevadensis	mormon tea	Ephedraceae									x	
Eremalche exilis		Malvaceae		x					x			
Eremalche rotundifolia	desert five-spot	Malvaceae	x	x	x	x	x	x	x		x	x
Eriogonum deflexum		Polygonaceae										x
Eriogonum inflatum	desert trumpet	Polygonaceae	x	x	x		x	x			x	x
Eriogonum sp.		Polygonaceae		x	x	x	x	x			x	x
Eriogonum thomasii		Polygonaceae	x	x	x	x				x		x
Eriogonum reniforme		Polygonaceae	x	x	x	x	x	x				x
Erioneuron pulchellum	fluff grass	Poaceae			x		x	x			x	
Eriophyllum wallacei	Wallace's woolly daisy	Asteraceae		x		x	x	x				
Erodium cicutarium	cranes bill	Geraniceae	x	x		x	x	x	x		x	x
Erodium texanum	Texas filaree	Geraniceae	x	x	x	x	x	x	x	x	x	x
Eschscholzia minutiflora	small-flowered desert poppy	Papaveraceae	x	x	x	x	x	x		x	x	x
Eschscholzia sp.		Papaveraceae			x	x	x	x		x		x
Eucrypta chrysanthemifolia		Hydrophyllaceae						x				x
Eucrypta micrantha		Hydrophyllaceae	x	x	x	x		x			x	x
Fagonia laevis	fagonia	Zygophyllaceae	x	x	x	x	x	x		x	x	x
Fagonia pachyacantha	fagonia	Zygophyllaceae		x			x	x				x
Ferocactus cylandraceus	barrel cactus	Cactaceae	x	x			x	x				x

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Filago depressa		Asteraceae	x	x		x					x	
Fouquieria splendens	ocotillo	Fouguieriaceae	x	x	x	x	x	x			x	x
Geraea canescens	desert sunflower	Asteraceae	x	x	x	x	x	x	x	x	x	x
Gilia brecciarum		Polemoniaceae					x	x				
Gilia sp.	gilia	Polemoniaceae					x			x		x
Gilia latifolia	broad leaved gilia	Polemoniaceae	x	x	x	x	x	x		x		x
Gilia stellata	star gilia	Polemoniaceae	x	x	x	x	x	x		x	x	x
Guillenia lasiophylla	mustard	Brassicaceae	x	x	x	x	x	x			x	x
Hesperocallis undulata	desert lily	Liliaceae	x	x	x	x	x	x	x			x
Hibuscus denudatus	desert hibiscus	Malvaceae	x	x	x	x	x	x		x		x
*Hordeum murinum**		Poaceae							x			
Hymenoclea salsola	cheesebush	Asteraceae	x	x	x	x	x	x	x	x	x	x
Hyptis emoryii	desert lavender	Lamiaceae	x	x	x	x	x	x		x	x	x
Isomeris arborea	bladderpod	Capparaceae					x				x	
Justicia californica	chuparosa	Scrophulariaceae			x	x	x	x		x		x
Koeberlinia spinosa spp. Tenuispina	crown-of-thorns	Koeberliniaceae		x								
Krameria erecta		Krameriaceae		x			x	x		x		x
Krameria grayi	white rhatany	Krameriaceae	x	x	x	x	x	x		x	x	x
*Lactura serriola**		Asteraceae		x			x					
Larrea tridentata	creosote bush	Zygophyllaceae	x	x	x	x	x	x	x	x	x	x
Lepidium fremontii	desert alyssum	Brassicaceae			x		x	x				
Lepidium lasicocarpum	peppergrass	Brassicaceae	x	x	x	x	x	x	x	x	x	x
Linanthus jonesii	linanthus	Polemoniaceae	x	x		x	x					x
Loeseliastrum matthewsii	desert calico	Polemoniaceae	x	x		x	x	x				x
Lotus strigosus	stiff hair lotus	Fabaceae	x	x	x	x	x	x	x	x	x	x
Lupinus arizonicus	lupine	Fabaceae	x	x	x	x	x	x	x	x	x	x

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Lycium andersonii	wolfberry	Solanaceae	x	x	x	x	x	x		x	x	x
Lycium pallidum	pallid box thorn	Solanaceae					x	x				
Malacothrix glabrata	desert dandelion	Asteraceae	x	x	x	x	x	x	x	x	x	x
Mammalaria sp.	fishhook cactus	Cactaceae	x		x		x	x		x		x
Mammalaria tetrancistra	fishhook cactus	Cactaceae	x	x		x					x	
Marina parryi	Parry's false prairie clover	Fabaceae	x	x		x	x	x		x		x
Mentzelia albicaulis or obscura	white-stemmed stickleaf	Loasaceae	x	x	x	x	x	x				x
Mentzelia involucrata	sand blazing star	Loasaceae	x	x	x	x	x	x		x	x	x
Mimulis bigelovii	Bigelow's monkeyflower	Scrophulariaceae			x	x		x			x	x
Mirabilis bigelovii	wishbone plant	Nyctaginaceae	x	x	x	x	x	x		x	x	x
Mohavea confertiflora	ghost flower	Scrophulariaceae	x			x	x	x				x
Monoptilon bellioides	desert star	Asteraceae	x	x	x	x	x	x		x	x	x
Nama demissum	purple mat	Hydrophyllaceae	x	x	x	x	x	x			x	x
Nama pusillum		Hydrophyllaceae	x		x	x	x	x		x		x
Nemacladus rubescens		Campanulaceae	x	x		x	x					x
Nerium oleander	oleander	Apocynaceae						x				x
Nicotiana obtusifolla	coyote tobacco	Solanaceae					x	x				x
Oenothera deltoides	dune evening primrose	Onagraceae							x			
Oligomeris linifolia		Resedaceae	x	x	x	x	x				x	x
Olneya tesota	Ironwood	Fabaceae	x	x	x	x	x	x	x	x	x	x
Opuntia sp.		Cactaceae										x
Opuntia basilaris basilaris	beavertail cactus	Cactaceae	x	x	x	x	x					x
Opuntia echinocarpa	golden cholla	Cactaceae	x	x	x	x	x	x		x	x	x
Opuntia ramosissima	pencil cholla	Cactaceae	x	x	x	x	x	x		x	x	x

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Orobanche cooperi	broomrape	Orobanchaceae					x					
Palafoxia arida	Spanish needles	Asteraceae	x	x	x	x	x	x	x		x	x
Parietaria hespera		Urticaceae										x
Pectocarya heterocarpa		Boraginaceae	x	x	x	x						x
Pectocarya penicillata		Boraginaceae	x		x			x			x	
Pectocarya peninsularis		Boraginaceae	x		x			x				
Pectocarya platycarpa	broad-nutted combbur	Boraginaceae	x	x	x	x	x	x	x			x
Pectocarya recurvata	broad-nut combseed	Boraginaceae	x	x	x	x	x	x	x	x	x	x
Pectocarya sp.		Boraginaceae					x					x
Perityle emoryi	Emory's rocket daisy	Asteraceae	x	x	x	x	x	x		x	x	x
Petalonyx thurberi	sandpaper plant	Loasaceae	x				x					
Peucephyllum schottii	pygmy-cedar	Asteraceae	x				x				x	
Phacelia crenulata	notch-leaf phacelia	Hydrophyllaceae	x	x	x	x	x	x	x	x	x	x
Phacelia distans	lace leaf phacelia	Hydrophyllaceae	x	x	x	x	x	x		x	x	x
Phacelia neglecta		Hydrophyllaceae	x	x	x	x	x	x		x		x
Phoradendron californicum	desert mistletoe	Visaceae		x	x	x	x	x				x
Physalis crassifolia	thick leaved ground cherry	Solanaceae					x	x			x	x
Plagiobothrys sp.		Boraginaceae					x	x				x
Plantago ovata	woolly plantain	Plantaginaceae	x	x	x	x	x	x	x	x	x	x
Pleuraphis rigida	big galleta grass	Plantaginaceae	x	x	x	x	x	x	x	x	x	x
Porophyllum gracile	odora	Asteraceae			x	x		x				x
PROBOSCIDEA ALTHEAEFOLIA	**UNICORN PLANT**	Martyniaceae			x	x		x				

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Prosopis glandulosa	honey mesquite	Fabaceae										x
Psathyrotes ramosissima	velvet turtleback	Asteraceae	x	x	x	x	x	x			x	x
Psorothamnus emoryi	dye plant	Fabaceae	x	x	x	x	x	x	x			x
Psorothamnus schotti	Schott's indigobush	Fabaceae	x	x	x	x	x	x			x	x
Psorothamnus spinosus	smoke tree	Fabaceae	x	x	x	x	x	x				x
Pulchea sericea	arrow plant	Asteraceae						x				
Rafinesquia neomexicana	desert chicory	Asteraceae	x	x	x	x	x	x		x	x	x
Salazaria mexicana	paper-bag bush	Lamiaceae		x			x				x	
Salsola tragus	Russian thistle, tumbleweed	Chenopodiaceae				x						
Salvia columbariae	chia	Lamiaceae	x	x	x	x	x	x		x	x	x
Sarcostemma cynanchoides	climbing milkweed	Asclepiadaceae	x	x	x		x	x			x	x
Sarcostemma hirtellum	trailing townula	Asclepiadaceae		x								
*Schismus arabicus**		Poaceae	x	x	x							
*Schismus barbatus**	mediterranean grass	Poaceae	x	x	x	x	x	x	x	x	x	x
Senecio mohavensis		Asteraceae	x	x		x	x	x		x	x	x
Senna armata	spiny senna	Fabaceae					x	x			x	
Simmondsia chinensis	jojoba	Simmondsiaceae			x	x	x	x			x	x
Sisymbrium irio	London rocket	Brassicaceae			x							x
Sphaeralcea angustifolia		Malvaceae					x					x
Sphaeralcea ambigua	globe mallow	Malvaceae			x	x	x	x		x	x	x
Stephanomeria pauciflora		Asteraceae	x	x	x	x	x	x			x	x
Streptanthella longirostris	mustard	Brassicaceae		x	x	x	x	x				x
Stillingia linearifolia	linear leaved stillingia	Euphorbiaceae		x								

Scientific Name	Common Name	Family	Solar Farm (northern region)	Solar Farm (southern region)	Gen-Tie A1	Gen-Tie A2	Gen-Tie B1	Gen-Tie B2	Telecom site	Red Bluff Substation A (east)	Red Bluff Substation B (west)	Red Bluff Substation Access Road (both alternatives)
Stillingia spinulosa		Euphorbiaceae	x	x		x			x			
*Tamarix aphyll**	tamarisk	Tamaricaceae				x						
Thysanocarpus curvipes	fringepod	Brassicaceae		x	x							x
Tiquilia plicata	tequilia	Boraginaceae			x	x			x			x
Tidestromia oblongifolia		Amaranthaceae		x			x	x				
Trichoptilium incisum	yellowhead	Asteraceae	x		x	x	x			x		x
Trixis californica		Asteraceae	x	x			x				x	
Vulpia bromoides		Poaceae	x		x	x	x				x	x
Vulpia octoflora var. octoflora		Poaceae	x									

Appendix B

Wildlife List from Desert Sunlight Surveys

Common Name	*Scientific Name*	Sign
BIRDS		
American avocet	*Recurvirostra americana*	O, V
American Kestrel	*Falco sparverius*	O
American Robin	*Turdus migratorius*	O
American White Pelican	*Pelecanus erythrorhynchos*	O
Anna's Hummingbird	*Calypte anna*	O
Ash-throated Flycatcher	*Myiarchus cinerascens*	O, V
Barn Swallow	*Hirundo rustica*	O
Black-crowned Night Heron	*Nycticorax nycticorax*	O
Black-tailed Gnatcatcher	*Polioptila melanura*	O, V
Black-throated Sparrow	*Amphispiza bilineata*	O, V
Black-throated Gray warbler	*Dendroica nigrescens*	O, V
Blue-gray Gnatcatcher	*Polioptila caerulea*	O, V
Brewer's Blackbird	*Euphagus cyanocephalus*	O, V
Brewer's Sparrow	*Spizella breweri*	O
Bullock's Oriole	*Icterus bullockii*	O, V
burrowing owl	*Athene cunicularia*	O
Common Poorwill	*Phalaenoptilus nuttallii*	O
Common Raven	*Corvus corax*	O, V
Costa's Hummingbird	*Calypte costae*	O
Egret	*Egretta sp.*	O
ferruginous hawk	*Buteo regalis*	O
Gambel’s Quail	*Callipepla gambelii*	O, V
Greater Roadrunner	*Geococcyx californianus*	O
Great-tailed Grackle	*Quiscalus mexicanus*	O, V
Horned Lark	*Eremophila alpestris*	O, V
House Finch	*Carpodacus mexicanus*	O, V
House Wren	*Troglodytes aedon*	O, V
Killdeer	*Charadrius vociferous*	O
Lark Sparrow	*Chondestes grammacus*	O
LeConte’s thrasher	*Toxostoma lecontei*	O, V
Lesser Goldfinch	*Spinus psaltria*	O
Lesser Nighthawk	*Chordeiles minor*	O
Loggerhead Shrike	*Lanius ludovicianus*	O
Merlin	*Falco columbarius*	O
Mourning Dove	*Zenaida macroura*	O, V
Northern Flicker	*Claptes auratus*	O
northern harrier	*Circus cyaneus*	O
Northern Mockingbird	*Mimus polyglottos*	O, V
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	O
Osprey	*Pandion haliaetus*	O
Phainopepla	*Phainopepla nitens*	O
prairie falcon	*Falco mexicanus*	O
Red-tailed Hawk	*Buteo jamaicensis*	O, V
Rock Wren	*Salpinctes obsoletus*	O, V
sage thrasher	*Oreoscoptes montanus*	O
Say’s Phoebe	*Sayonaris nigricans*	O
Sharp-shinned Hawk	*Accipiter striatus*	O
Swainson’s hawk	*Buteo swainsonii*	O
Tree Swallow	*Tachycineta bicolor*	O
Turkey Vulture	*Cathartes aura*	O
Verdin	*Auriparus flaviceps*	O

Common Name	*Scientific Name*	Sign
Violet-green Swallow	*Tachycineta thalassina*	O
Western Kingbird	*Tyraannus verticalis*	O, V
Western Meadowlark	*Sturnella neglecta*	O, V
White-crowned Sparrow	*Zonotrichia leucophrys*	O, V
white-throated sparrow	*Zonotrichia albicollis*	O, V
White-throated Swift	*Aeronautes saxatalis*	O
Wilson's Warbler	*Wilsonia pusilla*	O
Yellow-rumped Warbler	*Dendroica coronata*	O, V
REPTILES		
desert tortoise	*Gopherus agassizii*	O,B, T, S, C
chuckwalla	*Sauromalus obesus*	O, S
Mojave fringe-toed lizard	*Uma scoparia*	O
zebra-tailed lizard	*Callisaurus draconoides*	O
western whiptail	*Cnemidophorus tigris*	O
side-blotched lizard	*Uta stansburiana*	O
desert iguana	*Dipsosaurus dorsalis*	O, S
desert horned lizard	*Phrynosoma platyrhinos*	O, S
long-nosed leopard lizard	*Gambelia wislizenii*	O
sidewinder	*Crotlus cerastes*	O
coachwhip	*Masticophis flagellum*	O
southern sagebrush lizard	*Sceloporus graciosus vandenburgianus*	O
speckled rattlesnake	*Crotalus mitchelli*	O
gopher snake	*Pituophis melanoleucus*	O
western patch-nosed snake	*Salvadora hexalepis*	O
Long-tailed Brush Lizard	*Urosaurus graciosus*	O
western shovel-nosed snake	*Chionactis occipitalis*	O
California kingsnake	*Lampropeltis getula californiae*	O
MAMMALS		
black-tailed jackrabbit	*Lepus californicus*	O, T, S
white-tailed antelope ground squirrel	*Ammospermophilus leucurus*	O
coyote	*Canis latrans*	T, S
desert cottontail	*Sylvilagus audubonii*	O, T, S
burro deer	*Odocoileus hemionus eremicus*	O, T, S
Palm Spring round-tailed ground squirrel	*Spermophilus teriticaudus chlorus*	O
American badger	*Taxidea taxus*	B
Desert kit fox	*Vulpes macrotis arsipus*	B
Long-tailed Pocket Mouse	*Chaetodipus formosus*	O
Merriam's Kangaroo Rat	*Dipodomys merriami*	O, B
Desert Woodrat	*Neotoma lepida*	O, B
Spiny Pocket mouse	*Perognathus spinatus*	O
Little Pocket Mouse	*Perognathus longimembris*	O

O – Observed Directly T – Tracks S – Scat
B – Burrow V – Vocalization C – Carcass

Desert Tortoise Translocation Plan

DESERT TORTOISE TRANSLOCATION PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Prepared for
DESERT SUNLIGHT HOLDINGS, LLC
1111 Broadway St, 4th Floor
Oakland, CA 94607

Prepared by:
IRONWOOD CONSULTING INC.
20 Nevada Street, Suite 300
Redlands, CA 92373
and
RACHEL WOODARD
PMB 613, 1539 N. China Lake Boulevard
Ridgecrest, CA 93555

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List of Acronyms

ACEC	Area of Critical Environmental Concern
BLM	U.S. Bureau of Land Management
BO	Biological Opinion
CDCA	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CHU	Critical Habitat Unit
CPUC	California Public Utility Commission
DOI	U.S. Department of the Interior
DPV I	SCE's Devers to Palo Verde I transmission line
DSSF	Desert Sunlight Solar Farm
DTCC	Desert Tortoise Conservation Center
DWMA	Desert Wildlife Management Area
ELISA	Enzyme-linked immunosorbent assay
ESA	Endangered Species Act
GIS	Geographic Information System
I-10	Interstate 10
MW	Megawatt
MWD	Metropolitan Water District
O&M	Operations and Maintenance
PV	Photovoltaic
ROW	Right of Way
SBBM	San Bernardino Base and Meridian
SCE	Southern California Edison
URTD	Upper Respiratory Tract Disease
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Purpose and Introduction

The desert tortoise (*Gopherus agassizii*) is a federally and state-listed threatened species known to inhabit the Proposed Action location and immediately surrounding areas. The purpose of this Desert Tortoise Translocation Plan is to describe the translocation effort for the Proposed Action. The goals of this plan are to:

1. Translocate desert tortoises from the Solar Farm Site and Red Bluff Substation to identified recipient sites;
2. Minimize take of desert tortoises from project activities; and
3. Implement a long-term monitoring program within recipient and control sites to track the effectiveness of the translocation effort.

The Proposed Action includes the PV generating facility (Solar Farm Site) and generation interconnection transmission line (Gen-Tie Line) to be constructed by Desert Sunlight Holdings and the Red Bluff Substation and related project components to be constructed and administered by Southern California Edison (SCE).

Desert Sunlight Holdings, LLC (Desert Sunlight Holdings) proposes to construct and operate a 550-megawatt (MW) nominal capacity alternating current (AC) solar photovoltaic (PV) energy-generating project known as the Desert Sunlight Solar Farm (DSSF or Project). The site proposed for the Solar Farm Site, most of the corridor for the Proposed Action's 220-kilovolt (kV) Gen-Tie Line, and the potential site being considered for a new substation would be located on lands administered by the U.S. Department of Interior (DOI), Bureau of Land Management (BLM) Palm Springs-South Coast Field Office. Remaining lands along the Gen-Tie Line are owned by the Metropolitan Water District (MWD).

The Proposed Action also includes development of a new 500- to 220- (500/220-) kV substation (referred to here as the Red Bluff Substation), where the Project would interconnect with the SCE regional transmission system Devers-Palo Verde I (DPV I) transmission line. The Red Bluff Substation and associated SCE project components (access roads, distribution line, and telecommunications site) are included as part of the Proposed Action for planning and environmental considerations and it would be constructed, owned, and operated by SCE.

2.0 Estimated Numbers of Desert Tortoise

The Biological Resources Technical Report for the Desert Sunlight Solar Farm (Ironwood Consulting, 2010) provides detailed information on methods used to determine the estimated number of desert tortoises that could be translocated during the Proposed Action. All surveys and analysis were conducted between 2008 and 2010 using current protocols and statistical methods (USFWS 2010).

Reliable estimates of desert tortoise densities for the region surrounding the Action Area were not available prior to conducting Project surveys. Results of range-wide sampling provided limited information on densities recorded for the Eastern Colorado Recovery Unit, which can vary widely throughout the recovery unit, and USFWS has recommended against inferring the meaning of these data until the data can be further analyzed (USFWS 2008). USFWS has concluded that too few study plots and transects have been conducted in this region for confident analysis, but that the ratio of carcasses to live animals found in recent range-wide sampling was low, which may indicate a relatively stable population. Density estimates from range-wide sampling between 2001 and 2005 indicate the estimates of desert tortoise density for the entire Eastern Colorado Recovery Unit of between 3 and 15 animals per square kilometer, with estimates varying greatly between years (USFWS 2008).

2.1 Solar Farm Site and Gen-Tie Line

Solar Farm Site

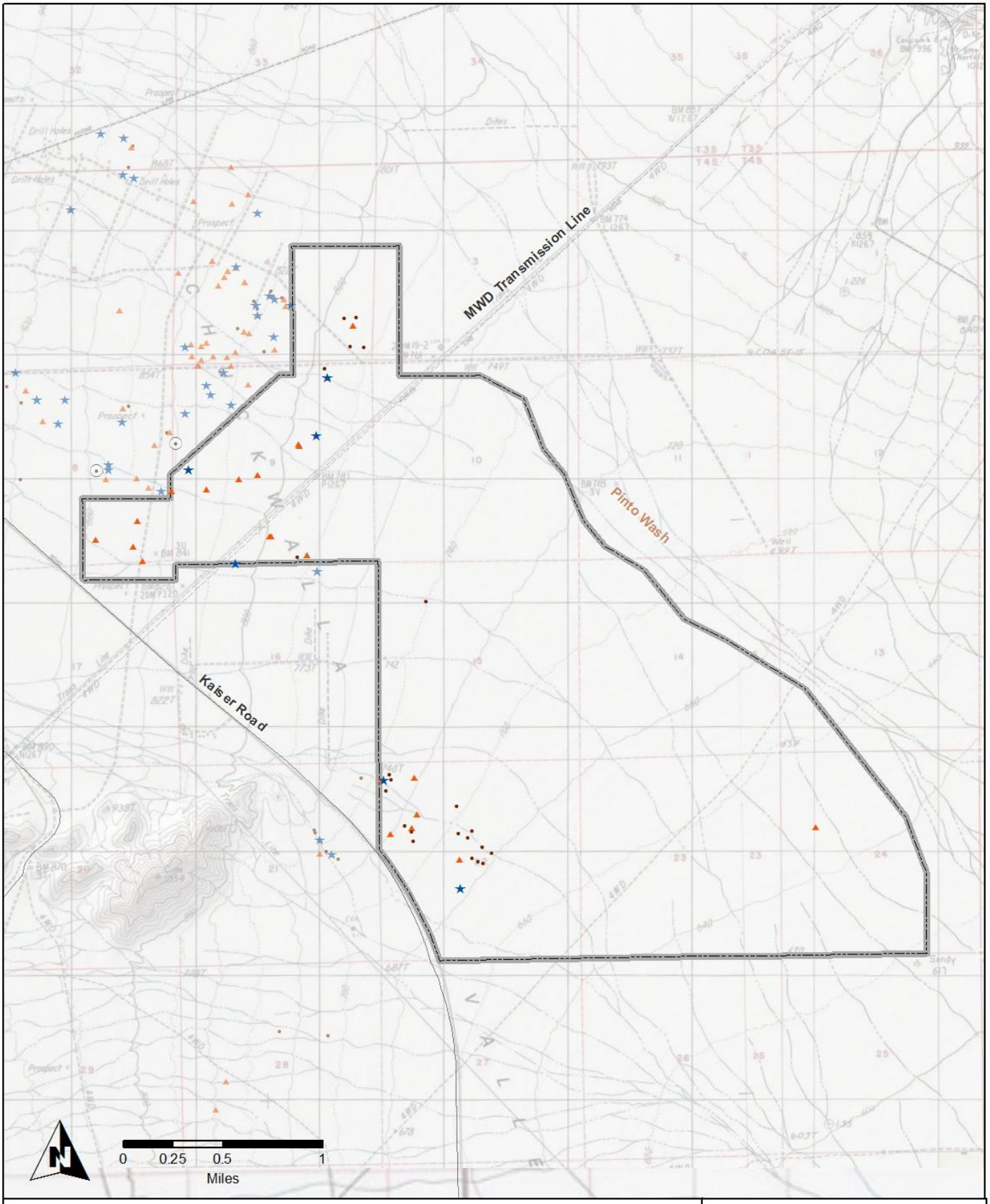
Both distribution and abundance are described for the Solar Farm Site. Desert tortoise sign was found at multiple locations within the Solar Farm Site, but was not distributed evenly (Figure 1). Active desert tortoise sign observed within the Solar Farm Site included live tortoises, active burrows, recent scat, and mating rings. Two concentrations of active tortoise sign are located within the Solar Farm Site. The concentration in northwest contained four observations of live tortoise, while the concentration in the southwest contained two observations of live tortoises. Outside these concentrations, relatively few sign (including active, inactive, or historic sign such as older carcasses) were found. In total, six live desert tortoises and twenty-two active burrows were observed within the boundaries of the Solar Farm Site during these surveys (Figure 1).

Gen-Tie Line

Presence of active desert tortoise sign along the Gen-Tie Line is noted, but abundance and distribution are not described in detail because translocation of desert tortoises is not proposed for the Gen-Tie Line (Fraser 2010). Active sign was found along the Gen-Tie Line east of Highway 177 and north of Interstate 10, including one live tortoise observed within 30 meters of the center of the Gen-Tie Line (Figure 2). The Gen-Tie Line along Kaiser Road lacked evidence of recent tortoise activity.

2.2 Red Bluff Substation and Related Components

No active desert tortoise sign was found on or immediately adjacent to the Red Bluff Substation. One active desert tortoise burrow and fresh scat were observed just north of the distribution line, approximately 2.0 kilometers (1.6 miles) west of the Red Bluff Substation. No desert tortoise sign were found on or near the telecommunications site, which covers approximately 0.2 acres.



Solar Farm

Tortoise

Active Burrow/Pallet

Scat - Fresh

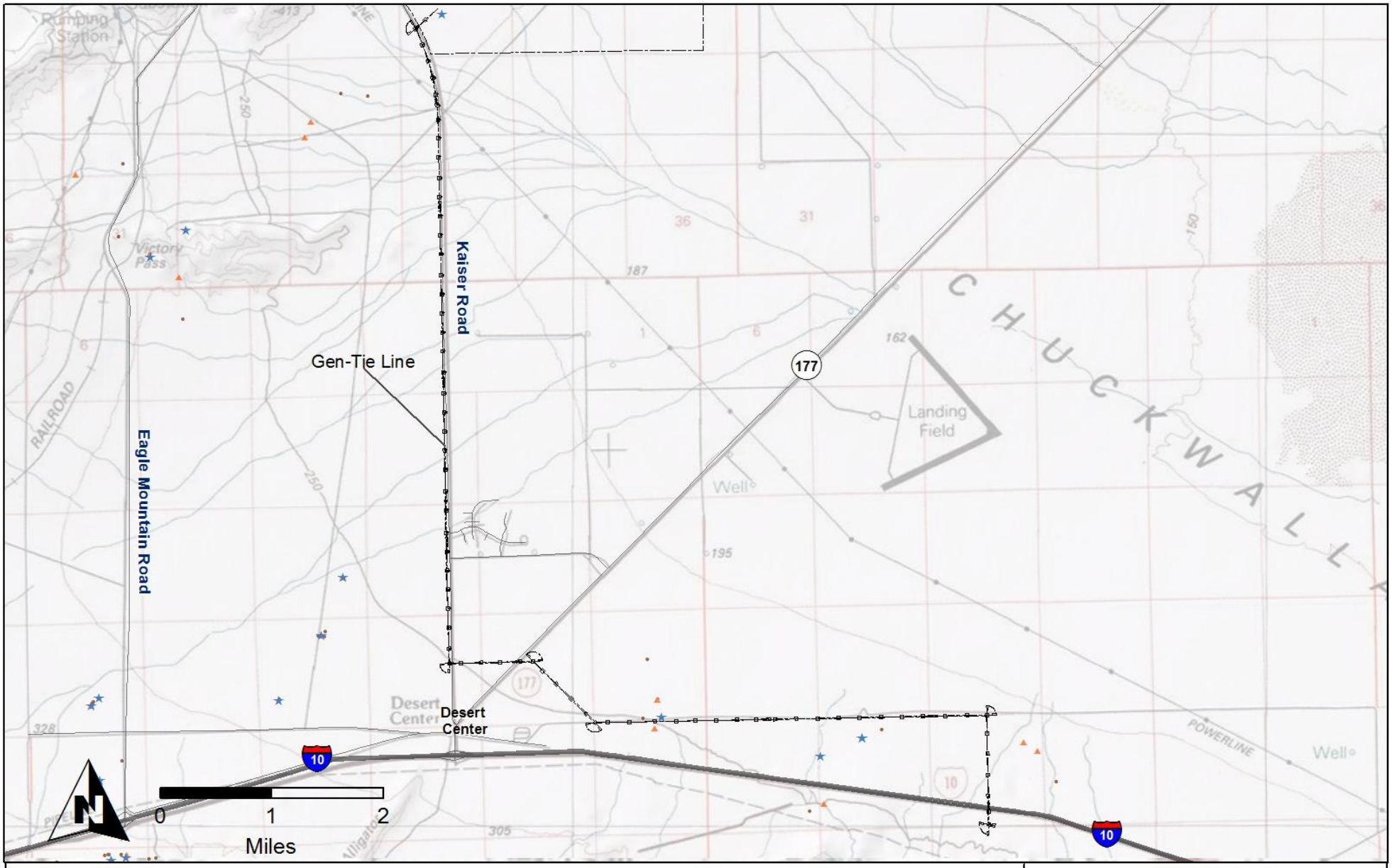
Mating Ring

Note: sign located outside project component is shaded

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC

Figure 1
Solar Farm
Active Desert Tortoise Sign

Prepared by Ironwood Consulting, Inc. - August 5, 2010



Project Components

Tortoise

Active Burrow/Pallet

Scat - Fresh

Note: sign located outside project component is shaded

DESERT SUNLIGHT
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DESERT SUNLIGHT HOLDINGS, LLC

Figure 2
Active Desert Tortoise Sign
Sunlight Components
Gen-Tie Line

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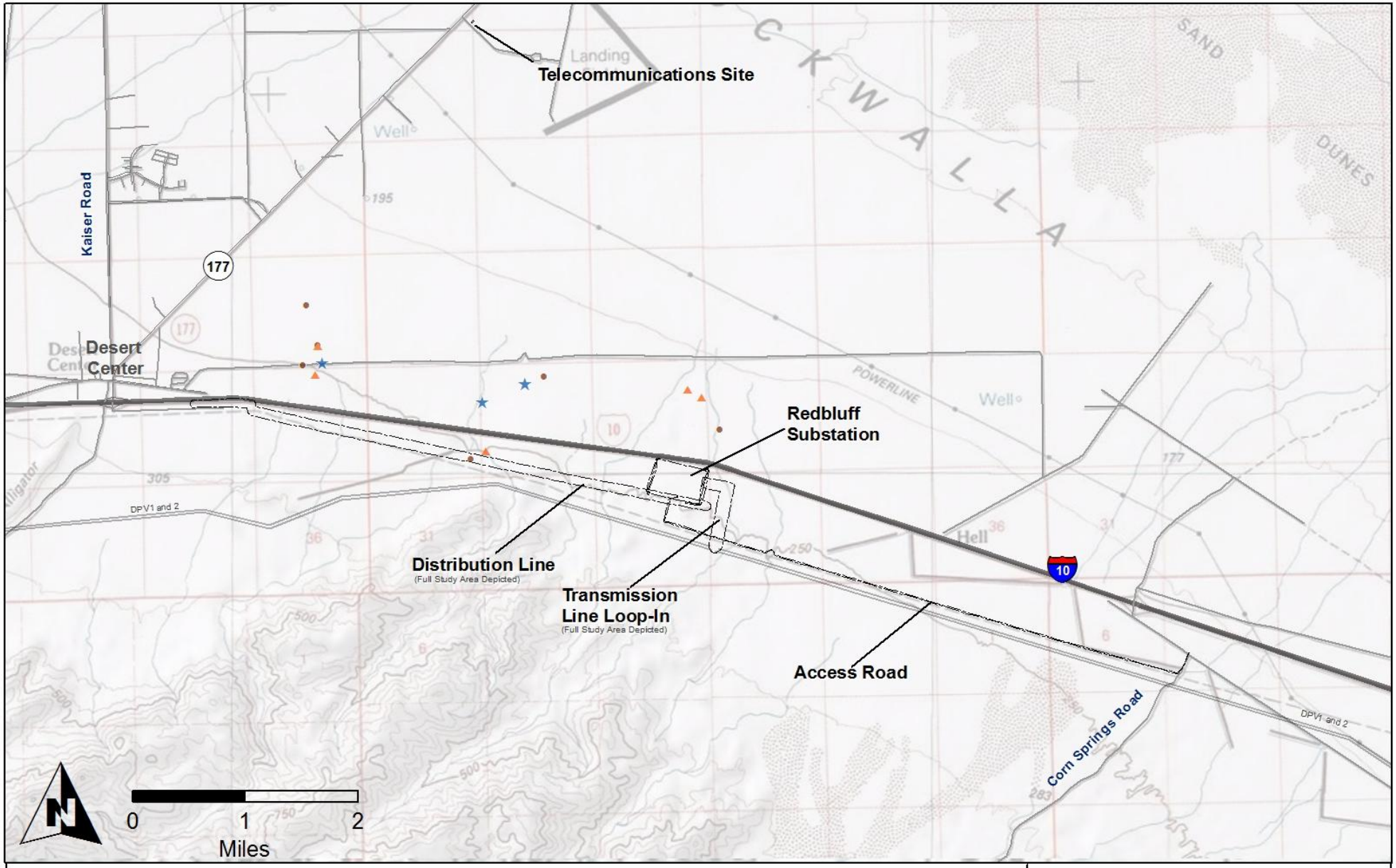

Project Components

★ Tortoise
▲ Active Burrow/Pallet
● Scat - Fresh

Note: sign located outside project component is shaded

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC

Figure 3
Active Desert Tortoise Sign
SCE Components

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3.0 Recipient and Control Sites

This section describes how the Recipient Site and Control Sites were selected for the DSSF Project, based on current direction from BLM, the California Department of Fish and Game (CDFG), and USFWS; and current research in the field of desert tortoise home range and movement (Bertolero 2007, Desert Tortoise Science Advisory Committee 2009, Dodd 1991, Harless 2009, Letty 2007, Reinert 1991, Seddon 2007).

3.1 Recipient Sites

Using Geographic Information Systems (GIS), land located within 35 kilometers (22 miles) of the Solar Farm Site boundaries was assessed for locating potential recipient sites. Several areas were investigated for suitability as recipient sites. Listed in general order of importance, factors used to determine suitability included:

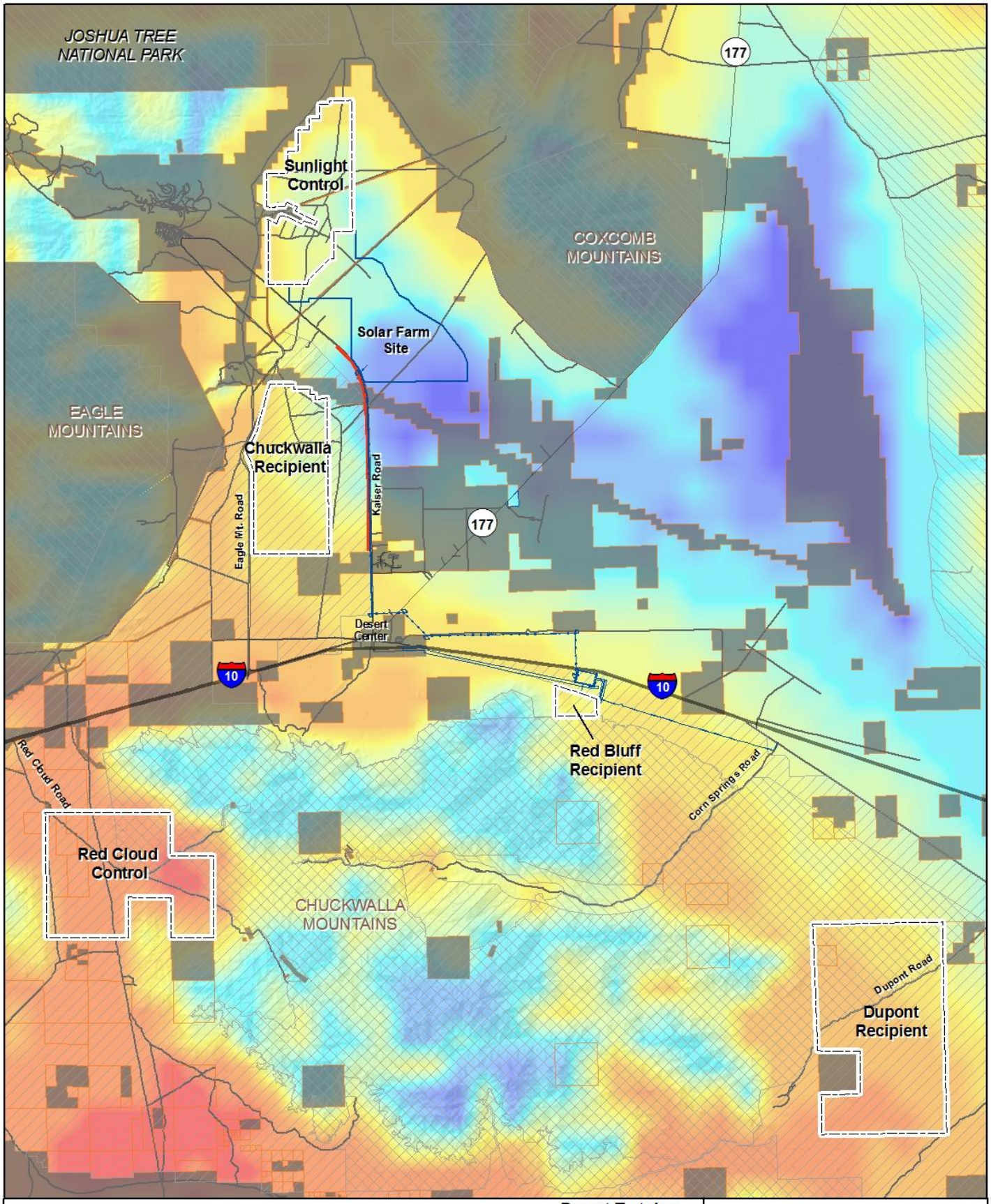
- land protection status;
- habitat quality and similarity;
- proximity to existing home ranges;
- disease status (if known);
- potential for increased predation (e.g., raven subsidies);
- habitat connectivity;
- existing tortoise densities;
- proximity to existing disturbances;
- survey status; and
- site access.

Observations made during site surveys (over 10,000 acres of full coverage) provided useful information on habitat adjacent to the Solar Farm Site. Areas to the east do not support high quality desert tortoise habitat and are similar in nature to the eastern and southern portions of the Solar Farm Site. The area to the south was not considered because it is currently proposed for solar development under a separate project. Therefore, the most suitable locations for recipient sites are located to the north and west of the Solar Farm Site. This is supported by recent habitat modeling performed by the USGS (Figure 4). Land ownership and long-term protection status limited much of study area located further from the Solar Farm Site from consideration.

Two primary recipient sites, and one secondary site, are proposed for use by the Project, one as the recipient site for tortoises translocated from the Solar Farm Site and one as the recipient site for tortoises translocated from the Red Bluff Substation (Figure 4):

- **Chuckwalla Recipient Site (primary)**, located west of the Solar Farm Site;
- **Dupont Recipient Site (secondary)**, located along Dupont Road east of the Chuckwalla Mountains; and

- **Red Bluff Recipient Site (primary)**, located in the immediate area of the Red Bluff Substation. In the event that tortoises are found at the Red Bluff Substation site during the pre-construction surveys, these tortoises would be translocated from the Red Bluff Substation to this area.



Translocation Site
Project Component
Exclusion Fence
Chuckwalla DWMA
Wilderness Area
BLM Lands
Private, State and Other Federal Lands
Desert Tortoise Habitat Value
High
Low
Source: Nussear et al. 2009

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DESERT SUNLIGHT HOLDINGS, LLC

Figure 4
Translocation Sites

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How each recipient site conforms to the direction from USFWS on the preparation of Translocation Plans (Fraser, comments on Palen and Genesis Draft Relocation Plans 2010), is discussed in further detail in this section. USFWS direction is in bold italics and the site analysis based on that guidance follows.

3.1.1 Chuckwalla Recipient Site (Primary)

The Chuckwalla Recipient Site is shown on Figure 5 including all data collected for desert tortoise presence and distribution in this recipient site.

Potential Recipient Sites should be close to or continuous with the project site (i.e., no barriers to movement).

The Chuckwalla Recipient Site lies within (1,800 meters) 6,000 feet of the Solar Farm Site, located just to the southwest of the site across Kaiser Road, and to the east of Eagle Mountain Road, both of which support very little traffic (Figure 6). Except for Kaiser Road, no additional barriers to movement are currently found between the Solar Farm Site and the Chuckwalla Recipient Site.

Potential Recipient Sites should have no designated ROWs or other encumbrances.

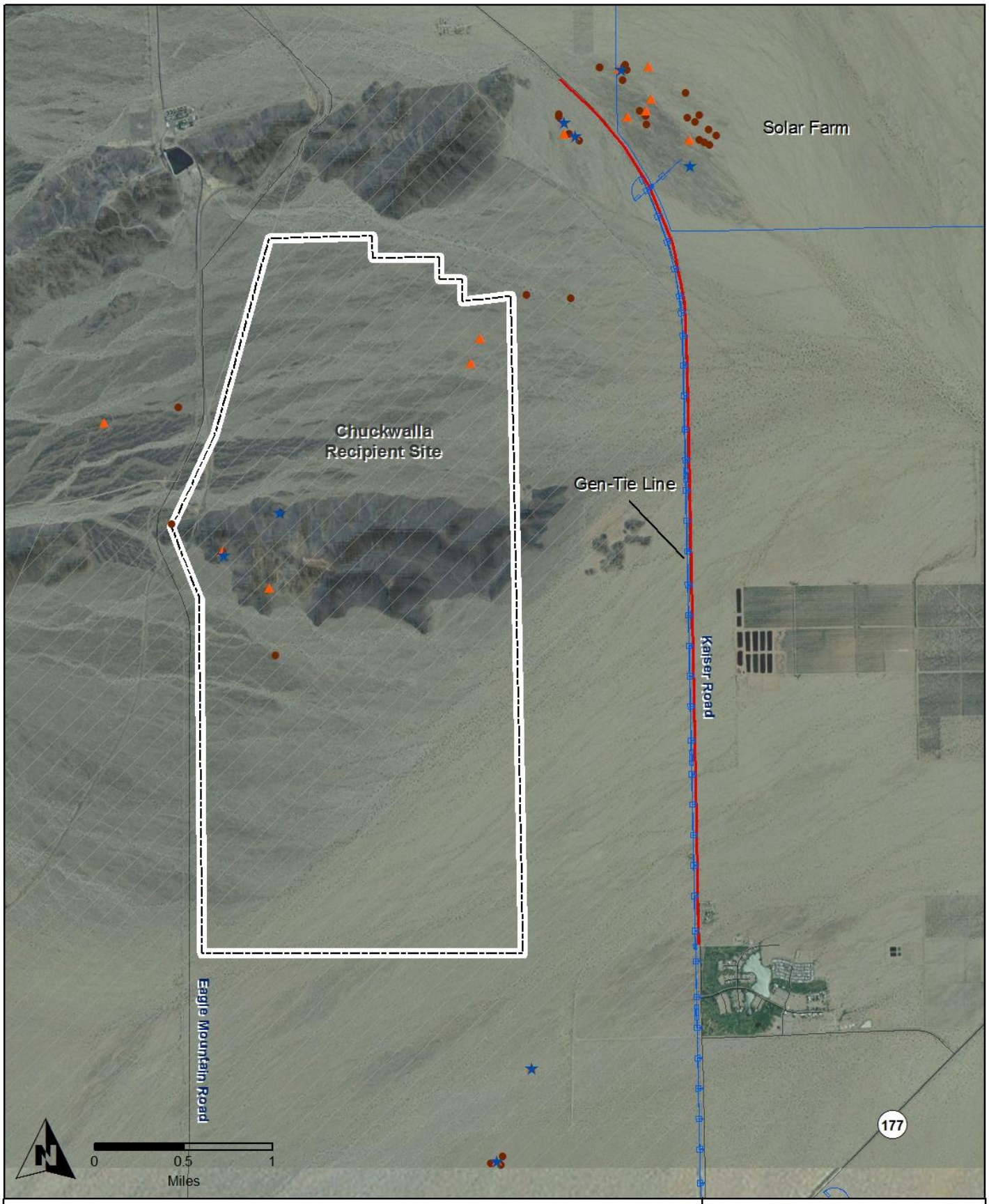
There are no existing designated ROWs or other encumbrances located within the Chuckwalla Recipient Site. A buffer of 100 meters (325 feet) on north side of this corridor is excluded from the translocation area to avoid the Metropolitan Water District of Southern California (MWD) emergency spillway to the north (Figure 6). In addition, an area of approximately 200 acres is avoided to exclude an existing Riverside County Landfill (which is currently closed and fenced). Beyond existing ROWs or encumbrances, BLM's LR2000 database does not show any over-filings or pending applications.

Potential Recipient Sites should support habitat suitable for all life stages of the desert tortoise.

The Chuckwalla Recipient Site supports Creosote Bush-White Bursage vegetation and several small areas of Blue Palo Verde-Ironwood-Smoke Tree Series vegetation (Desert Dry Wash Woodland), similar to those nearby areas that would be disturbed with the implementation of the Proposed Action. These habitats are known to support all life stages of the desert tortoise (USFWS 2008) and much of the Chuckwalla Recipient Site is known to support existing populations of desert tortoise.

The Chuckwalla Recipient Site may support better quality habitat than the Solar Farm Site for desert tortoise. The U.S. Geological Survey (USGS) recently released a model that predicts the statistical probability of habitat potential for desert tortoise in the Mojave and Sonoran deserts (Nussear et al. 2009). According to the model, the Chuckwalla Recipient Site is of moderate habitat potential, while the majority of the Solar Farm Site has a low probability of supporting desert tortoise habitat.

Desert Sunlight Holdings conducted baseline surveys of vegetation species richness and densities within the Solar Farm Site, Chuckwalla Recipient Site and Control Site. These surveys provide information on the baseline conditions of vegetation in these areas during an above average rainfall year in 2010 and will be useful in monitoring the vegetation in these areas over the long-term monitoring period (Section 4).



Recipient Site

Project Component

Chuckwalla DWMA

Tortoise Fencing

Tortoise

Pallet

Mating Ring

Scat

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Figure 5
Chuckwalla Recipient Site

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Potential Recipient Sites should be managed for conservation.

The Chuckwalla Recipient Site is located on BLM-managed lands within the Eastern Colorado Desert Recovery Unit for the desert tortoise. The Chuckwalla Recipient Site is within the Chuckwalla Desert Wildlife Management Area (DWMA) and Critical Habitat Unit (CHU) for desert tortoise, an area that allows up to 1% total disturbance and is managed by the BLM and USFWS for the protection and recovery of the desert tortoise. Desert Sunlight Holdings is presently working with the BLM, USFWS and CDFG to ensure that the recipient site be managed for conservation.

Confirm presence of desert tortoise at the Recipient Site.

Portions of the Chuckwalla Recipient Site were surveyed for resident desert tortoises in 2008 and 2010 using current protocols (USFWS 1992; 2010). All live desert tortoises found were observed for signs of upper respiratory tract disease (URTD) and cutaneous dyskeratosis (shell disease). No individuals showed signs of these diseases.

Areas surveyed within the Chuckwalla Recipient Site represent approximately 15% of the total area. Surveys will be completed according to current USFWS protocols prior to any translocation activities to identify and exclude areas of higher tortoise densities. No tortoises will be relocated to areas within the Chuckwalla Recipient Site that are estimated to contain more than 8 tortoises per square kilometer.

3.1.2 Dupont Recipient Site (Secondary)

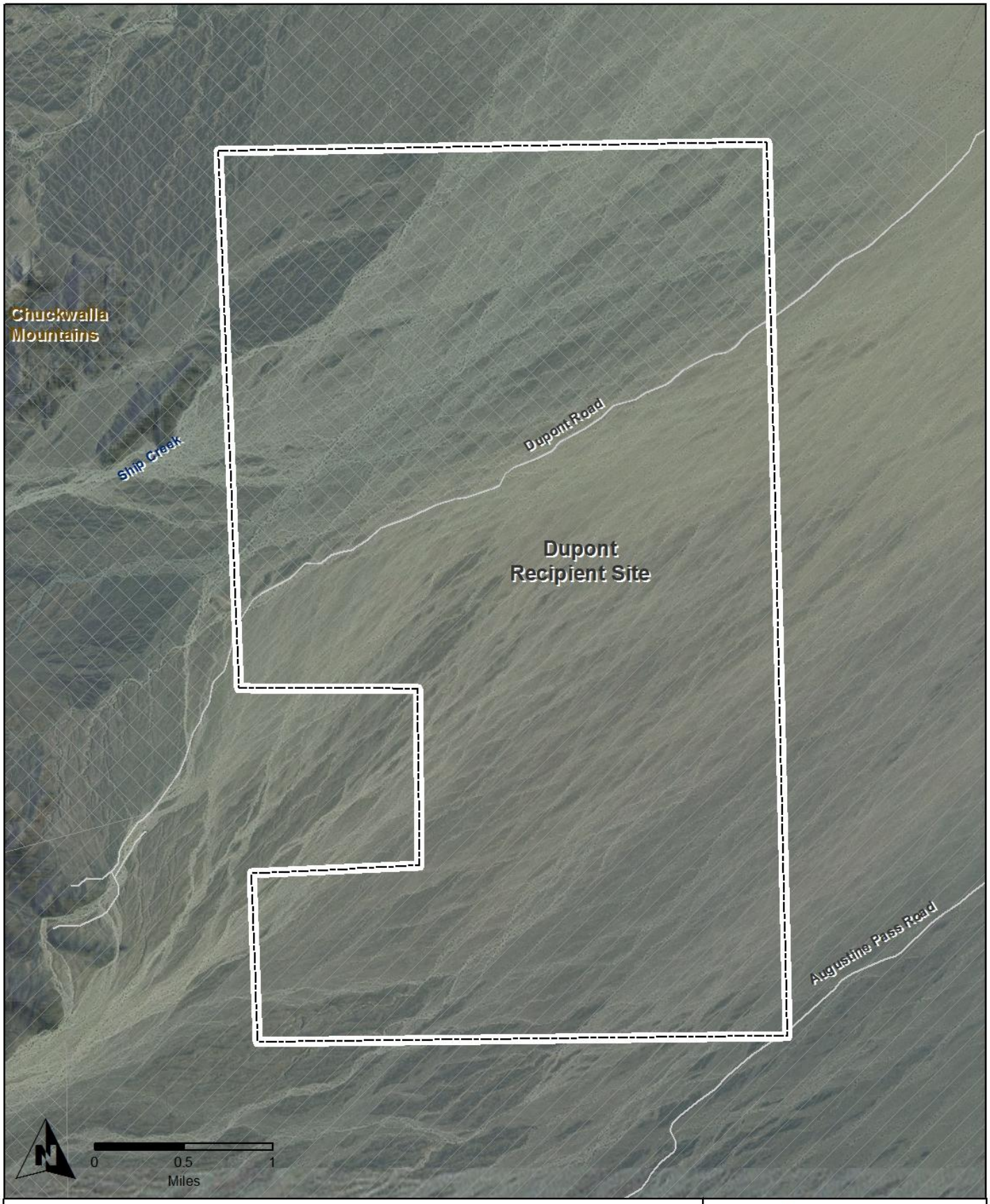
The Dupont Recipient Site is shown on Figure 6. Project-specific surveys of this site have not been conducted. Modeled habitat quality within the Dupont Recipient Site is shown in Figure 4.

Potential Recipient Sites should be close to or continuous with the project site (i.e., no barriers to movement).

The Dupont Recipient Site is situated (24 kilometers) 15 miles southeast of the Solar Farm Site, located on both side of Dupont Road, three miles south of Interstate 10 and approximately one mile west of the Chuckwalla Mountains. Interstate 10 and Highway 177 pose potential barriers to tortoise movement in the northwest direction; however, these roadways contain overpasses at major drainage crossings. These crossings could be used by tortoises for large-scale movement.

Potential Recipient Sites should have no designated ROWs or other encumbrances.

There are no existing designated ROWs or other encumbrances that would conflict with translocation of tortoises within the Dupont Recipient Site. BLM's LR2000 database indicated withdraw of lands into the Wilderness Area, withdraw of a Solar Energy Study Area, and private land transfer to the BLM within portions of the site.



Recipient Site

Unpaved Road

Chuckwalla DWMA

Wilderness Area

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Figure 6
Dupont Recipient Site

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Potential Recipient Sites should support habitat suitable for all life stages of the desert tortoise.

The Dupont Recipient Site supports Creosote Bush-White Bursage vegetation and broad stands of Blue Palo Verde-Ironwood-Smoke Tree Series vegetation (Desert Dry Wash Woodland), similar to habitats that would be disturbed with the implementation of the Proposed Action. The Dupont site contains a broad alluvial fan system similar to the portions of the Solar Farm Site that supports desert tortoise activity. These habitats are known to support all life stages of the desert tortoise (USFWS 2008).

The Dupont Recipient Site may support better quality habitat than the Solar Farm Site for desert tortoise. The USGS model indicates that the Dupont Recipient Site contains moderate to high habitat potential, while the majority of the Solar Farm Site has a low probability of supporting desert tortoise habitat.

Potential Recipient Sites should be managed for conservation.

The Dupont Recipient Site is located on BLM-managed lands within the Eastern Colorado Desert Recovery Unit for the desert tortoise. The Dupont Recipient Site is within the Chuckwalla DWMA and CHU for desert tortoise, an area that allows up to 1% total disturbance and is managed by the BLM and USFWS for the protection and recovery of the desert tortoise. The northern half of the Dupont Site is located within the Chuckwalla Mountains Wilderness Area, which is a protected area within the National Wilderness Preservation System. Desert Sunlight Holdings is presently working with the BLM, USFWS and CDFG to ensure that the recipient site be managed for conservation so potential threats are lessened in the future.

Confirm presence of desert tortoise at the Recipient Site.

The Dupont Recipient Site is located in the Chuckwalla Valley and supports desert tortoise, although densities are unknown. Range-wide sampling conducted between 2001 and 2005 within the Dupont region (note: only a few transects were conducted within the boundaries of the recipient site) indicated the historical presence of tortoise (i.e., carcasses) and recorded one live tortoise in 2003 (USFWS 2006). Multiple occurrences of desert tortoise were documented in the last 10 years within 10 miles of the Dupont Recipient Site, mostly within the Chocolate Mountains Aerial Gunnery Range (CNDDB 2010).

Project-specific surveys have not been conducted within the Dupont Recipient Site. Surveys will be completed according to current USFWS protocols prior to any translocation activities to identify and exclude areas of higher tortoise densities. Disease status of resident population is unknown at this time and data will be collected on the prevalence of possible disease during project-specific surveys. No tortoises will be relocated to areas within the Chuckwalla Recipient Site that are estimated to contain more than 8 tortoises per square kilometer.

3.1.3 Red Bluff Recipient Site (Primary)

The Red Bluff Recipient Site is shown on Figure 7 including all data collected for desert tortoise presence and distribution in this recipient site.

Potential Recipient Sites should be close to or continuous with the project site (i.e., no barriers to movement).

Using GIS, an area within 2 kilometers (1.2 miles) of the Red Bluff Substation boundary was drawn that represented potential recipient sites. Within this 2-kilometer area there are some barriers to desert tortoise movement such as Interstate 10 (I-10) to the north and the Chuckwalla Mountains to the south. Several potential impediments to movement were avoided in locating the Red Bluff Recipient Site, including Interstate 10 and the Chuckwalla Mountains (Figure 7).

Potential Recipient Sites should have no designated ROWs or other encumbrances.

With regard to existing designated ROWs or other encumbrances, several existing telephone, electrical transmission, and high-power gas lines and associated access roads are located within the Red Bluff Recipient Site. A buffer of 100 meters (325 feet) on both sides of each existing line or road is excluded from the translocation area (Figure 7). Beyond existing ROWs or encumbrances, BLM's LR2000 database does not show any over-filings or pending applications.

Potential Recipient Sites should support habitat suitable for all life stages of the desert tortoise.

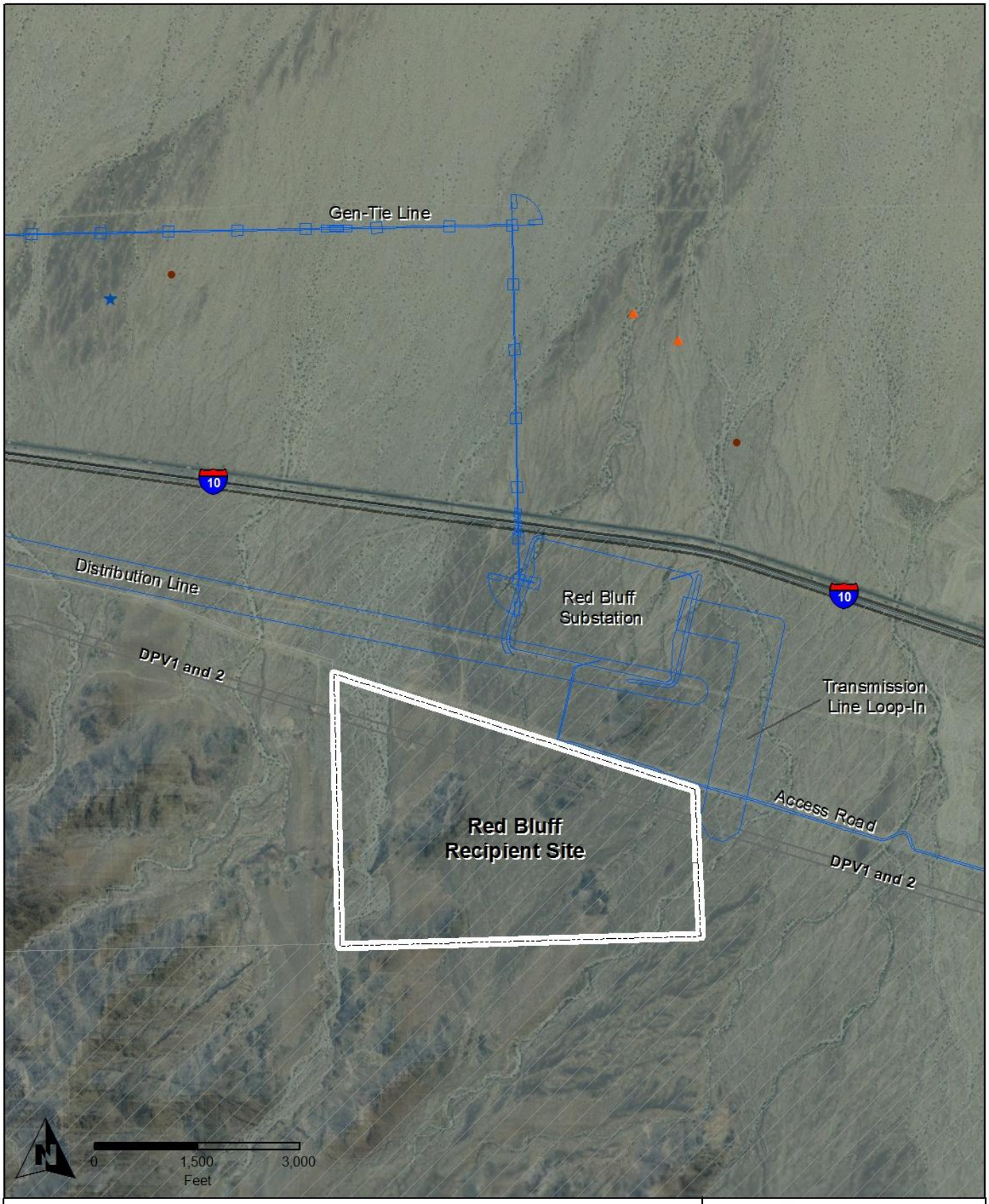
The Red Bluff Recipient Site supports Creosote Bush-White Bursage vegetation and Blue Palo Verde-Ironwood-Smoke Tree Series vegetation (Desert Dry Wash Woodland), similar to those adjacent areas proposed for the development of the Red Bluff Substation. These habitats are known to support all life stages of the desert tortoise (USFWS 2008).

Potential Recipient Sites should be managed for conservation.

The Red Bluff Recipient Site is located on BLM-managed lands within the Eastern Colorado Desert Recovery Unit for the desert tortoise and within the Chuckwalla DWMA and CHU. These areas will continue to be managed under the NECO Plan (for the DWMA), federal Endangered Species Act (for the CHU), and Desert Tortoise Recovery Plan (for both DWMA and CHU). Desert Sunlight Holdings is presently working with the BLM, USFWS and CDFG to ensure that the eventual recipient site be managed for conservation.

Confirm presence of desert tortoise at the Recipient Site.

The Red Bluff Recipient Site was surveyed for resident desert tortoises in 2009 and 2010 using current protocols (USFWS 2009, updated in 2010). One live desert tortoise was found and did not exhibit obvious clinical signs of URTD or shell disease. No areas of the Red Bluff Recipient Site appear to contain densities of desert tortoise higher than eight individuals per square kilometer (Figure 7).



Recipient Site

Project Component

Chuckwalla DWMA

Tortoise

Pallet

Mating Ring

Scat

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Figure 7
Red Bluff Recipient Site

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3.1.4 Linear Components of the Proposed Action

No Recipient Site was identified for tortoises located along the linear components of the Proposed Action. Linear components are often separated from the other Project component discussions in this document because desert tortoises do not need to be translocated from linear components of the Project (Fraser 2010). Linear components of the Project include:

<u>Desert Sunlight Holdings</u>

- Gen-Tie Line

<u>SCE/Red Bluff Substation</u>

- Access road
- Distribution line
- Transmission Loop-in

Any desert tortoises found on these linear components of the Proposed Action will be moved out of harm's way pursuant to USFWS guidance (Fraser 2010) as described in Section 4.

3.2 Control Sites

Two control sites, one primary and one secondary, have been identified for the Project:

- **Sunlight Control Site (primary)**, located within the original study area north of the Solar Farm Site; and
- **Red Cloud Control Site (secondary)**, located approximately seven miles southeast of Desert Center, south of Interstate 10.

