APPENDIX E

PHASE I CULTURAL RESOURES INVENTORY REPORT/ PALEONTOLOGICAL RESOURCES INVENTORY REPORT

PHASE I CULTURAL RESOURES INVENTORY REPORT

Wistaria Ranch Solar Energy Center

Imperial County, California

Prepared For:

WISTARIA RANCH SOLAR, LLC

Prepared By:

UltraSystems
environmental • management • planning

16431 Scientific Way
Irvine, CA 92618

March 2014

THIS PAGE INTENTIONALLY LEFT BLANK.

TABLE OF CONTENTS

Section **Page**

TABLES

Table **Page**

FIGURES

Figures **Page**

APPENDICES

Appendix

THIS PAGE INTENTIONALLY LEFT BLANK.

MANAGEMENT SUMMARY

PURPOSE AND SCOPE

UltraSystems Environmental Inc. (UltraSystems) undertook this Phase I cultural resource inventory as part of California Environmental Quality Act (CEQA) requirements for the proposed Wistaria Ranch Solar Energy Center, LLC Project (Project). The proposed Project consists of a Solar Energy Generating Facility with associated Transmission Interconnection Line, located entirely on private property. The format of this report follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (Office of Historic Preservation 1990).

PROJECT LOCATION

The Project area encompasses approximately 2,793 acres and is located near the community of Seeley in the County of Imperial, California. The project encompasses portions of Sections 3, 10, 15, 16, 28 and 33 in Township 6 South/Range 13 East on the USGS 7.5 Minute *Mount Signal* Quadrangle; portions of Sections 3, 6, 10, and 15 in Township 7 South/Range 13 East on USGS 7.5 Minute *Mount Signal* Quadrangle; Sections 11, 27, 28, 33, and 34 in Township 6 South/Range 13 East on the USGS 7.5 Minute *Heber* Quadrangle; and Sections 11, 14, 15, 23, 24, and 32 of Township 7 South/Range 13 East on the USGS 7.5 Minute *Heber* Quadrangle.

PROJECT DESCRIPTION

The proposed Project is a renewable energy project employing photovoltaic (PV) or concentrated photovoltaic (CPV) technology. The proposed Project consists of 32 parcels which comprise the 2,793 acres and 17 CUPs of approximately 20 megawatts (MW) each which may be constructed individually or as a consolidated Project generating approximately 250 MW. The Project may also include an energy storage component. All CUPs are anticipated to use the existing generation interconnection (gen-tie) line that extends from the Project site parcels to the Imperial Solar Energy Center South (ISECS) switchyard. The CUPs are anticipated to use the main Project switchyard; however, each CUP may independently construct a 230 kV step-up transformer and switchyard.

The Project will include electric line and vehicular crossings of Imperial Irrigation District (IID) facilities and County facilities. It is anticipated that electric line crossings would be either overhead or underground which may include either trenching or horizontal directional drilling to place the electric or water lines under existing IID and County facilities.

Primary Project activities with the potential to affect cultural resources include geotechnical work, site grading, trenching, and construction/placement of footings for transmission poles.

DATES OF INVESTIGATION

UltraSystems' director of cultural resources, Stephen O'Neil, M.A., RPA, requested on September 17, 2012 that the South Coastal Information Center (SCIC) at the San Diego State University conduct a cultural resources literature review. The SCIC replied on September 27, 2012 (Appendix A). A cultural resources survey of the Project area and the surrounding area (total of 2,793 ac) was conducted in over the course of October 1, 2012 through November 20, 2012 by UltraSystems archaeologists. Site photographs taken during the survey are located in Appendix B.

FINDINGS OF THE INVESTIGATION

The survey resulted in the discovery of three (3) isolated occurrences of historic artifacts and six (6) historic sites. The historic sites consist of two residential sites, a historic refuse deposit, and the Wistaria Canal and its related lateral branches; the Woodbine Canal and the Greeson Drain.

The results of the records search show that four (4) historic archaeological sites had been previously recorded within the Project vicinity (CA-IMP-3321, -3322, -3323, 3325). None of these sites were located during the present survey. It is likely that these sites have been lost because of intensive agricultural activities.

RECOMMENDATIONS

Under CEQA guidelines, a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. Under CEQA, an "historic resource" includes any of the following:

> [1] A resource listed in, or determined to be eligible for listing in, the California Register of Historic Resources;
>
> [2] A resource included in a local register of historical resources;
>
> [3] Any object, building, structure, site, are, place, record, or manuscript that a lead agency determines to be historically significant.

A project may have a significant effect on the environment if the project may have a significant effect on unique archeological resources, which include archeological artifacts,

objects, or sites for which there is a high probability of yielding important scientifically historical information.

Archaeological sites similar to the six historic sites discovered during the survey may be determined to be significant due to their potential for intact buried deposits. Any of these six historical sites could possibly yield additional information important to the understanding of the history of the region.

It is recommended that if a site(s) cannot be avoided, a formal Phase II evaluation be conducted by a qualified archeologist prior to ground disturbance that would destroy or degrade these resources, such as grading.

Preservation is the preferred treatment for historical resources. If preservation is not feasible, a data recovery plan may be used to mitigate the adverse effects to the historical resource. A data recovery plan details methods for recovering the scientifically consequential information from and about the historical resource, and recordation/deposition of data/materials with the California Historical Resources Regional Information Center. Following data recovery, a qualified archaeological monitor should be present at these sites during grading to ensure undiscovered resources are protected.

Should the archaeologist discover a significant buried deposit during construction the archaeologist must be empowered to divert construction equipment in the event of such a discovery until an evaluation of the find is completed.

DISPOSITION OF DATA

This report will be filed with the County of Imperial, UltraSystems, and the Southern Coastal Information Center. All field notes and other documentation related to the resources used to prepare this report are on file at UltraSystems' main office in Irvine, California.

SECTION 1.0 UNDERTAKING INFORMATION/ INTRODUCTION

CONTRACTING DATA

UltraSystems contracted with Wistaria Ranch Solar, LLC to conduct archaeological surveys on 60 parcels southwest of El Centro, California (Figure 1). The parcels are presently used for agriculture and are supported by a network of unpaved roads/berms, canals and laterals. The archaeological surveys included the supporting roads/berms and canals as appropriate. Table 1 lists the subject parcels, their acreage and the estimated percentage of surface visibility at the time of the survey. Parcels identified as roads or pathways had 100% visibility. Figure 2 depicts the Project area with the numbered subject parcels.

TABLE 1.
SUBJECT PARCELS WITH ACREAGE, TYPE AND SURFACE VISIBILITY

APN	Acres	Type/ % Surface Visibility	APN	Acres	Type/ % Surface Visibility
052-170-014	37.0	Crop (50)	052-210-025	55.5	(Crop) 0
052-180-001	36.6	Crop (50)	052-210-026	61.4	Crop (0)
052-180-002	40.4	Crop (50)	052-210-028	1.4	Pathway (100)
052-180-011	115.3	Crop (20)	052-210-029	73.3	Crop (100)
052-180-012	153.6	Crop (5)	052-210-032	5.2	Trans. Corridor (50)
052-180-015	148.5	Crop (5)	052-210-036	12.9	Pathway (100)
052-180-028	71.2	Crop (0)	052-210-039	1.9	Road (100)
052-180-030	10.7	Road (100)	052-350-002	23.2	Crop (0)
052-180-032	3.1	Road (100)	052-350-003	12.9	Crop (0)
052-180-039	152.4	Crop (100)	052-350-004	6.6	Crop (0)
052-180-040	8.3	Pathway (100)	052-350-020	76.7	Crop (0)
052-180-045	162.9	Crop (0)	052-350-021	150.1	Crop (100)
052-180-048	10.8	Pathway (100)	052-350-022	2.0	Crop (100)
052-180-054	82.7	Crop (0)	052-350-031	2.1	Road (100)
052-180-056	0.8	Road (100)	052-360-008	75.5	Crop (50)
052-180-059	3.1	Road (100)	052-360-009	4.8	Crop (50)
052-190-008	0.3	Trans. Corridor (50)	052-410-006	51.5	Crop (50)
052-190-009	9.7	Trans. Corridor (50)	052-440-003	3.0	Road (100)
052-190-010	10.5	Trans. Corridor (50)	052-440-004	156.9	Crop (50)
052-190-011	26.6	Trans. Corridor (50)	052-440-005	160.0	Crop (100)
052-190-012	45.2	Trans. Corridor (50)	052-440-006	79.8	Crop (0)
052-190-022	26.1	Trans. Corridor (50)	052-440-009	2.1	Road (100)
052-190-037	15.0	Trans. Corridor (0)	No APN	4.8	Road (100)
052-210-001	29.2	Trans. Corridor (50)	No APN	0.8	Road (100)
052-210-006	0.4	Crop (50)	No APN	9.2	Road (100)
052-210-014	31.6	Trans. Corridor (50)	No APN	0.1	Road (100)
052-210-015	38.6	Trans. Corridor (100)	No APN	4.2	Road (100)
052-210-016	64.5	Trans. Corridor (100)	**Total Acres**	**2932.5**	
052-210-019	123.5	Crop (100)	**Roadways not associated with an APN**	**19.1**	
052-210-020	436.0	Western 120 acres crop (100) Eastern 316 acres crop (0)			

