5.9 Paleontological Resources

This section evaluates the potential impacts on paleontological resources of the Palen Solar Power Project (PSPP or Project). The evaluation summarizes applicable laws, ordinances, regulations and standards (LORS), discusses the paleontological sensitivity of the Project area, evaluates potential Project-related impacts on the paleontological resources identified, and provides recommendations for mitigating potential impacts. Because the location of the planned substation where the Project will interconnect with the regional grid has not been finalized, the transmission line route itself cannot be finalized. For this reason this section does not cover a transmission line route, the Project's only offsite linear facility, and the following pages address only the paleontological resources of the Project site.

This assessment is based on a comprehensive literature review, museum records search, and fieldwork at the Project site. It was conducted in accordance with the professional standards of the Society of Vertebrate Paleontology (SVP) and was performed by qualified paleontological professionals. Additional details of the assessment, including personnel qualifications, are provided in Appendix H.

The paleontological resources evaluation presented in the following pages is intended to support compliance both by the California Energy Commission (CEC) with the requirements of the California Environmental Quality Act (CEQA), and by the Bureau of Land Management (BLM) with the requirements of the National Environmental Policy Act (NEPA). The two agencies are conducting a joint review of the Project and a combined CEQA/NEPA document will be prepared

Summary

With implementation of planned mitigation measures, the Project would have no significant impacts on paleontological resources. A comprehensive records search and literature review indicated that no fossil localities have been previously recorded in the Project area. No fossils were observed on the surface during the paleontological field survey that was conducted for the Project. However, the underlying geology includes an area in the northeast portion of the site that is of high sensitivity for paleontological resources (the area closest to what is now Palen Dry Lake), and the remainder of the plant site is of paleontological sensitivity ranging from low to high with increasing depth. The planned mitigation includes a comprehensive professionally-prepared monitoring and mitigation plan approved by the agencies before construction, including employee training; monitoring during excavations in locations of high paleontological sensitivity; and appropriate data recovery of fossil materials encountered, if any.

5.9.1 LORS Compliance

Fossils are considered nonrenewable scientific resources and are protected by various LORS. Those applicable are summarized in Table 5.9-1 and in the text following the table.

Table 5.9-1 Summary of Applicable Paleontological Resources LORS

LORS	Applicability	Where Discussed in AFC
Federal:		
Antiquities Act of 1906: Public Law 59-209; 16 United States Code (USC) 431 et seq.	Requires protection of paleontological resources and other objects of historic or scientific interest on Federal lands.	Section 5.9.1
NEPA: 42 USC 4321-4347	Recognizes the continuing responsibility to preserve important historic, cultural, and natural aspects of our national heritage on Federal lands.	Section 5.9.1
Paleontological Resources Preservation Act (PRPA), as provided for in Title VI of the Omnibus Public Land Management Act (1) of 2009, Public Law 111-11	Codifies the practice of the BLM of requiring that rare and scientifically significant fossils be collected only by qualified researchers who obtain a permit.	Section 5.9.1
Federal Land Policy and Management Act (FLPMA): 43 USC 1701-1784	Recognizes significant paleontological resources as scientific resources, and requires Federal agencies to manage public lands in a manner that protects the quality of scientific resources and, where appropriate, preserves and protects certain public lands in their natural condition. FLPMA authorizes fossil collection permits on BLM lands.	Section 5.9.1
National Preservation Act of 1966: 16 USC 470	Provides for the survey, recovery, and preservation of significant paleontological data when such data may be destroyed or lost due to a Federal, federally licensed, or federally funded project.	Section 5.9.1
Title 43 Code of Federal Regulations (CFR) Section 8365.1-5	Prohibits unauthorized collection of certain scientific resources, including vertebrate fossils, on Federal lands. Using fossils found on Federal lands for commercial purposes is also prohibited.	Sections 5.9.1, 5.9.3, and 5.9.4
State:		
CEQA: Public Resources Code (PRC) Section 21000 et seq.	Addresses project construction that encounters paleontological resources.	Sections 5.9.1
PRC Sections 5097.5	Prohibits unauthorized removal of paleontological resources from sites located on public lands; not applicable unless project lands have been acquired by the State.	Not applicable