One Control Site will be selected and used in conjunction with all translocated desert tortoises from the Solar Farm Site or the Red Bluff Substation. The purpose of the Control Site is to observe and record the movements and behaviors of animals within an area with no impact from the Project, so that these data can be compared to data recorded for desert tortoise movement and behavior among the translocated population and the recipient population. In the discussion below, USFWS direction is noted in bold italics and the site analysis based on that guidance follows.

3.2.1 Sunlight Control Site (Primary)

The Sunlight Control Site is shown on Figure 8 including all data collected for desert tortoise presence and distribution in this recipient site.

Potential control sites should not have been previously used as a Recipient Site for other projects and should be a minimum distance of 10 kilometers from the project site if the site is unfenced.

The Sunlight Control Site and has not been previously used as a Recipient Site for other projects. The Solar Farm Site and Red Bluff Substation will be fenced with security fencing and desert tortoise exclusion fencing. The proposed Sunlight Control Site is located adjacent to and north of the Solar Farm Site and 18 kilometers (11 miles) northwest of the Red Bluff Substation.

Confirm presence of desert tortoise at the Control Site.

The Sunlight Control Site was surveyed for resident desert tortoises in 2008 using current protocols (USFWS 1992). Several live tortoises and other active desert tortoise sign were observed during this survey (Figure 8). All live desert tortoises identified were assessed for obvious signs of URTD and shell disease. No individuals were observed with obvious clinical signs of these diseases.

3.2.2 Red Cloud Control Site (Secondary)

The Red Cloud Control Site is shown on Figure 9. Project-specific surveys of this site have not been conducted. Modeled habitat quality within the Red Cloud Control Site is shown in Figure 4.

Potential control sites should not have been previously used as a Recipient Site for other projects and should be a minimum distance of 10 kilometers from the project site if the site is unfenced.

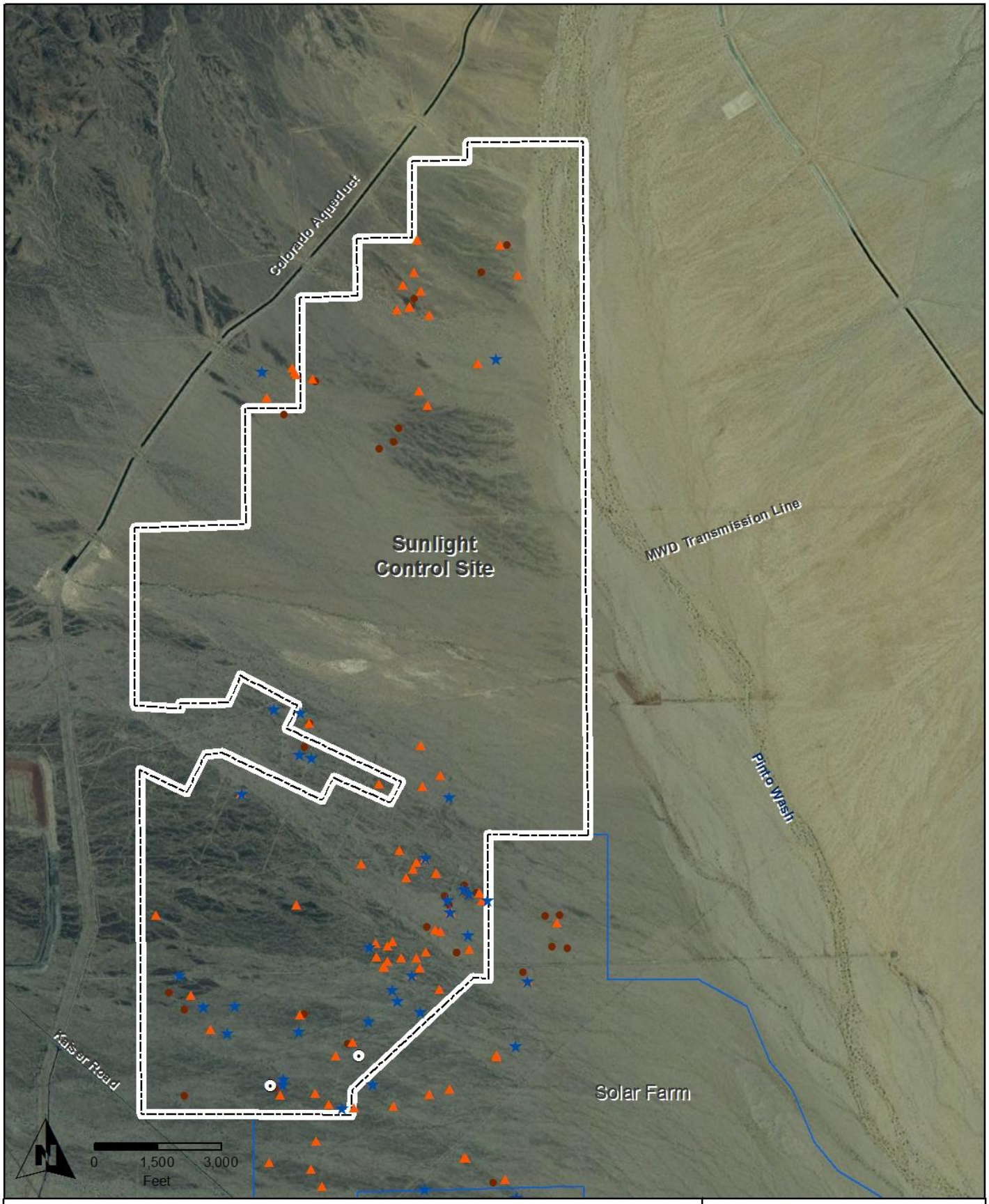
The Red Cloud Control Site and has not been previously used as a Recipient Site for other projects.

The Solar Farm Site and Red Bluff Substation will be fenced with security fencing and desert tortoise exclusion fencing. The secondary Red Cloud Control Site is located approximately 18 kilometers (11 miles) southwest of the Solar Farm Site and 16 kilometers (10 miles) southwest of the Red Bluff Substation.

Confirm presence of desert tortoise at the Control Site.

The Red Cloud Control Site is located in the Chuckwalla Valley and supports desert tortoise, although densities are unknown. Range-wide sampling conducted between 2001 and 2005 within the Red Cloud region indicated the current and historical presence of tortoises with carcasses and live tortoise observed annually during the study (USFWS 2006). Multiple occurrences of desert tortoise were documented in the last 5 to 10 years within 5 miles of the Red Cloud Control Site, mostly along the Interstate 10 corridor (CNDDB 2010).

Project-specific surveys have not been conducted within the Red Cloud Control Site. Surveys will be completed according to current USFWS protocols prior to any translocation activities to identify and exclude areas of higher tortoise densities. Disease status of resident population is unknown at this time and data will be collected on the prevalence of possible disease during project-specific surveys. No tortoises will be relocated to areas within the Chuckwalla Recipient Site that are estimated to contain more than 8 tortoises per square kilometer.



Control Site

Project Component

Tortoise

Pallet

Mating Ring

Scat

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DESERT SUNLIGHT HOLDINGS, LLC

Figure 8
Sunlight Control Site

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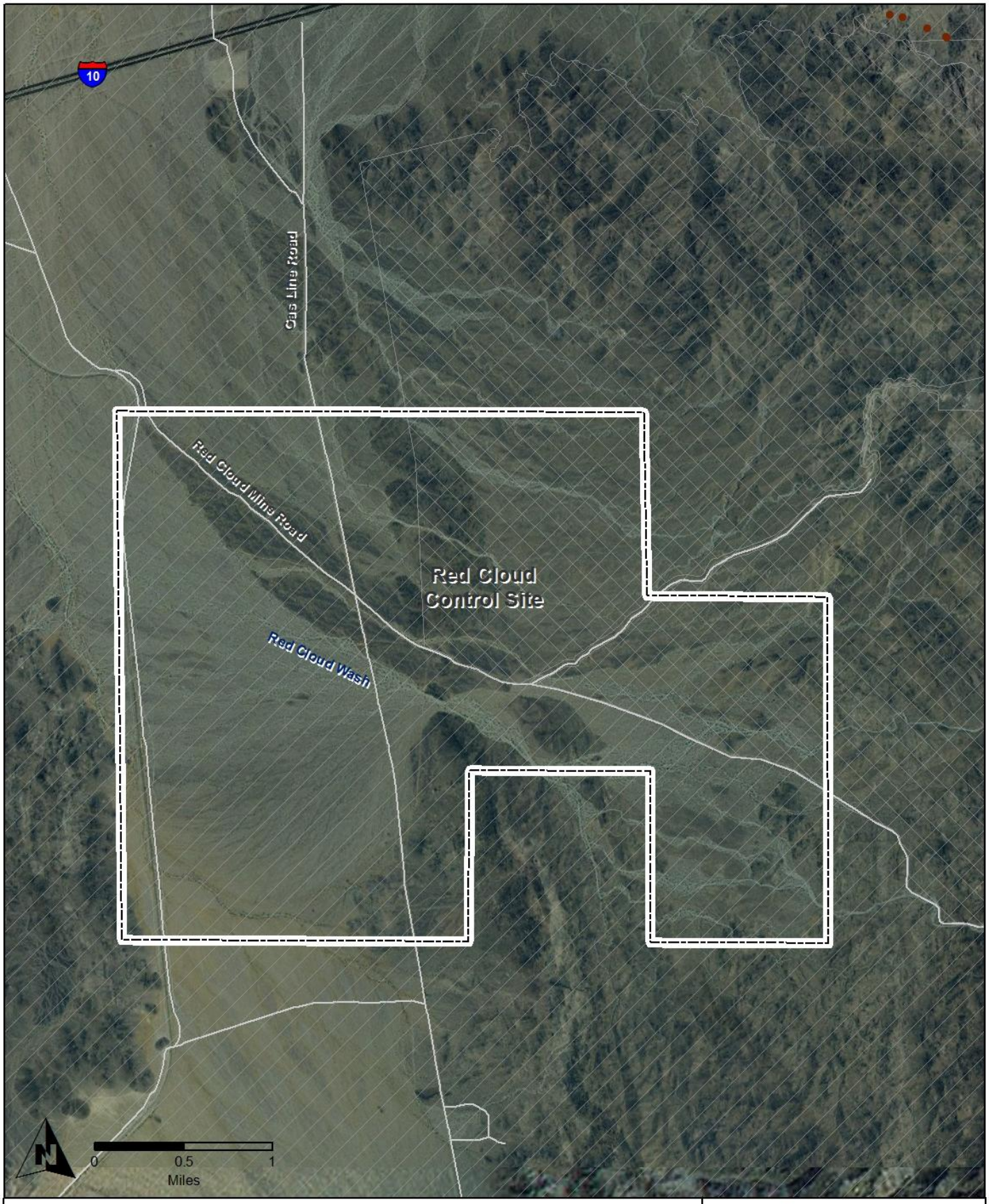

Control Site

Unpaved Road

Chuckwalla DWMA

Wilderness Area

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Figure 9
Red Cloud Control Site

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4.0 Proposed Methods for Desert Tortoise Translocation

This section describes the methods to be used for translocation of desert tortoise from the Solar Farm Site and Red Bluff Substation during three phases:

1. Perimeter fencing
2. Clearance surveys and translocation
3. Long-term monitoring and reporting

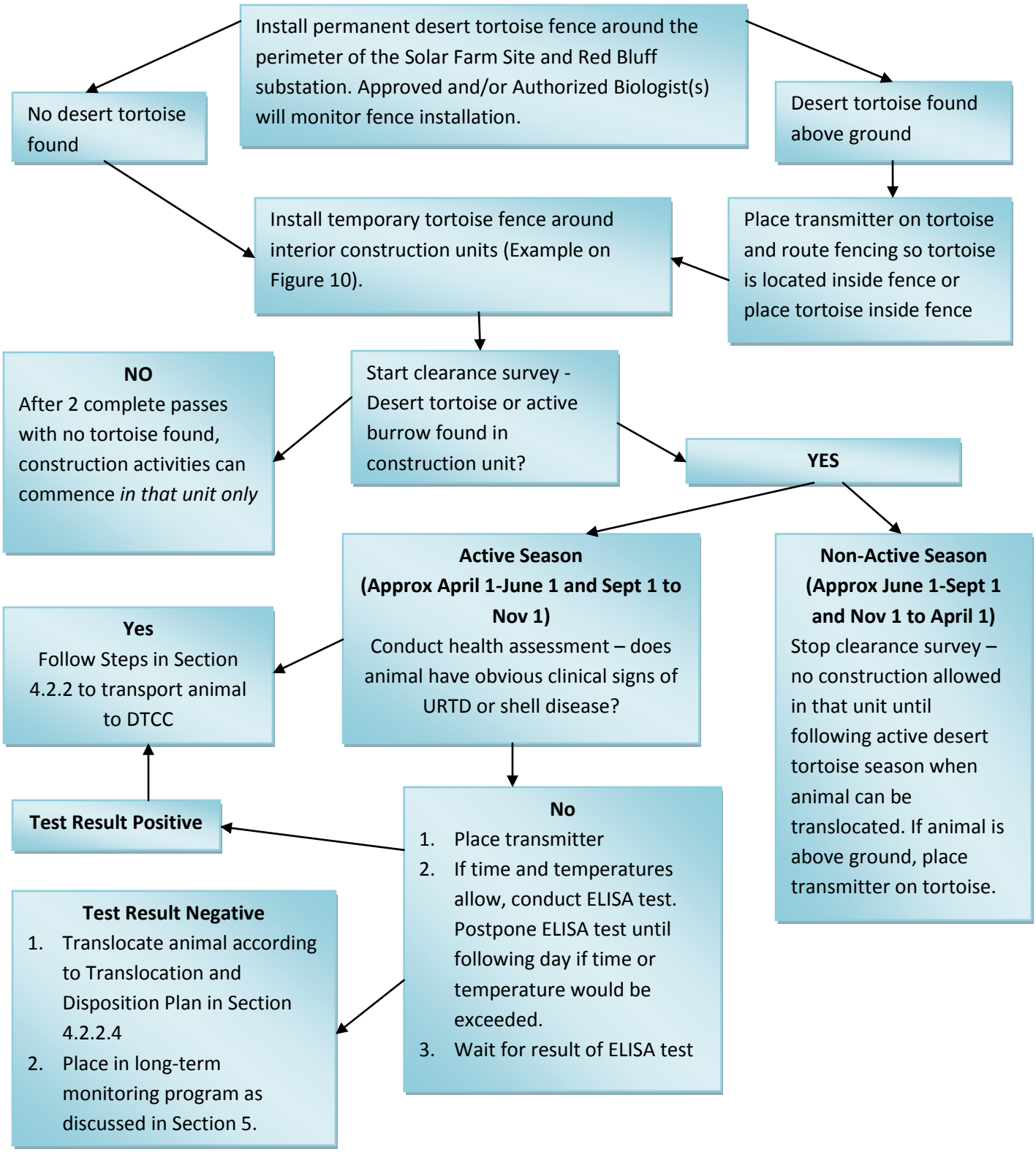
Figure 10 shows a flow chart summarizing the procedures described below and decision points in the proposed translocation process. All of these translocation activities will be commensurate with the specific Terms and Conditions of the USFWS Biological Opinion (BO) and Incidental Take Statement (ITS), and the Consistency Determination issued by the California Department of Fish and Game (CDFG).

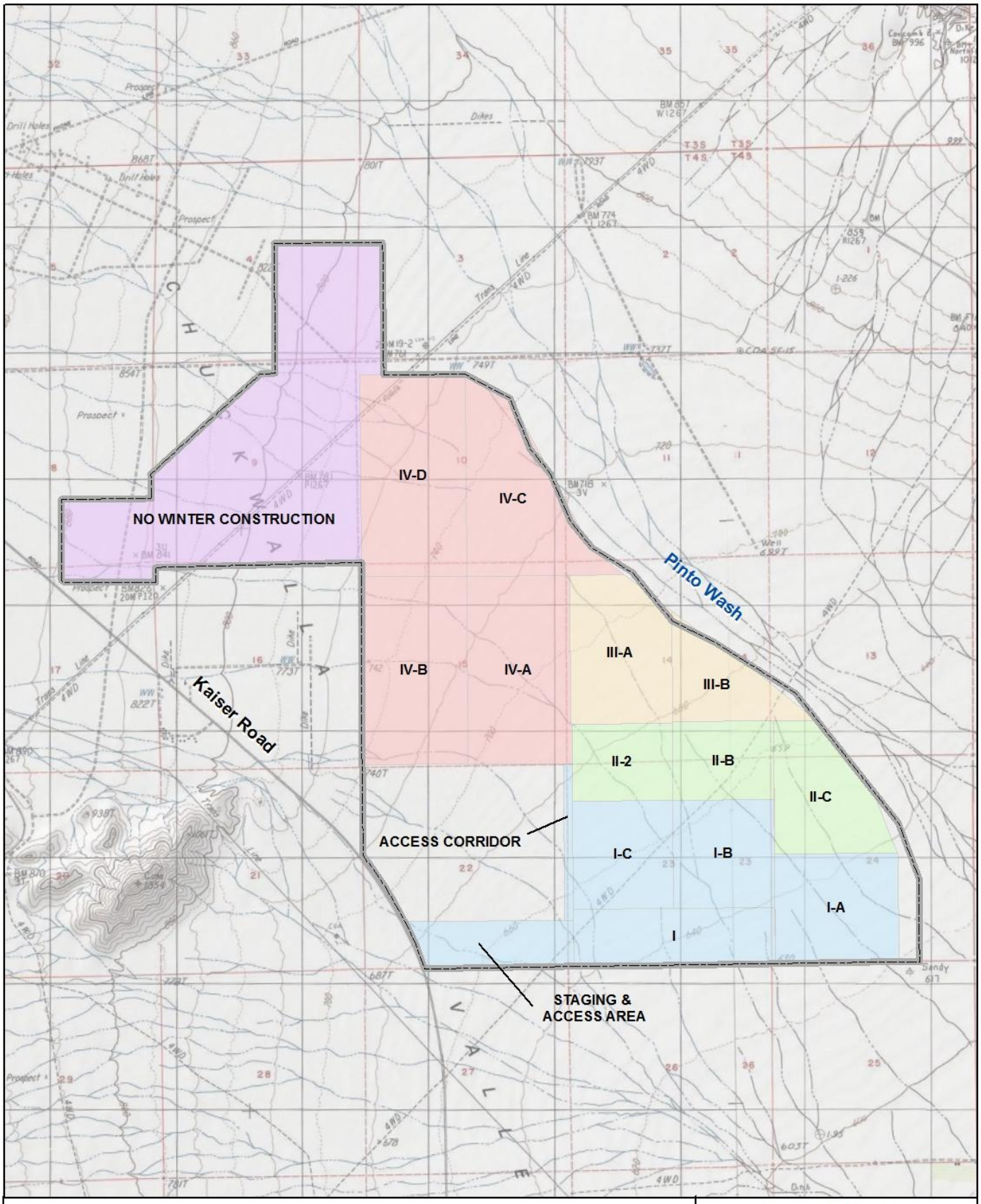
4.1 Perimeter Fencing

Prior to clearance surveys of the Solar Farm Site or the Red Bluff Substation, the perimeter of these sites would be fenced with security fencing and desert tortoise exclusion fencing. These fencing activities would be treated as a linear activity of the Proposed Action. All fencing activities would be monitored by a qualified biological monitor. All fencing would be checked and repaired, as necessary, on a daily basis to ensure its integrity.

All individual desert tortoises found above ground during construction of the perimeter fence will be given a unique identifier, fitted with a transmitter as discussed in section 4.2.2 and placed inside the Solar Farm Site. These individuals will eventually be part of the group of translocated animals and will be included in all other activities of the translocation program discussed in this section.

Figure 10. Decision Making Chart for Project Desert Tortoise Translocation





0 0.25 0.5 1
Miles

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SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC

Figure 11
Example of Interior Units and Temporary Fencing

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4.2 Solar Farm Site

4.2.1 Clearance Surveys during Non-Active Desert Tortoise Season (approximately June 1 to September 1 and November 1 to April 1) – No Translocation

If construction commences in a non-active season for desert tortoise (approximately June 1 to September 1 or November 1 to April 1), the following procedures would be followed. Prior to any other construction activities, the Solar Farm Site and Red Bluff Substation would be fenced into subsections with temporary desert tortoise exclusion fencing (example shown on Figure 10).

Clearance surveys would be conducted for each construction unit using belt transects at a minimum of 5-meter (16-foot) spacing, using tighter spacing if vegetation becomes denser. If a desert tortoise or active burrow is found within a unit, surveys will stop at that time and the unit would not be developed until the tortoise is translocated in the following active season. If two complete passes are completed in a unit (north-south and east-west) without a desert tortoise being found, construction may commence within that unit prior to the following active season. Construction will only be conducted in units without desert tortoise presence until the following active desert tortoise season when the tortoises from all remaining units will be translocated. Clearance surveys would be conducted for one unit near the southwestern boundary of the site that would allow the siting of an access and staging area from Kaiser Road, which would be fenced separately with permanent desert tortoise exclusion fencing (Figure 10).

If a desert tortoise is found above ground in the non-active season, it will be fitted with a transmitter and left where it was found so that it can more easily be re-located in the following active season.

4.2.2 Clearance Surveys II and Translocation during Active Desert Tortoise Season (approximately April 1 to June 1 and September 1 to November 1)

Clearance surveys would be conducted using belt transects at a minimum of 5-meter (15-foot) spacing, using tighter spacing if vegetation becomes denser. Clearance surveys will continue in each unit and at the Red Bluff Substation site until two consecutive passes are completed in a unit (north-south and east-west) without a desert tortoise being found, at which time construction may commence.

When a tortoise is found during clearance surveys, surveyors authorized to conduct these activities under the BO will:

1. Complete a detailed health assessment of the animal (if the animal shows clinical signs of disease, it will be transported to the Desert Tortoise Conservation Center (DTCC) as described in Section 4.2.2.1);
2. Place a transmitter on the individual (Section 4.2.2.2); and
3. Test individual the animal for URTD (ELISA test – Section 4.2.2.3);
4. Translocate the individual to the Recipient Site using disposition planning discussed in 4.2.2.4 below.

Data collected during clearance surveys will be collected on standardized data forms and digital data receivers and include detailed information on the exact location of collection within 3 meters and a description of the soils and vegetation in the immediate area.

4.2.2.1 Health Assessments

Detailed health assessments would be conducted following current USFWS guidance by individuals approved and permitted by the USFWS and CDFG to conduct such assessments. Detailed health assessments will be performed prior to translocation and repeated periodically during long-term monitoring as discussed in Section 5.

Any individual tortoise that exhibits clinical signs of URTD and/or shell disease will be transported to the DTCC near Las Vegas, Nevada for further evaluation. Tortoises will only be prepared for transport to the DTCC by individuals authorized for these activities under the Project BO. Preparation for transport would include hydrating the animal according to current USFWS guidelines and placing the tortoise in a new clean, ventilated protective container and placing it in the interior of the vehicle. Once the animal is ready for transport, the Lead Translocation Biologist will communicate with the DTCC that the animal is being transported to their facility and will remain in communication with the transport vehicle and DTCC until the animal has arrived at the DTCC and is removed from the vehicle by DTCC personnel. The tortoise will be transported to the DTCC within 48 hours of it being discovered with clinical signs of disease. The vehicle transporting the tortoise will be in good working order with working air conditioning and the driver will keep the box with the animal inside the vehicle at all times with temperatures remaining under 27 degrees Celsius (°C) or 80 degrees Fahrenheit (°F) until it is removed at the DTCC by their personnel. The driver will not stop the vehicle for longer than 10 minutes on the way to the DTCC. Personnel at the DTCC would coordinate with the Project's key personnel (Section 5) to update them on the status of the animal and any potential or moving it back out of captivity.

4.2.2.2 Transmittering

All tortoises found over 120mm mean carapace length (MCL) without obvious clinical signs of URTD or shell disease will be given a unique identifier provided by the USFWS and fitted with a transmitter following methods in Boarman et all (1998). These activities will conform to restrictions of time of day, temperature, and total time handled (*Desert Tortoise Field Manual*; USFWS 2009). Transmitters will remain on all individuals throughout the 5-year monitoring period and replaced as necessary (Section 5).

4.2.2.3 Disease Testing

All tortoises to be translocated to Project recipient sites will be tested for URTD using an enzyme-linked immunosorbent assay (ELISA) test and monitored in place pending test results. Blood will be drawn for disease testing between March 1 and October 15 to the extent possible. Blood drawing will only occur on the same day as transmittering if these activities combined will not exceed restrictions of time of day, temperature, and total time handled (*Desert Tortoise Field Manual*; USFWS 2009). If these restrictions could be exceeded, the blood drawing will occur on the following day.

Tortoises will remain in place until test results are received. All animals with positive test results will be transported to the DTCC as described above in Section 4.2.2.1. Animals with negative test results will be

translocated during the active season only according to the translocation and disposition plan below in Section 4.2.2.4.

4.2.2.4 Translocation and Disposition Plan

Translocation

All translocations would take place on the day of collection between 0700 and 1600 hours. Translocation will occur only when temperatures range from 18-30°C (65-85°F) and are not forecasted to exceed 32°C (90°F) within 3 hours of release and 35° (95°F) within one week of release. Forecasted daily low temperatures should not be cooler than 10°C (50°F) for one week post-release.

After the individual desert tortoise is given a unique identifier and transmitter it will be hydrated according to existing protocols. Individual desert tortoises will then be transported to their release sites (within the appropriate recipient site as described in Section 3) in clean, ventilated protective containers. If these containers are re-used, they will be disinfected according to existing protocols. All individuals will be released at unoccupied shelter sites such as unoccupied soil burrows, spaces within rock outcrops, caliche caves, or the shade of shrubs.

Disposition

Translocated tortoises will be placed within the appropriate recipient site where current estimated densities of less than 8 animals per square kilometer (20 per square mile) have been determined. Tortoises will be placed in a regular pattern throughout the Recipient Site so that tortoise densities will remain as consistent as possible. Tortoises found in close proximity to each other (i.e. within 50 meters) will be released in the same area of the Recipient Site in the same proximity. If all of the estimated 9-12 animals to be translocated are healthy, a maximum approximately 0.9-1.2 animals per square kilometer (2.3-3.1 animals per square mile) would be added to the Sunlight or Chuckwalla Recipient Site. Table 1 shows the disposition of juveniles and nests as well adults and sub-adults.

Table 1. Translocation of Desert Tortoises and Eggs

Size of tortoise	Translocation Strategy
Juveniles (<120mm MCL)	Health assessment as described, unique identifier, no transmitter, translocated as described.
Sub-adults (120-180mm MCL) and Adults (>180mm MCL)	Health assessment, unique identifier, transmittered, and translocated as described above. If individual is in burrow, every effort will be made to remove it using “tapping” or repeated visits to the burrow prior to using the less preferred method of carefully excavating the burrow.
Nests with potentially viable eggs	If a nest is suspected or found, the eggs will be carefully moved together and placed in a replacement nest created by an Authorized Biologist for the project at the appropriate recipient site . The replacement nest location(s) would be added to the long-term monitoring program.

4.3 Red Bluff Substation

Clearance surveys would be conducted for the Red Bluff Substation immediately following the construction of the perimeter fence using belt transects at 5-meter (16-foot) spacing:

- If these surveys are conducted within any season and *no* desert tortoise are found, construction can commence within the fence..
- If these surveys are conducted outside the active desert tortoise season and live desert tortoise or active burrow is found, construction will be halted until the next active desert tortoise season.
- If these surveys are conducted within the active desert tortoise season and a live desert tortoise or active burrow is found, the procedures listed in Section 4.2 above for health assessment, disease testing, transmittering, and translocation will be followed.

Any desert tortoise translocated from the Red Bluff Substation site would be placed in the Red Bluff Recipient Site as far as possible from know future activities of this project or other regional projects such as the Devers-Palos Verde II Transmission Line.

4.4 Linear Project Components

4.4.1 Gen-Tie Line

As a linear Project component, construction of the Gen-Tie Line can occur at any time of the year (Fraser 2010). Within 30 days prior to construction, a clearance survey will be conducted along each portion of the line and all active desert tortoise sign mapped and communicated to the Lead Biological Monitor and site-specific biological monitor(s). Biological monitors will be on-site during all construction activities to ensure that active burrows along the Gen-Tie Line will be avoided by project construction and facilities. If a desert tortoise is found on along the Gen-Tie Line, adverse effects would be avoided by allowing the tortoise to passively traverse the site while construction in the immediate area is halted. If the tortoise does not move out of harm’s way after approximately 20 minutes, an Authorized Biologist for the Project can actively move the animal out of harm’s way. The Authorized Biologist will be responsible for taking appropriate measures to ensure that any desert tortoise moved in this manner is not exposed to temperature extremes which could be harmful to the animal. Vehicles parked in desert tortoise habitat shall be inspected immediately prior to being moved. If a tortoise is found beneath a vehicle, the Authorized Biologist shall be contacted to move the animal from harm's way, or the vehicle shall not be moved until the desert tortoise leaves of its own accord.

4.4.2 Red Bluff related Components (Access Road, Distribution Line, and Telecommunications Site)

Construction of the Access Road, Distribution Line, and Telecommunications Site can occur at any time of the year (USFWS 2010) using the same methods described above in Section 4.4.1 for the Gen-Tie Line.

5.0 Monitoring and Reporting

5.1 Solar Farm Site and Gen-Tie Line

5.1.1 Monitoring During Construction and Translocation

All activities related to monitoring would be conducted by Approved and/or Authorized Biologists identified in the project BO.

During project construction, all desert tortoise fencing at the Solar Farm Site would be monitored daily and, if necessary, repaired or replaced. All site entrances and equipment moving outside the desert tortoise exclusion fence would be monitored by Approved and/or Authorized biological monitors. If any additional desert tortoises are located within the fenced area, the translocation process described in Section 4.2 would be followed.

All translocated tortoises would be monitored (i.e., re-located) at least once within 24 hours of their release, and a minimum of twice weekly for the first two weeks, prior to being placed in the long-term monitoring program (see Section 4.5 below). Standardized data sheets would be used to record individual tortoise locations, interactions, burrow locations, etc. during tracking.

5.1.2 Long-Term Monitoring

All tortoises translocated during the construction of the Proposed Action (Section 4.2) would be monitored for a period of 5 years.

Monitoring Frequency

All translocated desert tortoises and an equal number of resident individuals at the Recipient Site and Control Site (equal gender ratios) will be monitored on a long-term basis for a period of at least 5 years after the initial translocation date. Monitoring will occur a minimum of once a week between March 15 and May 31, twice a month from June 1 to November 15, and once a month between November 15 and March 15. If individual tortoises show extensive movements (i.e., greater than 800 meters or 0.5 miles) during the monitoring period, monitoring may be more frequent.

Transmitters will be changed as necessary throughout the monitoring period as necessary to maintain battery life. At the end of the 5-year monitoring period, coordination with USFWS and CDFG will determine whether transmitters should be removed and decommissioned.

Health Monitoring

Health assessments will be conducted for all translocated individuals annually prior to over-wintering (between October 15 and November 15) and subsequent to over-wintering (between March 1 and April 1); and a health assessment for each translocated individual will be conducted at the end of the 5-year monitoring period. Any health problems or mortalities observed will be reported to USFWS and CDFG verbally within 48 hours or via email within 5 business days and will include unique identifier, location, suspected health issue and/or cause of death (if known). Fresh carcasses will be brought for necropsy as directed by USFWS and CDFG. Animals showing clinical signs of disease will be transported to the DTCC following the guidelines provided in Section 4.2.2.1.

Vegetation Monitoring

Vegetation transects established in 2010 within the recipient sites will be surveyed annually between March 15 and April 30 to capture potential changes in habitat characteristics.

5.1.3 Reporting

Reporting During Translocation

All activities will be recorded on standardized data sheets and/or on digital data recorders. The Lead Biologist for the translocation effort will send e-mails prior to the 5th day of the month summarizing the translocation activities performed the previous month. These e-mails will be sent to the project biologists at BLM, USFWS, CDFG, and SCE (see Key Resources below). Annual project reports submitted to USFWS and CDFG by the BLM will contain detailed information on these translocations including all information recorded.

Reporting During Long-Term Monitoring

All activities will be recorded on standardized data sheets and/or on digital data recorders. Reporting to the respective federal and state agencies will be performed on a quarterly basis. The lead biologist for the project will send a brief report via e-mail to the appropriate contact at the BLM, USFWS, and CDFG. This report will include monitoring data for all desert tortoises in the monitoring program, including those from recipient and control populations.

Annual Reports

Annual reports will be completed each year by the Lead Translocation Biologist and submitted to the appropriate contact at the BLM on or before January 15 for the preceding calendar year so that the February 1 deadline for Annual Reports to USFWS can be met. Annual Reports will summarize all long-term monitoring activities conducted during the previous calendar year including health assessments, vegetation monitoring and any adaptive management employed.

Final Report

Following the completion of the fifth year of monitoring a Final Report will be completed that will assess the overall success of the monitoring program. The Final Report will summarize all long-term monitoring activities for five years of post-construction monitoring and will discuss any observed differences in individual or group behaviors in the translocated, recipient, and/or control populations; overall tracking of health assessments for each individual; an overview of the 5-years of vegetation monitoring; and any adaptive management employed throughout the long-term monitoring period and an assessment of the success of each adaptive management strategy (see section 5.3 below).

5.1.4 Key Resources

Project Proponent

Desert Sunlight Holdings, LLC (c/o First Solar, Inc.)
1111 Broadway St, 4th Floor
Oakland, CA 94607
(510) 625-7400
Contact: Wayne Hoffman
WHoffman@firstsolar.com

Lead Translocation Biologist
PMB 613, 1539 N. China Lake Boulevard
Ridgecrest, CA 93555
(760) 954-0645
Contact: Rachel Woodard
rachwoodard@earthlink.net

Biological Monitoring
Ironwood Consulting
20 Nevada St., Suite 300
Redlands, CA 92373
(909) 798-0330
Contact: Kathy Simon
Kathy@ironwoodconsultinginc.com

Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553-9046
(951) 697-5223
Contact: Kim Marsden
Kim_Marsden@BLM.gov

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Rd., 101
Carlsbad, CA 92011
760.431.9440 x 354 ph
Contact: Jody Fraser
jody_fraser@fws.gov

California Department of Fish and Game
Inland Deserts Region
3602 Inland Empire Blvd Suite C220
Ontario, CA 91764
(909) 484-0167
Contact: Magdalena Rodriguez
mcrodriguez@dfg.ca.gov

5.2 Red Bluff Substation and Related Components

All activities related to construction and long-term monitoring would be conducted by Approved and/or Authorized Biologists indentified in the Project BO.

5.2.1 Monitoring During Construction and Translocation

All activities would be consistent with the construction monitoring and translocation monitoring discussed above in Section 5.1.1 for the Solar Farm Site and Gen-Tie Line.

5.2.2 Long-Term Monitoring

All tortoises actively translocated from the Red Bluff Substation would be placed into a long-term monitoring program. All tortoises translocated during the construction of the Proposed Action (Section 4.2) would be monitored for a period of 5 years. Long-term monitoring activities would be consistent with the construction monitoring and translocation monitoring discussed above in Section 5.1.2 for the Solar Farm Site and Gen-Tie Line, with the exception of vegetation monitoring which will not be conducted for the red Bluff substation and related components.

5.2.3 Reporting

Reporting during translocation activities, long-term monitoring, annual reporting and final report will be consistent with the discussion above in Section 5.1.3 for the Solar Farm Site and Gen-Tie Line.

5.2.4 Key Resources

Project Proponent
Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770
(626) 302-1117
Contact: Paul Yamasaki
Paul.Yamasaki@sce.com

Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553-9046
(951) 697-5223
Contact: Kim Marsden
Kim_Marsden@BLM.gov

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Rd., 101
Carlsbad, CA 92011
760.431.9440 x 354 ph
Contact: Jody Fraser
jody_fraser@fws.gov

California Department of Fish and Game
Inland Deserts Region
3602 Inland Empire Blvd Suite C220
Ontario, CA 91764
(909) 484-0167
Contact: Magdalena Rodriguez
mcrodriguez@dfg.ca.gov

5.3 Adaptive Management

Key decisions were made to ensure that each phase of Project development was evaluated to attempt to reduce adverse effects to desert tortoise. These included the siting, design, construction, operation, and post-operation phases of the Proposed Action.

In additional to the specific project measures described below, Sunlight and SCE are committed to an adaptive management approach that supports flexible decision making and can be adjusted as the effects of the Proposed Action are better understood, including achievement of the purpose and goals of this plan (Section 1.0).

5.3.1 Solar Farm Site and Gen-Tie Line

Desert Sunlight Holdings evaluated a larger Project Study Area (PSA) when determining the siting of the Solar Farm Site. Areas of DWMA, CHU, and known or modeled higher desert tortoise density were avoided when siting the current Solar Farm Site.

Project design has incorporated features to reduce adverse effects to desert tortoise, including:

- Limiting vegetation disturbance and grading to the smallest area possible; and
- Working closely with Project biologists to improve desert tortoise exclusion features such as fencing and gates.

During construction and operations and maintenance (O&M) phases of the project, the following best management practices (BMPs) will be incorporated to reduce adverse effects to desert tortoise:

1. Speed limits on all unpaved areas of the Project will be a maximum of 15 miles per hour;
2. No dogs or firearms will be allowed on the project site during construction or O&M;
3. Construction and O&M activities will be limited to daylight hours to the extent possible;
4. Trash will always be contained within raptor and raven-proof receptacles and removed from the site frequently, including trash collected in vehicles in the field;
5. Water required for construction purposes will not be stored in open containers or structures and will be transported throughout the site in enclosed water trucks.
6. Water sources for the project (such as wells) will be checked periodically by biological monitors to ensure they are not creating open water sources through by leaking or consistently overfilling trucks.
7. All vehicles leaking fuel or other liquids will be immediately removed to the staging area and repaired – all vehicles will carry spill materials and all spills will be cleaned up promptly and disposed of correctly;
8. A formal Worker Environmental Awareness Program will be completed for every individual on all Project components. This Program will include formal classroom training. All individual completing training will sign a sign-in sheet and receive wallet cards and stickers to show they have completed this training. The training will include the following information and include photos of all resources:
    a. Discussion of the fragile desert ecosystem, vegetation and wildlife communities on the project site,

b. Discussion of desert tortoise ecology and known tortoise activity found on the Project components being constructed,
c. Legal drivers, permitting, and penalties related to avian and bat protection,
d. Project-specific desert tortoise protection measures, and
e. Worker responsibilities and biological monitor responsibilities, including the authority for biological monitors to halt project activities.

Post-operation activities will avoid disturbing areas of native vegetation adjacent to the project site. In addition, restoration and reclamation activities will take into account vegetation appropriate to support desert tortoise.

Results of long-term monitoring will be used to aid in making management decisions for the Project. Should adaptive management become necessary for any reason, the Lead Translocation Biologist for the Project would immediately inform the key personnel of the conditions causing management concern and possible avenues to correct these conditions. All key personnel for the Project would agree on the scope and direction of adaptive management actions prior to them being implemented except in the case of immediate threat to one or more desert tortoise. In cases of immediate threat, the Lead Translocation Biologist will direct activities to avoid or minimize the immediate threat and contact the key personnel within 3 days afterwards with information on the threat and actions taken to avoid or minimize the impacts, as well as actions recommended to avoid similar threats in the future.

5.3.2 Red Bluff Substation and Related Components

SCE evaluated two alternative sites for the proposed Red Bluff Substation and related components, and investigated larger areas for these facilities than they will cover in order to avoid sensitive resources such as active desert tortoise burrows. SCE's Project design, construction, and operations and maintenance (O&M) phases of the project, include the same project design features and BMPs discussed above to reduce adverse effects to desert tortoises.

Post-operation activities will avoid disturbing areas of native vegetation adjacent to the substation and related components. In addition, restoration and reclamation activities will take into account vegetation appropriate to support desert tortoise. Adaptive management actions would follow those discussed above in Section 5.3.1 for the Solar Farm Site and Gen-Tie Line.

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Habitat Compensation Plan

HABITAT COMPENSATION PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Purpose and Introduction

Under the Proposed Action, Desert Sunlight Holdings, LLC (Desert Sunlight Holdings or Applicant) proposes to construct and operate a 550-megawatt (MW) nominal capacity alternating current (AC) solar photovoltaic (PV) energy-generating project known as the Desert Sunlight Solar Farm (DSSF or Project). The PV generating facility (Solar Farm site), most of the corridor for the Proposed Action's 220-kilovolt (kV) generation interconnection transmission line (Gen-Tie Line), and the potential site being considered for a new substation would be located on lands administered by the U.S. Department of Interior (DOI), Bureau of Land Management (BLM), Palm Springs-South Coast Field Office. Remaining lands along the Gen-Tie Line are owned by the Metropolitan Water District (MWD).

Also under the Proposed Action, Southern California Edison (SCE) would develop a new 500- to 220 kV substation (referred to here as the Red Bluff substation), where the Project would interconnect with the Southern California Edison (SCE) regional transmission system Devers-Palo Verde I (DPV I) transmission line. Although the Red Bluff substation and associated SCE project components (access roads, distribution line, and telecommunications site) are included as part of the Proposed Action for planning and environmental considerations, they would be constructed, owned, and operated by SCE.

Mitigation Alternatives

The Applicant would compensate for the identified impacts to sensitive biological resources either by acquiring mitigation land or conservation easements in areas agreed to and approved by the relevant agencies, or by providing funding for land acquisition, endowment, restoration, and management actions under one of several programs, including the recently approved mitigation program created by California Senate Bill 34 (SB 34). The precise details of the mitigation will be established in the BLM Right of Way Grant, FWS Biological Opinion, and CDFG 2080.1 Consistency Determination.

(1) <u>SB 34</u>

SB 34 authorizes CDFG, in consultation with the BLM and FWS, to develop mitigation actions, including advance mitigation and interim mitigation strategies, to fully mitigate the impacts of the potential or actual take of state- listed threatened, endangered, or candidate species associated with the development of solar energy projects that are eligible for federal American Recovery and Reinvestment Act (ARRA) funding, and are proposed for siting in the California desert in the Desert Renewable Energy Conservation Plan (DRECP) planning area.

Specifically, SB 34 authorizes CDFG, in consultation with BLM and FWS, under an Interim Mitigation Strategy (IMS), to jointly approve the establishment and use of a mitigation account fund to be managed by the National Fish and Wildlife Foundation, for purposes of implementing project requirements for mitigation and conservation projects related to renewable energy development. Under the general account for renewable energy development, the Applicant would fund a project account. The amount of funding in the project account would be based on the specific project habitat compensation mitigation

ratios and measures developed in concert with the environmental analysis and permits issued by BLM, FWS, and CDFG as described above.

SB 34 establishes two implementation options for CDFG, BLM and FWS to accomplish the land acquisition requirements required to fully mitigate for the impacts of the Project. The participating agencies are in the process of entering into a necessary Memorandum of Understanding and adopting specific procedures to implement SB 34. Under SB 34, the two implementation options are:

a) An "advance mitigation" option in which the CDFG, BLM and FWS identify and purchase mitigations lands that act as a land bank, available to be credited to qualified projects, to meet all or a portion of their land acquisition obligations. This will be implemented through use of a revolving fund established in the legislation, with expenditures to be reimbursed from the participating projects 'mitigation fees
b) An "in-lieu" fee or mitigation account option, whereby the CDFG, BLM and FWS would use mitigation fees to implement the individual permit specific project mitigations to assist the project in completing land acquisition obligations.

(2) <u>REAT Biological Resource Compensation/Mitigation Cost Estimate Program</u>

A second mitigation alternative is the Governor's Office REAT, (Renewable Energy Action Team) Biological Resource Compensation/Mitigation Cost Estimate Program, a program very similar to the "In Lieu Fee" program above, but not governed by SB 34.

(3) <u>Self Mitigation</u>

The third alternative for Sunlight to mitigate its impacts is traditional self mitigation through direct acquisition of land or conservation easements. Under this alternative, Sunlight would acquire mitigation land or conservation easements in areas agreed to and approved by the relevant agencies and enable the transfer of the land or easements to NFWF or to an acceptable 3rd party land manager.

Project Habitat

Several Project habitat areas are considered sensitive habitat areas under the NECO plan: desert dry wash woodland, the Chuckwalla Desert Wildlife Management Area (DWMA), and Chuckwalla Critical Habitat Unit (CHU). Portions of several of the Gen-Tie Line alternatives lie within the Chuckwalla DWMA and portions of several Gen-Tie Line alternatives and the Red Bluff Substation Site A lie within both the Chuckwalla DWMA and CHU.

The habitat types found within the project site include Creosote bush scrub and desert dry wash woodland, and disturbed, ruderal, and non-vegetated areas. Portions of these habitats may support a variety of different sensitive species. These species include one federally- and state-listed threatened species, the desert tortoise, and one candidate species for listing under the federal Endangered Species Act (ESA), the Palm Springs round-tailed ground squirrel. The project site may provide habitat for birds including foraging habitat for the golden eagle, ferruginous hawk, Swainson's hawk, prairie falcon, and northern harrier, and foraging and nesting habitat for the short-eared owl, burrowing owl, loggerhead shrike, and LeConte's thrasher. Several bat species – including the pallid bat, California leaf-nosed bat, and western mastiff bat may forage within desert washes and may roost in the dry desert wash woodland within the Project area. American badger may also use habitat within the project area to burrow.

Mitigation Plan

In addition to avoidance and minimization measures included as part of the project design and siting process and best management practices proposed by the Applicant to avoid and minimize impacts, the Applicant will compensate for anticipated impacts to sensitive and listed species impacts through one of the alternative options described above. Impacts to DFG jurisdictional drainages regulated by California Fish and Game Code Sections 1600-1603 will be mitigated by the acquisition of sensitive species habitat that also includes jurisdictional drainages.

Some of these jurisdictional areas will be impacted by the project. These include desert dry wash woodland habitat and desert dry washes contained within Creosote bush scrub habitat. As part of the land acquisition process identified above, the Applicant would purchase credits or lands. Land or credits purchased would be for lands containing the habitat that is "like in- kind" with the habitats impacted by the project's development. Therefore, the compensation for the loss of jurisdictional drainages would be included within the compensation ratios established for the larger project site.

The Applicant would compensate for all potential habitat, species and CDFG jurisdictional impacts caused by the Project according to the BLM, FWS, and CDFG agreed upon compensation ratios to be agreed between the Applicant and these agencies. The ratios established in the Northern and Eastern Colorado Desert Coordinated Management Plan/Environmental Impact Statement (NECO Plan/EIS) are 1:1 for impacts within Creosote bush scrub, 3:1 for impacts within desert dry wash woodland, and 5:1 for impacts within the Chuckwalla CHU and Chuckwalla DWMA. N October 17th, 1995 California Department of Fish and Game Staff Report on Burrowing Owl Mitigation establishes a compensation ratio of 6.5 acres each for every individual borrowing owl on the project site, and requires creation or enhancement of two borrows for every active burrow on the project site.

Compensation provided by Sunlight would be utilized for land acquisition, appropriate endowment of acquired lands based on agreement with the relevant agencies, restoration, and management actions based on these mitigation ratios. The funding for each activity would be established in consultation with the FWS, BLM, and CDFG. An endowment funding strategy would be established for land acquired, so that adequate funds will be available to manage the compensation lands.

Avian & Bat Protection Plan

AVIAN AND BAT PROTECTION PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:
DESERT SUNLIGHT HOLDINGS, LLC
1111 Broadway St, 4th Floor
Oakland, CA 94607

Prepared by:
IRONWOOD CONSULTING INC.
20 Nevada Street, Suite 300
Redlands, CA 92373

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List of Acronyms

ABPP	Avian and Bat Protection Plan
AC	Alternating Current
ACEC	Area of Critical Environmental Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
CDCA	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CHU	Critical Habitat Unit
CPUC	California Public Utility Commission
DWMA	Desert Wildlife Management Area
I-10	Interstate 10
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
MW	Megawatt
NECO	Northern and Eastern Colorado Coordinated Management Plan
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
PV	Photovoltaic
ROW	Right of Way
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service

A. Introduction

Desert Sunlight Holdings, LLC (Sunlight or Applicant), a wholly owned subsidiary of First Solar Development, Inc. (First Solar), proposes to develop a 550-megawatt (MW) alternating current (AC) solar photovoltaic (PV) energy-generating project known as the Desert Sunlight Solar Farm Project (Project). The Project consists of three main components: a PV- generating facility (Solar Farm), a 220-kilovolt (kV) generation interconnection (Gen-Tie Line) transmission line, and a 500- to 220- (500/220) kilovolt (kV) substation (referred to herein as the Red Bluff Substation). The Solar Farm and most of the route for the Project's Gen-Tie Line would be located on lands administered by the U.S. Department of Interior, Bureau of Land Management, Palm Springs-South Coast Field Office (BLM). The Red Bluff Substation, where the project would interconnect with the Southern California Edison (SCE) regional transmission system, is included as part of the Project for planning and environmental considerations, but it would be constructed and operated by SCE.

A.1 Purpose of the Avian and Bat Protection Plan

The Avian and Bat Protection Plan (ABPP) is intended to reduce the potential risks for avian and bat mortality due to actions performed by Sunlight in the construction and operation of the Solar Farm and Gen-Tie Line; and by SCE in the construction and operation of their project components (Red Bluff Substation and associated access road, distribution line and telecommunications site). The objectives of this plan are as follows:

- Identify baseline conditions for raptor and bat species currently present at the Project components.
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project components.
- Specify steps that will be taken to avoid, minimize and mitigate any potential adverse effects on these species.
- Detail long-term monitoring and reporting goals for the Project.

This plan is modeled on the recommendations of the U.S. Fish and Wildlife Service (USFWS or Service) in its *Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities*. Although this document is applicable to wind energy, rather than solar energy, projects, USFWS recommends that this template be utilized, to the extent appropriate, for solar projects. This plan also follows the Avian and Bat Protection Plan Guidelines developed jointly by Edison Electric Institute's Avian Power Line Interaction Committee (1994, 2006) and the USFWS (2000, 2003, 2010). Additionally, the ABPP is consistent with applicable federal and state regulations established by the BLM and other regulatory agencies such as the *Northern and Eastern Colorado Desert Coordinated Management Plan* (NECO Plan, BLM and CDFG 2002).

A.2 Legal Drivers

The Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA) provide the primary legal bases for this ABPP. The Migratory Bird Treaty Act (16 U.S.C. §§ 703, *et seq*.) prohibits the taking, killing, possession, transportation and importation of migratory birds, their eggs, parts, and nests, except when authorized by the USFWS. Because MBTA does not provide a specific mechanism to authorize "incidental" take, proponents often work proactively with the Service to avoid and minimize the potential take of species.

The Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d) protects bald and golden eagles. Through a new regulation (50 CFR § 22.26), the Service can authorize take of bald and golden eagles when the take is associated with, but not the purpose of, an otherwise lawful activity, and cannot practicably be avoided. Thus, these new regulations provide a mechanism where take of eagles can be legally authorized.

Under the National Environmental Policy Act (42 USC §§ 4321-4370h), federal agencies such as BLM are required to prepare a detailed environmental impact statement (EIS) for any major federal action significantly affecting the quality of the human environment. An EIS must include an examination of the environmental impacts of a proposed project, a reasonable range of alternatives for a project and other related matters. BLM authorization of a right-of-way (ROW) grant for the Project would require a land use plan amendment (PA) to the California Desert Conservation Area (CDCA) Plan (BLM 1980), as amended. In addition, DOE will consider Sunlight's application for a loan guarantee under Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, Public Law (PL) 111-5 (the "Recovery Act").

The California Public Utilities Commission (CPUC) has discretionary authority to issue the Permit to Construct (PTC) for SCE's proposed Red Bluff Substation, a portion of the Proposed Project. As allowed by the California Environmental Quality Act (CEQA) Guidelines Section 15221, the CPUC intends to use this EIS to provide the environmental review required for its approval process. The CPUC and BLM have signed a Memorandum of Understanding (MOU) that defines the relationship of the two agencies, and identifies CPUC as a cooperating agency with the BLM.

The Applicant anticipates that construction and/or operation of the Project will not cause unauthorized "take" or prohibited "disturbance" of any species protected by the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. However, it is voluntarily proposing this Avian and Bat Protection Plan to proactively implement measures to avoid, minimize and mitigate for any potential adverse effects of the Project on such species. In addition, by utilizing the adaptive management approach in this plan, it is committing to evaluate data during the operation phase of the Project and make further adjustments to the plan, if necessary and appropriate.

B. Corporate Policy

Sunlight and SCE have a commitment to work cooperatively towards the protection of migratory birds and bats. These entities are committed to consistent coordination with agency personnel at BLM, USFWS, and the California Department of Fish and Game (CDFG) so that all parties and agencies understand the scope of the Project and can discuss project facilities and features that may require additional attention for avian species. To that end, Sunlight, SCE, BLM, USFWS, and CDFG have been conducting weekly telephone meetings since March 2010 to discuss ongoing Project components and any new information or changes that arise throughout the week.

C. Adaptive Management and Habitat Compensation

C.1 Adaptive Management Process

The Applicant has incorporated siting criteria, design features and best management practices into the Project that will provide significant avoidance and minimization measures into the Project to reduce the potential for adverse effects on protected avian and bat species. Specifically, decisions were made to ensure that each phase of project development was evaluated with an eye to reducing potential adverse effects to migratory birds and bats during the siting, design, construction, operation, and post-operation phases of the Proposed Project.

Moreover, in additional to the specific Project measures described below, Sunlight and SCE are committed to utilizing an adaptive management approach in the future during operation that supports flexible decision making and can be adjusted as the actual monitoring results are received. In so doing, the protections in this plan are expected to have continued effectiveness throughout the life of the Project.

Solar Farm and Gen-Tie Line

Sunlight evaluated a larger Project Study Area (PSA) when determining the siting of the Project. Areas of desert wash woodland were avoided in this siting to the extent possible, in part to avoid the potential roosting, nesting, and foraging areas for birds and bats within areas of greater vegetation structure.

The Applicant also has incorporated design features into the Project to reduce potential adverse effects to migratory birds and bats, including:

- Limiting vegetation disturbance and grading to the smallest area practicable; and
- Placing electrical lines underground or transmission lines on existing structures to the extent practical to avoid collisions with lines.

The Applicant further intends to utilize the following best management practices (BMPs) during the construction phase and operations and maintenance (O&M) phase of the project to reduce potential adverse effects to migratory birds and bats:

1. The Gen-Tie Line and all electrical components will be installed in accordance with the APLIC *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006) and maintained in accordance with APLIC *Mitigating Bird Collisions with power lines: The State of the Art in 1994* (Avian Power Line Interaction Committee 2004) to reduce the likelihood of electrocutions of raptors and other large birds.
2. Low and medium voltage connecting power lines will be placed underground to the extent practical to avoid collisions with lines.
3. Communication towers and permanent meteorological towers should not be guyed. If guy wires are necessary, bird flight diverters or high visibility marking devices would be used.

4. Facility lighting will be installed and maintained to prevent upward and side casting of light towards wildlife habitat and the use of motion sensors and switches to keep lights off when not required will be used. The use of high intensity lighting, steady-burning, or bright lights such as sodium vapor or spotlights will be avoided or minimized.
5. Speed limits on all unpaved areas of the Project will be a maximum of 15 miles per hour.
6. No dogs or firearms will be allowed on the project site during construction or O&M.
7. Construction and O&M activities will be limited to daylight hours to the extent possible.
8. Trash will always be contained within raptor and raven-proof receptacles and removed from the site frequently, including trash collected in vehicles in the field.
9. Water required for construction purposes will not be stored in open containers or structures and will be transported throughout the site in enclosed water trucks.
10. Water sources for the project (such as wells) will be checked periodically by biological monitors to ensure they are not creating open water sources through by leaking or consistently overfilling trucks.
11. All vehicles leaking fuel or other liquids will be immediately removed to the staging area and repaired – all vehicles will carry spill materials and all spills will be cleaned up promptly and disposed of correctly.
12. A formal Worker Environmental Awareness Program will be completed for every individual on all Project components. This Program will include formal classroom training. All individual completing training will sign a sign-in sheet and receive wallet cards and stickers to show they have completed this training. The training will include the following information and include photographs of all resources:
    a. Discussion of the fragile desert ecosystem, vegetation and wildlife communities on the Project site,
    b. Discussion of sensitive avian and bat species found on the Project components being constructed,
    c. Regulations and , permitting compliance, for avian and bat protection,
    d. Project-specific avian and bat protection measures such as nest avoidance, and
    e. Worker responsibilities and biological monitoring responsibilities, including the authority for biological monitors to halt project activities.

Post-operation activities will avoid disturbing areas of desert wash woodland adjacent to the Project site. In addition, restoration and reclamation activities will take into account vegetation appropriate to support bird species that were identified on the Project prior to construction.

Red Bluff Substation and Related Components

SCE evaluated two alternative sites for the proposed Red Bluff Substation and related components, and surveyed areas beyond the footprint of these facilities in order to avoid sensitive resources such as important avian and bat roosting, nesting, and foraging areas.

SCE's Project design, construction, and operations and maintenance (O&M) phases of the Project include the same project design features and BMPs discussed above to reduce potential adverse effects to migratory birds and bats.

Post-operation activities will avoid disturbing areas of desert wash woodland adjacent to the substation and related components. In addition, restoration and reclamation activities will take into account vegetation appropriate to support bird species that were identified on these facilities prior to construction.

Project Goals

Sunlight's fundamental objectives for the Project are to construct, operate and eventually decommission a 550-MW solar photovoltaic (PV) energy facility and associated interconnection transmission infrastructure, to facilitate the construction and operation by SCE of a necessary substation, to provide renewable electric power for California's existing transmission grid to help meet Federal and State renewable energy supply and GHG reduction requirements, to provide an environmentally responsible commercial solar energy project, and with its related renewable energy supply a significant portion of the needs of the State's investor-owned utilities.

Future Management Actions

The Applicant is committed to utilizing an adaptive management approach for future measures to protect covered avian and bat species. This adaptive management approach will include the following six key concepts described by Williams (2009) that are endorsed by the Service in its Interim Guidance for wind energy facilities:

1. Problem Assessment
2. Design
3. Implementation
4. Monitoring
5. Evaluation
6. Adjustment

The Problem Assessment, Design, and Implementation portions of the adaptive management plan for the Project are discussed above, with Monitoring, Evaluation, and Adjustment discussed later in this document in Sections F and G.

The Applicant will implement appropriate and reasonable future management actions if studies show that bird populations in the area surrounding the Project site are reduced or reducing for reason that are demonstrated to be attributable to the Project. The potential actions will be based on monitoring data, including baseline bird point count surveys that have been conducted at random locations on the site (stratified by vegetation community), and at control sites on surrounding BLM lands that are not likely to be disturbed during the lifespan of the Proposed Project.

C.2 Habitat Compensation

Compensation for Western burrowing owl impacts will be determined by reference to the DFG Staff Report on Burrowing Owl Mitigation (DFG, 1995). It is anticipated that due to the presence of eight burrowing owls and active burrows across the DSSF and SCE Red Bluff Substation and Components, mitigation for impacts will be required.

D. Site Suitability Assessment

D.1 Pre-Site Survey Assessment

Solar Farm and Gen-Tie Line

The Solar Farm Site alternatives and Gen-Tie Line route alternatives are not within an Important Bird Area, a Western Hemisphere Shorebird Reserve Network (WHSRN), or an area designated by the Convention on Wetlands of International Importance (Ramsar Convention). The Solar Farm Site alternatives are not within an area designated as a critical habitat unit (CHU), a Desert Wildlife Management Area (DWMA) or other Area of Critical Environmental Concern (ACEC). However, three of the four Gen-Tie Line alternatives are partially located within the Chuckwalla DWMA and all four are partially located within the Chuckwalla CHU. These DWMA and CHU areas are designated Desert Tortoise management areas.

Red Bluff Substation and Related Components

The Red Bluff Substation alternatives and related components are not within an Important Bird Area, WHSRN area, or Ramsar Convention area. The Red Bluff Substation alternatives and related components are within an area designated as Chuckwalla CHU and DWMA.

For the Solar Farm Site, Gen-Tie Line route, Red Bluff Substation and its related components, initial document assessments identified the potential presence of 10 sensitive avian species (Table 1) and 11 sensitive bat species (Table 2) within the Project areas. These pre-survey assessments were then followed up on by the surveys described in the succeeding sections of this plan.

The Solar Farm Site and Gen-Tie Line route would be constructed and operated in a manner consistent with the protection of migratory avian and bat species including avoidance of impacts, minimization of impacts, and mitigation for those impacts that are not able to be avoided.

This plan does not cover the common raven (*Corvus corax*) since this species is discussed separately and specially covered in the *Common Raven Management Plan for Desert Sunlight Solar Farm* (Ironwood Consulting 2010).

Table 1. Sensitive Avian Species with the Potential to Inhabit the Proposed Project Area

Scientific Name **Common Name**	**Status**
Passerine Species	
Chaetura vauxi Vaux's swift (breeding)	Federal: none State: SSC NECO: covered
Progne subis purple martin	Federal: none State: SSC NECO: covered
Toxostoma lecontei LeConte's thrasher	Federal: none State: SSC NECO: covered
Raptors	
Aquila chrysaetos golden eagle	Federal: not listed; protected by BGEPA State: SSC; fully protected NECO: covered
Athene cunicularia burrowing owl	Federal: none State: SSC NECO: covered
Buteo regalis ferruginous hawk (nesting)	Federal: none State: none NECO: covered
Buteo swainsonii Swainson's hawk (nesting)	Federal: none State: threatened NECO: covered
Circus cyaneus northern harrier	Federal: none State: SSC NECO: covered
Falco mexicanus prairie falcon (nesting)	Federal: none State: SSC NECO: covered
Lanius ludovicianus loggerhead shrike	Federal: none State: SSC NECO: covered

Table 2. Sensitive Bat Species with the Potential to Inhabit the Proposed Project Area

Scientific Name **Common Name**	**Status**
Antrozous pallidus pallid bat	Federal: none State: SSC NECO: covered
Eptesicus fuscus pallidus Big brown bat	Federal: none State: SSC NECO: covered
Eumops perotis californicus western mastiff bat	Federal: none State: SSC NECO: covered
Eumops perotis Pocketed free-tailed bat	Federal: none State: SSC NECO: covered
Lasiurus cinereus Hoary bat	Federal: none State: SSC NECO: covered
Lasiurus xanthinus Southern yellow bat	Federal: none State: SSC NECO: covered
Macrotus californicus California leaf-nosed bat	Federal: none State: SSC NECO: covered
Myotis californicus California myotis	Federal: none State: SSC NECO: covered
Parastrellus hesperus Western pipistrelle	Federal: none State: SSC NECO: covered
Plecotus townsendii Townsend's big-eared bat	Federal: none State: SSC NECO: covered
Tadarida brasiliensis Mexican free-tailed bat	Federal: none State: SSC NECO: covered

D.2 Bird Use Studies and Risk Assessment

D.2.1 Methods

Four separate types of surveys were conducted that contribute to the knowledge of avian species at the Solar Farm Site and Gen-Tie Line: point counts, golden eagle and raptor surveys, nest surveys, and incidental sightings. At the Red Bluff Substation and its related components, golden eagle and raptor surveys, nest surveys, and incidental sightings were conducted.