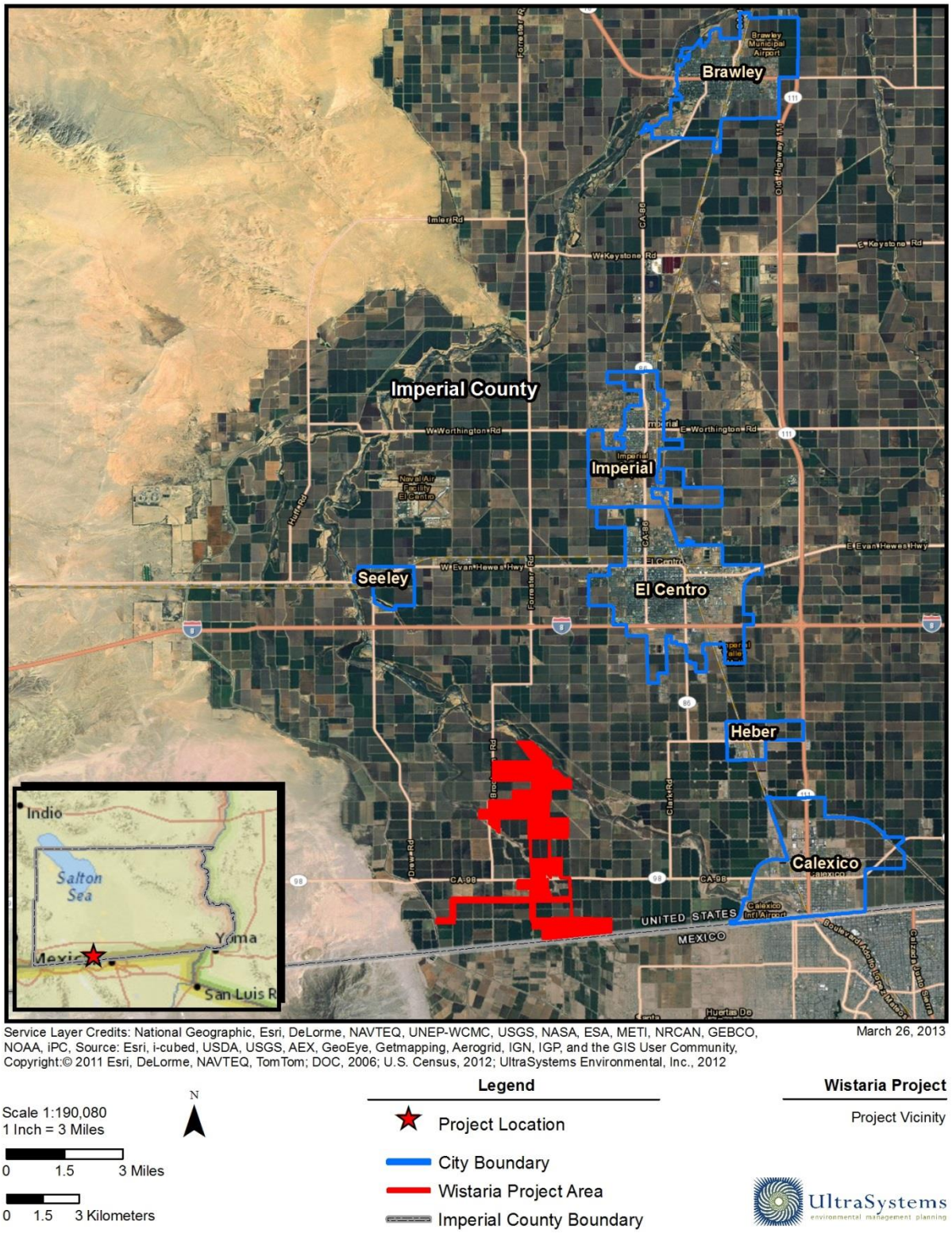

Figure 1. Project Vicinity Map

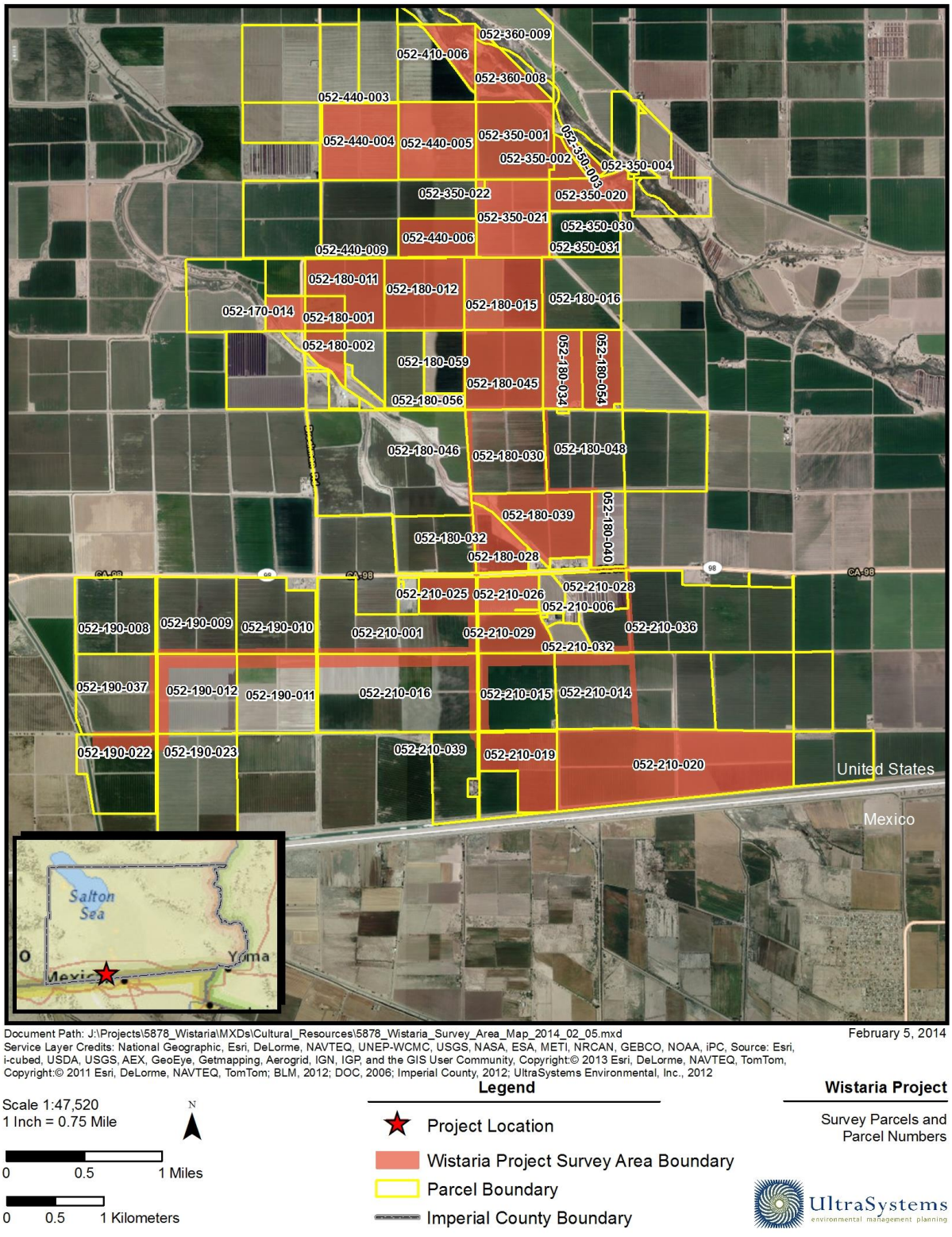

Figure 2. Survey Parcels and Parcel Numbers

STATE AND LOCAL REGULATIONS

This section contains an overview of the applicable laws, ordinances, regulations and standards that govern cultural resources and that must be followed prior to and during construction of the proposed Wistaria Ranch Solar project. Federal regulations are not addressed because this report has been prepared primarily to satisfy the requirements of CEQA (*California Public Resources Code* [PRC] §21000 *et seq*.; 14 *California Code of Regulations* [CCR] §15000 *et seq*.;) and other applicable State regulations.

CEQA requires a lead agency to determine whether a project would have a significant effect on one or more historical resources. According to Section 15064.5(a) of the State CEQA Guidelines, a "historical resource" is defined as a resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR) (PRC §21084.1); a resource included in a local register of historical resources (14 CCR §15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (14 CCR §15064.5[a][3]).

Section 5024.1 of the PRC, Section 15064.5 of the CEQA Guidelines, and PRC Sections 21083.2 and 21084.1 (CEQA) were used as the basic guidelines for this cultural resources study. PRC 5024.1 requires evaluation of historical resources to determine their eligibility for listing in the CRHR. The purposes of the CRHR are to maintain listings of the state's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources in the CRHR are stated below.

> The quality of significance in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California is present in any object, building, structure, site, area, place, record, or manuscript that possesses integrity of location, design, setting, materials, workmanship, feeling and association and that:
>
> (a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
>
> (b) Is associated with the lives of persons important in our past; or
>
> (c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
>
> (d) Has yielded, or may be likely to yield, information important in prehistory or history.

Impacts that affect those characteristics of the resource that would adversely alter the significance of a resource listed in or eligible for listing in the CRHR and/or local register are considered to have a significant effect on the environment. Impacts to cultural resources from the proposed project are considered significant if the project (1) physically destroys or damages all or part of a resource; (2) changes the character of the use of the resource or physical feature within the setting of the resource that contributes to its significance; or (3) introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

The purpose of this cultural resources investigation is to evaluate whether any cultural resources remain exposed on the surface of the project site or whether any cultural resources can reasonably be expected to exist in the subsurface. If resources are discovered, management recommendations would be required for evaluation of the resources for CRHR eligibility, as well as eligibility for the National Register of Historic Places under the National Historic Preservation Act, 16 U.S.C. 470 .

Broad mitigation guidelines for treating historical resources are codified in Section 15126.4(b) of the State CEQA Guidelines. To the extent feasible, public agencies should seek to avoid significant effects to historical resources, with preservation in place being the preferred alternative. If not feasible, a data recovery plan shall be prepared to guide subsequent excavation. Mitigation for historical resources such as buildings, bridges, and other structures that are consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995) will generally be considered mitigated below a level of significance.

LOCAL

Imperial County General Plan

The Imperial County General Plan provides goals, objectives and policies for the identification and protection of significant cultural resources. The Open Space Element of the General Plan includes goals, objectives and policies for the protection of cultural resources and scientific sites that emphasize identification, documentation and protection of cultural resources. Table 2 identifies General Plan policies for cultural resources that are relevant to the proposed Project and summarizes the Project's consistency with those policies. While the DEIR analyzes the Project's consistency with the General Plan pursuant to CEQA guidelines Section 15125(d), the Imperial County Board of Supervisors determine the Project's consistency with the General Plan.

TABLE 2
PROJECT CONSISTENCY WITH THE GENERAL PLAN'S
SIGNIFICANT CULTURAL RESOURCES
GOALS, OBJECTIVES AND POLICIES

Imperial County General Plan Policies	Consistency with General Plan	Analysis
IV. Open Space Implementation Programs and Policies 2. Cultural Resources Conservation Policy Identify and document significant historic and prehistoric resources, and provide for the preservation of representative and worthy examples; and recognize the value of historic and prehistoric resources, and assess current and proposed land uses for impacts upon these resources.	Yes, with Mitigation.	A records search and pedestrian surveys were conducted for the proposed project site. The proposed project is in compliance with this policy through incorporation of mitigation measures described in this report. Open space easements are being considered regarding the conservation of high-value cultural resources.

PROJECT PERSONNEL

UltraSystems Cultural Resources Manager Mr. Stephen O'Neil, M.A., RPA, who meets the Secretary of Interior's Standards and Guidelines for Archaeology (NPS 1983) for prehistoric archaeology and is a Riverside County-certified Archaeologist, directed the cultural resources study. Mr. David Smith, B.A., RPA prepared this report with contributions from Jay Sander, Megan Black and Stephen O'Neil. UltraSystems archaeologists David Smith (crew chief), Daniel Perez, Rocky Ciarmoli, Daniel Ballester, Todd Perry, Stephen O'Neil and Jay Sander conducted the field surveys. [Revisions were made December 2013 based upon peer review comments by Rebekah Loveless with Ericsson-Grant Inc.]

SECTION 2.0 NATURAL AND CULTURAL SETTINGS

NATURAL SETTING

The ancient geology of the Salton Trough consists of a variety of rock and sediment formations. These formations were produced throughout the past 11 million years during numerous events of marine and fresh water inundation and intermediate periods of drying.

Soils of these formations are predominantly clays and silts that were deposited as near-horizontal layers on the trough floor. Up to 20,000 feet of marine and non-marine sedimentary deposits have accumulated in the trough from erosion of nearby mountains and from sediment-burdened alluvial flows of the Colorado River. The oldest rocks of the region lie on the periphery of the Salton Basin and are composed of Precambrian crystalline gneisses, anorthosites and schists that have been intruded by several younger plutonic bodies, ranging from late Paleozoic to middle Cenozoic (Norris and Webb 1976). These ancient rocks occur in the Chocolate and Orocopia Mountains, bordering the Project area, as well as in the Cargo Muchacho Mountains and at Pilot Knob. Several major geologic formations are found in the Salton Basin. These layers, the Palm Springs, Imperial, Borrego, Brawley and Lake Cahuilla Formations, bear fossils and sediments that relate to the specific kind of habitat that formed each layer (Schoenherr 1992).

Much of the Salton Trough was at one time inundated and a connection existed with the Gulf of California. Periodically, access of oceanic waters to the region was cut off by transformations in the land, including buildup of alluvial sediments that were deposited in the Colorado River delta (Loeltz et al. 1975). After this region was separated from the ocean, it was periodically inundated by Colorado River flood flows that were diverted into the trough as the result of subsequent deltaic barrier formations (Busch 1995).

Intermittent freshwater lake and lagoon habitats persisted well into the Holocene. Later deposited sediments include the Lake Cahuilla Formation, named after the largest of the ancient lakes to have formed in the Salton depression. This formation consists of a horizontal layer of weakly consolidated siltstones and clays as thick as 300 feet and was formed along the shores and on the bottom of Ancient Lake Cahuilla. The shoreline of this ancient lake can be seen outlined along the mountains on the west side of the trough by algae-excreted lime deposits. In other locations, ancient sand bars, sand spits and beaches, as well as wave cut cliffs and ledges can be seen. The high stand of this ancient shoreline is estimated to have been at 42 feet above mean sea level. At 15 to 23 feet below sea level, the Project area is located fully within the bed of Ancient Lake Cahuilla. Within the last 2,000 years the Salton Trough is believed to have been filled to high stand level at least five times (Busch 1995).

During times when Ancient Lake Cahuilla was present in the Salton Trough, the environmental conditions of the Coachella and Imperial valleys would have been drastically altered from the conditions existing during periods of desiccation. Vast stands of wetlands would have sprung up around the ancient lake, much as they exist today around the Salton Sea. These wetlands would have provided an ample supply of vegetal resources, which could be used by humans for food, tool production, and building of structures. The ancient lake with its associated wetlands also provided humans with a variety of faunal resources. Such a huge body of water along the Pacific Flyway of bird

migration would have attracted countless bird species and other wildlife in search of food and water. Likewise, a multitude of Colorado River fish species would have been found in the lake and were undoubtedly exploited by prehistoric Native Americans.

The Lake Cahuilla Formation is known to contain abundant non-marine fossils (Jennings 1967). Shellfish and Colorado River fish, including freshwater mussel (*Anodonta* spp.), gastropods, freshwater clam (*Corbicula* spp.), Razorback sucker (*Xyrauchen texanus*), and Bonytail (*Gila elegans*), were abundant in Ancient Lake Cahuilla. Birds attracted to the region by the ancient lake included a variety of duck, grebes, coots, pelicans and gulls. Mammals present around Ancient Lake Cahuilla were mainly those of modern times, including bighorn sheep (*Ovis canadensis*), mountain lion (*Felis concolor*), coyote (*Canis latrans*) and various rodents. Remains of Lake Cahuilla vertebrates and invertebrates are commonly found in archaeological sites associated with the ancient lake.

Ancient Lake Cahuilla provided the region's inhabitants with an incredibly rich and varied selection of resources, and attracted many groups from the surrounding desert. As the ancient lake evaporated, playas formed that contained important resources such as salts and minerals (Kistler and Obradovich 1964; Jennings 1967). At the same time, the Salton Trough, including the Project area, experienced a gradual displacement of its foothill woodlands and lakeside plant communities by desert scrub as a result of increasingly arid climatic conditions of the Altithermal, a period of drying between 7,500 and 4,000 years BP. It appears that the coniferous woodland community that now dominates the 4,000 to 8,000 feet elevation range, grew at a much lower elevation, possibly as low as 700 feet above sea level (Martin and Mehringer 1965; FNAA 1999), within the area currently supporting desert scrub communities. In the early Holocene, a more uniform climate regime developed; lacking the previous fluctuations between extremes, with regularly occurring summertime monsoonal rains (Van Devender 1990). These increasingly constant climatic conditions further changed the floristic character of the region, resulting in progressively enriched desert scrub communities, with stabilization of plant communities occurring around 4,000 years BP (FNAA 1999).

PHYSIOGRAPHY

The Salton Trough, including the Coachella and Imperial valleys, is considered to be a rift valley, or graben, and is part of the Gulf of California Rift Zone, one of the most active seismic regions in the world. This region is characterized by numerous northwest-southeast trending fault zones and crustal rift areas. The major fault systems in the Project area are the San Jacinto and Elsinore, which lie to the west of the Salton Trough. Seismic activity in this region has produced innumerable events of subsidence, uplift, tilting, folding and crustal movement over millions of years, including the slow subsidence of the trough and the gradual rising of the surrounding lands (Busch 1995).

Subsidence of the Salton Trough is not readily apparent because of the accumulation of marine and non-marine sediment deposits that cover the original trough surface. Marine fossils can often be found deeply buried under many thousands of feet of alluvial deposits as a result of this sediment accumulation and subsidence (Busch 1995).

The Salton Sea, located in the northwestern portion of the Project area, was accidentally formed between 1905 and 1907, when floodwaters overwhelmed irrigation canals built to divert water from the Colorado River. The full flow of the river emptied into the Salton Basin and in only two years, 350,000 acres of land had been flooded (Busch 1995). The present sea thus represents an accidental, human-induced replication of a process that has been occurring for thousands of years in the Salton Trough region.

Soil associations in the Salton Trough are grouped into two major categories including soils of the basins, and soils of the mesas, alluvial fans, terraces and mountains rimming the basin. Basin soils generally vary from excessively drained to poorly drained sand, silt, clay and loam on nearly level to rolling topography (U.S. Department of Agriculture Soil Conservation Service 1981). Soils of the mesas, alluvial fans, terraces and mountains are very deep, well drained to excessively drained, highly stratified clays (U.S. Department of Agriculture Soil Conservation Service 1979, 1981). These areas are often covered by desert pavement.

CLIMATE

Located within the Colorado Desert region, the Coachella and Imperial valleys, including the Project area, have a low-altitude desert climate, characterized by hot, dry summers and mild winters. Temperatures typically reach 120°F in the summer months, with winter low temperatures rarely dropping below 32°F. Rainfall in the area averages approximately three inches per year, with the majority of the rainfall occurring from November through March. Summer monsoonal thunderstorms are also common.

The relatively flat topography of much of the Salton Basin area, in conjunction with extreme night and day temperature differentials, particularly in summer months, produces moderate winds and deep thermal circulation systems. The thermal systems facilitate general dispersion of local air pollution, in contrast to coastal basins where polluted inversion layers may remain for long periods of time (County of Imperial General Plan 1997).

