BIOLOGICAL RESOURCES TECHNICAL REPORT
STATELINE SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48669
SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for
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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
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
ESA	Endangered Species Act
GIS	Geographic Information System
MBTA	Migratory Bird Treaty Act
NEMO	Northern and Eastern Mojave Coordinated Management Plan
NEPA	National Environmental Policy Act
ORV	Off-road vehicle
POD	Plan of Development
PV	Photovoltaic
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

SUMMARY

Desert Stateline, LLC has requested a right-of-way grant from the Bureau of Land Management (BLM) to construct and operate a new solar photovoltaic energy generating facility in unincorporated San Bernardino County, California near the interstate boundary of California and Nevada, southwest of Primm (Stateline), Clark County, Nevada (Case File Number CACA-48669). The Solar Farm and associated generation interconnection line are collectively referred to in this report as the Stateline Solar Farm Project (Project). The Project site is located outside the boundaries of an Area of Critical Environmental Concern, Desert Wildlife Management Area, Wilderness Area, or designated Critical Habitat Unit.

This report provides a comprehensive description of methods and results of biological resource surveys and investigations conducted between 2007 and 2012 within the Study Area. The purpose of the surveys was to provide information supporting consultation between BLM, U.S. Fish and Wildlife Service (FWS), and California Department of Fish and Game (CDFG) with respect to the California and Federal Endangered Species Acts, National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Survey standards and recommended protection measures described in this report are consistent with the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects (Renewable Energy Action Team 2010).

Full-coverage surveys for desert tortoise (*Gopherus agassizii*), conducted most recently in 2012, resulted in the documentation of forty-six live tortoises. Observations of active tortoise sign were not evenly distributed throughout the Study Area. Higher concentrations of tortoise sign were evident in upper elevations within the alluvial fan supporting stabilized, rocky soils when compared to the lower reaches of the alluvial fan closer to the dry lakebed where soils consist of much finer sand and silt. Point estimates for three proposed Project alternatives range from 40 to 50 adult desert tortoises.

Two phases of aerial surveys to assess golden eagle occupancy and productivity surveys were conducted within a ten-mile buffer of the Project site in 2010 by the Wildlife Research Institute. Three golden eagles and fifty-five nests were observed within twelve potential territories, seven of which were potentially active. At least one active territory near the Umberci mine was estimated to partially overlap the Project site. Nelson's bighorn sheep (*Ovis canadensis nelsoni*), peregrine falcon (*Falco peregrine*), and prairie falcon (*Falco mexicanus*) were incidentally observed and recorded during the golden eagle surveys. Additional avian point counts and ground-based golden eagle surveys conducted in 2011 and 2012 revealed one nest southwest of Umberci Mine that contained a golden eagle chick in 2011.

Other special status wildlife species observed or having the potential to occur within the Project site included loggerhead shrike (*Lanius ludovicianus*), burrowing owl (*Athene cunicularia*), LeConte's thrasher (*Toxostoma lecontei*), American badger (*Taxidea taxus*), banded gila monster (*Heloderma suspectum cinctum*), pallid bat (*Antrozous pallidus*), small-footed myotis (*Myotis ciliolabrum*), and Townsend's big-eared bat (*Plecotus townsendii*).

Focused botanical surveys resulted in the documentation of eight special status (California Native Plant Society list status) plant species within the Study Area including Mojave milkweed (*Asclepias nyctaginifolia*), small-flowered androstephium (*Androstephium breviflorum*), Parish's club-cholla (*Grusonia parishii*), desert pincushion (*Coryphantha chlorantha*), Utah vine milkweed (*Cynanchum utahense*), Rusby's desert mallow (*Sphaeralcea rusbyi* var. *eremicola*), viviparous foxtail cactus (*Coryphantha vivipara* var. *rosea*) and nine-awned pappusgrass (*Enneapogon desvauxii*). More than 190 species of plants were identified during the surveys. No federal- or state-listed (endangered or threatened) plant species were observed.

1.0 INTRODUCTION

1.1 Purpose

This Biological Resources Technical Report (BRTR) provides a comprehensive description of methods and results of biological resource surveys and investigations conducted between 2007 and 2012 within the Study Area for the Stateline Solar Farm (Project) as proposed by Desert Stateline, LLC. The purpose of the surveys is to support formal consultation between Bureau of Land Management (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). Survey standards and recommended protection measures described in this report are consistent with the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects (Renewable Energy Action Team 2010).

1.2 Site Location

The Project site is located in unincorporated San Bernardino County, California near the boundary of California and Nevada, less than one mile southwest of the town of Primm (Stateline), Clark County, Nevada (Figure 1). The Project site is located west of Interstate 15 and Ivanpah Dry Lake and can be found on the Ivanpah Lake 7.5-Minute U.S. Geological Survey topographic quadrangle. Elevation at the site ranges from approximately 2,600 to 3,280 feet above mean sea level (amsl). The site is located outside the boundaries of an Area of Critical Environmental Concern (ACEC), Desert Wildlife Management Area (DWMA), BLM wilderness area, or USFWS designated critical habitat unit (CHU) for desert tortoise. The Study Area is less than 2 miles west of the Ivanpah Valley DWMA/ACEC and approximately 3.5 miles northwest from the Ivanpah CHU (Figure 2). The Clark Mountain ACEC is approximately 4 miles west of the site. The BLM-designated Stateline Wilderness Area is located less than one mile northwest of the Study Area. The Mesquite Wilderness Area is located immediately west of the Stateline Wilderness Area and located approximately 6 miles west of the Study Area.

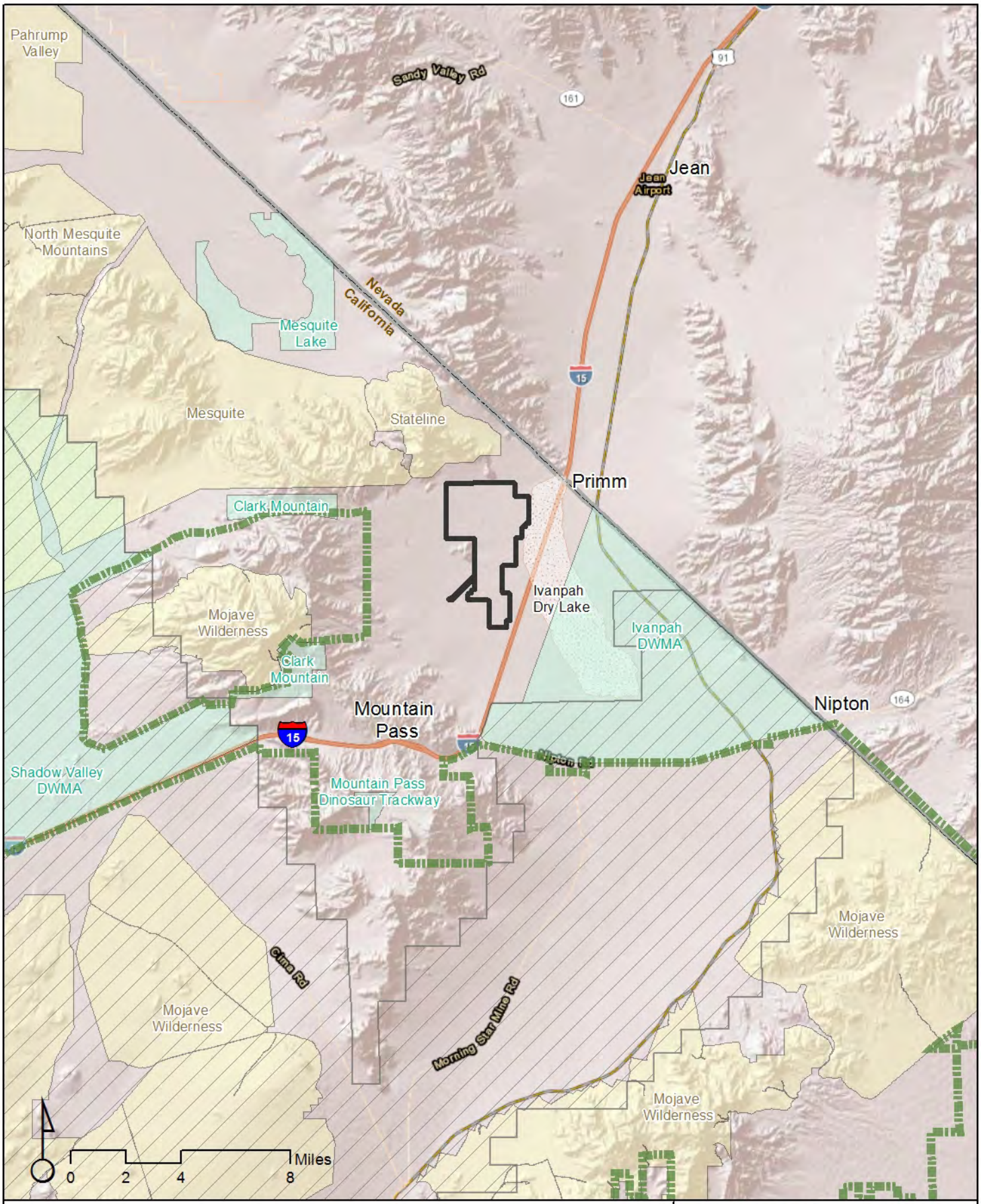
1.3 Site Characteristics

Soils within the Study Area consist primarily of sand and gravel within a broad alluvial fan originating in the Clark Mountain Range. Slopes within the site range from approximately 0 to 5 percent with an eastern aspect. Land uses adjacent to the site are shown on Table 1 below. Human disturbances within the Study Area include moderate levels of off-highway vehicle (OHV) activity, existing utility corridors (i.e., overhead power transmission lines and underground petroleum pipeline) and associated access roads.

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 1
Regional Setting

Ironwood Consulting, Inc. - June 27, 2011



Primary Study Area

Wilderness Area

Desert Tortoise Critical Habitat

BLM Area of Environmental Concern

Mojave National Preserve

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 2
Project Location

Ironwood Consulting, Inc. - June 27, 2011

Table 1 - Adjacent Land Use

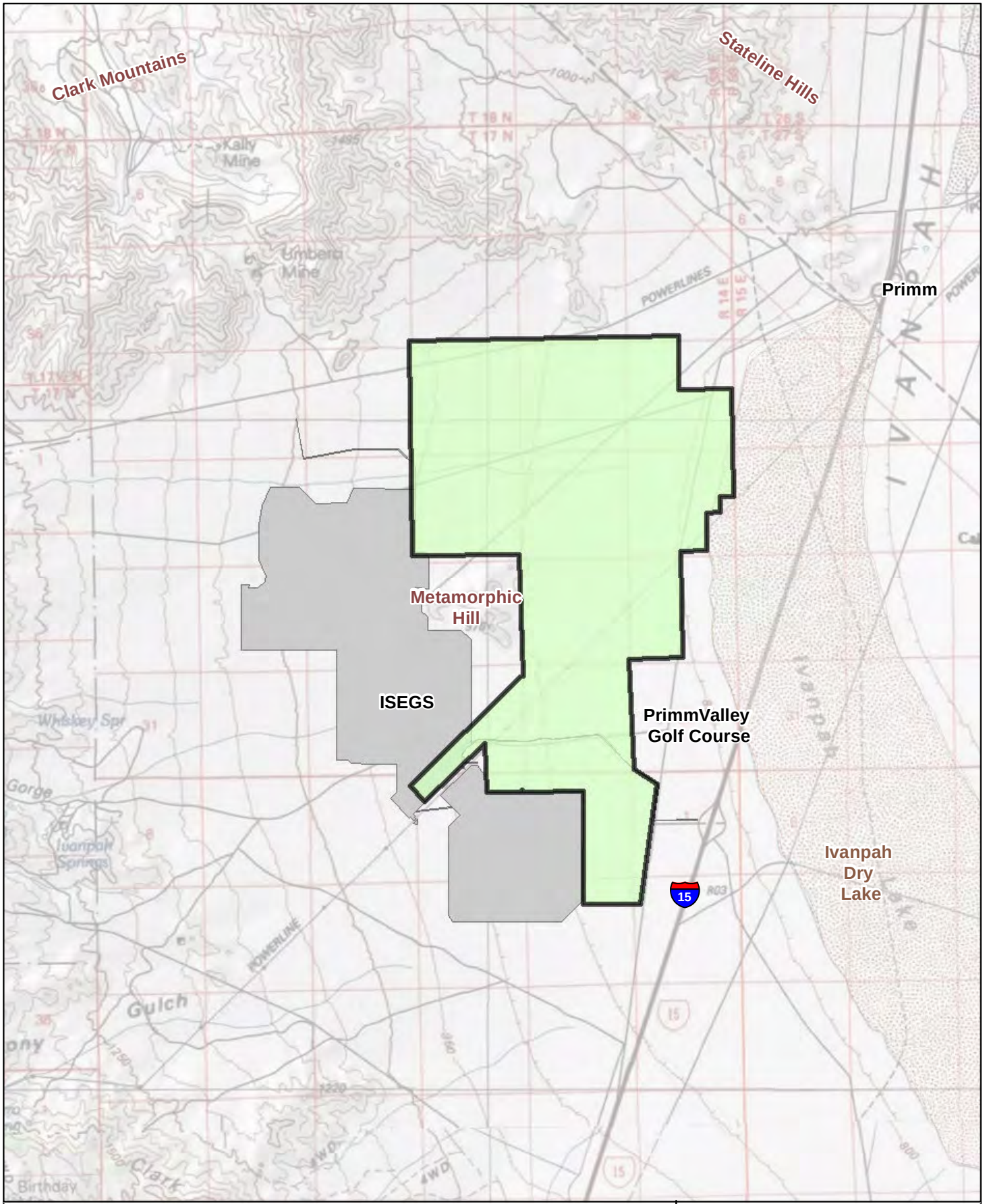
Direction	Land Uses
North	Overhead transmission lines; natural gas pipeline; development associated with Primm, Nevada; Stateline Hills
East	Ivanpah Dry Lake, Primm Valley Golf Course; BLM open space
South	BLM-managed land
West	Metamorphic Hill, Ivanpah Solar Electric Generating Station; BLM-managed land; Mojave National Preserve

1.4 Study Area

For the purpose of this report, Study Areas are defined by the area of land subject to biological resource surveys. The primary Study Area is consistent with the updated SF-299 applications submitted to the BLM on March 15, 2011. The primary Study Area has changed over the previous four years due to refinement of the site layout design alternatives and avoidance of sensitive resources. The Study Area for some species extended beyond the primary Study Area due to large territory sizes (e.g. golden eagles and bat species). Regular coordination between Ironwood Consulting, Inc. (Ironwood) and Desert Stateline, LLC. ensured that all potential disturbance areas were included in the scope of surveys. All Study Areas for the Project encompassed a larger geographic area than the proposed disturbance area resulting from the current site layout alternatives. Survey buffers were applied to Gen-Tie Line to encompass a 1,000-foot wide study corridor. This approach allows 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. Figure 3 provides the boundaries of primary Study Area. The legal description of the primary Study Area is shown in Table 2.

Table 2 - Legal Description of Stateline Primary Study Area

Township	Range	Sections
Solar Farm		
17 N	14 E	13 (NW1/4 , SW1/4, and SE1/4), 14, 15, 22, 23, 24, 25 (NW1/4 and SW1/4), 26 and 35
16 N	14 E	01 (NW1/4 and SW1/4), 02 (NW1/4, NE1/4, and SE1/4), 11 (NE1/4), 03 (NE1/4), and 12 (NW1/4)
Transmission Corridor		
17 N	14 E	34 (NE1/4, SE1/4, and SW1/4)
16 N	14 E	03 (NW1/4)



Stateline Solar Farm Project
Desert Stateline, LLC

Figure 3
Primary Study Area

Ironwood Consulting, Inc. - August 28, 2012

1.5 Project Summary

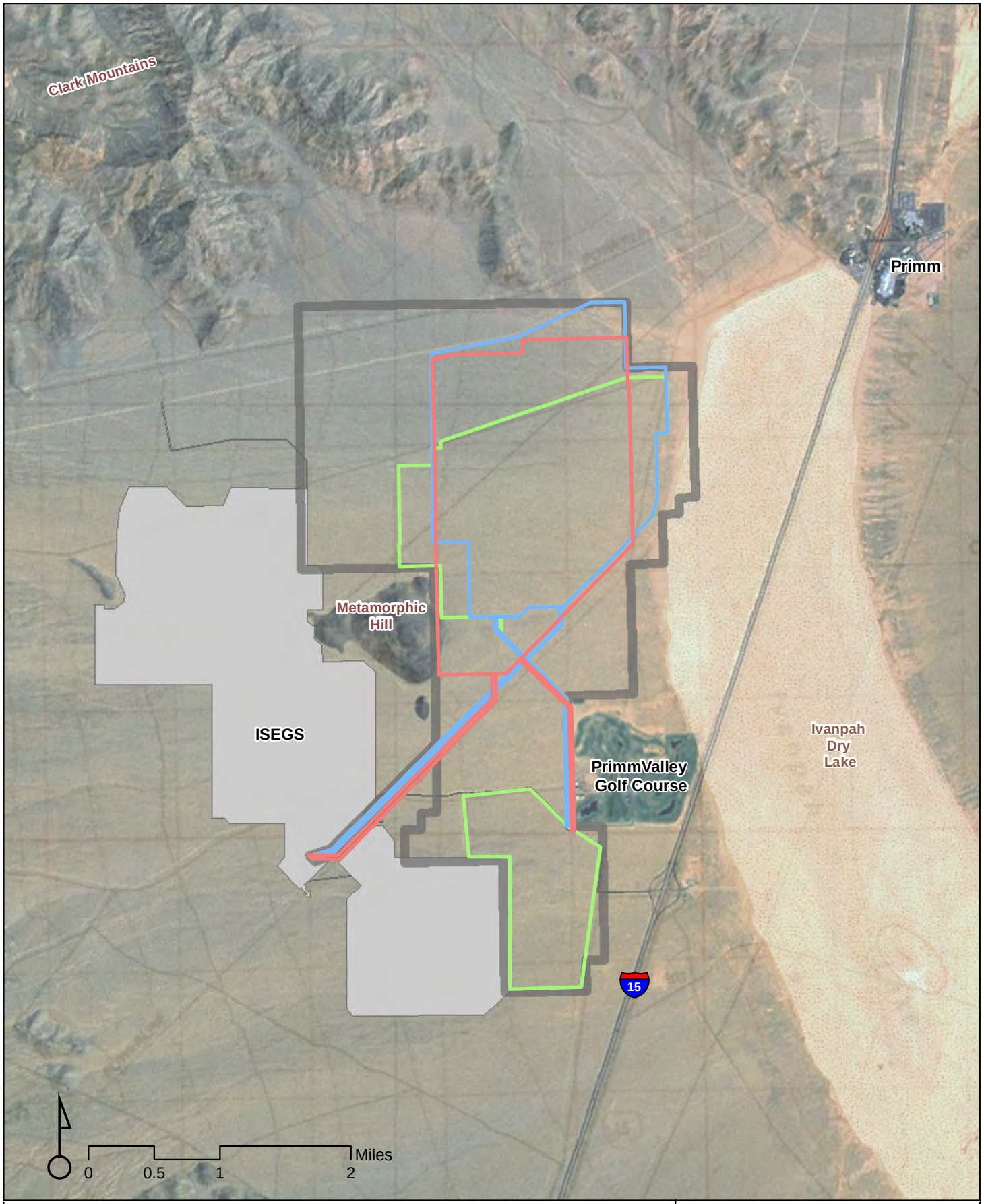
The Project is described in general terms below. Specific details of the Project description are included in other related documents including the Plan of Development (POD). The Project would include a 300-megawatt (MW) alternating current (AC) solar photovoltaic (PV) energy-generating Solar Farm and 220-kilovolt (kV) transmission line (Gen-Tie Line). Since 2008, Desert Stateline, LLC. has refined various alternatives for siting the Solar Farm within the overall project Study Area. Alternatives 1, 2 and 3, which are currently identified for inclusion in the Environmental Impact Statement/Report, have been evaluated in this report (Figure 4).

Alternative 1 would require approximately 2,143 acres of land. This includes 2,114 acres for the Solar Farm (north of the existing transmission line in this area) and the access corridor, and 41 acres for the transmission corridor. The site for Alternative 1 is a single contiguous area of land, with the Gen-Tie Line extending from the southwest corner of the project site to the Southern California Edison (SCE) Ivanpah Substation.