Point Counts

Point count surveys for all birds were conducted in April and May 2010 by an experienced desert avian biologist at a total of twelve locations, nine on the Solar Farm Site and three at control sites, using point count methodology as described in *Monitoring Bird Populations by Point Counts* (Ralph et al. 1995). The surveys identify bird species and their relative numbers at each fixed study point location (point counts). Point count methodology is well accepted and widely used in bird studies. Each point is visited for a fixed amount of time and all birds detected within an often fixed radius are recorded. Research suggests that the amount of time spent at a sampling location increases standard error, especially at times greater than 10 minutes (Smith et al. 1997). Each count was limited to 10 minutes to minimize standard error introduced by double counting, flyovers, etc. Additionally, incidental flyovers were recorded separately from typical observations and each count was divided into three survey periods consisting of the first three minutes, minutes 3 to 5, and minutes 5 to 10. This time division was done to facilitate data analysis used to differentiate birds most likely to be permanent or temporary occupants of the study point from transients in the area surveyed.

Golden Eagle Surveys

The Applicant participated in a joint program to conduct aerial surveys for golden eagles in and around Blythe and Desert Center, California. These surveys were conducted in two phases, with Phase 1 occurring on April 2-3, 2010 and Phase 2 occurring on May 14, 2010. These surveys were conducted in accordance with applicable USFWS guidance and were designed to record and report occupancy (Phase I) and productivity (Phase II) of golden eagle nests within a ten-mile radius of four solar projects, including Sunlight's Solar Farm Site.

Although the primary purpose of the surveys was to conduct the first of two aerial surveys for golden eagles [*Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations* (USFWS 2010)], the surveys also recorded data for other raptor species. The data and results from these surveys are found in the *Final Report, Golden Eagle Surveys Surrounding Four Proposed Energy Developments in the Mojave Desert Region, California* (Wildlife Research Institute 2010).

Nest Surveys

Surveys of the alternatives for all three main components of the Project site were conducted on April 23-24 and May 20, 2010 in accordance with draft State agency protocols for identifying

raptor nests [California Energy Commission (CEC) and CDFG 2010]. The results from these nest surveys are incorporated in this document.

Incidental Sightings

During all Project biological surveys, all bird species were identified and/or tallied on standardized data forms (Ironwood Consulting 2010).

D.2.2 Results

Results are compiled into passerines and raptors with a special discussion for sensitive species as listed on Table 1. Sensitive species detections for all Project components are also shown on Figure 1.

Passerines

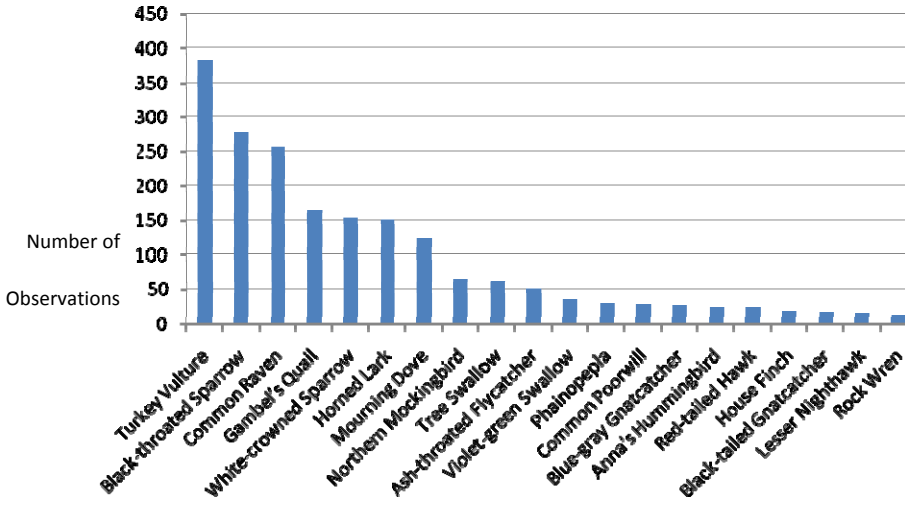
All of these passerine (songbird) species were found in habitats that are present both on the Solar Farm Site and Gen-Tie Line, and on the Red Bluff Substation and related components, and therefore any of these species may inhabit each of these Project components.

Thirty-eight passerine species are known to occur at the Project components (Table 3). The species indicated in bold type are sensitive species discussed separately below. The chart below Table 3 shows those species most commonly found on the Project components.

Table 3. Passerine Species Recorded at the Solar Farm and Gen-Tie Line

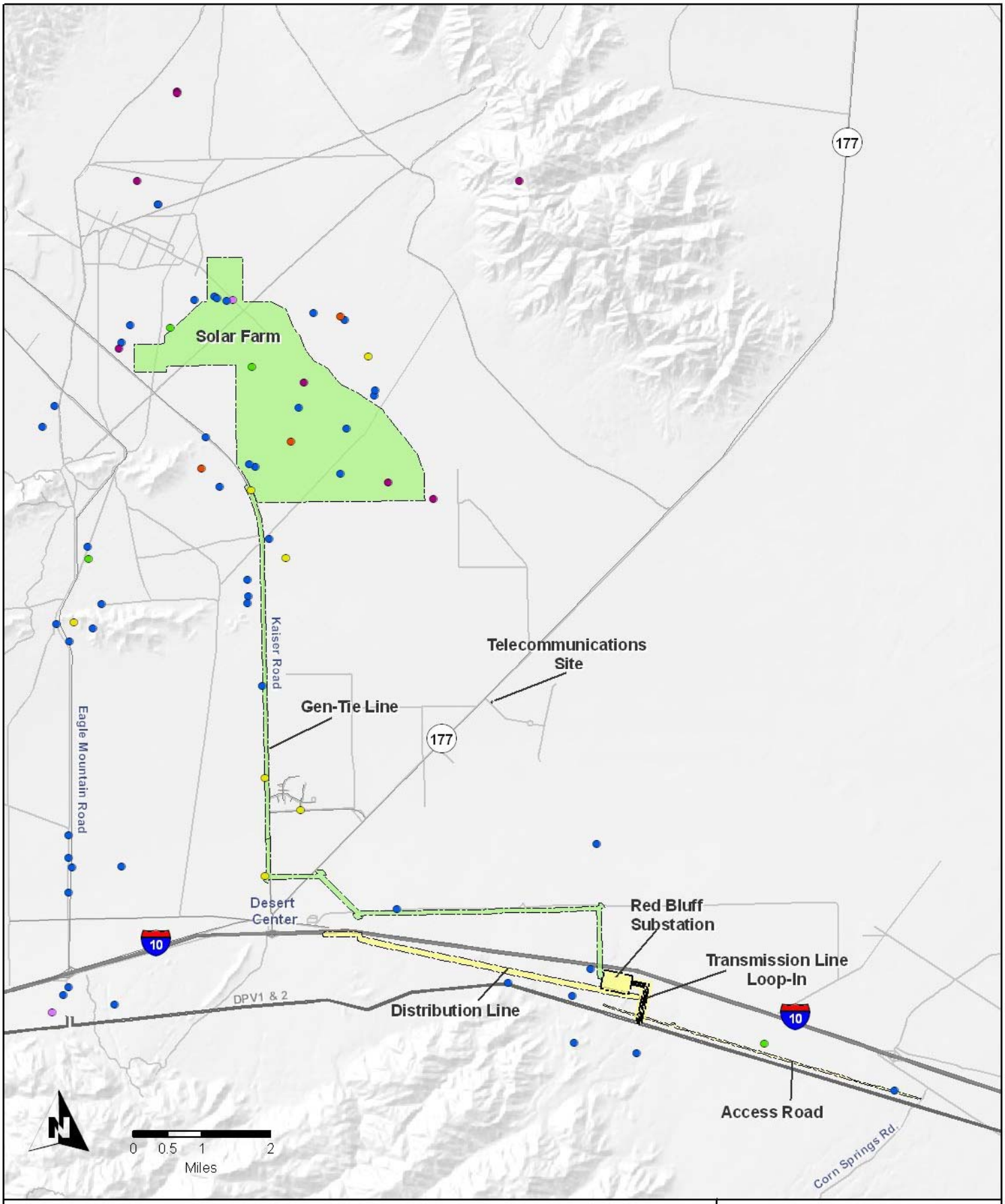
Common Name	***Scientific name***
American robin	*Turdus migratorius*
Anna's hummingbird	*Calypte anna*
ash-throated flycatcher	*Myiarchus cinerascens*
barn swallow	*Hirundo rustica*
black-crowned night heron	*Nycticorax nycticorax*
black-tailed gnatcatcher	*Polioptila melanura*
black-throated sparrow	*Amphispiza bilineata*
blue-gray gnatcatcher	*Polioptila caerulea*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Bullock's oriole	*Icterus bullockii*
common poorwill	*Phalaenoptilus nuttallii*
Costa's hummingbird	*Calypte costae*
Gambel's quail	*Callipepla gambelii*
greater roadrunner	*Geococcyx californianus*
great-tailed grackle	*Quiscalus mexicanus*
horned lark	*Eremophila alpestris*
house finch	*Carpodacus mexicanus*
house wren	*Troglodytes aedon*
killdeer	*Charadrius vociferous*
LeConte's thrasher	***Toxostoma Lecontei***
lesser goldfinch	*Carduelis psaltria*

Common Name	*Scientific name*
lesser nighthawk	*Chordeiles minor*
mourning dove	*Zenaida macroura*
northern flicker	*Colaptes auratus*
northern mockingbird	*Mimus polyglottos*
phainopepla	*Phainopepla nitens*
rock wren	*Salpinctes obsoletus*
northern rough-winged swallow	*Stelgidopteryx serripennis*
Say's phoebe	*Sayonaris nigricans*
tree swallow	*Tachycineta bicolor*
verdin	*Auriparus flaviceps*
violet-green swallow	*Tachycineta bicolor*
western kingbird	*Tyraannus verticalis*
western meadowlark	*Sturnella neglecta*
white-crowned sparrow	*Zonotrichia leucophrys*
white-throated swift	*Aeronautes saxatalis*
yellow-rumped warbler	*Dendroica coronata*



Most Common Incidental Observations of Bird Species

(Bird species with ten or more observations shown)



Project Area
Sunlight Component
SCE Component

Ferruginous Hawk
LeConte's Thrasher
Loggerhead Shrike
Northern Harrier
Prairie Falcon
Swainson's Hawk

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC.

Figure 1
Sensitive Avian Species

Prepared by Ironwood Consulting, Inc. - August 3, 2010

Le Conte's thrasher (*Toxostoma lecontei*) is a State Species of Special Concern and year-round desert resident. These species inhabit various desert scrub and wash habitats and typically breeds in desert areas that support cactus and large thorny shrubs such as *Lycium* spp. This species is distributed from the Mojave Desert east into southern Utah and northern Arizona, and south into northern Mexico (BLM 2002). Nine individual observations of this species were recorded during the surveys (Figure 1). Two were located on the Solar Farm Site with no records of Le Conte's thrasher located along the Gen-Tie Line, Red Bluff Substation or its related components.

Raptors

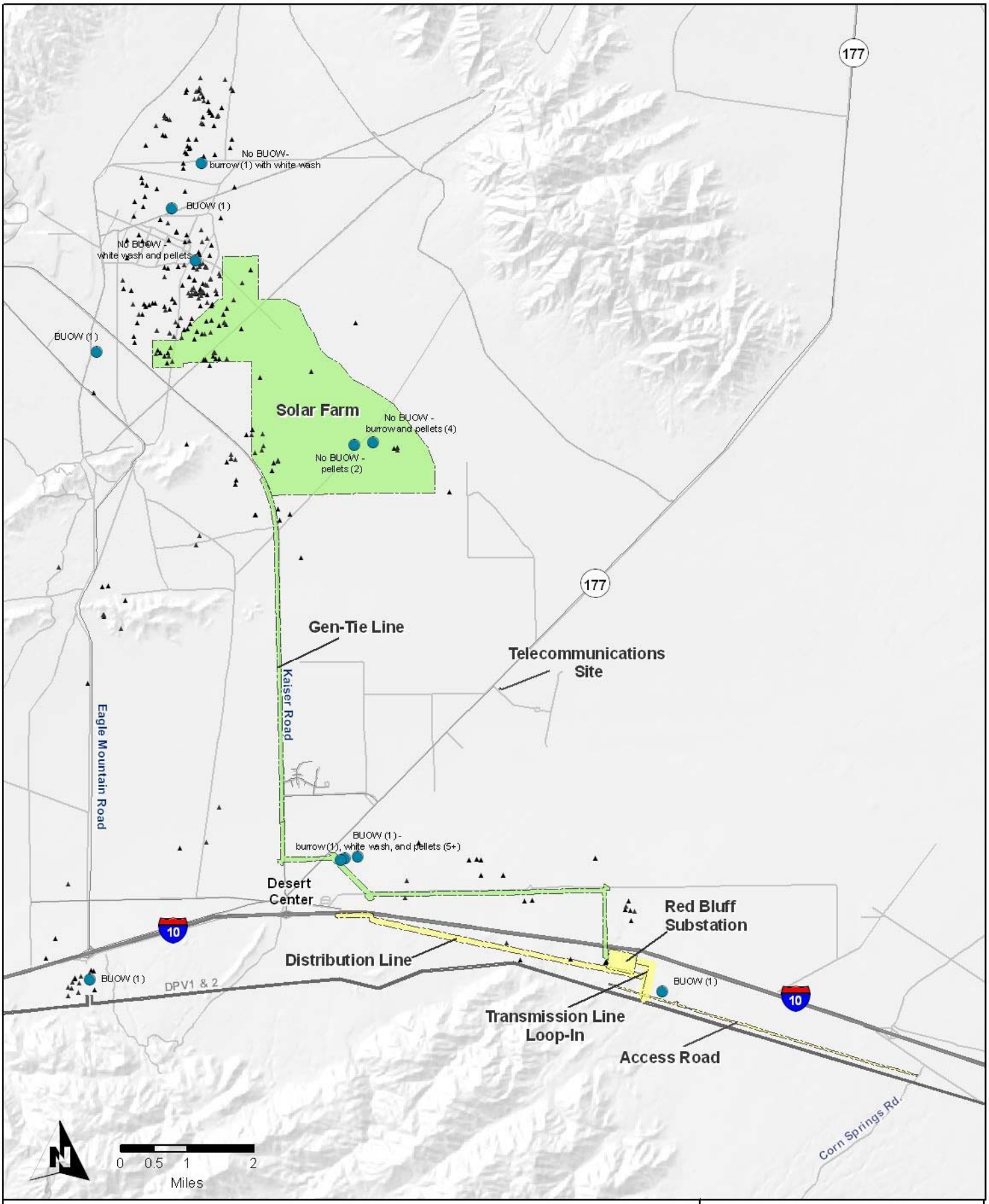
Thirteen raptor species (excluding common raven) are known to occur at the Solar Farm Site and along the Gen-Tie Line (Table 4). The species in bold type are sensitive species as shown on Table 1 with locations shown on Figure 1 for all species except burrowing owl, shown on Figure 2. Because the Solar Farm Site and Gen-Tie Line are located in the valley floor of the Chuckwalla Valley, most raptor species were observed as flyovers of the components as indicated on Table 4.

Table 4. Raptor Species Recorded at the Solar Farm and Gen-Tie Line

Common Name	*Scientific Name*	Approximate Number of Individuals	
		Solar Farm and Gen-Tie Line	Red Bluff Substation and Related Components
American kestrel	*Falco sparverius*	P	P
burrowing owl	***Athene cunicularia***	**1***	**0***
ferruginous hawk	***Buteo regalis***	**1 flyover**	**0**
golden eagle	***Aquila chrysaetos***	**0**	**0**
loggerhead shrike	***Lanius ludovicianus***	**23**	**6**
merlin	*Falco columbarius*	P	P
northern harrier	***Circus cyaneus***	**2 flyovers**	**0**
prairie falcon	***Falco mexicanus***	**4 flyovers**	**0**
red-tailed hawk	*Buteo jamaicensis*	P	P
sharp-shinned hawk	*Accipiter striatus*	P	P
Swainson's hawk	***Buteo swainsonii***	**18 flyovers**	**0**
turkey vulture	*Cathartes aura*	P	P

P = present at Project component (non-sensitive species were not recorded by location)
*see burrowing owl discussion for more information

Burrowing owl (*Athene cunicularia*) is a State Species of Special Concern and addressed in the NECO Plan/EIS. Burrowing owls inhabits open dry grasslands and desert scrubs, and typically nest in mammal burrows although they may use man-made structures including culverts and debris piles. In the Project region, they are resident species and exhibit strong nest site fidelity. Burrowing owls eat insects, small mammals and reptiles.



Project Area

Sunlight Component

SCE Component

Burrowing Owl Sign

Suitable Burrow
(no sign)

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC.

Figure 2
Project Components
Burrowing Owl Sign

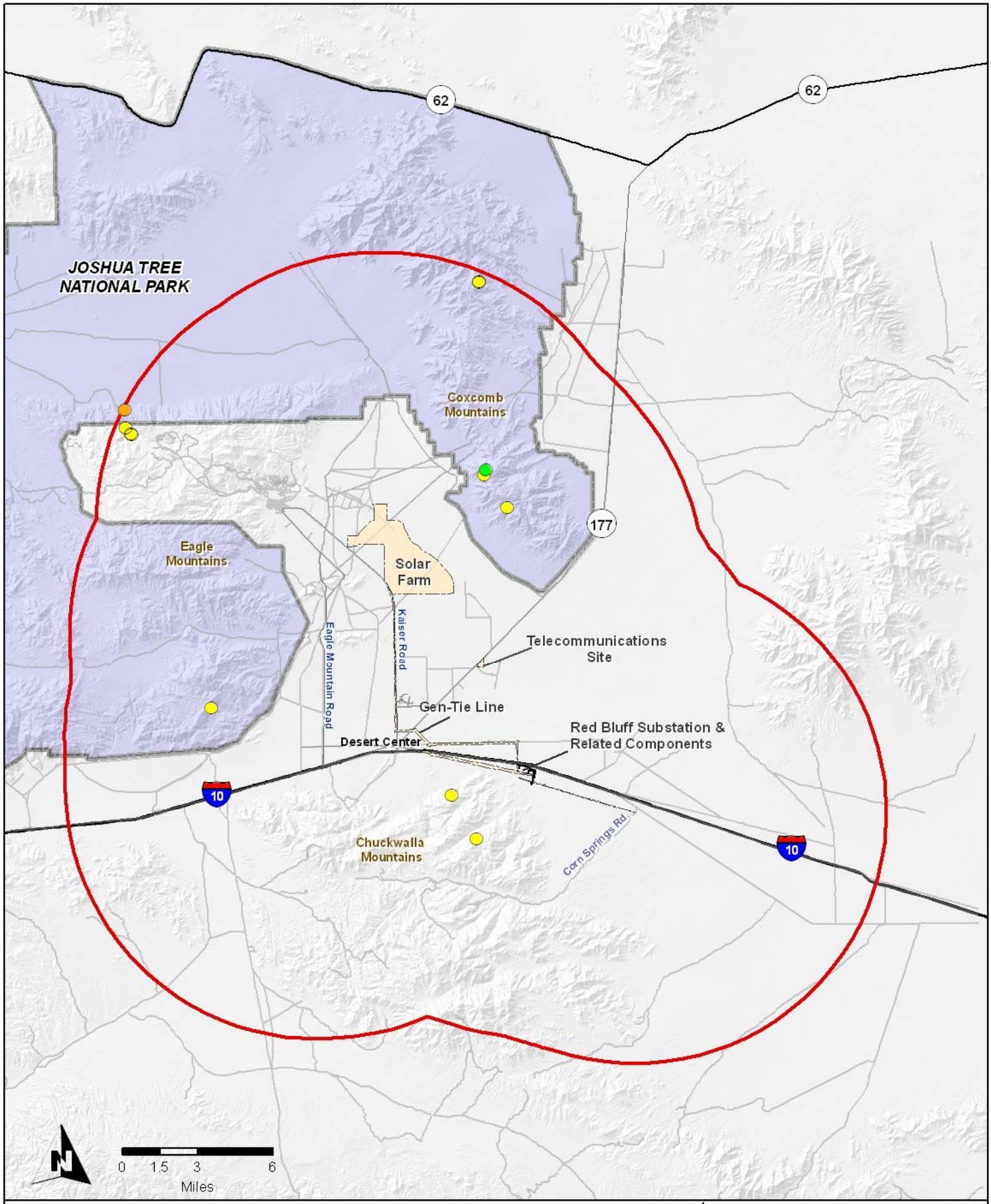
Prepared by Ironwood Consulting, Inc. - August 3, 2010

The Phase 1 assessment for burrowing owls concluded that suitable habitat for burrowing owls existed throughout the study area. During the Phase 2 burrow surveys, numerous suitable burrows were recorded on the Solar Farm Site; however, only two records of burrowing owl sign (i.e., burrow, white wash and pellets) were observed with no individuals present. One group of observations, which included one individual owl and two burrows with white wash and pellets, occurred approximately 1,500 feet east of the intersection of Gen-Tie A1 and highway 177. The two other individual owl sightings occurred approximately one mile north and 0.8 mile west of the Solar Farm alternatives. Owls observed were all individual adults and observations occurred during both spring and fall seasons. It is expected that the owls reside within the area and there is a high potential for pairs to occur. Phase 3 surveys will be performed prior to ground disturbing activities to determine the exact number of resident owls potentially affected by construction immediately prior to these activities.

Ferruginous hawk (*Buteo regalis*) is a State Species of Special Concern and addressed in the NECO Plan/EIS. This species typically nests in northern latitudes of North America and overwinters in southern regions. Migrant ferruginous hawks are a regular but uncommon during spring and fall in the California desert regions. Within the NECO planning area, ferruginous hawks have been observed overwintering in low numbers in the lower Colorado River Valley, Yuma Basin, West Mesa, and the agricultural areas of Imperial Valley (BLM 2002). Two sightings of migrating ferruginous hawks were recorded, one within the Solar Farm Site and one east of the Red Bluff Substation. Both observations occurred in March 2010 and consisted of flyovers. The golden eagle surveys performed by helicopter in spring 2010 did not observe presence of this species. Based on data reviewed and observations, it is not expected that ferruginous hawks utilize the study area for nesting or overwintering. This species may forage within the study area during migration.

Golden eagle (*Aquila chrysaetos*) is a State Species of Special Concern and Fully Protected Species, and it is addressed in the NECO Plan/EIS. Golden eagles and their primary prey species, jackrabbits, have declined in the California desert regions due to prolonged drought conditions that have persisted since 1998 (WRI 2010). Breeding in Southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November.

No golden eagle nests were found on or adjacent to the Solar Farm Site or other Project components. Phase I occupancy surveys conducted in April 2010 detected 13 potentially-active nests within a ten mile radius of the Solar Farm Site and Red Bluff Substation, as shown on Figure 3. Of these, nests were within Joshua Tree National Park (JTNP), with an additional three in steep hills west and above Eagle Mountain mine, nearly within the JTNP boundaries. These are located either on BLM lands or lands owned by Eagle Mountain Mine and the Kaiser Corporation. The remaining three potential nests were located south of Interstate 10 in the Chuckwalla Mountains, approximately 3 miles west and southwest from the proposed Red Bluff Substation. One observation of a golden eagle flyover of the Chuckwalla Valley was recorded during these surveys (WRI 2010).



Project

10-Mile Project Buffer

Golden Eagle Nest, Active

Golden Eagle Nest, Inactive

Prarie Falcon Nest,
Active and Reproductive

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC.

Figure 3
Results of Golden Eagle
Phase 1 and 2 Surveys

Prepared by Ironwood Consulting, Inc. - August 3, 2010

Phase II productivity surveys determined that 12 of these 13 nests were inactive, with one active but non-reproductive nest located in the Joshua Tree Wilderness Area approximately 5 miles from the Solar Farm Site boundary (Figure 3). No reproductive nests were located within the 10-mile radius of the Solar Farm Site and Red Bluff Substation (WRI 2010).

During these surveys, there were additional raptor species observed within 10 miles of the Solar Farm Site: turkey vultures, common ravens, prairie falcons, and Swainson's hawks (WRI 2010).

Loggerhead shrike (*Lanius ludovicianus*) is State Species of Special Concern and a year-round resident in parts of the Southern California desert. As a predatory bird its diet consists of insects, amphibians, small reptiles, small mammals, and other birds. One pair was observed approximately 0.2 miles northwest of the Solar Farm Site. Observations of adults were made in both spring and fall, and one individual with first-year plumage was recorded in the fall. Based on the amount and nature of observations made during the surveys, loggerhead shrikes are year-round residents within the study area. Loggerhead shrikes were often observed perching on palo verde and ironwood trees as well as larger creosote bush shrubs and other structures including utility poles.

Northern harrier *(Circus cyaneus*), a State Species of Special Concern, is a raptor species that occurs in a wide range of habitats throughout North America. In Southern California, harriers typically nest and forage in open habitats that provide adequate vegetative cover, suitable prey base, and scattered perches such as shrubs or fence posts (Shuford 2008). This species is often found near bodies of water and wetlands (CDFG 2010). Harriers are ground-nesting birds with suitable nesting habitat limited in the southern California desert (Shuford 2008). Three harriers were recorded: two within the Solar Farm Site, and one east of the Red Bluff Substation.

Prairie falcon (*Falco mexicanus*) is State Species of Special Concern that breeds throughout the arid West from southern Canada to central Mexico. The overall distribution appears to be stable. Prairie falcons are found in areas of the dry interior where cliffs provide secure nesting sites. In the desert they are found in all vegetation types, although sparse vegetation provides the best foraging habitat. Prairie falcons were observed in the southwest corner of the Solar Farm Site and approximately 1 mile east of the eastern boundary as flyovers. Two additional observations were recorded along the Gen-Tie Line, but not south of Interstate 10 (I-10) near the Red Bluff Substation alternatives or related components. During aerial surveys for golden eagles, two prairie falcons were recorded within 10 miles of the Solar Farm Site near the boundary of Eagle Mountain Mine and Joshua Tree National Park (WRI 2010). One location was an active, reproductive nest in 2010 with unknown nest success (Figure 3). No prairie falcon nests were observed within any Project areas.

Swainson's hawk (*Buteo swainsonii*) is state-listed (threatened) raptor species that breeds in much of western North America. Within California, nesting occurs primarily in the Central Valley and northern territories; however, regular nesting occurs in the high desert between the Tehachapi Mountains and Lancaster. This species winters in southern South America with a migration route of over 20,000 miles (Woodbridge 2008). Arrival on breading areas generally

occurs from late February to early May depending on geographical characteristics of the breeding area (Woodbridge 2008). Nest sites have not been documented in the Sonoran Desert of California. This species was observed within the study area during migration. Three incidental records were documented on April 9, 2010 during botanical and baseline surveys. Two observations were of individual Swainson's hawks and the third observation consisted of a group of over ten birds. All individuals were seen in flight overhead within or near the Solar Farm boundaries. Additionally, Swainson's hawks were observed during golden eagle surveys near Chuckwalla Mountains [two individuals (March 26 and April 3, 2010)], Coxcomb Mountains [fourteen individuals (April 2, 2010)], and Palen Mountains [four individuals (March 25, 2010)] (WRI 2010). This species is not expected to nest or overwinter within the study area.

D.2.3 Risk Assessment

Solar Farm and Gen-Tie Line Route

Potential direct impacts to passerine species which may occur at the Solar Farm Site alternatives and Gen-Tie Line route alternatives include the potential removal of individuals or occupied nests by Project machinery or through electrocution related to project electrical structures such as the Project substation. Potential indirect long-term impacts include the removal of approximately 4,400 acres of potential nesting and foraging habitat. Potential indirect short-term impacts include effects from increased nighttime lighting, and increased noise and dust that potentially could adversely affect nesting and roosting sites in areas adjacent to active construction. The Project is not expected to cause any prohibited "take" or "disturbance" of any species protected by the BGEPA or MBTA.

Avoidance and Minimization Measures

During pre-construction clearance surveys, all active raptor and owl nest locations would be identified and clearly marked with an avoidance buffer of approximately 50 meters. Regardless of seasonal timing of construction, active nests will be flagged and nests avoided whenever possible, with special attention paid to the nesting season of most avian species (February 15 – May 15). Avoidance areas will remain in place until it is determined by a biological monitor that the young have fledged.

Nest avoidance discussions will be part of mandatory site training for all construction personnel and will be included in Worker Environmental Awareness training briefings. Training will include identification of avoidance areas and requirements for these areas.

Red Bluff Substation and Related Components

Most potential impacts at the Red Bluff Substation alternatives are similar to those listed above for the Solar Farm Site and Gen-Tie line route, although potential indirect long-term impacts from the removal of habitat are restricted to approximately 152 acres of potential nesting and foraging habitat.

Cumulative Impacts

The Draft Environmental Impact Statement (EIS) for the Proposed Project (BLM 2010) lists those projects considered as part of the cumulative impact analysis.

For passerine and raptor species (with the exception of golden eagles), potential cumulative impacts identified in the EIS include the combined effects of all new and existing renewable energy projects, utility structures, and other human disturbances within 16 kilometers (10 miles) of the Proposed Project. Although each project may potentially remove a small number of individuals and nests, these effects are not likely to be cumulatively significant and project BMPs and avoidance measures discussed in Section C will be implemented at the project to attempt to avoid or minimize these potential impacts.

Golden eagles forage in an area extending up to 225 kilometers (140 miles) from the Project boundaries. Although there will be a potential direct cumulative loss of foraging habitat from the development of alternative energy projects and other regional projects discussed in the EIS, this loss is not expected to be significant, or cause prohibited "disturbance" or "taking," because it is only a small percentage of the total foraging area.

Potential long-term cumulative indirect effects include the potential removal of nesting and foraging habitat.

D.3 Bat Use Studies and Risk Assessment

D.3.1 Methods

On February 17, 2010, Dr. Patricia Brown, desert bat expert who has conducted numerous bat surveys in the Project region, conducted a reconnaissance-level survey of the Solar Farm Site alternatives, Gen-Tie route alternatives, Red Bluff Substation alternatives and related components. The purpose of this survey was to determine those bats species that might inhabit these project areas and to formulate avoidance and minimization measures for bat species to be used during the construction, O&M, and post-construction phases.

D.3.2 Results

Dr. Brown's results indicate that pallid bats and western pipistrelles could roost in small rocks on the ground on the Solar Farm Site alternatives. Radio-telemetry surveys have shown that hoary bats will roost in palo verde trees and ironwoods and that California leaf-nosed bats might roost in the limited areas of ironwood trees between foraging bouts. These tree species are found within the small area of desert dry wash woodland on the Solar Farm Site alternatives and along the Gen-Tie Line route alternatives, Red Bluff Substation and related components.

Desert dry wash woodland attracts foraging bats due to increased insect concentration. This is especially true for California leaf-nosed bats and pallid bats that feed on large insects they glean off the foliage. Roosts for these species have been identified in mines in the Eagle and Coxcomb Mountains, both within 16 kilometers (10 miles) of the Solar Farm Site.

D.3.3 Risk Assessment

Solar Farm and Gen-Tie Line

Impacts to bats include potential direct impacts to ground nesting species (pallid bats and western pipistrelles) and removal of trees with active bat colonies. Indirect impacts could potentially occur from removal of foraging habitat. Indirect impacts could also potentially occur from increased human activity, noise, nighttime lighting, and dust.

Avoidance and Minimization Measures

During pre-construction clearance surveys, all active bat colonies would be identified and clearly marked with an avoidance buffer of approximately 50 meters. Whenever possible, these areas will be avoided by construction activities.

Bat colony avoidance discussions will be part of mandatory site training for all construction personnel and will be included in initial Environmental Awareness training briefings. Training will include identification of avoidance areas and requirements for these areas.

Red Bluff Substation and Related Components

Most potential impacts at the Red Bluff Substation alternatives are similar to those listed above for the Solar Farm Site alternatives and Gen-Tie Line route alternatives, although indirect long-term impacts from the removal of habitat are restricted to approximately 152 acres.

Cumulative Impacts

For bat species, potential cumulative impacts are discussed for an area 16 kilometers (10 miles) from the boundaries of the Proposed Project. These include the potential for combined direct effects of the removal of individuals and occupied nests of ground nesting species such as pallid bats and western pipistrelles from project construction. Although each project may remove a small number of individuals, roosts, and nests, these effects are not likely to be cumulatively significant and project BMPs and avoidance measures discussed in Section C will be implemented to attempt to avoid or minimize these impacts.

Potential long-term cumulative indirect effects include the removal of nesting and roosting habitat.

E. Project Design and Impact-Reducing Conservation Measures

Sunlight has sited and designed the Project to avoid where possible fragmenting large contiguous blocks of high quality bird/bat habitat in desert wash woodland areas as discussed in Section A. Best management practices (BMPs) and avoidance/minimization measures that will be used during the construction, O&M, and post-construction phases of the Proposed Project are discussed in Sections C and D. All discussions below of macro- and micro-siting considerations, nest site buffers and conservation measures during the construction and O&M phases of the Project will apply to both Desert Sunlight Holdings project components (Solar Farm Site and Gen-Tie Line) and SCE project components (Red Bluff Substation and related components).

E.1 Macro- and Micro-Siting Considerations

Sections C and D also discuss macro- and micro-siting details including the avoidance of:

- *Locations with federally or state listed, or otherwise designated sensitive species, and areas managed for the conservation of listed species*
  Project components avoid DWMAs, CHU, and ACECs to the extent possible and were sited in the area of lowest known concentration for sensitive species available.
- *Areas frequently used for daily bird and bat movements (i.e., areas between roosting and feeding sites)*
  Areas of desert wash woodland were identified and avoided by Project components, particularly the larger expanses of this habitat found in the Pinto and Big Wash areas.
- *Breeding and wintering eagle use areas*
  These areas were identified and avoided for all Project components. Valley floor areas such as the proposed Solar Farm site do not provide wintering or breeding habitat for eagles.
- *Known migration flyways for birds and bats*
  Pinto Wash is a known bat migration corridor with impacts to this area avoided by the siting of the Solar Farm Site.
- *Areas near known bat hibernacula, breeding, and maternity/nursery colonies*
  No known areas are found with the footprint of the Project components.
- *Areas with high incidence of fog, mist, low cloud ceilings, and low visibility, or where other risk factors may come into play*
  No areas with these constraints are found in the Project region, except in times of extremely high winds and blowing sand and dust.
- *Fragmentation of large, contiguous tracts of wildlife habitat*
  Areas of potential movement corridors were avoided in siting the Solar Farm Site.

In addition, all Project facilities at all Project components are not adjacent to landscape features that attract migrant birds such as water sources, and are not within 1 mile of cliff tops (potential

raptor nesting areas). Project construction and O&M phases will minimize the potential for creating habitats suitable for rodents such as rock piles that will attract raptors.

E.2 Nest Site Buffers

During pre-construction clearance surveys for all Project components, a biologically meaningful buffer will be placed around any active avian nests or bat roosts located.

For passerines, an exclusion area will be established at approximately 100 (330 feet) meters from any active nest. The nest will be checked within a week prior to planned construction to determine nest success and whether young have fledged. The exclusion area boundary will not be removed until the biological monitor has determined that the nest has failed or the young have fledged.

For raptors, an exclusion area will be established at approximately 1.6 kilometers (1 mile) from any active nest (excluding nests of common raven). The nest will be checked within a week prior to planned construction to determine nest success and whether young have fledged. The exclusion area boundary will not be removed until the biological monitor has determined that the nest has failed or the young have fledged.

For burrowing owls, Phase III burrow surveys will be completed within 30 days prior to planned construction in each construction unit and within a 150-meter (500 foot) buffer area. All active burrowing owl nests will be avoided with a buffer of 100 meters (330 feet) during the nesting season (February 1 – August 31st). The nest will be checked within a week prior to planned construction to determine nest success and whether young have fledged. The exclusion area boundary will not be removed until the biological monitor has determined that the nest has failed or the young have fledged. Outside nesting season or after determining a nest has failed or young have fledged, owls will be passively relocated after concurrence of specific methods by CDFG. Passive relocation will include:

- Identifying suitable relocation sites within 1 mile of the Project area;
- Creating or enhancing at least two natural or artificial burrows per relocated owl;
- Passively relocating burrowing owls; and
- Monitoring and reporting the results of the passive relocation.

E.3 Construction Phase Conservation Measures

Conservation measures that that will be implemented by the Project that relate to bird conservation include those discussed in Sections C and D. In addition, the Project will:

1. Minimize permanent disturbance area such as creating unneeded access roads. Construction of the Gen-Tie Line and other linear Project features will avoid vegetation clearing, and grading whenever possible.
2. Vegetation clearing will be conducted outside of the bird breeding season to the maximum extent practicable (approximately February 1 – August 31), taking into account necessary timing of conservation measures for other species, including the federally- and state-

threatened desert tortoise (*Gopherus agassizii*) present at the Project site as well as the timing constraints in other Project permits.

3. Biological monitors will be present on-site during all phases of construction and will be tasked with monitoring avian and bat nesting and roosting sites in adjacent habitats and will employ the same buffers described above in E.2 if nests are found adjacent to an active construction area.
4. Construction activities will be conducted in a manner consistent with reducing fire danger.
5. During construction, all trash will be removed promptly and disposed of properly to avoid creating attractive nuisances for birds and bats.
6. Appropriate control measures will be implemented to prevent the introduction and spread of invasive plant species with and surrounding the project area (see the Project's Integrated Weed Management Plan – Ironwood Consulting, 2010).
7. Only plants native to the area for will be used seeding or planting during habitat revegetation and/or restoration efforts.

E.4 Operations and Maintenance Conservation Measures

During the O&M phase of the Project, conservation measures will be used to reduce the attractiveness of the facility to breeding, migrating, and wintering birds and bats to ensure mortality is minimized. Many of these measures are listed in Sections C and D, and the O&M phase will include these additional measures:

1. The Project will not create or maintain attraction features for birds and /or bats by removing and disposing of road kills near the Project of carrion that attracts raptors and other scavengers to the site, regularly removing vegetation around larger facilities such as substations and meteorological towers to reduce raptor foraging, and minimizing water availability.
2. The Project will minimize the use of lighting that could attract migrating birds and bats (feeding on concentrations of insects at lights). All nighttime lighting will be within 800 meters (0.5 mile) of the Project facilities. Lighting will be kept to the minimum level necessary for safety and security. High intensity, steady burning, bright lights such as sodium vapor or spotlights will not be used on Project facilities.

F. Post-Construction Monitoring and Risk Assessment Validation

The objective of post-construction monitoring is to validate the pre-construction risk assessment and to provide a factual basis for the Applicant to implement adjustments based on the monitoring results. All of the measures in this section apply to the Solar Farm, Gen-Tie and Red Bluff Substation and related components.

F.1 Post-Construction Monitoring

The long-term monitoring program for measuring raptor and bat incidence at the Project site will consist of three activities: incidental sightings, bi-annual point counts, and annual nest surveys. This program will be conducted during construction and for 5 years post-construction during the operations and maintenance phase of the Proposed Project.

F.1.1 Incidental Sightings

Throughout the construction and operation phases of the Proposed Project, all incidental sightings of raptors and bats will be logged. During construction, all sightings will be recorded by biological monitors. The Lead Biological Monitor will be tasked with keeping records and reporting these results (as described in Section F.2). During the first 5 years of the operation phase of the Project (the long-term monitoring period), a person designated by Sunlight will be responsible for completing this task, including reporting.

F.1.2 Nest Surveys

Nest surveys will be conducted at least twice each spring between March 15 and June 1, separated by at least 30 days. All Project-related infrastructure (e.g.; fence posts, transmission towers, and buildings) would be inspected for active and inactive raptor nests. Nest locations may also be detected via incidental sightings or during point count surveys.

F.2 Reporting and Risk Assessment Validation

Quarterly e-mail summaries of all biological monitoring activities will be submitted to BLM, USFWS, and CDFG by the Lead Biological Monitor. One section of these reports will focus on reporting for the long-term monitoring program for raptors (including owls) and bats. This section will include species and number of raptors observed incidentally, results of any point counts or nest surveys conducted during that monitoring quarter, and a discussion of whether these observation represent an increase or decrease in raptor activity and associated theories of cause. These reports may also include recommendations for future adaptive management actions.

On or before January 15th of each calendar year, an annual report will be submitted to the BLM that summarizes all monitoring activities sufficient for the BLM to provide necessary reporting to the USFWS and CDFG in their annual permitting report, due on or before February 1 of each year. This annual report will summarize all quarterly reports and be submitted via e-mail by the Lead Biological Monitor.

All biological monitors and project personnel will be given information on the provisions for reporting bird and bat fatalities to the USFWS office of law enforcement's confidential voluntary mortality reporting system website found at: http://www.aplic.org/USFWS_BirdFatality_FilerInstructions.pdf.

G. Implementation

G.1 Permit Compliance

BLM intends to complete the EIS and the associated Record of Decision (ROD). The ROD is expected to include terms, conditions and an incidental take statement for species protected by the federal Endangered Species Act pursuant to the Section 7 consultation process. The Applicant will also comply with other applicable federal and state legal requirements relating to protected species.

In addition to required legal permitting, the Applicant's consultants have prepared biological plans that outline Project commitments, including the following documents:

- Biological Resources Technical Report
- Integrated Weed Management Plan
- Draft Biological Assessment
- Desert Tortoise Translocation Plan
- Common Raven Management Plan

G.2 Employee Training

Employee training is a critical component of protecting biological resources during the construction and O&M phases of the Project. This training is discussed in detail in Section A.

G.3 Quality Control

During the quarterly and annual reporting discussed in Section F, the Lead Biological Monitor, and personnel from the BLM, USFWS, and CDFG will review existing practices and conduct project audits as necessary.

G.4 Key Resources

Key resources include the team of proponent personnel, biological monitors and agency personnel who will work together to ensure the success of the protection, avoidance, and minimization of impacts to bird and bat species during the construction and operations and maintenance phases of the Project. The names and contact information for key personnel are provided on the following page.

Project Proponents
Desert Sunlight Holdings, LLC
1111 Broadway St, 4th Floor
Oakland, CA 94607
(510) 625-7400
Contact: Wayne Hoffman
WHoffman@firstsolar.com

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770
(626) 302-1117
Contact: Paul Yamasaki
Paul.Yamasaki@sce.com

Biological Monitoring
Ironwood Consulting
20 Nevada St., Suite 300
Redlands, CA 92373
(909) 798-0330
Contact: Kathy Simon
Kathy@ironwoodconsultinginc.com

Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553-9046
(951) 697-5223
Contact: Kim Marsden
Kim_Marsden@BLM.gov

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Rd., 101
Carlsbad, CA 92011
760.431.9440 x 354 ph
Contact: Jody Fraser
jody_fraser@fws.gov

California Department of Fish and Game
Inland Deserts Region
3602 Inland Empire Blvd Suite C220
Ontario, CA 91764
(909) 484-0167
Contact: Magdalena Rodriguez
mcrodriguez@dfg.ca.gov

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Common Raven Management Plan

COMMON RAVEN MANAGEMENT PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:
DESERT SUNLIGHT HOLDINGS, LLC
1111 Broadway St, 4th Floor
Oakland, CA 94607

Prepared by:
IRONWOOD CONSULTING INC.
20 Nevada Street, Suite 300
Redlands, CA 92373

August 3, 2010

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List of Acronyms

AC	Alternating Current
ACEC	Area of Critical Environmental Concern
BLM	U.S. Bureau of Land Management
CDCA	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CHU	Critical Habitat Unit
CPUC	California Public Utility Commission
DOI	U.S. Department of the Interior
DPV I	SCE's Devers to Palo Verde I transmission line
DSSF	Desert Center Solar Farm
DWMA	Desert Wildlife Management Area
ESA	Endangered Species Act
I-10	Interstate 10
kV	Kilovolt
MVA	Mega-volt ampere
MW	Megawatt
MWD	Metropolitan Water District
O&M	Operations and Maintenance
PV	Photovoltaic
ROW	Right of Way
SBBM	San Bernardino Base and Meridian
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

Desert Sunlight Holdings, LLC (Desert Sunlight Holdings), proposes to construct and operate a 550-megawatt (MW) nominal capacity alternating current (AC) solar photovoltaic (PV) energy-generating project known as the Desert Sunlight Solar Farm (DSSF or Proposed Action). The PV generating facility (Solar Farm), most of the corridor for the Proposed Action's 220-kilovolt (kV) generation interconnection transmission line (Gen-Tie Line), and one of two potential sites being considered for a new substation would be located on lands administered by the U.S. Department of Interior (DOI), Bureau of Land Management (BLM), Palm Springs-South Coast Field Office.

The Proposed Action includes development of a new 500- to 220- kV substation (referred to here as the Red Bluff Substation), where the project would interconnect with the Southern California Edison (SCE) regional transmission system Devers-Palo Verde I (DPV I) transmission line. The Red Bluff substation and associated SCE project components (access roads, distribution line, and telecommunications site) are included as part of the Proposed Action for planning and environmental considerations, it would be constructed, owned, and operated by SCE.

The project area and surrounding vicinity support desert tortoise (*Gopherus agassizii*) and common raven (*Corvus corax*). Ravens are efficient predators of desert tortoise and thrive in areas of human activity. In order to avoid unwanted indirect impacts to the resident desert tortoise population, specific measures to control ravens would be required. This Common Raven Management Plan (CRMP) presents the raven control measures that will occur before, during, and after the Proposed Action is completed.

1.1 Plan Objectives

The primary objective of this CRMP is to protect the juvenile and hatchling desert tortoises from predation by common ravens. This would be accomplished by eliminating or minimizing all aspects of human impact that attract ravens (i.e., garbage, surface water, animal and plant waste materials, perching sites, nesting sites, and roosting sites).

The secondary objective is to avoid lethal removal of ravens by installing passive bird deterrents. The final objective of this plan is to comply with the regional management actions of the agencies cooperating in the effort to promote tortoise recovery pursuant to the *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a).

1.2 Project Location and Description

1.2.1 Desert Sunlight Holdings Project Components

Location

The region of the Proposed Action is a largely vacant, undeveloped, and relatively flat land area located in the Chuckwalla Valley of the Sonora Desert in eastern Riverside County. The Solar Farm site is approximately ten kilometers (six miles) north of the rural community of Desert Center and six kilometers (four miles) north of Lake Tamarisk, between the cities of Coachella (to the west) and Blythe (to the east) (Figure 1). The project area contains existing transmission lines, telephone lines and pipelines, as well as dirt roads. Joshua Tree National Park is located to the north, east, and west of the

0 45 90 180
Miles

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Figure 1
Regional Location

Prepared by Ironwood Consulting, Inc. - May 2010

area; at its closest point, the Solar Farm site is approximately 2.6 kilometers (1.4 miles) southwest of the national park boundary. The inactive Eagle Mountain Mine is located approximately 1.6 kilometers (1.0 mile) to the west of the Solar Farm site.

The Desert Sunlight Holdings' Proposed Action consists of two main components:

1. Solar Farm site (the main photovoltaic [PV] generating facility),
2. 220-kilovolt (kV) transmission line (Gen-Tie Line),

The Solar Farm site, where the power would be generated, would consist of several components:

- Main generation area, which includes PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance Facility;
- Solar Energy Visitor's Center;
- On-site substation (where the voltage of the Solar Farm-generated electricity would be stepped up to 220 kV, which is the voltage of the transmission line); and
- Site security and fencing (including desert tortoise exclusion fencing).

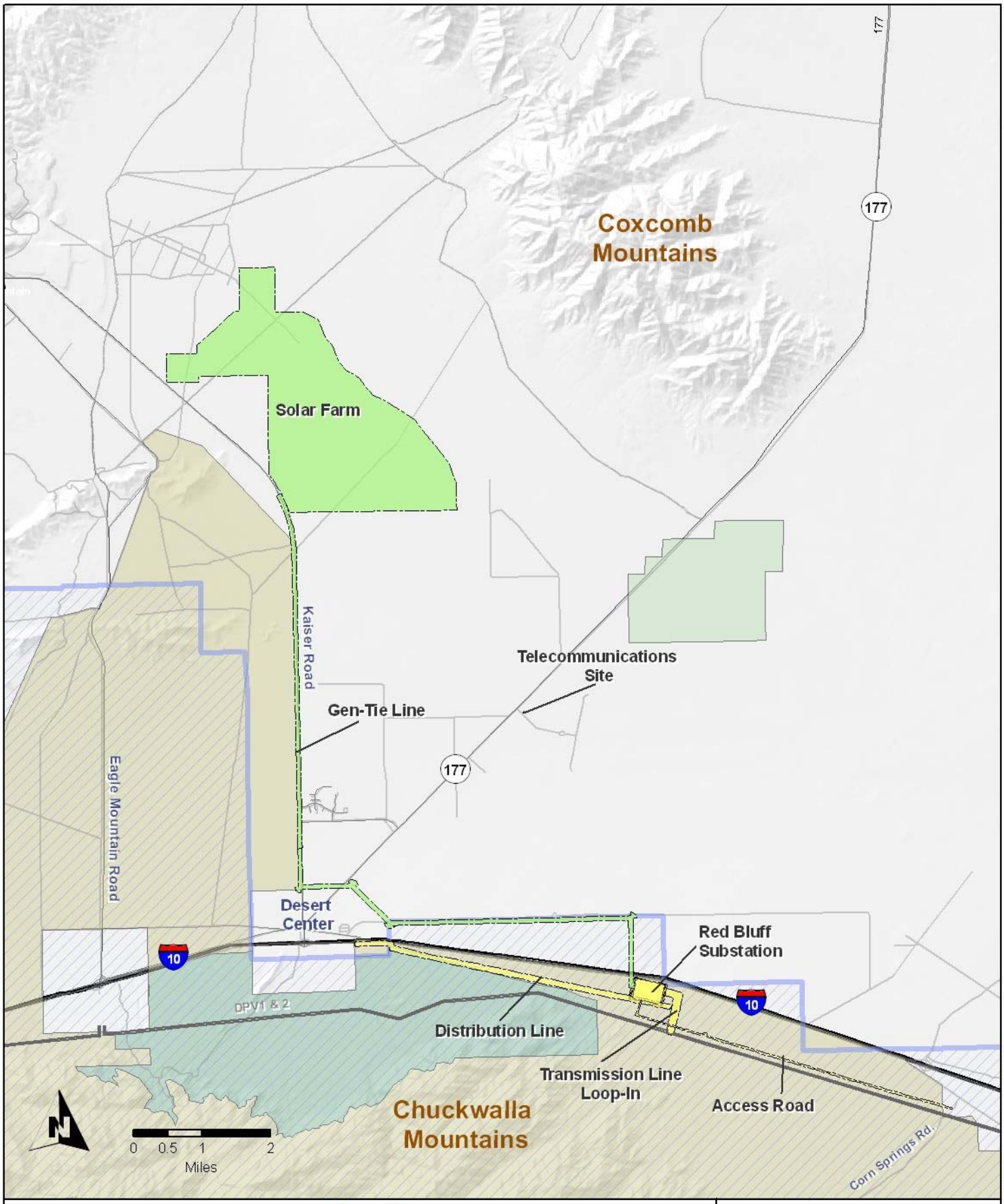
The Gen-Tie would transmit the electricity generated at the Solar Farm to the regional transmission system, via the Red Bluff Substation where the power generated at the Solar Farm would feed into SCE's existing Devers Palo Verde 1 (DPV1) 500-kV transmission line. Desert Sunlight Holdings plans to use steel monopoles for the transmission line. Poles are expected to be 40 meters (135 feet) tall and spaced approximately 275 to 335 meters (900 to 1,100 feet) apart.

The Desert Sunlight Holdings' components of the Proposed Action cover an area of approximately 1,812 hectares (7.0 square miles or 4,478 acres – Figure 2) within the San Bernardino Base and Meridian (SBBM). The Desert Sunlight Holdings' components of the Proposed Action are not located within the boundaries of an Area of Critical Environmental Concern (ACEC) or Wilderness Area (Figure 2). The proposed Gen-Tie Line crosses small portions of the Chuckwalla Desert Wildlife Management Area (DWMA – designated by the BLM) and Chuckwalla Critical Habitat Unit (CHU - designated by the U.S. Fish and Wildlife Service [USFWS]).

Table 1. Desert Sunlight Holdings Components of the Proposed Action (also shown on Figure 2)

Area	Acres
Solar Farm Site	4,244
Gen-Tie Line	105
Total	4,349

The Solar Farm site is located on the Victory Pass and East of Victory Pass 7.5 Minute U.S. Geological Survey (USGS) quadrangles. Elevations at the Solar Farm site range from approximately 55 to 80 meters (180 to 255 feet) above mean sea level (amsl). The Gen-Tie Line is located on the Victory Pass, Desert Center, and Corn Spring 7.5 Minute USGS quadrangles. Elevations within the Gen-Tie Line range from approximately 65 to 100 meters (220 to 320 feet) amsl.



Project Area
Sunlight Component
SCE Component
Desert Tortoise Critical Habitat
Chuckwalla DWMA
Alligator Rock DWMA
Desert Lily Preserve

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Figure 2
Project Components

Prepared by Ironwood Consulting, Inc. - July 14, 2010

Desert Sunlight Holdings Components of the Proposed Action Description

The Solar Farm Site would consist of several main components, all located within the project security and permanent desert tortoise fencing:

- Main Generation Area - PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- Solar Energy Visitor's Center;
- On-site Substation; and
- Site Security, Fencing, and Lighting.

At the On-site Substation, the Solar Farm output would be stepped up to the proposed transmission system's voltage of 220 kV. The Project would interconnect with the regional transmission system via a 220-kV single-circuit Gen-Tie Line that would exit the southwestern portion of the Solar Farm Site and follow a transmission right of way (ROW) to SCE's planned Red Bluff Substation to be located south of I-10.

1.2.2 SCE Project Components

Location

The majority of SCE project components (except the telecommunications site) are found south of Interstate 10 (I-10) in a rocky, undeveloped, and relatively flat land area located in the Chuckwalla Valley between I-10 and the Chuckwalla Wilderness (Figure 2). The area of SCE project components supports existing transmission lines including the DPV I line, telephone lines and pipelines, as well as dirt roads. The telecommunications site is a small largely vacant, undeveloped, and relatively flat land area located in the Chuckwalla Valley. The SCE project components of the Proposed Action consist of five main components (Figure 2):

1. 500/220-kV substation (Red Bluff Substation);
2. Loop in area east of the substation;
3. Access road from I-10 interchange with Highway 177, running south of, and parallel to I-10 along an existing dirt road;
4. Distribution line from the Red Bluff substation to an existing distribution line; and
5. Telecommunications site north of I-10 along Highway 177.

The SCE project components (excluding the telecommunications site) of the Proposed Action cover an area of approximately 152 acres (Figure 2) within the SBBM. The Red Bluff substation, distribution line and access road is not located with is not located within the boundaries of Wilderness Area and is within the Chuckwalla DWMA and CHU (Figure 2). The telecommunications site is not within an ACEC, Wilderness Area, DWMA, or CHU (Figure 2).

The Red Bluff substation, distribution line and access road are located on the Corn Spring 7.5 Minute USGS quadrangle. Elevations within the Red Bluff Substation, distribution line and access road range from approximately 90 to 100 meters (300 to 320 feet) amsl. The telecommunications site is located on the East of Victory Pass 7.5 Minute USGS quadrangle. The elevation of the telecommunications site is approximately 50 meters (160 feet) amsl.

SCE Components of the Proposed Action Description

SCE proposes to construct the Red Bluff Substation Project to interconnect the 550-MW DSSF Project to SCE's existing DPV1 500-kV transmission line. The DPV1 500-kV transmission line would connect to the Red Bluff Substation by looping the line into the Substation. Additionally, based on preliminary design information, the DSSF 220-kV Gen-Tie Line would be extended to just west of the proposed Red Bluff Substation and connect to a single dead-end structure, from which the line would be extended inside the Red Bluff Substation Site/Property.

Red Bluff Substation would consist of a 500/220-kV substation which, with its associated components, would require approximately 152 acres of land. It would interconnect the power from the Solar Farm (via the Gen-Tie Line) to SCE's DPV1 transmission line, which passes near the substation site. Substation features include:

- Transmission lines to connect the substation to the DPV1 line;
- Connection of the DSSF interconnection line into the substation;
- Modification of existing 220 kV structures (towers) near the substation;
- Construction of an electric distribution line for substation light and power; and
- Installation of telecommunications facilities associated with the substation.

2.0 Common Raven Biology

The common raven is resourceful and adaptable. It has a world-wide range that covers almost the entirety of North America, Europe, Siberia and Eastern Asia. Food sources vary greatly and the raven eats everything from grains to young livestock (Larsen 1970). The common raven population has soared over the last half-century. Their estimated population increase in the Mojave and Colorado Deserts ranges from 700 to 1,500% (Boarman 1993; USFWS 2008a). The most widely accepted cause of this population growth is from an expanding human infrastructure into the desert and a dependency on easy food sources found at landfills, illegal dump sites, and agricultural land (Boarman 1993).

The common raven in California has a unique genetic clade (ancestral grouping) that separates it from the other common ravens of North America and the world (USGS 2000). Although there are no superficial differences in appearance between the two populations, the California clade is actually a closer relative to the Chihuahuan Raven and the Holarctic clade, the more common northern hemisphere raven, is more related to the Pied Crow (USGS 2000). The two raven populations mix at their ranges, but do not interbreed indicating that the California clade is an endemic population (USGS 2000) to the state, although not to the desert regions, and requires careful management versus an exotic invader which in most cases can be eradicated where it is becoming a problem to native wildlife.

A result of raven overpopulation at the edges of human settlements has resulted in ravens learning to identify food sources in desert areas which they historically avoided, including preying on juvenile desert tortoises. Studies on the desert tortoise population indicate it is top-heavy, in that very little recruitment (young entering the population) is occurring (USFWS 2008). Common ravens are known to prey on juvenile desert tortoises and an increase in the raven populations has had a negative effect on the number of young tortoises recruited into in the population. The predation of juvenile tortoises by ravens has led to the creation *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a). The purpose of this document is to reduce raven predation on hatchling and juvenile desert tortoises, with the goal of increasing hatchling and juvenile desert tortoise survivorship and recruitment into the adult population, expected to contribute to the recovery of the species (USFWS 2008b).

Human subsidies that attract ravens include roads where road kills provides forage, open water sources, trash, and tall structures suitable for nesting (trees, radar towers, power poles, telephone poles, and buildings). Increased subsidies lead to an increase in ravens nesting in the immediate area. The establishment of new raven nests can have dire effects on the local juvenile tortoise population because nesting ravens spend 75 percent of their foraging time within 400 meters of their nest (Boarman 2002). Reducing human subsidies is a key element in the *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a) to be included in all projects that would likely provide such subsidies within desert tortoise habitat.

3.0 Baseline Conditions

3.1 Desert Sunlight Holdings Project Components

3.1.1 Existing Raven Subsidies

Existing raven subsidies at and near the Desert Sunlight Holdings components of the Proposed Action include roads, human developments, and open water sources. There are several existing paved roads (e.g., Interstate 10, Highway 177, Kaiser Road, and Eagle Mountain Road) in the vicinity of the Proposed Action, which potentially attract ravens because they may provide food from litter and road kill. The Lake Tamarisk Golf Club housing development is located south of the Solar Farm site and there are several other human settlements within the project area including Desert Center south of the Solar Farm site, Metropolitan Water District (MWD) housing near the MWD substation west of the Solar Farm site, and Eagle Mountain Mine northwest of the Solar Farm site. These settlements have small human populations, which likely provide food and shelter opportunities for ravens. Open water sources include three artificial lakes at the Lake Tamarisk Golf Club, located south of the Proposed Action as well as the Colorado River aqueduct north and northwest of the Solar Farm site.

3.1.2 Raven Presence at the Proposed Action

Common ravens are known to occur at the Solar Farm site and along the Gen-Tie line. Several methods have been useful in approximating the abundance of common raven at the Desert Sunlight Holdings components of the Proposed Action, including tallying incidental sightings from other surveys, bird point counts, and nest surveys. Figure 3 shows raven presence at the Desert Sunlight Holdings components of the Proposed Action.

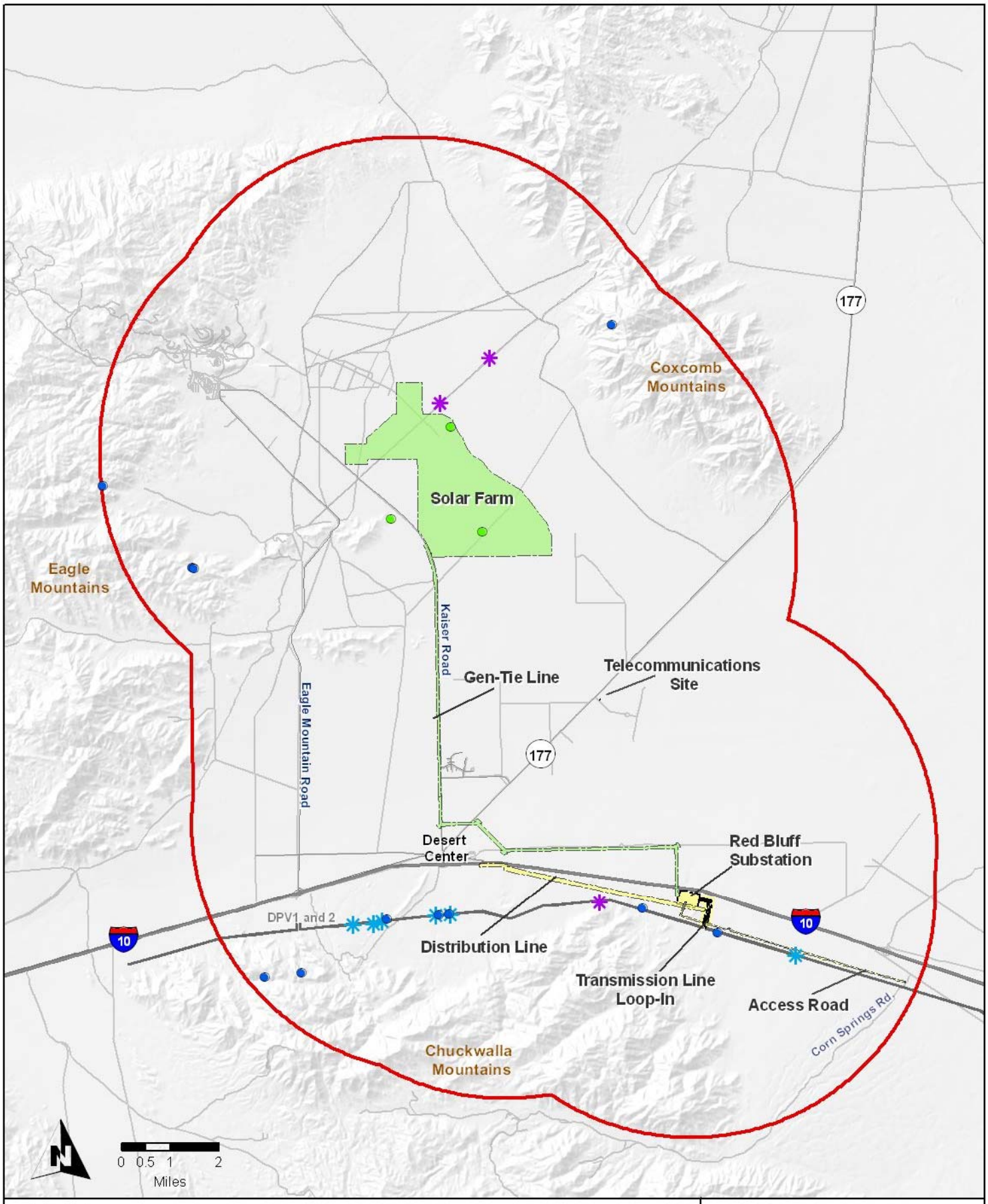
Incidental Sightings

During all project biological surveys, all common ravens were tallied on standardized data forms with approximately 192 individuals tallied (Ironwood Consulting 2010).