FLORAL RESOURCES

The Salton Trough, including the Project area, lies within the Sonoran Province of the Madrean Floristic Region of North America (FNAA 1999). This province is further divided into the Sonoran Sub-province or Sonoran Desert, in which, the Salton Sea region is found. The Sonoran Desert ranges from Baja California and Sonora, north to the southern extent of

the Mojave Desert and into southern Arizona up to elevations of approximately 3,400 feet above sea level (FNAA 1999). Because the Sonoran Desert is generally lower in elevation that the Mojave Desert, it is typically hotter and has more rainfall in the summer and milder temperatures in the winter (FNAA 1999). These warmer temperatures are reflected in the flora of the region, which has been characterized as subtropical (FNAA 1999). Approximately 3,000 species are believed to occur in the Sonoran Desert, including at least 25 genera that are localized to this sub province (FNAA 1999 and Turner et al.1995). Native plant communities of this region (adapted from BLM and California Fish and Game ca. 1980 and Schoenherr 1992) include the following:

Saltbush Scrub. This community generally occurs in the lower elevations of the region and includes honey and screw bean mesquites (*Prosopis glandulosa, P. pubescens*) and saltbushes (such as *Atriplex canescens* and *A. polycarpa*). In the harsh environment of extreme alkali soils, pickleweeds (*Salicornia* spp.) may be the only vegetation capable of existing.

Creosote Bush Scrub. This community lies below 2,500 feet elevation and is dominated by creosote bush (*Larrea tridentata*), desert brittlebush (*Encelia farinosa*), burrobush (*Ambrosia dumosa*) and ocotillo (*Fourquieria splendens*). Creosote Bush Scrub is the most dominant plant community in California, inhabiting more the 21 million acres (Schoenherr 1992), including much of the Project area.

Enriched Desert Scrub. This community lies between 1,000 and 4,000 feet elevation and contains agave (*Agave deserti*), desert brittlebush (*Encelia farinosa*), creosote bush (*Larrea tridentata*), cholla and beavertail cacti (such as *Opuntia basilaris, O. bigelovii*, and *O. erinacea*), Engelmann's hedgehog cactus (*Echnicerus engelmannii*), barrel cactus (*Ferocactus acanthodes*), ocotillo (*Fourquieria splendens*), golden bush (*Haplopapus* spp.), and desert agave (*Agave deserti*). This plant community is found in the foothill areas around the margins of the Project area.

Desert Dry Wash Woodland. This community typically lies below 1,000 feet elevation and is dominated by palo verde (*Cercidium floridum*), desert willow (*Chilopsis linearis*), desert smoketree (*Dalea spinosa*), desert ironwood (*Olneya tesota*), honey mesquite (*Prosopis glandulosa*), catclaw acacia (*Acacia gregii*), cheesebush (*Hymenoclea salsola*), and desert lavender (*Hyptis emoryi*). Plants of this community are found around some of the seasonal washes within the Project area.

Fan Palm Oasis. This community is generally found below 3,000 feet at springs and permanent streams with high water tables. Plants common to this community include California fan palm (*Washingtonia filifera*), slender willow (*Salix exigua*), and Fremont cottonwood (*Populus fremontii*). This plant community exists in the north-facing canyons of the San Jacinto Mountains, northwest of the Project area.

FAUNAL RESOURCES

Native animal species of the Salton Trough region include 401 bird species, over 20 species of mammals and 24 species of herpetiles (Patten et al. 2000; USFWS 1987). Special status species include 59 bird species, 15 mammal species and 12 herpetile species. Among the animals having special status are Yuma Clapper Rail (*Rallus longirostris yumanensis*), Brown Pelican (*Pelicanus occidentalis*), Peregrine Falcon (*Falco peregrinus*), Bighorn Sheep (*Ovis canadensis*), California Leaf-nosed Bat (*Macrotus californicus*), Flat-tailed Horned Lizard (*Phrynosoma mcalli*) and Coachella Valley Fringe-toed Lizard (*Uma notata*). Both of the native fish that occupy the Salton Sea, Desert Pupfish (*Cyprinodon macularius*) and Razorback Sucker (*Xyrauchen texanus*), are listed as federally endangered.

In terms of wildlife, the Salton Trough region is best known for functioning as a haven and breeding ground for migratory birds. The bird community at the Salton Sea is unique in many ways including supporting species such as the Yellow-footed Gull (*Larus livens*), a Mexican bird species that is only found at this one location in the United States. The Sea is also a major stopover for birds using the Pacific Flyway during migration seasons and is believed to support at least 20 million birds annually (Patton et al. 2000). The Sea likewise is an important breeding ground for species including Caspian Tern (*Sterna caspia*), Forster's Tern (*Sterna forsteri*), California Fulls (*Larus californicus*), Black Skimmer (*Rhyncops niger*), and the largest breeding population of Western Gull-billed Terns (*Sterna nilotica vanrossemi*) in the United States. In addition, thousands of herons, egrets, and Double-crested Cormorants (*Phalacrocorax auritus*) breed annually at this location (Patten et al. 2000).

CULTURAL SETTING

Archaeological research in the Coachella and Imperial valleys—as well as the surrounding Salton Trough region—remains at an incipient stage despite more than 50 years of scientific interest. The region's prehistory can be characterized into four broad cultural periods: the Paleo-Indian, the Pinto (or Archaic), the Amargosa (or Gypsum) and the Patayan (or Late Prehistoric at the northern reaches of the Project area). The Paleo-Indian Period lasted from approximately 12,000 to 7,000 years before present (BP), and is believed to have been a hunting-gathering lifestyle focusing on Pleistocene megafauna. Although some researchers have suggested that the area was occupied by humans prior to 12,000 years before present, conclusive evidence of such an early occupation in Southern California has yet to be presented to the scientific community.

The Pinto Period, characterized as a more diverse hunting-gathering tradition, lasted from approximately 7,000 to 3,500 years BP. Regional occupations during this period are generally found along the desert margins in drier times and in the interior valleys during periods of rain. Significant changes in technology, food production and trade characterize

the Amargosa Period from 3,500 to 1,100 years BP. During this period, milling of vegetal foods increases, there is a gradual shift from dart points to smaller points associated with the bow and arrow, and increased trade with neighboring groups is represented by the presence of shell and exotic lithic materials. The Patayan Period began after 1,100 years BP and lasted until the first Spanish explorers reached the area, around 1774. This culture was widely distributed across the Colorado Desert and is best identified by its distinct ceramic technology. The majority of archaeological sites identified in the Salton Trough region date to this period, yet the Patayan are still considered one of the least understood Southwestern prehistoric cultures (Cordell 1997; Reid and Whittlesey 1997).

THE PALEOINDIAN PERIOD (12,000 TO 7,000 YEARS BP)

In the Colorado Desert, the Paleo-Indian Period is represented by the San Dieguito Complex. San Dieguito technology consisted of a wide array of bifaces, choppers, scrapers, crescents and other tools associated with a hunting-gathering economy. This complex was first characterized by Malcolm Rogers in 1939 and was later refined by Claude Warren (1967) after conducting surface survey and excavation of the Harris site in San Diego County. Rogers distinguished three phases of San Dieguito tool production and use that depicted a developmental sequence towards increasing technological complexity and diversity. The earliest industry, termed San Dieguito I, consisted of chopping and scraping tools fashioned by percussion flaking. In these assemblages, projectile points were crude and relatively rare. The later San Dieguito II and San Dieguito III industries tended to contain greater amounts of finely manufactured projectile points, blades, and other pressure flaked objects.

Overall, the San Dieguito Complex shows strong affiliations with the Lake Mojave Complex to the north (Warren and True 1961; Warren et al. 1981). Sites representing the San Dieguito complex were recorded throughout the Colorado Desert area by Malcolm Rogers in the first half of the twentieth century (Rogers 1939, 1966; Warren et al. 1981). However, the problem of identifying undisturbed sites with San Dieguito components that are not mixed with other later materials has been problematic (Warren et al. 1981). Sites containing San Dieguito (or Lake Mojave) materials are generally found on old beaches and terraces adjacent to old lake basins and major river beds, occupied during the moister, cooler climate of the terminal Pleistocene and early Holocene period (Bedwell 1973; Cook and Fulmer 1981; Hester 1973; Warren et al. 1981; Weide 1976a).

The San Dieguito (and Lake Mojave) complex is characterized by a generalized hunting and gathering strategy, utilizing deer, elk and many smaller game animals (Cook and Fulmer 1981; Davis 1969; Wallace 1958). Artifacts from this complex include large leaf-shaped knives; leaf-shaped or wide-stemmed points; crescents; choppers; ovoid, domed, hafted, and “horse hoof” scrapers; end and side scrapers, engraving tools and drills (Campbell et al.

1937; Cook and Fulmer 1981; Warren et al. 1981). The lithic technology represented has been described as somewhat crude with irregular edges and surfaces, deep bulbs of percussion and step fractures, and crushed edges (Warren et al. 1981). However, Cook and Fulmer (1981) indicate the flaking was of good quality. Projectile Points from this complex are rather large and include Silver Lake and Lake Mojave styles (Moratto 1984; Warren et al. 1981).

THE PINTO PERIOD (7,000 TO 3,500 YEARS BP)

This period incorporates the Pinto Period as defined for the Mojave Desert region (Moratto 1984; Warren and Crabtree 1986), the Pinto Period described for the Colorado Desert region (Warren et al. 1981), and the Archaic Period of the southwest (Cordell 1997). Rogers (1958) termed the culture, which developed out of the San Dieguito Complex, the Amargosa Tradition; however, other have used the term "Amargosa" to define the period following the Pinto Period (from 3,500 to 1,100 years BP). Sites associated with the Pinto Period are generally identified by the presence of the distinctive Pinto Basin and Gypsum Cave type projectile points. These projectile points are typically stemmed or notched. Other lithic artifacts include knife blades, leaf-shaped and heavy-keeled scrapers, choppers, drills, graving tools and hammerstones. These sites occasionally also contain milling implements, typically in the form of manos and metates (Cook and Fulmer 1981; Moratto 1984; Wallace 1962; Warren et al. 1981).

Sites from this period have been recorded at Indian Hill Rockshelter, Pinto Basin, Salt Springs, Death Valley, near the Orocopia and Eagle Mountains, and near Needles, California (Campbell and Campbell 1935; Moratto 1984; Rogers 1939; Wallace 1962; Warren et al. 1981). Hunting and gathering continued in this period, with a greater emphasis on hunting. A larger adaptive strategy is also evident during this period, with seasonal occupations along the desert margins in drier times and in the interior valleys during periods of rain. A relative abandoning of the deserts during the beginning of the Pinto Period as a result of warm, dry conditions has been suggested (Hayden 1976; Moratto 1984; Wallace 1962), but remains controversial. If Pinto Period occupation of this region did occur, sites may have been lost or eliminated by natural processes or obscured by later settlements (Weide 1976b). A relationship between Pinto Period materials and periodic inundations of the Salton Sea has been proposed but remains poorly studied (Weide 1976a; Warren et al. 1981).

THE AMARGOSA PERIOD (3,500 TO 1,100 YEARS BP)

This period, also known as the Gypsum Period (Moratto 1984), is marked by stylistic and adaptive shifts in response to gradual ecological changes from the previous period. Projectile points during this period became smaller and represent a movement away from atlatl and darts to bow and arrow technology (Moratto 1984; Wallace 1962; Warren et al.

1981). Other materials associated with sites of this period include several varieties of knives, scrapers, drills, stone and shell beads, and incised and painted pebbles (Cook and Fulmer 1981; Moratto 1984; Warren et al 1981). An increase in milling implements, with the introduction of the mortar and pestle, suggests a greater reliance on vegetal foods that may have resulted from a decrease in availability of large game, such as desert big-horn sheep (Moratto 1984; Warren et al. 1981). In addition, the presence of exotic shells and non-local lithic materials may suggest increased trade with neighboring regions during this period (Cook and Fulmer 1981; Moratto 1984).

THE PATAYAN PERIOD (1,100 YEARS BP TO CONTACT)

During this period, much of the Salton Trough was populated by groups utilizing a distinctive ceramic technology that was characteristic of the Patayan cultural tradition. It is believed that these groups moved to the area at a time when Ancient Lake Cahuilla, which occupied most of the Project area, formed in the Salton Basin. This region became the westernmost extent of Patayan groups who populated a large area along the Colorado and Gila rivers and north to the present-day borders of Arizona, Utah and Nevada.

The Patayan culture was first termed the "Yuman Complex" by Malcolm Rogers in 1945. Rogers attempted to link this archaeologically identified culture to ethnographically known Yuman speaking groups such as the Quechan. Because a direct historic connection could not be clearly demonstrated, it was suggested that these groups be termed "Patayan," from the Yuman term meaning "old people" (Colton 1945). Later the term "Hakataya" was presented as a replacement for both "Yuman Complex" and "Patayan" (Schroeder 1957).

Rogers (1945) believed that pottery technology and floodplain agriculture, as historically documented from Yuman settlements in the region, was adopted from Mexican groups who traveled or traded up the Colorado River. Early researchers like Malcolm Rogers, Emil Haury and Albert Schroeder favored the idea that groups from Mexico provided the majority of the cultural and technological background for cultures in the region. Archaeological evidence from areas in the Salton Trough clearly suggests it was a very sparsely populated territory until Patayan groups moved west from the Colorado River to the shores of the burgeoning Ancient Lake Cahuilla. Unfortunately, it may be impossible to differentiate between population increases facilitated by access to Ancient lake Cahuilla resources and those that occurred from immigrants moving into the Ancient lake Cahuilla area from the south.

The origins of the Patayan are subject for debate, but a transition from the Archaic Period to the Patayan Period is visible within the archaeological record. While little is known about the organization of the Patayan, they were likely small, dispersed groups with exceptional mobility. Most documented Patayan sites appear to consist of temporary camps with few architectural features other than small jacal structures (Cordell 1997).

Archaeological sites in Arizona have produced marine shell, steatite, asphaltum and turtle shells from California, further indicating that these early Patayan groups were extensive travelers and/or traders (Stone 1991). Patayan groups probably subsisted on a wide variety of hunted, gathered and perhaps planted foods. At archaeological sites in the Salton Trough, numerous fish traps, fish bones and shell middens indicate Patayan groups were highly dependent on exploitation of lacustrine resources.

The Patayan Period has been generally separated into three developmental phases that characterize cultural changes. In the Salton Trough region, the Patayan I Phase (1075 to 950 YBP) is evidenced by the occurrence of Buff and Brown pottery wares in specific vessel forms. Five ceramic wares have been distinguished for this phase: Colorado Red, Black Mesa Buff, Black Mesa Red-on-buff, Colorado Beige, and Colorado Red-on-beige (Cordell 1997). Typical vessel forms include simple bowls and scoops, and large jars with tall tapered necks, direct rims, and "Colorado shoulders." The adoption of Cottonwood and Desert Side-Notched projectile points (Moratto 1984) is an additional characteristic of the Patayan I Phase.

The Patayan II Phase, lasting from approximately 950 to 450 years BP, is marked by increased adoption of new pottery characteristics (Waters 1982). The timing of transition into this phase is based on a series of geological interpretation, intrusive sherds, radiocarbon dates, and design similarities with certain Hohokam ceramic types (Cordell 1997). Pottery traits adopted during this time include new vessel forms such as jars that lack the Colorado shoulder distinctive of Patayan I jars, bowls and jars with recurved rims, and flat, open bowls that resemble plates. Four general ceramic wares distinguish the phase: Tumco Buff, Parker Buff, Palomas Buff, and Salton Buff (Cordell 1997). An increased use of pottery is the result of populations adjusting their subsistence and settlement patterns to adapt to environmental changes that occurred as a result of intermittent filling and drying of the Salton Basin.