Alternative 2 was developed based on refinements of Alternative 1 to further avoid sensitive biological resources in the northern and northeastern parts of the project study area. The Solar Farm would occupy two separate parcels north and south of the existing transmission corridor. The northern part of the Solar Farm site would avoid, and be located south of, an existing road and water line easement, and would also shift this part of the Solar Farm east compared to Alternative 1. The southern part of the Solar Farm site under Alternative 2 would be southwest of the existing Primm Valley Golf Club, and closer to I-15 and the Yates Well Road interchange. The Solar Farm, Gen-Tie Line, and access roads in Alternative 2 would require approximately 2,403 acres of land.

Alternative 3 was also developed based on further refinements avoid desert tortoise occupied habitat west of Solar Farm near Metaphoric Hill and south of Colosseum Road. The Solar Farm would occupy a single contiguous area of land similar to Alternative 1; however, this alternative would allow for additional buffering from the Ivanpah Solar Electric Generating Station. The additional area between projects would provide additional habitat for resident and translocated desert tortoises between the two projects. The Solar Farm, Gen-Tie Line, and access roads in Alternative 2 would require approximately 2,169 acres of land.

Features common to each alternative include phasing of development, project components, and construction methods. The action alternatives have a common description of equipment, systems, processes, operations, and decommissioning plans. Construction of the Project would be completed in three basic phases: 1) pre-construction activities, 2) site preparation and 3) construction and installation of the solar PV modules and electrical components, including the gen-tie line.



Primary Study Area

Proposed ROW - Alt 1

Proposed ROW - Alt 2

Proposed ROW - Alt 3

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 4
Site Layout Alternatives

Ironwood Consulting, Inc. - August 30, 2012

PV Arrays and Combining Switchgear. The PV modules will be mounted in tables that will connect, via angled brackets, to steel columns that will be driven into the ground. The PV modules will be electrically connected by wire harnesses and combiner boxes that will collect power from several rows of modules and feed the project's Power Conversion System (PCS) via underground direct current (DC) cables. Inverter hardware will be located in each PCS, which will convert the DC electric input into grid-quality AC electric output. A transformer will then step up the voltage of the array for on-site transmission of the power via underground lines to the PV combining switchgear (PVCS), then via overhead lines to the on-site project substation, where the voltage will be stepped up to 220 kV and routed to the Ivanpah substation.

Project Substation. The project substation will be on an approximately 2.5 ac site area that is centrally located within the layouts of Alternatives D and B, and north of the existing transmission lines.

Monitoring and Maintenance Facility. The Operational and Maintenance (O&M) facility, located adjacent to the project substation, will be designed for parts storage, plant security systems, and project monitoring equipment. The OO&M facility will consist of offices, a restroom, and a storage area. The OO&M facility will likely consist of a 45 ft wide by 67 ft long prefabricated building set on concrete slab-on-grade. The building will be approximately 19 ft tall at its highest point. A septic system and leach field, sited south of the O&M facility, will serve the project's sanitary wastewater treatment needs.

Meteorological Station. One or more meteorological stations will be installed prior to construction in order to track weather patterns. The meteorological station(s) will be attached to the data acquisition system (DAS) to collect data for analysis and system monitoring.

Security Guard Facility. The project will include an on-site guard shack at the entrance to the proposed Solar Farm for use by security personnel during project construction and operation. It is expected that the guard shack will be manned 24 hours a day throughout the life of the project or motion sensors will be installed in place of evening security.

Site Security and Fencing. Gates will be installed at the roads entering or exiting the Solar Farm site. Limiting access to the Solar Farm site will be necessary both to ensure the safety of the public and to protect the equipment from potential theft and vandalism. The perimeter of the Solar Farm site will be fenced with an approximately 6 ft tall chain-link fence topped with barbed wire for security purposes. In addition, 6 ft to 7ft chain-link fencing will surround the on-site substation, and 6ft fence around the switching station, O&M facility, and the temporary construction staging areas. The perimeter fence will include desert tortoise exclusion fencing consistent with the project mitigation measures to prevent desert tortoises from entering the Solar Farm site.

Temporary Work Areas. Five temporary construction staging areas will be used within the Solar Farm site during construction of Alternatives D and B. The construction staging areas will occupy a total of approximately 30 ac within the Solar Farm site. An additional approximately 7 ac within the Solar Farm site will be used for temporary construction offices and parking. Temporary construction fencing will

surround these areas. These areas will be used throughout the approximately 2- to 4-year project construction period and then decommissioned.

Roads. Graded all-weather roads will be required in selected locations on the Solar Farm site during construction to bring equipment and materials from the staging areas to the construction work areas. These roads will not be decommissioned after construction but will be used for long-term project operation and maintenance. Approximately 149.5 ac under Alternative B and approximately 179 ac under Alternative D will be used for internal and external access roads during project construction and operation.

Water Use. The project will use no water for electrical power generation. After completion of the construction phase of the project, the only water use will be for domestic purposes (drinking, washing, toilets) in the O&M facility. Water for the construction and operation of the project would be drawn from a combination of up to two different wells within the project study area operated by the Applicant upon receiving an approval for well construction from the County of San Bernardino. The wells will access water within the South Ivanpah Groundwater Basin.

During construction, an estimated total of 1,900 acre-feet (af) of water will be needed for such uses as soil compaction, dust control, and sanitary needs. The majority of the construction water use will occur during the first year of construction. The peak daily water demand is estimated at approximately 1.5 million gallons per day (gpd). During operations, one permanent, approximately 5,000-gallon, aboveground water storage tank will be installed adjacent to the O&M facility. Because of the project's small operating workforce (7 full-time-equivalent workers), water demand will be approximately 20 acre-feet per year (af/yr) or 300 gpd. The tank will also be sized to supply sufficient fire suppression water during operations. If needed, an on-site water treatment system (e.g., a package unit) may be installed to meet the project operation's potable water needs. At this time, up to two production wells and up to three monitoring wells are being proposed to serve the construction and operational needs.

Site Stabilization, Protection, and Reclamation Practices. After Project construction relatively minimal amounts of operations and maintenance activities are required during operations. Access roads and aisle ways would need to be maintained, but the project areas covered by panels can support revegetation. Therefore, the Applicant is exploring options to foster revegetation of the Proposed Solar Farm post-construction. The Applicant is planning to perform field tests of site preparation, revegetation, and restoration techniques in an environment similar to the Project Site. First Solar has previously implemented similar field tests at a non-desert site to explore options for vegetation treatment and restoration. The test program would examine vegetation removal techniques, stabilization during construction, and revegetation during and after construction.

Maintenance Activities. Project maintenance activities generally include all-weather road maintenance; vegetation restoration and management; scheduled maintenance of inverters, transformers, and other electrical equipment; and occasional replacement of faulty modules or other site electrical equipment. The Project's all-weather access roads would be regularly inspected, and any degradation due to

weather or wear and tear would be repaired. The Applicant would apply a dust palliative on dirt access roads. This is expected to be needed only once every two to five years.

Operations Workforce and Equipment. After the construction period, the workforce for O&M and security purposes is estimated to be seven to ten full time workers. Typical work schedules are expected to be during daylight hours only, with the exception of some limited maintenance work required after dark when PV modules are not live and 24-hour on-site security. The expected annual demand for water for sanitary purposes is approximately 12 acre-feet per year.

Only limited deliveries would be necessary for replacement PV modules and equipment during Project operation. Up to 20 daily round trips may be anticipated for workers and deliveries.

Decommissioning. The Project has a minimum expected lifetime of 30 years. When the Project concludes operations, much of the wire, steel, and modules of which the system is comprised would be recycled to the extent feasible. The Project components would be deconstructed and recycled or disposed of safely, and the Proposed Solar Farm could be converted to other uses in accordance with applicable land use regulations in effect at the time of closure. Conditions are likely to change over the course of a Project lifespan 30 years, and a final Decommissioning Plan will be developed in the future prior to facility closure based on conditions as they occur at that time. The reclamation measures provided in the Decommissioning Plan will be developed to ensure protection of the environment and public health and safety and to comply with applicable laws, ordinances, regulations, and standards.

2.0 METHODS

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;
- species of special consideration as referenced in the Northern and Eastern Mojave Coordinated Management Plan (NEMO) and Final EIS (BLM 2002) and Biological Opinion for the NEMO Plan (USFWS 2005);
- 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 Surveys

Prior to conducting site visits, a literature search was performed, which included a review of regional documents including the NEMO Plan / Final EIS and Biological Opinion. A search of the CDFG's California Natural Diversity Data Base (CNDDB) and the California Native Plant Society's Electronic Inventory (CNPSEI) were conducted to determine special status species that have been documented in the project region. These searches included a 5-mile radius surrounding the full Study Area. Preliminary surveys of the Study Area were conducted on 8 January 2007 by Kathy Simon and Kent Hughes and 14 June 2007 by Chris Blandford of 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 were conducted during the 2007 preliminary site visits. After the 2007 preliminary surveys, environmental documents that included extensive biological survey information became available for two nearby proposed renewable energy projects, the BrightSource Ivanpah Solar Generation Station and the NextLight Silver State Solar Energy Project. These reports were reviewed to determine whether any special status species found during surveys of those project sites might be relevant to Stateline Project (BrightSource 2007; Sycamore 2010). 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. The generated list was refined through coordination with the BLM Needles Field Office (personal communication, Sullivan 2007).

2.3 Desert Tortoise Focused Surveys

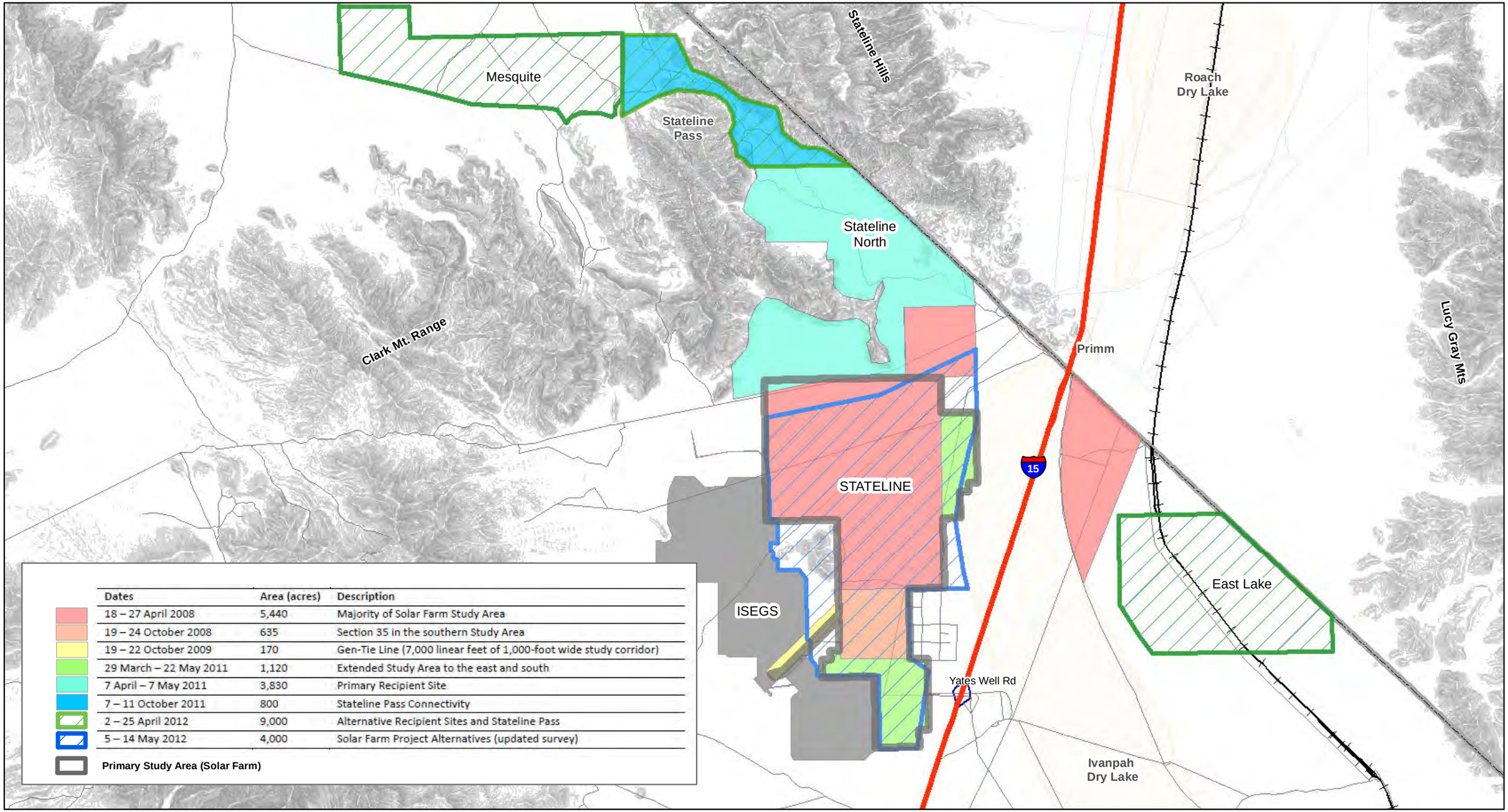
Full-coverage protocol desert tortoise surveys were conducted from 2008 to 2012 (Table 3 and Figure 5). In the spring of 2009, and again in 2010, the USFWS issued revised survey protocols (USFWS 2010a). The full coverage survey option described in the revised protocols was unchanged from the previous protocol (USFWS 1992a). As previously noted, the Study Area was delineated to be larger than the anticipated action area to allow for flexibility in site layout design. The revised protocols also provided methods to estimate the abundance of tortoises occurring within the action 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. Desert tortoise focused surveys were conducted by Ironwood biologists and independent biological contractors during each survey effort .

Table 3 - Full-Coverage Desert Tortoise Survey Periods and Area

Dates	Area (acres)	Description
18 – 27 April 2008	5,440	Majority of Solar Farm Study Area
19 – 24 October 2008	635	Section 35 in the southern Study Area
19 – 22 October 2009	170	Gen-Tie Line (7,000 linear feet of 1,000-foot wide study corridor)
29 March – 22 May 2011	1,120	Extended Study Area to the east and south
7 April – 7 May 2011	3,830	Primary Recipient Site
7 – 11 October 2011	800	Stateline Pass Connectivity
2 – 25 April 2012	9,000	Alternative Recipient Sites and Stateline Pass
5 – 14 May 2012	4,000	Solar Farm Project Alternatives (updated survey)

The survey crew consisted of experienced desert tortoise surveyors and 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 (personal communication LaPre 2008 to 2012). The larger survey crew was divided into smaller crews of approximately 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 until the entire surveyed portion of the Study Area was covered.

All tortoise sign [e.g., live tortoises (all age classes), 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 4. 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 Geographic Information Systems (GIS) to determine approximate abundance and distribution of desert tortoise.



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Primary Study Area (Solar Farm)

0 1 2 4 Kilometers

Stateline Solar Farm Project
Desert Stateline, LLC
Figure 5
Desert Tortoise Full-Coverage Surveys

Ironwood Consulting, Inc. - August 30, 2012

All records of live desert tortoise will be submitted to the CDFG's California Natural Diversity Database (CNDDB). Due to the volume of data, observations will be submitted to the CNDDB in ESRI ArcGIS shapefile format with relevant metadata and attribute information consistent with the fields found on the California Native Species Field Survey Form.

Table 4 - 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 [excellent], 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 from 2008 to 2012 (Figure 5). 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. 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 Surveys

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 Botanical Study

Surveys were performed to determine the presence and distribution of special status plant species and estimates of succulent species (cacti and yucca) within the Study Area. Vegetation sampling was also performed under the baseline survey effort as described in Section 2.8.

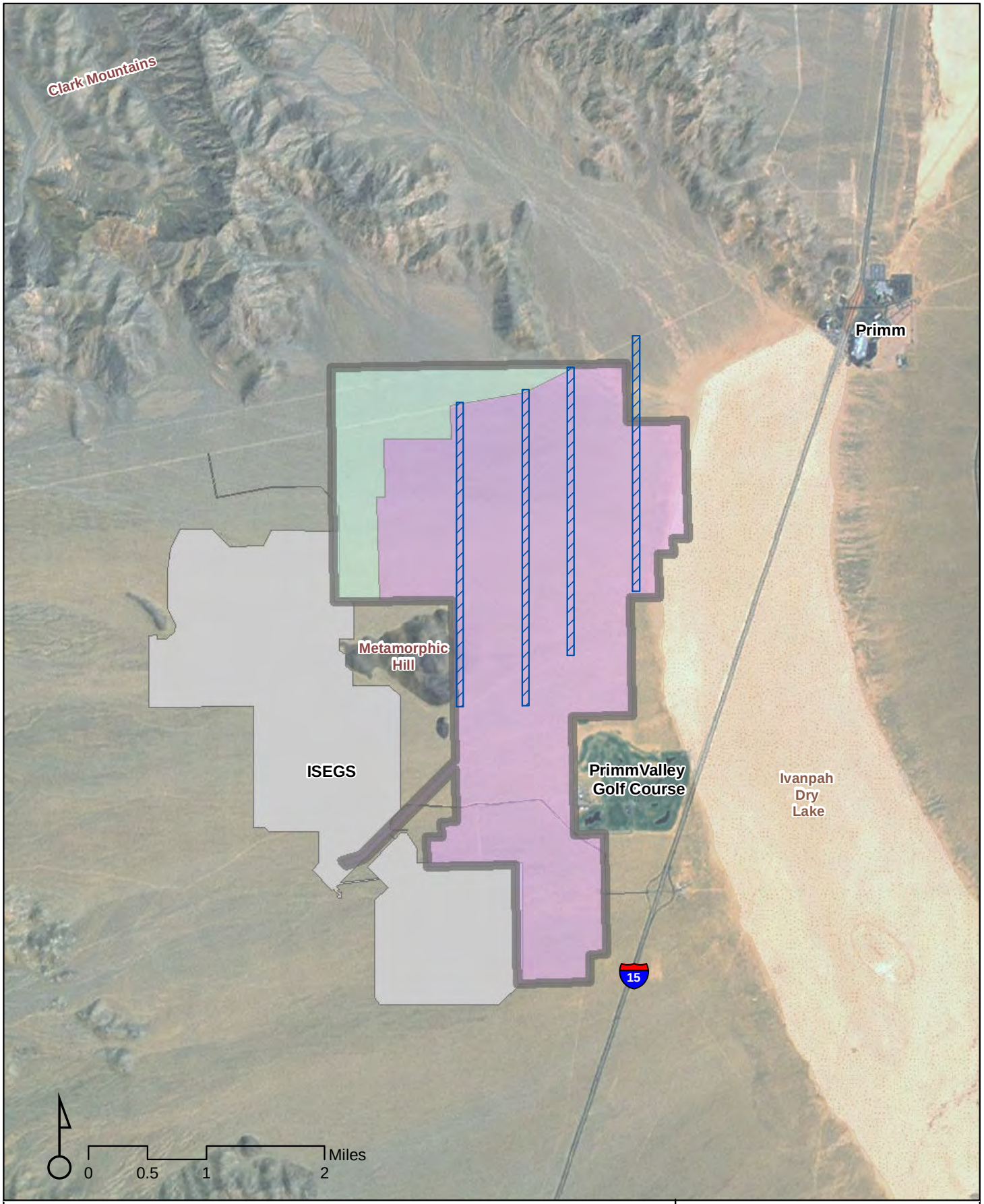
2.6.1 Special Status Plant Species

Surveys were performed to maximize the likelihood of locating special status plant species or special status natural communities within the primary Study Area (Figure 6). The primary objective was to identify all plant species within the primary 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).

All survey periods were scheduled to coincide with the primary blooming period for targeted special status species. Four surveys efforts were performed separately in 2008, 2010, 2011 and 2012 with the majority of the Study Area surveyed in 2010.

The initial surveys in spring (March 23; April 3, 4, 10, and 17; May 1 and 9) and fall (September 23; October 1 and 9) of 2008 were conducted following the intuitive controlled survey method, which is suitable for large areas and highly skilled investigators (BLM 2009). A team of experienced botanists led by Kent Hughes and Jim Andre performed multiple field visits when target species were most identifiable. The field botanists conducted meandering pedestrian transects throughout the entire project site. A complete survey was conducted in habitats with the highest potential for supporting the target species. Subsequently, surveys were focused in Sections 12, 14, and 15 within the upper alluvial fan, which contained stabilized rocky soils and higher plant diversity than lower regions of the alluvial fan where diversity was substantially lower.