Table 5.9-1 Summary of Applicable Paleontological Resources LORS

LORS	Applicability	Where Discussed in AFC
Local:		
Riverside County General Plan	Addresses preservation of paleontological resources in accordance with CEQA guidelines and presents policy for assessment and mitigation of significant paleontological resources.	Sections 5.9.3 and 5.9.4
Professional Standards		
Society of Vertebrate Paleontology Guidelines (1995)	Establishes standards for paleontological assessments and for mitigation of adverse impacts on paleontological resources.	Sections 5.9.1

5.9.1.1 Federal LORS

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906, which requires protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federally administered lands, including paleontological resources. Other Federal requirements and guidelines for the protection of significant paleontological resources include NEPA, FLPMA, the National Preservation Act of 1966, and Title 43 CFR. In addition to the above requirements, in March 2009, the PRPA was enacted as a result of the passage of the OPLA of 2009, Public Law 111-011, Title VI, Subtitle D. The PRPA sets forth regulations and provisions pertaining to paleontological resources on all federally administered lands. The PRPA codifies the practice of the BLM of requiring that rare and scientifically significant fossils be collected only by qualified researchers who obtain a permit, and is consistent with paleontological guidelines outlined in the Paleontology Resources Management Manual and Handbook H-8270-1. As a result of the recent enactment of the PRPA, Federal agencies will begin developing appropriate plans for the management of paleontological resources and the implementation of the PRPA. Federal protection for significant paleontological resources applies to the Project since construction and operations will occur on federally owned or managed lands.

In 2000, the Secretary of the Interior submitted a report to Congress entitled “Assessment of Fossil Management on Federal and Indian Lands.” This report was prepared with the assistance of eight Federal agencies including the Bureau of Indian Affairs, the BLM, the Bureau of Reclamation, the United States Fish and Wildlife Service, the United States Forest Service, the National Park Service, the United States Geological Survey, and the Smithsonian Institution. The consulting agencies concluded that administrative and Congressional actions with respect to fossils should be governed by these seven basic principles:

1) Fossils on Federal land are a part of America's heritage.
2) Most vertebrate fossils are rare.
3) Some invertebrate and plant fossils are rare.
4) Penalties for fossil theft should be strengthened.
5) Effective stewardship requires accurate information.
6) Federal fossil collections should be preserved and available for research and public education.
7) Federal fossil management should emphasize opportunities for public involvement.

5.9.1.2 State LORS

The CEC environmental review under the Warren-Alquist Act is considered a CEQA-equivalent process under California law. The CEQA Guidelines (Title 14 California Code of Regulations Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G to Section 15023 includes an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts, including the following: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" The Environmental Checklist also asks, "Does the project have potential to eliminate important examples of the major periods of California history or pre-history?" Fossils are important examples of periods of California pre-history.

Other State requirements for paleontological resources management are included in PRC Sections 5097.5. This statute prohibits the removal of any paleontological site or feature from State public lands without permission of the jurisdictional agency, defines the removal of paleontological sites or features as a misdemeanor, and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (State) lands. These protections would apply to the Project only if the State were to obtain ownership of Project lands during the term of its license.

5.9.1.3 Local LORS

Paleontological resources are addressed in the Riverside County General Plan. The County General Plan Multipurpose Open Space Element (adopted October 7, 2003) includes the following policies concerning paleontological resources:

- OS 19.8: "Whenever existing information indicated that a site proposed for development may contain biological, paleontological, or other scientific resources, a report shall be filed [with the Planning Department] stating the extent and potential significance of the resources that may exist within the proposed development and appropriate measures through which the impacts of development may be mitigated."
- OS 19.9: "This policy requires that when existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor grading activities, with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate repository, and file a report with the Planning Department documenting any paleontological resources that are found during the course of site grading."