The Patayan III Phase of the Colorado Desert (450 years BP to contact) has been differentiated by slight changes in the overall ceramic assemblage. Colorado Buff gradually replaced Tumco Buff as the dominant pottery ware during this phase (Schaefer 1994b), but other wares persist into this time period as well (Cordell 1997). Sites with Patayan III assemblages sometimes also contain glass and metal artifacts, indicating that this phase lasted well into the post-contact historic time periods.

In the Salton Trough, the Patayan III Phase is characterized by large population shifts triggered by the final evaporation of Ancient Lake Cahuilla (Rogers 1945; Wilke 1978; Waters 1982). Although a gradual process, the lake's desiccation represented a massive and fundamental degradation of the subsistence productivity of the region. Patayan groups, already mobile and dispersed, may have moved to areas where resources were

more readily available such as the western Colorado River Valley, or where social or kinship ties facilitated integration into other existing groups. Groups on the western side of the drying lake may have moved to the foothills and mountains of western California, such as the San Jacinto and San Bernardino Ranges along the boundaries of the Project area (Waters 1982).

ETHNOGRAPHY

The Project area was utilized prehistorically and into the 19th century by a variety of Native American groups, including the Kumeyaay, the Cocopah, and the Quechan. These three groups speak languages of the Yuman family of the Hokan language stock (Kroeber 1925). Short descriptions of their individual ethnographic context are provided below. (Much of the information provided here was derived from Zepeda-Herman, et al. 2011.)

At the time of the Spanish invasion, the Kumeyaay (also known as Kamia, Ipai, Tipai, and Diegueño) occupied the southern two-thirds of Imperial and San Diego counties. The term "Kamia" is sometimes used to indicate the desert Kumeyaay, but as these were generally the same as the Tipai tribal segment who came into the desert on a temporary basis to utilize local resources, this term will not be used here. Ipai refers to the Kumeyaay north of Agua Hedionda to the San Luis Rey River and Tipai refers to the Kumeyaay south of Agua Hedionda to Todos Santos Bay, Mexico, and east to the Imperial Sand Dunes. The Kumeyaay lived in semi-sedentary, politically autonomous villages or rancherias. A settlement system typically consisted of two or more seasonal villages with temporary camps radiating away from these central places (Luomala 1978). During the early Contact Period there are estimated to have been 6-9,000 Kumeyaay throughout their territory (Luomala 1978:596).

The Kumeyaay economic system was that of complex gatherers and hunters, with a focus on small game, and vegetal resources that could be gathered in bulk such as acorns and mesquite, as well as grass seeds and other plant resources. The most basic social and economic unit was the patrilocal extended family. A wide range of tools was made of both locally available and imported stone, including scrapers, choppers, flake-based cutting tools, and biface knives. Groundstone objects include mortars and pestles for processing soft seeds and small animals, and manos and metates for processing hard seeds, typically made of locally available fine-grained granite. The Kumeyaay made fine baskets using both coiled and twined techniques. The Kumeyaay also made pottery, using the paddle-and-anvil technique. Most were a plain brown utility ware called Tizon Brownware, but some were decorated (May 1978; Meighan 1954).

Trade was an important feature of Kumeyaay subsistence. Coastal groups traded salt, dried seafood, dried greens, and abalone shells to inland and desert groups for products such as

acorns, agave, mesquite beans, and gourds (Almstedt 1982:10; Cuero 1970:33; Luomala 1978:602). Travel and trade were accomplished by means of an extensive network of trails. Kumeyaay living in the mountains of eastern San Diego County frequently used these trails to travel down to their desert settlements along the New and Alamo Rivers to trade and socialize in winter (Gifford 1918:168; Spier 1923:300; Luomala 1978).

Their traditional lands included the southern Imperial Valley from the latitude of the southern half of the Salton Sea to well below what is the US–Mexico international border (Luomala 1978:593). Their main settlements were along the New and Alamo rivers (Gifford 1931).

Subsistence among the desert Kumeyaay consisted of hunting and gathering, and floodplain horticulture (Gifford 1931). In normal years, the Colorado River would overflow its banks in the spring and early summer and fill rivers such as the New and Alamo. When the floodwater receded, they would plant in the mud. A dam was maintained at *Xatopet* on the east/west portion of the Alamo River to control water flow and allow farming in years when water flow was insufficient. While Gifford (1931:22) and others have suggested these were recent adaptations and not traditional life ways, Bean and Lawton (1973) and Shipek (1988) argue that irrigation was indigenous.

The Kumeyaay's major desert food staple was mesquite and screwbean, called by them *anxi* and *iyix*, respectively (Gifford 1931:23). Seeds of the ironwood (*Palo fierro*) and palo verde were also used, though were not as desirable. Acorns were at times an important food. They were gathered in the mountains to the west of the Colorado Desert in October and acquired through trade from the southern Kumeyaay (Gifford 1931).

Animals were a minor aspect of the total sustenance in the desert area, but did provide valuable protein. Also, the skin and bone provided valuable material for clothing, blankets, and tools. Small game, primarily rabbits, was most frequently taken, using the bow and arrow as well as the rabbit stick throwing stick (*macana*). Sometimes fires were set along sloughs to drive rabbits out into the open where they could be caught with nets and/or clubbed. Men also used the bow and arrow to hunt deer and mountain sheep. Fish were taken in sloughs with bow and arrow, by hand, hooks, basketry scoops, and seine nets (Gifford 1931:24).

During the period flooding of the Coachella Valley by the Colorado River, creating temporary stands of Ancient Lake Cahuilla, the Kumeyaay and other desert tribes would have been able to take advantage of the new resources available. This would include fish, shellfish, and the marsh plants along the shallow coves. Only the Cahuilla however, who would have inhabited the northern portion of the lake during these events, have left any

record of the presence of the waters, incorporating them into their history of movement into and out of the mountains. No such evidence has been discovered for the Yuman peoples.

The Cocopah lived on the west side of the Colorado River delta from the tidewater area, north from a little above the latitude of Volcano Lake or Cerro Prieta to several miles south of the US–Mexico border (Kroeber 1925),to the east and southeast of the Project area. Like other river Yumans, the Cocopah settlements were dispersed residential areas or rancherias, not close-knit villages (de Williams 1983). During the early Contact Period there are estimated to have been 5,000 Cocopah throughout their territory (de Williams 1983:104).

Cocopah subsistence was similar to other river Yuman people, although their location in the Colorado River delta area provided a somewhat different environment from that of the upstream tribes. The Colorado River frequently changed course within the general floodplain throughout the area below the Grand Canyon. The river formed very active meanders in the delta region, requiring settlement and field movement among the Cocopah and other delta peoples (de Williams 1983). Mesquite and screwbean grew in profusion and formed a dietary staple of the Cocopah. Other important wild food sources of the delta region were "wild rice or wild wheat," and amaranth (de Williams 1983). The Cocopah planted a variety of maize, pumpkins, tepary beans, cowpeas, muskmelons, watermelons, and *heshmicha* (a grain resembling wheat), and sugar cane (Gifford 1933).

Fish was the most important animal food among all the Lower Colorado River peoples, including the Cocopa. The Cocopah fished in the Colorado and Hardy rivers, and occasionally parties would fish along the Gulf of California. Fish were also taken with bow and arrow, as well as by spears, gill nets, and dip nets (de Williams 1983, Gifford 1933:268). Hunting was relatively unimportant and was confined primarily to the hills and mountains.

The Cocopah frequently visited the mountainous Paipai country west of the delta in northern Baja California to trade and to gather pine nuts and acorns. Tobacco, mescal (roasted agave), and mountain sheep skins were obtained from the Paipai in exchange for delta foodstuffs. The Cocopah also obtained tobacco and eagle feathers from the Kumeyaay (de Williams 1983; Kelly 1977; Luomala 1978). At times, the Cocopah traded seashells to the Kamia (Gifford 1931:37). They also visited frequently with their allies, the Maricopa, on the middle Gila River and with the Halchidhoma, thus gaining access to resources to the east (Gifford 1933).

The Quechan (*Kwatsan*), also with their settlements centered to the east of the Project area, are often called the Yuma Indians in past historic accounts. Their territory was centered at the confluence of the Gila and Colorado Rivers (present-day Yuma, Arizona), but extended north on the Colorado about 60 miles and 30 miles up the Gila. The southern boundary reached into Baja California and Sonora, Mexico. Their neighbors on the northwest were the Cahuilla and Luiseño, and to the west the Kamia. Their eastern boundary was just west of Gila Bend, Arizona. During the early Contact Period there are estimated to have been 4,000 Quechan throughout their territory (Bee 1983:97).

The Quechan had a relatively large population. Though the Quechan are not mentioned by Alarcon or Diaz at the time of first Spanish contact in 1540, the next visitor to the area, Juan Oñate, estimated a population of about 4,000 in 1604 (Bee 1983). He mentioned a stable horticultural and gathering economy. Throughout winter and spring, the Quechan lived in large seasonal settlements located on terraces above the Colorado River floodplain. These winter settlements were moved from time to time, and so determining exact locations of villages is not possible (Bee 1983). When the Colorado floodwaters of spring receded, the Quechan left their winter villages on the river terraces and dispersed into camps near their 2- to 3-acre horticultural plots distributed along the river floodplain. Extended families resided in these camps. Planting was done in the mud, as the river receded. Major crops included maize, squash, pumpkin, watermelon, and wheat (Bee 1983). Wheat was introduced by Kino in 1700. After the fall harvest season, the Quechan would reconvene in villages on terraces above the river to avoid seasonal flooding (Bee 1983:88).

Quechan villages were actually a collection of houses, or small family settlements, dispersed along the Colorado and Gila rivers. Households consisted of composite families that lived together and moved, more or less as a unit from place to place within a constantly changing floodplain environment. The annual flood of the Colorado continually altered the gardening areas, eroding some, and burying others under silt. This would have altered the usefulness of potential village sites, camp sites, and garden plots from time to time. The Quechan burned the houses and possessions of the dead (Bee 1983), which also contributed to the movement of villages from time to time. Like other Lower Colorado Yuman peoples, the Quechan moved through their political territory which was also a very dynamic cultural landscape (Bee 1983).

HISTORY

The major historic periods for Southern California are defined by key events documented by participants, witnesses, historians, and cartographers:

- **Spanish Period** (1769–1821)
- **Mexican Period** (1821–1848)
- **American Period** (1848–Present)

The Spanish era encompasses the period of occupation by European descendants. This period marks a time of disease, exploitation and deculturation for the native peoples beginning circa 1769 with the founding of the Misión San Diego de Alcalá. Spanish occupation and control was passed on to Mexico after the latter gained its independence in 1821. The Mexican period, in turn, gave way to United States control subsequent to the Mexican-American War and the treaty of Guadalupe Hidalgo in 1848.

The Spanish Period represents exploration and the establishment of the San Diego Presidio, the Misión San Diego de Alcalá, and Misión San Luis Rey de Francia in this area. Mission life introduced agriculture (the cultivation of corn, wheat, olive and other crops), as well as horses and herds of grazing cattle. The Spanish period witnessed the introduction of adobe architecture to the area and the establishment of the Pueblo de San Diego in the location now known as Old Town. Despite the transition to the Mexican period, the structure of the Spanish Period was retained for a time, and the missions continued to operate as they had in the past.

Mexico's independence from Spain in 1821 ushered in the Mexican Period in Alta California. Mexico secularized the missions and continued the Spanish practice of granting large tracts of ranch lands to prominent soldiers, civil servants and other settlers. Little visible evidence of the transition of power from Spain to Mexico was immediately evident in the frontiers of Alta California. Laws and practices of the earlier government remained in place until shortly before the 1834 secularization of the missions (a decade after Mexican rule began). Secularization freed vast tracts of land for redistribution. Although several grants of land were made prior to 1834, this date starts the beginning of the era of the rancho. Agriculture was overshadowed by the trade in cattle hides and tallow. With the disbanding of the Franciscan mission system and confiscation of lands that has been used to support its Indian neophyte population, many of the local Native men found work on the ranchos as vaqueros and the women as servants at the haciendas. Others were used as agricultural laborers in small farms surrounding the pueblo of San Diego. Most, however, were left to return to aboriginal life ways as best they could, often joining with relations at those villages that had not been displaced by the Spanish and Mexican colonists (Carrico 1987). The hide trade made the harbor at San Diego, and other coastal stops such as San Juan Capistrano, favorite ports-of-call for the sailing ships of the era. With this trade came a degree of prosperity to the region. The Pueblo de San Diego and the ranchos grew, but this era was short-lived. The Mexican-American War of 1846–1848 was to bring the era of

Hispanic rule to a close. The Treaty of Guadalupe Hidalgo would cede Alta California (along with Arizona, New Mexico, and Texas) to the United States.

The American Period began with the cession of California by Mexico in 1848. However, prior to this time, Americans were already well established; a number of them elected Mexican citizenship and married into the local families. A Lands Commission was created in response to the Act of 1851, which provided a means of validating land ownership throughout the state by settlement of land claims. Few Mexican ranchos remained intact because of legal costs and a lack of what Americans considered to be sufficient evidence to provide title claims. Much of the land that once constituted rancho holdings became public land, available for settlement by immigrants to California. The growth and decline of towns occurred in response to increased population and the economic "boom and bust" period of the late 1880s.

A great influx of Americans and Europeans followed the discovery of gold in northern California in 1848. The gold seekers and homesteaders traveled through the Colorado Desert using the same route as Kearny and the Mormon Battalion, then known as the Southern Emigrant Trail in the early 1900s. In 1853 the route was used by the Birch Overland Mail and later in 1858 by the Butterfield Southern Overland Mail Line. After 1861, when the mail route stopped service, the route was used mostly for cattle drives from Mason and Vallecitos valleys to Carrizo Valley and the Fish Creek area in the desert (Cook and Fulmer 1980). In 1890, prospectors in search of minerals in the Anza–Borrego Desert began using the route (Cook and Fulmer 1980). Today this old Indian and pioneer route is called County Route S2, or the Great Southern Overland Stage Route of 1849, which connects Ocotillo at Interstate 8 with Warner Springs to the north. The segment of the Southern Pacific Railroad that runs northeast of the Project area was constructed in the 1870s (Pourade 1964). Around the turn of the century, the Imperial Valley experienced considerable population growth after the construction of irrigation projects, and agriculture became a prime focus of economic activity. The first canal built was the Imperial Canal. The Westside Main Canal is a 40-mile canal alignment built in 1907 that later became part of the All-American Canal system. The construction of the All-American Canal to transport water from the Colorado River to Imperial Valley between 1934 and 1940 transformed agricultural development and settlement of the Imperial and Coachella valleys. The areas served by the canal have become one of the richest and most important agricultural areas in the U.S. since the completion of the canal in 1938 (Queen 1999).