Primary Study Area

Full-Coverage Surveys (2010-2012)

Intuitive Controlled Surveys (2008)

Cactus and Yucca Sampling Area (80m wide)

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 6
Botanical Study Area

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All plant species observed during the surveys were identified and recorded. The location of each special status plant species was recorded on a Garmin 60CSx GPS unit. For some species (e.g., *Coryphantha chlorantha*) that occurred in small groups, one GPS record was created and the numbers of individual plants were recorded in the botanist's notes. All recorded data were incorporated into GIS and Minimum Convex Polygons (MCPs) areas were calculated using XTools Pro 7.0 to estimate area of occupied habitat.

The subsequent survey efforts were performed from April 14 to May 9, 2010 (approximately 3,800 acres), April 10 to 18 and May 27 to 28, 2011 (approximately 1,120 acres), and May 11 to 12, 2012 (approximately 260 acres). The survey team included personnel familiar with the identification of flora in the Mojave 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 (personal communication LaPre 2008 to 2012). 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. The survey crews also recorded all live tortoises and active burrows encountered during the special status plant surveys.

2.6.2 Cacti and Yucca

Systematic sampling of succulents (cacti and yucca) was conducted in spring of 2012 by botanists experienced with Mojave Desert flora. The purpose of this sampling effort was to estimate the number of individual cacti and yucca present. The survey crew walked over 125 kilometers of transects (equal to over 300 acres of coverage) in the north-south direction across four elevation cross sections (Figure 6). All species of cactus were documented and cumulative counts of the number of individual cacti were recorded. The resulting density of cacti within the sampling area was used to extrapolate estimates for project alternatives.

2.7 Rainfall Analysis

Measurements of total and average precipitation during winter periods (October through March) are important in determining the efficacy of both desert tortoise and special status plant surveys. Per the USFWS desert tortoise protocol, data was obtained from the Western Regional Climate Center (2011). The Mountain Pass Cooperative Observer Program (COOP) weather station (elevation above 4,700 ft and approximately 10 miles southwest of the Study Area) is the most proximate station to the Study

Area; however, rainfall data is not available after 1997. Subsequently, monthly precipitation totals were obtained from the two next closest weather stations providing current data: Horse Thief Springs California Remote Automated Weather Stations (RAWS) (elevation 5,000 ft and approximately 26 miles northwest of the Study Area) and Mid Hills California RAWS (elevation 5,413 ft and approximately 28 miles south of the Study Area). These stations occur at elevations approximately 2,000 feet greater than the Study Area, which may not be ideal indicators of rainfall within the Ivanpah Valley. The next closest weather station is located in Searchlight, Nevada (elevation 3,540 ft and approximately 30 miles east of the Study Area). Although the Searchlight station is slightly further from the Study Area, it is located at a similar elevation.

Rainfall data derived from the Searchlight and Mountain Pass stations were utilized in a previous desert tortoise study within Ivanpah Valley, which indicated a long term average of total monthly winter rainfall between 1961 and 1996 of 4.1 inches (Christopher et. al 1999). Available historical winter rainfall data from Searchlight and Mountain Pass was summarized to obtain a useful average for the Ivanpah Valley (Table 5).

Table 5 - Historical Winter Rainfall Data[1] (inches)

	October	November	December	January	February	March	Total	Monthly Average
Searchlight[2]	0.94	0.97	0.78	0.52	0.43	0.80	4.44	0.74
Mountain Pass[3]	0.54	0.68	0.63	0.92	0.89	0.89	4.55	0.76
Mean	0.74	0.83	0.71	0.72	0.66	0.85	4.50	0.75

[1] Western Regional Climate Center (2012)
[2] Range of data from 1931 to 2011
[3] Range of data from 1955 to 1997

Due to the absence of rainfall data for the Mountain Pass station since 1997, data obtained from the Horse Thief Wash and Mid Hills stations were used as a surrogate for recent year averages. Total winter rainfall data from Searchlight, Horse Thief Wash, and Mid Hills from the previous six winter periods were tabulated separately, provided in Appendix A, and were then averaged (Table 6).

Table 6 - Recent Winter Rainfall Data[1] (inches)

	October	November	December	January	February	March	Total	Monthly Average
2005-2006	1.79	0.00	0.03	0.24	0.42	1.44	3.92	0.65
2006-2007	1.08	0.32	0.58	0.91	0.67	0.02	3.58	0.60
2007-2008	0.25	0.63	1.01	1.06	0.50	0.09	3.53	0.59
2008-2009	0.02	0.91	0.85	0.14	1.59	0.03	3.53	0.59
2009-2010	0.00	0.06	1.12	2.80	1.91	0.36	6.25	1.04
2010-2011	1.67	0.27	7.45	0.05	1.29	0.50	11.23	1.87
2011-2012	0.37	0.38	0.26	0.35	0.07	0.28	1.72	0.29

[1] Western Regional Climate Center (2012): Searchlight, Mid Hills, and Horse Thief Wash Stations

The historical average rainfall for Ivanpah Valley during the winter months was estimated to be 0.75 inches. By comparison, below-average winter rainfall occurred from 2005 to 2009. This four-year period was characterized by gradually decreasing rainfall for each subsequent year. Winter rainfall was above average from 2009 to 2011, with the highest amount of rainfall occurring during the most-recent winter of 2010-2011. The 2011-2012 winter months were substantially well below average.

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 associated with the Project site.

2.8.1 Selection of Sampling Stations

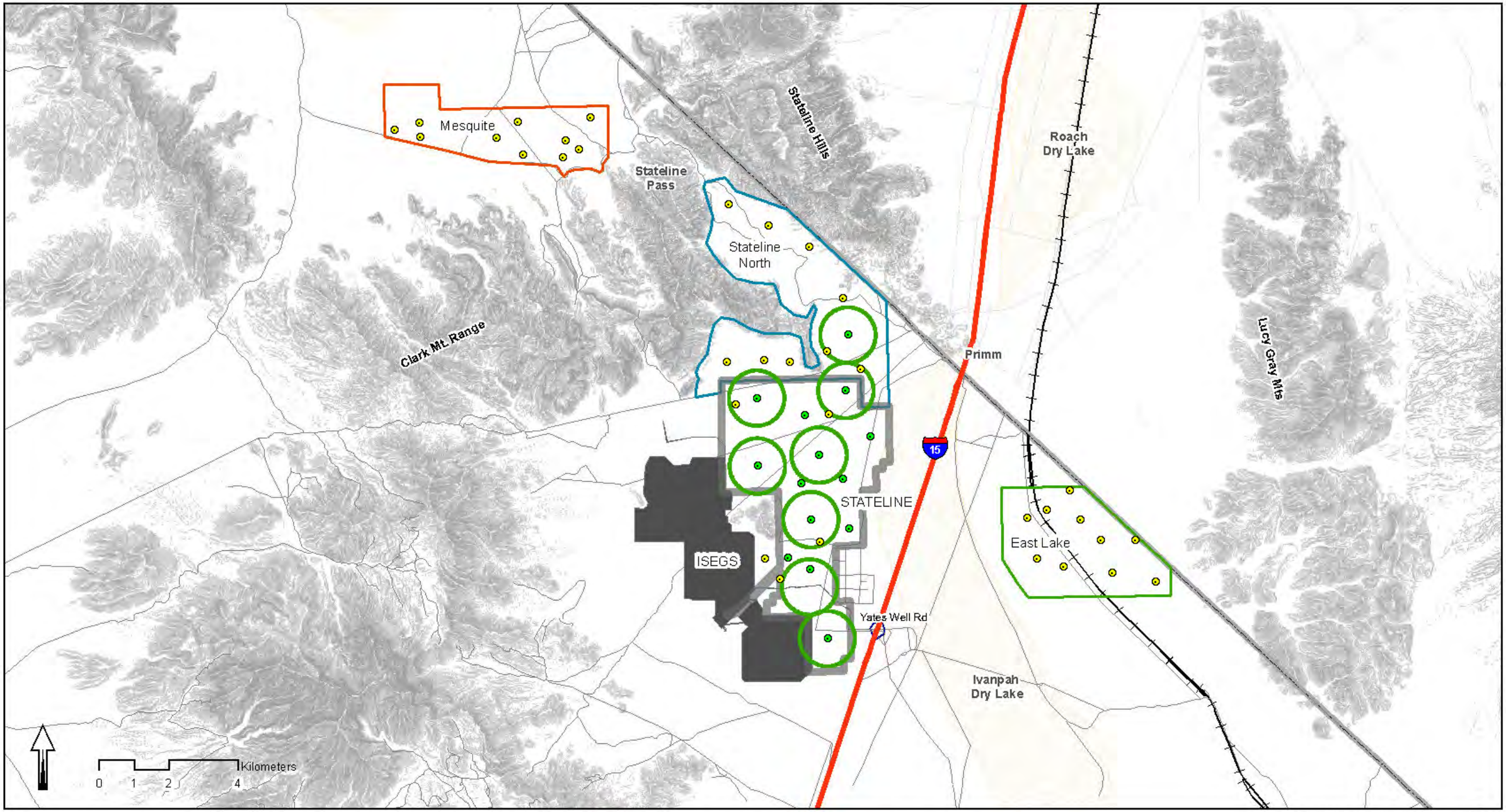
Fourteen primary sampling stations (vegetation, avian, and small mammal sampling), and forty additional sampling stations (vegetation only) were established (Figure 7). Sampling stations were systematically generated to obtain a sufficient representation of the area. The point for each sampling location represented the center or corner point of larger linear transects or grids depending on the specific methodology.

2.8.2 Vegetation Sampling

Vegetation sampling was conducted at all sampling stations during the peak of the blooming season in spring. In 2020, 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. In 2012, line-intercept transects were conducted to obtain quantitative data on vegetative structure and substrate composition. Two 100-meter transects were conducted per station (Canfield 1949). Perennial plant species including shrubs and succulents were recorded. Annual plant species were recorded using a 20 by 50 cm Daubenmire plot placed every ten meters along each transect line (Daubenmire 1959). Soil type and substrate class were described at each corner of the Daubenmire plots according to a soil texture triangle (Thien 1979).

2.8.3 Avian Point Counts

Bird point counts were conducted at all sampling locations during the month of April in 2010, 2011, and 2012. 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 fifty-six 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.



Primary Study Area (Solar Farm)

Baseline Sampling Station - vegetation, avian, and small mammal

Baseline Sampling Station - vegetation only

Baseline Sampling Station - golden eagle point count

Stateline Solar Farm Project
Desert Stateline, LLC
Figure 7
Baseline Sampling Stations

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2.8.4 Small Mammal Surveys

Trapping grids were established at all sampling locations from April 29 to 30, 2010 and May 2 to 5, 2011. 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.

2.9 Golden Eagle Surveys

2.9.1 Aerial Surveys

Surveys to assess golden eagle occupancy and productivity were conducted in 2010 by the Wildlife Research Institute (WRI). Prior to conducting golden eagle occupancy surveys of the Study Area, WRI contacted BLM to request data (historic records and reports) pertaining to golden eagle in the vicinity of the Study Area. Data provided by BLM was used to refine and improve survey focus.

WRI conducted helicopter surveys of the Study Area and associated 10-mile buffer on May 7 and 8, 2010 (Phase 1) and June 14, 2010 (Phase 2). Helicopter survey teams consisted of two golden eagle biologists and a helicopter pilot. Survey protocols were designed to comply with current USFWS Golden Eagle Inventory and Monitoring Protocols (USFWS 2010b). Phase 1 aerial transects concentrated on habitats likely to support golden eagle nesting, with in flight transect modifications made in response to terrain. Phase 1 surveys were conducted in an effort to confirm reproductive activity and ensure mountainous areas with intricate canyons were thoroughly investigated. Phase 2 surveys were focused on revisiting potentially active territories identified during Phase 1 surveys. During both Phase 1 and Phase 2 aerial transects, nest sites and other location-specific data were recorded using hand-held GPS units, with supplemental field notes documenting species and corresponding to each recorded waypoint. A total of 32 person-hours were logged during the Phase 1 survey with an additional 17 person-hours logged during Phase 2 surveys.

During both Phase 1 and Phase 2 surveys, two optically-stabilized zoom cameras were used to capture high-resolution, wide-angle and close-up, digital photographs of active and inactive golden eagle nests, other raptor nests, and significant wildlife species. Collected digital images were used to confirm species identification, nest condition, nest activity, nest occupation, and nest arrangement (WRI 2010). An active nest was defined as supporting evidence of new material having been added during the season and typically included the use of yucca, grasses and mosses in the construction of a bowl, used for incubation. An active nest may or may not have been occupied by a golden eagle (e.g., an incubating female or a young bird) at the time of survey. An occupied nest was defined an active nest in which an adult or young golden eagle, or a new egg, has been observed during the survey.

2.9.2 Seasonal Point Counts

Golden eagle point count surveys were conducted during each season (winter, spring, summer and fall) starting in spring of 2011 at eight sampling stations (Figure 7). These surveys will be repeated during each season through winter of 2012/2013. Two surveys were conducted at each station. Compared to the previously mentioned avian point count methodology employed under the baseline sampling study (Section 2.8.3), the golden eagle point counts included increased point count frequency and increased survey radius, per the recommendations in the Draft Eagle Conservation Plan Guidance (USFWS 2011a). The USFWS guidance recommends non-overlapping radii of 800 meters. To avoid overlapping sampling areas, eight of the original fourteen baseline sampling stations were surveyed. Each station was surveyed at 30-minute intervals during each visit. All bird species within 800 meters of the center point were recorded. Eagle flight activity located more than 175 meters above ground was recorded, but separated from all other data. Approximate flight paths and heights of eagles plus notes on general behavior and activity were recorded. Behavior that is noted during each 1-minute interval was recorded as either soaring flight, flapping-gliding, kiting-hovering, stooping or diving at prey, stooping or diving in an agonistic context with other eagles or other bird species, being mobbed, undulating/territorial flight, or perched. All observations of foraging were documented and referenced on a map or by GPS coordinates.

2.9.3 Ground-Based Nest Monitoring

Two territories (Umberci Mine and Keany Pass) consisting of two active golden eagle nests were identified in 2010 within the Clark Mountains located approximately two miles from the primary Study Area. Ground-based surveys of these territories were conducted during the breeding season in 2010, 2011, and 2012. Surveys stations were established where the biologist could view nests and watch for eagle activity through binoculars and a spotting scope. All incidental bird observations made during these surveys were recorded.

2.10 Raptor Nest Surveys

Project-specific surveys for raptor nests were conducted in April 2012. These surveys included inspecting all potential structures and trees in the Project vicinity for the presence of raptor nests. Due to the lack of trees within the Study Area, most structures with the potential to support nesting raptors were associated with existing transmission lines.

2.11 Raven Surveys

Several methods were useful in approximating the existing abundance of common ravens within the Project Action Area, including those conducted by Ironwood Consulting during focused desert tortoise surveys and point count sampling, as well as Wildlife Research Institute (WRI) during aerial surveys for golden eagles. Ravens were also observed during general avian point counts and golden eagle point counts as described in Sections 2.8.3 and 2.9.2. Point counts will continue seasonally and results will be added to the baseline dataset. Nest surveys along roads where structures exist that provide suitable

nest sites were conducted in 2012 to identify active and inactive nests. Additionally, focused surveys for desert tortoise included the documentation of all incidental observations of ravens. Immediately prior to construction (within 30 days of ground disturbance), biological monitors will conduct a road survey within the Project site and on all roadways within six miles to determine the status and location of existing raven subsidies. These data will add to the continued baseline information on raven presence.

2.12 Bat Surveys

A bat assessment was performed by Patricia Brown, Ph.D. (Brown-Berry Biological Consulting) on May 14, 2010 to assess potential bat habitat within the full Study Area. 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.

Acoustic monitoring was conducted on July 28 and 29, 2010 and from May 14 to 16, 2011 to determine which bat species utilize the Study Area. Ultrasonic detectors (i.e., Anabat II and 1A) recorded echolocation signals overnight in thirteen locations in different areas of the Study Area to identify bat species and document general activity levels.

Roost surveys were conducted of rock shelters and mines in the mountains adjacent to the project area during the day and at night for evidence of bats and guano. The Umberci Mine (located approximately 1.5 miles northwest of the Study Area) was visited several times to census the species and numbers of bats present. Occupied mines were monitored at dusk by surveyors with night vision equipment to obtain accurate exit counts. The surveyors kept two counts for at least sixty minutes after the first bat exited of how many bats entered and exited the mines. Video cameras with auxiliary infrared lights were used to remotely monitor mines and to obtain permanent records of exiting bats.

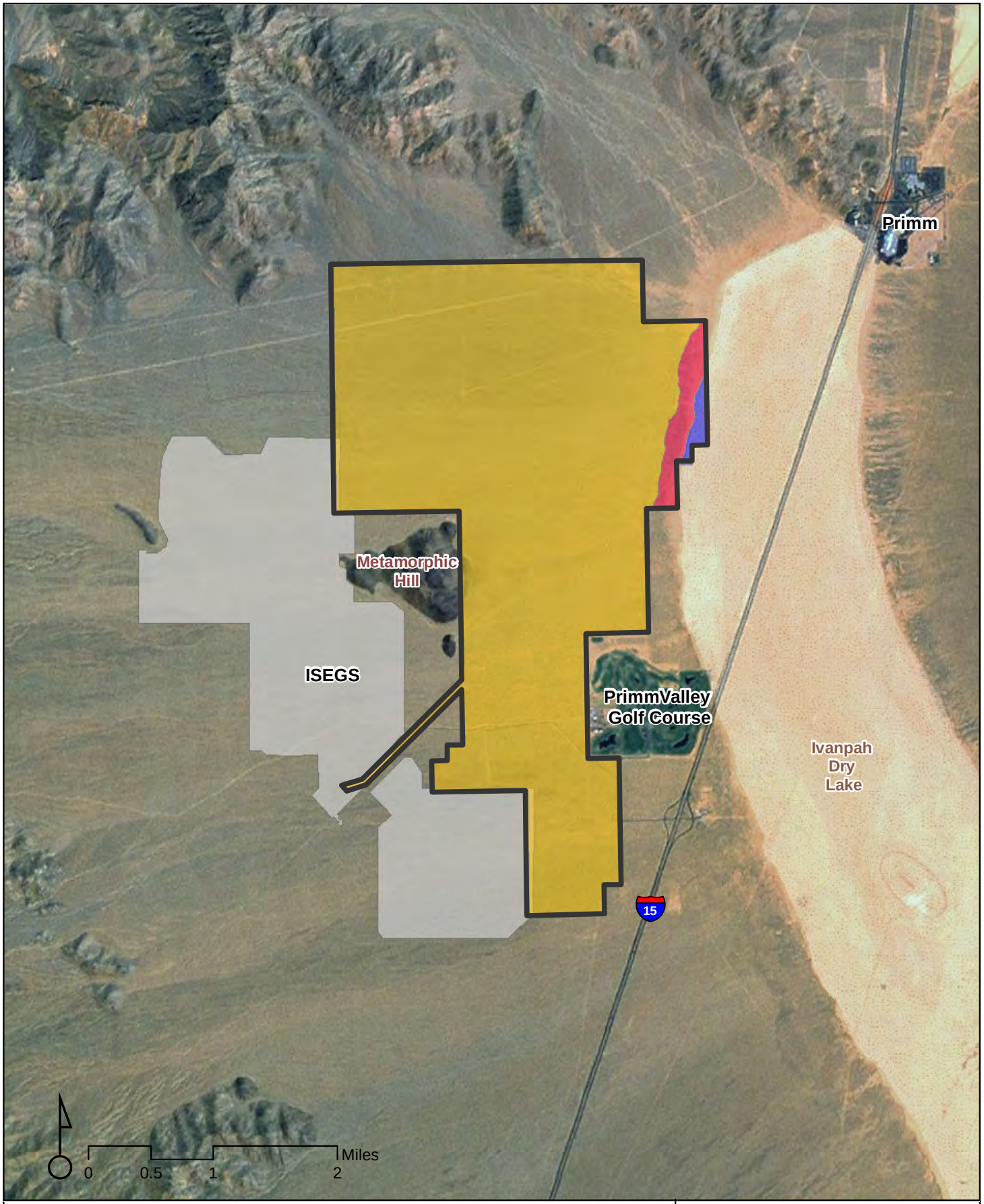
3.0 RESULTS

3.1 Vegetation Communities

The Study Area supports two macro vegetation communities: Creosote Bush-White Bursage Series (Sawyer and Keeler-Wolf 1995; analogous to Holland's Mojavean Creosote Bush Scrub, 1986) and Mixed Saltbush Series (Sawyer and Keeler-Wolf 1995; analogous to Holland's Alkali Desert Scrub, 1986) (Figure 8). Plant species typical of Creosote Bush-White Bursage Series found in the Study Area include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), wirelettuce (*Stephanomeria pauciflora*), cheesebush (*Ambrosia salsola*), beavertail cactus (*Opuntia basilaris*), barrel cactus (*Ferocactus cylindraceous*), Mojave yucca (*Yucca schidigera*), and Nevada ephedra (*Ephedra nevadensis*). Within this community, plant diversity was observed to be higher within the rocky terrain of the stabilized alluvial fan, which occurred in the higher elevations (generally above 2,500 feet) within the northern- and southern-most extents of the Study Area. The eastern extent of the Study Area borders Ivanpah Dry Lake and supports Mixed Saltbush Series. This community is situated within a relatively narrow band that begins at the edge of the non-vegetated dry lake and extends to the west approximately 800 feet. The dominant plant species occurring in this community include cattlespinach (*Atriplex polycarpa*), four-wing saltbush (*Atriplex canescens* ssp*. canescens*), and wheelscale (*Atriplex elegans*). More than 190 species of plants were identified within Study Area during the surveys (Appendix B).