Surveys were conducted for golden eagle April 2-3 and May 14, 2010 following draft protocols (USFWS 2010). No common ravens were observed on or within three miles of the Desert Sunlight Holdings project components during these surveys. These surveys focused on the more mountainous regions of the region, but did cross the valley where the Project Action is located. Common ravens and nests observed by helicopter within 10 miles of the Solar Farm site boundaries were recorded and are included on Figure 3.

Point Counts

Point count surveys for all birds were conducted between April 7 and 17, 2010 by an experienced desert avian biologist at a total of twelve locations, nine on the Proposed Action and three controls, using point count methodology as described in *Monitoring Bird Populations by Point Counts* (Ralph et al. 1995). The surveys are intended to allow compilation of bird species and their relative numbers at each fixed study point location (point counts). Point count methodology is well described and widely used in bird studies. Each point is visited for a fixed amount of time and all birds detected within an often fixed radius are recorded. Research suggests that the amount of time spent at a sampling location increases standard error especially at times greater than 10 minutes (Smith et al. 1997). Each count was limited to 10 minutes to minimize standard error introduced by double counting and flyovers. Additionally, incidental flyovers were recorded separately from typical observations and each count was divided into three survey periods consisting of the first three minutes, minutes 3 to 5, and minutes 5 to 10.



Project Area

Sunlight Component

SCE Component

5-Mile Project Buffer

Raven Location (Wildlife Research Institute)

Raven Location (Ironwood)

Active nest (Ironwood)

Potential Nest (Ironwood)

Ironwood Consulting, Inc. 2010. (Point Count and Nest Surveys)
Wildlife Research Institute, 2010. (Golden Eagle Surveys)

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Figure 3
Common Raven and Nest Sites

Prepared by Ironwood Consulting, Inc. - August 3, 2010

Four ravens were detected during these surveys (two individual birds and one pair), all as flyovers. These are shown on Figure 3.

Nest Surveys

Surveys were conducted on April 23-24 and May 20, 2010 following draft protocols for identifying raptor nests (CEC and CDFG, 2010 draft) to look for existing raven nests within and adjacent to the Desert Sunlight Holdings project components. Nests located during this survey included those found on existing transmission lines and trees. The survey confirmed presence of two existing active nests just northeast of the solar farm site and none near the Gen-Tie Line (Figure 3).

3.2 SCE Project Components

3.1.1 Existing Raven Subsidies

Existing raven subsidies near the SCE components of the Proposed Action include roads and human developments, and open water sources. There are several existing paved roads (e.g., Interstate 10, Highway 177, and Kaiser Road) in the vicinity of the SCE components of the Proposed Action, which potentially attract ravens because they may provide food from litter and road-kill. There are several other human settlements within the project area including Desert Center northeast of the Proposed Action, and several homes and farms along Highway 177. These settlements have small human populations, which likely provide food and shelter opportunities for ravens. Open water sources include three artificial lakes at the Lake Tamarisk Golf Club, located northeast of the SCE components of the Proposed Action.

3.1.2 Raven Presence at the Proposed Action

Common ravens are known to occur at all areas of the SCE components of the Proposed Action, including near the Red Bluff substation, along the access road and distribution line, and at the telecommunications site. Several methods have been used to determine the presence and quantify approximate abundance of common raven at the SCE components of the Proposed Action, including tallying incidental sightings and nest surveys. Figure 3 shows raven presence at the SCE components of the Proposed Action.

Incidental Sightings

During all project biological surveys, all common ravens were tallied on standardized data forms with approximately 55 individuals tallied (Ironwood Consulting 2010). Surveys were conducted for golden eagle in April and May 2010 following draft protocols (USFWS 2010). These surveys also recorded common ravens and nests observed by helicopter and are included on Figure 3. Six common ravens were observed on or within three miles of the SCE project components and several more within five miles (Figure 3).

Nest Surveys

Surveys were conducted on April 23-24 and May 20, 2010 following draft protocols for identifying raptor nests (CEC and CDFG, 2010) to look for existing raven nests within and adjacent to the SCE project components. Nests located during this survey included those found on existing transmission lines and within trees. The survey confirmed presence of two existing active nests and seven potential raven nests observed without ravens present (Figure 3).

4.0 Common Raven Control and Management

The goal of the minimization/mitigation measures proposed for the Proposed Action is to avoid, minimize and/or mitigate the increased potential for raven presence and nesting due to the construction and operation of the Proposed Action. All of the measures in this section apply to both the Desert Sunlight Holdings and SCE project components of the Proposed Action.

To achieve this goal, the Applicant and SCE propose the following minimization and avoidance measures:

- Design facilities to discourage ravens,
- Minimize food and water subsidies, and
- Provide environmental awareness practices training to on-site workers.

4.1 Design Facilities to Discourage Ravens

Project facilities will be designed to discourage roosting and nesting by comment ravens, including Placing electrical lines underground or transmission lines on existing structures to the extent practical to reduce potential roosting and nesting locations. Section 6.0 discussed additional avoidance measures that would be employed if long-term monitoring data showed an increase in raven numbers at the Project or within the region.

4.2 Minimize Food and Water Subsidies

Raven food subsidies generated by the project will be avoided and/or minimized by maintaining a clean construction site, minimizing road kill due to project vehicle traffic, and reducing open water sources. The following measures will be implemented:

- Traffic speeds on all project-related dirt roads will be limited to 15 miles per hour to reduce road killed animals. Biological monitors will be monitoring speeds during construction activities.
- Refuse management will be an integral part of the construction process. A sufficient number of refuse containers will be supplied and all containers will have sealable and lockable lids with the goal of preventing strong winds from blowing garbage around, wildlife from entering refuse containers, and unauthorized people from tampering with refuse. Biological monitors will periodically check on refuse containers to ensure they are not overflowing and are being closed properly.
- All work vehicles will have a sufficient supply of strong garbage bags to aid in collection and disposal of refuse at the end of each day into the large containers discussed above.
- Waste management contractors will supply an adequate number of portable toilets to promote a hygienic environment.

Reducing the open water sources will be a priority throughout the construction, and operations and maintenance phases of the Proposed Action.

- Water required for construction purposes will not be stored in open containers or structures and will be transported throughout the site in enclosed water trucks.
- Water sources for the project (such as wells) will be checked periodically by biological monitors to ensure they are not creating open water sources through by leaking or consistently overfilling trucks.

4.3 Provide Training

All personnel that enter any component of the project site during construction will be required to complete a Worker Education Program for Biological Resources. This program will be standardized and conducted by the Lead Biological Monitor or their designated monitor. A portion of this program will be focused on avoiding and minimizing the creation of new raven subsidies and will include current information about common raven biology and the approved Terms and Conditions of project permits for common raven management.

5.0 Long-Term Monitoring and Reporting

The objective of long-term raven monitoring is to determine whether the Proposed Action is contributing to an increase in common raven presence in the project vicinity. All of the measures in this section apply to both the Desert Sunlight Holdings and SCE project components of the Proposed Action

5.1 Long-term Monitoring

The long-term monitoring program for measuring common raven abundance at the project site will consist of three activities: incidental sightings, bi-annual point counts, and annual nest surveys. This program will be conducted during construction and for 5 years post-construction during the operations and maintenance phase of the Proposed Action.

5.1.1 Incidental Sightings

Throughout the construction and operation phases of the Proposed Action, all incidental sightings of common ravens will be logged. During construction, all sightings will be recorded by biological monitors. The Lead Biological Monitor will be tasked with keeping records and reporting these results (as described in Section 5.2). During the first 5 years of the operation phase of the project (the long-term monitoring period), a person designated by Sunlight will be responsible for completing this task, including reporting.

5.1.2 Nest Surveys

Nest surveys would be conducted at least twice each spring between March 15 and June 1, separated by at least 30 days. All project-related infrastructure (e.g.; fence posts, transmission towers, and buildings) would be inspected for active and inactive nests. Nest locations may also be detected via incidental sightings or during point count surveys. Further assessment would be performed on the ground underneath raven nests during spring months to determine any presence of tortoise predation.

5.2 Reporting

On or before January 15th of each calendar year, an annual report will be submitted to the BLM that summarizes all monitoring activities sufficient for the BLM to provide necessary reporting to the USFWS and CDFG in their annual permitting report, due on or before February 1 of each year. This annual report will include a section reporting on the long-term monitoring program for common raven. This section will include number of ravens observed incidentally, results of any point counts or nest surveys conducted during that monitoring quarter, and a discussion of whether these observation represent an increase or decrease in raven activity and associated theories of cause. These reports may also include recommendations for future adaptive management actions.

6.0 Adaptive Management

Adaptive management will be implemented as necessary to continually improve upon previous decision-making. Any adaptive management strategies would be previously approved by BLM, USFWS, and CDFG prior to implementation. All of the measures in this section apply to both the Desert Sunlight Holdings and SCE project components of the Proposed Action and directly tier to the goal for this plan as stated in section 4.0.

If monitoring data shows a potential increase in raven roosting or nesting behavior within the project site or immediate area, several additional measures may be implemented to minimize the attractiveness of the project site to this species, including facilities to discourage roosting or nesting on project-related structures.

6.1 Discourage Roosting

If long-term monitoring data show an increase in roosting by common ravens, measures to discourage roosting will be implemented using one or more of the following methods:

- Bird spikes installed on top of potential perches designed to prevent birds from gaining a foothold on the perch because of their porcupine design,
- Repellent coils installed on top of potential perches to deter birds from gaining footholds because of their destabilizing coil design,
- Bird control wire designed so that a line or grid of variable height posts is interconnected by a wire. This creates a confusing landing area in the same spirit as trip wires used for unsuspecting people.
- Bird netting, and/or
- Electric shock deterrents with low voltage pulses.

6.2 Discourage Nesting

If long-term monitoring data show an increase in nesting by common ravens, measures to discourage nesting will be implemented, using one or more of the methods described above for discouraging roosting. Inactive raven nests discovered during the monitoring efforts will be dismantled and passive nest deterrents would be installed to inhibit future nest building at the site. In the event that an active nest is found, it will be monitored closely throughout the season by a biological monitor to determine number of fledglings and status of development. As soon as it is determined that the nest is no longer active, it would be removed and passive deterrents installed.

6.3 Removal of Problem Ravens

Non-lethal deterrents previously described will be the first course of action. However, ravens may adapt quickly to avoid passive deterrents. If problem ravens are proven to be an active threat to resident desert tortoises then they could be subjected to lethal removal in coordination with BLM, USFWS, and CDFG. Because ravens and their active nests are protected under the Migratory Bird Treaty Act (MBTA) they cannot be indiscriminately killed, harmed, trapped, or harassed. Any management action would need to be coordinated with and possibly carried out by the BLM, USFWS, and CDFG.

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Jurisdictional Delineation Plan

Investigation of the Presence of Wetlands and Other Waters of the United States, Desert Sunlight Solar Farm Project, Riverside County, California

Prepared for

Desert Sunlight Holdings, LLC
1111 Broadway
4th Floor
Oakland, CA 94607

By

Ironwood Consulting Inc
20 Nevada Street, Suite 300
Redlands, CA 92373

And

HUFFMAN-BROADWAY GROUP, INC.
828 Mission Avenue
San Rafael, CA 94901

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This report should be cited as: Ironwood Consulting Inc. and Huffman-Broadway Group, Inc. 2010. *Investigation of the Presence of Wetlands and Other Waters of the United States Desert Sunlight Solar Farm Project, Riverside County, California.. Prepared for Desert Sunlight Holdings, LLC Oakland, CA. June. 39 pp. Exhibits.*

1.0 INTRODUCTION

1.1 Purpose and Scope of Work

At the request of Desert Sunlight Holdings, LLC (Sunlight), a wholly owned subsidiary of First Solar Development, Inc. (First Solar), Ironwood Consulting, Inc. and Huffman-Broadway Group, Inc. investigated the potential presence of wetlands and other waters of the United States subject to Corps of Engineers (Corps) jurisdiction under Section 404 of the Clean Water Act (CWA). The investigation covered a contiguous Study Area where a proposed new photovoltaic solar power generation facility (Solar Farm), generation interconnection transmission line (Gen-Tie Line) and substation would be located (Exhibit A, Figure 1). This study was conducted in accordance with Code of Federal Regulations (CFR) definitions of jurisdictional waters, the Corps' 1987 *Wetlands Delineation Manual*, the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, and supporting Corps and U.S. Environmental Protection Agency (EPA) guidance documents. Wetland determination data forms are provided in Exhibit C; and WETS analysis data are provided in Exhibit F. This investigation was conducted to seek a Corps Verified Jurisdictional Determination pursuant to applicable Corps guidance documents.

1.2 General Site Description

The Solar Farm is proposed to be located approximately six miles north of the rural community of Desert Center and four miles north of Lake Tamarisk, between the cities of Coachella (to the west) and Blythe (to the east) in an unincorporated part of Riverside County, California (Exhibit A, Figure 1). Approximate latitude and longitude coordinates for the center of the Study Area (Solar Farm area) are 33 degrees 49'20.0894N /' 115 degrees 23'37.427"W in the Pinto Wells, Coxcomb Mts., Victory Pass, East of Victory Pass, Desert Center, and Corn Springs United States Geological Survey (USGS) 7.5-minute series quadrangles (Exhibit A, Figure 2). Beyond the Solar Farm, the Study Area also encompasses the interconnection transmission line (Gen-Tie Line) and Red Bluff Substation, where the project would interconnect with the Southern California Edison (SCE) regional transmission system.

The Study Area for this investigation is defined as the area where potential ground disturbing components of the proposed project would occur based on the alternatives identified and analyzed in conjunction with the Environmental Impact Statement presently being prepared for the project by the Bureau of Land Management (BLM) (Exhibit A, Figure 3). The Study Area predominantly encompasses federal public lands under the jurisdiction of the BLM, but also includes portions of private property for the Gen-Tie Line alternatives and one of the substation locations.

1.3 Project Description

The Project consists of three main components associated with generating and delivering electricity from a photovoltaic (PV) solar facility:

- Solar Farm site (the main PV generating facility);
- 220-kV Gen-Tie Line; and
- 500/220-kV Substation (the Red Bluff Substation).

The Solar Farm site, where the power would be generated, would encompass between 3,045 and 4,245 acres, depending on the layout selected. The Solar Farm site would consist of several components:

- Main generation area, which includes PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- Solar Energy Visitor's Center;
- On-site substation (where the voltage of the Solar Farm-generated electricity would be stepped up to 220 kV, which is the voltage of the Gen-Tie Line); and
- Site security and fencing.

The Gen-Tie Line would transmit the electricity generated at the Solar Farm to the regional transmission system, through the Red Bluff Substation where the power from the Solar Farm would feed into the SCE's existing Devers Palo Verde 1 (DPV1) 500-kV transmission line. The length of the Gen-Tie Line would vary from 9.3 to 12.2 miles long, encompassing 177 to 236 acres, depending on the Gen-Tie Line route selected.

The Red Bluff Substation would consist of a 500/220-kV substation on approximately 90 acres, with an additional 20 to 30 acres needed for related features, access roads, and drainage control. It would interconnect the power from the Solar Farm (through the Gen-Tie Line) to SCE's DPV1 transmission line, which passes immediately adjacent to the two substation sites evaluated in this EIS.

1.4 Contact Information

Applicant Contact	***Wetland and Biological Consultant***	***Wetland Regulatory Scientist***
Applicant: Lisa Bodensteiner, Vice President, Business Development **Desert Sunlight Holdings, LLC** 1111 Broadway, 4th Floor Oakland, CA 94607 ***Applicant Contact:*** Amanda Beck (510) 625-7408 ABeck@FirstSolar.com	**Ironwood Consulting Inc.** 20 Nevada Street, Suite 300 Redlands, CA 92373 *Contact:* Chris Blandford (949) 351-0192 chris@ironwoodconsultinginc.com	**Huffman-Broadway Group, Inc** 828 Mission Avenue San Rafael, California 94901 *Contact:* Terry Huffman, Ph.D. (415) 925-2000 thuffman@h-bgroup.com

1.5 Driving Directions to Study Area from Corps Office

***From*:** U.S. Army Corps of Engineers
Regulatory Division, Los Angeles Office
915 Wilshire
Los Angeles, CA 90017

***To*:** Solar Farm Area

Route Changes	Directions	Miles
1.	Head **northwest** on **Wilshire Blvd** toward **Francisco St**	**0.2 mi**
2.	Take the 3rd **left** onto **S Bixel St**	**0.2 mi**
3.	Take the **CA-110 S/Harbor Fwy/I-110** ramp	**0.1 mi**
4.	Merge onto **CA-110 S/I-110 S**	**0.6 mi**
5.	Take the exit toward **Adams Blvd**	**0.3 mi**
6.	Keep **right** at the fork, follow signs for **I-10 E** and merge onto **I-10 E**	**2.7 mi**
7.	Take exit **16A** for **Santa Fe Ave**	**0.2 mi**
8.	Keep **left** at the fork, follow signs for **Freeway**	**0.5 mi**
9.	Keep **right** at the fork, follow signs for **CA-60 E/I-5 S/Pomona/Santa Ana** and merge onto **CA-60 E**	**52.2 mi**
10.	Take exit **53B** for **I-215 N** toward **San Bernardino/Barstow**	**0.1 mi**
11.	Merge onto **CA-91 E**	**0.2 mi**
12.	Continue onto **I-215 N**	**5.5 mi**
13.	Take the exit onto **I-10 E** toward **Redlands**	**119.0 mi**
14.	Take exit **192** for **Desert Center Rice Rd/CA-177**	**0.2 mi**
15.	Turn **left** at **CA-177 N/Desert Center Rice Rd**	**0.2 mi**
16.	Take the 1st **left** onto **Ragsdale Rd**	**0.1 mi**
Estimated Driving Time & Distance	About **2 hours 58 mins** ***(up to 4 hours 50 mins in traffic)***	**183 miles**

1.6 Environmental Setting

1.6.1 Topography

The majority of the Study Area consists of relatively flat desert terrain located in the Chuckwalla Valley of the Sonora Desert. Elevations range from approximately 180 to 320 feet (55 to 100 meters) above mean sea level.

1.6.2 Land Use

The Study Area consists of a largely vacant, undeveloped land area in eastern Riverside County. The Study Area contains existing transmission lines, telephone lines and pipelines, as well as dirt roads. Joshua Tree National Park is located to the north, east, and west of the Study Area; at its closest point, and is approximately 1.4 miles southwest of the National Park boundary. The inactive Eagle Mountain Mine is located approximately one mile from

the closest point west of the Study Area (Exhibit A, Figures 1 and 2).

1.6.3 Geology

Regional and site surficial geology are discussed in the 2007 *Phase 1 Geologic Reconnaissance Report* prepared for the Project by Eberhart /United Consultants (EUC). The site is in the east-northeastern Colorado Desert Geomorphic Province. The San Andreas Fault defines the southwestern boundary of the eastern Colorado Desert while the San Bernardino Mountains form a lesser defined boundary to the north. The proposed Solar Farm site and associated Gen-Tie Line and Substations are located in the Chuckwalla Valley, which was formed from multiple alluvial fans disseminating from the Eagle Mountains in the west and the Coxcomb Mountains in the east. Pinto Wash bisects the valley and forms the eastern boundary of the Solar Farm site. Review of recent aerial imagery and site photographs indicates that two significant geologic environments occur within the Study Area:

- Older alluvial sediments with developed desert pavement
- Active younger sediments with no evidence of desert pavement

1.6.3.1 Older Alluvial Sediments. EUC (2007) describes the established alluvial sediments as follows:

> *Older alluvial fan deposits consisting of Pleistocene nonmarine sediments extend outward into the valley from both the Eagle Mountains on the west and the Coxcomb Mountains on the east. Desert pavement type deposits (manganese and iron oxidized coatings on cobbles and sand) blanket the top three (3) to six (6) inches of the older alluvial fan material.*

1.6.3.2 Active Younger Sediments. The active younger sediments are of Holocene age and consist of fine to coarse sand, interbedded with clay, silt and gravel. There is no evidence of desert pavement. Topography in these areas tends to be consistent, with channel depths generally less than 1 foot deep.

1.6.3.3 Stream Channels. Lateral migration of stream channels is typically evaluated based on the analysis of historical aerial photographs. AECOM (2009) reviewed aerial photographs of the Study Area from 1978, 1996 and 2002. Stream channels within the Study Area appear to have been relatively stable over this period. On the basis of the authors' study of similar environments, it is expected that ephemeral stream channels in the older alluvial regions would remain relatively stable over time. It is more difficult to determine the stability of smaller channels in the more active portions of the site Study Area; the shallow channels within the younger sediments would likely exhibit frequent channel avulsion and lateral migration during flood flows.

1.6.3.4 Active Floodplain Characteristics. Desert regions pose a unique set of environmental and natural resource conditions that require careful review and evaluation

to fully determine the existence and extent of the active floodplain. Traditional streams with clearly definable bed, bank and channels are not common. Broad alluvial systems that form from erosive processes that commence in surrounding rugged mountains are more typical. These areas generally contain young soils and numerous, very dynamic smaller drainage features. The most comprehensive and current guide for determining the active floodplain in desert regions is A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley 2008).

Lichvar states that ephemeral drainages in xeric regions are more dynamic than intermittent/perennial systems in more mesic regions. Desert ephemeral washes may include active floodplains that consist of multiple low-flow channels. These low-flow channels may be redirected and change course as a result of low to moderate discharge events (i.e., 5 to 10 year frequencies). Discharge events are periods of precipitation that induce surface flow and are typically episodic, meaning they range in intensity and do not persist for long periods of time. Under these conditions, low-flow channels typically exhibit poorly formed soils and reduced vegetation cover and are spatially dynamic. The boundaries of the active floodplain may be determined by visual observations, both in the field and from aerial images, of changes in soil texture and vegetation cover. Exhibit A, Figure 4 presents a representative arrangement of low-flow channels within the active floodplain and adjacent terrace.

Alluvial fan systems can be described as either active or inactive. Key characteristics of active alluvial fans include discontinuous channels, presence of sheetflow, uniform topography, and relatively uniform vegetation cover. Characteristics of inactive alluvial fans include continuous and defined channels, presence of desert pavement, diverse topography, and relatively diverse vegetation cover. Local geological conditions substantially influence alluvial fan characteristics.

1.6.4 Soils

Soils data for the Study Area has not been mapped and is therefore not available from the U.S. Department of Agriculture National Resources Conservation Service (USDA 2009). This is similarly true for a large portion of the Chuckwalla Valley and other remote portions of the California desert. Although soils have not been mapped, on site observation of surface conditions and interpretation of aerial photography reveal two primary soil types within the Study Area: desert pavement and more active wash sediments. These soils consist of alluvial materials primarily made up of sorted sands and gravel.

1.6.5 Vegetation

The Study Area is dominated by two distinctive vegetation types, creosote bush scrub and desert dry wash woodland (following the Holland 1986 California Vegetation Classification System). Plant species typical of the creosote bush scrub vegetation type include creosote bush (*Larrea tridentata*), burro bush (*Ambrosia dumosa*), boxthorn (*Lycium* sp.), brittlebush (*Encelia farinose*), Schott's indigo bush (*Psorothamnus schottii*)

and prickly pear cactus (*Opuntia* and *Cylindropuntia* sp.). The evergreen creosote shrub visually appears relatively uniformly spaced within the desert landscape where it occurs. Vegetation density and height become noticeably reduced at locations within the Study Area exhibiting poor water infiltration capability such as stone covered desert pavement areas. Plants species typical of the desert dry wash woodland vegetation type include blue palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*), smoke tree (*Psorothamnus spinosa*), and desert willow (*Chilopsis linearis*). Desert dry wash woodland was found to occur within the Study Area adjacent to ephemeral dry wash areas with braided channels that support dynamic flow.

1.6.6 Climate

The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 defines southwestern California as a semi-arid region. The Riverside County Hydrology Manual describes the inland valley and desert areas as extremely hot and dry during the summer months and moderate during the winter. The mean seasonal precipitation is 3 inches in the eastern desert regions where the Study Area is located, which contrasts with the 35 to 40 inches of precipitation occurring in the San Bernardino and San Jacinto Mountains.

Three types of storms occur within the region: (1) general winter storms; (2) general summer storms; and (3) high intensity thunderstorms. General winter storms originate as extra tropical cyclones (warm Pacific Ocean air masses) that occur in the late fall or winter months. Monthly precipitation totals obtained from the Western Regional Climate Center Cooperative Observer Program for the Eagle Mountain, California Station, averaged for the winter months of October through March for the last ten years indicate that, from 2007 to 2010, average precipitation has been historically high and therefore represents a conservative baseline for Corps jurisdictional analysis (Exhibit A, Figure 6; Exhibit B). In the winter of 2009-2010, the average precipitation was 5.15 inches. High rates of precipitation occur over the interior mountain ranges, but precipitation decreases rapidly over the desert areas within the watershed basins. General summer storms can result in heavy precipitation and may include durations of several days. These storms typically occur between the months of July and September as a result of tropical air masses from either the Gulf of Mexico or the South Pacific Ocean. Thunderstorms that generate extremely high precipitation rates for short durations can occur at any time of year.

1.6.7 Hydrology

The Study Area is located within the Southern Mojave Watershed (HUC 18100100) (Exhibit A, Figure 7). The Study Area and ancillary project components would be located on portions of ten smaller (i.e., HUC 12) watersheds within the Southern Mojave Watershed. (Exhibit A, Figure 8). The Study Area is located within watersheds originating in the Eagle Mountains, with general flow directions of northwest to southeast. The alternative Gen-Tie Lines parallel to Eagle Mountain Road and Kaiser Road are also located within HUC 12 watersheds originating in the Eagle Mountains, with general flow directions of west to east. Big Wash is a major hydrological feature that crosses the Gen-Tie Lines and merges with other watersheds in upper Chuckwalla

Valley between Kaiser Road and Highway 177. The remaining project components – the Red Bluff Substation alternatives and southern extensions of the Gen-Tie Lines – are located within watersheds originating in the Chuckwalla Mountains, with general flow directions of southwest to northeast. Pinto Wash is east of the Solar Farm alternatives and flows from north to south while receiving surface flow from Eagle Mountain watersheds on the west and Coxcomb Mountain watersheds on the east; Pinto Wash does not intersect any of the proposed project features.

Surface and channel flooding can occur within the Study Area any time of year; however, many years can pass between surface flow events. General winter and summer storms generate low amounts of precipitation that typically infiltrates into the ground where it falls with little or no surface flow generated; or, if flow does occur, it typically runs within small localized areas before it can infiltrate below the ground surface. Flooding as a result of high intensity thunderstorms typically lasts only a few hours at most and may not necessarily occur over the entire site, but in localized areas.

1.6.8 FEMA Flood Zone

The Federal Emergency Management Agency (FEMA) has not conducted a flood hazard analysis of the Study Area and therefore no FEMA flood zone designation exists.

1.7 Disclaimer

Ironwood Consulting, Inc. and Huffman-Broadway Group, Inc., have conducted a thorough historic review and site investigation and made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the Corps may consider in determining jurisdiction under their CWA jurisdiction as part of the Corps jurisdictional verification/determination process; however, Sunlight reserves the right to challenge or seek revision to any areas over which the Corps may assert jurisdiction.

2.0 REGULATORY FRAMEWORK

2.1 Definition of Wetlands and Other Waters of the U.S.

Section 404 of the Federal Clean Water Act authorizes the Corps to regulate activities that discharge dredged or fill material to wetlands and other waters of the United States. As described by EPA's and the Corps' regulations (40 CFR § 230.3(s) and 33 CFR § 328.3(a), respectively), the term "waters of the United States" encompasses the following resources:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

- (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
- (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
- (iii) Which are used or could be used for industrial purpose by industries in interstate commerce

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

EPA and the Corps define wetlands as:

> [T]hose areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (EPA regulations at 40 CFR § 230.3(t); Corps regulations at 33 CFR § 328.3(b)).

2.2 Limits of Jurisdiction

The following provides the regulatory definitions and criteria followed in determining the geographic extent of potential EPA/Corps jurisdiction as applicable to inland waters.

The geographic limits of relevant federal jurisdiction for non-tidal waters of the U.S. are defined as follows at 33 CFR § 328.4(c):

> *Non-Tidal Waters of the United States*: The limits of jurisdiction in non-tidal waters:
>
> (1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark.
>
> (2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
>
> (3) When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

The terms "adjacent" and "ordinary high water mark," used in the above definition, are defined at 33 CFR § 328.3 as follows:

> The term *adjacent* means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands." (33 CFR § 328.3(c))
>
> The term *ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33 CFR § 328.3(e))

Wetlands: Implicit in the definition is the need for a site to meet certain water, soil, and vegetation criteria to qualify as a jurisdictional wetland. These criteria and the methods used to determine whether they are met and determine the geographic extent of wetland areas identified in the field are described in the Corps' 1987 *Wetlands Delineation Manual* and various regional supplements.

2.3 Identification of the Ordinary High Water Mark

The Corps definition of Ordinary High Water Mark (OHWM) provides the criterion by which the OHWM line can be identified which consists of "that *line on the shore established by fluctuations of water and indirect physical characteristics*." These associated physical characteristics are indicators that can be used to identify the OHWM caused by surface water fluctuations. Tables 1a and 1b, below provide a listing of indicators associated with areas that become flood or ponded, but are not dominated by wetland vegetation and the duration of flooding, ponding and/or near surface soil saturation (≤12 inches) is not sufficient to cause hydric soils to form or wetland hydrology conditions to occurs.

2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).

Table 1a. Potential Geomorphic Indicators of Ordinary High Water Marks for the Arid West *		
Potential Geomorphic OHWM Indicators		
(A) Below OHW	**(B) At OHW**	**(C) Above OHW**
1. In-stream dunes 2. Crested ripples 3. Flaser bedding 4. Harrow marks 5. Gravel sheets to rippled sands 6. Meander bars 7. Sand tongues 8. Muddy point bars 9. Long gravel bars 10. Cobble bars behind obstructions 11. Scour holes downstream of obstructions 12. Obstacle marks 13. Stepped-bed morphology in gravel 14. Narrow berms and levees 15. Streaming lineations 16. Dessication/mud cracks 17. Armored mud balls 18. Knick Points	1. Valley flat 2. Active floodplain 3. Benches: low, mid, most prominent 4. Highest surface of channel bars 5. Top of point bars 6. Break in bank slope 7. Upper limit of sand-sized particles 8. Change in particle size distribution 9. Staining of rocks 10. Exposed root hairs below intact soil layer 11. Silt deposits 12. Litter (organic debris, small twigs and leaves) 13. Drift (organic debris, larger than twigs)	1. Desert pavement 2. Rock varnish 3. Clast weathering 4. Salt splitting 5. Carbonate etching 6. Depositional topography 7. Caliche rubble 8. Soil development 9. Surface color/tone 10. Drainage development 11. Surface relief 12. Surface rounding

* Adapted from *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0)

Table 1b. Potential Vegetation Indicators of Ordinary High Water Marks for the Arid West *			
Potential Vegetation OHWM Indicators			
	(D) Below OHW	**(E) At OHW**	**(F) Above OHW**
Hydroriparian indicators	1. Herbaceous marsh species 2. Pioneer tree seedlings 3. Sparse, low vegetation 4. Annual herbs, hydromesic ruderals 5. Perennial herbs, hydromesic clonals	1. Annual herbs, hydromesic ruderals 2. Perennial herbs, hydromesic clonals 3. Pioneer tree seedlings 4. Pioneer tree saplings	1. Annual herbs, xeric ruderals 2. Perennial herbs, non-clonal 3. Perennial herbs, clonal and non-clonal co-dominant 4. Mature pioneer trees, no young trees 5. Mature pioneer trees w/upland species 6. Late-successional species
Mesoriparian indicators	6. Pioneer tree seedlings 7. Sparse, low vegetation 8. Pioneer tree saplings 9. Xeroriparian species	5. Sparse, low vegetation Annual herbs, hydromesic 6. ruderals 7. Perennial herbs, hydromesic clonals 8. Pioneer tree seedlings 9. Pioneer tree saplings 10. Xeroriparian species 11. Annual herbs, xeric ruderals	7. Xeroriparian species 8. Annual herbs, xeric ruderals 9. Perennial herbs, non-clonal 10. Perennial herbs, clonal and non-clonal codominent 11. Mature pioneer trees, no young trees 12. Mature pioneer trees, xeric understory 13. Mature pioneer trees w/upland species 14. Late-successional species 15. Upland species
Xeroriparian indicators	10. Sparse, low vegetation 11. Xeroriparian species 12. Annual herbs, xeric ruderals	12. Sparse, low vegetation 13. Xeroriparian species 14. Annual herbs, xeric ruderals	16. Annual herbs, xeric ruderals 17. Mature pioneer trees w/upland species 18. Upland species

* Adapted from *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0).

2.4 Wetlands Delineation Criteria

The Corps' 1987 *Wetlands Delineation Manual* identifies the key diagnostic criteria for determining the presence of wetlands. These include:

1. Wetland Hydrology: Inundation or saturation to the surface during the growing season.
2. Hydric Soils: Soils classified as hydric or that possess characteristics associated with reducing soil conditions.
3. Predominance of Wetland Vegetation: Vegetation classified as facultative, facultative wet, or obligate according to its tolerance of saturated (i.e., anaerobic) soil conditions.

Specific criteria used to determine the presence or absence of wetland hydrology, soil, and vegetation conditions are described in the sections below.

2.4.1 Wetland Hydrology

The 1987 Corps *Manual* states that wetland hydrology conditions occur when a "site is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation." Whether a site meets either of these criteria is determined by the presence of diagnostic indicators of wetland hydrology, which include listed in Table 2.

Table 2. Wetland Hydrology Indicators
(Based on 1987 Corps Manual and Corps Guidance Documents)

Primary Indicators	Secondary Indicators
Watermarks	Oxidized Rhizospheres Associated with Living Roots
Drift Lines	Water-Stained Leaves
Water-Borne Sediment Deposits	FAC-Neutral Test
Drainage Patterns Within Wetlands	Local Soil Survey Data

A March 8, 1992 Corps memorandum entitled *Clarification and Interpretation of the 1987 Manual* provides further clarification:

> Areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days for more than 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas wet between 5 percent and 12.5 percent of the growing season in most years may or may not be wetlands. Sites saturated to the surface for less than 5 percent of the growing season are non-wetlands.

Wetland hydrology indicators have also been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators are similar to the indicators listed above from the 1987 Corps *Manual* and are presented in Table 3.

Table 3. Wetland Hydrology Indicators for the Arid West
(Based on Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0)

	Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)	**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
Group A – Observation of Surface Water or Saturated Soils		
A1* – Surface Water	**X**	
A2 – High Water Table	**X**	
A3 – Saturation	**X**	
Group B – Evidence of Recent Inundation		
B1 – Water Marks	**X** (Nonriverine)	**X** (Riverine)
B2 – Sediment Deposits	**X** (Nonriverine)	**X** (Riverine)
B3 – Drift Deposits	**X** (Nonriverine)	**X** (Riverine)
B6 – Surface Soil Cracks	**X**	
B7 – Inundation Visible on Aerial Imagery	**X**	
B9 –Water-Stained Leaves	**X**	
B10 – Drainage		**X**
B11 – Salt Crust	**X**	
B12 – Biotic Crust	**X**	
B13 – Aquatic Invertebrates	**X**	
Group C – Evidence of Current or Recent Soil Saturation		
C1 – Hydrogen Sulfide Odor	**X**	
C2 – Dry-Season Water Table		**X**
C3 – Oxidized Rhizospheres along Living Roots	**X**	
C4 – Presence of Reduced Iron	**X**	
C6 – Recent Iron Reduction in Tilled Soils	**X**	
C7 – Thin Muck Surface	**X**	
C8 – Crayfish Burrows		**X**

Table 3. Wetland Hydrology Indicators for the Arid West (Based on Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0)		
	Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)	**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
C9 – Saturation Visible on Aerial Imagery		**X**
Group D – Evidence from Other Site Conditions or Data		
D3 – Shallow Aquitard		**X**
D5 – FAC-Neutral Test		**X**
***** Denotes number of wetland hydrology indicator described in detail in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).*		

2.4.2 Hydric Soils

The 1987 Corps *Manual* states that the diagnostic environmental characteristics indicative of wetland soil conditions are met when "soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions." According to the Manual, indicators of soils developed under reducing conditions may include:

1. Organic soils (Histosols);
2. Histic epipedons;
3. Sulfidic material;
4. Aquic or peraquic moisture regime;
5. Reducing soil conditions;
6. Soil colors (chroma of 2 or less);
7. Soil appearing on hydric soils list; and
8. Iron and manganese concretions.

A February 20, 1992, Corps memorandum entitled *Regional Interpretation of the 1987 Manual* states that the most recent version of National Technical Committee for Hydric Soils (NTCHS) hydric soil criteria will be used (to make hydric soil determinations). These soil criteria specify at least 15 consecutive days of saturation or 7 days of inundation (flooding or ponding) during the growing season in most years.

The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics. As indicated above, like the NRCS, the Corps has typically accepted guidance for the identification of hydric soils developed by the NTCHS. The NTCHS, a working group organized by NRCS, has

developed criteria for identifying and mapping hydric soils throughout the United States and defines a hydric soil as "a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part [of the soil profile]" (http://soils.usda.gov/use/hydric/intro.html). The most recent (2000) version of the NTCHS hydric soils criteria identifies those soils that are likely to meet this definition. These criteria, which are accepted by most state and federal agencies, are as follows (http://soils.usda.gov/use/hydric/criteria.html):

1. All Histels except Folistels and Histosols except Folists, or
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Andic, Vitrandic, and Pachic subgroups, or Cumulic subgroups that are:
    a. Somewhat poorly drained with a water table equal to 0.0 foot (ft) from the surface during the growing season, or
    b. poorly drained or very poorly drained and have either:
        (i.) water table equal to 0.0 ft during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in), or for other soils'
        (ii.) water table at less than or equal to 0.5 ft from the surface during the growing season if permeability is equal to or greater than 6.0 in/hour (h) in all layers within 20 in, or
        (iii.) water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in, or
3. Soils that are frequently ponded for a long duration or a very long duration (7 to 30 days) during the growing season, or
4. Soils that are frequently flooded for a long duration or a very long duration (7 to 30 days) during the growing season.

On the basis of computer database searches for soils meeting the second criterion, NRCS has developed hydric soils lists for many parts of the country. Although they are useful for determining whether a particular soil series *has the potential to support current hydric soil conditions*, caution should be used when using these lists for site-specific hydric soil determinations. Many soils on the lists have ranges in water table depths and other characteristics that allow them to be either hydric or nonhydric depending on landscape position and other site-specific factors (e.g., soil clay content, depth to bedrock). Accordingly, hydric soils lists are good ancillary tools to facilitate wetland determinations, but are not a substitute for onsite investigations.

Field indicators of hydric soils are morphological properties known to be associated with soils that meet the definition of a hydric soil. Presence of one or more field indicators suggests that processes associated with hydric soil formation have taken place on the site being observed. The field indicators are essential for hydric soil identification because once formed, they persist in the soil during both wet and dry seasonal periods. However,

few hydric soil indicators identify soils at a site as being currently hydric in accordance with the NTCHS hydric soils criteria described above. Field indicators of hydric soil conditions are listed in Table 4:

Table 4. Field Indicators of Hydric Soil Conditions
(Based on 1987 Corps Manual and Corps Guidance Documents)

1. Indicators of Historical Hydric Soil Conditions:	2. Indicators of Current Hydric Soil Conditions:
a. Histosols b. Histic epipedons; c. Soil colors (e.g., gleyed or low-chroma colors, soils with bright mottles (Redoximorphic features) and/or depleted soil matrix d. High organic content in surface of sandy soils e. Organic streaking in sandy soils f. Iron and manganese concretions g. Soil listed on county hydric soils list	a. Aquic or peraquic moisture regime (inundation and/or soil saturation for ≥7 continuous days) b. Reducing soil conditions (inundation and/or soil saturation for ≥ 7 continuous days) c. Sulfidic material (rotten egg smell)

The presence of one or more of the field indicators in "1 a, b, c, and/or d" above suggests that historical processes associated with hydric soil development have taken place at a given site. These indicators are useful in determining if soils at a site were historically formed under hydric soil conditions because the indicators persist in soils during both wet and dry periods and may remain for decades and even centuries after changes in site conditions occur that inhibit subsequent wetland development, such as the elimination of wetland hydrology (NRCS 1995). However, only the presence of field indicators "2 a, b, and/or c" confirms that hydric soils occur at a site during the period of observation.

Hydric soil indicators have also been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators are similar to those listed above from the 1987 Corps *Manual* and are presented in Table 5:

Table 5. Hydric Soil Indicators for the Arid West
(Based on Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0)

Hydric Soil Indicators			Hydric Soil Indicators for Problem Soils**
All Soils	**Sandy Soils**	**Loamy & Clayey Soils**	
A1* – Histosol	S1 – Sandy Mucky Mineral	F1 – Loamy Mucky Mineral	A9 – 1 cm Muck
A2 – Histic Epipedon	S4 – Sandy Gleyed Matrix	F2 – Loamy Gleyed Matrix	A10 – 2 cm Muck
A3 – Black Histic	S5 – Sandy Redox	F3 – Depleted Matrix	F18 – Reduced Vertic
A4 – Hydrogen Sulfide	S6 – Stripped Matrix	F6 – Redox Dark Surface	TF2 – Red Parent Material
A5 – Stratified Layers	--	F7 – Depleted Dark Surface	Other (See Section 5 of the Regional Supplement, Version 2.0)--
A9 – 1 cm Muck	--	F8 – Redox Depressions	--
A11 – Depleted Below Dark Surface	--	F9 – Vernal Pools	--
A12 – Thick Dark Surface	--	--	--

***** Denotes number of hydric soil indicator described in detail in *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).*
****** Indicators of hydrophytic vegetation and wetland hydrology must be present.

It should also be noted for problematic areas that the 2008 Corps Regional Supplement specifies 14 days continuous ponding as an acceptable indicator of problematic hydric soils (USACE 2008, p. 101).

2.4.3 Prevalence of Wetland Vegetation

Species Classifications

Species classifications (e.g., tolerance of anaerobic soil conditions) are determined by consulting the *National List of Plant Species that Occur in Wetlands* (Reed 1988) and the relevant regional lists, which are published by FWS's National Wetlands Inventory (NWI). Regional Interagency Review Panels develop the lists by determining species' estimated probability of occurrence in wetlands vs. non-wetlands. Classifications are made by unanimous agreement of the Panel. If the Panel is unable to reach a unanimous decision on the status of a species, "no agreement" (NA) is recorded. If insufficient information exists to determine the status of a species, "no indicator" (NI) is recorded. Species that are not included in the NWI list are assigned a "not listed" (NL) designation in this report.

The resulting NWI lists include plants that grow in a range of soil conditions from permanently wet to dry. Species are divided into the following "indicator categories:"

1. **"Obligate wetland" (OBL)** species, which, under natural conditions, occur almost always in wetlands (estimated probability >99 percent);
2. **"Facultative wetland" (FACW)** species, which usually occur in wetlands (estimated probability 67 – 99 percent), but are occasionally found in non-wetlands;
3. **"Facultative" (FAC)** species, which are equally likely to occur in wetlands or non-wetlands (estimated probability 34 – 66 percent);
4. **"Facultative upland" (FACU)** species, which sometimes occur in wetlands (estimated probability 1 – 33 percent), but more often occur in non-wetlands; and
5. **"Obligate upland" (UPL)** species, which occur in wetlands in other regions, but, under natural conditions, occur almost always in non-wetlands in the region specified (estimated probability >99 percent).

Species that have an indicator status of OBL, FACW, and FAC are typically considered to be adapted for life in anaerobic soil conditions (Corps 1987) and are used as evidence of hydrophytic vegetation when they dominate plant community composition or cover. Despite widespread use of the lists for wetland delineations, it is important to note that wetland indicator species assignments are not based on the results of a statistical analysis of species occurrence.

The indicator assignments are approximations of wetland affinity based on a synthesis of submitted review comments, published botanical literature, and the field experience of the members of the Interagency Review Panel. For this reason and because many plants have properties that enable them to occur in a range of microhabitats (i.e., wetlands and non-wetlands), the presence of wetland indicator species is not unequivocal evidence of the presence of wetland hydrology and hydric soils. A positive indicator or indicators of wetlands should be emphasized, such as an assemblage of plants that can only be considered "hydrophytes" when they are growing in water or partly drained hydric soils (not effectively drained hydric soils) (Corps 1987). From the FWS's perspective, all species on the NWI plant lists are hydrophytes at one time or another and the wetland indicator status (OBL, FACW, FAC, or FACU) reflects the likelihood that a given individual of a species is a hydrophyte or a certain population of these plants is hydrophytic. While OBL and FACW species are the most reliable plant indicators of wetlands, FAC and FACU species also contain populations of hydrophytes (Tiner 2006).

For the reasons stated above, the 1987 Corps *Manual* does not solely rely on the presence of hydrophytic vegetation to make wetland determinations.

Hydrophytic Vegetation Definitions

The Corps' 1987 *Manual* states that the wetland vegetation conditions are met when the prevalent vegetation (i.e., more than 50 percent of vegetation cover or tree basal area) consists of macrophytes that are typically adapted to sites having wetland hydrologic and soil conditions (e.g., periodic or continuous inundation or soil saturation). Hydrophytic vegetation is defined as "plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Cowardin *et al*.

1979). Hydrophytic vegetative species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Positive indicators of the presence of hydrophytic vegetation include:

1. More than 50 percent of the dominant species are rated as Obligate ("OBL"), Facultative Wet ("FACW"), or Facultative ("FAC") on lists of plant species that occur in wetlands (see Reed 1988 for California);
2. Visual observations of plant species growing in sites of prolonged inundation or soil saturation; and
3. Reports in the technical literature indicating the prevalent vegetation is commonly found in saturated soils.

Hydrophytic vegetation indicators have been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators include:

1. Dominance Test. More than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC.
2. Prevalence Index. The prevalence index is 3.0 or less with indicators of hydric soils and wetland hydrology being present.
3. Morphological adaptations. The plant community passes either the dominance test or the prevalence index after reconsideration of the indicator status of certain plant species that exhibit morphological adaptations for life in wetlands.

3.0 DELINEATION METHOD

The study will be conducted in accordance with Code of Federal Regulations (CFR) definitions of jurisdictional waters, the Corps' 1987 *Wetlands Delineation Manual*, the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual,* and supporting Corps and EPA guidance documents. The following provides an overview of the objective of the delineation approach, how the Study Area is defined, and the methods used to identify and map (delineate) areas potentially subject to Corps jurisdiction under Section 404 of the CWA.

3.1 Objective and Establishment of Study Area Boundary

The objective of this investigation was to identify and map areas potentially subject to CWA Section 404 jurisdiction under the Corps' Regulatory Program within the Study Area. The approach taken by this study was to identify, using field indicators, the location of potential wetlands or other waters of the United States subject to Corps jurisdiction. A description of these field indicators can be found in sections 2.3 and 2.4, above and the above referenced documents.

3.2 Field Data Collection

Prior to initiating detailed field survey work, existing land forms within the Study Area that may potentially contain wetlands or other waters of the United States were identified by conducting on-site reconnaissance inspections during the months of September through December 2009 and January 2010 in conjunction with review of the following information:

- Aerial photography of the area;
- USGS Topographic Mapping;
- Topographical Light Detection and Range (LIDAR) data (12 inch contours);
- USGS National Hydrology Dataset;
- Hydrological models of flood events; and
- Preliminary level vegetation and soils mapping conducted during January 2007.

It should be noted that no soils mapping for the Study Area has been prepared by BLM or the U.S. Department of Agriculture National Resources Conservation Service and therefore was not available for review. This is similarly true for a large portion of the Chuckwalla Valley where the Study Area is located and other remote portions of the California desert. Although soils have not been mapped, on site observation of surface conditions and interpretation of aerial photography reveal two primary soil types within the Study Area: desert pavement and more active wash sediments. These soils consist of alluvial materials primarily made up of sorted sands and gravel.

Based on the above site reconnaissance and document review, land features were identified that had the potential to be the types of areas that may flood, pond, and /or the

soils become saturated. This review indicated that low-lying landscape features such as channels and depressions within the Study Area have the potential to have field indicators which would provide indication of wetlands or other waters of the United States.

Detailed field investigations within areas identified as having potential areas subject to Corps CWA jurisdiction were initiated in February 2010 and ended in May 2010 (see Exhibit C for field investigation dates). These on-site field surveys were designed to collect data that would provide evidence of areas potentially subject to Corps jurisdiction. Field data was collected along linear transects systematically plotted across portions of the Study Area that were determined to be representative of existing soils, vegetation and drainage conditions that may contain wetlands or other waters of the United States (Exhibit D). The linear transects were oriented perpendicular to the general surface water drainage pattern.

Each potential jurisdictional land feature encountered along an identified transect, such as a low-lying depressional area or channel, was sampled (sample point) and if any indicators of wetland hydrology, hydric soils, wetland vegetation, and/or a OHWM were found, this information was documented using a Trimble YUMA handheld computer with built-in GPS and ESRI ArcPad software. The widths of each channel's OHWM encountered in the field were measured to the nearest foot. Measurement of channel width was taken by measuring across the active channel from one OHWM to the OHWM on the opposite side of the channel. Each of the above described sample point locations was also documented as a point feature using the above described GPS unit. The GPS united allowed for real-time GIS data collection unit with sub-meter accuracy after post-processing. Photographs were also taken of representative channels during the survey effort.

3.3 Rainfall Analysis

A "Climate Analysis" (WETS analysis) was conducted to assess whether rainfall periods during the 2009 to 2010 period of study fall well within the normal range of precipitation based on long-term records collected at the nearest appropriate NWS cooperative weather station. The method for rainfall analysis followed the Technical Standard for Water-Table Monitoring of Potential Wetland Sites (Corps 2005), which is a technical standard by which the Corps determines what is normal, below normal and above normal rainfall month for any given year of record. The purpose of this analysis was to aid in establishing whether surface hydrology indicators observed on site were likely the result of the amount of rainfall received during the period of study. Daily weather data for 2009 and 2010 were compared with historical average monthly rainfall data (averaged for the years 1971 to 2000) from the Western Regional Climatic Center for the Eagle Mountain rainfall station (CA 2598, see Exhibit B).

3.4 Mapping

Areas potentially subject to Corps jurisdiction were identified and entered as geo-referenced attribute data into a GIS data base (1) using the field data collected at each GIS documented sample location (Exhibit C), and (2) by digitizing active drainage features

identified through interpretation of orthorectified digital satellite imagery with ≤ 60 cm pixel resolution. The photointerpretation process was aided through the use of the above referenced field data, topographic data derived from modeled Topographical Light Detection and Range (LIDAR) data, and field verification of the mapped land features. This photointerpretation approach allowed for qualitative photointerpretation of drainages and individual shrubs and trees at intervals of less than 2 feet in width. Active linear drainage features were mapped as line features due to their narrow width. Desert Dry Wash Woodland habitat included linear drainage features and adjacent riparian shrubs and trees were mapped as polygons.

4.0 TECHNICAL FINDINGS

The following sections describe the landscape features and field indicators found within the Study Area that provide a technical basis for (a) determining the presence or absence of a potential water of the United States; and (b) defining the geographic extent of any potential water of the United States identified. Two types of landscape features were found that potentially contain waters of the United States. These include:

1. Natural drainages
2. Man Made Drainages

4.1 Field Indicators of Hydric Soils

Based on field observations within the Study Area, soil indicators were not found that meet the hydric soils criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). On site observations of surface conditions, including road and channel bank cuts and interpretation of aerial photography, revealed two primary soil types, desert pavement and more active wash sediments. On site examination revealed that soils or substrates within both natural drainages and man made drainages consist of alluvial materials primarily made up of sorted sands and gravel, and are well drained, ranging from moderately well drained to excessively well drained.

4.2 Field Indicators of Wetland Hydrology Conditions

Based on field observations within the Study Area, wetland hydrology indicators were not found that meet the hydric soils criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). On site observations revealed evidence of flooding within the low-lying natural and man made drainages. These observations also showed that there was no evidence of ponding and soil saturation for long to very long periods of time. The lack ponding and soil saturation conditions meeting the wetland hydrology criteria is a direct result of the moderately well drained to excessively well drained alluvial soils.

Although wetland hydrology conditions were not found within the Study Area, the field indicators of active surface water flow or flooding found within natural and man made drainages were sufficient enough to form an OHWM. As indicated in Section 2.0, an OHWM provides a technical basis for (a) determining the presence a potential water of the United States; and (b) defining the geographic extent of potential waters of the United States.

The natural and man made drainages within the Study Area with an OHWM exhibited the following characteristics which are discussed in detail in the following subsections:

1. identifiable field indicators of surface flow

2. identifiable landscape features that supports surface flow
3. identifiable landscape features with a recognizable OHWM

4.2.1 Field Indicators of Surface Flow

Review of topographic mapping (USGS and LIDAR modeling) and imagery of the Study Area provided visual indication of the presence of curvilinear depressional land surface features where focused surface water flow could potentially be directed. Field investigations confirmed the presence of surface flow within a number of these channels or drainages while others lacked evidence / field indicators of active ephemeral surface water flow. No drainages were found to contain evidence of perennial or intermittent surface water flow, and no evidence of subsurface flow was found in the form of spring discharges, artesian flows or evidence of a high groundwater table. The active ephemeral drainages had downstream surface channel and evidence of surface water / hydrologic connectivity with other active drainages within and outside the Study Area. These ephemeral drainages are locally referred to as desert dry washes. Indicators of drainages having active surface water flow paths included (1) water marks defined by linear deposits of fine grained sediment, minerals and/or plant debris; (2) bank scour, erosion and/or shelving; (3) deposits of sorted alluvial materials; and (4) flow deposited woody and soft tissue plant debris (Exhibit C).

Flow-deposited woody and soft tissue plant debris were typically absent in drainages that did not have active surface flow. If woody debris was present, the pieces observed were relatively thick (i.e., greater that ¼ inch) weathered limb or root material or milled posts or lumber. The wood pieces found were randomly placed and were not part of a collective flow line of deposited woody and/or soft tissue plant debris, which would be indicative of an active channel. The historical drainages were found to possess one or more of the same type of indicators found in active drainages, but the indicators found were considerably weathered. Surface flow indicators such as bank scour, erosion and shelving areas had rounded edges in contrast to those found in active drainages having angular edges. Water marks defined by linear deposits of fine grained sediment and minerals, and sorted alluvial materials such as gravels, cobbles and boulders were etched or varnished from weathering. The historical drainages were found to consist of the historical remains of channel drainages that were abandoned due to upslope changes in drainage due to either channel down-cutting or the channel becoming abandoned as the surface drainage became redirected or changed course due to deposition of alluvial material damming the channel flow path.

Surface water flow patterns were also found within various portions of the landscape that were relatively flat. These surface flow areas were defined by flow-deposited fine grained sediment or soft tissue plant debris. The visible surface flow pattern at these locations would continue for several feet then disappear either on a relatively flat soil surface or localized depression.

The results of the WETS analysis described in subsection 3.3, above show that the level of monthly precipitation received for water year 2009-2010 was above normal (Exhibit

B). This confirms that the field indicators located within the Study Area provide technical evidence of active surface water flow resulting from precipitation and resulting channel flooding (Exhibit C). In addition, the observed flow patterns are consistent with the general discussion of surface and channel flooding described in subsection 1.6.7, above.

Based on the above technical findings and as documented in Exhibit C, drainages were found with indicators of active surface water flows within the Study Area.

4.2.2 Landscape Features that Support Surface Flow

Detailed field surveys identified land surface features that have the potential to convey surface flows. These features included a bed or channel and abutting banks. These physical features were found associated with both active flow areas and historical drainages. These drainage types can be summarized as follows:

1. Active drainage channel and abutting banks containing evidence of recent surface flows as indicated by the presence of unweathered sediment material (sand, gravel, cobbles, etc.) with unweathered surfaces, and the presence of flow deposited woody debris and/or soft tissue plant debris.
2. Active drainage channel and abutting banks containing evidence of historical surface flows as indicated by the presence of unweathered sediment material (sand, gravel, cobbles, etc.) with unweathered surfaces, but lacked the presence of flow deposited woody debris and/or soft tissue plant debris.
3. Historical drainage channels and abutting banks having no evidence of recent surface flow as indicated by weathered sedimentary gravel, cobbles, boulders, erosional or depositional deposits, and the lack of flow deposited woody debris and/ or soft tissue plant debris.

Based on hydrologic modeling (AECOM 2001, 2010a&b) for the Study Area, the frequency interval of flow events within drainages with observable plant debris (1 above) and unweathered sediment material was found to be in a 1 to 15 year range. Strojan, et. al. (1987) found that the surface litter decomposition rates for creosote bush and burro bush in the Mojave Desert was 42.5% and 58.4%, respectively. Kemp, et. al. (2003) reported a similar one year decompositions rate for creosote bush and a 74% loss within a 41 month period. This lends support to qualitative observations made by one of the preparers of this report, Dr. Terry Huffman, who has observed over 20 + years of delineating wetlands within arid environments that that soft plant tissue (i.e., pieces of plant leaves and thin bark) will decompose in arid drainage environments within a 2 to 3 year period. In addition, field observations by Dr. Huffman indicated that small woody stems (<1/4 inch) decompose over many more years, perhaps 10 + years. For older drainages where the surfaces of the sediment material (e.g., sand, gravel, cobbles, etc.) is no longer smoothed by the interaction of surface water flow and transport, but weathered, and lacks flow deposited woody and thin tissue plant debris, the frequency interval likely ranges to well over a decade in shallower channels to prehistoric times for deeply incised channels (i.e., > 6 feet in desert pavement areas).

The land surface of the Study Area is characterized by the presence of active and inactive alluvial fan systems. Ephemeral drainage channels are found on both types of these alluvial fan types. The majority of the ephemeral channels supporting active surface water flow were narrow, with an average width of 2 feet. Active alluvial fans were characterized by sandy soils, uniform vegetation, and evidence by surface flow patterns indicative of surface water sheetflow. Channels within these areas were weakly expressed and discontinuous. This discontinuity indicated that new channels could be formed with each major flood event resulting in the current channels being bypassed and blocked off. Evidence was found where previously bypassed cutoff channels had become filled with sediment. The specific conditions varied within the Study Area. For example, the central-southern Solar Farm contained very sandy soils with weakly expressed washes and uniformly spaced creosote evergreen shrub vegetation. The portion of Big Wash that crossed Kaiser Road also contained sandy soils, but contained more indicators of recent flow and abutting and adjacent uniformly distributed desert dry wash woodland vegetation. Inactive alluvial fans, which were generally more stable, supported well-defined channels among older sediments often containing upland terraces of desert pavement and rock. These areas were found in the northwest and southwest portions of the Solar Farm alternatives, along the southern portion of Gen-Tie A-1, along the northern portion of Gen-Tie B-1 that parallels Eagle Mountain Road, Redbluff Substation A, and the Redbluff Substation A access road alternatives.

Based on the above technical findings, drainages with active surface flow were found within the Study Area with physical features that allow for the conveyance of surface flows.

4.2.3 Landscape Features with a Recognizable OHWM

The desert dry washes with active flow were found to have identifiable features which represented the geographic reach of lateral surface water. These features included channels or beds with evidence of active flow abutting banks which demarcated the lateral reach or extent of flow. Field indicators of the extent of active flow along the banks included water marks defined by linear deposits of fine grained sediment, minerals and/or plant debris, bank scour, erosion and/or shelving, and flow deposited woody and soft tissue plant debris.

Based on the above technical findings, the active drainages, described in the above subsections, have recognizable landscape features from which the lateral extent of surface water flow can be geographically delineated. The upper limit of this active flow was used to identify the OHWM. Exhibit D shows the location of these active ephemeral drainages.

4.3 Field Indicators of Wetland Vegetation

Based on field observations within the Study Area, a dominance of wetland plant species or hydrophytes was <u>not</u> found. Based on this result, the criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers*

Wetland Delineation Manual: Arid West Region (Version 2.0) for wetland vegetation was not met.

4.3.1 Natural and Man Made Drainages

Two vegetation types occur within the Study Area, creosote bush scrub and Desert Dry Wash Woodland. The majority of natural and man made ephemeral drainages found within the Study Area occur within the creosote bush scrub vegetation type. The dominant plant species typical of this vegetation type, creosote bush, burro bush, and brittlebush are classified as upland species by the U.S. Fish and Wildlife Service, National Wetlands Inventory (Reed 1988).

Desert Dry Wash Woodland vegetation located within and directly abutting active drainages likely benefit from both surface and subsurface flows that periodically occur. Desert Dry Wash Woodland occurs in several locations within the Study Area. The dominant plant species typical of this vegetation type, blue ironwood, palo verde, and smoke tree are not considered plants that can occur in wetland conditions, however, the plants do occur in washes with braided channels that support dynamic flow. Although this vegetation type is typically associated with active drainages and commonly referred to as riparian vegetation, these woody shrub and tree species are classified as "upland" plant species by the U.S. Fish and Wildlife Service, National Wetlands Inventory (Reed 1988). According to the Corps, wetland species occur in habitats where soils and substrates are flooded or ponded for long to very long continuous periods of time that are ≥ 7 days (Corps 2008). The National Wetlands Inventory classification indicates that the frequency of upland plants occurring within wetlands about 1%.

These riparian plant species do, however, possess a unique ability to survive in arid systems where ephemeral drainages convey limited periodic surface flows as they can grow root systems which follow soil moisture to considerable depths. These phreatophytes are likely providing indication of subsurface flow where they occur within the Study Area.

5.0 AREAS POTENTIALLY SUBJECT TO FEDERAL JURISDICTION

This section presents the findings of this delineation with respect to the identification and geographic extent of areas found that could potentially constitute wetlands or other waters of the United States under Section 404 of the Clean Water Act for purposes of this jurisdictional determination by the Corps.

5.1 Wetlands

No areas meeting the Corps technical criteria for wetlands were identified within the Study Area. These findings are based on the absence of one or more of hydric soil, wetland hydrology, and wetland vegetation indicators as required by the Corps' *1987 Manual, the Arid West Regional Supplement*, guidance documents, and regulations.