The Kumeyaay, Quechan and other local desert tribes had been greatly reduced in population by this period, but still remained in their traditional lands in Imperial and San Diego counties. Native Americans constituted an important source of labor on farms and building projects throughout the region. "Between 1850 and 1870, about the only

employment opportunities open to Indians were those generally open to immigrants or persons considered socially or racially inferior. Whites and Hispanics employed Indians as day laborers in unskilled capacities or as domestics and herders" (Carrico 1987:29). Employment is these arenas lasted through the early twentieth century.

Agriculture and ranching were prime activities of the newcomers to the county and, by the turn of the twentieth century, small towns had been created with all the facilities necessary for future growth including post offices, schools, churches, small commercial establishments and growing residential sections.

LOCAL HISTORY

The history of the Salton Trough region since European contact can be divided into several themes, including exploration, transportation, irrigation and creation of the Salton Sea, and mining use of the area. Each of these is connected, to some degree, with the development of one of the least hospitable areas of North America.

Exploration

Spanish explorers probed westward in search of gold, silver, and a route across the Colorado Desert to the South Sea, as they called the Pacific Ocean. Along the way the Spanish explorers pursued a mission to convert Native Americans to Christianity. In 1605, Juan de Onate accompanied by 30 soldiers and two Franciscan friars, reached the Colorado River from a starting point near present-day Santa Fe, New Mexico. The expedition traveled down river to the Gulf of California, but did not venture into the seemingly endless desert they saw across the river to the west. By the late seventeenth century, several missions had been established in Arizona, and a chain of missions was stretching northward up the peninsula of Baja California. In 1701, Fathers Eusebio Francisco Kino and Juan Maria Salvatierra set out to explore the Sonoran Desert in search of a land route from Mexico to Baja California that could be used to supply the new missions. On this and subsequent explorations, Kino reached the coast of the Gulf of California and the Colorado River, and once attempted to cross the river delta, but no overland route was established. The Colorado Desert and the Salton Trough remained inaccessible to Europeans (Pourade 1971; Bannon 1974).

The Spanish Period (1769-1821) in the Colorado Desert begins with the Alarcon exploration up the Colorado River in 1540 and the land expedition to the Colorado River by Melchior Diaz in the same year. Cabrillo claimed the coast of Alta California for Spain in 1542. It was not until 1769 that a permanent settlement was founded. In that year, the San

Diego Presidio and the San Diego Mission - in what is now Old Town - were established (Rolle 1998). Native American culture in the coastal strip of California rapidly deteriorated despite their repeated attempts to revolt against the Spanish invaders (Carrico 1986: Cook 1976). One of the hallmarks of the Spanish colonial schemes was the rancho system, in which large land grants were made to meritorious or well-connected individuals to encourage settlement (Rolle 1998).

The first Spanish explorer to enter the Imperial Valley was Pedro Fages, who rode along the northwest edge of the Colorado Desert while looking for deserters from San Diego in 1772. He apparently entered the desert on an Indian trail, which led through Oriflamme Canyon to Carrizo Creek and the desert floor (Boulton 1931:214; Lawton 1976:47; Pourade 1961:53-54).

In September of 1771, Father Francisco Garcés followed the Gila River west to its confluence with the Colorado River, traveled south to the Laguna de Salada in Baja California, then turned northwest until he reached the southern end of what is now known as Imperial Valley. Looking across the desert to the northwest, Garcés and his party were the first Europeans to see the Salton Trough region, the desert side of the peninsular ranges of Alta California, and the future path of the immigrant road between Yuma and San Diego. After his return to Mexico, Garcés talked to Juan Bautista de Anza, the commander of the Spanish presidio at Tubac in what is now southern Arizona. Anza was a third-generation frontier soldier who, like his father and grandfather, had spent his life patrolling the great desert of northern Mexico. In his enthusiasm for finding an overland route to the South Sea coast, excited by Garcés, Anza wrote to the Viceroy of Mexico, Antonio Maria Bucareli Ursua, and received permission to mount an expedition to cross the Colorado River into California (Hoyt 1948; Dowd 1960; Pourade 1971; Bannon 1974).

On January 9, 1774, Captain Anza left Tubac accompanied by Father Garcés, a second priest named Juan Diaz, an Indian guide named Sebastian Tarabal, a Piman interpreter, 21 soldiers, a carpenter, five muleteers and two servants. The expedition included 35 mules loaded with provisions, 65 head of cattle and 140 horses, many of which were picked up at outposts along the way before reaching the Colorado River and entering unknown territory. After about a month of travel across the Sonoran Desert to Yuma, the Anza expedition crossed the Colorado River, entering the Colorado Desert. Rather than crossing or skirting the extensive sand dunes that lie west of Yuma, Anza decided to follow the river south into Baja California. Following 17 days of hardship, Anza reduced his force to 17 soldiers, the two friars, and six helpers, and left his cattle behind. After continuing for a short time southward through the Colorado Delta, the expedition turned northwest, passed the Laguna de Salada, and reached the Imperial Valley west of the future site of Calexico (Hoyt 1948; Dowd 1960; Pourade 1971; Bannon 1974).

By March 10, Anza and his party had reached an oasis he named San Sebastian, located about 12 miles west of the present southwestern shore of the Salton Sea. Indians at San Sebastian told the Spanish soldiers that they had been preceded in 1772 by Don Pedro Fages, the military governor of California, who had come through the Carrizo Corridor, skirting the Colorado Desert before recrossing the mountains to the west. Fages, who had started in San Diego, eventually found his way through the Cajon Pass, Antelope Valley, and the Tehachapi Mountains and ended up in San Luis Obispo. From San Sebastian, the Anza expedition crossed Borrego Valley and entered the Santa Rosa Mountains, immediately west of the Project area. Anza and his men reached San Gabriel Mission on March 22, 1774, having spent 74 days traveling the 700 miles from Old Mexico. In the process, they accomplished the first European crossing of the Colorado Desert and the Salton Trough. After several more crossings from Sonora to the missions of Alta California, Anza was named governor of New Mexico in 1777. He died in 1788 (Hoyt 1948; Dowd 1960; Pourade 1971; Bannon 1974).

Following the Anza expeditions, no trips through the Salton Trough region are mentioned in official records for several decades. By the Mexican Period (beginning in 1821) mail was being carried by Maricopa Indian messengers between Sonora and the California coast, via the northern Colorado Desert and the San Gorgonio Pass (Hoyt 1948; Fitch 1961; Johnston 1977), a route that is near the northern portion of the Project area. During roughly the same period, from 1815 to the 1830s, Indians from San Gabriel Mission made annual trips through San Gorgonio Pass into the Salton Trough to collect salt (Johnston 1977; Nordland 1977).

In 1823, Captain Jose Maria Romero, who had made a previous trip across the southern part of the Salton Trough, left Mission San Gabriel in Los Angeles accompanied by Lieutenant Jose Maria Estudillo and a small party of soldiers. The group traversed the San Gorgonio Pass and entered the Salton Trough in search of a route directly east to the Colorado River, possibly crossing the northern portion of the Project area. After several days of intense heat, lack of water and trouble with their horses, the explorers made their way back to San Bernardino in January of 1824, having failed in their attempt. In November of 1825 Romero mounted a second expedition, this time accompanied by Sub-Lieutenant of Engineers Romualdo Pacheco, 15 soldiers, and a group of laborers to clear vegetation. Following the approximate route of the later Southern Pacific Railroad through the Coachella Valley and along the eastern side of the Salton Trough, the party then turned east and reached the Colorado River near present-day Blythe after an 18-day journey. Pacheco returned to San Diego from Yuma along a southern route passing through the Project area and reported that the San Gorgonio Pass route was not practical. In his opinion, a trail connecting Yuma with San Diego would be superior in spite of dangers from Indians and the necessity of crossing the mountains east of the Pacific Coast. As a result of

Pacheco's promotion of the route, the Yuma to San Diego trail, rather than the San Gorgonio Pass route, was named the official road from Sonora to Alta California in 1826 (Hoyt 1948; Pourade 1971; Johnston 1977; Nordland 1977).

The last Mexican expedition across the Salton Trough was probably that of General Flores and his men in January of 1847. Retreating from Alta California to Sonora during the Mexican War, Flores used this escape route through unfamiliar territory to avoid capture by American forces (Hoyt 1948).

Transportation

During the early Anglo period, most immigrants came to Southern California by the Southern Route crossing Imperial Valley from Yuma on the Colorado River to San Diego and Los Angeles (Dowd 1960; Fitch 1961). An important event in the development of the Salton Trough occurred in 1853, when the U.S. government funded an expedition to survey a transcontinental railroad route. In November the party, led by Lieutenant R.S. Williamson and including Professor William P. Blake, a geologist, traversed the San Gorgonio Pass, descending into the Coachella Valley, passing along what would become the eastern shore of the Salton Sea, and soon reached the confluence of the Colorado and Gila Rivers. Williamson found the route to be a feasible one for the construction of railroad tracks across the Colorado Desert from Los Angles to Arizona. Professor Blake was believed to be the first to use the name Colorado Desert for the region, as well as the first to describe Ancient Lake Cahuilla, based on his observations of the vestigial shoreline and oral histories of local Indian groups (Cory 1915; Hoyt 1948; Fitch 1961; De Stanley 1966; Duke 1974; Nordland 1977).

A great influx of American and Europeans followed the discovery of gold in Northern California in 1848. The gold seekers and homesteaders traveled through the Colorado Desert using the same route as Kearny and the Mormon Battalion, then known as the Southern Emigrant Trail in the early 1900's. In 1853 the route was used by the Birch Overland Mail and later in 1858 by the Butterfield Southern Overland Mail Line. After 1861, when the mail route stopped service, the route was used mostly for cattle drives from Mason and Vallecitos valleys to Carrizo Valley and the Fish Creek area in the desert (Cook and Fulmer 1980). In 1890, prospects in search of minerals in the Anza Borrego Desert began using the route S2, or the Great Southern Overland Stage Route of 1849, which connects Ocotillo at Interstate 8 with Warner Springs to the north.

In 1862 William D. Bradshaw established an eastward route from San Bernardino through the San Gorgonio Pass and northern Imperial Valley to the gold fields of Arizona. Known as the Bradshaw Trail, it traversed almost all of Riverside County and passed across the northern portion of what would later be the Salton Sea, approximately 48 miles north of the Project area. Actually this trail was in use long before Bradshaw. It was part of the

ancient Indian trade route known as the Cocomaricopa or Maricopa-Cahuilla trail. Traveling east from Los Angeles on existing roads through the San Gorgonio Pass, Bradshaw and his party left Washington's wagon road behind at Dos Palmas Oasis, six miles east of the present northeastern shore of the Salton Sea, crossed the Orocopia Mountains, then continued along ancient Indian trails, using a map drawn for them by Cabazon, a Cahuilla chief. Heavily used from 1862 – 1877, the trail allowed further economic development and contact with population centers to the west that influenced the entire region.

Cattlemen and merchants, in addition to gold prospectors, began using the Bradshaw Trail to supply the gold fields. Newton Noble, a cattle rancher from San Gorgonio Pass, used the trail for drives to Arizona, and freight wagons carried goods over the route to La Paz, Ehrenberg, and Tucson. Big Mike and Joe Goldwater, brothers who brought supplies over the Bradshaw Trail and operated stores in both La Paz and Ehrenberg, were among the better-known freighters who used the route. During the same period, the U.S. Army's "California Column" made the Bradshaw Trail one of their main communication routes (Johnston 1977; Ross 1992).

In September of 1862, the first of several passengers and mail stages, the Colorado Stage and Express Line, owned by David W. Alexander, began running six-horse Concord coaches between Los Angeles and La Paz over the Bradshaw Trail. James Grant of San Bernardino, also in 1862, established the Express and Saddle Train, which grew to be the California and Arizona Stage Company, the most important line between Los Angeles and Santa Fe, New Mexico throughout the 1860s and 1870s. Before the Southern Pacific Railroad was completed to Yuma in 1877, Grant's company linked with the railroad tracks, and continued on the Bradshaw Trail into Arizona. Other stage companies that used the Bradshaw Trail included the Arizona Overland Mail, Banning and Company, and the New Mexico Stage Company. Some early maps label the trail "Butterfield Stage Route" (Hoyt 1948; Dowd 1960; Fitch 1961; Pourade 1971; Pepper 1973; Johnston 1977; Ross 1992).

Until the Southern Pacific Railroad was completed east to Santa Fe, the Bradshaw trail was the main means of communication between Southern California and the eastern part of the United States. During the last years of the Civil War it was the only stage route operating into and out of Southern California. By the 1880s, however, passenger coaches were discontinued, and commerce took the form predominantly of express and mail contracts carried by mule trains and freight wagons. The Bradshaw trail was used as a freight route until the twentieth century, and even accommodated automobile travel until the highway that eventually became Interstate 10 was built, farther to the north (Johnston 1977; Ross 1992).

The early twentieth century saw the development of automobile transportation across the Colorado Desert. Most car and truck traffic was along previously established wagon roads following the path of least topographic resistance from one watering place to the next between desert settlements. Most of these roads remained unpaved until the late 1920s. U.S. Route 99 was, for many years, the main highway through the West Coast states between the Mexican and Canadian Borders. By 1927, when it was made part of the California State Highway System, Route 99 had been paved with concrete in the vicinity of the Project area. Post-World War II realignments and additions resulted in the redesignation of U.S. 99, as it passes through the Salton Trough, as State Routes 86 and 111. During the late 1950s and early 1960s, U.S. 99 was replaced by Interstate Highway 10 as the main transportation artery from Los Angeles, through San Gorgonio Pass, to the southeastern United States (Cooper 2002).

Irrigation and the Creation of the Salton Sea

The first proposal to irrigate the Colorado Desert for agriculture came from Dr. Oliver M. Wozencraft after he saw Indians cultivating plots during an exploratory trip in May 1849. It was 10 years, however, before he secured the rights to 1,600 square miles of desert land in the Salton Trough from the California Legislature. Wozencraft died in 1887, never having realized his dream of turning the Salton Trough into an agricultural region (Kennan 1917; Fitch 1961; Nordland 1977).

After Wozencraft, others joined in the proposal to bring water to the Salton Trough. In 1875 and 1876, Lieutenant George M. Wheeler headed an examination of the feasibility of diverting water from the Colorado River between the Grand Canyon and the Mexican border to irrigate California (Cory 1915; Fitch 1961). In 1891, the Colorado River Irrigation Company was formed, with engineer Charles R. Rockwood directing operations. The financial depression of the 1890s put the company out of business, however, but in 1896, Rockwood formed the California Development Company. In 1900, a contract was signed by Canadian capitalist George Chaffey, the founder of Ontario, California, to provide funding and promotion through his California Development Company (Cory 1915; Kennan 1917; Fitch 1961).