3.2 Wildlife Communities

All wildlife species observed or detected within the Study Area are listed in Appendix B. Wildlife observed within the Study Area were representative of the northeastern Mojave Desert. Bird species common to the Study Area, listed in order of most-to-least frequently observed during the surveys, included black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), brewer's sparrow (*Spizella breweri*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Carpodacus mexicanus*), and ash-throated flycatcher (*Myiarchus cinerascens*). Reptile species common to the Study Area, listed in order of most-to-least frequently observed during the surveys, included western whiptail (*Cnemidophorus tigris*), side-blotched lizard (*Uta stansburiana*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), long-nosed leopard lizard (*Gambelia wislizenii*), and desert horned lizard (*Phrynosoma platyrhinos*). The most common mammal species observed was black-tailed jackrabbit (*Lepus californicus*) and small mammals observed during baseline sampling included long-tailed pocket mouse (*Chaetodipus formosus*), Merriam's kangaroo rat (*Dipodomys merriami*), desert woodrat (*Neotoma lepida*), spiny pocket mouse (*Perognathus spinatus*), little pocket mouse (*Perognathus longimembris*), and Great Basin pocket mouse (*Perognathus parvus*). No fish or amphibian species are likely to inhabit the Study Area or immediately surrounding areas because of the absence of suitable aquatic habitat.



Primary Study Area

Creosote Bush-White Bursage Series

Mixed Saltbush Series

Unvegetated Dry Lakebed

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 8
Vegetation Communities

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3.3 Special Status Plant Species

Twenty-two special status species were reviewed for their potential to occur within the Study Area (Table 7). These species are not federal- or state-listed (endangered or threatened), but are considered special status by the CNPS. Species covered in NEMO that have specific ranges or habitat requirements not occurring within an adjacent USGS 7.5-minute topographic quadrangles are considered absent and not discussed further (e.g., Lane Mountain milk-vetch). The 2008 surveys resulted in the documentation of seven special status species and are noted as occurring within Sections 13, 14 and 15 in the northern extent of the Study Area. These areas are located outside the proposed Project footprint and therefore exact numbers of individuals within these areas have not been tallied. The 2010 full coverage surveys resulted in the documentation of six special status plant species within the proposed Alternatives (Figure 9). The species documented during each survey effort and their distributions within the Study Area are discussed in more detail below.

Table 7 - Special Status Plant Species

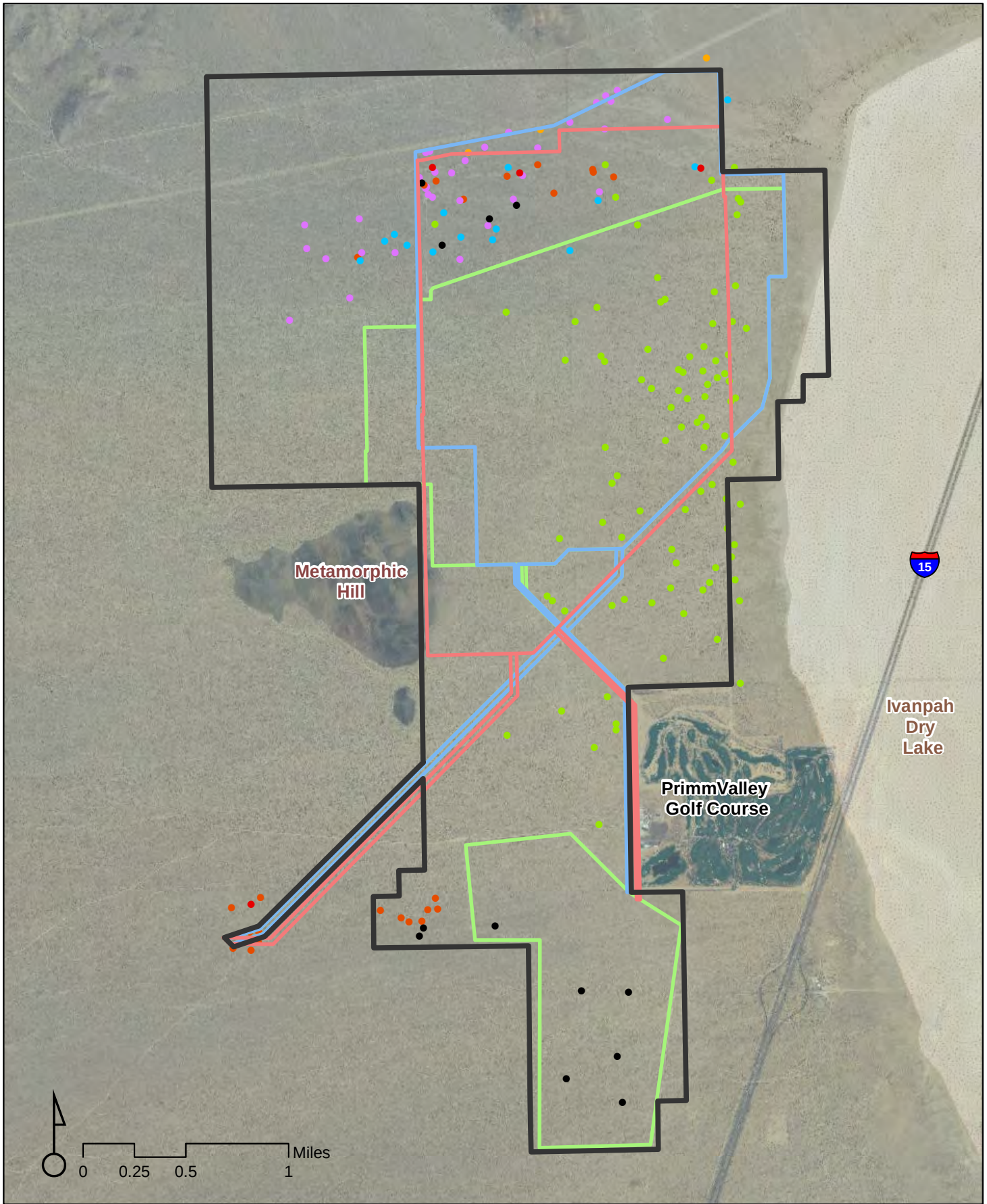
Scientific Name	Common Name	Status	Source	Notes	Occurrence within Study Area
PLANTS					
Achnatherum aridum	Nevada needlegrass	CNPS 2.3	BLM	May-July blooming period. Occurs in Joshua tree woodland and pinyon-juniper woodland between 1,640 and 8,400 feet (500 and 2,570 meters) elevation.	**Absent**
Agave utahensis var. *nevadensis*	Clark Mountain agave	CNPS 4.2	NEMO, CNPS	May-July blooming period. Occurs in Joshua tree woodland, pinyon-juniper and Mojavean desert scrub between 2,900 and 5,200 feet (900 and 1,585 meters) elevation. Found in Clark Mountain above 2,953 feet (900 meters).	**Absent**
Aliciella triodon	coyote gilia	CNPS 2.2	BLM	April-June blooming period. Occurs in Great Basin scrub and pinyon-juniper woodland, sometime sandy, between 2,000 and 5,570 feet (610 and 1,700 meters) elevation.	**Absent**
Arctomecon merriamii	white bear poppy	CNPS 2.2	NEMO, CNPS	April-May blooming period. Desert scrub and chenopod scrub between 1,600 to 5,900 feet (480 to 1,800 meters) elevation, typically in rocky soils.	**Absent**
Asclepias nyctaginifolia	Mojave milkweed	CNPS 2.1	CNPS	May-June blooming period. Desert scrub and pinyon-juniper woodland 3,300 to 5,600 feet (1,000 to 1,700 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (100+ individuals at 15 locations and in Sections 13, 14 and 15)

Scientific Name	Common Name	Status	Source	Notes	Occurrence within Study Area
Androstephium breviflorum	small-flowered androstephium	CNPS 2.2	CNPS	Mar-Apr blooming period. Desert scrub (bajadas) and desert dunes 730 to 2,100 feet (220 to 640 meters) elevation.	**Present** within lower-elevation active alluvial fan with finer soils (140+ individuals at 91 locations)
Astragalus cimae var. *cimae*	Cima milkvetch	CNPS 1B.2	CNPS	April-June blooming period. Occurs in Great Basin scrub and, sometime clay soils, between 2,900 and 6,070 feet (890 and 1,850 meters) elevation.	**Absent**
Astrolepis cochisensis ssp. *cochisensis*	scaly cloak fern	CNPS 2.3	BLM	April-October blooming period. Occurs in Joshua tree woodland and piyon-juniper woodland between 2,950 and 5,900 feet (900 and 1,800 meters) elevation.	**Absent**
Bouteloua trifida	red grama	CNPS 2.3	NEMO, CNPS	May-September blooming period. Desert scrub, typically rocky or carbonate soils, between 2,300 and 6,500 feet (700 and 1,980 meters) elevation.	**Absent**
Cordylanthus parviflorus	small-flowered bird's-beak	CNPS 2.3	BLM	August-October blooming period. Occurs in Joshua tree woodland, pinyon-juniper and Mojavean desert scrub between 2,300 and 7,200 feet (700 and 2,200 meters) elevation.	**Absent**
Coryphantha chlorantha	desert pincushion	CNPS 2.1	NEMO, CNPS	April-September blooming period. Occurs in Joshua tree woodland, pinyon-juniper and Mojavean desert scrub between 145 and 5,000 feet (45 and 1,525 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (~20 individuals at 17 locations and in Sections 13, 14 and 15)
Coryphantha vivipara var. *rosea*	viviparous foxtail cactus	CNPS 2.2	BLM	May-June blooming period. Occurs in pinyon-juniper and Mojavean desert scrub between 4,100 and 8,860 feet (1,250 and 2,700 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (Sections 13, 14 and 15 only – not in proposed Project alternatives)
Cymopterus gilmanii	Gilman's cymopterus	CNPS 2.3	NEMO, CNPS	April-May blooming period. Desert scrub, often carbonate soils, between 3,000 to 6,500 feet (910 and 1,980 meters) elevation.	**Absent**
Cynanchum utahense	Utah vine milkweed	CNPS 4.2	NEMO, CNPS	April-June blooming period. Desert scrub, often sandy or gravelly, between 490 and 4,700 feet (150 and 1,435 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (30+ individuals at 12 locations and in Sections 13, 14 and 15)
Enneapogon desvauxii	nine-awned grass	CNPS 2.2	BLM	August-September blooming period. Pinyon-juniper and desert scrub, often rocky or carbonate soils, between 4,180 and 5,990 feet (1,275 and 1,825 meters).	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (Sections 13, 14 and 15 only – not in proposed Project alternatives)

Scientific Name	Common Name	Status	Source	Notes	Occurrence within Study Area
Eriogonum bifurcatum	forked buckwheat	CNPS 1B.2	BLM	April-June blooming period. Chenopod scrub, often sandy, between 230 and 2,660 feet (70 and 810 meters) elevation.	**Absent**
Grusonia parishii	Parish club-cholla	CNPS 2.2	NEMO, CNPS	May-July blooming period. Occurs in Joshua tree woodland and desert scrub, often sandy or rocky, between 980 and 5,000 feet (300 and 1,524 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (50+ individuals at 27 locations and in Sections 13, 14 and 15)
Mortonia utahensis	Utah mortonia	CNPS 4.3	NEMO, CNPS	March-May blooming period. Occurs in Joshua tree woodland, pinyon-juniper and Mojavean desert scrub between 2,490 and 6,890 feet (760 and 2,100 meters) elevation.	**Absent**
Penstemon albomarginatus	white-margined beardtongue	CNPS 1B.1	BLM	March-May blooming period. Desert scrub, typically sandy, and desert dunes, stabilized, between 2,100 and 3,500 feet (640 and 1,065 meters) elevation.	**Absent**
Penstemon bicolor ssp. *roseus*	rosy two-toned beardtongue	CNPS 1B.1	NEMO, CNPS	May blooming period. Occurs in Joshua tree woodland and desert scrub, often rocky or gravelly and sometimes disturbed, between 2,300 and 4,290 feet (700 and 1,500 meters) elevation.	**Absent**
Penstemon utahensis	Utah beardtongue	CNPS 2.3	BLM	April-May blooming period. Occurs in pinyon-juniper woodland, often rocky, desert scrub and chenopod scrub between 3,490 and 8,200 feet (1,065 and 2,500 meters) elevation.	**Absent**
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert mallow	BLM Sensitive CNPS 1B.2	NEMO, CNPS	March-June blooming period. Occurs in Joshua tree woodland and Mojavean desert scrub between 2,200 and 4,290 feet (975 and 1,500 meters) elevation.	**Present** within upper-elevation stabilized alluvial fan with rocky, gravelly soils (12 individuals at 5 locations and in Sections 13, 14 and 15)

California Native Plant Society's (CNPS) Lists
1A. Presumed extinct in California
1B. Rare or Endangered in California and elsewhere
2. Rare or Endangered in California, more common elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

Threat Code extensions and their meanings:
.1 - Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California



Primary Study Area
Proposed ROW - Alt 1
Proposed ROW - Alt 2
Proposed ROW - Alt 3

Pink Funnel Lily
Androstephium breviflorum

Mojave Milkweed
Asclepias nyctaginifolia

Desert Pincushion
Coryphantha chlorantha

Utah Vine Milkweed
Cynanchum utahense

Parish Club-cholla
Grusonia parishii

Rusby's Desert Mallow
Sphaeralcea rusbyi var. eremicola

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 9
Special Status Plant Species

Ironwood Consulting, Inc. - August 30, 2012

Mojave milkweed (*Asclepias nyctaginifolia)* is a CNPS List 2.1, perennial herb belonging to the Asclepiadaceae (Milkweed) family. It is historically known to occur in Mojavean desert scrub and pinyon-juniper woodland at elevations ranging from 3,300 to 5,600 feet (1,000 to 1,700 meters) amsl. Records of this species exist in San Bernardino County in California and into Nevada, Arizona, and New Mexico. Within the Study Area, this species was found at higher elevations with rocky soils. Over one-hundred individuals were recorded at fifteen distinct locations during the 2010 surveys. Mojave milkweed was also recorded during the 2008 surveys within the northwest quarter of Section 15, and northern quadrant of Section 14.

Small-flowered androstephium (*Androstephium breviflorum*) is a CNPS List 2.2, bulbiferous herb belonging to the Liliaceae (Lily) family. It typically occurs at elevations from 730 to 2,100 feet (220 to 640 meters) amsl and in association with Mojavean desert scrub, often within desert bajadas, and in some cases in sand dune habitat. Records of existing and historical populations are fairly widespread and exist in Riverside and San Bernardino Counties, California and also in portions of Arizona, Nevada, Utah, Wyoming, and Colorado. Small-flowered androstephium is presumed extant near Pisgah, Cady, Baker, and Cronese Valley (Consortium of California Herbaria 2011). Within the Study Area, this species is found within the lower alluvial near the fringe of Ivanpah Dry Lake where soils are generally finer. Over 140 individual plants were recorded at 91 locations during the 2010 surveys. This species was not observed in higher elevations within the alluvial fan in the northern and western extents of the Study Area.

Desert pincushion (*Coryphantha chlorantha*) is a CNPS List 2.1, stem succulent belonging to the Cactaceae (Cactus) family. It is historically known to occur in Mojavean desert scrub, Joshua tree woodland, and pinyon-juniper woodland, often in association with gravelly or rocky soils, at elevations ranging from 145 and 5,000 feet (45 and 1,525 meters) amsl. Records of this species exist in San Bernardino and Inyo Counties in California and into Nevada, Arizona, and New Mexico. Desert pincushion was found less than one mile west of the Study Area in 2007 (BrightSource Energy 2007). Over twenty individuals were recorded at seventeen locations during the 2010 surveys. Desert pincushion was also recorded during the 2008 surveys within the northwest quarter of Section 15, and northern quadrant of Section 14.

Viviparous foxtail cactus (*Coryphantha vivipara* var. *rosea*) is a CNPS List 2.2, stem succulent belonging to the Cactaceae (Cactus) family. It is historically known to occur in Mojavean desert scrub and pinyon-juniper woodland, often with carbonate soils, at elevations ranging from 4,100 and 8,860 feet (1,250 and 2,700 meters) amsl. Records of this species exist in San Bernardino County in California and into Nevada, and Arizona. Desert pincushion was recorded during the 2008 surveys as occurring within the northwest quarter of Section 15 and northern quadrant of Section 14. This species was not found at lower elevations within the Project alternatives footprint in 2010.

Utah vine milkweed (*Cynanchum utahense*) is a CNPS List 4.3, perennial herb belonging to the Asclepiadaceae (Milkweed) family. It is historically known to occur in Mojavean desert scrub, with sand or gravelly soils, at elevations ranging from 490 and 4,700 feet (150 and 1,435 meters) amsl. This species is relatively widespread with records existing in Imperial, Riverside, San Bernardino, and San Diego Counties, California and into Arizona, Nevada, and Utah. Utah vine milkweed was found less than one mile west of the Study Area in 2007 (BrightSource Energy 2007). Over thirty individuals were recorded at twelve locations during the 2010 surveys. Utah vine

milkweed was also recorded during the 2008 surveys within the northwest quarter of Section 15 and northern quadrant of Section 14.

Nine-awned pappusgrass (*Enneapogon desvauxii*) is a CNPS List 2.2, perennial herb belonging to the Poaceae (Grass) family. It is historically known to occur in Mojavean desert scrub and pinyon-juniper woodland, often with rocky soils, at elevations ranging from 4,180 and 5,990 feet (1,275 and 1,825 meters) amsl. This species is a late season bloomer that responds to summer rainfall events. This species is relatively widespread with records existing in San Bernardino County, California and into neighboring states as far as Colorado, Texas, and Mexico. Nine-awned pappusgrass was recorded during the 2008 surveys as occurring within the northwest quarter of Section 15 and northern quadrant of Section 14. This species was not found at lower elevations within the Project alternatives footprint in 2010.

Parish's club-cholla (*Grusonia parishii*) is a CNPS List 2.3, stem succulent belonging to the Cactaceae (Cactus) family. It is historically known to occur in Mojavean desert scrub, with sand or rocky soils, at elevations ranging from 980 to 5,000 feet (300 to 1,525 meters) amsl. This species is relatively widespread with records existing in Imperial, Riverside, and San Bernardino Counties, California and into Arizona, Nevada, and Texas. Parish's club-cholla was found less than one mile west of the Study Area in 2007 (BrightSource Energy 2007). Over fifty individuals were recorded at twenty-seven locations during the 2010 surveys. Parish's club-cholla was also recorded during the 2008 surveys within the northwest quarter of Section 15, northern quadrant of Section 14, and throughout Section 12.