5.2 Other Waters

Ephemeral drainages within the Study Area were found that meet the technical criteria to potentially be subject to CWA Section 404 jurisdiction as "other waters" of the United States (Exhibit D). This finding is based on the presence of an OHWM as defined by Corps regulations. Length and width measurements for each ephemeral drainage found to contain an observable OHWM are provided in Exhibit C. The total length of drainages identified is ___ feet or ___ miles and the average widths between ordinary high water marks within these ephemeral drainages ranges from ___ to _____ within the Study Area.

6.0 CWA JURISDICTIONAL ANALYSIS

This section analyzes the potential for waters identified within the Study Area to constitute waters of the United States subject to jurisdiction under the CWA. Section 6.1 provides an explanation of the jurisdictional determination process following EPA and Corps guidance. Section 6.2 defines the area to be analyzed (i.e., the Review Area). Section 6.3 analyzes the potential for waters of the United States to be present in the Review Area. Section 6.4 describes any jurisdictional and /or non-jurisdictional waters found. Section 6.5 summarizes the findings of this jurisdictional analysis.

6.1 Regulatory Background

Beyond the Corps and EPA regulatory definitions of "waters of the United States" as described in Section 2.0, recent judicial decisions have further limited and refined the scope of CWA jurisdiction with regard to isolated waters and certain wetlands and non-navigable tributaries. Two of these decisions are relevant to this jurisdictional analysis.

First, in *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, No. 99-1178* (531 U. S. 159; January 2001) ("SWANCC"), both statutory and constitutional challenges were made to the assertion of CWA jurisdiction over isolated, non-navigable, intrastate waters solely on the basis that those waters were used as habitat by migratory birds. The U.S. Supreme Court in SWANCC rejected the "migratory bird rule," and held that CWA jurisdiction does not exist over "isolated, non-navigable, intrastate waters" where there is no interstate or foreign commerce nexus.

Second, in *Rapanos v. United States* and *Carabell v. United States* (547 U.S. 715 [126 S. Ct. 2208] [2006]) (*Rapanos*), the U.S. Supreme Court addressed jurisdiction over wetlands and other waters that themselves did not constitute navigable waters. In Rapanos, the Court held that CWA jurisdiction extends to traditionally navigable waters, tributaries of such waters that flow year-round or contain continuous flow at least seasonally, and wetlands that directly abut such waters or tributaries. The Court held that jurisdiction does not exist, however, where such waters (1) do not have "a continuous surface water connection to bodies that are 'waters of the United States' in their own right"; or (2) do not have a hydrological connection that constitutes a "significant nexus" to or otherwise "significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'"

In response to *Rapanos*, EPA and the Corps issued guidance to EPA regions and Corps districts (Rapanos guidance; EPA and Corps, 2008). The Rapanos guidance identifies which waters the agencies will categorically assert jurisdiction over and which will be subject to a case-by-case analysis to identify whether the water has a "significant nexus" to a "traditional navigable water" (TNW) based on the *Rapanos decision*. The Rapanos guidance focuses only on those definitions of "waters of the United States" in 33 CFR § 328.3(a)(1), (a)(5) and (a)(7).[1] Neither the Court's decision nor the guidance draws a

[1] The Rapanos guidance covers the following 33 CFR § 328.3(a) definitions of "waters of the United States":

bright line with regard to the geographic reach of jurisdiction, particularly in drainages where flows are ephemeral and where wetlands are adjacent to, but not directly abutting relatively permanent waters. In the Rapanos guidance (p. 8), significant nexus is defined as follows:

> [A] significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW.

According to the Rapanos guidance, a significant nexus analysis "will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary, to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters."(Rapanos guidance, p. 8) The analysis will consider both hydrologic and ecologic factors. Hydrologic factors include volume, duration, and frequency of flow, proximity to the TNW, size of the watershed, and average annual rainfall. Ecologic factors include the potential of tributaries to carry pollutants and flood waters to TNWs, provision of aquatic habitat to support a TNW, and the potential of wetlands to trap and filter pollutants or store flood waters. The guidance states (on p.10), "[w]here it is determined that a tributary and its adjacent wetlands collectively have a significant nexus with traditional navigable waters, the tributary and all of its adjacent wetlands are jurisdictional."

6.2 Review Area

For the purpose of this analysis, the Study Area used for the delineation process is also to be considered the Review Area. A Review Area as defined by the Rapanos guidance is the area of interest for the verification of the location and extent of waters of the United States. Exhibit D provides maps that show the extent of the Review Area (also referred to as the Study Area).

6.3 CWA Analysis

Section 5.0 of this report discusses a number of active ephemeral drainages (locally known as desert dry washes) identified and delineated within the Study Area / Review Area that meet the technical criteria of "other waters" *potentially* subject to CWA jurisdiction. Maps showing the geographic extent of these drainages within the Review Area are included in Exhibit D.

The following discussion follows the Corps Approved Jurisdictional Determination Form developed following the *Rapanos* decision.

(a)(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(a)(5) Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;
(a)(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.

6.3.1 Are Jurisdictional Waters Present within the Study Area (*Rapanos Analysis*)?

Table 6 provides a summary of the Rapanos guidance process for determining jurisdiction over waters of the United States under Section 404 of the CWA.

Table 6. Summary of Process for Determining Jurisdiction Over Waters of the U.S. Under Section 404 of the Clean Water Act Following EPA and Corps Rapanos Guidance

Categories of Water or Water Body*	Corps Will Categorically Assert Jurisdiction	Corps Will Assert Jurisdiction Based on a Fact-Specific Analysis to Determine Whether Waters Identified Have a Significant Nexus With a TNW	
		Analysis Based on Significant Nexus Testing	*Analysis Based on Other Factors*
1. TNW, including territorial seas, and adjacent wetlands	Yes	Not Applicable (NA)	NA
2. Relatively permanent waters (RPWs)[2] that flow directly or indirectly into TNWs	Yes	NA	NA
3. Non-RPWs that flow directly or indirectly into TNWs	NA	Yes	Need to document that drainage flows directly or indirectly into a TNW.
4. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	NA	NA	Need to document that wetland abuts "permanent" or "seasonal" tributary that flows directly or indirectly into a TNW
5. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	NA	Yes	NA
6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	NA	Yes	NA
7. Impoundments of jurisdictional waters	NA	NA	Need to document that: • Impoundment created from WOUS • Water meets one of above 1 thru 6 waters categories • Water is isolated with a nexus to interstate or foreign commerce

* *U.S. Army Corps of Engineers. 2007. U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook. May 30.*

2 Under the Corps / EPA Rapanos guidance, RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

As described in the technical findings of this report (Section 4.0), the active ephemeral drainages identified in the Review Area are not permanent or even seasonal, but rather flow or flood for few hours during heavy precipitation events. The climate data in Section 1.6.6 indicates that the Review Area receives an annual average rainfall amount of 3 inches. Thus, these ephemeral drainages are non-Relatively Permanent Waters (non-RPWs). (A Relatively Permanent Water is defined in the Rapanos guidance as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months). These drainages (non-RPWs) are shown on the maps in Exhibit D and are listed in the Exhibit B field data table. In addition, no areas were found within the Review Area that meet the Corps criteria for wetlands in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement.

Using the Rapanos guidance analysis as summarized by Table 6, the non-RPWs were determined *not* to meet any of the seven categories of waters, as shown below in Table 7.

Table 7. Summary of EPA and Corps Rapanos Analysis

Category of Water or Water Body*	Wetlands (acs)	Other Waters (acs)	Rationale For Determination if Waters in Review Area are Subject to Corps Jurisdiction under CWA Section 404
1. TNW, including territorial seas, and adjacent wetlands	Not Applicable	Not Applicable	Criteria for type of water not met; waters are non-RPWs.
2. Relatively permanent waters (RPWs) that flow directly or indirectly into TNWs	Not Applicable	Not Applicable	Criteria for type of water not met; waters are non-RPWs, but do not flow directly or indirectly into TNWs.
3. Non-RPWs that flow directly or indirectly into TNWs	Not Applicable	Not Applicable	Criteria for type of water not met; waters are non-RPWs.
4. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	Not Applicable	Not Applicable	Criteria for type of water not met; no wetlands present within Review Area.
5. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	Not Applicable	Not Applicable	Criteria for type of water not met; no wetlands present within Review Area.
6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	Not Applicable	Not Applicable	Criteria for type of water not met; no wetlands present within Review Area.
7. Impoundments of jurisdictional waters	Not Applicable	Not Applicable	Criteria for type of water not met; waters are non-RPWs.

* *U.S. Army Corps of Engineers. 2007. U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook. May 30.*

6.3.2 Are There Isolated Waters within the Study Area?

When the non-RPWs identified within the Review Area flow, they flow toward the western boundary of Palen Dry Lake. The linear distance from the eastern boundary of the Study Area to the approximate western boundary of Palen Dry Lake ranges from

approximately 23,000 to 33,000 feet. Review of topographic mapping on USGS 7.5-minute series quadrangles for the area (i.e., East of Victory Pass [1987 Provisional Edition]; Palen Lake [1983 Provisional Edition]; Corn Springs [1986 Provisional Edition]; and Sidewinder Well [1983 Provisional Edition]) indicates a historical lack of surface channel and surface hydrologic connectivity between the Review Area non-RPWs and Palen Dry Lake (Exhibit E). In addition the USGS 1:25K high resolution National Hydrography Dataset (NHD) shows this same lack of hydrologic connection (Exhibit E). The above-referenced USGS topographic maps show that the elevations along the eastern edge of the Review Area are above 600 feet mean sea level (msl). Elevations along the western margin of Palen Dry Lake range from approximately 423 to 426 feet msl. Although these elevation ranges provide indication that surface flow should naturally move toward Palen Lake, the drainages shown on the USGS quadrangle maps named above run to higher local ground elevations and abruptly stop before reaching the western Palen Dry lake margin (Exhibit E). Field studies conducted by HBG during March 2010 confirmed the general local accuracy of the USGS topographic and NHD mapping. The field investigations found that downstream surface channel and resulting surface hydrologic connectivity from the Review Area to Palen Dry Lake does not occur due to being blocked by higher ground surface elevations. The distance between where the non-RPW drainages cease, due to higher ground elevations that end surface flow, ranges from approximately 1,000 to 7,000 linear feet from the closest boundary of Palen Dry Lake (Exhibit E). Based on the finding that the flows end before reaching another water body, the non-RPWs within the Study Area are determined to be“isolated” non-RPW waters.

Given the relative proximity of Palen Dry Lake to the Study Area and the potential, although not foreseeable, connectivity, this dry lake area was also tested using Rapanos guidance analysis as summarized by Table 6. Review of satellite and high resolution imagery and the above-described the USGS mapping and USGS NHD show that any potential overflow or drainage out of the lake is blocked by the Palen Mountains to the east and by the extensive active sand dune formations that extend southeasterly over 20,000 linear feet from the south-southeast Palen Dry Lake boundary through Chuckwalla Valley toward Ford Dry Lake and Interstate I-10 (Exhibit E). Field studies conducted by HBG during March 2010 confirmed the general local accuracy of the USGS topographic and NHD mapping. The field study also found the presence of an OHWM along the approximated western and southern boundary line indicated on the USGS and USGS NHD mapping (Exhibits C and E). Based on the finding that the flows end before reaching another water body, Palen Dry Lake was determined to be an “isolated” water. Palen Dry Lake was also determined *not* to meet any of the seven categories of waters for the same reasons as stated for the above-described fact analysis for the non-RPWs within the Study Area.

Fact-specific analysis was conducted to determine if the non-RPWs within the Study Area have a substantial nexus to interstate or foreign commerce of which the “use, degradation or destruction of” could affect interstate or foreign commerce. The results of the analysis indicate for these intrastate waters that there is no substantial nexus (current or potential) to interstate or foreign commerce associated with the non-RPWs within the Review Area

(Table 8). The same analysis was also conducted for Palen Dry Lake. The analysis found for this intrastate water no substantial nexus (current or potential) to interstate or foreign commerce associated with Palen Dry Lake (Table 8).

Table 8. Interstate / Foreign Commerce Analysis

Factors Used to Determine Substantial Nexus to Interstate or Foreign Commerce	Do Isolated Interstate or Intrastate Waters the Use, Degradation or Destruction of Which Could Affect Interstate or Foreign Commerce Occur in Review Area or Palen Dry Lake?	Fact-Specific Analysis
Waters which are or could be used by interstate or foreign travelers for recreational purposes.	No	*Review Area*: Given the ephemeral as well as unpredictable nature of surface flows no recreational use of the ephemeral drainages occurs. *Palen Dry Lake*: Given the ephemeral as well as unpredictable nature of surface ponding no recreational use of the dry lake occurs. There are no boat ramps at the lake or vehicle access roads to the edge of the lake. BLM prohibits vehicle use on the lake and adjacent dune areas. Review of advertizing brochures and billboard postings for local recreational opportunities at the Blythe Chamber of Commerce, the Desert Center Restaurant and Desert Station Restaurant provided no indication of recreational opportunities at Palen Dry Lake. Staff at the Blythe Chamber of Commerce indicted there were no recreational opportunities at the dry lake. An internet search for Palen Dry Lake yielded the same result and no indication that any interstate or foreign travel occurs for recreational purposes.
Waters from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.	No	*Review Area*: Given the ephemeral as well as unpredictable nature of surface flows no fish or shellfish habitat is associated with the ephemeral drainages. *Palen Dry Lake*: Given the ephemeral as well as unpredictable nature of surface ponding no fish or shellfish habitat is associated with this dry lake.
Waters which are or could be used for industrial purposes by industries in interstate commerce.	No	*Review Area*: Given the ephemeral as well as unpredictable nature of surface flows the waters associated with the ephemeral drainages are not used and could not be used for industrial purposes, including but not limited to mineral extraction, power generation, and agricultural irrigation. *Palen Dry Lake*: Given the ephemeral as well as unpredictable nature of surface ponding the waters associated with the dry lake are not used and could not be used for industrial purposes, including but not limited to mineral extraction, power generation, and agricultural irrigation.
Waters which are interstate isolated waters	Not Applicable	Waters are intrastate isolated waters

Table 8. Interstate / Foreign Commerce Analysis		
Factors Used to Determine Substantial Nexus to Interstate or Foreign Commerce	**Do Isolated Interstate or Intrastate Waters the Use, Degradation or Destruction of Which Could Affect Interstate or Foreign Commerce Occur in Review Area or Palen Dry Lake?**	**Fact-Specific Analysis**
Other factors	Not Applicable	None are known to occur.

6.4 Are Non-Jurisdictional Waters Present within the Study Area?

On the basis of the above analysis and findings within the Review Area, no areas were found within the Review Area that meet the Corps criteria for wetlands in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement. The above analysis also found that the Review Area contains non-RPWs that are isolated, non-navigable and wholly intrastate waters with no substantial nexus to interstate or foreign commence. As required as part of the determination process under the Rapanos Guidance it should be noted that:

1. Prior to the January 2001 Supreme Court decision in *SWANCC*, the non-RPWs in the Review Area would have been regulated based solely on the Migratory Bird Rule (51 F.R. 41217), given the presence of a federally listed endangered species, the desert tortoise (*Gopherus agassizii*).

2. The waters are isolated with no significant nexus to interstate or foreign commerce and therefore no significant nexus standard analysis for connectivity to a TNW is required by the Rapanos Guidance as non-RPWs are not in a category of water requiring such analysis.

6.5 Jurisdictional Analysis Summary

On the basis of the above analysis and as summarized by Table 9, the active ephemeral drainages (non-RPWs or desert dry washes) found within the Review Area and as shown by Exhibit D would be considered non-jurisdictional under the CWA (Exhibit D). The non-RPWs within the Review Area are *not* jurisdictional waters of the United States based on the fact that:

1. No wetlands were found with the Review Area as there were no areas that met the criteria in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement.
2. The non-jurisdictional non-RPWs found are isolated waters with no substantial connection to interstate or foreign commerce.

Table 9. Jurisdictional Analysis Summary

Category of Waters	Category of Waters Found	Type of Water (s)	Nexus to Interstate or Foreign Commerce?	Jurisdictional Water Found?	Non-Jurisdictional Water Found?
1. TNW, including territorial seas, and adjacent wetlands	Not present	NA	No	No	No
2. Relatively permanent waters (RPWs) that flow directly or indirectly into TNWs	Not present	NA	No	No	No
3. Non-RPWs that flow directly or indirectly into TNWs	Not present	NA	No	No	No
4. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	Not present	NA	No	No	No
5. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	Not present	NA	No	No	No
6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	Not present	NA	No	No	No
7. Impoundments of jurisdictional waters	Not present	NA	No	No	No
Isolated	**X**	Non-RPWs	No	No	**X**

6.6 Disclaimer

HBG has made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the Corps may consider. Nevertheless, Sunlight reserves the right to challenge or seek revision to any areas over which the Corps may assert such jurisdiction, as the implementation of the Corps / EPA Rapanos Guidance is further clarified or altered through formal guidance, assertions or disclaimers of jurisdiction over other properties, court decisions, or other relevant actions.

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Exhibit A. Figures

Figure 1	Regional Location Map
Figure 2	USGS Topographic Map of the Study Area
Figure 3	Project Components and Alternatives
Figure 4	Typical Cross-section of Desert Ephemeral Wash
Figure 5	Vegetation Map of the Study Area
Figure 6	Precipitation Averages for Winter Months
Figure 7	Southern Mojave Hydrological Unit Boundary
Figure 8	Watershed Units

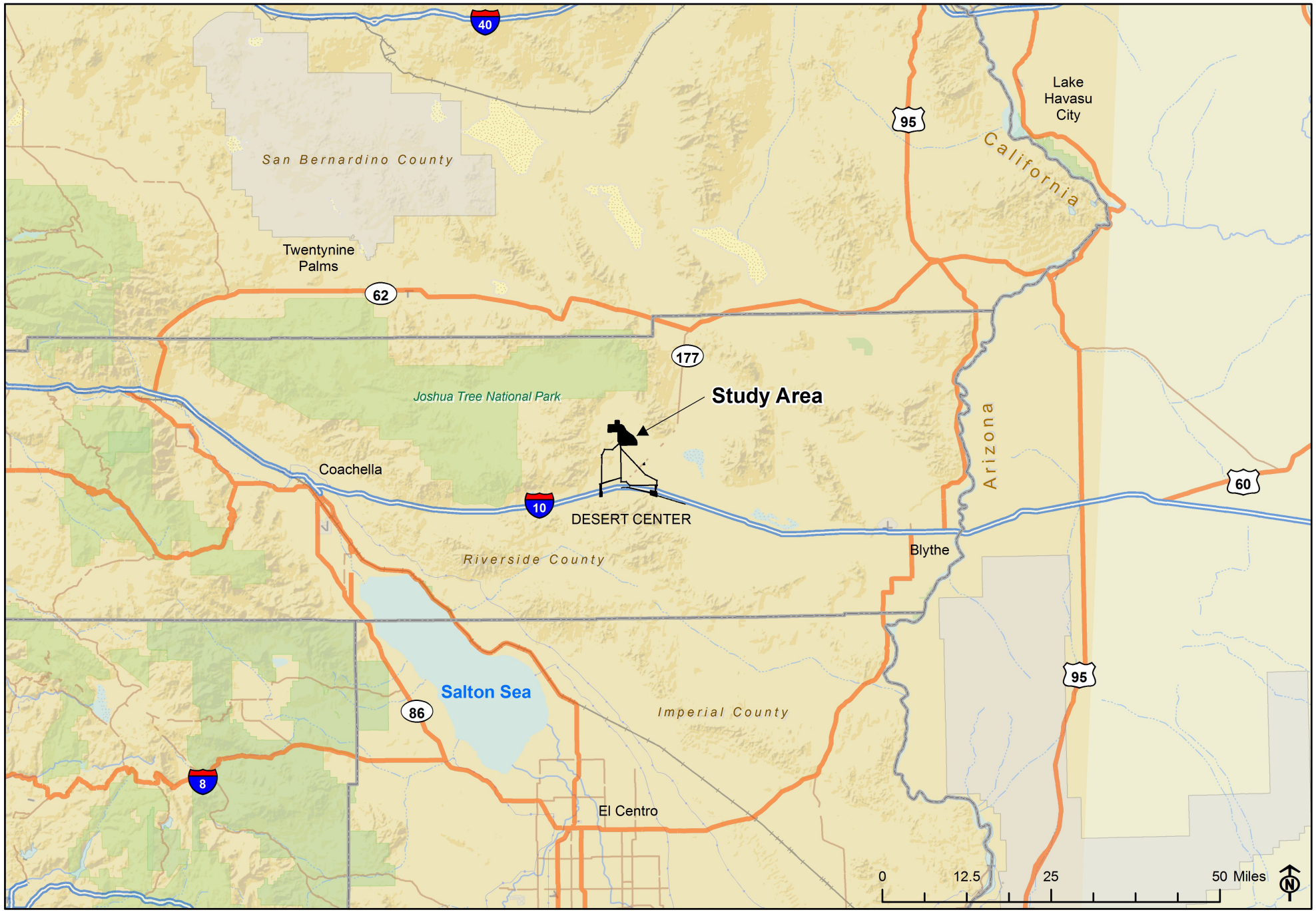

Figure 1. Regional Location Map
Desert Sunlight Solar Farm Project,
Desert Center, Riverside County, California

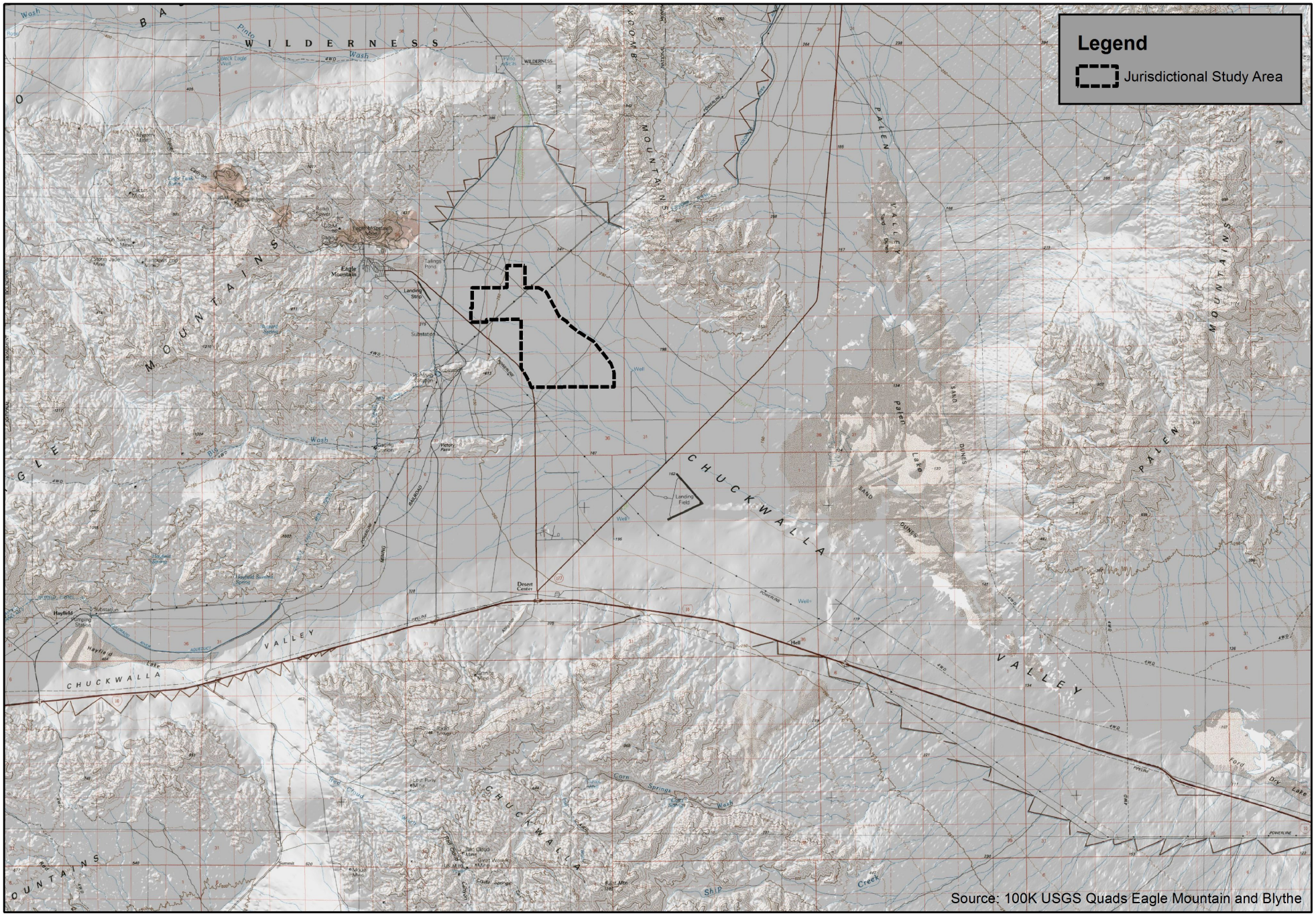

Figure 2. USGS Topographic Map of the Study Area
Desert Sunlight Solar Farm Project,
Desert Center, Riverside County, California

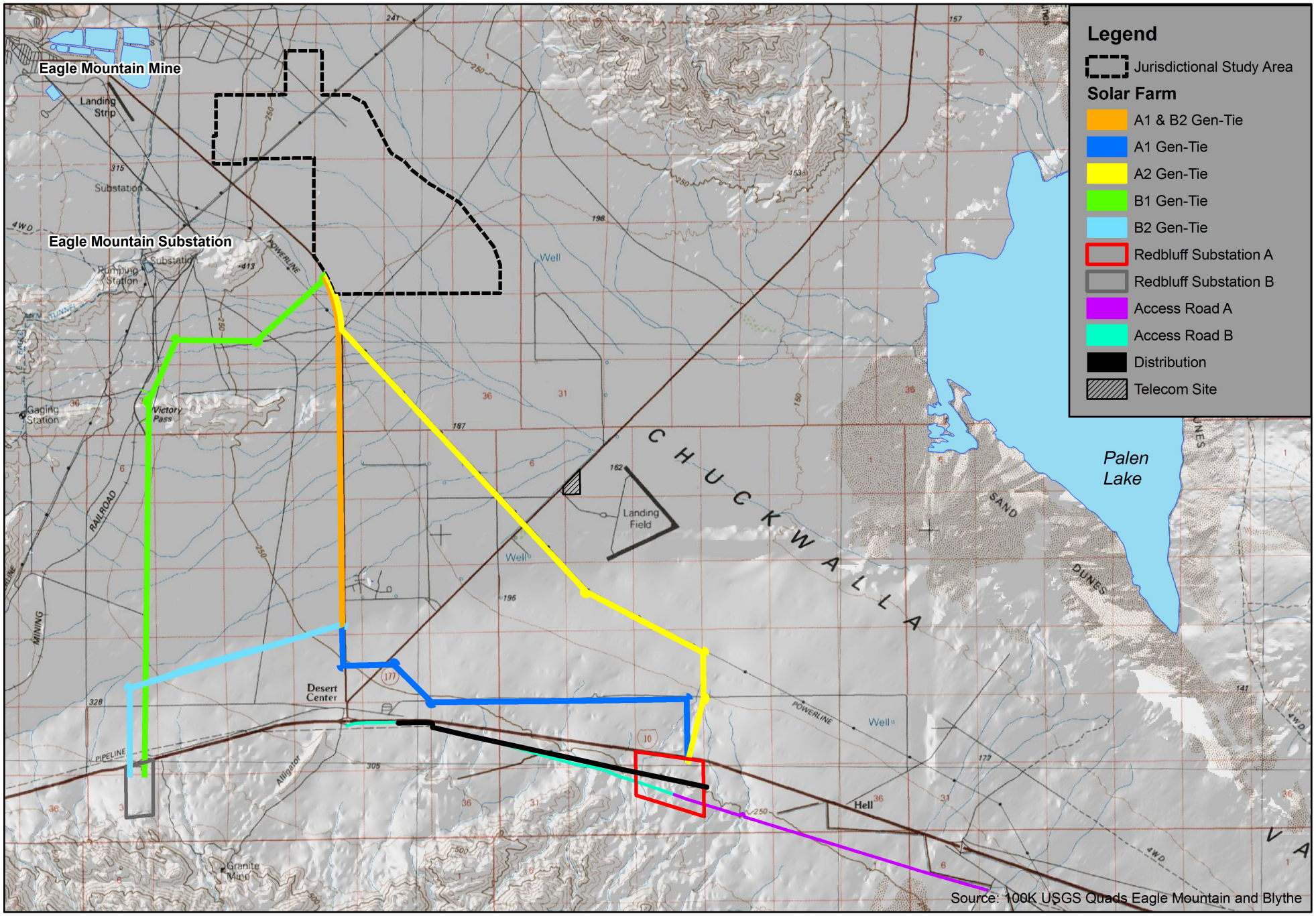

Figure 3. Project Components and Alternatives
Desert Sunlight Solar Farm Project,
Desert Center, Riverside County, California

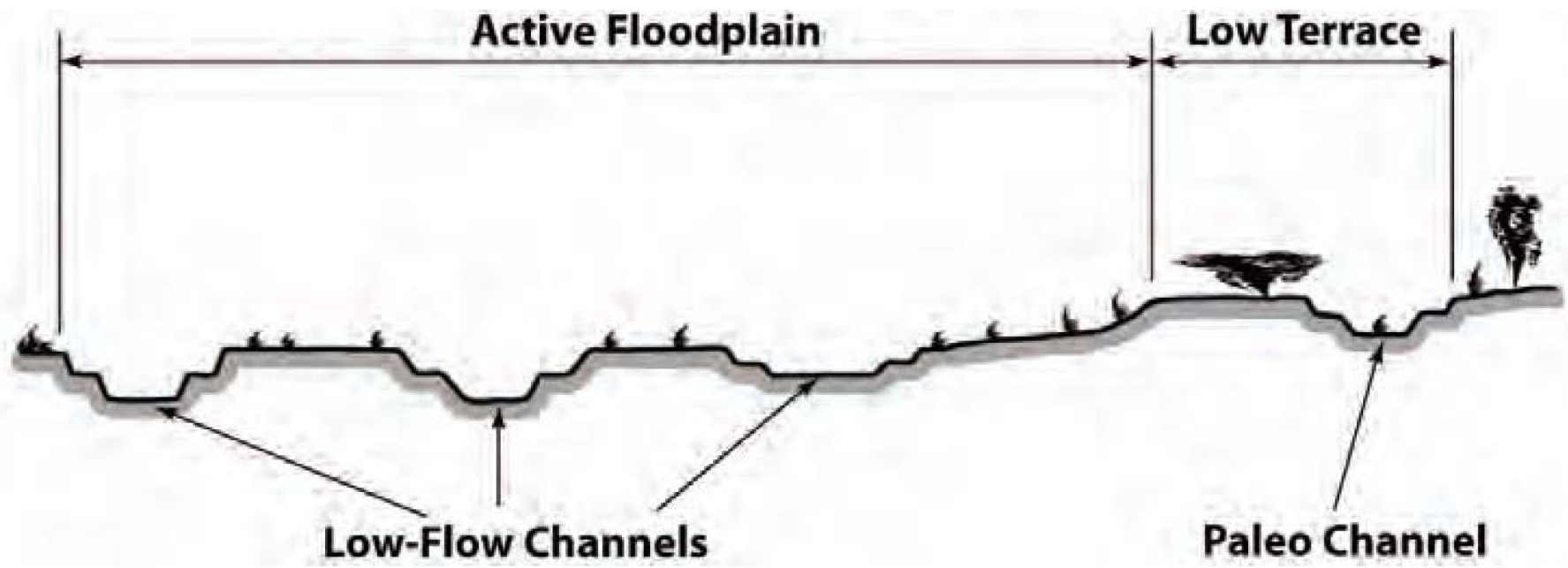

Figure 4. Typical Cross Section of Desert Ephemeral Wash (Lichvar et al. 2008)

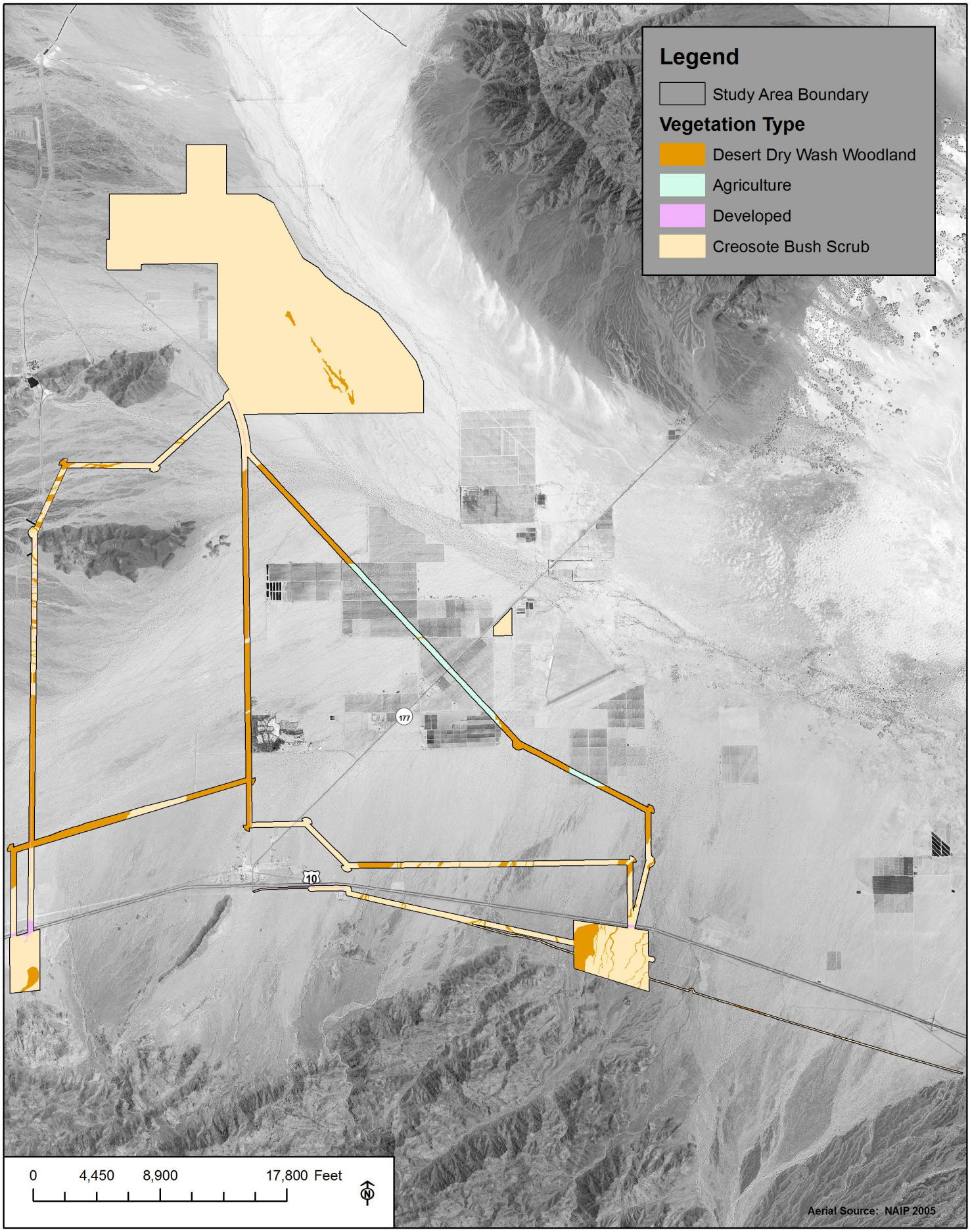

Figure 5. Vegetation Map of the Study Area
First Solar Desert Sunlight Solar Farm,
Desert Center, Riverside County, California

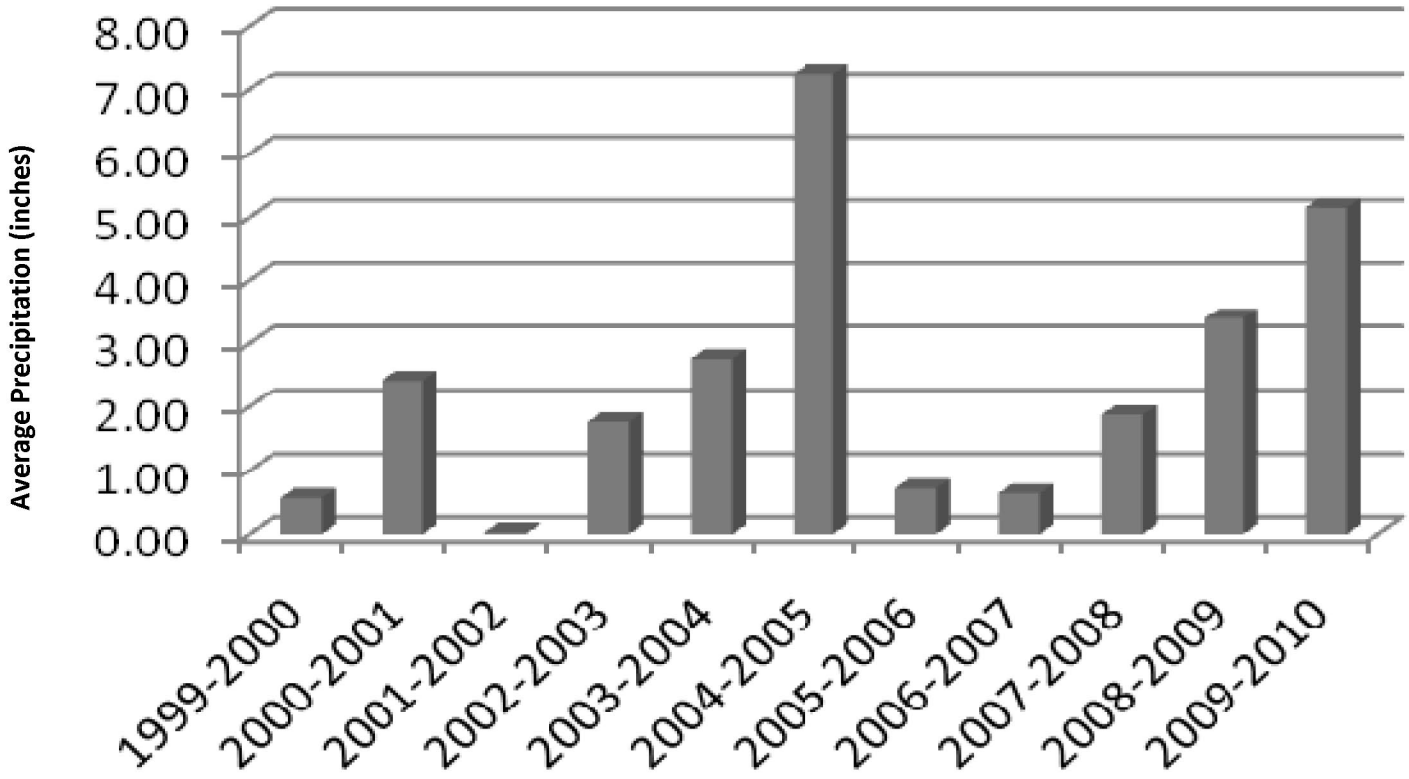

Figure 6. Precipitation Averages for Winter Months (October-March)

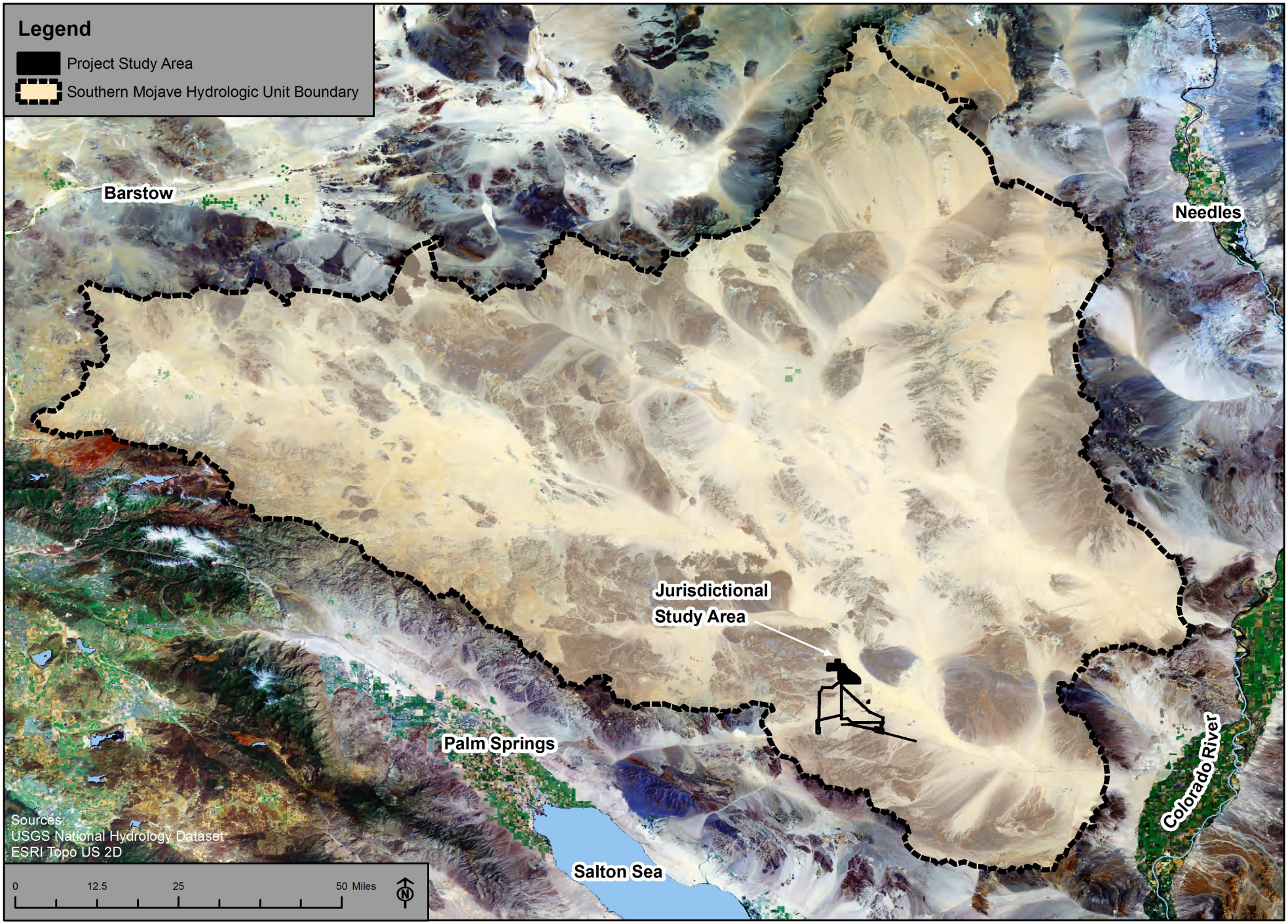

Figure 7. Southern Mojave Hydrologic Unit Boundary
Desert Sunlight Solar Farm Project,
Desert Center, Riverside County, California

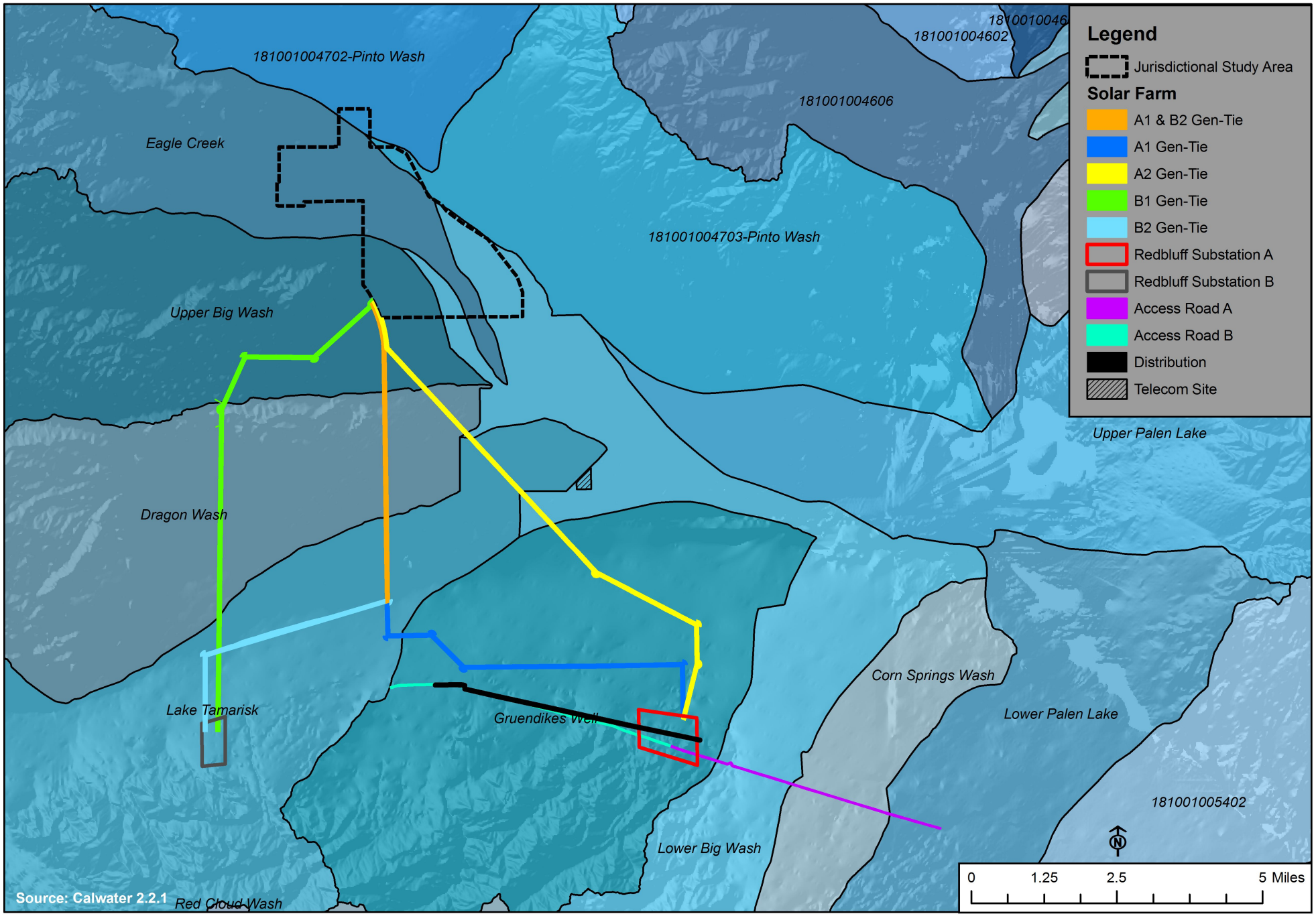

Figure 8. Watershed Units
Desert Sunlight Solar Farm Project,
Desert Center, Riverside County, California

Exhibit B.

Monthly Precipitation Totals

WETS Station : EAGLE MOUNTAIN, CA2598 Creation Date: 08/29/2002
Latitude: 3348 Longitude: 11527 Elevation: 00970
State FIPS/County(FIPS): 06065 County Name: Riverside
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.) avg daily max	avg daily min	avg	Precipitation (Inches) avg	30% chance will have less than	more than	avg # of days w/.1 or more	avg total snow fall
January	65.0	45.5	55.3	0.59	0.07	0.68	1	0.0
February	69.7	49.3	59.5	0.53	0.00	0.69	1	0.0
March	75.1	53.6	64.4	0.50	0.04	0.56	1	0.0
April	82.8	60.3	71.5	0.08	0.00	0.07	0	0.0
May	90.5	68.2	79.4	0.08	0.00	0.09	0	0.0
June	100.7	77.5	89.1	0.06	0.00	0.00	0	0.0
July	104.5	82.8	93.6	0.22	0.00	0.22	0	0.0
August	103.2	81.3	92.2	0.94	0.04	0.97	1	0.0
September	97.5	75.4	86.4	0.47	0.00	0.37	0	0.0
October	86.3	64.4	75.4	0.24	0.00	0.27	0	0.0
November	73.4	52.9	63.2	0.18	0.00	0.13	0	0.0
December	65.3	45.7	55.5	0.42	0.00	0.50	1	0.0
Annual	-----	-----	-----	------	2.66	5.19	--	----
Average	84.5	63.1	73.8	------	------	------	--	----
Total	-----	-----	-----	4.31	------	------	5	0.0

GROWING SEASON DATES

Probability	Temperature 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *	----------	----------	> 365 days
	> 365 days	> 365 days	> 365 days
70 percent *	----------	----------	> 365 days
	> 365 days	> 365 days	> 365 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

total 1948-2002 prcp

Station : CA2598, EAGLE MOUNTAIN
------- Unit = inches

yr	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	annl
48							0.14	M0.00	0.00	1.45	0.00	M0.22	1.81
49	2.56	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.15	0.50	3.35
50	0.00	0.06	0.07	0.00	0.03	0.00	2.68	0.00	0.57	0.00	0.00	0.00	3.41
51	M0.26	M0.00	0.03	0.28	M0.07	0.00	0.20	1.57	0.06	0.49	M0.56	M0.15	3.67
52	1.24	0.00	0.28	1.11	0.00	0.00	0.22	0.00	0.07	0.00	0.74	0.86	4.52
53	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.23	0.00	0.00	0.07	M0.00	1.33
54	0.84	0.09	0.89	0.00	0.00	0.00	0.19	0.00	0.30	0.03	0.04	0.00	2.38
55	1.14	0.00	0.00	0.00	0.00	0.00	0.45	1.62	0.00	0.00	0.00	0.01	3.22
56	M0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.07	0.00	0.00	0.10
57	0.61	0.05	0.04	0.07	0.05	0.00	0.00	1.53	0.00	0.98	0.00	0.07	3.40
58	0.00	0.53	0.27	0.30	0.05	0.00	0.00	0.10	0.00	0.15	0.00	0.00	1.40
59	0.00	0.01	0.00	0.07	0.00	0.00	0.23	0.49	0.13	0.28	0.00	2.54	3.75
60	0.44	0.59	0.18	0.00	0.00	0.00	0.08	0.00	1.11	0.00	0.87	0.21	3.48
61	0.00	0.00	0.04	0.00	0.00	0.00	0.04	0.88	0.15	0.00	0.01	0.56	1.68
62	0.18	0.08	0.30	0.00	0.00	0.00	0.01	0.00	0.54	0.11	0.00	0.52	1.74
63	0.31	0.30	0.06	0.00	0.00	0.00	0.00	0.27	1.75	0.10	0.40	0.00	3.19
64	0.01	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.02	0.31	0.19	0.11	0.78
65	0.00	0.00	0.30	0.88	0.00	0.00	0.00	0.10	0.00	0.00	M1.20	2.29	4.77
66	0.20	0.00	0.46	0.00	0.00	0.03	0.00	M0.63	0.10	0.91	0.06	0.24	2.63
67	0.05	0.00	0.00	0.08	0.00	0.00	0.00	0.88	1.19	0.00	0.36	0.35	2.91
68	0.00	0.06	0.00	0.03	0.00	0.00	2.15	0.14	0.00	0.03	0.05	0.08	2.54
69	0.80	0.02	0.04	0.00	0.22	0.03	0.00	0.00	1.40	0.00	0.52	0.20	3.23
70	M0.16	0.21	0.16	0.00	0.00	0.00	0.00	0.07	0.02	0.07	0.00	0.35	1.04
71	0.00	0.07	0.00	0.05	0.04	0.00	0.00	4.79	0.12	0.24	0.00	0.12	5.43
72	0.00	0.00	0.00	0.00	0.00	1.13	0.00	0.10	0.06	0.93	0.25	0.00	2.47
73	0.00	0.53	0.67	0.00	0.03	0.00	0.00	0.11	0.00	0.00	0.03	0.00	1.37
74	0.97	0.00	0.51	0.00	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.94	2.49
75	0.00	0.00	0.02	0.06	0.00	0.00	0.35	0.00	0.00	0.07	0.00	0.05	0.55
76	0.06	1.50	0.23	0.36	0.05	0.00	0.13	0.00	5.03	0.18	0.00	0.00	7.54
77	0.41	0.00	0.01	0.01	0.06	0.08	0.08	2.24	0.00	0.02	0.00	0.57	3.48
78	2.18	0.66	0.91	0.34	0.00	0.00	0.00	0.00	0.00	2.39	0.07	M0.00	6.55
79	1.34	0.47	0.81	0.00	0.14	0.00	1.53	3.68	0.00	0.00	0.00	0.27	8.24
80	1.07	2.05	0.68	0.52	0.04	0.00	0.19	0.00	0.04	0.00	0.00	0.00	4.59
81	0.52	0.11	1.10	0.00	0.31	0.01	0.00	0.35	0.25	0.23	0.18	0.00	3.06
82	0.39	0.41	0.61	0.01	0.36	0.00	0.34	0.29	0.12	0.00	0.00	1.72	4.25
83	0.32	0.37	2.42	0.00	0.00	0.00	0.00	5.72	2.52	0.48	0.09	0.96	12.88
84	0.16	0.00	0.00	0.00	0.00	0.00	1.30	0.44	0.00	0.00	0.96	1.92	4.78
85	0.20	0.19	0.03	0.02	0.00	0.00	0.33	0.00	0.73	0.16	1.13	0.54	3.33
86	0.16	1.21	0.09	0.02	0.00	0.00	0.88	0.03	0.00	0.69	0.21	0.23	3.52
87	0.03	0.00	0.07	0.00	0.05	0.06	0.00	0.00	0.04	0.22	1.53	0.80	2.80
88	0.67	0.97	0.02	0.42	0.00	0.03	0.00	2.37	0.00	0.00	0.00	0.00	4.48
89	M1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.00	0.00	2.28
90		0.00	0.04	0.00	0.00	0.40	0.00	1.04	0.27	0.25	0.00	0.00	2.00
91	0.83	0.61	1.71	0.00	0.00	0.00	0.61	0.03	1.28	0.28	0.01	0.60	5.96
92	0.38	1.86	2.56	0.21	0.21	0.00	0.00	0.44	0.00	0.49	0.00	1.52	7.67
93	3.54	1.79	0.39	0.00	0.08	0.00	0.00	2.58	0.00	0.00	0.23	0.00	8.61
94	0.01	0.37	1.05	0.00	0.84	0.00	0.00	0.31	0.00	0.00	0.41	1.33	4.32
95	1.77	0.27	0.24	0.08	0.04	0.00	0.03	0.65	0.11	0.00	0.00	0.00	3.19
96	0.07	0.24	0.05	0.00	0.10	0.00	0.01	0.01	0.80	0.07	0.25	0.05	1.65
97	0.16	0.00	0.00	0.10	0.02	0.00	0.19	0.05	2.28	0.15	0.00	0.73	3.68
98	0.27	1.85	0.59		0.00		0.35	0.78	0.21	0.00	0.00	0.14	4.19
99	0.00	M0.19	0.00	0.06	0.09	0.00	0.34	0.09	0.32	0.00	0.00	0.00	1.09
0	0.02	M0.31	0.23	0.00	0.00	0.15	0.00	M1.28	0.00	0.22	0.02	0.00	2.23
1	0.60	1.28	0.30	0.00	0.00	0.00	2.25	0.00	M0.00	0.00	0.01	0.01	4.45
2													

Exhibit C

Field Data

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
0	0	subB	936.96766311600	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.05377454449	936.96766311700	ISOLATE	-115.45620585900	33.69661836620	BIG WASH	21	Lake Tamarisk
1	0	subB	1805.19973858000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.10360420906	1805.19973859000	ISOLATE	-115.45605046800	33.69702807120	BIG WASH	21	Lake Tamarisk
2	0	subB	584.35336237800	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.03353726827	584.35336237700	ISOLATE	-115.45332802000	33.69774880700	BIG WASH	21	Lake Tamarisk
3	0	subB	1376.95654263000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.07902643151	1376.95654263000	ISOLATE	-115.45181108100	33.69845926490	BIG WASH	21	Lake Tamarisk
4	0	subB	1759.59636482000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.10098693554	1759.59636483000	ISOLATE	-115.45484937800	33.69739699850	BIG WASH	21	Lake Tamarisk
5	0	access_east	143.64201507900	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00824391730	143.64201507100	ISOLATE	-115.23910520600	33.67359531990	BIG WASH	15	Lower Palen Lake
6	0	access_east	130.06962137100	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00746496909	130.06962137300	ISOLATE	-115.24053331700	33.67395607630	BIG WASH	15	Lower Palen Lake
7	0	access_east	127.64835853000	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00732600772	127.64835853200	ISOLATE	-115.24088382900	33.67404782300	BIG WASH	15	Lower Palen Lake
8	0	access_east	133.46278114900	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00765970966	133.46278115000	ISOLATE	-115.24283339000	33.67453551360	BIG WASH	15	Lower Palen Lake
9	0	access_east	122.73646966100	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00704410409	122.73646966200	ISOLATE	-115.24436381800	33.67491557530	BIG WASH	15	Lower Palen Lake
10	0	access_east	128.86534716300	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00739585326	128.86534716300	ISOLATE	-115.24514539800	33.67509681800	BIG WASH	15	Lower Palen Lake
11	0	access_east	121.55973194000	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00697656864	121.55973194000	ISOLATE	-115.24548542500	33.67519926370	BIG WASH	15	Lower Palen Lake
12	0	access_east	122.00721113500	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00700225041	122.00721114300	ISOLATE	-115.24622474800	33.67537215280	BIG WASH	15	Lower Palen Lake
13	0	access_east	127.85511831200	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00733787410	127.85511831300	ISOLATE	-115.24892457800	33.67602038880	BIG WASH	15	Lower Palen Lake
14	0	access_east	134.37005578600	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00771178006	134.37005578400	ISOLATE	-115.25065164800	33.67646995930	BIG WASH	15	Lower Palen Lake
15	0	access_east	66.40118784500	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00381090380	66.40118784460	ISOLATE	-115.25152130500	33.67658977340	BIG WASH	15	Lower Palen Lake
16	0	access_east	131.48842772700	2.50000000000	E	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.00754639737	131.48842773400	ISOLATE	-115.25136019800	33.67662920610	BIG WASH	15	Lower Palen Lake
17	0	access_east	126.87372895100	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00728155010	126.87372894900	ISOLATE	-115.25653128800	33.67802195020	BIG WASH	13	Corn Springs Wash
18	0	access_east	121.04907453700	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00694726094	121.04907453600	ISOLATE	-115.25641900700	33.67957071620	BIG WASH	13	Corn Springs Wash
19	0	access_east	144.77506452900	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00830894539	144.77506452700	ISOLATE	-115.26267714000	33.67967102920	BIG WASH	13	Corn Springs Wash
20	0	access_east	121.37437088900	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00696593038	121.37437088900	ISOLATE	-115.26483543700	33.68019831800	BIG WASH	13	Corn Springs Wash
21	0	access_east	124.75387149400	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00715988702	124.75387149500	ISOLATE	-115.26862208200	33.68121399000	BIG WASH	13	Corn Springs Wash
22	0	access_east	124.17658758200	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00712675549	124.17658758600	ISOLATE	-115.27097413800	33.68185119640	BIG WASH	13	Corn Springs Wash
23	0	access_east	119.80690365500	2.50000000000	E	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.00687597014	119.80690365400	ISOLATE	-115.27984523500	33.68419277420	BIG WASH	13	Corn Springs Wash
24	0	access_east	126.35919946800	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00725202017	126.35919946900	ISOLATE	-115.28170004300	33.68469119840	BIG WASH	27	Lower Big Wash
25	0	access_east	124.75811022800	2.50000000000	E	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.00716013029	124.75811022700	ISOLATE	-115.28299474900	33.68502271570	BIG WASH	27	Lower Big Wash
26	0	access_east	123.24334008000	2.50000000000	E	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.00707319445	123.24334007900	ISOLATE	-115.28429742200	33.68538402800	BIG WASH	27	Lower Big Wash
27	0	access_east	123.17920852900	2.50000000000	E	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.00706951380	123.17920852600	ISOLATE	-115.28414832600	33.68534686590	BIG WASH	27	Lower Big Wash
28	0	access_east	127.75799467500	2.50000000000	E	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.00733229997	127.75799467700	ISOLATE	-115.28693390800	33.68605368540	BIG WASH	27	Lower Big Wash
29	0	access_east	113.92003564400	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00653811040	113.92003564400	ISOLATE	-115.29634544900	33.68857310500	BIG WASH	27	Lower Big Wash
30	0	access_east	173.86920506400	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00997871930	173.86920507300	ISOLATE	-115.29857893500	33.68922440720	BIG WASH	27	Lower Big Wash
31	0	access_east	122.14966960100	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00701042640	122.14966960600	ISOLATE	-115.30150325400	33.68993138990	BIG WASH	27	Lower Big Wash
32	0	access_east	160.86672697800	2.50000000000	E	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.00923247974	160.86672697600	ISOLATE	-115.30217293500	33.69016157650	BIG WASH	27	Lower Big Wash
33	0	access_east	150.53075712300	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.00863927669	150.53075711800	ISOLATE	-115.30756360000	33.69153999570	BIG WASH	16	Gruendikes Well
34	0	subA	123.35717378500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00707972761	123.35717379200	ISOLATE	-115.31457363300	33.69347087570	BIG WASH	16	Gruendikes Well
35	0	subA	120.61473947200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00692233353	120.61473947200	ISOLATE	-115.31871112800	33.69473716910	BIG WASH	16	Gruendikes Well
36	0	subA	119.83534001600	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.00687760216	119.83534001500	ISOLATE	-115.32156984500	33.69558277000	BIG WASH	16	Gruendikes Well
37	0	subA	122.59207892200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00703581720	122.59207891300	ISOLATE	-115.32231746900	33.69582045340	BIG WASH	16	Gruendikes Well
38	0	access_west	123.34257718600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00707888988	123.34257718500	ISOLATE	-115.32821542800	33.69746447280	BIG WASH	16	Gruendikes Well
39	0	access_west	122.56660382500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00703435513	122.56660382400	ISOLATE	-115.32848873300	33.69756223370	BIG WASH	16	Gruendikes Well
40	0	access_west	124.54458639300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00714787571	124.54458638900	ISOLATE	-115.33221274100	33.69868977790	BIG WASH	16	Gruendikes Well
41	0	access_west	109.95115171700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00631032781	109.95115171900	ISOLATE	-115.34025836900	33.70044677330	BIG WASH	16	Gruendikes Well
42	0	access_west	121.72554579900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00698608504	121.72554580100	ISOLATE	-115.34544864300	33.70161562180	BIG WASH	16	Gruendikes Well
43	0	access_west	188.77920342200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01083443546	188.77920342200	ISOLATE	-115.34457571800	33.70137380010	BIG WASH	16	Gruendikes Well
44	0	access_west	141.90818090500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00814440891	141.90818090700	ISOLATE	-115.34852888000	33.70233864740	BIG WASH	16	Gruendikes Well
45	0	access_west	48.97008061830	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00281049590	48.97008061510	ISOLATE	-115.34798257100	33.70231708320	BIG WASH	16	Gruendikes Well
46	0	access_west	121.92187658000	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.00699735288	121.92187658200	ISOLATE	-115.34955681800	33.70261415390	BIG WASH	16	Gruendikes Well
47	0	access_west	117.41168772000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00673850366	117.41168772000	ISOLATE	-115.35365133700	33.70360123930	BIG WASH	16	Gruendikes Well
48	0	access_west	120.03862924700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00688926936	120.03862924600	ISOLATE	-115.35447779200	33.70379750690	BIG WASH	16	Gruendikes Well
49	0	access_west	120.85452708000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00693609545	120.85452707900	ISOLATE	-115.35625992100	33.70423175800	BIG WASH	16	Gruendikes Well
50	0	access_west	112.03356620000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00642984195	112.03356620100	ISOLATE	-115.35988233600	33.70506329740	BIG WASH	16	Gruendikes Well
51	0	access_west	118.00976439500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00677282854	118.00976439500	ISOLATE	-115.36153027200	33.70543316380	BIG WASH	16	Gruendikes Well
52	0	access_west	146.74691804900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00842211421	146.74691804900	ISOLATE	-115.36174021900	33.70552197220	BIG WASH	16	Gruendikes Well
53	0	access_west	130.50792463200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00749012423	130.50792463300	ISOLATE	-115.36426668100	33.70601906280	BIG WASH	16	Gruendikes Well
54	0	access_west	131.46184607200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00754487179	131.46184607400	ISOLATE	-115.36848995100	33.70690783300	BIG WASH	16	Gruendikes Well
55	0	access_west	116.80718887900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00670381020	116.80718887600	ISOLATE	-115.37140717600	33.70744075800	BIG WASH	16	Gruendikes Well
56	0	access_west	132.69894430300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00761587146	132.69894429800	ISOLATE	-115.37068393600	33.70731009570	BIG WASH	16	Gruendikes Well
57	0	access_west	134.60993573700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00772554728	134.60993573500	ISOLATE	-115.37268374700	33.70765175080	BIG WASH	16	Gruendikes Well
58	0	access_west	58.58347095240	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00336222859	58.58347095330	ISOLATE	-115.38171158800	33.71000248460	BIG WASH	16	Gruendikes Well
59	0	access_west	169.75914090100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00974283407	169.75914089900	ISOLATE	-115.39856325400	33.70969610290	BIG WASH	16	Gruendikes Well
60	0	access_west	47.25265205500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00271192907	47.25265204820	ISOLATE	-115.39755531400	33.70978422400	BIG WASH	16	Gruendikes Well
61	0	access_west	53.25802883270	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00305659027	53.25802883520	ISOLATE	-115.39678982900	33.70981486930	BIG WASH	16	Gruendikes Well
62	0	access_west	50.18114868440	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00288000165	50.18114868130	ISOLATE	-115.39641083500	33.70982938990	BIG WASH	16	Gruendikes Well
63	0	access_west	46.31174624750	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00265792850	46.31174624600	ISOLATE	-115.39422871200	33.70987386370	BIG WASH	16	Gruendikes Well
64	0	access_west	52.94909248220	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00303885976	52.94909248380	ISOLATE	-115.39261835300	33.70989603440	BIG WASH	16	Gruendikes Well
65	0	access_west	48.41944601180	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00277889383	48.41944600930	ISOLATE	-115.39101831700	33.70992752980	BIG WASH	16	Gruendikes Well
66	0	access_west	63.64300472250	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00365260587	63.64300471750	ISOLATE	-115.39031671100	33.70991250750	BIG WASH	16	Gruendikes Well
67	0	access_west	48.81867039390	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00280180615	48.81867039310	ISOLATE	-115.38848629900	33.70993849630	BIG WASH	16	Gruendikes Well
68	0	subA	1189.84516924000	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.06828771632	1189.84516924000	ISOLATE	-115.31844079000	33.69659475100	BIG WASH	16	Gruendikes Well
69	0	subA	979.80399115500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.05623301143	979.80399115500	ISOLATE	-115.31899840200	33.69336880730	BIG WASH	16	Gruendikes Well
70	0	subA	728.68026055400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04182049246	728.68026055700	ISOLATE	-115.31990102900	33.69388431980	BIG WASH	16	Gruendikes Well