Work on the Imperial Canal was begun in April of 1900, utilizing portions of the Alamo River. By March of 1902, the canal was brought on line and irrigation of the Imperial Valley had begun (Cory 1915; Kennan 1917; Dowd 1960; Fitch 1961). Agricultural development of the trough as a result of irrigation and real estate promotion by Chaffey exceeded expectations. From little or no cultivation in 1900, agriculture in the Salton Trough grew to 120,000 acres under cultivation by January of 1905. The demand for irrigation meant that all efforts were focused on keeping the water flowing. Proposed levees to protect the canal were never built (Kennan 1917; Fitch 1961).

During the winter of 1904-1905, greater than usual rainfall in the watershed area of the Gila River caused a high rate of discharge into the Colorado River above the new temporary Imperial Canal intake. After several unsuccessful attempts to halt or divert the flooding, water rushed uncontrolled into the canal. With no levees, the sides were quickly overflowed along its entire length. In addition to flooding of the Alamo River-Imperial Canal system, the excess flow affected the New River, which also overflowed. The entire discharge of the Colorado River began to pour into the Salton Basin, marking the creation of the Salton Sea (Cory 1915; Kennan 1917; Fitch 1961; Duke 1974; Woerner 1989).

Agricultural development resumed in the Imperial and Coachella Valleys, with runoff from irrigation and inflow from the Alamo and New Rivers keeping the sea from evaporating, as earlier inundation of the Salton Basin had in 1862 and 1891 (Cory 1915; Fitch 1961; Woerner 1989). In 1919, a bill was introduced in Congress to authorize construction of a canal entirely within the United States, to replace the portion of the Imperial Canal-Alamo River system that was located in Mexico.

Around the turn of the century, the Imperial Valley experienced considerable population growth after the construction of irrigation projects, and agriculture became a prime focus of economic activity. The first canal built was the Imperial Canal. The Westside Main Canal is a 40-mile canal alignment built in 1907 the later became part of the All-American Canal System. The construction of the All-American Canal to transport water from the Colorado River to Imperial Valley from 1934-1940 transformed agricultural development and settlement of the Imperial and Coachella Valleys. The areas served by the canal have become one of the richest and most important agricultural areas in the U.S. since the completion of the canal in 1938 (Queen 1999).

Electric power generation, which is related to irrigation in the Salton Trough region, was begun by the Imperial Irrigation District in 1936, when a three-unit diesel plant was constructed at Brawley. By 1943, the district had obtained $6 million through a bond issue to buy the Imperial and Coachella Valley facilities of the California Electrical Power Company and make additions to the existing system. In addition to the Brawley diesel plant, four hydroelectric plants were built on the All-American Canal and a steam plant began operating in El Centro. The Imperial Irrigation District continues to supply electric power to the Imperial and Coachella Valleys today (Fitch 1961; Imperial Irrigation District 1998).

Mining

Natural materials, mostly for industrial use, have been mined, quarried, or extracted through drilling from the Salton Trough area and the bordering mountains since the late nineteenth century. These include copper, lead, nickel, mica, borite, tungsten, calcite, manganese, sand and gravel. Gypsum quarrying in the Fish Creek Mountains southwest of

the Salton Sea has been the highest dollar-value mining industry in the Salton Trough region (Fitch 1961; Morton 1977; Lamb 1992). Although the Coachella Valley has yielded no gold, the mountains to the north, east and southeast of the Salton Trough have seen gold mining activity. Gold mining in the La Paz gold fields near the Colorado River was the impetus for development of the Bradshaw Trail, which became the first commercial road connecting San Gorgonio Pass and the Los Angeles area with Arizona, across the Project area in the 1860s (Fitch 1961; Johnston 1977).

Salt mining was also once important in the immediate Salton Sea area. Much of the salt mining activity took place around the northern shore of the sea. Salt has accumulated for millennia at the bottom of the Salton Sink. The first European-American exploitation of salt deposits was in 1884, when the New Liverpool Salt Company built a plant near where the north end of the Salton Sea would be more than 20 years later. A one-mile rail spur connected the plant with the Southern Pacific Railroad at Salton. Large steam-powered salt plows were used to cut wide, shallow furrows in the playa bed. Only 10-acre plots were worked at one time, where about 700 tons of salt were plowed up in parallel ridges each day, exposing saltwater spring seepage below. In addition to being the Southern Pacific rail connection, the settlement of Salton was the location of the salt milling works. In addition to the refined salt produced for use with food, unrefined salt was sold for industrial use (Fitch 1961; De Stanley 1966).

In 1877, the completion of the Southern Pacific Railroad across the Project area, connecting Los Angeles and Yuma, enabled mining companies to transport men, equipment, supplies and bullion to and from the mines easily. Most gold production in the vicinity of the Salton Trough occurred from about 1890 to 1910, and from the late 1930s until shortly after the United States' entry into World War II at the end of 1941, when gold mining was suspended as a non-essential industry (Fitch 1961; Morton 1977).

SECTION 3.0 METHODS

CULTURAL RESOURCES RECORDS SEARCH

The Southern Coastal Information Center (SCIC) conducted the cultural resources records search within a one-mile radius Area of Potential Effect (APE) of the Project area, providing a letter of their findings on September 27, 2012 (see Appendix A). The review consisted of an examination their records on the *Mount Signal* and *Heber* 7.5-minute USGS quadrangle maps to evaluate the Project site for any sites recorded or cultural resources studies conducted within the APE. In addition, the California Points of Historical Interest (PHI),

California Historical Landmarks (CHL), the CRHR, the NRHP and the California State Historic Resources Inventory (HRI) were reviewed.

NATIVE AMERICAN SCOPING

UltraSystems sent a letter on September 17, 2012 to the Native American Heritage Commission (Commission or NAHC) requesting information on potential culturally significant sites from their Sacred Lands File within the Project's area of concern as defined by the Commission. The NAHC responded on September 18, 2012 providing UltraSystems with a list of Tribal groups that may have knowledge of culturally significant sites within the Project area. The correspondence from NAHC and a Native American Communication log is contained in Appendix A. Table 3 lists the Native American tribes affiliated with the Project area as provided by the NAHC.

TABLE 3.
NATIVE AMERICAN TRIBES AFFILIATED WITH THE PROJECT AREA

Native American Tribe/ Affiliation
La Posta Band of Mission Indians
Manzanita Band of Kumeyaay Nation
Campo Band of Mission Indians
Torres Martinez Desert Cahuilla Indians
Kwaaymii Laguna Band of Mission Indians
Fort Yuma Quechan Indian Nation
Ewiiaapaayp Band of Kumeyaay Indians
Cocopah Indian Tribe
Quechan Indian Nation
Inter-Tribal Cultural Resource Protection
Kumeyaay Cultural Repatriation Committee

All tribes and individuals on the list provided by the NAHC were sent notification letters regarding the Project and a request for any comments or concerns relative to cultural resources in the vicinity of the Project area. Copies of all Native American correspondence are contained in Appendix A.

AGRICULTURAL PRACTICES IN THE AREA

According to Ken Wilson (2011), farming activities have occurred within the agricultural fields surrounding Wistaria Ranch's proposed solar fields from the 1930s to the present.

Wilson states that terracing and leveling took place to prepare the fields for agricultural activities (Wilson 2011). He also notes that drainage tiles were placed in these fields (*ibid*.). Continued farming activities have included laser leveling, chiseling and subsoiling. Wilson contends that the agricultural activities over the past 80 years in the immediate area, have impacted soils to depths of five to six feet where the drainage tiles were placed (*ibid*.).

SECTION 4.0 FINDINGS

CULTURAL RESOURCES RECORDS SEARCH

The results of the records search conducted by SCIC show that 35 cultural resource technical studies have been conducted on or within a one-mile radius of the Project area (Table 4). (The note of "Unknown Findings" in the Comment column is due to the SCIC staff using the "Key Word" list on the title page of reports to provide information on what resources were covered in a survey. The lack of noted resources would not have a bearing on the potential for unanticipated discoveries within the Project area, as these survey reports are limited to resources outside of Project area. Furthermore, if any of these surveys had been conducted within the project area and cultural resources had been found, they would have appeared as site or isolated records, and not previously discovered resources are known for the Project area.)

The record search also resulted finding 29 recorded cultural resources (Table 5). Of those, three are prehistoric sites, nine are remnants of old wagon trails, and the remainder consist primarily of segments of various historic canals.

TABLE 4
CULTURAL RESOURCES TECHNICAL STUDIES
WITHIN ONE MILE OF THE PROJECT AREA

Report No.	Recorder(s)/ Year	Comment
BLM05	BLM, 1981	Unknown Findings*
BURKED01	D. Burkenroad, 1979	Unknown Findings
BUYSSJ01	J. Buysse and B. F. Smith, 2002	CA-IMP-103, -3708, -7958, -3045, -6915, -7959. Lithic Scatter, Prehistoric Resources.
CALTRA20	Caltrans, 1999	Unknown Findings

Report No.	Recorder(s)/ Year	Comment
CSRI03	Cultural Systems Research, Inc., 1982	Unknown Findings
CSRI04	Cultural Systems Research, Inc., 1982	Unknown Findings
DAVISE03	E. L. Davis, 1980	Unknown Findings
GALLED01	D. Gallegos, 1979	Unknown Findings
GREENE02	E. Green and J. Middleton, 1994	All-American Canal. Unknown Findings
HANEYJ02	J. Haney, 1999	CA-IMP-1427, -3316, -374, -3969, -4904, -4907, -5996, -6914, -6916, -6918, -6920, -6922, -6924, -3173, -3317, -3964, -4899, -4906, -4909, -6003, -6915, -6917, -6919, -6921, -6923.
HUPPJ01	J. Hupp, 1999	Unknown Findings
ICPD07	Imperial County Planning Department,1987	Unknown Findings
IID02	Imperial Irrigation District, 1993	Unknown Findings
IMPERI03	Imperial County, 1979	Unknown Findings
PIGNIA04	A. R. Pigniolo, R. Phillips, D. Gallegos, 1990	Unknown Findings
PIGNIA10	A. R. Pigniolo, C. Serr, J. Aguilar, and F. Dittmer	Historic Irrigation System, Historic residential structures, Ancient Lake Cahuilla.
SCHAEJ02	J. Schaefer, 1981	Unknown Findings
SCHAEJ43	J. Schaefer and C. O'Neill, 2001	All-American Canal, Historic Irrigation.
SHACKM01	M. S. Shackley. 1982	Unknown Findings
SHACKM06	M. S. Shackley, 1984	Unknown Findings
SHACKM11	S. Shackley, 1982	Unknown Findings

Report No.	Recorder(s)/ Year	Comment
USINS01	US Immigration and Naturalization Service, 2002	Unknown Findings
VONWEJ48	J. Von Werlhof and S. Von Werlhof, 1976	Unknown Findings
VONWEJ114	J. Von Werlhof and K. McNitt, 1980	Unknown Findings
VTN01	VTN Consolidated, Inc., 1977	Unknown Findings
VTN02	VTN Consolidated, Inc. 1979	Unknown Findings
WAI04	Wirth Associates, Inc., 1979	Unknown Findings
WAI07	Wirth Associates, Inc., 1980	Unknown Findings
WAI09	Wirth Associates, Inc., 1980	Unknown Findings
WALKEC01	C. Walker, C. Bull, and J. Von Werlhof, 1979	Unknown Findings
WALKEC02	C. Walker, C. Bull, and J. Von Werlhof, 1981	Unknown Findings
WELCHP03	P. Welch, 1983	Unknown Findings
WLODAR10	R. J. Wlodarski, 2005	Unknown Findings
WRT01	W. Roberts and Todd, 1999	Unknown Findings
ZEPEDC02	C. Zepeda-Herman, 2011	Cremations, Historic Roads, Lithic Scatter, Temporary Camps, Metates.

- The “Unknown Findings” description was provided by the SCIC based on their “Key Word” summary of the survey report.

TABLE 5
CULTURAL RESOURCES
ON AND WITHIN ONE MILE OF THE PROJECT SITE

Trinomial/ Primary	Recorder(s)/ Year	Comment
CA-IMP-1670	(Recorder Unknown, Year not Provided)	Indian trail NW. Previous designations: 46-IMP-(1856)-3058, 4-IMP-2015. Taken from 1854 USGLO Survey Notes by G. H. Derby
CA-IMP-3316	J. Yogel, 1978	Cross road from San Diego to form Yuma course NE and SW. No resources identified.
CA-IMP-3321*	(Recorder Unknown, Year not Provided)	Crossed wagon road from Fort Yuma to Warner's Ranch, course N of W. Previous designations: 46-IMP-(1856)-305, 4-IMP-2012, 4-IMP-143-H. Taken from 1856 USGLO Survey Notes by R.C. Matthewson.
CA-IMP-3322*	(Recorder Unknown, Year not Provided)	Wagon Road to Fort Yuma, course SE. Previous designations: 46-IMP-(1856)-306, 4-IMP-2013, 4-IMP-1411-H. Taken from 1854 USGLO Survey Notes by G.H. Derby.
CA-IMP-3323*	(Recorder Unknown, Year not Provided)	Cross Road from San Diego to Yuma course N. 21W. and S. 21E. Previous designations: 49-IMP-(1856)-400, 4-IMP-2016, 4-IMP-145-H. Taken from 1880 USGLO Survey Notes by S.W. Brunt.
CA-IMP-3324	J. Yogel, 1978	Cross Road bears N and SE. No resources identified.
CA-IMP-3325*	(Recorder Unknown, Year not Provided)	Mesquite thicket. Previous designations: 49-IMP-(1856)-398, 4-IMP-2017, 4-IMP-147-H. Taken from1880 USGLO Survey Notes by S.W. Brunt.
CA-IMP-3326	J. Vogel, 1978	Cross Road from San Diego to Yuma, course NE and SW. No resources identified.