5.9.1.4 Professional Standards

The SVP has established standard guidelines that outline professional protocols and practices for the conducting of paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Typically, state regulatory agencies with paleontological LORS accept and utilize the professional standards set forth by the SVP.

As defined by the SVP, significant nonrenewable paleontological resources are defined as:

> Fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a

> project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments.

As defined by the SVP, significant fossiliferous deposits are defined as:

> A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years, before present (BP).

Based on the significance definitions of the SVP, all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be “sensitive” to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from that for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case.

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

5.9.1.5 Involved Agencies

Agency contacts for Project paleontological resource issues are shown in Table 5.9-2

Table 5.9-2 Agencies and Agency Contacts

Agency Contact	Phone/E-mail	Permit/Issue
Cheryl Martinez Bureau of Land Management Palm Springs Field Office 1201 Bird Center Drive Palm Springs, CA 92262	(760) 833-7147 Cheryl_Martinez@blm.gov	Field Authorization Request, under Permit No. CA-09-00-005P
David L. Jones Chief Engineering Geologist Riverside County Planning Department, Geology Division, 4080 Lemon Street Riverside, CA 92502	(951) 955-4004 dljones@rctlma.org	None required

5.9.1.6 Required Permits and Permit Schedule

A BLM permit and Field Work Authorization was required to conduct the paleontological resources investigation reported in this AFC. All work on the Project is being completed under BLM Permit No. CA-09-00-005P, which authorizes survey, recordation, and limited collection of paleontological resources.

5.9.2 Affected Environment

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist. Once destroyed, a fossil can never be replaced. The following subsections discuss existing conditions with respect to paleontological resources in the Project area.

5.9.2.1 Records Search and Field Survey

For this Project, museum records searches were performed by the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (LACM), the Department of Earth Sciences at the San Bernardino County Museum (SBCM), and the Colorado Desert District Stout Research Center (CDDSRC). The LACM records search was performed by Dr. Samuel McLeod, Curator of Vertebrate Paleontology, on May 7, 2009. The CDDSRC records search was performed by Mr. George Jefferson, Associate State Archaeologist, on June 11, 2009. The SBCM records search was performed by Mr. Eric Scott, Curator of Paleontology, on June 17, 2009. Museum collections records were searched for the purposes of determining whether there are any known fossil localities within or near the Project site, identifying the geologic units present in the Project area, and determining the paleontological sensitivity ratings of those geologic units in order to assess potential impacts to nonrenewable paleontological resources. Published and unpublished literature and geologic maps were reviewed, and mitigation measures specific to this Project were developed in accordance with the SVP's professional standards and guidelines.

A pedestrian reconnaissance survey of the Project area was performed May 25 through June 19, 2009. The field survey was led by Project Paleontologist Justin Strauss with assistance from Stephanie

Lukowski and Benjamin Borkan, under the direction of Paleontology Field Manager Jessica DeBusk and Principal Investigator Cara Corsetti. Ms. DeBusk conducted field visits during the course of the field survey. The purpose of the fieldwork was to inspect the study area for surface fossils and exposures of potential fossil-bearing geologic units and to determine areas in which fossil-bearing geologic units could be exposed during Project-related ground disturbances.

5.9.2.2 Paleontological Sensitivity

Due to the nature of the fossil record, paleontologists cannot know either the quality or the quantity of fossils present in a given geologic unit prior to natural erosion or human-caused exposure. Therefore, in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce scientifically significant fossils elsewhere within the same geologic unit (both within and outside of the study area) or a unit representative of the same depositional environment.