Rusby's desert mallow (*Sphaeralcea rusbyi* var. *eremicola*) is a CNPS List 1B.2, NEMO-covered perennial herb belonging to the Malvaceae (Mallow) family. It is historically know to occur in Mojavean desert scrub and Joshua tree woodlands at elevations ranging from 3,200 to 4,900 feet (975 to 1,500 meters) amsl. Records of this species exist in Inyo and San Bernardino Counties, California, but are known to exist in Arizona and New Mexico. The Stateline Study Area is located within the low end of this species' typical elevation range. Twelve individuals were recorded at five locations during the 2010 surveys. Rusby's desert mallow was also recorded during the 2008 surveys within the northwest quarter of Section 15, northern quadrant of Section 14, and throughout Section 12.

3.4 Cacti and Yucca

Cacti and yucca are collectively referred to as succulents. Cacti are generally characterized by fleshy, high-moisture tissues that occur above ground. Many species of cacti have relatively large rigid spines and small spines called glochids, which makes handling and difficult and potentially dangerous process. Species of cacti can be sorted into two fundamental groups based on the number of stems: single-stemmed and segmented. Single-stemmed cacti include California barrel cactus (*Ferocactus lecontii* var. *cylindraceous*), cotton-top (*Echinocactus polycephalus*), fish-hook cactus (*Mammilaria tetrancistra*). Segmented cacti include prickly-pear (*Opuntia* spp.), cholla (*Cylindropuntia* spp.), and club cholla (*Grusonia* spp.). Yucca species are perennial monocots belonging to the Liliaceae (Lily) family, which are not closely related to cacti. Only one species of yucca was present within the Study Area: Mojave yucca (*Yucca schidigera*). Young Mojave yuccas appear as a basal rosette of stiff leaves up to two feet long that are armed with sharp tips. Mature Mojave yuccas support one to several trunks covered within dead leaves and a rosette of live leaves at the apex of the trunk.

The total number of succulents observed during sampling was multiplied by a factor (project site area/survey coverage area) to provide an estimate of the number of cactus by species (Table 8). Succulents were generally found within the rocky terrain of the stabilized alluvial fan, which occurred in the higher elevations (generally above 2,500 feet) of the alluvial fan where plant diversity was found to be generally higher. Most succulents were rare or absent within lower elevations of the alluvial fan near the dry lakebed where soils are composed of finer material and lacking gravel, rocky substrates.

Table 8 - Succulents Occurring within Project Site

Scientific Name	Common Name	Growth Form	Estimated Quantity[1]
Common Cacti			
Coryphantha chlorantha[2]	Desert pincushion	S	20
Coryphantha vivipara var. rosea[2]	Viviparous foxtail cactus	S	Less than 10
Cylindropuntia acanthocarpa	Buckhorn cholla	J	Less than 10
Cylindropuntia echinocarpa	Silver cholla	J	9,900
Cylindropuntia ramosissima	Pencil cholla	J	31,500
Echinocactus polycephalus	Cottontop	S	650
Echinocereus engelmanii	Calico cactus	S	60
Ferocactus cylindraceus	Barrel cactus	S	30
Grusonia parishii	Parish club cholla	J	50
Mammillaria tetrancistra	Fish-hook cactus	S	30
Opuntia basilaris	Beavertail prickly-pear	J	2,000
Opuntia erinacea	Mojave prickly-pear	J	50
Yucca schidigera	Mojave yucca	Y	3,000

[1] Special Status Plant Species; also listed in Table 7.

S = single-stemmed cacti
J = jointed (segmented) cacti
Y = yucca

3.5 Special Status Wildlife Species

Nineteen special status wildlife species (excluding bat species, which are presented in Section 3.6) were evaluated for their potential to occur (Table 9). One wildlife species that is federal- and state-listed as threatened is found near the Study Area, the desert tortoise. Six additional special status wildlife species were detected within or adjacent to the primary Study Area including golden eagle, burrowing owl, prairie falcon, loggerhead shrike, Swainson's hawk, and Le Conte's thrasher (Figure 10). Special status species detected within the Study Area or having a moderate or greater potential to occur are discussed further in this section of the report.

Table 9 - Special Status Wildlife Species

Scientific Name	Common Name	Status	Source	Occurrence within Study Area
BIRDS				
Accipiter cooperi	Cooper's hawk	CDFG: WL IUCN: LC	NEMO	**Not observed – Low Potential** Nesting habitat limited. May be present (foraging) year-round.
Aquila chrysaetos	golden eagle	BLM: Sensitive CDFG: Fully Protected, WL IUCN: LC	NEMO	**Present – Resident** Nesting habitat absent within Project alternatives, but nests and seven active territories are located within 10 mile buffer. Umberci Mine territory overlaps Study Area. Present (foraging) year-round.
Athene cunicularia	burrowing owl	BLM: Sensitive CDFG: SSC IUCN: LC USFWS:BCC	NEMO	**Present – Likely Resident** Two burrows with sign observed. May be present in low numbers year-round.
Buteo regalis	ferruginous hawk	FWS: FSC, MNBMC; CDFG: WL IUCN: LC USFWS:BCC	NEMO	**Not observed – Low Potential** Nesting habitat absent. May be use site vicinity for overwintering.
Buteo swainsoni	Swainson's hawk	CDFG: Threatened IUCN: LC USFWS:BCC	NEMO	**Present - Migration** Two individuals observed in migration one mile north of Study Area in 2011. Nesting habitat absent. May be present (foraging) during summer and fall during migration.
Chaetura vauxi	Vaux's swift	CDFG: SSC IUCN: LC	CDFG	**Not observed - Low Potential** Nesting habitat limited. May be present (foraging) during summer and fall prior to migration.
Charadrius alexandrinus nivosus	western snowy plover	ESA: Threatened CDFG: SSC USFWS:BCC	NEMO	**Not observed – Low Potential** May be a rare migrant to Ivanpah Dry Lake during winter months.
Circus cyaneus	northern harrier	CDFG: SSC IUCN: LC	NEMO	**Present – Likely Resident** One individual observed outside Primary Study Area. Nesting habitat limited. May use site vicinity for overwintering.
Falco mexicanus	prairie falcon	CDFG: WL IUCN: LC USFWS:BCC	NEMO	**Present – Foraging** Four individuals observed during aerial eagle surveys. One individual observed during avian point counts. Nesting habitat absent from Primary Study Area. May be present (foraging) year-round. Three nests observed within 10 mile buffer.
Falco peregrinus anatum	peregrine falcon	ESA: Delisted CESA: Delisted CDFG: FP USFWS:BCC	CDFG	**Present – Migration** Four individuals observed during aerial survey and avian point counts. Nesting habitat absent from vicinity of Study Area. May be present (foraging) during migration.
Lanius ludovicianus	loggerhead shrike	CDFG: SSC IUCN: NT USFWS:BCC	NEMO	**Present – Likely Resident** Three individuals observed within Primary Study Area. Nesting habitat present.
Pyrocephalus rubinus	vermilion flycatcher	CDFG: SSC IUCN: LC	NEMO, USGS	**Not observed - Low Potential** Nesting habitat limited. May be present (foraging) year-round.

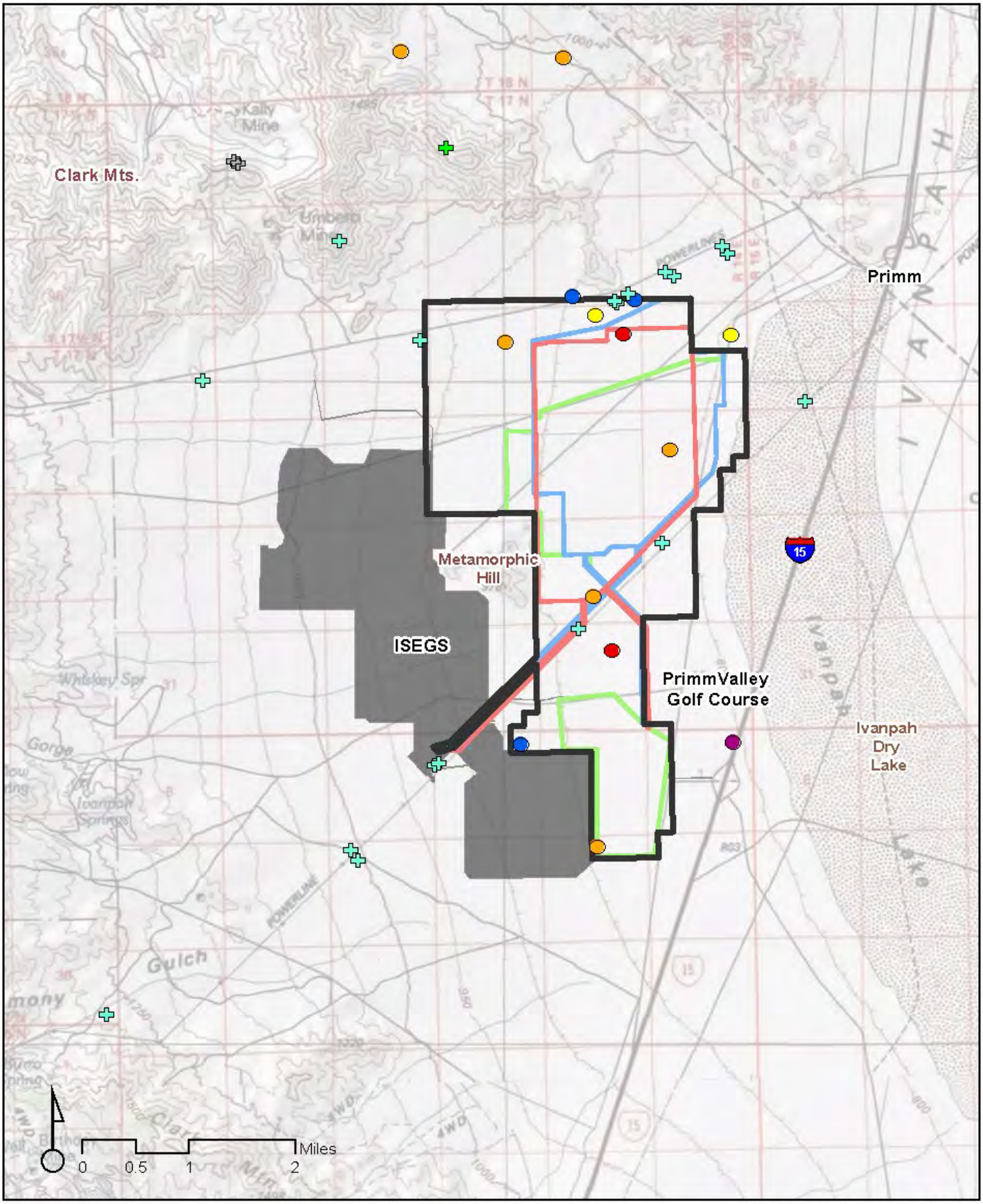
Scientific Name	Common Name	Status	Source	Occurrence within Study Area
Toxostoma bendirei	Bendire's thrasher	BLM: Sensitive CDFG: SSC IUCN: VU USFWS:BCC	NEMO	**Not observed - Low Potential** Nesting habitat present.
Toxostoma crissale	Crissale thrasher	CDFG: SSC IUCN: LC USFWS:BCC	NEMO, USGS	**Not observed - Low Potential** Nesting habitat present.
Toxostoma lecontei	Le Conte's thrasher	BLM: Sensitive CDFG: SSC IUCN: LC USFWS:BCC	NEMO, USGS	**Present – Likely Resident** Four individuals observed within Primary Study Area. Nesting habitat present.
REPTILES				
Gopherus agassizii	desert tortoise	CDFG: Threatened FWS: Threatened IUCN: VU	NEMO, BLM, USFWS	**Present.** Thirty-three live tortoises observed within Study Area. Study Area is located within BLM Category I desert tortoise habitat.
Heloderma suspectum cinctum	banded Gila monster	BLM: Sensitive CDFG: SSC IUCN: NT	NEMO, BLM	**Not observed – Moderate Potential** May occur in Clark Mountain and Metamorphic Hill west of the Study Area.
MAMMALS[1]				
Ovis canadensis nelsoni	Nelson's bighorn sheep	BLM: Sensitive	NEMO, BLM, CDFG	**Present.** Observed within ten-mile buffer in Clark Mountains. Not observed within Primary Study Area. Clark Mountain herd was estimated in 1988 to have 150 sheep. Bighorn may utilize northern extent of Study Area during migration.
Taxidea taxus	American badger	CDFG: SSC IUCN: LC	CDFG	**Not observed – High Potential** Documented near site in 2007.

[1] Bat species are listed in Table 10

CDFG - California Department of Fish and Game
SSC - California Species of Special Concern
WL – Watch List

IUCN - The World Conservation Union
LC – Least Concern
NT – Near Threatened
VU - Vulnerable

FWS - Fish and Wildlife Service
BCC - Birds of Conservation Concern



Note: golden eagle data shown on separate figure.

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Figure 10
Special Status Wildlife Species

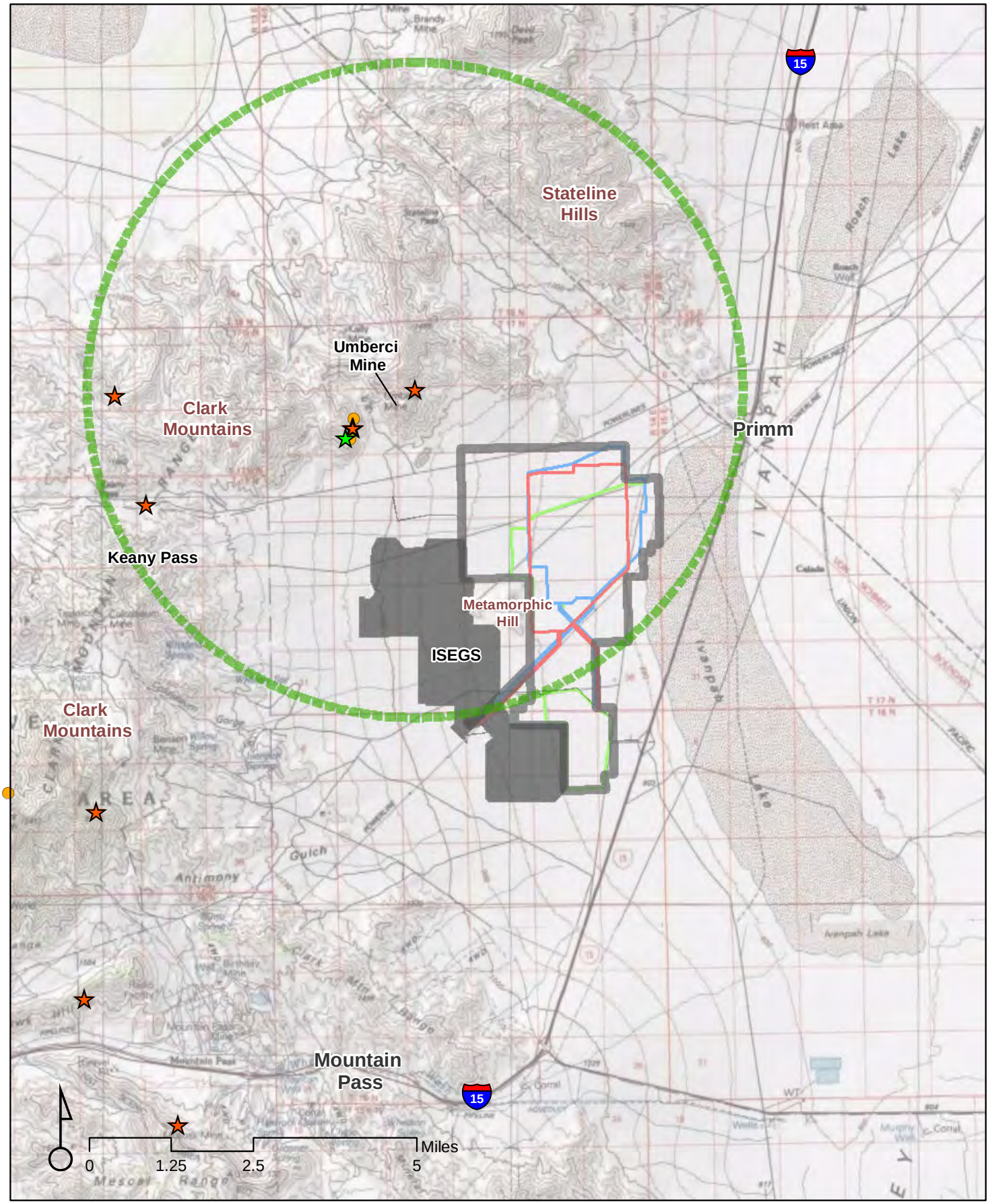
3.5.1 Birds

Golden eagle (*Aquila chrysaetos*) is a California fully protected and BLM-sensitive species and is protected by the federal Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act. This large eagle is found throughout the United States typically occurring in open country, prairies, tundra, open coniferous forest and barren areas, especially in hilly or mountainous regions. Within the desert regions, this species usually builds nests on cliff ledges. 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 (WRI 2010). Due to the large investment in energy and time that an adult golden eagle is required to provide in raising young, some eagles will forgo a season of reproduction even when food supply is abundant (WRI 2010).

Direct observations of golden eagles were recorded in vicinities of Clark Mountain west (n=1) and Umberci Mine (n=2). A total of fifty-five historic and recent nests were observed within twelve estimated territories, seven of which were potentially active (WRI 2010). Many of the nests were likely alternative nest sites for the same territory. None of the territories were found to be engaged or successful in producing young for the 2010 breeding season. The lack of successful breeding may be attributed to natural annual variation due to high energy and time demands as previously noted. Also, continued drought conditions may have an adverse effect on golden eagle reproduction efforts (WRI 2010). Additionally, it is possible that some golden eagles may have attempted to reproduce early in the season and subsequently failed prior to the Phase 1 survey effort.

A standardized five-mile buffer was applied to each potentially active nest to model the estimated territory size and potential foraging area. Based on the standard territory size, one territory located near the Umberci Mine was estimated to partially overlap the Project site (Figure 11). The Umberci Mine territory contained two groups of potential nest sites, located approximately 3,000 feet east and 3,500 feet southwest of the mine. This territory was the subject of further ground-based surveys in 2011.

Ground-based nest monitoring of the Umberci Mine territory conducted in April 2011 revealed one active, reproductive nest within the southwestern nest site group. One chick approximately one month old was observed on April 23 and 26, 2011. This nest site is located approximately two miles northwest of the proposed Project site. No golden eagles were observed using the eastern group during site visits on April 24 and 26, 2011. Surveys of the next proximate territory within the Keany Pass region (approximately five miles west of the Study Area) revealed nest sites that were occupied by red-tailed hawks incubating up to three chicks. The presence of active red-tailed hawk nests may indicate that these nest sites were not used by golden eagles in 2011.



Primary Study Area
Proposed ROW - Alt 1
Proposed ROW - Alt 2
Proposed ROW - Alt 3

2010 Golden Eagle Observation
2010 Active Nest
2011 Reproductive Nest
Approximate Active Territory (5-mile radius)

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 11
Golden Eagle Nests

The spring 2011 golden eagle point count surveys revealed a pair of golden eagles. The pair was observed on April 24, 2011 during the second visit at Station #12 located in the northern extent of the Study Area. The pair was observed exhibiting aerial displays and undulating flight at an altitude of 150 meters above the ground. An adult golden eagle was observed perched on and foraging in the vicinity of Metamorphic Hill on several occasions during the winter/spring of 2011 (Mohlmann 2011). No golden eagles were observed during the summer 2011 golden eagle point count surveys, including the previously active Umberci Mine nest. The lack of observations during late summer may be a result of annual movement into higher elevations of the neighboring mountain ranges.

The fall 2011 surveys revealed one golden eagle on two separate days, possibly the same individual. On November 19, the eagle was observed coursing low from northeast to southwest heading towards Metamorphic Hill, circling up above the hill, then flew to within 50 meters of the ground before disappearing to the northeast of Metamorphic Hill. On November 20, an eagle was observed within 5 meters of the ground over the Project site. The eagles were too distant to confirm sex or age; however, they were likely older than one year due to lack of white wing and tail patches. Winter surveys conducted in February 2012, revealed one eagle (unknown sex/age) soaring high over ISEGS then bird flew in a straight line with wings swept back towards nearest the 2010 nesting site near the Umberci Mine. Anecdotal observations from biologists in the region indicated the presence of a pair of golden eagles, likely the Umberci Mine pair, exhibiting courtship behavior in the vicinity of Metamorphic Hill during late winter. Based on the cumulative observations of golden eagles within and around the Project site, the pair associated with the Umberci Mine territory occupies a roughly similar territory as depicted by the five-mile buffer (Figure 11).