Trinomial/ Primary	Recorder(s)/ Year	Comment
CA-IMP-3327	(Recorder Unknown, Year not Provided)	Cross Wagon Road from Fort Yuma to Warner's Ranch, course NW. Previous designations: 46-IMP-(1856)-304, 4-IMP-2019, 4-IMP-149-H. Taken from 1856 USGLO Survey Notes by R. C. Matthewson.
CA-IMP-3414	(Recorder Unknown, Year not Provided)	Cross Wagon Road from Fort Yuma to Warner's Ranch, course NW. Previous designations: 46-IMP-(1856)-302, 4-IMP-2186, 4-IMP-236-H.Taken from 1856 USGLO Survey Notes by R. C. Matthewson.
CA-IMP-3415	(Recorder Unknown, Year not Provided)	Cross Wagon Road from Fort Yuma to Warner's Ranch, course NW. Previous designations: 46-IMP-(1856)-303, 4-IMP-2187, 4-IMP-237-H. Taken from 1856 USGLO Survey Notes by R.C. Matthewson.
CA-IMP-3679	T. Gonzalez, 1980	Pottery scatter, human bone fragments, historic overlapping with prehistoric site
CA-IMP-6641	Archaeological Survey Association,1956	Low density lithic and ceramic scatter: ceramic sherds, hammerstones, core, scraper, flakes
CA-IMP-7130	J. Krintz/2011, K. Tennesen and J. Whitaker/2010, A. York,	The All-American Canal, eligible for the NRHP.
CA-IMP-7834	C. Bodmer et al./2011, T. Mitchell et al./2012, H.	Westside Main Canal.
CA-IMP-11785	M. Bray, 2011	Early 20th century residential or agriculture site.
P-13-008770	G. E. Collins, 2004	Historic Canal/Aqueduct
P-13-013073	A. Pigniolo, 2010	Historic Canal/Aqueduct
P-13-013074	A. Pigniolo, 2010	Historic Canal
P-13-013075	P. Aguilar, 2010	Historic Canal

Trinomial/ Primary	Recorder(s)/ Year	Comment
P-13-013076	P. Aguilar, 2010	Historic Canal
P-13-013077	P. Aguilar, 2010	Historic Canal
P-13-013078	P. Aguilar, 2010	Historic Canal
P-13-013079	A. Pigniolo, 2010	Historic Drain
P-13-013080	F. Dittmer, 2010	Historic Drain
P-13-013081	F. Dittmer, 2010	Historic Drain
P-13-013082	P. Aguilar, 2010	Historic Drain
P-13-013083	P. Aguilar, 2010	Historic Residential Structure
P-13-013084	P. Aguilar, 2010	Historic Residential Structure

(Footnote: Trinomials followed with an /*/ indicates the four sites recorded within the Project boundaries.)

NATIVE AMERICAN SCOPING

The NAHC responded on September 18, 2012 to UltraSystems' request for information providing a list of Tribal groups that may have knowledge of culturally significant sites within the Project area. The Commission had also searched its Sacred Lands File and found that there were no recorded sacred sites within a half mile radius of the Project boundary, the area of concern as defined by the NAHC. There have been three responses from the Tribes as of when this report was prepared. Ms. Gwendolyn Parada, Chairperson of the La Posta Band of Mission Indians, replied by e-mail on October 22, 2012 requesting that a Native American monitor be present during any ground disturbing work at the Project site. Mr. Preston J. Arrow-Weed (Quechan) of the Ah-Mut-Pipa Foundation responded November 5, 2012 by telephone to state that there are many cultural resources and sites within the area of the Project. Mr. Desidero Vela, representing the Ewiiaapaayp Band of Kumeyaay Indians, responded by telephone on November 5, 2012 with the request that Native American monitors be present for any subsurface excavation conducted out of the footprint of the agricultural field; he further stated that "This area is Kumeyaay territory as they used this area when Lake Cahuilla was present, and after it was gone this was a feud area against other tribes." The correspondence from NAHC and a Native American Communication log is contained in Appendix A.

FIELD SURVEY

The initial cultural resources survey of the subject property was conducted from October 1-5, 2012. At that time, approximately 1,000 acres, composed of various APN's, provided at least 50% surface visibility and could be adequately surveyed at 15 meter intervals.

The remaining approximate 2,600 acres still contained crops and had to await survey until harvesting occurred in early or mid-November. UltraSystems' survey team returned to the project on November 16, 2012. At that time, harvesting had been conducted to some degree in most of the fields. The survey resumed on November 16, 2012 and continued through November 20, 2012. Table 1 lists the parcels surveyed, their acreage, their use type (crop, corridor, road), and their relative surface visibility. Of the listed parcels, several were surveyed during the ISEC South survey (Zepeda-Herman 2011). These include those portions of the Transmission Interconnection Line corridor located APN 052-190-022 and APN 052-190-023. As these parcels had been surveyed within the last two years they were not re-surveyed during this project. No cultural resources were recorded on these parcels from the previous survey.

Constraints

Un-harvested or partially harvested agricultural crops in numerous parcels posed the single most significant constraint to the survey. Remaining crops tended to reduce surface visibility to less than 10% in a given active field (see Figures 1 and 2 in Appendix B.) A 50-meter pedestrian assessment was used to inspect the interior of large parcels to determine if crop densities persisted throughout the parcel or if lower density areas affording more surface visibility were present. Table 1 lists the parcels that were assessed using a 50-meter transect, and the estimated percentage of visibility; typically 0%. In no case did any of these parcels have visibility exceeding 5%; therefore, these parcels were not surveyed. Other considerations that presented individual parcels from being surveyed was the presence of newly cultivated crops (see Figure 3 in Appendix B) and the presence of sheep being used to control vegetation (see Figure 4 in Appendix B).

All remaining parcels in Table 1 had 50% or greater surface visibility and were surveyed at 15-meter transect intervals (see Figure 5 in Appendix B). The survey transects trended north/south or east/west depending on the direction of plowing (see Figure 6 in Appendix B).

Results

The survey resulted in the discovery of three isolated occurrences of historic artifacts (Table 6) and six historic archaeological sites (Table 7). (See Figure 4.) The historic sites

consist of two residential sites, a historic refuse deposit, the Wistaria Canal and its related lateral branches, the Woodbine Canal and the Greeson Drain.

Isolate numbers WRSI #1 and WRSI #2 appear to be metal parts of agricultural vehicles, implements, or related machinery. Isolate number WRSI #3 is a fragment of a whiteware

TABLE 6:
NEWLY IDENTIFIED ISOLATED FINDS IN THE PROJECT AREA

Isolate No.	USGS 7.5' Quadrangle	Artifact Type	Material	Description
WRSI #1	Signal Mount	Metal	Steel	Segment of metal teeth from farm implement
WRSI #2	Signal Mount	Metal	Steel	1" bolt head
WRSI #3	Signal Mount	Ceramic	Whiteware	Portion of whiteware cup

TABLE 7:
NEWLY IDENTIFIED ARCHAEOLOGICAL SITES IN THE PROJECT AREA

Site No.	USGS 7.5' Quad	Site Type	Material	Description
CA-IMP-12134; P-13-014391	Signal Mount	Historic	Glass, ceramics, metal	Residential site
CA-IMP-12135; P-13-014392	Signal Mount	Historic	Glass, ceramics, metal	Refuse Deposit
P-13-014393	Signal Mount	Historic	Concrete	Wistaria Canal and Laterals (functional)
CA-IMP-12136; P-13-014395	Signal Mount	Historic	Glass, ceramic, metal, concrete, lumber	Residential site
P-13-014395	Signal Mount	Historic	Concrete	Woodbine Canal and

				Laterals (functional)
P-13-014396	Signal Mount	Historic	Concrete	Greeson Drain and Laterals (functional)

coffee cup. None of these artifacts were related to any other artifact, site, or sites. The artifacts were not collected.

Of the four historic archaeological sites (see Figure 4), two are residential in nature. Site CA-IMP-12134 is located in the northwest corner of APN 052-350-022 immediately southeast of the intersection of Lyon Street and Brockman Avenue. The approximately 2-acre rectangular parcel appears to have once had one or more structures, none of which remain. Grading is apparent over the entire parcel and several piles of milled lumber, unidentifiable metal fragments and glass fragments are near the northern part of the parcel. A large glass, ceramic and metal deposit was also noted near the southeastern boundary of the parcel and appears to have been revealed by the excavation of a shallow east-west drainage ditch. The ditch demonstrates that subsurface deposits of historic materials are at the site.

Site CA-IMP-12135 consists of a glass and ceramic refuse scatter in the northeast corner of APN 052-350-021. Artifacts noted include nine assorted fragments of clear, cobalt and green glass, and 5 fragments of ceramic and porcelain objects. The site does not appear to be associated with any other historic or historic archaeological site in the immediate area.

Site P-13-014393 consists of the Wistaria Canal and its related laterals (nos. 1-7). The Wistaria Canal is the main historical canal that supplies water to most of the subject parcels in this study.

Site CA-IMP-12136 is located in the southwestern corner of APN 052-180-028 immediately northeast of the intersection of Hwy 98 and Rockwood Road. The site consists of two concrete slabs, related foundations and walkways. An extensive refuse scatter consisting of over 100 assorted metal, glass and ceramic fragments were noted near the slabs. The remainder of the site is populated with non-indigenous trees including palm and willow.

Site P-134-014395 consists of the Woodbine Canal located between the boundaries of APN 052-210-025,-026, -028-, and -029. Site P-13-014396 consists of the Greeson Drain located midway in APN 052-210-020.

California Department of Parks and Recreation Site Record forms were prepared for all six newly discovered cultural resource properties and submitted to the South Coastal

Information Center for processing. All six were given primary designation and three were given trinomials by the SCIC (Lennox 2013) which are used here.

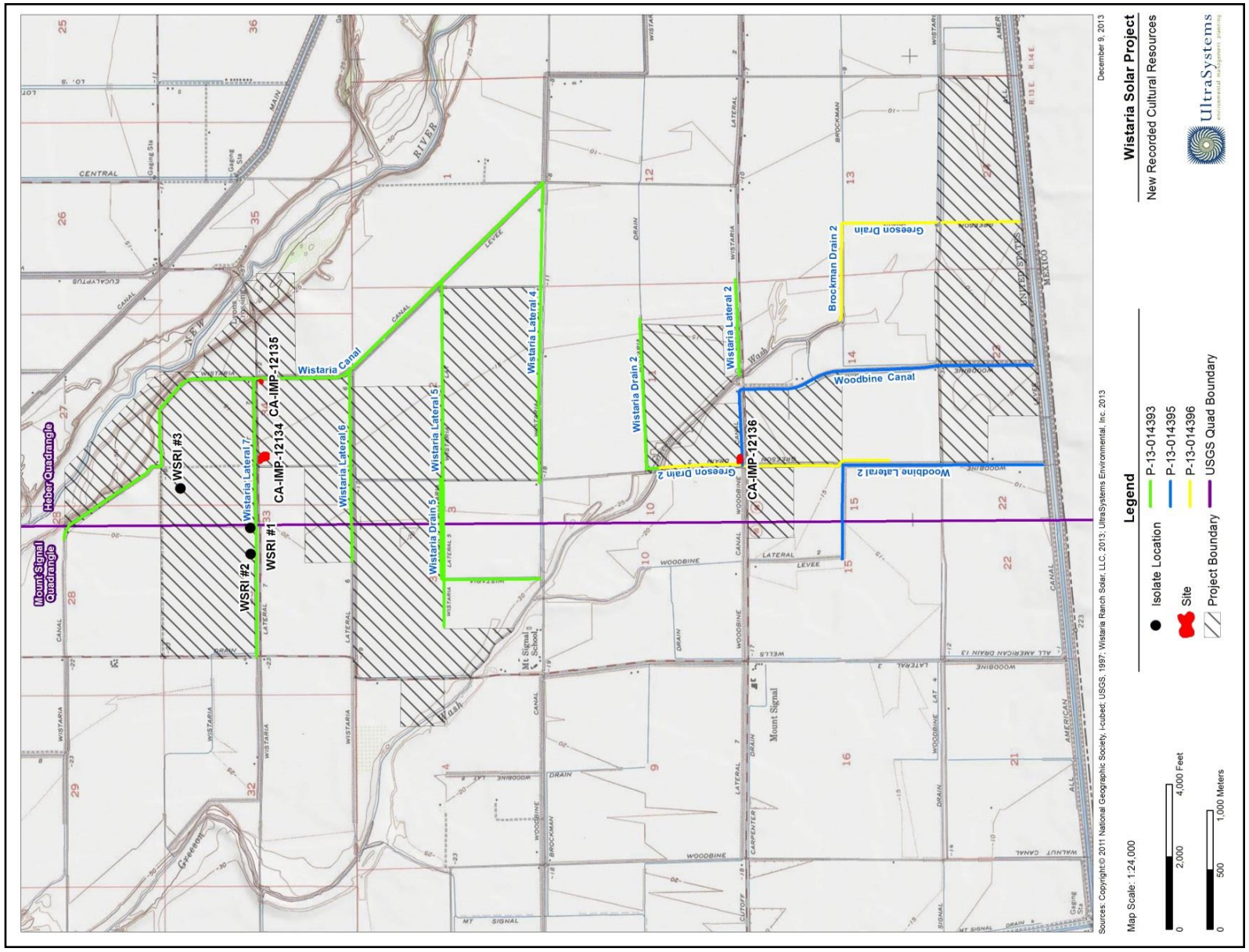

Figure 4. New Recorded Cultural Resources

Previously Recorded Sites

The results of the records search show that four historic archaeological sites had been previously recorded on the project site parcels (CA-IMP-3321, -3322, -3323, 3325). CA-IMP-3321 was recorded as a remnant of a wagon road from Ft. Yuma to Warner Ranch. CA-IMP-3322 was another segment of a wagon road to Ft. Yuman. CA-IMP-3323 was recorded as another road segment. CA-IMP-3325 was recorded as a large mesquite thicket. The record for -3325 does not indicate why the trees were recorded. No artifacts or structures are noted on that record. All four historical sites' information appears to have been derived from USGS survey maps prepared in 1854, 1856 and 1880 without field checking.

Situated just beyond the north-northwest edge of the Project's one-mile radius APE is CA-IMP-3679. The investigator recorded the presence of human bone fragments (upper crania and possible femur), though there was no evidence of a burial feature; the site also contained scattered Native American ceramics and shell fragments, as well as historic trash deposit including ceramics.

The cultural resources survey conducted for the ISEC-South and ISEC-West project (See Table 4, Report No. ZEPEDC02) noted the presence of a site within the BLM lands portion of the combined ISEC projects' APE containing evidence of cremations. This prehistoric site was discussed in the background section of the ISEC report as a part of the project survey's CHRIS records search (Zepeda-Herman, et al. 2011), and concerns a prehistoric site (CA-IMP-3679) on BLM-managed lands approximately five miles to the west of the Wistaria Project boundary (*ibid.*).

Previously recorded sites were not re-located during the survey conducted for the Wistaria Project. It is likely most, if not all, have been lost because of intensive agricultural activities since they were initially recorded.

SECTION 5.0 MANAGEMENT CONSIDERATIONS

THRESHOLDS OF SIGNIFICANCE

The following criteria are based on the Environmental Checklist Form in Appendix G of the State CEQA Guidelines. The questions are related to the impacts that the proposed Project may have on archaeological, historical and paleontological resources, and if there is the possibility of disturbing human remains. The checklist questions and an impact analysis are presented below.