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. The SVP's "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources" define three categories of paleontological sensitivity (potential) for rock units: high, low, and undetermined:

- **High Potential.** Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontologic resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both a) the potential for yielding abundant or significant vertebrate fossils and b) the importance of recovered evidence for new and significant paleontological data.
- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.
- **Undetermined Potential.** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

Note that metamorphic and granitic rock units generally do not yield fossils and therefore have no to low potential to yield significant nonrenewable fossiliferous resources.

5.9.2.3 Regional Geologic Setting

California is naturally divided into the following 12 geomorphic provinces, each distinguished from one another by unique topographic features and geologic formations: 1) the Sierra Nevada; 2) the Klamath Mountains; 3) the Cascade Range; 4) the Modoc Plateau; 5) the Basin and Range; 6) the Mojave Desert; 7) the Colorado Desert; 8) the Peninsular Ranges; 9) the Transverse Ranges; 10) the Coast Ranges; 11) the Great Valley; and 12) the Offshore area. The Project site is located in the northeast corner of the Colorado Desert geomorphic province. The Colorado Desert is bounded to the east by the Colorado River, to the south by the international border, and to the west by the Peninsular Ranges. Norris and Webb define the northern border as the southern edge of the eastern Transverse Ranges and the San Bernardino-Riverside county line.

The Project site is located within Chuckwalla Valley, situated between the Chuckwalla Mountains to the south and the Palen and Coxcomb Mountains to the north. Alluvial divides reaching up to 1,500 feet above mean sea level (msl) serve as boundaries between the mountain ranges to the north and west of the Valley. The Valley is dominated by up to 1,200 feet of sand, gravel, and clay derived from the surrounding highlands and contains numerous dry lake beds that are separated by sand dunes. The surrounding mountains reach 2,000 to 4,000 feet above msl and the lowest point of the valley is Ford Dry Lake, located southeast of the project area at an elevation of approximately 360 feet above msl. These lake beds, alluvial sediments, and sand dunes underlie the Project site, and are discussed in more detail in the following sections.

5.9.2.4 Geologic Setting of the Project Site and Vicinity

According to geologic mapping by Jennings, Stone and Pelka, the Project site is underlain by Quaternary alluvial, aeolian, and lake bed deposits ranging from Pleistocene (1.8 million years old to 10,000 years BP to Holocene (10,000 years BP to Recent) in age. Quaternary lake bed deposits, which date to the Pleistocene and have the potential to produce significant vertebrate fossils, are present both at the surface and subsurface within the Project area. These units, and their paleontological resource potential, are discussed in more detail in the following sections.

Table 5.9-3 Geologic Units Underlying the PSPP Site and their Paleontological Sensitivity Ratings

Geologic Unit	Age	Types of Species	Sensitivity Rating
Younger Alluvium	Holocene	None	Low to High (increases with depth)
Windblown Sands/Sand Dunes	Holocene to Pleistocene	Terrestrial Vertebrates None	Low to High (increases with depth)
Lake Bed Deposits	Holocene to Pleistocene	Terrestrial Vertebrates	High

Quaternary Younger Alluvium (Qya, Qal)

Much of Chuckwalla Valley is underlain by Quaternary younger alluvium, mapped as “Qal” by Jennings and “Qya” by Stone and Pelka. Quaternary younger alluvium is generally reported as Holocene in age (10,000 years BP to Recent) but is locally dated as 2,000 years to 0 years BP in age. These sediments, underlying about half of the surficial deposits within the Project area, are composed of alluvial silt, sand, and gravel derived from the surrounding mountains. Although these Holocene-aged sediments often contain the remains of modern organisms, they are too young to contain significant paleontological resources. However, paleontologically sensitivity Quaternary lake beds or Quaternary intermediate age or older alluvium may occur at a relatively shallow but unknown depth. Therefore, Quaternary alluvium within the Project area is assigned a paleontological sensitivity ranging from low to high, increasing with depth.