Western burrowing owl (*Athene cunicularia*) is a State Species of Special Concern and addressed in the NEMO 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. The Study Area supports numerous suitable burrows, mainly old tortoise burrows; however, only one record of burrowing owl sign (i.e., burrow with white wash) was observed in 2010 (Figure 10). This species is considered present within the Study Area; however, likely in low numbers. Phase 3 surveys are recommended prior to ground disturbing activities to determine the number of resident owls potentially affected by construction.

Swainson's hawk (*Buteo swainsonii*) is State-listed (threatened) raptor species that breeds in much of western North America. Within California, nesting occurs in the Central Valley, Great Basin and Mojave and Colorado Deserts. Regular nesting also 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 at breeding 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. Two incidental records were documented in the spring of 2011 during surveys of the northern desert tortoise recipient site south of Stateline Pass. This species is not expected to nest or overwinter within the Project.

Prairie falcon (*Falco mexicanus*) is a State Species of Special Concern and addressed in the NEMO Plan/EIS. This large falcon typically builds nest sites on cliffs, similar to the golden eagle. In the desert they are found in most vegetation types, although sparse vegetation provides the best foraging habitat. In the Mojave, mean home range size has been found to be approximately 50 to 70 km² (Harmata et al. 1978). A single prairie falcon was observed in flight over the northern portion of the Study Area in spring 2008. The 2010 golden eagle aerial surveys recorded four individual prairie falcons and three cavity nests, which were attributed to prairie falcons. Individuals were located in the vicinity of Clark Mountains, Stateline Hills, and Lucy Gray Mountains. The nests were located approximately two miles north (near Umberci Mine), six miles west, and nine miles southwest of the Study Area, all within the Clark Mountain range (Figure 10). Nesting habitat for this species does not occur within the Study Area. The nearest possible nesting habitat is within the northern region of the Clark Mountain range located approximately two miles northwest of the Study Area. One prairie falcon nest was recorded approximately two miles north of the primary Study Area

Peregrine falcon (*Falco peregrinus anatum*) is a State Fully Protected Species. This large falcon typically builds nest sites on cliffs, similar to the golden eagle and prairie falcon; however, peregrine falcon typically nests near large water bodies. This species primarily breeds in woodland, forest, and coastal habitats (CDFG 2010). Peregrine falcons are aerial predators and target birds of a variety of sizes; they occasionally prey on mammals, insects, and fish (CDFG 2010). The 2010 golden eagle aerial surveys recorded three individual peregrine falcons, which were likely migrating individuals. Two individuals were located approximately nine miles north of the Study Area in the Stateline Hills and one approximately six miles west of the Study Area within the Clark Mountain range. Nesting habitat for this species does not occur within or near the Study Area due to the absence of a large water body supporting an adequate prey source.

Loggerhead shrike (*Lanius ludovicianus*) is a State Species of Special Concern and a year-round resident in parts of the Southern California desert. It typically is found in open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. As a predatory bird its diet consists of insects, amphibians, small reptiles, small mammals, and other birds. Shrikes typically build nests one to three meters above the ground depending on the height of the vegetation. Three sightings of loggerhead shrikes were recorded during the surveys, both along the existing transmission corridor in the northern extent of the Study Area (Figure 10). This species is considered to be present, with suitable nesting and foraging habitat located within the Study Area.

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. Four sightings of Le Conte's thrasher were recorded during the surveys (Figure 10). This species is considered to be present, with suitable nesting and foraging habitat located within the Study Area.

3.5.1.1 Raptor Nests

In addition to the prairie falcon nests located in the Clark Mountain Range noted previously, thirteen red-tail hawk (*Buteo jamaicensis*) nests were identified within and adjacent to the primary Study Area from 2010 to 2012 (Figure 10). Several red-tail hawk nests were repeatedly used as nest sites between the years.. Nesting of other raptor species were not observed; however, two unidentifiable nest sites, which possibly belonged to a raptor species, were identified by WRI in the 2010 (Figure 10).

3.5.2 Reptiles

Desert tortoise (*Gopherus agassizii*) is a Federal- and State-listed threatened species. Desert tortoises are well adapted to living in a highly variable, and often harsh, desert environment. They spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, desert tortoises emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms. Activity and movement is generally influenced by temperature and precipitation, which correlate with potential food and water resources. Extreme temperatures, both high and low, and periods of drought typically result in reduced tortoise activity (Franks et. al. 2011). Mating occurs both during spring and fall. Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity [at approximately 180mm mean carapace length (MCL)]. Eggs are generally laid in friable soil at near burrow entrances between April and June and occasionally September and October. Eggs hatch within three to four months.

Desert tortoises inhabit a variety of habitats from flats and slopes dominated by creosote-white bursage communities, where a diversity of perennial plants is relatively high, to a variety of habitats in higher elevations. Throughout most of the Mojave Desert in California, tortoises are found most often on gentle slopes with sandy-gravel soils. Soils must be appropriately soft for digging burrows, but firm enough so that burrows do not collapse. Tortoises typically prefer habitats with abundant annual forbs, grasses and cactus, which constitute its primary food sources. Studies within the Eastern Mojave indicated that tortoises consumed Booth's evening primrose (*Camissonia boothii)*, Panamint cryptantha (*Cryptantha angustifolia)*, smooth desert dandelion (*Malacothrix glabrata)*, beavertail cactus (*Opuntia basilaris)*, desert chicory (*Rafinesquia neomexicana)*, Mediterranean grass (*Schismus barbata)*, small wirelettuce (*Stephanomeria exigua)* and other species (Avery 1998). Current research has suggested that plant species that have high potential for potassium excretion (high-PEP) may be critical to the diet of desert tortoise (Oftedal 2002; Oftedal et. al 2002). Excess potassium can be detrimental to the health tortoises. When excreting potassium salts from their bladder, tortoises risk expelling valuable water and protein in the process. Site-specific information for high-PEP plants is provided in later in this section.

Desert tortoises occupy home ranges, which are generally defined as the area traversed while carrying out a range of normal activities (e.g., foraging and mating). The size of desert tortoise home ranges can vary with respect to sex, geographic location, substrate, topography, and year depending on climate factors such as rainfall and temperature. Ernst and Lovich (1994) provided a summary of available literature that indicated the size of desert tortoise home ranges within the Mojave Desert are between 0.4 ha and 89 ha (1 to 220 acres). Data available from a study site in Bird Springs Valley, Nevada, provides the relevant and proximate information for home ranges in the Ivanpah Valley (personal communication Nussear 2011). The large sample size and duration of study is substantially greater than available published data sets and therefore serves as a valuable surrogate for the estimation of a lifetime utilization area, which is presented here as cumulative home range. These data indicated an average cumulative home range of 14 ha (35 ac) for females and 20 ha (50 ac) for males, and a maximum cumulative home range of for 110 ha (271 ac) females and 102 ha (253 ac) for males (personal communication Nussear 2011). From this dataset, the maximum cumulative home range is considerably larger than the average, which suggests a high degree of variability in the dataset. This is likely representative of tortoise populations. Home ranges of females are generally smaller than those of males (Duda et al. 1999). Some tortoises have been known to travel great distances, although these movements occur may occur outside their usual home range (Berry 1986).

2008-2010 Results

Sign of desert tortoise (i.e., live tortoises, active burrows/pallets, and recent scat, and tracks) were found throughout the Study Area. Thirty-three live tortoises [twenty-eight adults (>160 mm) and five immature (<160 mm)] and 234 good-to-excellent burrows/pallets were observed within the Study Area during the surveys. In addition, 159 other inactive burrows/pallets ranging in quality from poor-to-fair were recorded. Live tortoise observations were not evenly distributed throughout the Study Area. One group was located in the northeast quadrant of Section 22 and southeast quadrant of Section 15, and another group was located the southeastern quadrant of Section 22. The remaining tortoise observations were more broadly distributed, but generally occurred at higher elevations within the study area that supported a stabilized alluvial fan consisting of rocky, gravelly soils.

Noticeable concentrations of tortoises and their sign were apparent. One concentration was located in the northeast quadrant of Section 22 (Ivanpah Lake 7.5-Minute U.S. Geological Survey topographic quadrangle) and southeast quadrant of Section 15, and another group was located the southeastern quadrant of Section 22. The remaining tortoise observations were more broadly distributed, but generally occurred at higher elevations within the study area that supported a stabilized alluvial fan consisting of rocky, gravelly soils. Siting of the Project avoided these concentrations and avoided occupied habitat within the upper alluvial fan to the extent feasible.

2012 Results

The concentrations of tortoises apparent in 2008 were not obvious in 2012. Live tortoise observations were more evenly distributed across upper elevations of the alluvial fan within areas that supported a stabilized soils consisting of rocky, gravelly soils. Within the boundaries of the Project site (2,150 acres), sixteen live adult tortoises (>160 mm MCL) were recorded (Figure 12). Using the USFWS estimation formula in of the (USFWS 2010a), The estimated number of tortoises was calculated using the formula in Table 3 of the USFWS's *Revised Pre-Project Survey Protocols for the Desert Tortoise (Gopherus agassizii)* (USFWS 2010a):

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

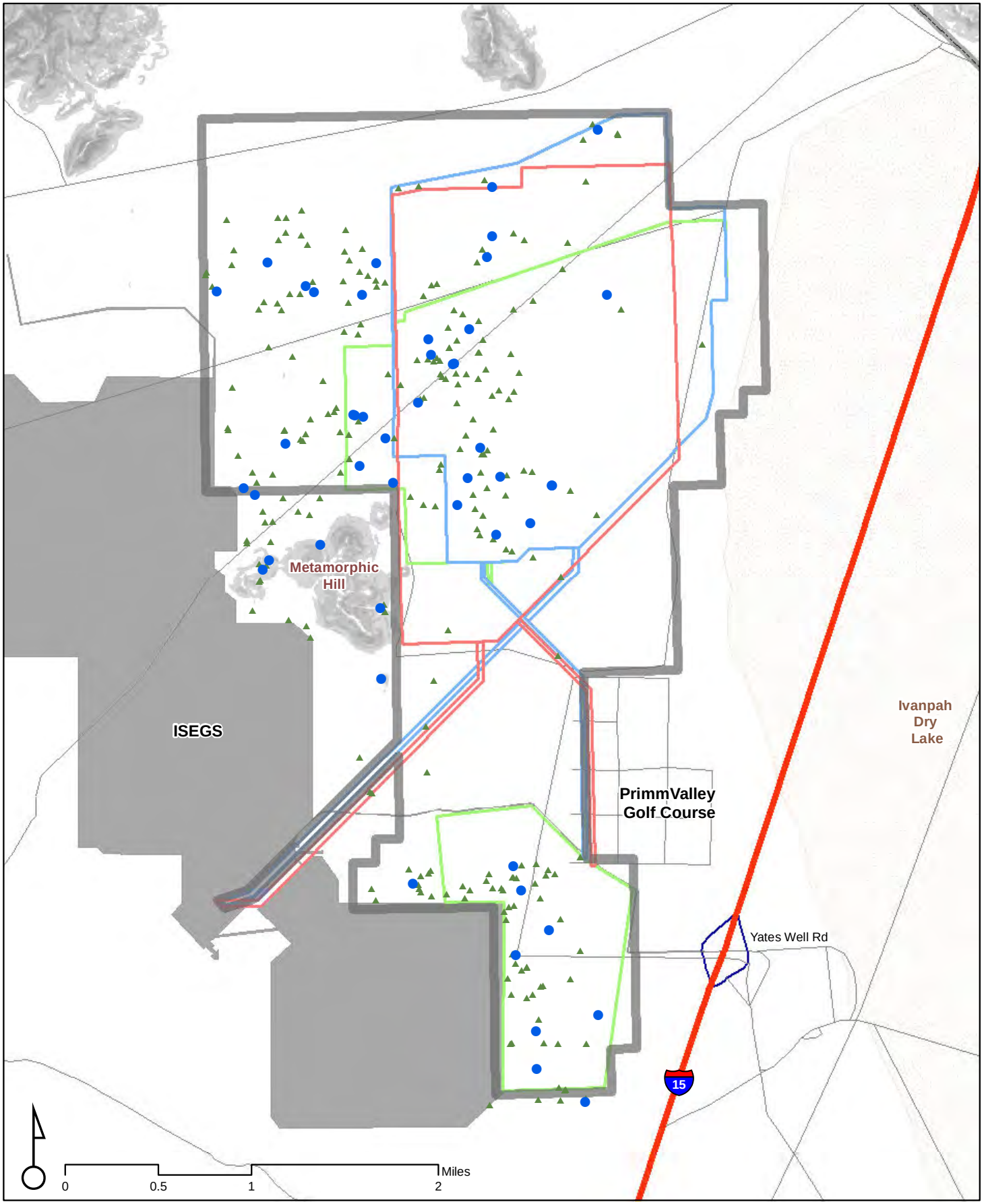
A value of 0.64 was used for the P_a (probability that a tortoise is above ground) because winter rainfall monthly averages for the Study Area during the majority of surveys were estimated to be less than 1.5 inches during winter prior to the surveys (Table 6). P_d (probability of detecting a tortoise, if above ground) is a constant value of 0.63 based on regional sampling data (USFWS 2010). Four more adult live tortoises were recorded in 2012 than in 2008 and abundance estimates were updated (Table 9).

Table 9 - Desert Tortoise Estimates[1]

	Alternative 1	Alternative 2			Alternative 3
		Total	North	South[2, 3]	
Live Tortoises Observed	16	20	13	7	17
Estimated Number of Tortoises	40	50	32	17	42
Lower 95% Confidence Interval	15	19	12	6	16
Upper 95% Confidence Interval	107	130	88	52	112

[1] Includes only adult tortoises >160mm mean carapace length (MCL); estimates rounded to nearest whole number
[2] Includes three tortoises processed by ISEGS
[3] Unknown age classes were treated as adult tortoises, which may result in higher estimates

One immature tortoise was found 1,300 meters from the western edge of Ivanpah Dry Lake and one adult tortoise was found 1,400 meters from the western edge of Ivanpah Dry Lake. These observations indicate that the habitat near the dry lakebed is lower quality than higher in the alluvial fan. Based on rainfall patterns over the previous five years and observations of limited movement in 2012, it is likely that the distribution of tortoises did not change substantially between 2008 and 2010; however, due to above-average winter rainfall in winter of 2010/2011, it is likely that tortoise activity increased in the spring of 2011 to take advantage increased forage. The lack of rainfall in the winter of 2011/2012 resulted in limited tortoise movement within the survey area and it is expected that tortoise had not moved great distances from their 2011 winter burrows.



Primary Study Area
Proposed ROW - Alt 1
Proposed ROW - Alt 2
Proposed ROW - Alt 3
Desert Tortoise
Burrow (good and/or active condition)

Stateline Solar Farm Project
Desert Stateline, LLC

Figure 12
Active Desert Tortoise Sign (2012)

Ironwood Consulting, Inc. - August 31, 2012

Current research has suggested that certain plant species may be critical to the diet of desert tortoise (Oftedal 2002; Oftedal et. al 2002). Excess potassium can be detrimental to the health tortoises. When excreting potassium salts from their bladder, tortoises risk expelling valuable water and protein in the process. Tortoises have been theorized to select plants species with high potential for potassium excretion (high-PEP) to assist in overcoming this challenge. Many high-PEP plants only germinate following winters with high rainfall. Although a systematic study for high-PEP plants has not been completed in the Mojave Desert, ongoing research has revealed valuable data on this subject (Oftedal 2002). Botanical studies performed on the Stateline Study Area did not include collecting specific data on high-PEP plant distribution; however, a qualitative evaluation of the abundance of high-PEP plants within the Study Area was performed by referencing the species list from the Study Areas and published information on high-PEP plants (Table 10). It should be noted that the PEP values can vary greatly within each species depending on the growth phased on the specimen plant. Based on the values in Table 10, several species that were common within the Study Area contained moderate to high PEP values including *Malacothrix glabrata, Cryptantha angustifolia, Cryptantha nevadensis, Opuntia basilaris, Cylindropuntia ramosissima, Chamaesyce albomarginata, Erodium cicutarium*, and *Plantago ovate*. However, many of the high-PEP plants (>15 g/kg DM) as indicated were determined to be uncommon or rare including *Descurainia pinnata, Lepidium lasiocarpum, Chamaesyce micromera, Astragalus didymocarpus, Lotus strigosus, Mentzelia albicaulis*, and *Camissonia claviformis*.

Table 10 - Relative Abundance and PEP Values

Family/Species	PEP (g/kg DM)[1]	Occurrence within Study Area[2]
ASTERACEAE		
Malacothrix glabrata	5.3	C
Prenanthella exigua	9.4	R
Stephanomeria exigua	-4.0	R
BORAGINACEAE		
Cryptantha angustifolia	0.1	C
Cryptantha circumscissa	2.6	U
Cryptantha micrantha	5.5	U
Cryptantha nevadensis	6.6	C
BRASSICACEAE		
Descurainia pinnata	16.7	U
Lepidium lasiocarpum	19.1	U
CACTACEAE		
Opuntia basilaris	22.4	C
Cylindropuntia ramosissima	12.2	C
EUPHORBIACEAE		
Chamaesyce albomarginata	14.2	C
Chamaesyce micromera	15.9	R
FABACEAE		
Astragalus didymocarpus	24.6	R
Lotus strigosus	20.6	R
GERANIACEAE		
Erodium cicutarium	19.9	C
LOASACEAE		

Family/Species	PEP (g/kg DM)[1]	Occurrence within Study Area[2]
Mentzelia albicaulis	15.0	U
MALVACEAE		
Sphaeralcea ambigua	9.6	LC
NYCTAGINACEAE		
Allionia incarnata	7.5	U
Mirabilis laevis	12.2	U
ONAGRACEAE		
Camissonia boothii	12.3	U
Camissonia claviformis	18.4	U
PLANTAGINACEAE		
Plantago ovata	13.9	C
POACEAE		
Aristida adscensionis	13.6	R
Bouteloua barbata	13.6	R
Bromus rubens	4.2	C
Bromus tectorum	1.9	R
Erioneuron pulchellum	9.1	R
Muhlenbergia porteri	5.4	R
Pleuraphis rigida	8.0	C
Schismus barbatus	6.9	C
Sporobolus flexuosus	5.7	R
Vulpia octoflora	6.7	U

[1] DM - ; PEP Values derived from Oftedal 2002 and Oftedal et. al 2002
[2] Occurrence: A-Abundant; C-Common; LC-Locally Common; U-Uncommon; R-Rare

As previously noted, plant diversity was greater within the upper alluvial fan, which contained stabilized rocky soils, than lower regions of the alluvial fan where diversity was substantially lower. Many of these species that contain medium to high PEP values were also found within the upper alluvial fan with rocky gravelly soils. The correlation between the distribution of active tortoise sign and areas containing relatively higher plant diversity may suggest that tortoises within the Study Area are occupying areas that may support higher abundance of high-PEP plant species. However, it should be noted that several other factors including presence of friable soils and seasonal water availability may also contribute to the distribution of tortoises within the Study Area.

Banded Gila monster (*Heloderma suspectum cinctum*) is a State Species of Special Concern and BLM-Sensitive lizard that typically inhabits lower mountain slopes, rocky bajadas, canyon bottoms, and arroyos. It occurs from southwest Utah into southern Nevada and extreme eastern Riverside and San Bernardino Counties. This is the largest native lizard in California measuring up to fourteen inches long and the only venomous lizard in the United States. The Gila monster is a terrestrial species that spends most of its life underground within mammal burrows, under rocks and other natural cavities. It is typically active for only a few weeks within the months of April and May. There are historical records of this species occurring within the Mojave National Preserve and Clark Mountains (Lovich and Beaman, 2007). Suitable habitat is located in the rocky foothills surrounding the Study Area, including Metamorphic Hill. Although this species was not detected during the various biological surveys

performed within the Study Area, the proximity of suitable habitat indicates that this species has a limited potential to occur.