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
71	0	subA	806.30743438600	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04627567920	806.30743438800	ISOLATE	-115.32046610100	33.69384371240	BIG WASH	16	Gruendikes Well
72	0	subA	777.44196087400	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04461902898	777.44196087800	ISOLATE	-115.32130403800	33.69438303390	BIG WASH	16	Gruendikes Well
73	0	subA	407.46701469100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02338538881	407.46701469900	ISOLATE	-115.32209305700	33.69455386960	BIG WASH	16	Gruendikes Well
74	0	subA	393.65418428900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02259264143	393.65418429000	ISOLATE	-115.32279758500	33.69519951780	BIG WASH	16	Gruendikes Well
75	0	subA	403.65412759400	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02316655921	403.65412759800	ISOLATE	-115.32128169500	33.69621505460	BIG WASH	16	Gruendikes Well
76	0	subA	440.36213064400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02527330869	440.36213064700	ISOLATE	-115.32170816400	33.69635992830	BIG WASH	16	Gruendikes Well
77	0	subA	736.39465688400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04226323788	736.39465688300	ISOLATE	-115.31530118800	33.69336306890	BIG WASH	16	Gruendikes Well
78	0	subA	155.67465232300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00893449566	155.67465232200	ISOLATE	-115.31445581800	33.69380731300	BIG WASH	16	Gruendikes Well
79	0	subA	636.54601672500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03653271446	636.54601673000	ISOLATE	-115.31405360400	33.69150070160	BIG WASH	16	Gruendikes Well
80	0	subA	633.57557298200	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.03636223445	633.57557298600	ISOLATE	-115.31193004600	33.69084968610	BIG WASH	16	Gruendikes Well
81	0	sfAB	1066.70466007000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06122042356	1066.70466006000	ISOLATE	-115.41638052200	33.83874527080	BIG WASH	31	Eagle Creek
82	0	sfAB	383.16675247700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02199074567	383.16675247600	ISOLATE	-115.41668400100	33.83889941790	BIG WASH	31	Eagle Creek
83	0	sfAB	1154.60990425000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06626549037	1154.60990425000	ISOLATE	-115.41784943800	33.84036120460	BIG WASH	31	Eagle Creek
84	0	sfAB	1893.64672110000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10868036737	1893.64672109000	ISOLATE	-115.41490871300	33.84245817190	BIG WASH	31	Eagle Creek
85	0	sfAB	819.45362920700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04703016697	819.45362920600	ISOLATE	-115.41489043300	33.83721308480	BIG WASH	31	Eagle Creek
86	0	sfAB	233.01014700400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01337294232	233.01014700100	ISOLATE	-115.41511743100	33.83746756020	BIG WASH	31	Eagle Creek
87	0	sfAB	1628.47371046000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09346153067	1628.47371046000	ISOLATE	-115.41720976300	33.83809440580	BIG WASH	31	Eagle Creek
88	0	sfAB	389.61154785100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02236062602	389.61154785100	ISOLATE	-115.41335085700	33.83756191400	BIG WASH	31	Eagle Creek
89	0	sfAB	730.40493730300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04191947528	730.40493730500	ISOLATE	-115.41528042900	33.83591520280	BIG WASH	31	Eagle Creek
90	0	sfAB	112.67110892700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00646643187	112.67110892400	ISOLATE	-115.41346659600	33.83098668370	BIG WASH	31	Eagle Creek
91	0	sfAB	127.38846714800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00731109201	127.38846714700	ISOLATE	-115.41334341200	33.83100841140	BIG WASH	31	Eagle Creek
92	0	sfAB	152.16576942700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00873311349	152.16576943100	ISOLATE	-115.41293731700	33.83098075810	BIG WASH	31	Eagle Creek
93	0	sfAB	354.34769954900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02033675962	354.34769954900	ISOLATE	-115.41459897300	33.83167758630	BIG WASH	31	Eagle Creek
94	0	sfAB	302.89082197700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01738354121	302.89082197600	ISOLATE	-115.41524151200	33.83215900050	BIG WASH	31	Eagle Creek
95	0	sfAB	583.70244075700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03349991051	583.70244076200	ISOLATE	-115.42312297900	33.83239278800	BIG WASH	31	Eagle Creek
96	0	sfAB	320.53811123100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01839635625	320.53811123200	ISOLATE	-115.42271669300	33.83254148020	BIG WASH	31	Eagle Creek
97	0	sfAB	200.43573574700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01150342836	200.43573575200	ISOLATE	-115.42274253600	33.83270491290	BIG WASH	31	Eagle Creek
98	0	sfAB	183.36345566800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01052361431	183.36345566900	ISOLATE	-115.42344475600	33.83298038520	BIG WASH	31	Eagle Creek
99	0	sfAB	646.81839958400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03712226811	646.81839958600	ISOLATE	-115.42190945200	33.83234280590	BIG WASH	31	Eagle Creek
100	0	sfAB	2837.19491395000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.16283258230	2837.19491396000	ISOLATE	-115.42372261100	33.83214040770	BIG WASH	31	Eagle Creek
101	0	sfAB	512.49338508300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02941307307	512.49338508700	ISOLATE	-115.42817795700	33.83261644550	BIG WASH	31	Eagle Creek
102	0	sfAB	590.75461807500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03390464980	590.75461807000	ISOLATE	-115.42727833400	33.83233373950	BIG WASH	31	Eagle Creek
103	0	sfAB	2059.22676720000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11818335441	2059.22676720000	ISOLATE	-115.42452771600	33.83148305470	BIG WASH	31	Eagle Creek
104	0	sfAB	2074.26039538000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11904616594	2074.26039538000	ISOLATE	-115.42205420100	33.83174636280	BIG WASH	31	Eagle Creek
105	0	sfAB	1373.13181747000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07880692249	1373.13181747000	ISOLATE	-115.41946968300	33.83109314850	BIG WASH	31	Eagle Creek
106	0	sfAB	209.60506584800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01202967550	209.60506584900	ISOLATE	-115.41831586200	33.83088848150	BIG WASH	31	Eagle Creek
107	0	sfAB	1095.52852827000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06287468597	1095.52852826000	ISOLATE	-115.41691298300	33.83120323020	BIG WASH	31	Eagle Creek
108	0	sfAB	586.71433673800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03367276956	586.71433673700	ISOLATE	-115.41525282400	33.83109207920	BIG WASH	31	Eagle Creek
109	0	sfAB	264.23787575300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01516516734	264.23787575000	ISOLATE	-115.41673508100	33.83103880590	BIG WASH	31	Eagle Creek
110	0	sfAB	374.84530338100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02151316020	374.84530338200	ISOLATE	-115.41746086300	33.83095057740	BIG WASH	31	Eagle Creek
111	0	sfAB	1493.64455668000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08572340201	1493.64455668000	ISOLATE	-115.41784271800	33.83143360920	BIG WASH	31	Eagle Creek
112	0	sfAB	1367.45295789000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07848100080	1367.45295789000	ISOLATE	-115.42508910400	33.83299888850	BIG WASH	31	Eagle Creek
113	0	sfAB	526.99041257400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03024508796	526.99041257500	ISOLATE	-115.42596728600	33.83251134920	BIG WASH	31	Eagle Creek
114	0	sfAB	404.57503720400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02321941214	404.57503720300	ISOLATE	-115.42531180000	33.83286461910	BIG WASH	31	Eagle Creek
115	0	sfAB	530.61351557700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03045302546	530.61351557400	ISOLATE	-115.42473793200	33.83328068650	BIG WASH	31	Eagle Creek
116	0	sfAB	516.16310673700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02962368611	516.16310673900	ISOLATE	-115.42467586800	33.83307158470	BIG WASH	31	Eagle Creek
117	0	sfAB	808.75338590400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04641605750	808.75338590200	ISOLATE	-115.42986036500	33.83362317530	BIG WASH	31	Eagle Creek
118	0	sfAB	883.15019639400	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.15205754070	883.15019639700	ISOLATE	-115.43086185400	33.83404709520	BIG WASH	31	Eagle Creek
119	0	sfAB	500.30613588100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02871362121	500.30613588000	ISOLATE	-115.42803067000	33.83402808760	BIG WASH	31	Eagle Creek
120	0	sfAB	855.80750886100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04911659257	855.80750886800	ISOLATE	-115.42712058700	33.83352430390	BIG WASH	31	Eagle Creek
121	0	sfAB	302.92675811100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01738560366	302.92675811600	ISOLATE	-115.42536722000	33.83390584080	BIG WASH	31	Eagle Creek
122	0	sfAB	1487.41238540000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08536572460	1487.41238540000	ISOLATE	-115.42728238300	33.83405754360	BIG WASH	31	Eagle Creek
123	0	sfAB	1569.03431247000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09005017863	1569.03431247000	ISOLATE	-115.43052360300	33.83440682410	BIG WASH	31	Eagle Creek
124	0	sfAB	175.40445425100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01006683048	175.40445425000	ISOLATE	-115.43161135900	33.83466227200	BIG WASH	31	Eagle Creek
125	0	sfAB	677.37610954900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03887603935	677.37610956000	ISOLATE	-115.42647678800	33.83440344930	BIG WASH	31	Eagle Creek
126	0	sfAB	423.48069269600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02430444747	423.48069269400	ISOLATE	-115.42742628400	33.83486319580	BIG WASH	31	Eagle Creek
127	0	sfAB	875.21021967400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05023015494	875.21021967800	ISOLATE	-115.42424083100	33.83509227350	BIG WASH	31	Eagle Creek
128	0	sfAB	906.08990205100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05200240485	906.08990204700	ISOLATE	-115.42502866400	33.83486754120	BIG WASH	31	Eagle Creek
129	0	sfAB	260.22095221700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01493462765	260.22095221800	ISOLATE	-115.42398407200	33.83521372620	BIG WASH	31	Eagle Creek
130	0	sfAB	728.50869269600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04181064582	728.50869269600	ISOLATE	-115.42154482800	33.83495978590	BIG WASH	31	Eagle Creek
131	0	sfAB	1218.27472981000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06991934859	1218.27472981000	ISOLATE	-115.42099736000	33.83294506670	BIG WASH	31	Eagle Creek
132	0	sfAB	1176.54569794000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06752443170	1176.54569794000	ISOLATE	-115.42346197500	33.83348964020	BIG WASH	31	Eagle Creek
133	0	sfAB	1565.76190278000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08986236816	1565.76190278000	ISOLATE	-115.42124209900	33.83360269630	BIG WASH	31	Eagle Creek
134	0	sfAB	612.44415887600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03514945815	612.44415888200	ISOLATE	-115.42305185100	33.83431400040	BIG WASH	31	Eagle Creek
135	0	sfAB	2134.78430480000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.12251976038	2134.78430481000	ISOLATE	-115.41995911600	33.83467295830	BIG WASH	31	Eagle Creek
136	0	sfA	1751.63345796000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10052992757	1751.63345796000	ISOLATE	-115.42794566700	33.83543701810	BIG WASH	31	Eagle Creek
137	0	sfA	554.22030628700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03180786882	554.22030629500	ISOLATE	-115.42965137400	33.83653843340	BIG WASH	31	Eagle Creek
138	0	sfA	325.70011768900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01869261465	325.70011768800	ISOLATE	-115.43086878600	33.83695302470	BIG WASH	31	Eagle Creek
139	0	sfA	249.12914492200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01429804551	249.12914492000	ISOLATE	-115.43129280800	33.83673156930	BIG WASH	31	Eagle Creek
140	0	sfA	447.96198412800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02570948026	447.96198412500	ISOLATE	-115.42922874300	33.83654181420	BIG WASH	31	Eagle Creek
141	0	sfA	494.10843870000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02835792233	494.10843870000	ISOLATE	-115.42644373300	33.83609511720	BIG WASH	31	Eagle Creek

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary																			
FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
142	0	sfA	696.54957448800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03997644482	696.54957448600	ISOLATE	-115.42617483500	33.83658734300	BIG WASH	31	Eagle Creek
143	0	sfAB	663.01549099200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03805185325	663.01549099300	ISOLATE	-115.42214475600	33.83593928300	BIG WASH	31	Eagle Creek
144	0	sfAB	2835.06608329000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.16271040423	2835.06608329000	ISOLATE	-115.41818774600	33.83585269500	BIG WASH	31	Eagle Creek
145	0	sfA	368.94336554600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02117443558	368.94336555000	ISOLATE	-115.41506487300	33.83521604200	BIG WASH	31	Eagle Creek
146	0	sfAB	1846.32108299000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10596424948	1846.32108298000	ISOLATE	-115.41546939900	33.83515845630	BIG WASH	31	Eagle Creek
147	0	sfAB	833.42139556800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04783180645	833.42139556800	ISOLATE	-115.41997655900	33.83509410120	BIG WASH	31	Eagle Creek
148	0	sfAB	964.80619436300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05537225633	964.80619437100	ISOLATE	-115.42178973500	33.83526355350	BIG WASH	31	Eagle Creek
149	0	sfAB	233.78760517800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01341756228	233.78760518000	ISOLATE	-115.42078691800	33.83494700770	BIG WASH	31	Eagle Creek
150	0	sfAB	282.03979642200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01618685700	282.03979642500	ISOLATE	-115.41862231000	33.83364402780	BIG WASH	31	Eagle Creek
151	0	sfAB	382.93610579400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02197750837	382.93610579800	ISOLATE	-115.41810301200	33.83298831930	BIG WASH	31	Eagle Creek
152	0	sfAB	548.97571212300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03150687053	548.97571212000	ISOLATE	-115.41987198700	33.83421600030	BIG WASH	31	Eagle Creek
153	0	sfAB	412.11430170100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02365210639	412.11430170200	ISOLATE	-115.42094906500	33.83564039630	BIG WASH	31	Eagle Creek
154	0	sfAB	2363.36919910000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13563872814	2363.36919911000	ISOLATE	-115.41738249700	33.83638103410	BIG WASH	31	Eagle Creek
155	0	sfAB	2558.19369574000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.14682011569	2558.19369574000	ISOLATE	-115.41553763300	33.83684993380	BIG WASH	31	Eagle Creek
156	0	sfAB	3090.24568647000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.17735569826	3090.24568648000	ISOLATE	-115.42015415400	33.83736823110	BIG WASH	31	Eagle Creek
157	0	sfAB	1096.29164066000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06291848259	1096.29164066000	ISOLATE	-115.42300826400	33.83790715200	BIG WASH	31	Eagle Creek
158	0	sfAB	327.12598221800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01877444802	327.12598221400	ISOLATE	-115.42346027700	33.83807807530	BIG WASH	31	Eagle Creek
159	0	sfA	332.81576146100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01910099641	332.81576146100	ISOLATE	-115.42482430600	33.83803554520	BIG WASH	31	Eagle Creek
160	0	sfAB	831.79257969800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04773832528	831.79257969100	ISOLATE	-115.41939397300	33.83812777930	BIG WASH	31	Eagle Creek
161	0	sfA	2277.46862859000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13070871376	2277.46862859000	ISOLATE	-115.42658607300	33.83846846920	BIG WASH	31	Eagle Creek
162	0	sfA	2792.38813474000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.16026102702	2792.38813473000	ISOLATE	-115.42774556700	33.83952232750	BIG WASH	31	Eagle Creek
163	0	sfA	1085.99094761000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06232730416	1085.99094761000	ISOLATE	-115.42739860000	33.83771511090	BIG WASH	31	Eagle Creek
164	0	sfAB	1050.80596569000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06030796405	1050.80596568000	ISOLATE	-115.41932477300	33.84005325050	BIG WASH	31	Eagle Creek
165	0	sfA	463.03339624500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02657446030	463.03339624400	ISOLATE	-115.42288964900	33.83973103980	BIG WASH	31	Eagle Creek
166	0	sfA	826.03311901500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04740777772	826.03311902200	ISOLATE	-115.42270066000	33.84021388090	BIG WASH	31	Eagle Creek
167	0	sfA	2866.25995539000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.16450068615	2866.25995539000	ISOLATE	-115.42788456600	33.84030433870	BIG WASH	31	Eagle Creek
168	0	sfA	311.99383927200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01790598251	311.99383927500	ISOLATE	-115.43016769800	33.84036764890	BIG WASH	31	Eagle Creek
169	0	sfA	2379.95817001000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13659080406	2379.95817001000	ISOLATE	-115.42699799500	33.84146296930	BIG WASH	31	Eagle Creek
170	0	sfA	1180.24841281000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06773693829	1180.24841281000	ISOLATE	-115.42156127200	33.84127931650	BIG WASH	31	Eagle Creek
171	0	sfA	2023.90803530000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11615633811	2023.90803530000	ISOLATE	-115.42891680300	33.84214895210	BIG WASH	31	Eagle Creek
172	0	sfA	234.39911493900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01345265811	234.39911493900	ISOLATE	-115.42720328000	33.84198282990	BIG WASH	31	Eagle Creek
173	0	sfA	3699.76225910000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.21233713608	3699.76225910000	ISOLATE	-115.42527901800	33.84322112270	BIG WASH	31	Eagle Creek
174	0	sfA	2089.40421631000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11991530167	2089.40421632000	ISOLATE	-115.42465498300	33.84232874580	BIG WASH	31	Eagle Creek
175	0	sfA	802.26927996800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04604392103	802.26927996500	ISOLATE	-115.41949477100	33.84377758160	BIG WASH	31	Eagle Creek
176	0	sfA	670.38962392000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03847507024	670.38962392200	ISOLATE	-115.41935234200	33.84321376600	BIG WASH	31	Eagle Creek
177	0	sfA	594.81831379800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03413787384	594.81831379200	ISOLATE	-115.41971325200	33.84282515470	BIG WASH	31	Eagle Creek
178	0	sfA	331.07303121100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01900097746	331.07303121500	ISOLATE	-115.41948413900	33.84237152910	BIG WASH	31	Eagle Creek
179	0	sfAB	2200.16062033000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.12627184460	2200.16062033000	ISOLATE	-115.41391395300	33.84005472830	BIG WASH	31	Eagle Creek
180	0	sfAB	613.09911448900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03518704743	613.09911448800	ISOLATE	-115.41145984600	33.83877462610	BIG WASH	31	Eagle Creek
181	0	sfB	2352.56670380000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13501875022	2352.56670380000	ISOLATE	-115.40941163900	33.84573431410	BIG WASH	31	Eagle Creek
182	0	sfB	602.16107594100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03455929040	602.16107594100	ISOLATE	-115.41150261100	33.84699128990	BIG WASH	31	Eagle Creek
183	0	sfB	1059.60706898000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06081307788	1059.60706898000	ISOLATE	-115.41307252800	33.84607301040	BIG WASH	31	Eagle Creek
184	0	sfB	499.10517831700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02864469573	499.10517831800	ISOLATE	-115.41355669700	33.84602068810	BIG WASH	31	Eagle Creek
185	0	sfB	403.42506542700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02315341285	403.42506542600	ISOLATE	-115.41376603900	33.84533042860	BIG WASH	31	Eagle Creek
186	0	sfAB	2125.86717900000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.12200798778	2125.86717899000	ISOLATE	-115.40653201700	33.84291840340	BIG WASH	31	Eagle Creek
187	0	sfAB	2575.45006908000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.14781049524	2575.45006907000	ISOLATE	-115.40812491300	33.84276372260	BIG WASH	31	Eagle Creek
188	0	sfAB	3931.17323463000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.22561829859	3931.17323464000	ISOLATE	-115.41084449300	33.84121116870	BIG WASH	31	Eagle Creek
189	0	sfAB	462.81848936300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02656212634	462.81848936100	ISOLATE	-115.41474973200	33.84293115690	BIG WASH	31	Eagle Creek
190	0	sfAB	441.04258709000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02531236152	441.04258709200	ISOLATE	-115.41502296600	33.84334361670	BIG WASH	31	Eagle Creek
191	0	sfAB	1556.08232927000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08930683708	1556.08232927000	ISOLATE	-115.40916363700	33.84183269930	BIG WASH	31	Eagle Creek
192	0	sfAB	534.75362698100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03069063516	534.75362697600	ISOLATE	-115.41355381300	33.84330471040	BIG WASH	31	Eagle Creek
193	0	sfB	1169.33406053000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06711054066	1169.33406053000	ISOLATE	-115.40678119600	33.84588488810	BIG WASH	31	Eagle Creek
194	0	sfB	247.61472129400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01421112955	247.61472129000	ISOLATE	-115.40809508000	33.84632519610	BIG WASH	31	Eagle Creek
195	0	sfB	560.02411411700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03214096155	560.02411411800	ISOLATE	-115.40840008800	33.84604127370	BIG WASH	31	Eagle Creek
196	0	sfB	3048.53674637000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11823473757	2060.12206734000	ISOLATE	-115.40975403000	33.84851777050	BIG WASH	31	Eagle Creek
196	0	sfB	3048.53674637000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.05672719691	988.41467903200	ISOLATE	-115.40975403000	33.84851777050	BIG WASH	34	181001004702-Pinto Wash
197	0	sfB	2932.95428444000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13377131159	2330.83133320000	ISOLATE	-115.40964095300	33.84800762270	BIG WASH	31	Eagle Creek
197	0	sfB	2932.95428444000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.03455710234	602.12295124300	ISOLATE	-115.40964095300	33.84800762270	BIG WASH	34	181001004702-Pinto Wash
198	0	sfB	1145.46410547000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05560258028	968.81935885000	ISOLATE	-115.40670850900	33.84666207130	BIG WASH	31	Eagle Creek
198	0	sfB	1145.46410547000	2.50000000000	E	181001004703-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.01013801347	176.64474662200	ISOLATE	-115.40670850900	33.84666207130	BIG WASH	32	181001004703-Pinto Wash
199	0	sfB	985.36056987300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03541940726	617.14775212000	ISOLATE	-115.40656606100	33.84698287270	BIG WASH	31	Eagle Creek
199	0	sfB	985.36056987300	2.50000000000	E	181001004703-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.02113250791	368.21281773900	ISOLATE	-115.40656606100	33.84698287270	BIG WASH	32	181001004703-Pinto Wash
200	0	sfB	1331.84435947000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01521555532	265.11583596400	ISOLATE	-115.40986190600	33.84951597400	BIG WASH	31	Eagle Creek
200	0	sfB	1331.84435947000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.06122179313	1066.72852351000	ISOLATE	-115.40986190600	33.84951597400	BIG WASH	34	181001004702-Pinto Wash
201	0	sfB	3262.49312282000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.18724134084	3262.49312282000	ISOLATE	-115.40984186900	33.85017259430	BIG WASH	34	181001004702-Pinto Wash
202	0	sfB	3147.53551906000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.17449252945	3040.35783315000	ISOLATE	-115.40899389900	33.85169001970	BIG WASH	34	181001004702-Pinto Wash
203	0	sfB	2537.29580715000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.13946958914	2430.11812124000	ISOLATE	-115.41070510600	33.85153047860	BIG WASH	34	181001004702-Pinto Wash
204	0	sfB	400.30159667200	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.02297415041	400.30159667500	ISOLATE	-115.41100545500	33.85125759290	BIG WASH	34	181001004702-Pinto Wash
205	0	sfB	836.01760462700	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.04798080835	836.01760462700	ISOLATE	-115.41299221400	33.85206068060	BIG WASH	34	181001004702-Pinto Wash
206	0	sfB	2453.89946212000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.14083445031	2453.89946212000	ISOLATE	-115.40838650800	33.85240469600	BIG WASH	34	181001004702-Pinto Wash
207	0	sfB	608.16641788400	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.03490394960	608.16641788200	ISOLATE	-115.40938117700	33.85311794180	BIG WASH	34	181001004702-Pinto Wash

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary																			
FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
208	0	sfB	1435.80711989000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.08240398989	1435.80711989000	ISOLATE	-115.40668140500	33.85271987350	BIG WASH	34	181001004702-Pinto Wash
209	0	sfAB	1537.32599624000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08823037169	1537.32599624000	ISOLATE	-115.40516293200	33.83240310030	BIG WASH	31	Eagle Creek
210	0	sfAB	1648.95428682000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09463695402	1648.95428681000	ISOLATE	-115.40764655000	33.83402195860	BIG WASH	31	Eagle Creek
211	0	sfAB	1984.81318743000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11391260258	1984.81318743000	ISOLATE	-115.40843667800	33.83496686270	BIG WASH	31	Eagle Creek
212	0	sfAB	1227.17378095000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07043008385	1227.17378095000	ISOLATE	-115.41105092600	33.83571305860	BIG WASH	31	Eagle Creek
213	0	sfAB	1423.43926372000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08169417262	1423.43926372000	ISOLATE	-115.41306899100	33.83250681770	BIG WASH	31	Eagle Creek
214	0	sfAB	1982.42422619000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11377549508	1982.42422619000	ISOLATE	-115.41027167200	33.83292850170	BIG WASH	31	Eagle Creek
215	0	sfAB	1029.29853806000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05907360756	1029.29853806000	ISOLATE	-115.40975438400	33.83335098050	BIG WASH	31	Eagle Creek
216	0	sfAB	961.66833479000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05519216797	961.66833479200	ISOLATE	-115.41178172800	33.83429421200	BIG WASH	31	Eagle Creek
217	0	sfAB	2461.66413109000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.14128008099	2461.66413109000	ISOLATE	-115.41112918100	33.83669447820	BIG WASH	31	Eagle Creek
218	0	sfAB	1792.22001562000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09837551743	1714.09501562000	ISOLATE	-115.40775180700	33.83809280470	BIG WASH	31	Eagle Creek
219	0	sfAB	9770.58234986000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.56075426709	9770.58234985000	ISOLATE	-115.39347894100	33.82958185510	BIG WASH	31	Eagle Creek
220	0	sfAB	9157.46050366000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.52556591504	9157.46050365000	ISOLATE	-115.39360489500	33.83363529110	BIG WASH	31	Eagle Creek
221	0	sfAB	1764.97048515000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10129536760	1764.97048514000	ISOLATE	-115.38929402700	33.82714221970	BIG WASH	31	Eagle Creek
222	0	sfAB	12898.39534450000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	1.15492440547	6707.80094696000	ISOLATE	-115.38022315800	33.81635852740	BIG WASH	27	Lower Big Wash
222	0	sfAB	12898.39534450000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	1.06587369104	6190.59439756000	ISOLATE	-115.38022315800	33.81635852740	BIG WASH	31	Eagle Creek
223	0	sfAB	11740.20539830000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	1.60292177422	9309.76966466000	ISOLATE	-115.37586372500	33.81322831810	BIG WASH	27	Lower Big Wash
223	0	sfAB	11740.20539830000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.41846345277	2430.43573366000	ISOLATE	-115.37586372500	33.81322831810	BIG WASH	31	Eagle Creek
224	0	sfAB	1965.74015168000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.11281796096	1965.74015168000	ISOLATE	-115.37307828300	33.80938092140	BIG WASH	27	Lower Big Wash
225	0	sfAB	6037.99133765000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	1.03959905951	6037.99133765000	ISOLATE	-115.38831469400	33.82965050670	BIG WASH	31	Eagle Creek
226	0	sfAB	401.49568300000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02304268153	401.49568300500	ISOLATE	-115.38659521600	33.82534070340	BIG WASH	31	Eagle Creek
227	0	sfAB	1530.25496979000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08782455061	1530.25496979000	ISOLATE	-115.38597828700	33.82916646580	BIG WASH	31	Eagle Creek
228	0	sfAB	2342.97076134000	2.50000000000	E	181001004703-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.13446801890	2342.97076133000	ISOLATE	-115.39674203100	33.84025947970	BIG WASH	32	181001004703-Pinto Wash
229	0	sfAB	3544.63692383000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.20343416689	3544.63692384000	ISOLATE	-115.39897911800	33.83869723670	BIG WASH	31	Eagle Creek
230	0	sfAB	2324.36526936000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13340021059	2324.36526935000	ISOLATE	-115.40168930300	33.83900692710	BIG WASH	31	Eagle Creek
231	0	sfAB	885.42601637900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05081646100	885.42601637800	ISOLATE	-115.40849487300	33.84001428480	BIG WASH	31	Eagle Creek
232	0	sfAB	378.19379599700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02170533724	378.19379599300	ISOLATE	-115.40886059700	33.84040320470	BIG WASH	31	Eagle Creek
233	0	sfAB	3674.83928862000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.21090675440	3674.83928861000	ISOLATE	-115.39395073500	33.83147596890	BIG WASH	31	Eagle Creek
234	0	sfAB	4144.44619203000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.23785848210	4144.44619203000	ISOLATE	-115.39548713300	33.83403385920	BIG WASH	31	Eagle Creek
235	0	sfAB	2283.12700924000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13103346013	2283.12700923000	ISOLATE	-115.39805434600	33.83452064860	BIG WASH	31	Eagle Creek
236	0	sfAB	964.38716867600	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.05534820757	964.38716867300	ISOLATE	-115.39850096400	33.80570584320	BIG WASH	28	Upper Big Wash
237	0	sfAB	650.92405779800	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03735790047	650.92405779800	ISOLATE	-115.39969479500	33.80664940940	BIG WASH	28	Upper Big Wash
238	0	sfAB	459.22811312200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02635606710	459.22811312100	ISOLATE	-115.39947476600	33.80683959950	BIG WASH	28	Upper Big Wash
239	0	sfAB	475.77049338500	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02730546909	475.77049338200	ISOLATE	-115.39612373100	33.80331024500	BIG WASH	28	Upper Big Wash
240	0	sfAB	484.38475831200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02779985987	484.38475831700	ISOLATE	-115.39783928800	33.80429392290	BIG WASH	28	Upper Big Wash
241	0	sfAB	442.34617146600	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02538717697	442.34617146600	ISOLATE	-115.39930180300	33.80488234070	BIG WASH	28	Upper Big Wash
242	0	sfAB	475.55039883400	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02729283740	475.55039882800	ISOLATE	-115.39961163500	33.80425379530	BIG WASH	28	Upper Big Wash
243	0	sfAB	4872.67025803000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.21059520040	3669.41077173000	ISOLATE	-115.38267031200	33.80764677820	BIG WASH	27	Lower Big Wash
243	0	sfAB	4872.67025803000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06905759219	1203.25948631000	ISOLATE	-115.38267031200	33.80764677820	BIG WASH	31	Eagle Creek
244	0	sfAB	6898.50608806000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.90718683009	5268.94110914000	ISOLATE	-115.38602110000	33.80968462070	BIG WASH	27	Lower Big Wash
244	0	sfAB	6898.50608806000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00652577153	37.90168106580	ISOLATE	-115.38602110000	33.80968462070	BIG WASH	28	Upper Big Wash
244	0	sfAB	6898.50608806000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.27404671106	1591.66329785000	ISOLATE	-115.38602110000	33.80968462070	BIG WASH	31	Eagle Creek
245	0	sfAB	7499.84172697000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.43043168773	7499.84172697000	ISOLATE	-115.39659220900	33.81561330230	BIG WASH	28	Upper Big Wash
246	0	sfAB	7751.45043130000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.11811636342	2058.05951624000	ISOLATE	-115.39567491900	33.81820122110	BIG WASH	27	Lower Big Wash
246	0	sfAB	7751.45043130000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.32675567694	5693.39091506000	ISOLATE	-115.39567491900	33.81820122110	BIG WASH	28	Upper Big Wash
247	0	sfAB	3036.07673722000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.17424682835	3036.07673723000	ISOLATE	-115.40262679800	33.81933594190	BIG WASH	28	Upper Big Wash
248	0	sfAB	11250.54267560000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	1.93707690696	11250.54267560000	ISOLATE	-115.37299878800	33.81517319920	BIG WASH	27	Lower Big Wash
249	0	sfAB	8142.89011155000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.46733758675	8142.89011155000	ISOLATE	-115.36878453000	33.81183010380	BIG WASH	27	Lower Big Wash
250	0	sfAB	2529.41530312000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.14516846322	2529.41530312000	ISOLATE	-115.37316621700	33.81794523180	BIG WASH	27	Lower Big Wash
251	0	sfAB	1269.79036594000	2.50000000000	E	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07287593928	1269.79036594000	ISOLATE	-115.37186926200	33.82056988220	BIG WASH	27	Lower Big Wash
252	0	B1	746.27520572300	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03768272761	656.58384583700	ISOLATE	-115.40557953500	33.80464131440	BIG WASH	28	Upper Big Wash
253	0	B1	414.83473939000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02380823803	414.83473939100	ISOLATE	-115.40533542200	33.80437740040	BIG WASH	28	Upper Big Wash
254	0	B1	154.53922610500	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00372175541	64.84786622380	ISOLATE	-115.40544972400	33.80385415570	BIG WASH	28	Upper Big Wash
255	0	B1	106.82999933000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00613119831	106.82999933100	ISOLATE	-115.40592071200	33.80448944420	BIG WASH	28	Upper Big Wash
256	0	B1	405.84446103200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02329226705	405.84446104100	ISOLATE	-115.40610413800	33.80383241980	BIG WASH	28	Upper Big Wash
257	0	B1	723.42432925100	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04151884351	723.42432925600	ISOLATE	-115.41006194300	33.80083388360	BIG WASH	28	Upper Big Wash
258	0	B1	797.62974879600	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04577764858	797.62974878900	ISOLATE	-115.40955110900	33.80138449360	BIG WASH	28	Upper Big Wash
259	0	B1	654.86548523300	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03758410728	654.86548523900	ISOLATE	-115.41063487400	33.80044464090	BIG WASH	28	Upper Big Wash
260	0	B1	702.86843164100	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04033909732	702.86843163900	ISOLATE	-115.41164763500	33.79976665900	BIG WASH	28	Upper Big Wash
261	0	B1	345.41600849300	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01850900088	322.50083137400	ISOLATE	-115.41775706100	33.79541845420	BIG WASH	28	Upper Big Wash
262	0	B1	428.92852570600	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02461711006	428.92852570100	ISOLATE	-115.41730421900	33.79548282470	BIG WASH	28	Upper Big Wash
263	0	B1	416.03031246400	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02387685448	416.03031246600	ISOLATE	-115.41968241700	33.79371648310	BIG WASH	28	Upper Big Wash
264	0	B1	350.51611206000	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02011685675	350.51611206500	ISOLATE	-115.41929065900	33.79456762130	BIG WASH	28	Upper Big Wash
265	0	B1	385.95980093100	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02215104459	385.95980093400	ISOLATE	-115.42015550100	33.79352856930	BIG WASH	28	Upper Big Wash
266	0	B1	528.38325507200	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03032502612	528.38325507900	ISOLATE	-115.42065679800	33.79282990780	BIG WASH	28	Upper Big Wash
267	0	B1	406.42072710800	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02332534017	406.42072710200	ISOLATE	-115.42360665400	33.79156454870	BIG WASH	28	Upper Big Wash
268	0	B1	563.50347153400	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03234064919	563.50347152900	ISOLATE	-115.42420757800	33.79162148850	BIG WASH	28	Upper Big Wash
269	0	B1	272.49308259100	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01563895102	272.49308259200	ISOLATE	-115.44664299800	33.78461241640	BIG WASH	28	Upper Big Wash
270	0	B1	217.76132419600	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01249778031	217.76132419800	ISOLATE	-115.44681210500	33.78412558960	BIG WASH	28	Upper Big Wash
271	0	B1	683.58643329200	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03923246288	683.58643329300	ISOLATE	-115.44380939200	33.79048881010	BIG WASH	28	Upper Big Wash
272	0	B1	503.35453502500	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02888857524	503.35453502800	ISOLATE	-115.44461986200	33.78860253150	BIG WASH	28	Upper Big Wash

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
273	0	B1	532.20296818200	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03054424749	532.20296818300	ISOLATE	-115.44500841500	33.78801049520	BIG WASH	28	Upper Big Wash
274	0	B1	184.92026613600	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01061296293	184.92026613500	ISOLATE	-115.44830204800	33.78199053200	BIG WASH	28	Upper Big Wash
275	0	B1	371.92238121100	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.02134540755	371.92238121800	ISOLATE	-115.45002564400	33.77433543700	BIG WASH	23	Dragon Wash
276	0	B1	314.52805607300	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01805142654	314.52805607700	ISOLATE	-115.44996512600	33.77340600840	BIG WASH	23	Dragon Wash
277	0	B1	278.37545311600	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01597655264	278.37545311600	ISOLATE	-115.45004968200	33.76317412950	BIG WASH	23	Dragon Wash
278	0	B1	278.76835173800	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01599910191	278.76835173800	ISOLATE	-115.45004664900	33.76265435440	BIG WASH	23	Dragon Wash
279	0	sfAB	647.37740633100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03715435069	647.37740633600	ISOLATE	-115.42576945800	33.83100579190	BIG WASH	31	Eagle Creek
280	0	sfAB	419.86266801900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02409680142	419.86266802000	ISOLATE	-115.42797633100	33.83123924420	BIG WASH	31	Eagle Creek
281	0	sfAB	263.53276508000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01512469956	263.53276508000	ISOLATE	-115.42759747000	33.83174236740	BIG WASH	31	Eagle Creek
282	0	sfAB	1234.34032970000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07084138715	1234.34032970000	ISOLATE	-115.42961142300	33.83183461590	BIG WASH	31	Eagle Creek
283	0	sfAB	1051.54639343000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06035045876	1051.54639344000	ISOLATE	-115.43164563800	33.83224452360	BIG WASH	31	Eagle Creek
284	0	sfb	230.68057180400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01323924310	230.68057180600	ISOLATE	-115.43248374300	33.83248178860	BIG WASH	31	Eagle Creek
285	0	sfAB	593.48284402500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03406122842	593.48284402600	ISOLATE	-115.42929987100	33.83212151170	BIG WASH	31	Eagle Creek
286	0	sfAB	2119.54359032000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10419061274	1815.41723629000	ISOLATE	-115.40313814000	33.84318332450	BIG WASH	31	Eagle Creek
286	0	sfAB	2119.54359032000	2.50000000000	E	181001004703-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.01745445099	304.12635403300	ISOLATE	-115.40313814000	33.84318332450	BIG WASH	32	181001004703-Pinto Wash
287	0	sfB	664.35472015600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03812871443	664.35472015500	ISOLATE	-115.41045877500	33.84479112670	BIG WASH	31	Eagle Creek
288	0	sfB	469.18063827500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02692726345	469.18063827900	ISOLATE	-115.41232942500	33.84473635570	BIG WASH	31	Eagle Creek
289	0	sfA	206.17260937500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01183267960	206.17260938100	ISOLATE	-115.41813907600	33.84298944410	BIG WASH	31	Eagle Creek
290	0	sfAB	841.61090562400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04830181965	841.61090562500	ISOLATE	-115.41831875200	33.84150429860	BIG WASH	31	Eagle Creek
291	0	sfA	814.61983967600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04675274562	814.61983967400	ISOLATE	-115.42224733300	33.84069035610	BIG WASH	31	Eagle Creek
292	0	sfAB	553.48014934300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03176538965	553.48014934100	ISOLATE	-115.42053524400	33.84016024120	BIG WASH	31	Eagle Creek
293	0	sfAB	334.71212389400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01920983264	334.71212389300	ISOLATE	-115.42166722100	33.83941136800	BIG WASH	31	Eagle Creek
294	0	sfAB	1045.42807903000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05999931583	1045.42807903000	ISOLATE	-115.42140363700	33.83806619890	BIG WASH	31	Eagle Creek
295	0	sfA	302.22214574000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01734516447	302.22214574500	ISOLATE	-115.42440340000	33.83835133310	BIG WASH	31	Eagle Creek
296	0	sfAB	303.01269384300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01739053569	303.01269384100	ISOLATE	-115.42383916300	33.83780535150	BIG WASH	31	Eagle Creek
297	0	sfA	308.78796278900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01772199052	308.78796278800	ISOLATE	-115.42516390100	33.83751512780	BIG WASH	31	Eagle Creek
298	0	subB	441.09121603500	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02531515244	441.09121603600	ISOLATE	-115.45640495700	33.69578149380	BIG WASH	21	Lake Tamarisk
299	0	B1	121.43621989500	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.00696948002	121.43621990100	ISOLATE	-115.45050196500	33.77035803060	BIG WASH	23	Dragon Wash
300	0	B1	252.24406819100	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01447681750	252.24406818600	ISOLATE	-115.45012394600	33.75985067120	BIG WASH	23	Dragon Wash
301	0	B1	351.64737248100	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.02018178217	351.64737247900	ISOLATE	-115.45006903300	33.75939196830	BIG WASH	23	Dragon Wash
302	0	B1	181.45738496500	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01041422090	181.45738496000	ISOLATE	-115.45024348700	33.75912738270	BIG WASH	23	Dragon Wash
303	0	B1	219.42520331700	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01259327384	219.42520332300	ISOLATE	-115.45016497200	33.75602950000	BIG WASH	23	Dragon Wash
304	0	B1	241.89891922300	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01388308765	241.89891922300	ISOLATE	-115.45032529100	33.74992358470	BIG WASH	23	Dragon Wash
305	0	B1	103.38413716900	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.00593343303	103.38413716800	ISOLATE	-115.45110780700	33.74985863520	BIG WASH	23	Dragon Wash
306	0	B1	164.18358244900	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.00942284105	164.18358245000	ISOLATE	-115.45113704400	33.74892232840	BIG WASH	23	Dragon Wash
307	0	B1	380.94862778500	2.50000000000	E	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.02186344283	380.94862778400	ISOLATE	-115.45049920500	33.74803135850	BIG WASH	23	Dragon Wash
308	0	B2	322.43139441800	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01850501575	322.43139442000	ISOLATE	-115.45175910600	33.70533842430	BIG WASH	21	Lake Tamarisk
309	0	subB	352.38010002400	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02022383494	352.38010002400	ISOLATE	-115.45388711000	33.69941327120	BIG WASH	21	Lake Tamarisk
310	0	subB	334.37152135200	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01919028474	334.37152134500	ISOLATE	-115.45474739300	33.69982308010	BIG WASH	21	Lake Tamarisk
311	0	subB	445.25929985700	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02555436753	445.25929985300	ISOLATE	-115.45449423400	33.69960104600	BIG WASH	21	Lake Tamarisk
312	0	subB	454.53262880900	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02608658338	454.53262880900	ISOLATE	-115.45577370000	33.70032595190	BIG WASH	21	Lake Tamarisk
313	0	subB	408.19956643000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02342743150	408.19956642800	ISOLATE	-115.45557571300	33.70031182640	BIG WASH	21	Lake Tamarisk
314	0	subB	320.64270087000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01840235887	320.64270087200	ISOLATE	-115.45513635000	33.70022746030	BIG WASH	21	Lake Tamarisk
315	0	subB	94.85484565800	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.00544391906	94.85484565620	ISOLATE	-115.45518603300	33.70007138210	BIG WASH	21	Lake Tamarisk
316	0	subB	599.97121543400	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.03443360970	599.97121543900	ISOLATE	-115.45589520600	33.70005267480	BIG WASH	21	Lake Tamarisk
317	0	subB	421.52845297600	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02419240433	421.52845297800	ISOLATE	-115.45631848900	33.70009511680	BIG WASH	21	Lake Tamarisk
318	0	subB	456.81164804500	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02621738109	456.81164804100	ISOLATE	-115.45414190600	33.69577222120	BIG WASH	21	Lake Tamarisk
319	0	subB	465.44772823600	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02671302389	465.44772823000	ISOLATE	-115.45391641800	33.69611056010	BIG WASH	21	Lake Tamarisk
320	0	subB	750.34868080800	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.04306408866	750.34868080600	ISOLATE	-115.45458290900	33.69659408850	BIG WASH	21	Lake Tamarisk
321	0	subB	303.35862704300	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01741038952	303.35862704100	ISOLATE	-115.45464379200	33.69542649940	BIG WASH	21	Lake Tamarisk
322	0	subB	146.58168066300	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.00841263089	146.58168066400	ISOLATE	-115.45646979300	33.69659255160	BIG WASH	21	Lake Tamarisk
323	0	subB	446.27832104600	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02561285130	446.27832104200	ISOLATE	-115.45626967100	33.69614282410	BIG WASH	21	Lake Tamarisk
324	0	subB	181.99207920700	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01044490813	181.99207920700	ISOLATE	-115.45615229300	33.69559854780	BIG WASH	21	Lake Tamarisk
325	0	subB	680.69685615000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.03906662398	680.69685614800	ISOLATE	-115.45435368100	33.69922962520	BIG WASH	21	Lake Tamarisk
326	0	sfAB	1531.71140454000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.08790813846	1531.71140453000	ISOLATE	-115.40039788000	33.80430029540	BIG WASH	28	Upper Big Wash
327	0	sfAB	447.08133849700	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02565893816	447.08133849600	ISOLATE	-115.40063299600	33.80472816050	BIG WASH	28	Upper Big Wash
328	0	sfAB	406.15877255000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02331030605	406.15877254900	ISOLATE	-115.40203405800	33.80706868660	BIG WASH	28	Upper Big Wash
329	0	sfAB	275.91879910800	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.01583556010	275.91879910800	ISOLATE	-115.40243802200	33.80709931940	BIG WASH	28	Upper Big Wash
330	0	sfAB	628.15518341200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03605114689	628.15518341800	ISOLATE	-115.40378177500	33.80758455400	BIG WASH	28	Upper Big Wash
331	0	sfAB	181.51524254800	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.01041754147	181.51524255000	ISOLATE	-115.40325362000	33.80821909910	BIG WASH	28	Upper Big Wash
332	0	sfAB	552.41172864100	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03170407074	552.41172864300	ISOLATE	-115.40551846500	33.80899800570	BIG WASH	28	Upper Big Wash
333	0	sfAB	878.76249096200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.05043402726	878.76249095500	ISOLATE	-115.40141229100	33.80902865010	BIG WASH	28	Upper Big Wash
334	0	sfAB	903.82384748100	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.05187235121	903.82384747700	ISOLATE	-115.40098356100	33.80839466210	BIG WASH	28	Upper Big Wash
335	0	sfAB	529.02437114800	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03036182112	529.02437114600	ISOLATE	-115.40546484400	33.81111649590	BIG WASH	28	Upper Big Wash
336	0	sfAB	606.09916489100	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03478530561	606.09916489300	ISOLATE	-115.40604067300	33.81136091610	BIG WASH	28	Upper Big Wash
337	0	sfAB	676.71681534200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03883820106	676.71681534300	ISOLATE	-115.40679782800	33.81125997530	BIG WASH	28	Upper Big Wash
338	0	sfAB	314.27372019700	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.01803682967	314.27372020300	ISOLATE	-115.40543039900	33.81245363490	BIG WASH	28	Upper Big Wash
339	0	sfAB	658.58851466700	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03779777977	658.58851466300	ISOLATE	-115.40487239300	33.80935471690	BIG WASH	28	Upper Big Wash
340	0	sfAB	379.23743029900	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02176523360	379.23743030000	ISOLATE	-115.40591974800	33.80964270410	BIG WASH	28	Upper Big Wash
341	0	sfAB	671.12725727000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.03851740457	671.12725727200	ISOLATE	-115.40573203200	33.81016058750	BIG WASH	28	Upper Big Wash
342	0	sfAB	1818.19176024000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.10434984850	1818.19176024000	ISOLATE	-115.40305939000	33.80579662630	BIG WASH	28	Upper Big Wash

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary																			
FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
343	0	sfAB	210.40931472800	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.01207583303	210.40931472500	ISOLATE	-115.40265896300	33.80563521500	BIG WASH	28	Upper Big Wash
344	0	A1	488.31081846300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02802518471	488.31081845900	ISOLATE	-115.33326105900	33.71439159370	BIG WASH	16	Gruendikes Well
345	0	A1	451.83440395400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02593172658	451.83440395500	ISOLATE	-115.33385655900	33.71427687960	BIG WASH	16	Gruendikes Well
346	0	A1	449.52395420500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02579912501	449.52395420800	ISOLATE	-115.33607354300	33.71435650610	BIG WASH	16	Gruendikes Well
347	0	A1	534.68920435000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03068693781	534.68920435400	ISOLATE	-115.33631635900	33.71443122260	BIG WASH	16	Gruendikes Well
348	0	A1	432.78496124500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02483843901	432.78496124600	ISOLATE	-115.33848506200	33.71426520220	BIG WASH	16	Gruendikes Well
349	0	A1	431.63140670800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02477223409	431.63140670500	ISOLATE	-115.33888796500	33.71425467960	BIG WASH	16	Gruendikes Well
350	0	A1	443.63935279300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02546139536	443.63935279200	ISOLATE	-115.34480860400	33.71429814550	BIG WASH	16	Gruendikes Well
351	0	A1	111.92257069700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00642347169	111.92257069700	ISOLATE	-115.34555254400	33.71387242200	BIG WASH	16	Gruendikes Well
352	0	A1	244.30902290100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01402140857	244.30902290600	ISOLATE	-115.34528702000	33.71405267550	BIG WASH	16	Gruendikes Well
353	0	A1	425.78282509500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02443657169	425.78282509000	ISOLATE	-115.34703644900	33.71429718360	BIG WASH	16	Gruendikes Well
354	0	A1	440.17437504600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02526253300	440.17437504600	ISOLATE	-115.35341456400	33.71425248630	BIG WASH	16	Gruendikes Well
355	0	A1	199.68522709900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01146035509	199.68522709700	ISOLATE	-115.35326900100	33.71400152350	BIG WASH	16	Gruendikes Well
356	0	A1	211.25582718400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01212441616	211.25582718200	ISOLATE	-115.35971823400	33.71463507160	BIG WASH	16	Gruendikes Well
357	0	A1	174.92239828700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01003916427	174.92239829100	ISOLATE	-115.35978857300	33.71418535260	BIG WASH	16	Gruendikes Well
358	0	A1	240.26036182900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01378904740	240.26036183000	ISOLATE	-115.36041857200	33.71400786600	BIG WASH	16	Gruendikes Well
359	0	A1	299.47777415100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01718765921	299.47777415000	ISOLATE	-115.36231030000	33.71445021360	BIG WASH	16	Gruendikes Well
360	0	A1	454.71977107700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02609732387	454.71977107600	ISOLATE	-115.36263253800	33.71429474760	BIG WASH	16	Gruendikes Well
361	0	A1	436.40712366700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02504632252	436.40712366800	ISOLATE	-115.36343943800	33.71429652320	BIG WASH	16	Gruendikes Well
362	0	A1	440.81039093700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02529903529	440.81039094000	ISOLATE	-115.36361380700	33.71426978360	BIG WASH	16	Gruendikes Well
363	0	A1	370.32365006900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02125365301	370.32365007300	ISOLATE	-115.36391831900	33.71431567570	BIG WASH	16	Gruendikes Well
364	0	A1	242.86443852500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01393850083	242.86443852400	ISOLATE	-115.36416737600	33.71404852990	BIG WASH	16	Gruendikes Well
365	0	A1	519.60150498400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02982102301	519.60150497900	ISOLATE	-115.36746863300	33.71424859270	BIG WASH	16	Gruendikes Well
366	0	A1	199.23283275100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01143439123	199.23283274500	ISOLATE	-115.36707418200	33.71435339100	BIG WASH	16	Gruendikes Well
367	0	A1	107.41205957700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00616460397	107.41205957500	ISOLATE	-115.36635935900	33.71409203380	BIG WASH	16	Gruendikes Well
368	0	A1	318.90423785300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01830258482	318.90423784900	ISOLATE	-115.31339137800	33.70338620550	BIG WASH	16	Gruendikes Well
369	0	A1	233.77544412200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01341686433	233.77544412000	ISOLATE	-115.31352569600	33.70299476070	BIG WASH	16	Gruendikes Well
370	0	A1	110.04716798000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00631583838	110.04716797700	ISOLATE	-115.31338652200	33.70308561220	BIG WASH	16	Gruendikes Well
371	0	A2	389.83056170100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02237319569	389.83056169800	ISOLATE	-115.31197036900	33.70446402750	BIG WASH	16	Gruendikes Well
372	0	A2	153.17887004600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00879125746	153.17887004900	ISOLATE	-115.31166492700	33.70354504770	BIG WASH	16	Gruendikes Well
373	0	A2	265.95061734000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01526346518	265.95061734300	ISOLATE	-115.31224252600	33.70271917850	BIG WASH	16	Gruendikes Well
374	0	A2	96.02651651590	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00551116371	96.02651652050	ISOLATE	-115.31209948500	33.70258861750	BIG WASH	16	Gruendikes Well
375	0	A2	236.28641435500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01356097419	236.28641435600	ISOLATE	-115.31155129300	33.70511182400	BIG WASH	16	Gruendikes Well
376	0	A1	125.71899136100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00721527728	125.71899136000	ISOLATE	-115.31337866400	33.70706719650	BIG WASH	16	Gruendikes Well
377	0	A1	200.71040846200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01151919241	200.71040846500	ISOLATE	-115.31262637000	33.70737671490	BIG WASH	16	Gruendikes Well
378	0	A1	155.83666729100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00894379404	155.83666729700	ISOLATE	-115.31269918500	33.70638024790	BIG WASH	16	Gruendikes Well
379	0	A1	303.54190408900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01742090818	303.54190409200	ISOLATE	-115.31274392800	33.70609533740	BIG WASH	16	Gruendikes Well
380	0	A1	252.51471762400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01449235064	252.51471762200	ISOLATE	-115.31342541300	33.70610716010	BIG WASH	16	Gruendikes Well
381	0	A1	578.93887970400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03322651973	578.93887970400	ISOLATE	-115.31271368700	33.71106895790	BIG WASH	16	Gruendikes Well
382	0	A1	552.50019155900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03170914782	552.50019157000	ISOLATE	-115.31364131500	33.70791649350	BIG WASH	16	Gruendikes Well
383	0	A1	311.75883518100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01789249513	311.75883518000	ISOLATE	-115.31269845500	33.70826724100	BIG WASH	16	Gruendikes Well
384	0	A1	39.64478183440	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00227529740	39.64478183370	ISOLATE	-115.31250389800	33.71029319610	BIG WASH	16	Gruendikes Well
385	0	A1	161.31985196700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00925848554	161.31985196700	ISOLATE	-115.31318915900	33.71017528270	BIG WASH	16	Gruendikes Well
386	0	A2	346.82725754700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01990514564	346.82725754800	ISOLATE	-115.30907289100	33.71612455090	BIG WASH	16	Gruendikes Well
387	0	A2	239.40131121700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01373974467	239.40131121400	ISOLATE	-115.30845878400	33.71609771330	BIG WASH	16	Gruendikes Well
388	0	A2	181.71103848000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01042877861	181.71103847600	ISOLATE	-115.30834026000	33.71683472730	BIG WASH	16	Gruendikes Well
389	0	A2	702.29940691000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04030643979	702.29940690700	ISOLATE	-115.30941871500	33.71415365730	BIG WASH	16	Gruendikes Well
390	0	A2	156.43560060900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00897816808	156.43560061000	ISOLATE	-115.30871495500	33.71473619180	BIG WASH	16	Gruendikes Well
391	0	subA	299.80390162000	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.01720637636	299.80390162300	ISOLATE	-115.32150240000	33.69864359560	BIG WASH	16	Gruendikes Well
392	0	subA	395.13806142400	2.50000000000	E	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02267780426	395.13806142300	ISOLATE	-115.32105662400	33.69749038390	BIG WASH	16	Gruendikes Well
393	0	subA	263.27429093900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01510986518	263.27429093300	ISOLATE	-115.32053432500	33.69773919360	BIG WASH	16	Gruendikes Well
394	0	subA	250.94025271400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01440198879	250.94025271400	ISOLATE	-115.31678815300	33.69801873150	BIG WASH	16	Gruendikes Well
395	0	subA	315.86916912800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01812839584	315.86916912600	ISOLATE	-115.31655337800	33.69786835350	BIG WASH	16	Gruendikes Well
396	0	subA	105.02621105600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00602767511	105.02621106300	ISOLATE	-115.31651589300	33.69759495850	BIG WASH	16	Gruendikes Well
397	0	subA	1823.93062642000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.10467921410	1823.93062641000	ISOLATE	-115.31519496800	33.69958148340	BIG WASH	16	Gruendikes Well
398	0	subA	1180.87091175000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06777266482	1180.87091174000	ISOLATE	-115.31434674200	33.70034662480	BIG WASH	16	Gruendikes Well
399	0	subA	590.04932199500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03386417137	590.04932200200	ISOLATE	-115.31536643300	33.69798683400	BIG WASH	16	Gruendikes Well
400	0	subA	832.99163404400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04780714153	832.99163404100	ISOLATE	-115.31349129000	33.69972479100	BIG WASH	16	Gruendikes Well
401	0	subA	481.98765377200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02766228500	481.98765378100	ISOLATE	-115.31373374400	33.69965113830	BIG WASH	16	Gruendikes Well
402	0	subA	1094.29685188000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06280399747	1094.29685188000	ISOLATE	-115.31373095800	33.69862626890	BIG WASH	16	Gruendikes Well
403	0	subA	1437.19007585000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.08248336064	1437.19007586000	ISOLATE	-115.31225618700	33.69960497780	BIG WASH	16	Gruendikes Well
404	0	subA	504.68972705100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02896520472	504.68972705100	ISOLATE	-115.31364623200	33.69793272700	BIG WASH	16	Gruendikes Well
405	0	subA	481.90850980000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02765774276	481.90850979400	ISOLATE	-115.31324353800	33.69774083780	BIG WASH	16	Gruendikes Well
406	0	subA	653.80466203700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03752322441	653.80466204000	ISOLATE	-115.30957225700	33.69964199850	BIG WASH	16	Gruendikes Well
407	0	subA	175.98549297000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01010017751	175.98549296800	ISOLATE	-115.30924113400	33.69976157880	BIG WASH	16	Gruendikes Well
408	0	subA	358.89502992600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02059774047	358.89502992100	ISOLATE	-115.30938278100	33.69920908190	BIG WASH	16	Gruendikes Well
409	0	subA	302.02912246600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01733408646	302.02912246800	ISOLATE	-115.31046329400	33.69922468190	BIG WASH	16	Gruendikes Well
410	0	subA	289.20335813500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01659798887	289.20335813700	ISOLATE	-115.31087526400	33.69801381640	BIG WASH	16	Gruendikes Well
411	0	subA	1246.22994196000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07152375700	1246.22994195000	ISOLATE	-115.31537811500	33.70031281460	BIG WASH	16	Gruendikes Well
412	0	subA	711.52820726400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04083610005	711.52820726400	ISOLATE	-115.31609963000	33.70001038510	BIG WASH	16	Gruendikes Well
413	0	subA	163.67319433000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00939354880	163.67319432700	ISOLATE	-115.32082360900	33.69896004550	BIG WASH	16	Gruendikes Well