Quaternary Windblown Sand/Sand Dunes (Qs)

The northeast portion of the Project site is underlain by active sand dunes and sand sheets, “Qs,” of Recent age. The sand derives from the surrounding mountains, and dune formation has likely resulted from winds originating from the northwest, based on their accumulation in the southeast area of the valley floor. Whereas the uppermost active sand dune deposits are not likely to contain fossilized remains, underlying older sand dune deposits may contain scientifically vertebrate specimens. Therefore, sand

dune deposits within the Project area are assigned a paleontological sensitivity ranging from low to high, increasing with depth.

Quaternary Lake Bed Deposits (Ql)

Surficial exposures of Quaternary lake bed deposits occur in the northeastern portion of the Project site and may also be found at the subsurface underlying both aeolian deposits and younger alluvium (Figure 5.9-1). Quaternary lake bed deposits, mapped by Jennings as "Ql," are locally weakly consolidated to slightly dissected and in part overlain by modern playa deposits consisting of partly gypsiferous silt and clay. Jennings and Stone date these sediments to the Holocene and the latest Pleistocene. These Quaternary lacustrine sediments were likely deposited as a result of an expanded ancient Palen Lake now situated immediately north of the northeastern corner of the Project site. Quaternary lake beds and similar deposits nearby and elsewhere in the Mojave Desert have produced numerous fossil vertebrate localities. Therefore, these sediments are determined to have a high paleontological sensitivity.

Sensitive Geologic Units

The majority of the Project site is immediately underlain by Quaternary younger alluvium of Holocene age that is considered to have a low paleontological sensitivity. Quaternary older alluvium, which dates to the Pleistocene, is present in the subsurface throughout the Project area at an unknown but potentially shallow depth. The northeastern portion of the Project site is considered an area of high sensitivity as it is underlain by Quaternary lake bed deposits at the surface, and potentially Pleistocene-aged windblown sands/sand dunes at depth. As with alluvium, surficial lake bed deposits likely date to the Holocene but at depth these sediments date to the Late Pleistocene. The locations of paleontologically sensitive geologic units underlying the Project site and linear facilities are identified on Figure 5.9-1.

Paleontological Resources Assessment

A review of museum collections records at the LACM, SBCM, and CDDSRC confirmed that no fossil localities have been previously recorded within the Project boundaries or within a one-mile radius. However, at least three vertebrate fossil localities have been previously recorded southwest of the project area within the same or similar sediments. LACM 5977, located east-southeast of the Project site north of U.S. Interstate 10 and on the southwest side of Ford Dry Lake, yielded fossilized remains of *Perognathus* (pocket mouse). LACM (CIT) 208 and LACM 3414, located north-northwest of the proposed Project site between Eagle and Coxcomb Mountains, yielded fossilized remains of *Gopherus* (tortoise), *Equus* (horse), *Camelops* (camel), and *Tanupolama stevensi* (llama). The depth at which these localities were discovered was not reported by the LACM; however, the SBCM indicates that significant vertebrate fossil remains have often been discovered in this region from similar Pleistocene deposits at a depth as shallow as five feet below ground surface.

A transect survey of the entire study area was conducted utilizing 25 to 50 meter intervals. The interval width used in any given area was determined based on the expected abundance of fossil materials in each area, based upon the recommendations of the museum records searches performed prior to the field survey, inspection of geologic and aerial maps, and visual observations of ground surface visibility. Both a handheld Garmin Global Positioning System (GPS) unit and a Trimble GeoXT GPS unit were used to ensure complete coverage of the project area. Upon discovery of any fossil materials, the exact location of each fossil was recorded on the Trimble unit and pertinent information was recorded for each specimen, including notes on the material on which it was found and a brief description of the specimen. A set of photographs were also taken and if warranted, the fossil was then collected.