3.5.3 Mammals

American badger (*Taxidea taxus*) is a State Species of Special Concern associated with open grassland and desert communities. This species is associated with dry open forest, shrub, and grassland communities with an adequate burrowing rodent population. Environmental conditions associated with the presence of this species occur on the site and this species was found approximately one mile west of the site in 2007 (BrightSource Energy 2007); therefore, this species has high potential to occur within the Study Area. This species was not directly observed during the focused surveys.

Nelson's bighorn sheep (*Ovis canadensis nelsoni*) is a California fully protected, BLM-sensitive and NEMO-covered species that inhabits open rocky steep areas with available water sources. 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. The most proximate herd is the Clark Mountain herd, which was estimated in 1988 to have 150 sheep. Forty-one bighorn sheep were observed during golden eagle surveys: ten on Devil's Peak (three during Phase 1 and seven during Phase 2), one in Devil's Canyon (Phase 2), three in Ivanpah Valley (Phase 1), and twenty-seven in the Stateline Hills (Phase 1) (WRI 2010). According to the NEMO plan, bighorn sheep regularly travel between different ranges, and some movement between the Clark Mountains, Spring Mountains, and New York Mountains, including neighboring ranges in Nevada. Although Ivanpah Dry Lake supports a seasonal supply of water, it is not likely that sheep would utilize the lower basin area of the Ivanpah Valley near the lakebed, therefore crossing the Study Area (personal communication Wehausen 2008). The northernmost section of the Study Area may be used infrequently by big horn sheep during foraging and periods of movement between the Clark Mountains and Stateline Hills. Metamorphic Hill contains steep rocky terrain and may attract sheep lower into the Ivanpah Valley; however, this habitat is relatively isolated from other portions of the Clark Mountain range. A habitat evaluation tool was developed for the Desert National Wildlife Range in Nevada and includes an assessment of seven factors important to the use and presence of bighorn sheep (Monson and Sumner 1980). A review of the evaluation criteria indicates that the majority of the Study Area is not defined as important big horn sheep habitat due to low to moderate scores in the seven assessment factors.

3.6 Bat Species

Eight bat species were detected within or near the Study Area and nine species have the potential to occur (Table 11; Brown 2010). Four of the detected species are State Species of Special Concern including pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Plecotus townsendii*), Small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*). Canyon bats (*Parastrellus hesperus*) and California myotis (*Myotis californicus*), and Mexican free-tailed bats (*Tadarida brasiliensis*) were the most common species detected during echolocation surveys (Brown 2011). The rocky hills immediately adjacent to the Study Area (e.g., Stateline Hills, Metamorphic Hills, and Clark Mountains) provide ample crevice roosting habitat for several bat species.

Table 11 - Bat Species Potentially Occurring within Study Area

Species		Status		Detection within Study Area
		State	Federal	
FAMILY MOLOSSIDAE (FREE-TAILED BATS)				
Eumops perotis	Western mastiff bat	SSC	FSOC	Not Detected
Nyctinomops	Pocketed free-tailed	-	-	Not Detected
Tadarida brasiliensis	**Mexican free-tailed bat**	**-**	**-**	**Present - all sites**
FAMILY VESPERTILIONIDAE (MOUSE-EARED BATS)				
Antrozous pallidus	**Pallid bat**	**SSC**	**-**	**Present - rock outcrops and near dry**
Corynorhinus	**Townsend's big-eared**	**SSC**	**FSOC**	**Present - Umberci Mine**
Eptesicus fuscus pallidus	Big brown bat (So. CA)	-	-	Not Detected
Euderma maculatum	Spotted bat	SSC	FSOC	Not Detected
Lasionycteris	Silver haired bat	-	-	Not Detected
Lasiurus blossevillii	Red bat	SSC	-	Not Detected
Lasiurus cinereus	**Hoary bat**	**-**	**-**	**Present - in migration near Primm**
Myotis californicus	**California myotis**	**-**	**-**	**Present - all sites**
Myotis ciliolabrum	**Small-footed myotis**	**-**	**FSOC**	**Present - rock outcrops**
Myotis evotis	Long-eared myotis	-	FSOC	Not Detected
Myotis thysanodes	Fringed myotis	-	FSOC	Not Detected
Myotis volans	Long-legged myotis	-	FSOC	Not Detected
Myotis yumanensis	**Yuma myotis**	**-**	**FSOC**	**Present - near Primm Valley GC**
Parastrellus hesperus	**Canyon bat**	**-**	**-**	**Present - rock outcrops and near dry**

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

Guano of pallid bats was found in a shallow rock cave in the foothills approximately one mile north of the Study Area. Use of this cave was further confirmed during evening surveys. A mine shaft was located near the active cave. This species has been found to roost in rock crevices during the day and congregate for socialization in boulder caves and mines during the night (Brown 2011). Such habitat is present within and adjacent to the Study Area. Echolocation signals were recorded early in the evening near the dry lakebed, which could suggest that pallid bats are roosting within small rock crevices on the ground

and burrows throughout other portions of the Study Area. The small-footed myotis may occupy similar habitat within and near the Study Area.

The Umberci Mine, located in the Clark Mountain Range approximately two miles northwest of the Study Area, serves as a maternity colony and hibernation site for Townsend's big-eared bats. Over one-hundred bats exited the mine on May 16, 2011 and a torpid Townsend's big-eared bat was found when the mine was entered (Brown 2011). Although not detected during echolocation surveys within the Project site, this species could forage over the project area and not be detected due to their characteristically faint calls.

The Yuma myotis is typically found near open water and feeds on emerging aquatic insects. Based on the absence of such habitat within the primary Study Area, this species was most likely in the vicinity as a result of the lakes at the Primm Valley Golf Course.

3.7 Sensitive Habitats

The site is located in Category III desert tortoise habitat (BLM 2002). The site is located outside the boundaries of an Area of Critical Environmental Concern (ACEC), Desert Wildlife Management Area (DWMA), BLM wilderness area, or USFWS designated critical habitat unit (CHU) for desert tortoise. The Study Area is less than 2 miles west of the Ivanpah Valley DWMA/ACEC and approximately 3.5 miles northwest from the Ivanpah CHU (Figure 2). The Clark Mountain ACEC is approximately 4 miles west of the site. The BLM-designated Stateline Wilderness Area is located less than one mile northwest of the Study Area. The Mesquite Wilderness Area is located immediately west of the Stateline Wilderness Area and located approximately 6 miles west of the Study Area. The Mojave National Preserve is located three miles west of the western boundary and six miles south of the southern boundary of the Study Area.

The conservation of wildlife corridors and habitat connectivity is increasingly important as more is understood about population dynamics and genetic exchange for all wildlife species. The ccharacterization of connectivity varies based on the scale of assessment. On a fine scale within the Study Area, desert washes within the alluvial fan likely support local wildlife movement. In general, larger washes containing increased vegetation cover would be expected to attract more wildlife use than unvegetated, narrow washes. Large mammal species including Nelson's big horn sheep, mountain lion, bobcat, and mule deer are expected to occupy steep, rugged terrain and boulder-strewn slopes for cover and protection, primarily in the Stateline Hills and Clark Mountains, but they may migrate down the alluvial fans in search of food and water. The site is located low in the bajada, adjacent to the dry lakebed, where washes are more weakly expressed at lower elevations. On a broad scale, the site is located within a portion of Ivanpah Valley that is bounded by topographic and anthropogenic features that influence habitat connectivity. Ivanpah Dry Lake represents an expansive area void of vegetation and is not expected to serve as a functional movement corridor. Furthermore, Interstate 15 bisects Ivanpah Dry Lake, inhibiting east-west migration within the valley. Interstate 15 contains two box

culverts, each approximately 25 meters wide and 5 meters high, located between Yates Well Road and Nipton Road. These represent the sole linkages connecting the west and east extents of the valley south of Primm. The developed footprint associated with the town of Primm abuts the Stateline Hills, creating a sizeable barrier to movement.

For desert tortoise, the Clark Mountain Range located along the western and northwestern boundary of the valley serves as a substantial topographic barrier, dividing the Ivanpah Valley from Shadow Valley and the Amargosa Valley and South Las Vegas genotypic sub-clusters (Hagerty and Tracey 2010). The southern extent of the Spring Mountain Range and the Stateline Hills are also major topographic features posing potential restrictions to tortoise movement. Although these features are substantial, there are opportunities for tortoise movement in and out of this portion of Ivanpah Valley. Two potential linkages exist between Ivanpah Valley and Mesquite Valley to the north. The Stateline Pass linkage is identified as a least cost path (Haggerty et al. 2010). This linkage becomes constrained by the neighboring hills to less than 1/2 mile wide. Based on distance from active tortoise sign observed during surveys conducted in 2011, this linkage is presumed viable for tortoise. The other possible linkage passes through the northern Clark Mountain Range, west of Umberci Mine. The connection into Mesquite Valley is important as it may allow for gene flow to continue north and ultimately to the east into Northern Ivanpah Valley and west through Mesquite Pass and into Shadow Valley. Hagerty's cumulative current map indicates moderate gene flow potential for the bajadas surrounding Mesquite Lake and high gene flow potential through Mesquite Pass itself.

Within the western lobe of the Ivanpah Valley, the ISEGS project is expected to result in increasde habitat fragmentation (USFWS 2011b). There currently exists a half mile wide gap between ISEGS Unit 1 and the Primm Valley Golf Course. This gap corresponds roughly with a least-cost path modeled by Hagerty et al. (2010); however, the existing tortoise exclusion fencing along Colosseum Road likely undermines this area's ability to support substantial connectivity. Under existing conditions, the most reasonable route for north-south tortoise connectivity in this portion of the valley exists west of ISEGS and north through the upper elevation passes within the Clark Mountain Range.

Sensitive plant communities (e.g.; desert dry wash woodland) or wetlands are not present on the site; however, washes associated with California Department of Fish and Game Section 1600 jurisdiction are present. These washes tend to support assemblages of plant species, some of which are special status, that differ from the surrounding upland areas. The site does not support aeolian sand deposits.

4.0 RECOMMENDED PROTECTION MEASURES

The following information is intended to provide the CEQA/NEPA document preparers an outline for general avoidance and minimization measures potentially relevant to the Stateline Project. The following measures are considered standard practices for large-scale utility projects and are consistent with the *Best Management Practices and Guidance Manual: Desert Renewable Energy Projects* (Renewable Energy Action Team 2010).

4.1 General Measures

This section describes a range of design features, construction and operation best management practices (BMPs), and avoidance practices that when implemented as part of Project construction and/or operation, should collectively avoid, reduce or eliminate potential adverse effects to biological resources. Each category of features, practices and plans is described separately below.

Environmental Inspection and Compliance Monitoring Program and Plan

A comprehensive Environmental Inspection and Compliance Monitoring Program and Plan, covering both construction and operation and maintenance (O&M), should be developed. A qualified individual should be designated to serve as the Project Environmental Manager. The Environmental Manager should be responsible for:

- development and implementation of the overall Project compliance program,
- communication and coordination with the applicable regulatory agencies,
- ensuring compliance with the various conditions and requirements of permits and approvals,
- record keeping and reporting required by permits and approvals,
- ensuring that all applicable environmental plans are up to date,
- advising management of actual and potential compliance issues, and
- ensuring that Project planning takes appropriate account of compliance issues in advance.

Construction Related Plans

The following construction related plans should be developed, as necessary. These plans have specific objectives that would indirectly help reduce potential adverse effects to biological resources.

- Storm Water Pollution Prevention Plan
- Dust Control Plan
- Waste Management Plan
- Spill Prevention Control and Countermeasure Plan
- Hazardous Materials Management Plan
- Fire Prevention Plan

Construction Related BMPs

The following general measures should be implemented during construction, which would assist with reducing potential adverse effects to biological resources:

- Construction and O&M activities should be limited to daylight hours to the extent possible,
- Water required for construction purposes should not be stored in open containers or structures and should be transported throughout the site in enclosed water trucks,
- Water sources (such as wells) should be checked periodically by monitors to ensure they are not creating open water sources through leaking or consistently overfilling trucks,
- All vehicles leaking fuel or other liquids should be immediately removed to the staging area and repaired – all spills should be cleaned up promptly and disposed of correctly,
- All construction activities conducted outside the fenced areas should be monitored by a qualified biological monitor,
- Vegetation removal should be limited to the smallest area necessary,
- Construction traffic should remain on existing roads when possible – new roads, passing areas, and turning areas should be limited to permitted area of direct effect,
- Speed limits on all unpaved areas of the Project site should be a maximum of 15 miles per hour,
- Trash should always be contained within raven-proof receptacles and removed from the site frequently, including trash collected in vehicles in the field,
- No dogs or firearms should be allowed on the Project site during construction or O&M, and
- Plant and wildlife collection by Project staff during construction or operation should be prohibited except as allowed by the Project's permits.

Worker Environmental Awareness Program

A formal Worker Environmental Awareness Program (WEAP) should be completed for every individual working on the Project site. All individuals completing the training should sign an attendance sheet and receive wallet cards and stickers to show they have completed this training. The training should include the following information and include photos of all resources:

- Discussion of the fragile desert ecosystem, vegetation and wildlife communities within and surrounding the Project site,
- Discussion of rare plant species and other sensitive species found within and surrounding the Project site,
- Desert tortoise ecology, threats, legal protections, permitting, and penalties (including both legal and imposed by Project permits),
- Project-specific protection measures, and
- Worker responsibilities, communication protocol, and monitor responsibilities, including the authority for monitors to halt Project activities if warranted.

4.2 Desert Tortoise Protection Measures

Due to the expected presence of desert tortoise within the Project site, formal consultation between the BLM and USFWS would be necessary. A biological assessment that fully addresses the impacts to desert tortoise would be required to initiate formal consultation. The measures described in this section of the report reflect standard requirements and may be incorporated as part of the proposed Project, which would also be included in the biological assessment. The Biological Opinion (BiOp) would provide specific conditions and requirements that may supersede some of the following measures. A Lead Biologist should be designated for the Project and should be responsible for all aspects of clearance surveys, monitoring, desert tortoise translocation, contacts with agency personnel, reporting, and long-term monitoring and reporting.

Exclusion Fencing

Prior to beginning clearance surveys, desert tortoise exclusion fencing should be constructed in specified areas consistent with clearance survey areas. The Project site should be completely fenced with security and desert tortoise exclusion fencing, including desert tortoise exclusion gates at access points. Fence installation should be monitored as a linear component. Exclusion fencing should be maintained over the course of construction and operations, as necessary.

Preconstruction Clearance Surveys

Clearance surveys should be conducted consistent with the USFWS Desert Tortoise Field Manual and current translocation guidance (USFWS 2009b and 2010c). If a desert tortoise or active burrow is found within a planned area of construction, surveys should stop at that time until the tortoise is translocated in the active season. If two complete passes are completed in a construction area (north-south and east-west) without a desert tortoise being found, construction may commence within that area outside of active season. Fencing should continue to be checked on a daily basis throughout construction.

Translocation

A Desert Tortoise Translocation Plan should be prepared for the Project. The purpose of the plan is to describe the process of translocation, minimize mortality of desert tortoises, and assess the effectiveness of the translocation effort through a long-term monitoring program. Injured tortoises should be transported to a rehabilitation facility approved by the USFWS and CDFG. Tortoises found recently killed should be salvaged and transported to a veterinary pathologist, who is familiar with desert tortoise and approved by the USFWS and CDFG. Procedures for salvaging and transport should generally follow Guidelines for the Field Evaluation of Desert Tortoise Health and Disease (Berry and Christopher 2001). Detailed health assessments on all live tortoises should be conducted following current USFWS guidance by individuals approved and permitted by the USFWS and CDFG to conduct such assessments. Detailed health assessments should be performed prior to translocation and repeated periodically during long-term monitoring. Any individual tortoise that exhibits clinical signs of Upper Respiratory Tract Disease (URTD) should be transported to the Desert Tortoise Conservation Center (DTCC) near Las Vegas, Nevada for

further evaluation. Tortoises should only be prepared for transport to the DTCC by individuals authorized for these activities under the BiOp. The tortoise should be transported to the DTCC within 48 hours of it being discovered with clinical signs of disease.

Avoidance – Construction

During the construction of linear features (fencing, transmission lines, and access roads), all live tortoises and active burrows should be avoided to the extent possible. All activities should be monitored by qualified biologists. The biological monitor should instruct crews to provide approximately one hour for a live tortoise to leave an active construction area without assistance. If the tortoise does not leave the area on its own an Authorized Biologist (listed under the BiOp to handle tortoises) should carefully move the tortoise out of the construction area and into a translocation area pursuant to the conditions of the BiOp. Biological monitors should flag an avoidance area approximately 20 meters from any active burrow to be avoided and construction activities should continue around this avoidance area while a biologist monitors the burrow. If an active burrow cannot be avoided by construction activities, the burrow should be excavated using protocols in USFWS Desert Tortoise Field Manual (USFWS 2009b).

Avoidance – Operations and Maintenance

During the operation phase of the project, all applicable desert tortoise protection measures identified under construction should be implemented. For example, this may include the need for a biological monitor outside the fenced facility during road, fence and utility maintenance involving ground disturbance, annual Worker Environmental Awareness Program refresher, actions to take if a tortoise is encountered, etc. Additionally, a biological monitor should be designated and responsible for overseeing compliance with the desert tortoise protection measures. The biological monitor should have a copy of all measures including the BiOp when work is being conducted on site. The monitor should be on site during all project maintenance activities to ensure compliance with the desert tortoise measures. The monitor should have the authority to halt all non-emergency activities that are in violation of the measures. Work should proceed only after hazards to desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an authorized biologist. An annual compliance report should be submitted to the BLM annually.

Common Raven Management Plan

A Common Raven Management Plan should be developed for the Project. The primary objective of the plan is to protect the juvenile and hatchling desert tortoises from predation by common ravens. This should be accomplished in part 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 2008b).

4.3 Other Biological Resource Protection Measures

Integrated Weed Management Plan

An Integrated Weed Management Plan (IWMP) should be prepared to reduce and/or eliminate the propagation and further spread of noxious and invasive weeds in the Mojave Desert due to construction, operation and decommissioning of the Project. The objectives of the IWMP would be as follows:

- Identify weed species currently present within 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 and maintenance activities that may increase the presence of weeds or introduce new weed species on and adjacent to the Project components, and
- Specify steps that should be taken to ensure that the presence of weed populations on and adjacent to the Project components should not increase because of construction activities. These steps should 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.

Avian and Bat Protection Plan

Due to the potential presence of golden eagle, raptors, and bat species within the Project site, an Avian and Bat Protection Plan (ABPP) should be developed. The goal of the ABPP would be to reduce the potential risks for avian and bat mortality potentially resulting from construction and operation of the Project. 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 should be taken to avoid, minimize and mitigate any potential adverse effects on these species, and
- Detail long-term monitoring and reporting goals.

Vegetation Resources Management Plan

The Vegetation Resources Management Plan (VRMP) will provide details regarding the proposed salvage and transplantation of target species [eight special status plant species (listed by the California Native Plant Society) and ten additional species of succulents]. The VRMP will include the following:

- Distribution of target plants within the Project site;
- Criteria for determining whether an individual plant is appropriate for salvage;
- Equipment and methods for salvage, propagation, transport, and planting;
- Procedures for marking and flagging target plants during preconstruction clearances surveys;
- Storage and/or pre-planting requirements;
- Proposed transplantation sites;
- A requirement for ten years of maintenance of the transplanted individuals, including removal of invasive species and irrigation (if necessary); and
- A requirement for ten years of monitoring to determine the percentage of surviving plants each year and to adjust maintenance activities using an adaptive management approach.

4.4 Compensatory Mitigation

Consistent with BLM NEMO requirements and conditions likely to be imposed on the Project by CDFG and USFWS, areas of desert tortoise habitat should be acquired to partially offset the potential adverse effects of the Project. A Compensatory Mitigation Plan, or Habitat Compensation Plan, would be a valuable tool to document the details of mitigation opportunities. Land acquisition should be considered the first priority; however, it is evident that the land purchase opportunities within the eastern and northwestern Mojave Desert are limited. Supplemental mitigation actions should be considered. These actions could be in the form of habitat restoration and enhancement throughout the Mojave Desert. Continued coordination with the BLM, CDFG, and USFWS would be beneficial in identifying all possible compensatory mitigation opportunities as they arise.