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
414	0	subA	350.00633981100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02008759985	350.00633981300	ISOLATE	-115.32058154500	33.70001852000	BIG WASH	16	Gruendikes Well
415	0	subA	440.18394247000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02526308210	440.18394247300	ISOLATE	-115.31948534300	33.70033752390	BIG WASH	16	Gruendikes Well
416	0	subA	428.94368064000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02461797983	428.94368064100	ISOLATE	-115.31993024200	33.70037016000	BIG WASH	16	Gruendikes Well
417	0	subA	156.03398545600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00895511854	156.03398545000	ISOLATE	-115.31998427400	33.70146060530	BIG WASH	16	Gruendikes Well
418	0	subA	506.45400643500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02906646042	506.45400643200	ISOLATE	-115.31837737400	33.70154163980	BIG WASH	16	Gruendikes Well
419	0	subA	263.62254233400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01512985206	263.62254233100	ISOLATE	-115.31855532600	33.70060453330	BIG WASH	16	Gruendikes Well
420	0	subA	686.74396099800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03941368004	686.74396099400	ISOLATE	-115.31762937000	33.70128782040	BIG WASH	16	Gruendikes Well
421	0	subA	276.70567255300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01588072042	276.70567255400	ISOLATE	-115.31721823100	33.70171355010	BIG WASH	16	Gruendikes Well
422	0	subA	239.88568824400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01376754409	239.88568823600	ISOLATE	-115.31695843200	33.70148894990	BIG WASH	16	Gruendikes Well
423	0	subA	992.82801042700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.05698048728	992.82801043400	ISOLATE	-115.31012352800	33.69386542740	BIG WASH	16	Gruendikes Well
424	0	subA	1166.65712307000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06695690559	1166.65712307000	ISOLATE	-115.31220522100	33.69143869990	BIG WASH	16	Gruendikes Well
425	0	subA	324.51042858000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01862433589	324.51042858200	ISOLATE	-115.31942932000	33.69625493200	BIG WASH	16	Gruendikes Well
426	0	subA	294.80214103600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01691931480	294.80214104000	ISOLATE	-115.31965575000	33.69596411500	BIG WASH	16	Gruendikes Well
427	0	subA	180.42757911600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01035511818	180.42757911300	ISOLATE	-115.31925191600	33.69632121480	BIG WASH	16	Gruendikes Well
428	0	subA	366.11217916300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02101194784	366.11217915800	ISOLATE	-115.31823816300	33.69591365810	BIG WASH	16	Gruendikes Well
429	0	subA	286.06516008500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01641788109	286.06516008800	ISOLATE	-115.31786238000	33.69692930730	BIG WASH	16	Gruendikes Well
430	0	subA	206.74019323800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01186525443	206.74019323500	ISOLATE	-115.31800886400	33.69668871400	BIG WASH	16	Gruendikes Well
431	0	subA	280.03295161300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01607167996	280.03295161600	ISOLATE	-115.31693154300	33.69672786580	BIG WASH	16	Gruendikes Well
432	0	subA	519.47083460700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02981352357	519.47083460800	ISOLATE	-115.31636880900	33.69638102690	BIG WASH	16	Gruendikes Well
433	0	subA	678.95867090200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03896686587	678.95867090400	ISOLATE	-115.31623921900	33.69607442030	BIG WASH	16	Gruendikes Well
434	0	subA	449.53594961100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02579981345	449.53594961000	ISOLATE	-115.31570251800	33.69635674980	BIG WASH	16	Gruendikes Well
435	0	subA	445.59732055600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02557376725	445.59732055700	ISOLATE	-115.31551833900	33.69611713580	BIG WASH	16	Gruendikes Well
436	0	subA	827.38378502800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04748529528	827.38378503100	ISOLATE	-115.31562966100	33.69555495930	BIG WASH	16	Gruendikes Well
437	0	subA	485.00845208600	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02783565496	485.00845208200	ISOLATE	-115.31413545000	33.69621983220	BIG WASH	16	Gruendikes Well
438	0	subA	613.14209367700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03518951410	613.14209367700	ISOLATE	-115.31475950400	33.69562224990	BIG WASH	16	Gruendikes Well
439	0	subA	1219.73155564000	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07000295889	1219.73155565000	ISOLATE	-115.31449583000	33.69551120720	BIG WASH	16	Gruendikes Well
440	0	subA	243.01950048400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01394740017	243.01950048300	ISOLATE	-115.31393924300	33.69544652050	BIG WASH	16	Gruendikes Well
441	0	subA	448.29184657100	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02572841176	448.29184657800	ISOLATE	-115.31426623000	33.69510663190	BIG WASH	16	Gruendikes Well
442	0	subA	391.26429401300	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02245548060	391.26429401400	ISOLATE	-115.31548443800	33.69472496040	BIG WASH	16	Gruendikes Well
443	0	subA	404.22413351400	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02319927304	404.22413351800	ISOLATE	-115.31487219100	33.69430114810	BIG WASH	16	Gruendikes Well
444	0	subA	272.24481323900	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01562470232	272.24481323700	ISOLATE	-115.31458236700	33.69447650090	BIG WASH	16	Gruendikes Well
445	0	subA	350.58887321800	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02012103267	350.58887321400	ISOLATE	-115.31425944400	33.69485781350	BIG WASH	16	Gruendikes Well
446	0	subA	499.71412408200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02867964440	499.71412408000	ISOLATE	-115.31780639900	33.69211501590	BIG WASH	16	Gruendikes Well
447	0	subA	231.27856979700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01327356346	231.27856979500	ISOLATE	-115.31589554200	33.69319600440	BIG WASH	16	Gruendikes Well
448	0	subA	240.34888833700	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01379412812	240.34888833500	ISOLATE	-115.31781795100	33.69390664590	BIG WASH	16	Gruendikes Well
449	0	subA	249.40206091500	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01431370873	249.40206091700	ISOLATE	-115.31765172900	33.69522370370	BIG WASH	16	Gruendikes Well
450	0	subA	143.92179444200	2.50000000000	E	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00825997443	143.92179444600	ISOLATE	-115.31785295300	33.69506621290	BIG WASH	16	Gruendikes Well
451	0	sfAB	485.22160452600	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02784788823	485.22160452300	ISOLATE	-115.39941785000	33.80846330580	BIG WASH	28	Upper Big Wash
452	0	sfAB	1071.82033780000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.06151402306	1071.82033780000	ISOLATE	-115.39771392200	33.80733235280	BIG WASH	28	Upper Big Wash
453	0	sfAB	2650.12357187000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.15209616459	2650.12357186000	ISOLATE	-115.40124668400	33.81228433220	BIG WASH	28	Upper Big Wash
454	0	sfAB	1240.59410686000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07120030457	1240.59410685000	ISOLATE	-115.40144615000	33.81284493940	BIG WASH	28	Upper Big Wash
455	0	sfAB	893.33275350900	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.05127024527	893.33275350900	ISOLATE	-115.40049983200	33.81158285860	BIG WASH	28	Upper Big Wash
456	0	sfAB	3645.28325824000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.20921047166	3645.28325824000	ISOLATE	-115.40026156000	33.81348359070	BIG WASH	28	Upper Big Wash
457	0	sfAB	1329.69559537000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07631402636	1329.69559537000	ISOLATE	-115.40448809600	33.81444933580	BIG WASH	28	Upper Big Wash
458	0	sfAB	3471.57206203000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.19924082082	3471.57206202000	ISOLATE	-115.39097940300	33.80593696150	BIG WASH	28	Upper Big Wash
459	0	sfAB	1168.13090293000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.06704148892	1168.13090293000	ISOLATE	-115.38925493800	33.80505045150	BIG WASH	28	Upper Big Wash
460	0	sfAB	1707.86515281000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.09801797250	1707.86515281000	ISOLATE	-115.39481942100	33.80661134730	BIG WASH	28	Upper Big Wash
461	0	sfAB	3611.84725422000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.20729150908	3611.84725423000	ISOLATE	-115.39850109700	33.81302709060	BIG WASH	28	Upper Big Wash
462	0	sfAB	3921.08245501000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.22503916753	3921.08245500000	ISOLATE	-115.40140204900	33.81559499100	BIG WASH	28	Upper Big Wash
463	0	sfAB	2080.39107991000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.11939801882	2080.39107991000	ISOLATE	-115.39713435700	33.80900979520	BIG WASH	28	Upper Big Wash
464	0	sfAB	1375.41584682000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07893800774	1375.41584682000	ISOLATE	-115.39669930400	33.80983280130	BIG WASH	28	Upper Big Wash
465	0	sfAB	363.07202504200	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02083746700	363.07202504000	ISOLATE	-115.39642329600	33.81020302550	BIG WASH	28	Upper Big Wash
466	0	sfAB	3004.96102588000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.51738309674	3004.96102588000	ISOLATE	-115.38617495900	33.80571292700	BIG WASH	28	Upper Big Wash
467	0	sfAB	2505.18843844000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.14377803251	2505.18843844000	ISOLATE	-115.40332016700	33.81704532270	BIG WASH	28	Upper Big Wash
468	0	sfAB	6091.33812656000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.34959470423	6091.33812655000	ISOLATE	-115.39765943900	33.82236892320	BIG WASH	31	Eagle Creek
469	0	sfAB	2650.25193769000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.15210353178	2650.25193770000	ISOLATE	-115.40160166000	33.82322432260	BIG WASH	31	Eagle Creek
470	0	sfAB	4701.11822218000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.09493941643	1654.22439186000	ISOLATE	-115.39983048100	33.82095909770	BIG WASH	28	Upper Big Wash
470	0	sfAB	4701.11822218000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.17486764407	3046.89383032000	ISOLATE	-115.39983048100	33.82095909770	BIG WASH	31	Eagle Creek
471	0	A1B1	185.22980109500	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01063072779	185.22980109300	ISOLATE	-115.40132005500	33.79252333570	BIG WASH	28	Upper Big Wash
472	0	A2	194.99498187200	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01119117205	194.99498187700	ISOLATE	-115.39856431100	33.79169278070	BIG WASH	28	Upper Big Wash
473	0	A2	528.90722912900	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03035509809	528.90722912500	ISOLATE	-115.39936791400	33.79280762380	BIG WASH	28	Upper Big Wash
474	0	A2	382.17054925900	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02193357147	382.17054926100	ISOLATE	-115.39978446300	33.79309794180	BIG WASH	28	Upper Big Wash
475	0	A2	429.02780008200	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02462280763	429.02780008200	ISOLATE	-115.40002008200	33.79328698100	BIG WASH	28	Upper Big Wash
476	0	A2	381.63621381900	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02190290483	381.63621381700	ISOLATE	-115.40010988500	33.79356410120	BIG WASH	28	Upper Big Wash
477	0	A2	1231.85920397000	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.07069899013	1231.85920397000	ISOLATE	-115.39901182400	33.79321523170	BIG WASH	28	Upper Big Wash
478	0	sfAB	1543.14848275000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.08856453643	1543.14848275000	ISOLATE	-115.39180486200	33.80290906960	BIG WASH	28	Upper Big Wash
479	0	sfAB	2131.95798765000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.12235755209	2131.95798765000	ISOLATE	-115.39180789800	33.80372852400	BIG WASH	28	Upper Big Wash
480	0	sfAB	1566.47860972000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.08990350148	1566.47860972000	ISOLATE	-115.39260264100	33.80849361780	BIG WASH	28	Upper Big Wash
481	0	sfAB	2419.99604988000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.13888866218	2419.99604989000	ISOLATE	-115.39469791300	33.81224049670	BIG WASH	28	Upper Big Wash
482	0	sfAB	486.93233427600	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02794607061	486.93233427600	ISOLATE	-115.39639572200	33.81271612590	BIG WASH	28	Upper Big Wash
483	0	sfAB	926.27166595700	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.05316067872	926.27166595800	ISOLATE	-115.39895672200	33.81361552750	BIG WASH	28	Upper Big Wash

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary																			
FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
484	0	subB	1055.71764076000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.06058985542	1055.71764076000	ISOLATE	-115.45056586900	33.70049824640	BIG WASH	21	Lake Tamarisk
485	0	subB	1138.55584389000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.06534411409	1138.55584388000	ISOLATE	-115.45226170100	33.69877125650	BIG WASH	21	Lake Tamarisk
486	0	subB	448.77817252000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02575632303	448.77817252200	ISOLATE	-115.45001634700	33.69749408400	BIG WASH	21	Lake Tamarisk
487	0	subB	964.56760582400	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.05535856324	964.56760581700	ISOLATE	-115.45588746100	33.69827368400	BIG WASH	21	Lake Tamarisk
488	0	subB	340.87589994000	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01956358471	340.87589994000	ISOLATE	-115.45621125200	33.69827317120	BIG WASH	21	Lake Tamarisk
489	0	subB	240.89749810700	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.01382561399	240.89749810300	ISOLATE	-115.45507737900	33.69762370870	BIG WASH	21	Lake Tamarisk
490	0	subB	785.94964132500	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.04510730265	785.94964132700	ISOLATE	-115.45409512400	33.69789923330	BIG WASH	21	Lake Tamarisk
491	0	subB	684.18778612900	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.03926697579	684.18778612500	ISOLATE	-115.45387702800	33.69832767540	BIG WASH	21	Lake Tamarisk
492	0	subB	638.62397842700	2.50000000000	E	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.03665197305	638.62397843000	ISOLATE	-115.45003178800	33.70081769910	BIG WASH	21	Lake Tamarisk
493	0	subB	1323.55155182000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.22788422036	1323.55155182000	ISOLATE	-115.44999809300	33.69848831310	BIG WASH	21	Lake Tamarisk
494	0	subB	562.35798498000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.09682472193	562.35798497800	ISOLATE	-115.45054538200	33.69775886120	BIG WASH	21	Lake Tamarisk
495	0	subB	1085.66285681000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.18692542300	1085.66285681000	ISOLATE	-115.45302248300	33.69707233410	BIG WASH	21	Lake Tamarisk
496	0	subB	1870.11668146000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.32198978675	1870.11668146000	ISOLATE	-115.45553227300	33.69717306150	BIG WASH	21	Lake Tamarisk
497	0	subB	1392.26646232000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.23971529999	1392.26646233000	ISOLATE	-115.45117160300	33.70100605910	BIG WASH	21	Lake Tamarisk
498	0	access_east	118.88431592300	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.02046906266	118.88431592300	ISOLATE	-115.24497131100	33.67507368280	BIG WASH	15	Lower Palen Lake
499	0	access_east	165.29062218100	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.02845912916	165.29062217800	ISOLATE	-115.24306785200	33.67459011850	BIG WASH	15	Lower Palen Lake
500	0	access_east	144.45526331300	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.02487177399	144.45526331600	ISOLATE	-115.24709988600	33.67559400020	BIG WASH	15	Lower Palen Lake
501	0	access_east	119.89588329500	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.02064323059	119.89588329500	ISOLATE	-115.24815222900	33.67585506320	BIG WASH	15	Lower Palen Lake
502	0	access_east	138.64145360700	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.02387077369	138.64145361100	ISOLATE	-115.24964553300	33.67622378910	BIG WASH	15	Lower Palen Lake
503	0	access_east	99.59940420670	7.50000000000	D	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.01714865775	99.59940420910	ISOLATE	-115.25099874100	33.67667194120	BIG WASH	15	Lower Palen Lake
504	0	access_east	115.30538804400	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.01985285607	115.30538804400	ISOLATE	-115.25307770100	33.67707620190	BIG WASH	13	Corn Springs Wash
505	0	access_east	119.71584246000	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02061223183	119.71584245800	ISOLATE	-115.25948419800	33.67879003300	BIG WASH	13	Corn Springs Wash
506	0	access_east	122.57204663300	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02110400252	122.57204663000	ISOLATE	-115.26003366700	33.67894629340	BIG WASH	13	Corn Springs Wash
507	0	access_east	122.74475461300	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02113373874	122.74475461100	ISOLATE	-115.26094246600	33.67918505400	BIG WASH	13	Corn Springs Wash
508	0	access_east	123.16965382500	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02120689632	123.16965382900	ISOLATE	-115.26180215500	33.67940443470	BIG WASH	13	Corn Springs Wash
509	0	access_east	116.70445649500	7.50000000000	D	Corn Springs Wash	DWW	unnamed	RISIF	RIVERINE	0.02009374251	116.70445649000	ISOLATE	-115.26595504100	33.68050419690	BIG WASH	13	Corn Springs Wash
510	0	access_east	117.48686948000	7.50000000000	D	Corn Springs Wash	DWW	unnamed	RISIF	RIVERINE	0.02022845549	117.48686947900	ISOLATE	-115.26629144100	33.68059597420	BIG WASH	13	Corn Springs Wash
511	0	access_east	118.84119578400	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02046163839	118.84119578200	ISOLATE	-115.26816013200	33.68108663950	BIG WASH	13	Corn Springs Wash
512	0	access_east	133.41269768000	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02297050580	133.41269767700	ISOLATE	-115.27003617000	33.68158501180	BIG WASH	13	Corn Springs Wash
513	0	access_east	123.33661996900	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02123564393	123.33661996300	ISOLATE	-115.27211603100	33.68213901230	BIG WASH	13	Corn Springs Wash
514	0	access_east	118.63748246800	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02042656379	118.63748247200	ISOLATE	-115.27184891000	33.68205686360	BIG WASH	13	Corn Springs Wash
515	0	access_east	125.43991979900	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02159778234	125.43991980300	ISOLATE	-115.27360128200	33.68251594800	BIG WASH	13	Corn Springs Wash
516	0	access_east	125.30526359000	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02157459773	125.30526358800	ISOLATE	-115.27577527300	33.68308523880	BIG WASH	13	Corn Springs Wash
517	0	access_east	116.61424800000	7.50000000000	D	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02007821074	116.61424799900	ISOLATE	-115.27679045900	33.68336661390	BIG WASH	13	Corn Springs Wash
518	0	access_east	127.14785428600	7.50000000000	D	Corn Springs Wash	DWW	unnamed	RISIF	RIVERINE	0.02189184819	127.14785428700	ISOLATE	-115.27890529100	33.68392318880	BIG WASH	13	Corn Springs Wash
519	0	access_east	121.38437407700	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02089951344	121.38437408200	ISOLATE	-115.28347297900	33.68515107920	BIG WASH	27	Lower Big Wash
520	0	access_east	118.74911637300	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02044578450	118.74911636800	ISOLATE	-115.28448474900	33.68541394370	BIG WASH	27	Lower Big Wash
521	0	access_east	117.27195618500	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02019145251	117.27195618300	ISOLATE	-115.28468706300	33.68547068970	BIG WASH	27	Lower Big Wash
522	0	access_east	119.22818705700	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02052826912	119.22818705800	ISOLATE	-115.28792244800	33.68631600800	BIG WASH	27	Lower Big Wash
523	0	access_east	127.46848697700	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02194705354	127.46848697800	ISOLATE	-115.28962441500	33.68678034510	BIG WASH	27	Lower Big Wash
524	0	access_east	145.96483953200	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02513168725	145.96483953500	ISOLATE	-115.29039159200	33.68698345100	BIG WASH	27	Lower Big Wash
525	0	access_east	121.95978221300	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02099858509	121.95978220900	ISOLATE	-115.29164915300	33.68731622170	BIG WASH	27	Lower Big Wash
526	0	access_east	139.30914359800	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02398573409	139.30914359600	ISOLATE	-115.29296317600	33.68767133550	BIG WASH	27	Lower Big Wash
527	0	access_east	121.27899384000	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02088136946	121.27899384500	ISOLATE	-115.29363510200	33.68783926150	BIG WASH	27	Lower Big Wash
528	0	access_east	120.52531488800	7.50000000000	D	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.02075160380	120.52531488600	ISOLATE	-115.29325561400	33.68773063180	BIG WASH	27	Lower Big Wash
529	0	access_east	134.08952154400	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02308703883	134.08952154300	ISOLATE	-115.29806451100	33.68903108310	BIG WASH	27	Lower Big Wash
530	0	access_east	117.73734308700	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02027158111	117.73734308200	ISOLATE	-115.30440461400	33.69072748810	BIG WASH	16	Gruendikes Well
531	0	access_east	127.35728547800	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02192790728	127.35728547600	ISOLATE	-115.30502421400	33.69089003440	BIG WASH	16	Gruendikes Well
532	0	subA	118.38339620200	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02038281615	118.38339620300	ISOLATE	-115.31207084500	33.69275561540	BIG WASH	16	Gruendikes Well
533	0	subA	118.70079323800	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02043746440	118.70079323700	ISOLATE	-115.31976528800	33.69505063130	BIG WASH	16	Gruendikes Well
534	0	access_west	120.43226587100	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02073558297	120.43226586900	ISOLATE	-115.32755616800	33.69728066900	BIG WASH	16	Gruendikes Well
535	0	access_west	150.39507441500	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02589446874	150.39507441600	ISOLATE	-115.33650034900	33.69989960810	BIG WASH	16	Gruendikes Well
536	0	access_west	128.31807755900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02209333291	128.31807755700	ISOLATE	-115.34268517200	33.70097559120	BIG WASH	16	Gruendikes Well
537	0	access_west	153.59854648600	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02644603073	153.59854648400	ISOLATE	-115.34503037800	33.70164344720	BIG WASH	16	Gruendikes Well
538	0	access_west	124.12477225800	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02137134509	124.12477226400	ISOLATE	-115.34722711700	33.70205318770	BIG WASH	16	Gruendikes Well
539	0	access_west	121.48268571000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02091644038	121.48268571000	ISOLATE	-115.35275855600	33.70340130870	BIG WASH	16	Gruendikes Well
540	0	access_west	120.04256804700	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02066848623	120.04256804800	ISOLATE	-115.35544346600	33.70402305610	BIG WASH	16	Gruendikes Well
541	0	access_west	129.11012725000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02222970511	129.11012725400	ISOLATE	-115.35726197000	33.70446395250	BIG WASH	16	Gruendikes Well
542	0	access_west	122.93628108600	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02116671506	122.93628108600	ISOLATE	-115.35787545100	33.70459989470	BIG WASH	16	Gruendikes Well
543	0	access_west	119.75279381000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02061859398	119.75279381200	ISOLATE	-115.35906818300	33.70490044550	BIG WASH	16	Gruendikes Well
544	0	access_west	123.70271068600	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02129867608	123.70271068400	ISOLATE	-115.35953394200	33.70499612870	BIG WASH	16	Gruendikes Well
545	0	access_west	117.13978029900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02016869495	117.13978029500	ISOLATE	-115.36079133100	33.70527619910	BIG WASH	16	Gruendikes Well
546	0	access_west	124.23032285300	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02138951840	124.23032285500	ISOLATE	-115.36248419400	33.70564869320	BIG WASH	16	Gruendikes Well
547	0	access_west	125.39460759100	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02158998065	125.39460759800	ISOLATE	-115.36581656100	33.70633086780	BIG WASH	16	Gruendikes Well
548	0	access_west	129.66238408700	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02232479065	129.66238408900	ISOLATE	-115.36975388200	33.70711247870	BIG WASH	16	Gruendikes Well
549	0	access_west	129.78635810600	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.02234613604	129.78635810400	ISOLATE	-115.37347951800	33.70783244990	BIG WASH	16	Gruendikes Well
550	0	access_west	121.95238821700	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02099731202	121.95238822000	ISOLATE	-115.37666444200	33.70858189410	BIG WASH	16	Gruendikes Well
551	0	access_west	53.90406993990	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00928100378	53.90406994270	ISOLATE	-115.39518198500	33.70986213250	BIG WASH	16	Gruendikes Well
552	0	subA	1093.82547115000	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.18833083181	1093.82547115000	ISOLATE	-115.31965988000	33.69663373760	BIG WASH	16	Gruendikes Well
553	0	subA	1113.25120075000	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.19167548222	1113.25120075000	ISOLATE	-115.31348097300	33.69522484260	BIG WASH	16	Gruendikes Well
554	0	subA	2232.56254300000	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.38439437724	2232.56254299000	ISOLATE	-115.31031309400	33.69659854510	BIG WASH	16	Gruendikes Well

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
555	0	subA	614.29426336600	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.10576691862	614.29426336400	ISOLATE	-115.31138649700	33.69350945010	BIG WASH	16	Gruendikes Well
556	0	subA	414.83724580600	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.07142514563	414.83724580500	ISOLATE	-115.31253705500	33.69207340900	BIG WASH	16	Gruendikes Well
557	0	subA	1285.89949081000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.22140142748	1285.89949081000	ISOLATE	-115.31347805000	33.69747492750	BIG WASH	16	Gruendikes Well
558	0	sfAB	5629.23520222000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.95576966291	5551.11020220000	ISOLATE	-115.41298807300	33.83784627860	BIG WASH	31	Eagle Creek
559	0	sfAB	5060.13167559000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.87123479263	5060.13167559000	ISOLATE	-115.41083228400	33.84040172120	BIG WASH	31	Eagle Creek
560	0	sfAB	801.50997479600	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13800102872	801.50997479800	ISOLATE	-115.41350359400	33.83722117490	BIG WASH	31	Eagle Creek
561	0	sfAB	505.84557139500	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08709462317	505.84557139100	ISOLATE	-115.41320347400	33.83567921020	BIG WASH	31	Eagle Creek
562	0	sfAB	1765.51948189000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.30398062705	1765.51948190000	ISOLATE	-115.41563393100	33.83217977750	BIG WASH	31	Eagle Creek
563	0	sfAB	1067.08512830000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.18372677829	1067.08512829000	ISOLATE	-115.41753096100	33.83232758680	BIG WASH	31	Eagle Creek
564	0	sfAB	1085.75149698000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.18694068474	1085.75149699000	ISOLATE	-115.41606346600	33.83176532540	BIG WASH	31	Eagle Creek
565	0	sfAB	1197.77355114000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.20622822850	1197.77355115000	ISOLATE	-115.42029422900	33.83244349570	BIG WASH	31	Eagle Creek
566	0	sfAB	301.50217267400	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05191153111	301.50217267500	ISOLATE	-115.42349380100	33.83281822680	BIG WASH	31	Eagle Creek
567	0	sfAB	152.50579694900	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02625788515	152.50579695300	ISOLATE	-115.42341561400	33.83270591900	BIG WASH	31	Eagle Creek
568	0	sfAB	397.47974480600	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06843659518	397.47974481200	ISOLATE	-115.42870496000	33.83284514940	BIG WASH	31	Eagle Creek
569	0	sfAB	1285.67900314000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.22136346473	1285.67900315000	ISOLATE	-115.42757561000	33.83332772260	BIG WASH	31	Eagle Creek
570	0	sfAB	772.52116621500	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13300984267	772.52116622000	ISOLATE	-115.42382472900	33.83451602260	BIG WASH	31	Eagle Creek
571	0	sfAB	2388.05792758000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.41116699855	2388.05792758000	ISOLATE	-115.41677004900	33.83426343990	BIG WASH	31	Eagle Creek
572	0	sfAB	686.26066721400	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.11815782838	686.26066720600	ISOLATE	-115.42423908500	33.83607715020	BIG WASH	31	Eagle Creek
573	0	sfA	553.06309347800	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09522436182	553.06309347900	ISOLATE	-115.43131663700	33.83614314470	BIG WASH	31	Eagle Creek
574	0	sfA	479.65723055500	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08258561132	479.65723055300	ISOLATE	-115.42570148300	33.83699211860	BIG WASH	31	Eagle Creek
575	0	sfA	925.38376821800	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.15932916119	925.38376821300	ISOLATE	-115.42631091200	33.83741484200	BIG WASH	31	Eagle Creek
576	0	sfAB	853.03966695800	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.14687322089	853.03966695500	ISOLATE	-115.42376241900	33.83681093490	BIG WASH	31	Eagle Creek
577	0	sfA	1980.23720465000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.34094993193	1980.23720465000	ISOLATE	-115.42913095600	33.84283938310	BIG WASH	31	Eagle Creek
578	0	sfA	488.12260365000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08404314801	488.12260364400	ISOLATE	-115.43139630000	33.84062505720	BIG WASH	31	Eagle Creek
579	0	sfA	1112.85875675000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.19160791266	1112.85875674000	ISOLATE	-115.42451817700	33.84147079480	BIG WASH	31	Eagle Creek
580	0	sfAB	6418.48146789000	15.00000000000	C	Eagle Creek	DWW	unnamed	RISIF	RIVERINE	2.21022089115	6418.48146789000	ISOLATE	-115.38048397900	33.80905750670	BIG WASH	31	Eagle Creek
581	0	sfAB	5799.52142315000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.99854018994	5799.52142314000	ISOLATE	-115.40451835200	33.83105711570	BIG WASH	31	Eagle Creek
582	0	sfAB	2753.74364688000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.47412941579	2753.74364688000	ISOLATE	-115.40939535900	33.83184925240	BIG WASH	31	Eagle Creek
583	0	sfAB	4584.65857755000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.78936958980	4584.65857755000	ISOLATE	-115.40401191500	33.83393229050	BIG WASH	31	Eagle Creek
584	0	sfAB	3141.07956819000	7.50000000000	D	181001004703-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.54081948488	3141.07956819000	ISOLATE	-115.39366580400	33.83892440250	BIG WASH	32	181001004703-Pinto Wash
585	0	sfAB	5183.42385123000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.89246278430	5183.42385122000	ISOLATE	-115.39948262600	33.82698141530	BIG WASH	31	Eagle Creek
586	0	sfAB	2672.71898174000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.46017888804	2672.71898174000	ISOLATE	-115.39867658400	33.80672479950	BIG WASH	28	Upper Big Wash
587	0	sfAB	3298.27114873000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.56788415095	3298.27114873000	ISOLATE	-115.40051200400	33.80604370700	BIG WASH	28	Upper Big Wash
588	0	sfAB	1732.32324729000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.29826502192	1732.32324729000	ISOLATE	-115.39650132400	33.80306901040	BIG WASH	28	Upper Big Wash
589	0	sfAB	3831.06977869000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.65961945226	3831.06977870000	ISOLATE	-115.40030819500	33.80516640820	BIG WASH	28	Upper Big Wash
590	0	sfAB	1550.69631770000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.26699316765	1550.69631771000	ISOLATE	-115.40303993400	33.81034825840	BIG WASH	28	Upper Big Wash
591	0	sfAB	903.59039136100	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.15557685802	903.59039135900	ISOLATE	-115.40594954600	33.81264735340	BIG WASH	28	Upper Big Wash
592	0	sfAB	492.62336513700	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.08481807251	492.62336513200	ISOLATE	-115.40351999300	33.81137003160	BIG WASH	28	Upper Big Wash
593	0	sfAB	1801.04317540000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.31009696546	1801.04317540000	ISOLATE	-115.39822840200	33.80713439240	BIG WASH	28	Upper Big Wash
594	0	sfAB	2369.48172780000	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.81593723409	2369.48172780000	ISOLATE	-115.38123255600	33.80766288400	BIG WASH	27	Lower Big Wash
595	0	B1	269.23825761800	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.04635644932	269.23825762600	ISOLATE	-115.40581301900	33.80429702060	BIG WASH	28	Upper Big Wash
596	0	B1	265.00002475100	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.04562672602	265.00002475000	ISOLATE	-115.40589446300	33.80461050050	BIG WASH	28	Upper Big Wash
597	0	B1	425.71766330000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07329849575	425.71766329100	ISOLATE	-115.40663766200	33.80341699770	BIG WASH	28	Upper Big Wash
598	0	B1	409.42219905700	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.07049280287	409.42219905000	ISOLATE	-115.40673852300	33.80332487930	BIG WASH	28	Upper Big Wash
599	0	B1	646.44949141800	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.11130328709	646.44949142000	ISOLATE	-115.41446257700	33.79773031280	BIG WASH	28	Upper Big Wash
600	0	B1	155.25638342200	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.02673147097	155.25638341600	ISOLATE	-115.41449565700	33.79795063970	BIG WASH	28	Upper Big Wash
601	0	B1	315.87086413800	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.05438547936	315.87086413600	ISOLATE	-115.41342604800	33.79795339180	BIG WASH	28	Upper Big Wash
602	0	B1	694.61374605600	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.11959603066	694.61374605900	ISOLATE	-115.41635465100	33.79625507380	BIG WASH	28	Upper Big Wash
603	0	B1	763.69239789800	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.12754428733	740.77722079100	ISOLATE	-115.41784202300	33.79504140180	BIG WASH	28	Upper Big Wash
604	0	B1	737.42358583700	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.12696687084	737.42358583900	ISOLATE	-115.42038511900	33.79334435370	BIG WASH	28	Upper Big Wash
605	0	B1	837.19305581400	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.14414480989	837.19305581800	ISOLATE	-115.42267719500	33.79186329670	BIG WASH	28	Upper Big Wash
606	0	B1	629.39903790100	7.50000000000	D	Dragon Wash	CBS	Big Wash	RISIF	RIVERINE	0.10836760295	629.39903790900	ISOLATE	-115.45043735700	33.77922261690	BIG WASH	23	Dragon Wash
607	0	B1	672.69318476900	7.50000000000	D	Dragon Wash	CBS	Big Wash	RISIF	RIVERINE	0.11582182933	672.69318477400	ISOLATE	-115.45035723900	33.77874613900	BIG WASH	23	Dragon Wash
608	0	B1	411.00105045200	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.07076464367	411.00105045700	ISOLATE	-115.45010849100	33.77209497070	BIG WASH	23	Dragon Wash
609	0	sfAB	298.70270487400	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05142952908	298.70270487500	ISOLATE	-115.41285191200	33.83078199630	BIG WASH	31	Eagle Creek
610	0	sfA	175.51687897000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03021984831	175.51687897100	ISOLATE	-115.41853543500	33.84254867290	BIG WASH	31	Eagle Creek
611	0	B1	380.66329234400	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.06554120047	380.66329233600	ISOLATE	-115.45029396900	33.77225784520	BIG WASH	23	Dragon Wash
612	0	B1	372.85110052000	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.06419612612	372.85110052100	ISOLATE	-115.45014380100	33.77258092910	BIG WASH	23	Dragon Wash
613	0	B1	175.93589464600	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.03029199288	175.93589464300	ISOLATE	-115.45011570000	33.77272602800	BIG WASH	23	Dragon Wash
614	0	B1	283.56286626300	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.04882280755	283.56286625700	ISOLATE	-115.45015810100	33.75837623800	BIG WASH	23	Dragon Wash
615	0	B1	276.42188922800	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.04759330049	276.42188922600	ISOLATE	-115.45016234200	33.75866238080	BIG WASH	23	Dragon Wash
616	0	B1	348.98921377300	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.06008767455	348.98921377800	ISOLATE	-115.45021612000	33.75711401070	BIG WASH	23	Dragon Wash
617	0	B1	294.66635708800	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.05073456562	294.66635709300	ISOLATE	-115.45035843200	33.74928809280	BIG WASH	23	Dragon Wash
618	0	B1	109.20541281800	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.01880258485	109.20541282200	ISOLATE	-115.45111497100	33.74964006770	BIG WASH	23	Dragon Wash
619	0	B1	370.94135161300	7.50000000000	D	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.06386731261	370.94135161700	ISOLATE	-115.45093898600	33.74823635090	BIG WASH	23	Dragon Wash
620	0	B1	736.03110862200	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.12672711925	736.03110862000	ISOLATE	-115.45172673800	33.70680466690	BIG WASH	21	Lake Tamarisk
621	0	subB	1070.86090260000	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.18437687717	1070.86090260000	ISOLATE	-115.45480318200	33.70036634640	BIG WASH	21	Lake Tamarisk
622	0	subB	348.42337956500	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.05999025130	348.42337956300	ISOLATE	-115.45533207400	33.69690566180	BIG WASH	21	Lake Tamarisk
623	0	subB	448.61418711900	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.07724073470	448.61418712500	ISOLATE	-115.45303793800	33.69912395630	BIG WASH	21	Lake Tamarisk
624	0	subB	578.27556646800	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.09956535235	578.27556646300	ISOLATE	-115.45346331500	33.69544845550	BIG WASH	21	Lake Tamarisk
625	0	subB	125.31050343700	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.02157549990	125.31050344100	ISOLATE	-115.45411187900	33.69655587910	BIG WASH	21	Lake Tamarisk

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
626	0	subB	356.54256442100	7.50000000000	D	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.06138818258	356.54256442100	ISOLATE	-115.45380231200	33.69592918080	BIG WASH	21	Lake Tamarisk
627	0	sfAB	979.41690426200	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.16863238710	979.41690426400	ISOLATE	-115.40598614900	33.81317718260	BIG WASH	28	Upper Big Wash
628	0	sfAB	5042.78488345000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.86824808599	5042.78488345000	ISOLATE	-115.39914200300	33.82341829730	BIG WASH	31	Eagle Creek
629	0	sfAB	8323.70670724000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.49198912711	2857.47285023000	ISOLATE	-115.39497586900	33.81882924430	BIG WASH	27	Lower Big Wash
629	0	sfAB	8323.70670724000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.46431429120	2696.73740327000	ISOLATE	-115.39497586900	33.81882924430	BIG WASH	28	Upper Big Wash
629	0	sfAB	8323.70670724000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.47684167592	2769.49645375000	ISOLATE	-115.39497586900	33.81882924430	BIG WASH	31	Eagle Creek
630	0	A1	449.35289779200	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07736792317	449.35289778500	ISOLATE	-115.33257315600	33.71429146320	BIG WASH	16	Gruendikes Well
631	0	A1	429.09290540800	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07387963247	429.09290540900	ISOLATE	-115.33798549400	33.71427360270	BIG WASH	16	Gruendikes Well
632	0	A1	422.36478542700	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07272120961	422.36478542700	ISOLATE	-115.34436557900	33.71424770830	BIG WASH	16	Gruendikes Well
633	0	A1	566.75210991100	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.09758128614	566.75210990600	ISOLATE	-115.34552908500	33.71410890750	BIG WASH	16	Gruendikes Well
634	0	A1	466.51725522900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.08032321888	466.51725522900	ISOLATE	-115.36050647800	33.71422330630	BIG WASH	16	Gruendikes Well
635	0	A1	601.02309245300	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.10348193741	601.02309245100	ISOLATE	-115.36183034400	33.71436089060	BIG WASH	16	Gruendikes Well
636	0	A1	362.44309764400	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.06240411461	362.44309764500	ISOLATE	-115.36166990700	33.71411090680	BIG WASH	16	Gruendikes Well
637	0	A2	301.97610414200	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.05199313088	301.97610414200	ISOLATE	-115.31170723800	33.70531985060	BIG WASH	16	Gruendikes Well
638	0	A2	159.27232388300	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.02742292078	159.27232388400	ISOLATE	-115.31165606000	33.70397056240	BIG WASH	16	Gruendikes Well
639	0	A2	46.41988303140	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.00799240410	46.41988302720	ISOLATE	-115.31140247500	33.70417293090	BIG WASH	16	Gruendikes Well
640	0	A1	78.00426297210	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.01343048605	78.00426297410	ISOLATE	-115.31329339900	33.70734537220	BIG WASH	16	Gruendikes Well
641	0	A1	238.31460364900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04103212873	238.31460364400	ISOLATE	-115.31299230900	33.70651570540	BIG WASH	16	Gruendikes Well
642	0	A1	358.20238722900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06167396474	358.20238722600	ISOLATE	-115.31272109300	33.71233417870	BIG WASH	16	Gruendikes Well
643	0	A1	785.60469395300	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.13526251618	785.60469395600	ISOLATE	-115.31318601400	33.70997453320	BIG WASH	16	Gruendikes Well
644	0	A1	273.13269813400	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04702697971	273.13269813400	ISOLATE	-115.31352867100	33.71040858060	BIG WASH	16	Gruendikes Well
645	0	A1	519.14208382500	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.08938396760	519.14208382300	ISOLATE	-115.31293056700	33.71470022570	BIG WASH	16	Gruendikes Well
646	0	A2	522.28005391900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.08992425171	522.28005392000	ISOLATE	-115.31013007800	33.70925923780	BIG WASH	16	Gruendikes Well
647	0	A2	495.00610417800	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.08522832372	495.00610417900	ISOLATE	-115.31044262200	33.70936202480	BIG WASH	16	Gruendikes Well
648	0	A2	386.22142877700	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06649817989	386.22142877300	ISOLATE	-115.31008911300	33.71182300730	BIG WASH	16	Gruendikes Well
649	0	A2	263.90909448900	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04543889368	263.90909448600	ISOLATE	-115.30935519700	33.71727264240	BIG WASH	16	Gruendikes Well
650	0	A2	311.76607126200	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.05367873128	311.76607126100	ISOLATE	-115.30894132400	33.71702496200	BIG WASH	16	Gruendikes Well
651	0	A2	387.48170189800	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.06671516906	387.48170190200	ISOLATE	-115.30832410000	33.71531140020	BIG WASH	16	Gruendikes Well
652	0	subA	1567.49856967000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.26988611737	1567.49856967000	ISOLATE	-115.32029825500	33.69997887170	BIG WASH	16	Gruendikes Well
653	0	subA	440.61183786600	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07586291974	440.61183786600	ISOLATE	-115.32054458200	33.69862856320	BIG WASH	16	Gruendikes Well
654	0	subA	1094.32069762000	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.18841609808	1094.32069762000	ISOLATE	-115.32130577100	33.69959395440	BIG WASH	16	Gruendikes Well
655	0	subA	421.92344445800	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.07264522115	421.92344446100	ISOLATE	-115.32097678900	33.69970532240	BIG WASH	16	Gruendikes Well
656	0	subA	1921.34361773000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.33080985154	1921.34361773000	ISOLATE	-115.31442818300	33.69954402560	BIG WASH	16	Gruendikes Well
657	0	subA	1452.62181487000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.25010706179	1452.62181488000	ISOLATE	-115.31636510700	33.70029262240	BIG WASH	16	Gruendikes Well
658	0	subA	1434.10870276000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.24691954249	1434.10870276000	ISOLATE	-115.31141815100	33.69973505910	BIG WASH	16	Gruendikes Well
659	0	subA	964.43384094700	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.16605265857	964.43384095000	ISOLATE	-115.31899378400	33.70112708180	BIG WASH	16	Gruendikes Well
660	0	subA	381.24436721100	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.06564124780	381.24436721300	ISOLATE	-115.31992978500	33.70191864540	BIG WASH	16	Gruendikes Well
661	0	subA	452.97636993200	7.50000000000	D	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.07799179923	452.97636993500	ISOLATE	-115.31960854600	33.70163226150	BIG WASH	16	Gruendikes Well
662	0	sfAB	2911.77807666000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.50133920053	2911.77807666000	ISOLATE	-115.39870078900	33.81093722370	BIG WASH	28	Upper Big Wash
663	0	sfAB	2447.45614534000	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.42139396442	2447.45614534000	ISOLATE	-115.39820992400	33.80845306180	BIG WASH	28	Upper Big Wash
664	0	sfAB	142.32556040500	7.50000000000	D	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.02450508960	142.32556040000	ISOLATE	-115.39602816800	33.80560243960	BIG WASH	28	Upper Big Wash
665	0	A1B2	336.49893274100	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.05793714407	336.49893274200	ISOLATE	-115.40156309400	33.79405947660	BIG WASH	28	Upper Big Wash
666	0	A1B2	278.89260566500	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04801869932	278.89260566500	ISOLATE	-115.40159182700	33.79320722940	BIG WASH	28	Upper Big Wash
667	0	A1B2	270.67861861200	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04660444535	270.67861860700	ISOLATE	-115.40156462100	33.79265729500	BIG WASH	28	Upper Big Wash
668	0	A1B2	283.26530539900	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.04877157462	283.26530540100	ISOLATE	-115.40155324900	33.79147510440	BIG WASH	28	Upper Big Wash
669	0	B1	224.38905256300	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.03863447875	224.38905256300	ISOLATE	-115.44863076900	33.78232408080	BIG WASH	28	Upper Big Wash
670	0	A1	203.20213943000	7.50000000000	D	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.03498659425	203.20213942700	ISOLATE	-115.37819792100	33.71453623970	BIG WASH	16	Gruendikes Well
671	0	subB	1248.42477489000	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.42989833846	1248.42477489000	ISOLATE	-115.45085059500	33.69773740800	BIG WASH	21	Lake Tamarisk
672	0	subB	1989.35287144000	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.68503886757	1989.35287143000	ISOLATE	-115.45436952500	33.69730753970	BIG WASH	21	Lake Tamarisk
673	0	access_east	147.16718038700	15.00000000000	C	Lower Palen Lake	DWW	unnamed	RISIF	RIVERINE	0.05067740372	147.16718039000	ISOLATE	-115.23723048700	33.67313280970	BIG WASH	15	Lower Palen Lake
674	0	access_east	118.20862035500	15.00000000000	C	Lower Palen Lake	CBS	unnamed	RISIF	RIVERINE	0.04070544778	118.20862035700	ISOLATE	-115.24166638100	33.67424209180	BIG WASH	15	Lower Palen Lake
675	0	access_east	138.11983110600	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04756192531	138.11983110500	ISOLATE	-115.25194782200	33.67678919890	BIG WASH	13	Corn Springs Wash
676	0	access_east	122.31646019100	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04211999318	122.31646019800	ISOLATE	-115.25370059300	33.67724863150	BIG WASH	13	Corn Springs Wash
677	0	access_east	122.22473739100	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04208840819	122.22473738800	ISOLATE	-115.25469988300	33.67751212980	BIG WASH	13	Corn Springs Wash
678	0	access_east	159.40623532000	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.05489195431	159.40623532000	ISOLATE	-115.25750902000	33.67824921850	BIG WASH	13	Corn Springs Wash
679	0	access_east	122.90055311400	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04232112711	122.90055311300	ISOLATE	-115.26138849700	33.67929169190	BIG WASH	13	Corn Springs Wash
680	0	access_east	142.51493081900	15.00000000000	C	Corn Springs Wash	DWW	unnamed	RISIF	RIVERINE	0.04907538940	142.51493081900	ISOLATE	-115.26372553500	33.67992172950	BIG WASH	13	Corn Springs Wash
681	0	access_east	122.45031985500	15.00000000000	C	Corn Springs Wash	DWW	unnamed	RISIF	RIVERINE	0.04216608810	122.45031985100	ISOLATE	-115.26611820700	33.68054261600	BIG WASH	13	Corn Springs Wash
682	0	access_east	115.27114194800	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.03969391940	115.27114194900	ISOLATE	-115.26740215500	33.68089088990	BIG WASH	13	Corn Springs Wash
683	0	access_east	120.23948509700	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04140478137	120.23948509400	ISOLATE	-115.27132679500	33.68192039080	BIG WASH	13	Corn Springs Wash
684	0	access_east	121.11618560200	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.04170667548	121.11618560500	ISOLATE	-115.27277895700	33.68230735770	BIG WASH	13	Corn Springs Wash
685	0	access_east	155.66674119800	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.05360424972	155.66674119600	ISOLATE	-115.27497272000	33.68287028390	BIG WASH	13	Corn Springs Wash
686	0	access_east	125.22927611400	15.00000000000	C	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.02746473520	79.75759103460	ISOLATE	-115.28071879500	33.68442634740	BIG WASH	13	Corn Springs Wash
686	0	access_east	125.22927611400	15.00000000000	C	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.01565829376	45.47168508160	ISOLATE	-115.28071879500	33.68442634740	BIG WASH	27	Lower Big Wash
687	0	access_east	119.21806925600	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.04105305415	119.21806925300	ISOLATE	-115.28237919300	33.68485808120	BIG WASH	27	Lower Big Wash
688	0	access_east	118.77183921600	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.04089939367	118.77183921200	ISOLATE	-115.28322479500	33.68508802780	BIG WASH	27	Lower Big Wash
689	0	access_east	146.79075806200	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.05054778170	146.79075805100	ISOLATE	-115.28518283700	33.68560757160	BIG WASH	27	Lower Big Wash
690	0	access_east	123.71133210400	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.04260032097	123.71133210400	ISOLATE	-115.28600045400	33.68581489490	BIG WASH	27	Lower Big Wash
691	0	access_east	123.72545640100	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.04260518471	123.72545640200	ISOLATE	-115.28887074000	33.68656229300	BIG WASH	27	Lower Big Wash
692	0	access_east	125.75766182700	15.00000000000	C	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.04330497997	125.75766183100	ISOLATE	-115.29746389500	33.68886379730	BIG WASH	27	Lower Big Wash
693	0	access_east	123.95435498400	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04268400654	123.95435498200	ISOLATE	-115.30546063400	33.69102219560	BIG WASH	16	Gruendikes Well

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
694	0	subA	118.13020460200	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04067844511	118.13020460500	ISOLATE	-115.31720277800	33.69428698280	BIG WASH	16	Gruendikes Well
695	0	access_west	119.86668905600	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04127640808	119.86668905700	ISOLATE	-115.32980253600	33.69789562320	BIG WASH	16	Gruendikes Well
696	0	access_west	124.95364183400	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.04302811358	124.95364183700	ISOLATE	-115.33286785600	33.69893566140	BIG WASH	16	Gruendikes Well
697	0	access_west	117.30695593300	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04039495728	117.30695592700	ISOLATE	-115.34686464100	33.70195950030	BIG WASH	16	Gruendikes Well
698	0	access_west	125.39625940300	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04318053010	125.39625939700	ISOLATE	-115.36503267800	33.70615975400	BIG WASH	16	Gruendikes Well
699	0	access_west	135.73575156000	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.04674096128	135.73575155800	ISOLATE	-115.39973109500	33.70943203380	BIG WASH	16	Gruendikes Well
700	0	subA	1290.18092503000	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.44427717804	1290.18092503000	ISOLATE	-115.31750234600	33.69608495740	BIG WASH	16	Gruendikes Well
701	0	subA	919.42843757200	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.31660758870	919.42843757200	ISOLATE	-115.31812879800	33.69315954530	BIG WASH	16	Gruendikes Well
702	0	subA	2533.92342622000	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.87256316330	2533.92342621000	ISOLATE	-115.31088274300	33.69910600990	BIG WASH	16	Gruendikes Well
703	0	sfAB	1575.48710945000	15.00000000000	C	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.54252310932	1575.48710945000	ISOLATE	-115.43039129700	33.83281543370	BIG WASH	31	Eagle Creek
704	0	sfAB	1875.63525464000	15.00000000000	C	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.64587990862	1875.63525464000	ISOLATE	-115.42931801000	33.83717543850	BIG WASH	31	Eagle Creek
705	0	sfAB	1598.33353843000	15.00000000000	C	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.55039033693	1598.33353843000	ISOLATE	-115.43001946900	33.83784750950	BIG WASH	31	Eagle Creek
706	0	sfAB	3267.41048316000	15.00000000000	C	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	1.12514135095	3267.41048316000	ISOLATE	-115.40357701900	33.81213928880	BIG WASH	28	Upper Big Wash
707	0	sfAB	1912.86964491000	15.00000000000	C	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.65870166836	1912.86964491000	ISOLATE	-115.40474334400	33.80995323220	BIG WASH	28	Upper Big Wash
708	0	B1	424.16344857000	15.00000000000	C	Upper Big Wash	DWW	Big Wash	RISIF	RIVERINE	0.14606179359	424.16344857000	ISOLATE	-115.41562047600	33.79669740160	BIG WASH	28	Upper Big Wash
709	0	B1	430.81668927000	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.14835285443	430.81668926600	ISOLATE	-115.45020903200	33.77636021740	BIG WASH	23	Dragon Wash
710	0	B1	257.34475081900	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.08861733844	257.34475081700	ISOLATE	-115.45003454200	33.76426975880	BIG WASH	23	Dragon Wash
711	0	B1	107.20936128300	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.03691782413	107.20936128500	ISOLATE	-115.45076952200	33.76433935470	BIG WASH	23	Dragon Wash
712	0	subB	494.02119649400	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.17011749191	494.02119649100	ISOLATE	-115.44977585200	33.69733793040	BIG WASH	21	Lake Tamarisk
713	0	B1	269.90001991500	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.09294077821	269.90001991400	ISOLATE	-115.45004853700	33.76362871100	BIG WASH	23	Dragon Wash
714	0	B1	109.24106470800	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.03761744652	109.24106470100	ISOLATE	-115.45078277100	33.76370860140	BIG WASH	23	Dragon Wash
715	0	B1	107.41541328200	15.00000000000	C	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.03698877868	107.41541328200	ISOLATE	-115.45079646700	33.76306733540	BIG WASH	23	Dragon Wash
716	0	B1	1115.72190532000	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.38420175803	1115.72190531000	ISOLATE	-115.45174062700	33.70935673030	BIG WASH	21	Lake Tamarisk
717	0	subB	268.73924156200	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.09254106114	268.73924156200	ISOLATE	-115.45384566400	33.69703763810	BIG WASH	21	Lake Tamarisk
718	0	subB	416.01290977400	15.00000000000	C	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.14325513422	416.01290977400	ISOLATE	-115.45370974900	33.69700057870	BIG WASH	21	Lake Tamarisk
719	0	sfAB	4776.45262912000	15.00000000000	C	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	1.64478396319	4776.45262911000	ISOLATE	-115.40120837900	33.80390187910	BIG WASH	28	Upper Big Wash
720	0	A1	452.83734570900	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.15593572511	452.83734570600	ISOLATE	-115.33454308100	33.71430704810	BIG WASH	16	Gruendikes Well
721	0	A1	478.72761613800	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.16485110749	478.72761613800	ISOLATE	-115.33753892600	33.71420941380	BIG WASH	16	Gruendikes Well
722	0	A1	435.83221702900	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.15007996454	435.83221703000	ISOLATE	-115.34670357500	33.71429561400	BIG WASH	16	Gruendikes Well
723	0	A1	494.43293572100	15.00000000000	C	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.17025927539	494.43293572300	ISOLATE	-115.35951421200	33.71436468210	BIG WASH	16	Gruendikes Well
724	0	A2	738.89969865300	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.25444204499	738.89969864500	ISOLATE	-115.31124357800	33.70498134770	BIG WASH	16	Gruendikes Well
725	0	A1	268.07853314600	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.09231354447	268.07853315000	ISOLATE	-115.31283216600	33.70755456980	BIG WASH	16	Gruendikes Well
726	0	A1	542.38221864800	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.18677073645	542.38221864000	ISOLATE	-115.31302845300	33.70924044620	BIG WASH	16	Gruendikes Well
727	0	A1	264.09979024100	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.09094345394	264.09979023400	ISOLATE	-115.31362388400	33.71112071270	BIG WASH	16	Gruendikes Well
728	0	A2	439.63124118000	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.15138816845	439.63124118000	ISOLATE	-115.30928642800	33.71266187310	BIG WASH	16	Gruendikes Well
729	0	A1	470.08960850500	15.00000000000	C	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.16187658695	470.08960850200	ISOLATE	-115.37836077300	33.71434645200	BIG WASH	16	Gruendikes Well
730	0	subB	832.11864948700	28.00000000000	B	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	0.53487883805	832.11864948600	ISOLATE	-115.45350670300	33.69850299710	BIG WASH	21	Lake Tamarisk
731	0	subB	1805.47887638000	28.00000000000	B	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	1.16054656884	1805.47887638000	ISOLATE	-115.45224411000	33.69807424810	BIG WASH	21	Lake Tamarisk
732	0	subB	2089.65816042000	28.00000000000	B	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	1.34321461185	2089.65816043000	ISOLATE	-115.45129575200	33.69833949480	BIG WASH	21	Lake Tamarisk
733	0	subB	1887.90031122000	28.00000000000	B	Lake Tamarisk	CBS	unnamed	RISIF	RIVERINE	1.21352637085	1887.90031122000	ISOLATE	-115.45016066900	33.69894344090	BIG WASH	21	Lake Tamarisk
734	0	access_east	117.13563138200	28.00000000000	B	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.07529379428	117.13563138300	ISOLATE	-115.25554025600	33.67774003870	BIG WASH	13	Corn Springs Wash
735	0	access_east	116.58247729000	28.00000000000	B	Corn Springs Wash	CBS	unnamed	RISIF	RIVERINE	0.07493823150	116.58247728500	ISOLATE	-115.26059523200	33.67908204930	BIG WASH	13	Corn Springs Wash
736	0	access_east	121.69013424400	28.00000000000	B	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.07822139024	121.69013423900	ISOLATE	-115.28730178800	33.68615661770	BIG WASH	27	Lower Big Wash
737	0	access_east	216.37195025300	28.00000000000	B	Lower Big Wash	DWW	unnamed	RISIF	RIVERINE	0.13908206169	216.37195025100	ISOLATE	-115.29954684000	33.68972599540	BIG WASH	27	Lower Big Wash
738	0	subA	117.47509730800	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.07551200011	117.47509730700	ISOLATE	-115.31029452300	33.69227107070	BIG WASH	16	Gruendikes Well
739	0	access_west	144.24678419500	28.00000000000	B	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.09272061427	144.24678419900	ISOLATE	-115.33953940500	33.70041289970	BIG WASH	16	Gruendikes Well
740	0	access_west	126.81538044200	28.00000000000	B	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.08151585520	126.81538044300	ISOLATE	-115.37501274300	33.70821198240	BIG WASH	16	Gruendikes Well
741	0	access_west	1761.45465190000	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	1.13224816927	1761.45465190000	ISOLATE	-115.39697040100	33.71010002760	BIG WASH	16	Gruendikes Well
742	0	subA	587.62627034100	28.00000000000	B	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.37772120224	587.62627033500	ISOLATE	-115.30978845000	33.69312962560	BIG WASH	16	Gruendikes Well
743	0	subA	864.21930048300	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.55551286532	864.21930047200	ISOLATE	-115.31099502300	33.69108193470	BIG WASH	16	Gruendikes Well
744	0	sfAB	1798.36141254000	28.00000000000	B	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	1.15597152321	1798.36141254000	ISOLATE	-115.39511587200	33.80306489770	BIG WASH	28	Upper Big Wash
745	0	B1	384.67489585800	28.00000000000	B	Dragon Wash	DWW	Big Wash	RISIF	RIVERINE	0.24726577328	384.67489586100	ISOLATE	-115.45058372400	33.77968008020	BIG WASH	23	Dragon Wash
746	0	B1	251.78928390800	28.00000000000	B	Dragon Wash	CBS	unnamed	RISIF	RIVERINE	0.16184802455	251.78928390200	ISOLATE	-115.45027228800	33.75314381400	BIG WASH	23	Dragon Wash
747	0	A1	459.71297084800	28.00000000000	B	Gruendikes Well	DWW	unnamed	RISIF	RIVERINE	0.29549961395	459.71297083900	ISOLATE	-115.33710879300	33.71426685530	BIG WASH	16	Gruendikes Well
748	0	A1	784.52039851500	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.50428308445	784.52039851900	ISOLATE	-115.31259712600	33.70428790080	BIG WASH	16	Gruendikes Well
749	0	A1A2	255.22665263100	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.16405753613	255.22665263000	ISOLATE	-115.31271579100	33.70279431560	BIG WASH	16	Gruendikes Well
750	0	A2	217.73652396300	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.13995919814	217.73652396700	ISOLATE	-115.31016531100	33.71021933330	BIG WASH	16	Gruendikes Well
751	0	A2	285.25615080700	28.00000000000	B	Gruendikes Well	CBS	unnamed	RISIF	RIVERINE	0.18336024386	285.25615081000	ISOLATE	-115.30866215800	33.71767208570	BIG WASH	16	Gruendikes Well
752	0	B1	406.95062097400	15.00000000000	C	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.14013451135	406.95062097200	ISOLATE	-115.40495620600	33.80561364460	BIG WASH	28	Upper Big Wash
753	0	sfAB	326.60388469100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01874448374	326.60388469400	ISOLATE	-115.41650054400	33.84311406560	BIG WASH	31	Eagle Creek
754	0	sfAB	163.65534233400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00939252424	163.65534233300	ISOLATE	-115.41634252900	33.84316152880	BIG WASH	31	Eagle Creek
755	0	sfAB	97.54893775880	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00559853867	97.54893776010	ISOLATE	-115.41688338300	33.84323369500	BIG WASH	31	Eagle Creek
756	0	sfA	819.86062540200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04705352533	819.86062539800	ISOLATE	-115.41824399100	33.84370550780	BIG WASH	31	Eagle Creek
757	0	sfA	537.90765126200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03087165124	537.90765126800	ISOLATE	-115.41760437300	33.84378106800	BIG WASH	31	Eagle Creek
758	0	sfA	550.67885511000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03160461749	550.67885511700	ISOLATE	-115.41709124500	33.84400474750	BIG WASH	31	Eagle Creek
759	0	sfA	573.15046963700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03289431070	573.15046963600	ISOLATE	-115.42089467500	33.84260747360	BIG WASH	31	Eagle Creek
760	0	sfA	891.90801807000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05118847670	891.90801807500	ISOLATE	-115.42195055600	33.84344133310	BIG WASH	31	Eagle Creek
761	0	sfA	1162.68935181000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06672918686	1162.68935180000	ISOLATE	-115.42200421300	33.84375291060	BIG WASH	31	Eagle Creek
762	0	sfA	327.23401392000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01878064818	327.23401392400	ISOLATE	-115.43062215500	33.84252448630	BIG WASH	31	Eagle Creek
763	0	sfA	596.43731377000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03423079165	596.43731377500	ISOLATE	-115.43131057800	33.84286946520	BIG WASH	31	Eagle Creek
764	0	sfA	453.92414025400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02605166094	453.92414024500	ISOLATE	-115.42903225500	33.84250107510	BIG WASH	31	Eagle Creek