During the course of the paleontological survey within the Project site, a single non-significant fossil point yielding non-diagnostic vertebrate material was recorded. The specimen was discovered *ex-situ* (removed from their original place of fossilization) as a lag deposits transported an unknown distance and

re-deposited on top of alluvial sediments. For this reason, and due to the lack of diagnostic characteristics, the fossil resource discovered on the surface within the Project site is not considered significant. For the purposes of surface clearance, the specimen was collected and examined by vertebrate paleontologists and subsequently determined to be unidentifiable. Maps illustrating the locations of paleontological resources noted during onsite transect surveys are included in Appendix H.

5.9.3 Environmental Impacts

The following subsections address potential Project impacts during construction and operation. As discussed in Section 5.9.2.2, the SVP's "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources" define three categories of paleontological sensitivity (potential) for rock units: high, low, and undetermined. Potential Project impacts are assessed in terms of whether Project excavation activities would occur in areas whose underlying geology leads to a classification high, low, or undetermined sensitivity. Excavations in an area of high sensitivity have a high potential for a significant impact; excavations in areas of low sensitivity have a low potential for significant impact. Excavations in areas of undetermined sensitivity require a site-specific determination by a qualified professional in terms of potential impact significance. The PSPP site does not include areas considered of "undetermined sensitivity".

5.9.3.1 Construction

Construction of the Project has the potential to result in the destruction of sub-surface paleontological resources via breakage and crushing related to ground disturbing activities during grading for the proposed solar field, power block, drainage channels, and access road. Ground disturbance and terrain modification, expected to disturb 4.5 million cubic yards of sediments, has the potential to adversely impact an unknown quantity of fossils that may occur on or underneath the surface in areas containing paleontologically sensitive geologic units.

The Project site is underlain by fossiliferous geologic units. No significant paleontological resources were observed on the ground surface during the field survey. However, the entire Project area is underlain by geologic sediments determined to have a high paleontological sensitivity either at the surface or at a potentially shallow depth (five feet or less below ground surface) (See Figure 5.9-1). However, the implementation of mitigation measures described in Section 5.9.4 (e.g., proper planning, employee training, professional paleontologist monitoring in areas of high paleontological sensitivity) during Project construction will ensure that any significant fossils that may be encountered would not be adversely impacted by rendering them permanently unavailable.

5.9.3.2 Operation

Operational impacts to paleontological resources typically include those effects related to the continuing implementation of activities within a specific project area. They may also occur as the result of the construction of new roads in areas that were previously inaccessible, which increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting (poaching). The operation of the Project will not result in an adverse impact to paleontological resources because no new roads will be constructed that provide access to previously inaccessible areas; the short extension of Corn Springs Road to provide access to the Project site will not provide access to any other areas. Additionally, the Project site will be fenced, thereby decreasing public access and opportunities for the loss of paleontological resources through vandalism and unlawful collecting.

5.9.3.3 Cumulative Impacts

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The Project is not expected to have significant adverse impacts. In general, for scientifically significant paleontological resources that are present within the Project area, the potential for the Project to contribute to significant cumulative impacts would be low as measures to avoid or salvage the resources would be implemented. The mitigation measures below would effectively recover the value to science and society of significant fossils that would otherwise have been destroyed by surface-disturbing actions. Further, other projects in the vicinity of the Project also will be required to comply with LORS that protect paleontological resources. In any case, the Project's potential contribution to significant adverse cumulative impacts would not be cumulatively considerable.

5.9.4 Mitigation Measures

Although no significant Project adverse impacts on paleontological resources have been identified, the following mitigation measures have been developed to ensure that the potential adverse impacts of ground disturbance on paleontological resources are less than significant. The measures are based on the SVP standard guidelines and meet the requirements of CEQA. These mitigation measures have been used throughout California and have been demonstrated to be successful in protecting paleontological resources while allowing timely completion of construction projects in paleontologically sensitive areas.