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Appendix A

Winter Rainfall Data

Winter Rainfall Data
Mid Hills, Horse Thief Springs, and Searchlight
2005 to 2012[1]

Site	Winter Period	October	November	December	January	February	March	Total	Monthly Average
Mid Hills	2005-2006	2.52	0.00	0.03	0.12	0.39	0.51	3.57	0.60
	2006-2007	1.78	0.00	0.27	0.00	0.53	0.04	2.62	0.44
	2007-2008	0.00	1.88	0.75	1.67	0.23	0.08	4.61	0.77
	2008-2009	0.01	1.86	0.28	0.02	1.34	0.08	3.59	0.60
	2009-2010	0.00	0.06	0.67	2.25	1.77	0.93	5.68	0.95
	2010-2011	1.11	0.17	4.80	0.00	1.16	0.50	7.74	1.29
	2011-2012	0.39	0.43	0.03	0	0	0	0.85	0.14
	Average	**0.83**	**0.63**	**0.98**	**0.58**	**0.77**	**0.31**	**4.09**	**0.68**
Horse Thief Springs	2005-2006	1.25	0.00	0.05	0.57	0.87	3.36	6.10	1.02
	2006-2007	0.00	0.97	1.14	2.66	1.22	0.02	6.01	1.00
	2007-2008	0.75	0.00	0.45	0.00	0.30	0.10	1.60	0.27
	2008-2009	0.03	0.00	0.85	0.18	2.30	0.00	3.36	0.56
	2009-2010	0.01	0.03	1.72	3.03	2.54	0.15	7.48	1.25
	2010-2011	1.92	0.57	12.13	0.15	1.19	1.01	16.97	2.83
	2011-2012	0.54	0.72	0.35	0.98	0.08	0.85	3.52	0.59
	Average	**0.64**	**0.33**	**2.38**	**1.08**	**1.21**	**0.78**	**6.43**	**1.07**
Searchlight	2005-2006	1.60	0.00	0.00	0.02	0.00	0.46	2.08	0.35
	2006-2007	1.47	0.00	0.33	0.06	0.26	0.00[2]	2.12	0.35
	2007-2008	0.00	0.00	1.82	1.52	0.96	0.08	4.38	0.73
	2008-2009	0.02	0.86	1.41	0.22	1.14	0.00	3.65	0.61
	2009-2010	0.00	0.09	0.97	3.13	1.41	0.00[2]	5.60	0.93
	2010-2011	1.98	0.07	5.41	0.00	1.51	0.00	8.97	1.50
	2011-2012	0.18	0.00[2]	0.40[2]	0.08	0.12	0.00[2]	0.78	0.13
	Average	**0.75**	**0.15**	**1.48**	**0.72**	**0.77**	**0.08**	**3.94**	**0.66**

[1] Western Regional Climate Center (2011)
[2] Missing data

Appendix B

Plant Species Detected - Primary Study Area

Family	Genus	Species	Var./Sp.	Common name	Status
Aizoaceae	Sesuvium	Verrucosum		western sea-purslane	
Amaranthaceae	Amaranthus	Fimbriatus		fringed amaranth	
	Tidestromia	Oblongifolia		honey-sweet	
Apocynaceae	Amsonia	Tomentosa		woolly amisonia	
Asclepiadaceae	Asclepias	Erosa		desert milkweed	
	Asclepias	Nyctaginifolia		Mojave milkweed	CNPS: List 2.3
	Cynanchum	Utahense		Utah vine milkweed	CNPS: List 4.3
Asteraceae	Acamptopappus	Shockleyi		Shockley's goldenhead	
	Acamptopappus	Sphaerocephalus	var. hirtellus	goldenhead	
	Adenophyllum	Cooperi		Cooper's dogweed	
	Adenophyllum	Porophylloides		San Felipe dogweed	
	Ambrosia	Dumosa		white bur-sage	
	Ambrosia	Salsola		cheesebush	
	Anisocoma	Acaulis		scalebud	
	Baccharis	Brachyphylla		shortleaf baccharis	
	Baileya	Multiradiata		desert marigold	
	Baileya	Pauciradiata		laxflower	
	Baileya	Pleniradiata		woolly marigold	
	Bebbia	Juncea	var. aspera	sweetbush	
	Brickellia	Arguta	var. arguta	spearleaf brickellia	
	Brickellia	Knappiana		Knapp's brickellia	
	Chaenactis	Carphoclinia	var. carphoclinia	pebble pincushion	
	Chaenactis	Fremontii		Fermont's pincushion	
	Chaenactis	Steviodes		Steve's pincusions	
	Encelia	Actoni		Action encelia	
	Encelia	Virginensis		Virgin River encelia	
	Eriophyllum	Wallacei		Wallace's wooly daisy	
	Filago	Depressa		dwarf cottonrose	
	Glyptopleura	Marginata		carveweed	

Family	Genus	Species	Var./Sp.	Common name	Status
	Gutierrezia	Microcephala		sticky snakeweed	
	Gutierrezia	Sarothrae		common snakeweed	
	Machaeranthera	arida		arid tansyaster	
	Malacothrix	glabrata		desert dandylion	
	Malacothrix	sonchoides		yellow saucers	
	Monoptilon	bellidiforme		desert star	
	Monoptilon	belliodes		Mojave desert star	
	Pectis	papposa	var. papposa	chinchweed	
	Porophyllum	gracile		odora	
	Prenanthella	exigua		brightwhite	
	Psilostrophe	cooperi		paperflower	
	Rafinesquia	neomexicana		desert chicory	
	Senecio	flaccidus	var. monoensis	shrubby ragwort	
	Stephanomeria	pauciflora	var. pauciflora	wirelettuce	
	Stylocline	gnaphaloides		everlasting neststraw	
	Stylocline	micropoides		woollyhead neststraw	
	Thymophylla	pentachaeta	var. belenidium	five-needle prickleyleaf	
	Viguiera	parishii		Parish's goldeneye	
	Xylorhiza	tortifolia	var. tortifolia	Mojave aster	
Boraginaceae	Amsinkia	tessellata	var. tessellata	devil's lettuce	
	Cryptantha	angustifolia		Panamint cryptantha	
	Cryptantha	barbigera		bearded cyrptantha	
	Cryptantha	circumscissa		cushion cryptantha	
	Cryptantha	decipiens		gravel cryptantha	
	Cryptantha	dumetorum		bushloving cryptantha	
	Cryptantha	ineaquada			
	Cryptantha	maritima		Guadelupe cryptantha	
	Cryptantha	micrantha		redroot crytantha	
	Cryptantha	nevadensis		Nevada crytantha	
	Cryptantha	pterocarya		wing nut cryptantha	
	Cryptantha	recurvata		curvenut cryptantha	

Family	Genus	Species	Var./Sp.	Common name	Status
	Cryptantha	virginensis		Virgin River cryptantha	
	Pectocarya	heterocarpa		chuckwalla pectocarya	
	Pectocarya	platycarpa		broadfruit combseed	
	Plagiobothrys	jonesii		Jone's popcorn flower	
	Tiquilia	plicata		fanleaf crinklemat	
Brassicaceae	Caulanthus	cooperi		Cooper's jewelflower	
	Descurainia	pinnata	ssp. glabra	western tansymustard	
	Descurainia	pinnata	ssp. halictorum	alkali tansymustard	
	Dithyrea	californica		specklepod	
	Draba	cuneifolia		wedgeleaf draba	
	Guillenia	lasiophylla		California mustard	
	Lepidium	fremontii	var. fremontii	desert peppergrass	
	Lepidium	lasiocarpum	var. lasiocarpum	shaggyfruit pepperweed	
	Malcolmia	africans		African mustard	
	Sisymbrium	irio		London rocket	
	Streptanthella	longirostris		longbeak streptanthella	
Cactaceae	Coryphantha	chlorantha		desert pincushion	CNPS: List 2.1
	Coryphantha	vivipara		viviparous pincushion	CNPS: List 2.2
	Echinocactus	polycephalus	var. polycepahlus	cottontop	
	Echinocereus	engelmanii		Calico cactus	
	Ferocactus	cylindraceus	var. lecontei	barrelcactus	
	Grusonia	parishii		matted cholla	CNPS: List 2.3
	Mammillaria	tetrancistra		fishhook cactus	
	Opuntia	acanthocarpa	var. coloradensis	buckhorn cholla	
	Opuntia	basilaris	var. basilaris	beavertail	
	Opuntia	echinocarpa		silver cholla	
	Opuntia	erinacea	var. erinacea	Mojave prickleypear	
	Opuntia	ramosissima		pencil cholla	
Campanulaceae	Nemacladus	glanduliferus	var. orientalis	glandular threadplant	
Chenopodiaceae	Atriplex	canescens	ssp. canescens	four-wing saltbush	
	Atriplex	elegans	var. fascicularis	wheelscale	

Family	Genus	Species	Var./Sp.	Common name	Status
	Atriplex	polycarpa		cattlespinach	
	Salsola	tragus		Russian thistle	
	Suaeda	moquinii		inkweed	
Ephedraceae	Ephedra	funerea		Death Valley jointfir	
	Ephedra	nevadensis		Nevada jointfir	
Euphorbiaceae	Chamaesyce	albomarginata		rattlesnake weed	
	Chamaesyce	micromera		Sonoran sandmat	
	Chamaesyce	setiloba		Yuma sandmat	
Fabaceae	Acacia	greggii		catclaw acacia	
	Astragalus	acutirostris		sharpkeel milkvetch	
	Astragalus	didymocarpus	var. dispermus	two-seeded milkvetch	
	Dalea	mollissima		soft prairie clover	
	Lupinus	concinnus		elegant lupine	
	Lupinus	shockleyi		Shockley's lupine	
	Psorothamnus	fremontii	var. fremontii	Mojave indigobush	
Geraniaceae	Erodium	cicutarium		filaree	
	Erodium	texanum		Texas filaree	
Hydrophyllaceae	Eucrypta	micrantha		desert eucrypta	
	Nama	demissum	var. demissum	purplemat	
	Phacelia	crenulata	var. ambigua	ntoch-leafed phacelia	
	Phacelia	distans		wild heliotrope	
	Phacelia	fremontii		Fremont's phacelia	
Krameriaceae	Krameria	erecta		white rhatany	
Lamiaceae	Salazaria	mexicana		paperbag bush	
	Salvia	dorrii	var. pilosa	purple sage	
	Salvia	mohavensis		Mojave sage	
Liliaceae	Androstephium	breviflorum		pink funnel lily	
	Yucca	schidigera		Mojave yucca	
Loasaceae	Mentzelia	albicaulis		small flowered blazing star	
Malvaceae	Eremalche	exilis		white mallow	
	Sphaeralcea	ambigua	var. ambigua	desert globemallow	

Family	Genus	Species	Var./Sp.	Common name	Status
	Sphaeralcea	emoryi		Emory's globemallow	
	Sphaeralcea	rusbyi	var. eremicola	Rusby's globemallow	CNPS: 1B.2
Molluginaceae	Mollugo	cerviana		carpet weed	
Nyctaginaceae	Allionia	incarnata		trailing allonia	
	Boerhavia	triquetra		slender spiderling	
	Boerhavia	wrightii		Wright's spiderling	
Oleaceae	Menodora	spinescens		spiny desert olive	
Onagraceae	Camissonia	boothii	var. condensata	Booth's evening primrose	
	Camissonia	brevipes	var. brevipes	yellow cups	
	Camissonia	chamaeneroides		long fruit suncup	
	Camissonia	claviformis	ssp. aurantiaca	brown-eyed primrose	
	Camissonia	refracta		narrow-leafed suncup	
	Gaura	coccinea		scarlet gaura	
	Oenothera	primaveris	ssp. bufonis	desert evening primrose	
Orobanchaceae	Orobanche	cooperi		Cooper's broomrape	
Papaveraceae	Eschscholzia	glyptosperma		desert gold poppy	
Plantaginaceae	Plantago	ovata		desert plantain	
Poaceae	Achnatherum	hymenoides		indian ricegrass	
	Achnatherum	speciosum		desert needlegrass	
	Aristida	adscensionis		sixweeks threeawn	
	Aristida	purpurea	var. parishii	purple threeawn	
	Bouteloua	aristidoides	var. aristidoides	needle grama	
	Bouteloua	barbata	var. barbata	six weeks grama	
	Bromus	madritensis	ssp. rubens	red brome	
	Bromus	tectorum		June grass	
	Enneapogon	desvauxii		nine-awned pappusgrass	CNPS: List 2.3
	Erioneuron	pulchellum		fluffgrass	
	Hordeum	murinum		foxtail barley	
	Muhlenbergia	porteri		Porter's bush muhly	
	Pleuraphis	rigida		galleta grass	
	Schismus	barbatus		Mediterranean grass	

Family	Genus	Species	Var./Sp.	Common name	Status
	Sporobolus	flexuosus		mesa dropseed	
	Tridens	muticus		slim tridens	
	Vulpia	octoflora	var. octoflora	six weeks fescue	
Polemoniaceae	Gilia	cana	ssp. speciformis	showy gilia	
	Gilia	latifolia		broad leafed gilia	
	Gilia	ophthalmoides		eyed gilia	
	Gilia	scopulorum		rock gilia	
	Gilia	sinuata		cinder gilia	
	Gilia	stellata		star gilia	
	Gilia	transmontana		transmontane gilia	
	Ipomopsis	polycladon		branching gilia	
	Langloisia	setosissima	ssp. punctata	lilac sunbonnet	
	Langloisia	setosissima	ssp. setosissima	Great Basin sunbonnet	
	Linanthus	aureus	ssp. aureus	golden gilia	
	Linanthus	demissus		desert linanthus	
	Linanthus	jonesii		Jones' linanthus	
	Loeseliastrum	matthewsii		desert calico	
	Loeseliastrum	schottii		Schott's calico	
Polygonaceae	Chorizanthe	brevicornu	var. bervicornu	brittle spineflower	
	Chorizanthe	rigida		rigid spineflower	
	Eriogonum	brachypodum		Parry's buckwheat	
	Eriogonum	deflexum	var. deflexum	skeleton weed	
	Eriogonum	fasciculatum	ssp. polifolium	eastern Mojave buckwheat	
	Eriogonum	inflatum	var. inflatum	desert trumpet	
	Eriogonum	palmerianum		Palmer's buckwheat	
	Eriogonum	pusillum		yellow turban	
	Eriogonum	reniforme		kidneyleaved buckwheat	
	Eriogonum	thomasii		Thomas' buckwheat	
	Eriogonum	trichopes	var. trichopes	little desert buckwheat	
	Rumex	hymenosepalus		wild rhubarb	
Portulacaceae	Calyptridium	monandrum		pussypaws	

Family	Genus	Species	Var./Sp.	Common name	Status
Scrophulariaceae	Antirrhinum	filipes		twining snapdragon	
	Mimulus	bigelovii	var. bigelovii	Mojave monkeyflower	
	Penstemon	palmeri	var. palmeri	Palmer's penstemon	
Solanaceae	Lycium	andersonii		Anderson's desert thorn	
	Lycium	cooperi		Cooper's boxthorn	
	Nicotiana	obtusifolia		desert tobacco	
	Physalis	crassifolia		yellow nightshade ground cherry	
Visaceae	Phoradendron	californicum		desert mistletoe	
Zygophyllaceae	Larrea	tridentata		creosote bush	
	Kallstroemia	californica		California caltrop	

Appendix C

Wildlife Species Detected - Primary Study Area

Common Name	Scientific Name	Sign
Birds		
American Kestrel	*Falco sparverius*	O
Ash-throated Flycatcher	*Myiarchus cinerascens*	O,V
Bank Swallow	*Riparia riparia*	O
Barn Swallow	*Hirundo rustica*	O
Black Phoebe	*Sayornis nigricans*	O,V
Black-tailed Gnatcatcher	*Polioptila melanura*	O,V
Black-throated Sparrow	*Amphispiza bilineata*	O,V
Blue-gray Gnatcatcher	*Polioptila caerulea*	O,V
Brewer's Sparrow	*Spizella breweri*	O
Bullock's Oriole	*Icterus bullockii*	O
Burrowing Owl	*Athene cunicularia*	O, S, F
Common Poorwill	*Phalaenoptilus nuttallii*	O
Common Raven	*Corvus corax*	O,V, N
Cooper's Hawk	*Accipiter cooperii*	O
Costa's Hummingbird	*Calypte costae*	O
Gambel's Quail	*Callipepla gambelii*	O,V
Golden Eagle	*Aquila chrysaetos*	O
Great Blue Heron	*Ardea herodias*	O
Greater Roadrunner	*Geococcyx californianus*	O
Horned Lark	*Eremophila alpestris*	O,V
House Finch	*Carpodacus mexicanus*	O,V
Le Conte's Thrasher	*Toxostoma lecontei*	O,V
Lesser Goldfinch	*Carduelis psaltria*	O
Lesser Nighthawk	*Chordeiles acutipennis*	O
Loggerhead Shrike	*Lanius ludovicianus*	O,V
Mourning Dove	*Zenaida macroura*	O,V
Northern Harrier	*Circus cyaneus*	O
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	O
Osprey	*Pandion haliaetus*	O
Peregrine Falcon	*Falco peregrinus*	O
Phainopepla	*Phainopepla nitens*	O,V
Prairie Falcon	*Falco mexicanus*	O,V, N
Red-tailed Hawk	*Buteo jamaicensis*	O,V, N
Rock Wren	*Salpinctes obsoletus*	O,V
Sage Thrasher	*Oreoscoptes montanus*	O,V
Say's Phoebe	*Sayornis saya*	O,V
Scott's Oriole	*Icterus parisorum*	O
Sharp-shinned Hawk	*Accipiter striatus*	O
Swainson's Hawk	*Buteo swainsoni*	O
Tree Swallow	*Tachycineta bicolor*	O

Common Name	Scientific Name	Sign
Turkey Vulture	*Cathartes aura*	O
Verdin	*Auriparus flaviceps*	O
Violet-green Swallow	*Tachycineta thalassina*	O
Western Kingbird	*Tyrannus verticalis*	O,V
Western Scrub-Jay	*Aphelocoma californica*	O,V
White-crowned Sparrow	*Zonotrichia leucophrys*	O,V
White-throated sparrow	*Zonotrichia albicollis*	O
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
California Kingsnake	*Lampropeltis getula californiae*	O
Coachwhip	*Masticophis flagellum*	O
Desert Horned Lizard	*Phrynosoma platyrhinos*	O, S
Desert Iguana	*Dipsosaurus dorsalis*	O, S
Gopher Snake	*Pituophis melanoleucus*	O
Long-nosed Leopard Lizard	*Gambelia wislizenii*	O
Long-tailed Brush Lizard	*Urosaurus graciosus*	O
Side-blotched Lizard	*Uta stansburiana*	O
Sidewinder	*Crotlus cerastes*	O
Speckled Rattlesnake	*Crotalus mitchelli*	O
Western Patch-nosed Snake	*Salvadora hexalepis*	O
Western Shovel-nosed Snake	*Chionactis occipitalis*	O
Western Whiptail	*Cnemidophorus tigris*	O
Zebra-tailed Lizard	*Callisaurus draconoides*	O
Mammals		
Black-tailed Jackrabbit	*Lepus californicus*	O, T, S
Burro Deer	*Odocoileus hemionus eremicus*	O, T, S
California Myotis	*Myotis californicus*	V
Canyon Bat	*Parastrellus hesperus*	V
Coyote	*Canis latrans*	T, S, B
Desert Cottontail	*Sylvilagus audubonii*	O, T, S, B
Desert Kit Fox	*Vulpes macrotis arsipus*	B, T, S
Desert Woodrat	*Neotoma lepida*	O, B
Great Basin Pocket Mouse	*Perognathus parvus*	O
Hoary Bat	*Lasiurus cinereus*	V
Little Pocket Mouse	*Perognathus longimembris*	O
Long-tailed Pocket Mouse	*Chaetodipus formosus*	O
Merriam's Kangaroo Rat	*Dipodomys merriami*	O, B
Mexican Free-tailed Bat	*Tadarida brasiliensis*	V
Pallid Bat	*Antrozous pallidus*	V

Common Name	Scientific Name	Sign
Palm Spring Round-tailed Ground Squirrel	*Spermophilus teriticaudus chlorus*	O
Small-footed Myotis	*Myotis ciliolabrum*	V
Spiny Pocket Mouse	*Perognathus spinatus*	V
Townsend's Big-eared Bat	*Corynorhinus townsendii*	O, V
White-tailed Antelope Ground Squirrel	*Ammospermophilus leucurus*	O
Yuma Myotis	*Myotis yumanensis*	V

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