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit C. Field Data Summary

FID_channe	Id	project_co	length	width	category	Watershed	Vegetation	Waters_Nam	Cowardin_C [1]	HGM_Code	Area__acre	Linear_ft	Waters_Typ	Lat_nad83	Long_nad83	Lcl_Wtrway	FID_Cal_Wa	HU_12_NAME
765	0	sfA	483.76666205500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02776438602	483.76666205600	ISOLATE	-115.42710895700	33.84101085800	BIG WASH	31	Eagle Creek
766	0	sfA	479.32977638100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02750974382	479.32977638500	ISOLATE	-115.42841872300	33.84007944490	BIG WASH	31	Eagle Creek
767	0	sfA	2638.71526748000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.15144141801	2638.71526748000	ISOLATE	-115.42709193900	33.83982831960	BIG WASH	31	Eagle Creek
768	0	sfB	220.37604111000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03794353325	220.37604110500	ISOLATE	-115.43255330200	33.83367248160	BIG WASH	31	Eagle Creek
769	0	sfAB	550.23091376400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03157890919	550.23091376900	ISOLATE	-115.42844061900	33.83530911890	BIG WASH	31	Eagle Creek
770	0	sfAB	1380.66692531000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07923937817	1380.66692530000	ISOLATE	-115.42958600700	33.83515432880	BIG WASH	31	Eagle Creek
771	0	sfAB	757.63138042200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04348205811	757.63138042300	ISOLATE	-115.42979807500	33.83486529670	BIG WASH	31	Eagle Creek
772	0	sfAB	363.80477864500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.02087952127	363.80477864400	ISOLATE	-115.43166438100	33.83532426370	BIG WASH	31	Eagle Creek
773	0	sfAB	183.22494831400	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01051566508	183.22494831500	ISOLATE	-115.43194015900	33.83543061290	BIG WASH	31	Eagle Creek
774	0	sfB	200.55548708900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01151030114	200.55548708700	ISOLATE	-115.43254205500	33.83518879610	BIG WASH	31	Eagle Creek
775	0	sfAB	635.63960590800	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03648069364	635.63960591100	ISOLATE	-115.40677717900	33.83219324340	BIG WASH	31	Eagle Creek
776	0	sfAB	240.17788973900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01378431415	240.17788973500	ISOLATE	-115.40701848400	33.83238920460	BIG WASH	31	Eagle Creek
777	0	sfAB	877.02341548900	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05033421806	877.02341549400	ISOLATE	-115.41165301400	33.83146795600	BIG WASH	31	Eagle Creek
778	0	sfAB	942.76459777600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05410724276	942.76459777400	ISOLATE	-115.40602705900	33.82913178980	BIG WASH	31	Eagle Creek
779	0	sfAB	955.08913455700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05481457384	955.08913455900	ISOLATE	-115.39788473000	33.83111495900	BIG WASH	31	Eagle Creek
780	0	sfAB	958.26418533500	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.05499679668	958.26418533000	ISOLATE	-115.40037894300	33.83298929230	BIG WASH	31	Eagle Creek
781	0	sfAB	215.69131377700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01237897806	215.69131377600	ISOLATE	-115.41120027200	33.83215055350	BIG WASH	31	Eagle Creek
782	0	sfAB	296.52383294700	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01701812632	296.52383294600	ISOLATE	-115.41043758400	33.83192910380	BIG WASH	31	Eagle Creek
783	0	sfAB	864.60716251300	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04962162319	864.60716250800	ISOLATE	-115.40976265000	33.83133487530	BIG WASH	31	Eagle Creek
784	0	sfAB	1911.60531407000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10971104879	1911.60531406000	ISOLATE	-115.40287721800	33.83216391120	BIG WASH	31	Eagle Creek
785	0	sfAB	1669.97934470000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.09584362630	1669.97934470000	ISOLATE	-115.40726492700	33.83126449940	BIG WASH	31	Eagle Creek
786	0	sfAB	2229.01355547000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.12792777522	2229.01355546000	ISOLATE	-115.39611581500	33.81760406050	BIG WASH	28	Upper Big Wash
787	0	sfAB	1914.97221705000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.10990428243	1914.97221705000	ISOLATE	-115.40253489700	33.82943024630	BIG WASH	31	Eagle Creek
788	0	sfAB	660.10523099200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03715085127	647.31643246100	ISOLATE	-115.40361730300	33.82844468960	BIG WASH	31	Eagle Creek
789	0	sfAB	829.37594953600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04686565375	816.58715100900	ISOLATE	-115.40243834600	33.82847169860	BIG WASH	31	Eagle Creek
790	0	sfAB	2266.81721185000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13009740656	2266.81721185000	ISOLATE	-115.39792438500	33.82649907930	BIG WASH	31	Eagle Creek
791	0	sfAB	4304.26021822000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.24703054512	4304.26021821000	ISOLATE	-115.39587273700	33.82561679280	BIG WASH	31	Eagle Creek
792	0	sfAB	3367.26808047000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.19325459599	3367.26808047000	ISOLATE	-115.40210708400	33.82658709350	BIG WASH	31	Eagle Creek
793	0	sfAB	4337.17828020000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.24891978192	4337.17828021000	ISOLATE	-115.40082238900	33.82443880500	BIG WASH	31	Eagle Creek
794	0	sfAB	2185.21955016000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.12541434517	2185.21955016000	ISOLATE	-115.40420964900	33.82455447010	BIG WASH	31	Eagle Creek
795	0	sfAB	1218.79799749000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06994938002	1218.79799749000	ISOLATE	-115.40542331500	33.82452994760	BIG WASH	31	Eagle Creek
796	0	sfAB	788.77894832000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.04526968253	788.77894832300	ISOLATE	-115.40607868700	33.82433788690	BIG WASH	31	Eagle Creek
797	0	sfAB	688.12094943100	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.03949270830	688.12094943000	ISOLATE	-115.40619558300	33.82581942000	BIG WASH	31	Eagle Creek
798	0	sfAB	1506.24626422000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08644664051	1506.24626422000	ISOLATE	-115.39516383400	33.82773456270	BIG WASH	31	Eagle Creek
799	0	sfAB	2562.99238775000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.14709552271	2562.99238774000	ISOLATE	-115.39529263600	33.82637540240	BIG WASH	31	Eagle Creek
800	0	sfAB	2296.48314321000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.13179999674	2296.48314322000	ISOLATE	-115.39825720900	33.82832198720	BIG WASH	31	Eagle Creek
801	0	sfAB	1350.20752637000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.07749124922	1350.20752636000	ISOLATE	-115.40163323800	33.82968836160	BIG WASH	31	Eagle Creek
802	0	sfAB	2335.08791124000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.13401560556	2335.08791124000	ISOLATE	-115.40354916500	33.81975110840	BIG WASH	28	Upper Big Wash
803	0	sfAB	2201.35370815000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.12634031842	2201.35370815000	ISOLATE	-115.40387786300	33.81894648800	BIG WASH	28	Upper Big Wash
804	0	sfAB	1504.79898378000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.08636357804	1504.79898378000	ISOLATE	-115.39316791300	33.81940105750	BIG WASH	31	Eagle Creek
805	0	sfAB	3873.77653714000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.22232418142	3873.77653714000	ISOLATE	-115.39095796300	33.81059049640	BIG WASH	28	Upper Big Wash
806	0	sfAB	3973.84016026000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.22806704317	3973.84016027000	ISOLATE	-115.39117330100	33.81261336660	BIG WASH	28	Upper Big Wash
807	0	sfAB	2005.95785028000	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.11512613925	2005.95785028000	ISOLATE	-115.39709638900	33.81721051220	BIG WASH	28	Upper Big Wash
808	0	sfAB	1205.18090220000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06916786629	1205.18090219000	ISOLATE	-115.37907910900	33.80933635110	BIG WASH	31	Eagle Creek
809	0	sfAB	1195.15916270000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.06859269758	1195.15916270000	ISOLATE	-115.37625133400	33.80557083010	BIG WASH	31	Eagle Creek
810	0	A2	83.85718212600	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.00481274002	83.85718212690	ISOLATE	-115.39837783600	33.79273791660	BIG WASH	28	Upper Big Wash
811	0	A1B2	260.98240440500	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.01497832900	260.98240440900	ISOLATE	-115.40171622300	33.79516444100	BIG WASH	28	Upper Big Wash
812	0	sfAB	7102.18929242000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	1.22282873492	7102.18929242000	ISOLATE	-115.39680482400	33.83008796300	BIG WASH	31	Eagle Creek
813	0	sfAB	1197.82939321000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.20623784319	1197.82939322000	ISOLATE	-115.38742391300	33.81748304050	BIG WASH	31	Eagle Creek
814	0	sfAB	1450.27689897000	7.50000000000	D	Lower Big Wash	CBS	unnamed	RISIF	RIVERINE	0.24493750082	1422.59700477000	ISOLATE	-115.37786508500	33.80343665120	BIG WASH	27	Lower Big Wash
814	0	sfAB	1450.27689897000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00476582200	27.67989419550	ISOLATE	-115.37786508500	33.80343665120	BIG WASH	31	Eagle Creek
815	0	sfAB	1448.33925979000	15.00000000000	C	Eagle Creek	DWW	unnamed	RISIF	RIVERINE	0.49873941453	1448.33925979000	ISOLATE	-115.39043388300	33.81974749600	BIG WASH	31	Eagle Creek
202	0	sfB	3147.53551906000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.00615115277	107.17768591000	ISOLATE	-115.40899389900	33.85169001970	BIG WASH	34	181001004702-Pinto Wash
203	0	sfB	2537.29580715000	2.50000000000	E	181001004702-Pinto Wash	CBS	unnamed	RISIF	RIVERINE	0.00615115277	107.17768591000	ISOLATE	-115.41070510600	33.85153047860	BIG WASH	34	181001004702-Pinto Wash
218	0	sfAB	1792.22001562000	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00448375804	78.12500000210	ISOLATE	-115.40775180700	33.83809280470	BIG WASH	31	Eagle Creek
558	0	sfAB	5629.23520222000	7.50000000000	D	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.01345127411	78.12500000210	ISOLATE	-115.41298807300	33.83784627860	BIG WASH	31	Eagle Creek
252	0	B1	746.27520572300	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00514757575	89.69135987900	ISOLATE	-115.40557953500	33.80464131440	BIG WASH	28	Upper Big Wash
254	0	B1	154.53922610500	2.50000000000	E	Upper Big Wash	CBS	unnamed	RISIF	RIVERINE	0.00514757575	89.69135987900	ISOLATE	-115.40544972400	33.80385415570	BIG WASH	28	Upper Big Wash
261	0	B1	345.41600849300	2.50000000000	E	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.00131515020	22.91517711220	ISOLATE	-115.41775706100	33.79541845420	BIG WASH	28	Upper Big Wash
603	0	B1	763.69239789800	7.50000000000	D	Upper Big Wash	CBS	Big Wash	RISIF	RIVERINE	0.00394545060	22.91517711220	ISOLATE	-115.41784202300	33.79504140180	BIG WASH	28	Upper Big Wash
788	0	sfAB	660.10523099200	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00073397604	12.78879853170	ISOLATE	-115.40361730300	33.82844468960	BIG WASH	31	Eagle Creek
789	0	sfAB	829.37594953600	2.50000000000	E	Eagle Creek	CBS	unnamed	RISIF	RIVERINE	0.00073397604	12.78879853170	ISOLATE	-115.40243834600	33.82847169860	BIG WASH	31	Eagle Creek

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

[1] RISIF = RIVERINE INTERMITTENT STREAMBED INTERMITTENTLY FLOODED

Exhibit D

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Exhibit E

Hydrology Maps for CWA Jurisdictional Analysis

Integrated Weed Management Plan

INTEGRATED WEED MANAGEMENT PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:
SUNLIGHT, LLC
1111 Broadway St, 4th Floor, Oakland, CA 94607

Prepared by:
IRONWOOD CONSULTING INC.
20 Nevada Street, Suite 300, Redlands, CA 92373

August 3, 2010

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List of Acronyms

AC	Alternating Current
ACEC	Area of Critical Environmental Concern
BLM	U.S. Bureau of Land Management
Cal-IPC	California Invasive Plant Council
CDCA	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CHU	Critical Habitat Unit
CPUC	California Public Utility Commission
DOI	U.S. Department of the Interior
DPV1	SCE's Devers to Palo Verde I transmission line
DSSF	Desert Center Solar Farm
DWMA	Desert Wildlife Management Area
I-10	Interstate 10
kV	Kilovolt
MW	Megawatt
MWD	Metropolitan Water District
O&M	Operations and Maintenance
PV	Photovoltaic
ROW	Right of Way
SBBM	San Bernardino Base and Meridian
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

Desert Sunlight Holdings, LLC (Sunlight or Applicant), a wholly owned subsidiary of First Solar Development, Inc. (First Solar), proposes to develop a 550-megawatt (MW) alternating current (AC) solar photovoltaic (PV) energy-generating project known as the Desert Sunlight Solar Farm Project (DSSF or Project). The Project consists of three main components: a PV- generating solar facility (Solar Farm), a 220-kilovolt (kV) generation interconnection (Gen-Tie Line) transmission, and a 500- to 220- (500/220) kilovolt (kV) substation (referred to here as the Red Bluff Substation). The Solar Farm and most of the corridor for the Project's Gen-Tie Line would be located on lands administered by the U.S. Department of Interior, Bureau of Land Management (BLM), Palm Springs-South Coast Field Office. In addition, the Project includes development of Red Bluff Substation, where the Project would interconnect with the Southern California Edison (SCE) regional transmission system. While the substation is included as part of the Project for planning and environmental review purposes, it would be constructed and operated by SCE.

1.1 Purpose of Integrated Weed Management Plan

The Integrated Weed Management Plan (IWMP) is intended to reduce and/or eliminate the propagation and further spread of noxious and invasive weeds in the Colorado Desert due to the construction and operation of the Solar Farm and Gen-Tie Line; and by SCE in the construction and operation of their Project components (Red Bluff substation, access road, distribution line and telecommunications site). While the IWMP specifically describes a proposed project configuration, it is intended to be adaptable to any project configuration selected. The objectives of this plan are as follows:

- Identify weed species currently present at the Project components.
- Identify weeds not seen on the Project components that may have the potential to be present in the Project area and have the potential to invade the Project site due to construction activities.
- Identify construction activities that may increase the presence of weeds or introduce new weed species on and adjacent to the Project components.
- Specify steps that will be taken to ensure that the presence of weed populations on and adjacent to the Project components will not increase because of construction activities. These steps will be intended to (1) prevent weeds not currently found on the Project site from becoming established there, and (2) prevent weeds already present on the site from spreading to other areas.

Additionally, the IWMP will be consistent with applicable federal and state laws, regulations and weed management guidelines established by the BLM and other regulatory agencies. These legal authorities include, but are not limited to, the Federal Noxious Weed Act of 1974, including the 1988 and 1991 amendments; the federal Plant Protection Act of 2000; Section 403 of the California Food and Agriculture Code; and the *Northern and Eastern Colorado Desert Coordinated Management Plan* (NECO Plan, BLM and CDFG 2002).

1.2 Project Location and Description

This discussion provides a brief summary of project locations and project description for the Sunlight and SCE project components of the Proposed Action. Complete details of project locations and description are found in the Desert Sunlight Solar Farm Environmental Impact Statement (BLM 2010).

1.2.1 Sunlight Project Components

Sunlight's Proposed Action consists of two main components:

1. Solar Farm Site (the main photovoltaic [PV] generating facility),
2. 220-kilovolt (kV) transmission line (Gen-Tie Line),

Location

The region of the Proposed Action is a largely vacant, undeveloped, and relatively flat land area located in the Chuckwalla Valley of the Sonora Desert in eastern Riverside County. The Solar Farm site is approximately ten kilometers (six miles) north of the rural community of Desert Center and six kilometers (four miles) north of Lake Tamarisk, between the cities of Coachella (to the west) and Blythe (to the east) (Figure 1). The project area contains existing transmission lines, telephone lines and pipelines, as well as dirt roads. Joshua Tree National Park is located to the north, east, and west of the area; at its closest point, the Solar Farm site is approximately 2.6 kilometers (1.4 miles) southwest of the national park boundary. The inactive Eagle Mountain Mine is located approximately 1.6 kilometers (1.0 mile) to the west of the Solar Farm site.

The Sunlight components of the Proposed Action cover an area of approximately 1,812 hectares (7.0 square miles or 4,478 acres – Table 1 and Figure 2). The Solar Farm Site is not located within the boundaries of an Area of Critical Environmental Concern (ACEC), Desert Wildlife Management Area (DWMA), Critical Habitat Unit (CHU), or Wilderness Area (Figure 2). The proposed Gen-Tie Line crosses small portions of the Chuckwalla DWMA and CHU. Elevations at the Solar Farm site range from approximately 190 to 270 meters (620 to 880 feet) above mean sea level (amsl). Elevations within the Gen-Tie Line range from approximately 210 to 250 meters (690 to 830 feet) amsl.

Table 1. Sunlight Components of the Proposed Action (also shown on Figure 2)

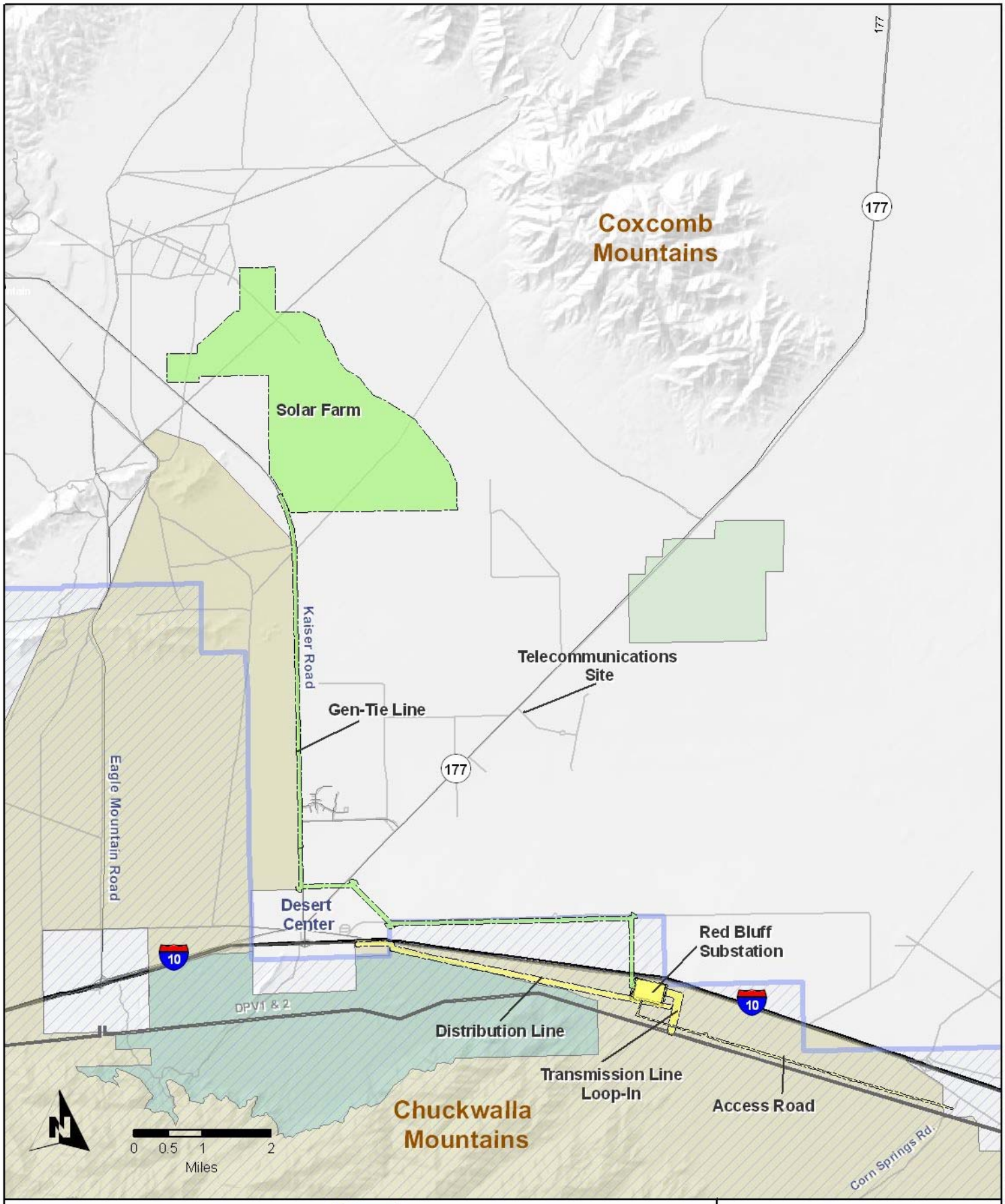
Area	Acres
Solar Farm Site	4,244
Gen-Tie Line	105
Total	4,349

0 45 90 180
Miles

DESERT SUNLIGHT
SOLAR FARM PROJECT
FIRST SOLAR DEVELOPMENT, INC.

Figure 1
Regional Location

Prepared by Ironwood Consulting, Inc. - May 2010



Project Area
Sunlight Component
SCE Component
Desert Tortoise Critical Habitat
Chuckwalla DWMA
Alligator Rock DWMA
Desert Lily Preserve

DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC.

Figure 2
Project Components

Prepared by Ironwood Consulting, Inc. - July 14, 2010

Project Description - Sunlight Components

The Solar Farm site, where the power would be generated, would consist of several components:

1. Main generation area, which includes PV arrays, combining switchgear, overhead lines, and access corridors;
2. Operations and Maintenance Facility;
3. Solar Energy Visitor's Center;
4. On-site substation (where the voltage of the Solar Farm-generated electricity would be stepped up to 220 kV, which is the voltage of the Gen-Tie Line); and
5. Site security and fencing (including desert tortoise exclusion fencing).

The Gen-Tie would transmit the electricity generated at the Solar Farm to the regional transmission system, via the Red Bluff Substation where the power generated at the Solar Farm would feed into SCE's existing Devers Palo Verde 1 (DPV1) 500-kV transmission line. Sunlight plans to use steel monopoles for the transmission line. Poles are expected to be 40 meters (135 feet) tall and spaced approximately 275 to 335 meters (900 to 1,100 feet) apart.

1.2.2 SCE Project Components

The SCE project components of the Proposed Action consists of five components (Figure 2):

1. 500/220-kV substation (Red Bluff Substation);
2. Loop in area east of the substation;
3. Access road from the I-10 exit at Corn Springs Road, running south of, and parallel to I-10;
4. Distribution line from the Red Bluff substation to existing distribution lines; and
5. Telecommunications site north of I-10 along Highway 177 (Rice Road).

Location

The majority of SCE project components (except the telecommunications site) are found south of Interstate 10 (I-10) in a rocky, undeveloped, and relatively flat land area located in the Chuckwalla Valley between I-10 and the Chuckwalla Wilderness (Figure 2). The area of SCE project components supports existing transmission lines including the DPV I line, telephone lines and pipelines, as well as dirt roads. The telecommunications site is a small largely vacant, undeveloped, and relatively flat land area located in the Chuckwalla Valley.

The SCE project components (excluding the telecommunications site) of the Proposed Action cover an area of approximately 152 acres (Table 2 and Figure 2) within the SBBM. The Red Bluff substation, distribution line and access road are not located within the boundaries of a Wilderness Area and are within the Chuckwalla DWMA and CHU. The telecommunications site is not within an ACEC, Wilderness Area, DWMA, or CHU (Figure 2). Elevations within the Red Bluff Substation, distribution line and access road range from approximately 230 to 280 meters (765 to 930 feet) amsl. The elevation of the telecommunications site is approximately 190 meters (620 feet) amsl.

Table 2. SCE Components of the Proposed Action (also shown on Figure 2)

Area	Acres
Red Bluff substation	72
Access road, drainage, transmission loop-in and distribution system	80
Telecommunications site	0.2
Total	152

Project Description - SCE Components

Red Bluff Substation would consist of a 500/220-kV substation which, together with its associated components, will require approximately 152 acres of land. It would interconnect the power from the Solar Farm Site (via the Gen-Tie Line) to SCE's DPV1 transmission line, which passes near the substation site. Substation features include:

1. Transmission lines to connect the substation to the DPV1 line;
2. Connection of the DSSF interconnection line into the substation;
3. Modification of some existing 220 kV structures (towers) near the substation;
4. Re-direction of drainage features to pass the boundaries of the substation fence;
5. Upgrade of an electric distribution line for substation light and power; and
6. Installation of telecommunications facilities associated with the substation.

2.0 Weeds

2.1 Definitions

Weeds are defined for this document as species of non-native plants that are included on the weed lists of the California Department of Food and Agriculture (CDFA, 2007), the California Invasive Plant Council (Cal-IPC 2006), or those weeds of special concern identified by BLM. The Mojave Weed Management Plan website (http://www.mojavewma.org/) was also consulted to assemble a list of target weeds for the Project. Weeds can be toxic (containing chemicals which are poisonous to one or more species), or non-toxic, native (part of the evolved natural community or introduced from elsewhere) or non-native, invasive (pushing out native vegetation or simply existing in place of a native species) or non-invasive, and/or noxious (aggressively invasive) or not noxious. Weeds can also be nonnative species that are not toxic, invasive, or noxious, but are undesirable within a native ecosystem.

The California Invasive Plant Council (Cal-IPC) has created three categories (Cal-IPC 2006) for invasive species based on their ability to cause harm to native ecologies. These categories, which have been generally accepted in California as a reliable measure of potential harmfulness, are:

High – Species that have "severe ecological impacts on physical processes, plant and animal communities, and vegetation structure." (Cal-IPC 2006) Their ability to reproduce and disperse is high and most are fairly widely distributed.

Moderate – Species that have "substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure." (Cal-IPC 2006) reproduction and dispersion is moderate to high for moderate species but generally require disturbance to become established in an area.

Limited – Species that are "invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score." (Cal-IPC 2006). Their ability to reproduce, disperse, and invade is low to moderate overall and they may be a problem only locally at most.

It is important to note that these categories of harm for invasive species are based upon statewide cumulative trends. The actual harm caused by invasive species may be more or less severe at local levels.

2.2 Weed Identification and Risk Assessment

Currently, weed occurrence on the Project site is low to moderate. Disturbance and moisture (e.g., applying water for dust control) from the proposed Project would create conditions favorable for a greater presence of weeds on the Project site.

2.2.1 Solar Farm and Gen-Tie Line Corridor

Six non-native weed species are known to occur on the Applicant's Project components. These species are identified below on Table 3.

Table 3. Weeds with potential to be found within the Sunlight Components

Common Name ***Scientific Name***	**Project Components where weed was found**
Asian mustard *Brassica tournifortii*	Throughout Solar Farm site and all Gen-Tie Line alternatives
Red brome *Bromus rubens*	Throughout Solar Farm site but predominately in southern half and all Gen-Tie Line alternatives
Bermuda grass *Cynodon dactylon*	Gen-Tie Line alternatives B-1 and B-2 (not found on the Proposed Action)
Prickley lettuce *Lactuca serriola*	Throughout Solar Farm site
Mediterranean grass *Schismus* spp.	Throughout Solar Farm site
Athel *Tamarix aphylla*	Gen-Tie alternative A-2 (not found on the Proposed Action)

Consistent with BLM guidelines for weed management, a weed risk assessment was conducted for each component that involves soil disturbance and/or alteration of site vegetation. The Cal-IPC rating for risk of spread and consequence of spread follows plant identification.

1. **Asian mustard** (*Brassica tournefortii*) is a winter annual that grows in desert, desert dunes, and coastal scrub. It flowers early and tends to push out native species. Cal-IPC considers this plant highly invasive (Cal-IPC 2006).

   Risk: Asian mustard is rated high for likelihood of spread and moderate for consequence of spread. Spread could occur due to soil disturbance and vegetation cutting that may disperse seeds, as well as vehicle tires and footwear. This species is already widespread throughout the Chuckwalla Valley and other desert regions of southern California and increases in its spread would likely be into areas already supporting this species.

2. **Red Brome** (*Bromus rubens*) invades disturbed areas as well as native habitat. Cal-IPC considers this plant highly invasive (Cal-IPC 2006).

   Risk: Red brome is rated high for likelihood of spread and moderate for consequence of spread. Spread could occur due to soil disturbance and vegetation cutting that may disperse seeds, as well as from vehicle tires and footwear. This species is already widespread throughout the Chuckwalla Valley and other desert regions of southern California and increases in its spread would likely be into areas already supporting this species.

3. **Bermuda grass** (*Cynodon dactylon*) is a creeping perennial that, in native habitats, can out-compete native species, especially in riparian areas. Cal-IPC considers this plant moderately invasive (Cal-IPC 2006).

   Risk: Under the desert conditions present at the Project site and associated transmission line corridors, the rating for consequence of spread for Bermuda grass is low since it is unable to survive in normal dry desert conditions.

4. **Prickley lettuce** (*Lactuca serriola*) grows in disturbed areas. Cal-IPC evaluated this species but did not list it as an invasive species. Although it is not listed by Cal-IPC, it is a non-native species.

   Risk: As prickley lettuce is not listed by Cal-IPC, no risk assessment is required.

5. **Mediterranean grass** (*Schismus* spp.) is an annual grass found in both central and southern California. Cal-IPC considers this plant to have limited invasive potential (Cal-IPC 2006).

   Risk: Mediterranean grass is rated high for likelihood of spread and moderate for consequence of spread. Spread could occur due to soil disturbance and vegetation cutting that may disperse seeds, as well as from vehicle tires and footwear. This species is already widespread throughout the Chuckwalla Valley and other desert regions of southern California and increases in its spread would likely be into areas already supporting this species.

6. **Athel** (*Tamarix aphylla*) tends to be associated with riparian habitats and is less invasive than other tamarisk species**.** Cal-IPC considers this plant to have limited invasive potential (Cal-IPC 2006).

   Risk: Athel was only present on the A-2 Gen Tie Line alternative and is rated moderate for likelihood of spread in the areas of the A-2 Gen-Tie Line alternative, and low for consequence of spread.

2.2.*2* Red Bluff Substation and Related Components

Three non-native weed species are known to occur in the areas that would be occupied by Red Bluff Substation and related components. These species are identified below on Table 4 along with their rating for invasiveness as identified by Cal-IPC.

Consistent with BLM guidelines for weed management, a weed risk assessment was conducted for each component of the Desert Sunlight Project that involve soil disturbance

Table 4. Weeds with potential to be found within SCE Components

Common Name ***Scientific Name***	**Project Components where weed was found**
Asian mustard *Brassica tournifortii*	Throughout all SCE components
Red brome *Bromus rubens*	Throughout all SCE components
Orchardgrass *Dactylis glomerata*	Access road

activities and/or alteration of site vegetation. The risk of spread of the Cal-IPC listed weed species follows plant identification.

1. **Asian mustard** (*Brassica tournefortii*) is a winter annual that grows in desert, desert dunes, and coastal scrub. It flowers early and tends to push out native species. Cal-IPC considers this plant highly invasive (Cal-IPC 2006).

   Risk: Asian mustard is rated high for likelihood of spread and moderate for consequence of spread. Spread could occur due to soil disturbance and vegetation cutting that may disperse seeds, as well as from vehicle tires and footwear. This species is already widespread throughout the Chuckwalla Valley and other desert regions of southern California and increases in its spread would likely be into areas already supporting this species.

2. **Red Brome** (*Bromus rubens*) invades disturbed areas as well as native habitat. Cal-IPC considers this plant highly invasive (Cal-IPC 2006).

   Risk: Red brome is rated high for likelihood of spread and moderate for consequence of spread. Spread could occur due to soil disturbance and vegetation cutting that may disperse seeds, as well as from vehicle tires and footwear. This species is already widespread throughout the Chuckwalla Valley and other desert regions of southern California and increases in its spread would likely be into areas already supporting this species.

3. **Orchardgrass** (*Dactylis glomerata*) is an aggressive perennial that can overrun native grasslands. Cal-IPC considers this plant to have limited invasive potential (Cal-IPC 2006).

   Risk: Under the desert conditions present at the Project site and associated transmission line corridors and access rating for consequence of spread for orchard grass is low since it is unable to survive in normal dry desert conditions.

3.0 Weed Management

3.1 Solar Farm and Gen-Tie Line

Weed management areas will include the Solar Farm site and Gen-Tie Line, and a 30 meter (100 foot) buffer around these areas, to the extent possible without entering private property not owned by the project.

Control measures will be essential to prevent the spread of identified weed species within the Project area. BLM Manual Section 9015 (BLM 1992) states that projects with weeds that have a moderate risk rating should develop preventative management measures. This will apply to Asian mustard and Red brome. Mediterranean grass, while receiving a high rating, is a dominant and widespread annual throughout the Mojave and Colorado Deserts and is unlikely to be controlled easily; however, control methods will be used whenever possible.

Soil disturbed during construction will provide areas for the introduction of invasive species adapted to disturbance. Other areas that are paved, graveled, or covered with a dust suppressant will not provide substrates suitable to vegetation growth. Areas where soil is de-compacted post-construction will also be areas of potential for weed invasion and establishment. Measures to minimize the introduction of new weed species and the spread of existing weed populations by Project personnel and equipment will be used on these areas that may support weed populations.

Preventative measures will be used to discourage weeds from colonizing these areas. If an area is identified (through monitoring – see Section 4.0) where colonization is occurring, containment and control measures will be implemented.

3.1.1 Preventative Measures

General measures to prevent the spread of weed seeds and vegetative reproductive structures (such as rhizomes) and inhibit their germination include the following:

1. Limiting disturbance areas during construction to the minimum needed to perform work.
2. Limiting entrance and exit to defined routes.
3. Maintaining and using vehicle wash and inspection stations and closely monitoring the types of materials brought on site to minimize the potential for weed introduction.

Measures #2 and #3 will apply to both construction and operations & maintenance (O&M) phases of the Project, as appropriate.

During Construction

Risks of weed spread during the course of construction will be addressed with the following measures:

Equipment Cleaning: To prevent the spread of weed species into new habitats, and prior to entering the Project work areas, construction equipment will be cleaned of dirt and mud that could contain weed seeds, roots, or rhizomes. Equipment will be inspected to ensure they are free of any dirt or mud that could contain weed seeds and the tracks, feet, tires, and undercarriage will be carefully washed, with special attention being paid to axles, frame, cross members, motor mounts, underneath steps, running boards, and front bumper/brush guard assemblies. Other construction vehicles (e.g. pick-up trucks) that will be frequently entering and exiting the site will be inspected and washed on an as-needed basis.

All vehicles will be washed off-site when possible. Should off-site washing prove infeasible, an on-site cleaning station will be set up to clean equipment before it enters the work area. Either high-pressure water or air will be used to clean equipment and the cleaning site will be situated away from any sensitive biological resources. If possible, water used to wash vehicles and equipment will be collected and re-used.

Site Soil Management: Soil management will consist of limiting ground disturbance to the minimum necessary for construction activities and using dust suppressants to minimize the spread of seeds. Disturbed vegetation and topsoil will be re-deposited at or near the area from which they are removed to eliminate the transport of soil-borne noxious weed seeds, roots, or rhizomes. Dust suppressants (e.g. water and/or palliative) will be minimized on the site as much as possible, but will use during construction to minimize the spread of airborne weed seeds, especially during very windy days.

Weed-free Products: Any use of hay or straw bales on the Project site will be limited to certified weed-free material. Other products such as gravel, mulch, and soil may also carry weeds and these products, too, will be certified weed-free. If needed, mulch will be made from the local, on-site native vegetation cleared from the Project area. Soil will not be imported onto the Project site from off-site sources.

Personnel Training

Weed management will be part of mandatory site training for all construction personnel and will be included in initial Environmental Awareness training briefings. Training will include weed identification and threat impacts including impacts to local agriculture, vegetation communities, wildlife, and creating fire potential. Training will also cover the importance of preventing the spread of weeds.

3.1.2 Containment and Control Measures

Project development may increase the density of existing weed species in areas of soil disturbance. Because Asian mustard, red brome, and athel occur within the area, the control and suppression of these species will be planned and implemented to keep their populations from spreading or increasing.

These methods will be implemented when Project monitoring (Section 4.0) indicates weeds are spreading. Personnel responsible for weed control will be trained in the proper and safe use of all equipment and chemicals used for weed control.

Mechanical Removal and Herbicides

The Project will use mechanical weed removal methods as its preferred method, but herbicides may be used when conditions (such as wind, proximity of native vegetation) are such that the effect on native species is expected to be minimal. During suppression or eradication activities, care will be taken to have the least affect on native plant species.

Herbicides used will be limited to those approved by the BLM. Currently, only glyphosate compounds such as RoundUp™, a post-emergent herbicide, are recommended by the Desert District of the BLM (Anthony Chavez, personal communication, 2010). Post-emergent herbicides are applied to growing plants. Because they are effective whenever the plant is present, timing is not as critical for these herbicides. It is important, however, that they are applied before the plants flower and set seed.

The Applicant and its contractors will follow the BLM's Herbicide Use Standard Operating Procedures provided in Appendix B of the Record of Decision for the Final Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement (BLM 2007), as applicable, to the Project. These Standard Operating Procedures have been included as an attachment to this report.

Woody Vegetation

The only documented woody invasive weed species encountered during surveys was athel and it was found in very low numbers. If the transmission corridor is not selected then no control efforts will be necessary. If this corridor is selected and monitoring shows spread of athel, then the athel may be controlled by cutting the trees and applying Garlon™ Ultra Herbicide to the stump immediately after cutting. Garlon™ is approved for use on athel by the BLM. All cut material generated during athel clearance will be removed from the site by truck. This material will be covered with a tarp or other material that will keep athel cuttings or seed from being spread by truck movement.

3.2 Red Bluff Substation and Related Components

Weed management areas for SCE will include the Red Bluff substation, the related components, and a 30 meter (100 foot) buffer around these areas.

Control measures will be essential to prevent the spread of identified weed species within the Project area. BLM Manual Section 9015 states that projects with weeds that have a moderate risk rating should develop preventative management measures. This will apply to Asian mustard and red brome.

Soil disturbed during construction will provide areas for the introduction of invasive species adapted to disturbance. Other areas that are paved, graveled, or covered with a dust suppressant will not provide substrates suitable to vegetation growth. Areas where soil is de-compacted post-construction will also be areas of potential for weed invasion and establishment. Measures to minimize the introduction of new weed species and the spread of existing weed populations by Project personnel and equipment will be used on these areas that may support weed populations.

Preventative measures will be used to discourage weeds from colonizing these areas. If an area is identified (through monitoring – see Section 4.0) where colonization is occurring, containment and control measures will be implemented.

3.2.1 Preventative Measures

Preventative measures during construction (including personnel training) would be conducted as described above in Section 3.1.1 for the Solar Farm and Gen-Tie Line Corridor.

3.2.2 Containment and Control Measures

Containment and control measures would be conducted as described above in Section 3.1.2 for the Solar Farm and Gen-Tie Line Corridor, with the exception of woody components because no woody invasive weed species are located within the areas considered for the Red Bluff Substation and related components.

4.0 Long-Term Monitoring and Reporting

BLM Manual Section 9015 states that projects with weeds that have a moderate risk rating should be monitored for at least three consecutive years, including the potential for follow-up weed control. These measures will apply to the full Project area.

4.1 Long-Term Monitoring

Baseline weed conditions will be assessed in the pre-construction phase of the Project, during Project clearance surveys and fence installation using a stratified random sampling technique will be used to identify and count the extent of weeds on the site. Monitoring will take place each year during construction, and annually for three years following the completion of construction. The purpose of annual monitoring will be to determine if weed populations identified during baseline surveys have increased in density or spread as a result of the Project. The period of three years following construction is consistent with BLM guidelines and is likely to cover the annual variation in plant growth due to variation in rainfall and temperatures.

Eradication of the existing weed species is not possible due to their current prevalence in the region. However, the Applicant and SCE are committed to ensuring that their activities do not worsen existing regional conditions. Both spatial and temporal controls, as well as replicates for each type of Project feature, will be incorporated into the monitoring program to qualitatively and quantitatively monitor weed densities associated with the Project.

Control methods will be implemented both proactively and when monitoring identifies the necessity. Measurable weed increases, as well as visually verified increases, will require weed control. This will include even small patches of unusually high density (e.g., concentrations in swales) that are growing as a result of Project activities.

After the three years of operations monitoring is complete, general management and monitoring of the Project area will be conducted by designated site personnel each year during both the germinating and early growing season (November through April) to eliminate new weed individuals prior to seed set. Throughout construction and long-term monitoring, personnel will be trained to identify weedy and native species and work with a trained vegetation monitor to determine where elimination is necessary.

4.1.1 Success Standards

Weed control will be ongoing on the Project site for the life of the Project, but plan success will be determined by BLM after the three years of operations monitoring through the reporting and review process.

Success criteria will be defined as having no more than ten percent increase in a weed species or in overall weed cover in any part of the Project. Thus, some areas may be considered successful at the end of the monitoring period while other components may need additional weed control

and monitoring. Assessments of success on components would be made annually until all components reach these success criteria. Following the approach of baseline surveys, a stratified random sampling technique will be used to identify and count the extent of weeds on the site. If no weed patches or statistically significant elevated weed densities (i.e., increases greater than the margin of error for the original baseline surveys) are detected in the Project area that can be shown to be caused by Project activities, then the plan will be considered successful. Continued monitoring and control, with modified techniques as necessary, will be implemented through an adaptive management process if the plan is not successful after three years.

4.1.2 Adaptive Management - New Weeds

Weeds not identified by field survey or previously reported for the area could colonize the site or site facilities, both during construction as well during operation. The facility owner or appropriate designee during operations will be required to continually update the potential noxious and invasive weed list and provide monitoring and management appropriate to any new species in coordination with the BLM.

4.2 Reporting

Monitoring reports are required by the site owner and/or operator to evaluate monitoring results to determine if success standards are being met, and if not, what adaptive control measures should be implemented and the rationale for the use of these measures.

4.2.1 Construction Reporting

Daily monitoring records will be kept by biological monitors that will include information relevant to invasive weeds. These results will be included in annual reports as discussed below.

4.2.2 Annual Reports

Annual weed monitoring results will be presented in a report prepared following each of these surveys. These annual reports will include the following:

- Summaries of construction monitoring during the years of construction.
- Survey findings on location, type, spatial extent, and density of noxious weeds. These data will include mapping and photographs, as appropriate, as well as textual and tabular data content to fully describe conditions on the Project site.
- Management efforts, including date, location, type of treatment implemented, and results within the Weed Management Areas.
- Ongoing evaluation of success of prevention and control measures.
- Additional control measures implemented and rationale for implementation.
- Any adaptive management techniques used during the reporting period.

Copies of these reports will be kept on file at the site and a copy of each annual report will be sent to the BLM for review and comment.

4.2.3 Final Monitoring Report

After three years of post-construction monitoring and the success criteria has been achieved, a final monitoring report will be produced to describe the outcome of weed management on the Project. This report will be submitted to the BLM for review, which will use the results of this to determine if any additional monitoring or control measures are necessary.

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Attachment: BLM Herbicide Treatment Standard Operating Procedures

APPENDIX B

HERBICIDE TREATMENT STANDARD OPERATING PROCEDURES

APPENDIX B

HERBICIDE TREATMENT STANDARD OPERATING PROCEDURES

This section identifies standard operating procedures (SOPs) that will be followed by the U.S. Department of the Interior Bureau of Land Management (USDI BLM) under all alternatives to ensure that risks to human health and the environment from herbicide treatment actions will be kept to a minimum. Standard operating procedures are the management controls and performance standards required for vegetation management treatments. These practices are intended to protect and enhance natural resources that could be affected by future vegetation treatments.

Prevention of Weeds and Early Detection and Rapid Response

Once weed populations become established, infestations can increase and expand in size. Weeds colonize highly disturbed ground and invade plant communities that have been degraded, but are also capable of invading intact communities. Therefore, prevention, early detection, and rapid response are the most cost-effective methods of weed control. Prevention, early detection, and rapid response strategies that reduce the need for vegetative treatments for noxious weeds should lead to a reduction in the number of acres treated using herbicides in the future by reducing or preventing weed establishment.

As stated in the BLM's *Partners Against Weeds: An Action Plan for the BLM*, prevention and public education are the highest priority weed management activities. Priorities are as follows:

- Priority 1: Take actions to prevent or minimize the need for vegetation control when and where feasible, considering the management objectives of the site.
- Priority 2: Use effective nonchemical methods of vegetation control when and where feasible.
- Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls.

Prevention is best accomplished by ensuring the seeds and vegetatively reproductive plant parts of new weed species are not introduced into new areas.

The BLM is required to develop a noxious weed risk assessment when it is determined that an action may introduce or spread noxious weeds or when known habitat exists. If the risk is moderate or high, the BLM may modify the project to reduce the likelihood of weeds infesting the site, and to identify control measures to be implemented if weeds do infest the site.

To prevent the spread of weeds, the BLM takes actions to minimize the amount of existing non-target vegetation that is disturbed or destroyed during project or vegetation treatment actions (Table B-1). During project planning, the following steps are taken:

- Incorporate measures to prevent introduction or spread of weeds into project layout, design, alternative evaluation, and project decisions.
- During environmental analysis for projects and maintenance programs, assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices.
- Determine prevention and maintenance needs, to include the use of herbicides if needed, at the onset of project planning.
- Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

During project development, weed infestations are prioritized for treatment in project operating areas and along access routes. Weeds present on or near the site are identified, a risk assessment is completed, and weeds are controlled as necessary. Project staging areas are weed free, and travel through weed infested areas is avoided or minimized. Examples of prevention actions to be followed during project activities include cleaning all equipment and clothing before entering the project site; avoiding soil disturbance and the creation of other

soil conditions that promote weed germination and establishment; and using weed-free seed, hay, mulch, gravel, soil, and mineral materials on public lands where there is a state or county program in place.

Conditions that enhance invasive species abundance should be addressed when developing mitigation and prevention plans for activities on public lands. These conditions include excessive disturbance associated with road maintenance, poor grazing management, and high levels of recreational use. If livestock grazing is managed to maintain the vigor of native perennial plants, particularly grasses, the chance of weeds invading rangeland is much less. By carefully managing recreational use and educating the public on the potential impacts of recreational activities on vegetation, the amount of damage to native vegetation and soil can be minimized at high use areas, such as campgrounds and off-highway vehicle (OHV) trails. Early detection in recreation areas is focused on roads and trails, where much of the weed spread occurs.

The BLM participates in the National Early Warning and Rapid Response System for Invasive Plants (Figure B-1). The goal of this System to minimize the establishment and spread of new invasive species through a coordinated framework of public and private processes by:

- Early detection and reporting of suspected new plant species to appropriate officials;
- Identification and vouchering of submitted specimens by designated specialists;
- Verification of suspected new state, regional, and national plant records;
- Archival of new records in designated regional and plant databases;
- Rapid assessment of confirmed new records; and
- Rapid response to verified new infestations that are determined to be invasive.

Herbicide Treatment Planning

BLM Manual 9011 (*Chemical Pest Control*) outlines the policies, and BLM Handbook H-9011-1 (*Chemical Pest Control*) outlines the procedures, for use of herbicides on public lands. As part of policy, the BLM is required to thoroughly evaluate the need for chemical treatments and their potential for impact on the environment. The BLM is required to use only U.S. Environmental Protection Agency (USEPA)-registered herbicides that have been properly evaluated under National Environmental Policy Act (NEPA), and to carefully follow label directions and additional BLM requirements.

An operational plan is developed and updated for each herbicide project. The plan includes information on project specifications, key personnel responsibilities, and communication, safety, spill response, and emergency procedures. For application of herbicides not approved for aquatic use, the plan should also specify minimum buffer widths between treatment areas and water bodies. Recommended widths are provided in BLM Handbook H-9011-1 (*Chemical Pest Control*), but actual buffers are site and herbicide active ingredient specific, and are determined based on a scientific analysis of environmental factors, such as climate, topography, vegetation, and weather; timing and method of application; and herbicide risks to humans and non-target species. Table B-2 summarizes important SOPs that should be used when applying herbicides to help protect resources of concern on public lands.

Revegetation

Disturbed areas may be reseeded or planted with desirable vegetation when the native plant community cannot recover and occupy the site sufficiently.

Determining the need for revegetation is an integral part of developing a vegetation treatment. The most important component of the process is determining whether active (seeding/planting) or passive (natural recovery) revegetation is appropriate.

U.S. Department of the Interior policy states, “Natural recovery by native plant species is preferable to planting or seeding, either of natives or non-natives. However, planting or seeding should be used only if necessary to prevent unacceptable erosion or resist competition from non-native invasive species” (620 Departmental Memorandum 3 2004). This policy is reiterated in the USDI *Burned Area Emergency Stabilization and Rehabilitation* Manual, the BLM *Burned Area Emergency Stabilization and Rehabilitation* Manual (BLM H-1742-1), and the *Interagency Burned Area Rehabilitation Guidebook*.

TABLE B-1
Prevention Measures

BLM Activity	Prevention Measure
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagules to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and public land kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost-effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagules is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site, and ensure that they are weed-free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands. • Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Revegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, uninfested material in a weed-free condition.

TABLE B-1 (Cont.)
Prevention Measures

BLM Activity	Prevention Measure
Revegetation (Cont.)	• Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover revegetation. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). • Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. • Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way (ROW), and other areas of disturbed soils.

In addition to these handbooks and policy, use of native and non-native seed in revegetation and restoration is guided by BLM Manual 1745 (*Introduction, Transplant, Augmentation and Reestablishment of Fish, Wildlife and Plants)*. This manual states that native species shall be used, unless it is determined through the NEPA process that: 1) suitable native species are not available; 2) the natural biological diversity of the proposed management area will not be diminished; 3) exotic and naturalized species can be confined within the proposed management area; 4) analysis of ecological site inventory information indicates that a site will not support reestablishment of a species that historically was part of the natural environment; or 5) resource management objectives cannot be met with native species.

When natural recovery is not feasible, revegetation can be used to stabilize and restore vegetation on disturbed sites and to eliminate or reduce the conditions that favor invasive species. Reseeding or replanting may be required when there is insufficient vegetation or seed stores to naturally revegetate the site.

To ensure revegetation success, there must be adequate soil for root development and moisture storage, which provides moisture to support the new plants. Chances for revegetation success are improved by selecting seed with high purity and percentage germination; selecting native species or cultivars adapted to the area; planting at proper depth, seeding rate, and time of the year for the region; choosing the appropriate planting method; and, where feasible, removing competing vegetation. Planting mixtures are adapted for the treatment area and site uses. A combination of forbs, perennial grasses, and shrubs is typically used on rangeland sites, while shrubs and trees might be favored for riparian and forestland sites. A mixture of several native plant species and types or functional groups enhances the value of the site for fish and wildlife and improves the health and aesthetic character of the site. Mixtures can better take advantage of variable soil, terrain, and climatic conditions, and thus are more likely to withstand insect infestations and survive adverse climatic conditions.

The USDI BLM Native Seed program was developed in response to Congressional direction to supply native plant material for emergency stabilization and longer-term rehabilitation and restoration efforts. The focus of the program is to increase the number of native plant species for which seed is available and the total amount of native seed available for these efforts. To date, the program has focused on native plant material needs of emergency stabilization and burned area rehabilitation in the Great Basin, but is expanding to focus on areas such as western Oregon, the Colorado Plateau, and most recently the Mojave Desert. The Wildland Fire Management Program funds and manages the effort.

The National Seed Warehouse is a storage facility for the native seed supply. Through a Memorandum of

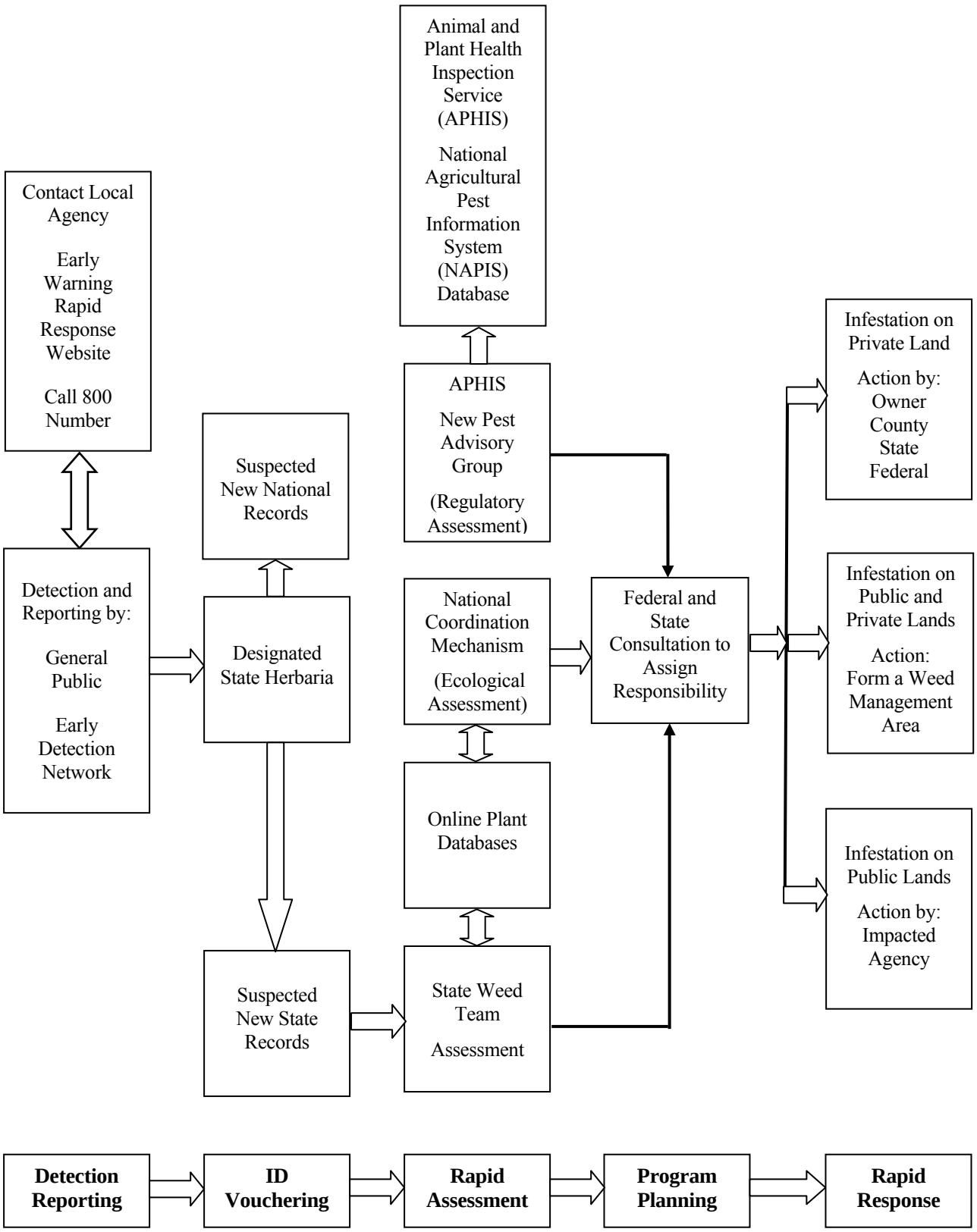

Figure B-1. National Early Warning and Rapid Response System for Invasive Plants.

Understanding with the BLM Idaho State Director, each state (Idaho, Oregon, Nevada, Utah and Colorado) can reserve an annual seed supply for purchase based on a reasonable projection of annual acreage to be stabilized or rehabilitated over a 5-year period.

The Great Basin Restoration Initiative (GBRI) grew out of concern for the health of the Great Basin after the wildfires of 1999. The goal of GBRI is to implement treatments and strategies to maintain functioning ecosystems and to proactively restore degraded ones at strategic locations. Native plants are emphasized in restoration projects where their use is practical and the potential for success is satisfactory. Monitoring is recommended to measure treatment success. To increase the availability of native plants, especially native forbs, the GBRI has established a collaborative native plant project, the Great Basin Native Plant Selection and Increase Project, to increase native plant availability and the technology to successfully establish these plants. This project is supported by funding from the BLM's Native Plant Initiative.

The BLM will follow the following SOPs when revegetating sites:

- Cultivate previously disturbed sites to reduce the amount of weed seeds in the soil seedbank.
- Revegetate sites once work is completed or soon after a disturbance.
- When available, use native seed of known origin as labeled by state seed certification programs.
- Use seed of non-native cultivars and species only when locally adapted native seed is not available or when it is unlikely to establish quickly enough to prevent soil erosion or weed establishment.
- Use seed that is free of noxious and invasive weeds, as determined and documented by a seed inspection test by a certified seed laboratory.
- Limit nitrogen fertilizer applications that favor annual grass growth over forb growth in newly seeded areas, especially where downy brome (cheatgrass) and other invasive annuals are establishing.
- Use clean equipment, free of plants and plant parts, on revegetation projects to prevent the inadvertent introduction of weeds into the site.
- Where important pollinator resources exist, include native nectar and pollen producing plants in the seed mixes used in restoration and reclamation projects. Include non-forage plant species in seed mixes for their pollinator/host relationships as foraging, nesting, or shelter species. Choose native plant species over manipulated cultivars, especially of forbs and shrubs, since natives tend to have more valuable pollen and nectar resources than cultivars. Ensure that bloom times for the flowers of the species chosen match the activity times for the pollinators. Maintain sufficient litter on the soil surfaces of native plant communities for ground-nesting bees.
- Where feasible, avoid grazing by domestic and wild animals on treatment sites until vegetation is well established. Where total rest from grazing is not feasible, efforts should be made to modify the amount and/or season of grazing to promote vegetation recovery within the treatment area. Reductions in grazing animal numbers, permanent or temporary fencing, changes in grazing rotation, and identification of alternative forage sources are examples of methods that could be used to remove, reduce or modify grazing impacts during vegetation recovery.

Special Precautions

Special Status Species

Federal policies and procedures for protecting federally-listed threatened and endangered plant and animal species, and species proposed for listing, were established by the Endangered Species Act of 1973 and regulations issued pursuant to the Act. The purposes of the Act are to provide mechanisms for the conservation of threatened and endangered species and their habitats. Under the Act, the Secretary of the Interior is required to determine which species are threatened or endangered and to issue recovery plans for those species.

Section 7 of the Act specifically requires all federal agencies to use their authorities in furtherance of the Act to carry out programs for the conservation of listed

species, and to ensure that no agency action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat. Policy and guidance (BLM Manual 6840; *Special Status Species*) also stipulates that species proposed for listing must be managed at the same level of protection as listed species.

The BLM state directors may designate special status in cooperation with their respective state. These special status species must receive, at a minimum, the same level of protection as federal candidate species. The BLM will also carry out management for the conservation of state-listed species, and state laws protecting these species will apply to all BLM programs and actions to the extent that they are consistent with Federal Land Policy and Management Act (FLPMA) and other federal laws.

The BLM consulted with the U.S. Fish and Wildlife Service (UFWS) and National Marine Fisheries Service (NMFS) during development of the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS) as required under Section 7 of the Endangered Species Act. As part of this process, the BLM prepared a formal consultation package that included a description of the program; species listed as threatened or endangered, species proposed for listing, and critical habitats that could be affected by the program; and a Biological Assessment (BA) that evaluated the likely impacts to listed species, species proposed for listing, and critical habitats from the proposed vegetation treatment program. Over 300 species were evaluated in the BA. The BA also provides broad guidance at a programmatic level for actions that will be taken by the BLM to avoid adversely impacting species or critical habitat.

Before any vegetation treatment or ground disturbance occurs, BLM policy requires a survey of the project site for species listed or proposed for listing, or special status species. This is done by a qualified biologist and/or botanist who consults the state and local databases and visits the site at the appropriate season. If a proposed project may affect a proposed or listed species or its critical habitat, the BLM consults with the USFWS and/or NMFS. A project with a "may affect, likely to adversely affect" determination requires formal consultation and receives a Biological Opinion from the USFWS and/or NMFS. A project with a "may affect, not likely to adversely affect" determination requires informal consultation and receives a concurrence letter from USFWS and/or NMFS, unless that action is implemented under the authorities of the alternative consultation agreement pursuant to counterpart regulations established for *National Fire Plan* projects.

Wilderness Areas

Wilderness areas, which are designated by Congress, are defined by the Wilderness Act of 1964 as places "where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." The BLM manages 175 Wilderness Areas encompassing over 7.2 million acres.

Activities allowed in wilderness areas are identified in wilderness management plans prepared by the BLM. The BLM does not ordinarily treat vegetation in wilderness areas, but will control invasive and noxious weeds when they threaten lands outside wilderness area or are spreading within the wilderness and can be controlled without serious adverse impacts to wilderness values.

Management of vegetation in a wilderness area is directed toward retaining the natural character of the environment. Tree and shrub removal is usually not allowed, except for fire, insect, or disease control. Reforestation is generally prohibited except to repair damage caused by humans in areas where natural reforestation is unlikely. Only native species and primitive methods, such as hand planting, are allowed for reforestation.

Tools and equipment may be used for vegetation management when they are the minimum amount necessary for the protection of the wilderness resource. Motorized tools may only be used in special or emergency cases involving the health and safety of wilderness visitors, or the protection of wilderness values.

Habitat manipulation using mechanical or chemical means may be allowed to protect threatened and endangered species and to correct unnatural conditions, such as weed infestations, resulting from human influence.

The BLM also manages a total of 610 Wilderness Study Areas (WSAs) encompassing nearly 14.3 million acres. These are areas that have been determined to have wilderness characteristics worthy of consideration for wilderness designation. The BLM's primary goals in WSAs are to manage them so as to not impair their wilderness values and to maintain their suitability for

preservation as wilderness until Congress makes a determination on their future.

In WSAs, the BLM must foster a natural distribution of native species of plants and animals by ensuring that ecosystems and processes continue to function naturally.

Cultural Resources

The effects of BLM actions on cultural resources are addressed through compliance with the National Historic Preservation Act, as implemented through a national Programmatic Agreement (*Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act*) and state-specific protocol agreements with State Historic Preservation Officers (SHPOs). The BLM's responsibilities under these authorities are addressed as early in the vegetation management project planning process as possible.

The BLM meets its responsibilities for consultation and government-to-government relationships with Native American tribes by consulting with appropriate tribal representatives prior to taking actions that affect tribal interests. The BLM's tribal consultation policies are detailed in BLM Manual 8120 (*Tribal Consultation Under Cultural Resource Authorities)* and Handbook H-8120-1 (*Guidelines for Conducting Tribal Consultation).* The BLM consulted with Native American tribes and Alaska Native groups during development of the PEIS. Information gathered on important tribal resources and potential impacts to these resources from herbicide treatments is presented in the analysis of impacts.

When conducting vegetation treatments, field office personnel consult with relevant parties (including tribes, native groups, and SHPOs), assess the potential of the proposed treatment to affect cultural and subsistence resources, and devise inventory and protection strategies suitable to the types of resources present and the potential impacts to them.

Herbicide treatments, for example, are unlikely to affect buried cultural resources, but might have a negative effect on traditional cultural properties comprised of plant foods or materials significant to local tribes and native groups. These treatments require inventory and protection strategies that reflect the different potential of each treatment to affect various types of cultural resources.

Impacts to significant cultural resources are avoided through project redesign or are mitigated through data recovery, recordation, monitoring, or other appropriate measures. When cultural resources are discovered during vegetation treatment, appropriate actions are taken to protect these resources.

TABLE B-2
Standard Operating Procedures for Applying Herbicides

Resource Element	Standard Operating Procedure
Guidance Documents	BLM Handbook H-9011-1 (*Chemical Pest Control*); and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9012 (*Expenditure of Rangeland Insect Pest Control Funds*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides. • Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide product label for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. • Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. • Consider surrounding land uses before aerial spraying. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. • Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations. • Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Clean OHVs to remove seeds.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Air Quality See Manual 7000 (*Soil, Water, and Air Management*)	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).
Soil See Manual 7000 (*Soil, Water, and Air Management*)	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources See Manual 7000 (*Soil, Water, and Air Management*)	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. • Use local historical weather data to choose the month of treatment. Considering the phenology of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. • Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment.
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
Vegetation See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)	• Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for revegetation and restoration projects to compete with invasive species until desired vegetation establishes. • Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Pollinators	• Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment. • Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label.
Wildlife See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. • Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife.
Threatened, Endangered, and Sensitive Species See Manual 6840 (*Special Status Species*)	• Survey for special status species before treating an area. Consider effects to special status species when designing herbicide treatment programs. • Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
Livestock See Handbook H-4120-1 (*Grazing Management*)	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Avoid use of diquat in riparian pasture while pasture is being used by livestock. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Wild Horses and Burros	• Minimize using herbicides in areas grazed by wild horses and burros. • Use herbicides of low toxicity to wild horses and burros, where feasible. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources.
Cultural Resources and Paleontological Resources See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*), and 8270 (*Paleontological Resource Management*) See also: *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act*	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act* and state protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.
Visual Resources See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and manual 8400 (*Visual Resource Management*)	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. • If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Wilderness and Other Special Areas See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)	• Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the "minimum tool" to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation See Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access. • Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.
Social and Economic Values	• Consider surrounding land use before selecting aerial spraying as a method, and avoid aerial spraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. • Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. • Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes and Alaska Native groups to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated pest management program for projects proposing local use of herbicides.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas. • Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of MSDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.