PAL -1 Prior to the start of any project-related construction (defined as construction-related vegetation clearing, ground disturbance and preparation, and site excavation activities), the project owner will ensure that the designed paleontological resource specialist approved by the CEC Compliance Project Manager (CPM) is available for field activities and prepared to implement the Conditions of Certification. The designated paleontological resource specialist will be responsible for implementing all paleontological mitigation measures that are established by the CEC as Conditions of Certification and for using qualified personnel to assist in this work.

PAL -2 Prior to the start of construction, a Paleontological Resource Monitoring and Mitigation Plan (PRMMP) drafted by the designated paleontological resource specialist will be submitted to the CPM for approval. The plan will identify general and specific measures to minimize potential impacts to sensitive paleontological resources. The project paleontological resource specialist will implement the PRMPP as needed.

The PRMMP will include, but not be limited to, the following elements and measures:

- A discussion of the sequence of project-related tasks, such as any preconstruction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation.
- Identification of the person(s) expected to assist with each of the tasks identified within this condition, and a discussion of the mitigation team leadership and organizational structure, and the interrelationship of tasks and responsibilities.
- Identification of the extent of the areas where monitoring is to occur and a schedule for the monitoring where monitoring of project construction activities is deemed necessary.
- An explanation that the designated Paleontological Resource Specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined.

- A discussion of the equipment and supplies necessary for the recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits.
- Inventory, preparation and delivery for curation info a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources.
- Identification of the institution (expected to be the SBCM) that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any requirements of specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution.

PAL- 3 Prior to the start of construction, the Paleontological Resource Specialist will prepare a staff training program for review and approval by the CPM. Prior to and throughout the project and as needed, the paleontological resource specialist will conduct training for the project owner, project managers, construction supervisors, equipment operators and all new employees in accordance with the CPM approved training plan. Contractor briefings will also be videotaped and used for education for new employees.

The paleontological training program will address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources. The training program will also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities. The training program will be presented by the designated paleontological resource specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials or any other areas of interests or concerns.

PAL- 4 During construction, the designated paleontological resource specialist or paleontological monitor will monitor construction-related grading, excavation, trenching, and/or augering in areas with a significant potential for fossil-bearing sediments to occur. All ground disturbances in lake bed deposits will be monitored on a full-time basis because of their high paleontological sensitivity. All ground disturbances in younger alluvium and in wind-blown sand/sand dune deposits (at or less than five feet in depth) will be spot-checked by paleontological monitors; ground disturbances in these areas that are greater than five feet in depth will be monitored on a full-time basis because of their high sensitivity. Paleontological monitoring will include inspection of exposed rock units and microscopic examination of matrix to determine if fossils are present. Paleontological monitors will have authority to temporarily divert excavations or drilling away from exposed fossils in order to efficiently and professionally recover the fossil specimens and collect associated data.

PAL – 5 The project owner, through the designated paleontological resource specialist, will ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

PAL - 6 The project owner will ensure preparation of a Paleontological Resources Report by the designated paleontological resource specialist following the analysis of the recovered fossil materials and related information. The Paleontological Resources Report will be submitted to the CPM for approval. The report will include a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources found in the field;

determinations of sensitivity and significance; and a statement by the paleontological resource specialist that project impacts to paleontological resources have been mitigated.

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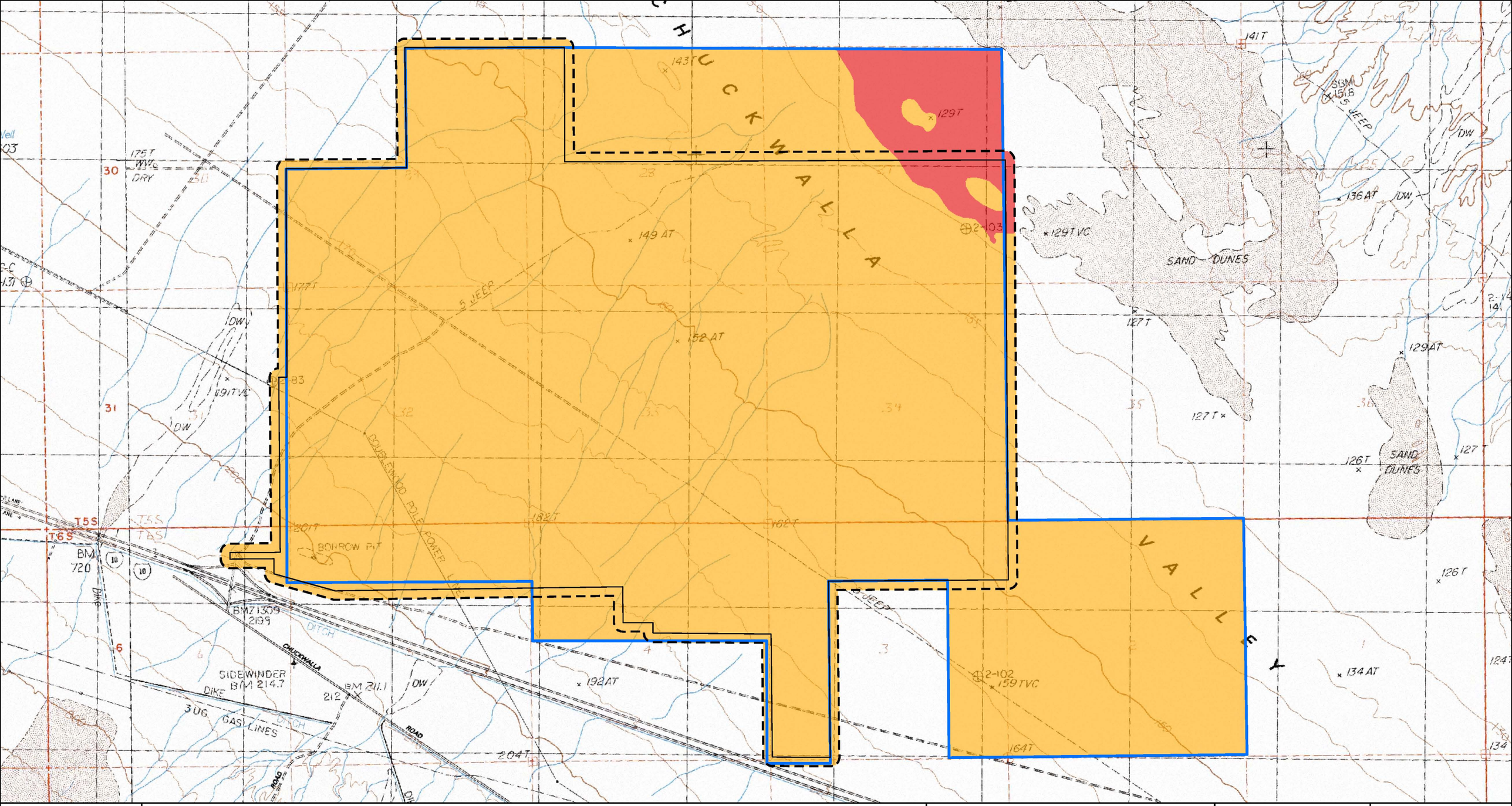

Map Location

Legend

Paleontological Sensitivity
- Low to High (increasing with depth)
- High

- Disturbance Area
- Project Right of Way
- Disturbance Area Plus 200' Buffer

Source: USGS 7.5' Quadrangle: Sidewinder Well (Created 1977; Field Checked 1978; Edited 1983); Geologic Data: Stone and Pelka (1989) and Jennings (1967).

N W E S

1 inch = 2,100 feet

0 0.5 1 Miles

Palen Solar Power Project

Figure 5.9-1 Paleontological Sensitivity Map

Solar Millennium

AECOM

Project: 12944-001
Date: August 2009