PROJECT IMPACT ANALYSIS

Threshold a: Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Threshold b: Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Threshold c: Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Threshold d: Would the project disturb any human remains, including those interred outside of formal cemeteries?

SECTION 6.0 RECOMMENDATIONS

Under CEQA guidelines, a resource is considered historically significant if it meets at least one of four criteria related to its association with important events or individuals, its architectural characteristics and/or its data potential. Specifically, a resource is "historically significant" if it meets the criteria for listing on the CRHR, including the following:

> The quality of significance in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California is present in any object, building, structure, site, area, place, record, or manuscript that possesses integrity of location, design, setting, materials, workmanship, feeling and association and that:
>
> (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
>
> (B) Is associated with the lives of persons important in our past; or
>
> (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
>
> (D) Has yielded, or may be likely to yield, information important in prehistory or history.

(14 CCR 15064.5(a)(3)). Therefore, the six historic sites located within the APE during the survey are considered under these criteria, and recommendations are presented below.

Archaeological sites similar to the six identified sites are rarely found significant under criteria A, B, or C of Section 15064.5(a)(3). Any one of these sites may, however, be significant under Criterion D due the potential for intact buried deposits, and could possibly yield additional information important to the understanding of the history of the region.

It is recommended that if any one of these sites cannot be avoided, a formal Phase II evaluation be conducted by a qualified archeologist prior to grading or other ground disturbance that would destroy or degrade the site's significance. A Phase II evaluation would be needed to further assess the significance of the site and avoid potential adverse impacts; however, if the project applicant can avoid these sites, they are preferably left intact in their respective locations.

Phase II testing and evaluation procedures may include, but not be limited to the following:

- Shovel test pits
- One meter square excavation units
- Surface collection
- Site mapping
- Soils profiles
- Soils sampling
- Artifact analysis
- Floral and faunal analysis
- Radiocarbon analysis
- Curation

These techniques are used if testing indicates a site is significant and is determined to be a "historically significant" under Section 15064.5 of the CEQA Guidelines and/or eligible for CRHR listing under PRC 5024.1. In CEQA, historical resources are considered a part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment (Section 21084.1).

Preservation is the preferred treatment for historical resources. In case preservation is not feasible, a data recovery plan should be prepared prior to groundbreaking that describes provisions to record and document scientifically important information and, if advisable, collect and deposit excavated materials. Following data recovery, a qualified archaeological monitor should be present during grading to ensure undiscovered resources are protected.

It is presumed that of the six historic sites recorded, the three canals will be left intact to continue their irrigation function (P-13-014393 – Wistaria Canal and Laterals, P-13-

014395 – Woodbine Canal and Laterals, P-13-014396 – Greeson Canal and Laterals). These were observed to be all functional canals during the 2012 survey.

Of the three remaining newly recorded historic sites, there are two residential sites and one refuse deposit (P-13-014391 – residential site, P-13-014392 – refuse deposit, P-13-014395 – residential site). These lay along the edge of fields usually along access roads at the intersection of roads or roads and canals (see site records maps in Appendix E). The preferred treatment of these sites is preservation through avoidance of construction at these sites. If preservation of any/all of the three sites is not feasible, then Phase II testing as described above should be conducted at the subject site(s) to gather data on the historic agricultural operations of the respective area(s). Following Phase II investigations, monitoring of the respective site(s) should be conducted during subsurface construction operations.

Wilson notes that if any archaeological resources are present within the immediate area, they would no longer retain their physical integrity because the soils in the fields have been continually impacted to depths of three feet by agricultural activity and up to five to six feet where drainage tiles were placed (Wilson 2011). Thus it is unlikely that any proposed activities associated with this undertaking would impact significant historical resources (*ibid*.).

Though approximately one-half of the agricultural fields for the proposed Wistaria solar facility were covered with vegetation during the survey, resulting in <50 percent coverage, there were no archaeological artifacts observed in the fields for which greater than or equal to 50 percent visibility was achievable. Furthermore, a similar survey of over 900 acres two miles to the west for ISEC-South in open fields with a comparable agricultural history and also within the bed of Ancient Lake Cahuilla did not yield observation of any cultural artifacts (Zepeda, et al. 2011). Wilson recommended for the Imperial Solar Energy Center-South two miles to the west (and the County of Imperial approved [ISEC-South EIR/EA, 2011]), that full-time archaeological monitoring would not need to take place in the fields, but that a data recovery plan be developed for this area to insure procedures are in place to address any unforeseen encounters with archaeological resources (Wilson 2011.). Because of the known heavy and long-term disturbance to agricultural fields in the Imperial Valley (*ibid*.), and the lack of findings during the cultural resources survey, it is not recommended that cultural resource monitoring be conducted during subsurface construction work in the proposed solar fields.

Section 21083.2(i) of the CEQA Statutes and Section 15064.5(f) of the State CEQA Guidelines provide for the accidental discovery of historical / archaeological resources during construction.

A worker education program (WEP), and cultural resources monitoring procedures and data recovery plan, should be developed before commencement of ground-disturbing activity for the Wistaria Solar Project. The cultural resources plan should cover Project procedures and requirements to be followed during ground-disturbing activities that may affect cultural resources conducted in the pre-grading meeting. In addition, all construction

workers and/or equipment operators shall be made aware of these procedures through the WEP training during regular tailgate meetings.

All workers will be instructed that if prehistoric or historic artifacts or signs are observed during subsurface excavation, the construction crew must stop work in the immediate area and report to their supervisor. The supervisor will follow the procedures described in the cultural resources monitoring and data recovery plan which will include calling a qualified archaeologist to come to the site to make a determination of the significance of the find and determine the next course of activity. If a discovery proves to be significant, additional work (such as preservation or implementation of data recovery excavation) may be warranted.

HUMAN REMAINS

There is the potential for human remains to be present within the APE, and that human remains might be discovered during Project construction activities. Therefore, in accordance with Section 7050.5 of the *California Health and Safety Code,* if potential human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has made a determination regarding the identification of the remains as to if they are human or non-human, and if human then the remains are modern, historic or pre-historic. The County Coroner shall be notified within 24 hours of the discovery and shall make such a determination within 2 working days of notification. If the County Coroner determines that the remains are Native American, he or she shall notify the Native American Heritage Commission in Sacramento within 24 hours. In accordance with Section 5097.98 of the *California Public Resources Code,* the Native American Heritage Commission must immediately notify those persons it believes to be the most likely descended from the deceased Native American. The descendants shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the Property Owner, the treatment of the human remains.

DECOMMISSIONING

Decommissioning of the proposed Project is expected to take place approximately 30 years following commissioning. Activities related to decommissioning will consist of the removal of solar panels and related utility equipment. Ground disturbance to remove equipment during decommissioning will take place in the same locations as construction occurred, and therefore it is expected that no further disturbance of potential cultural resources will take place during this decommissioning phase of the project. Due to the extensive disturbance by farming in the agricultural fields and the limited depth of disturbance for the proposed project, archaeological monitoring is not required on the agricultural fields outside the three recorded historic period sites.

SUMMARY OF MITIGATION PROGRAM

With implementation of the mitigation program listed above, potential impacts to archaeological, historical and paleontological resources would be reduced to a level considered less than significant.

The CEQA checklist table is provided below.

TABLE 8
CEQA ENVIRONMENTAL CHECKLIST

Cultural Resources – Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less than Significant	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?		**X**		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		**X**		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?		**X**		
d) Disturb any human remain, including those interred outside of formal cemeteries?		**X**		

SECTION 7.0 REFERENCES

Almstedt, Ruth F.

1982 The Kumeyaay and Ipai. In, *APS/SDG&E Interconnection Project Native American Cultural Resources*, pp. 6-21. Document on file with San Diego Gas & Electric, San Diego, California.

Barrows, David P.

1900 *The Ethno-botany of the Coahuilla Indians of Southern California*. University of Chicago Press. (Reprinted 1976 by Malki Museum, Banning).

Bannon, John F.

1974 *The Spanish Borderlands Frontier, 1513-1821*. University of New Mexico Press, Albuquerque.

Bean, Lowell J., and Harry W. Lawton

1973 Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture and Agriculture. In, *Native Californians: A Theoretical Perspective*, edited by Lowell J. Bean and Thomas C. Blackburn, pp. 19-48. Ballena Press: Socorro, New Mexico.

Bedwell, S.F.

1973 *Fort Rock Basin Prehistory and Environment*. University of Oregon Books, Eugene, Oregon.

Bee, Robert L.

1983 Quechan. In, *Southwest*, edited by Alfonso Ortiz, pp. 86-89. Handbook of the North American Indians, vol. 10, W.C. Sturtevant, ed. Smithsonian Institution: Washington, D.C.

Busch, Richard

1995 The Salton Sea (Now You "Sea" It – Now You Don't). *Lithosphere*. June 1995.

Carrico, Richard L.

1987 *Strangers in a Stolen Land: Indians of San Diego County from Prehistory to the New Deal*. Sierra Oaks Publishing Co.: Newcastle, California.

Cook, John R. and Scott G. Fulmer

1981 *The Archaeology of the McCain Valley Study Area in Eastern San Diego County, California: A Scientific Class II Cultural Resource Inventory*. Prepared for U.S. Department of Interior, Bureau of Land Management, California Desert District, Riverside, California.

Cooper, Casey
2002 History of the U.S. Highway System from Dirt Paths to Superhighways. http://gbcnet.com/ushighways/history.

Cordell, Linda S.
1997 *Archaeology of the Southwest*. Academic Press, Orlando, Florida.

Cory, H.T.
1925 *The Imperial Valley and the Salton Sink*. John J. Newbegin, San Francisco.

County of Imperial
1997 General Plan. County of Imperial, California.

Cuero, Delfina
1970 *The Autobiography of Delfina Cuero: A Diegueno Woman. As told to Florence C. Shipek.* Malki Museum Press: Banning, California.

DeStanley, Mildred
1966 *The Salton Sea Yesterday and Today*. Triumph Press, Inc., Los Angeles.

DeWilliams, Anita Alvarez
1983 Cocopa. In, *Southwest*, edited by Alfonso Ortiz, pp. 99-112. Handbook of the North American Indians, vol. 10, W.C. Sturtevant, ed. Smithsonian Institution: Washington, D.C.

Dowd, M. J.
1960 *Historic Salton Sea*. Office of Public Information, Imperial Irrigation District, El Centro, California.

Duke, Alton
1974 *When the Colorado River Quit the Ocean*. Southwest Printers, Yuma, Arizona.

Ezzo, Joseph A.
1994 On the Trail to Avikwaame: Results of a Noncollection Class II Cultural Resources Survey of Quien Sabe/Big Maria Terrace, Riverside County, California. *Technical Series* No. 49. Statistical Research, Tucson.

Fitch, Marcella K. E.
1961 *History of the Economic Development of the Salton Sea Area*. Unpublished thesis presented to the faculty of the Department of History, University of Southern California.

Flora of North America Association (FNAA)
1999 Flora of North America. Internet site http://fna.org.

Gifford, E.W.

1918 Clans and Moieties of Southern California. *University of California Publications in American Archaeology and Ethnology.*

1931 The Kamia of Imperial Valley. *Bulletin of the Bureau of American Ethnology* 97:1-94. Smithsonian Institution: Washington, D.C.

1933 The Cocopah. *University of California Publications in American Archaeology and Ethnology* 31(5):257-334. University of California Press: Berkeley.

Hester, T. R.

1973 Chronological Ordering of Great Basin Prehistory. *Contributions of the Archaeological Research Facility* 17, University of California, Berkeley.

Hoyt, Franklyn

1948 *A History of the Desert Region of Riverside County From 1540 to the Completion of the Railroad to Yuma in 1877*. Unpublished thesis presented to the faculty of the Department of History, University of Southern California.

Imperial Irrigation District

1998 *Imperial Irrigation District History*. Imperial Irrigation District, El Centro, California.

Jennings, Charles W.

1967 *Geologic Map of California, Salton Sea Sheet*. State of California Division of Mines and Geology.

Johnston, Francis J.

1977 The Bradshaw Trail: Narrative and Notes. In, *Historical Portraits of Riverside County,* John R. Brumgardt, editor, pp. 32-39. Historical Commission Press, Riverside, California.

Kelly, William H.

1977 Cocopa Ethnography. University of Arizona Press: Tucson.

Kendrick, Grace

1971 *The Antique Bottle Collector*. Pyramid Books, New York.

Kennan, George

1917 *The Salton Sea: An Account of Harriman's Fight with the Colorado River*. The Macmillan Company, New York.

Kistler and Obradovich

1964 Oral communication, cited in Salton Sea Sheet, Geological Map of California, Olaf Jenkins 1977.

Kroeber, A. L.
1925 Handbook of the Indians of California. *Bulletin* 78. Bureau of American Ethnology of the Smithsonian Institution, Washington, D.C.

Kowta, Makoto
1969 The Sayles Complex, a Late Milling Stone Assemblage from Cajon Pass and the Ecological Implications of its Scraper Planes. *University of California Publications in Anthropology* 6.

Lamb, Blaine P.
1992 High Iron Below Sea Level: Railroading in California's Colorado Desert. *Journal of the West*, 31(1): 20-30.

Lennox, Jaime
2013 RE: Site Forms for the Wistaria Solar Project (SRID-374). E-mail to Megan Black, UltraSystems Environmental, on January 15, 2013. From Jaime Lennox, Coordinator, South Coastal Information Center, San Diego, California.

Loeltz, O. J., Burdge Irelan, J. H. Robinson, and F. H. Olmsted
1975 Geohydrologic Reconnaissance of the Imperial Valley, California. *U.S. Geological Survey Professional Paper* 486-K.

Luomala, Katharine
1978 Tipai-Ipai. In, *California*, edited by Robert F. Heizer, pp. 592-609. Handbook of the North American Indians, vol. 8, W.C. Sturtevant, ed. Smithsonian Institution: Washington, D.C.

Martin, P.S. and Mehringer, P. J., Jr.
1965 Pleistocene Pollen Analysis and Biogeography of the Southwest. In, *Quaternary of the United States,* H. E. Wright, Jr. and D. G. Frey, editors, pp. 433-451. Princeton University Press.

May, Ronald V.
1978 A Southern California Indigenous Ceramic Typology: A Contribution to Malcolm J. Rogers Research. *ASA Journal* 2:2.

McGuire, Randall H.
1982 Problems in Culture History. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, Randall H. McGuire and Michael B. Schiffer, editors, pp. 153-222. Academic Press, New York.

Meighan, Clement W.
1954 A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10:215-227.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Inc., New York.

Morton, Paul K.
1977 Geology and Mineral resources of Imperial County, California. *County Report* Number 7. California Division of Mines and Geology, Sacramento.

National Park Service (NPS)
1983 Archaeology and Historic Preservation. *Secretary of the Interior's Standards and Guidelines: Professional Qualifications Standards.* http://www.cr.nps.gov/local-law/arch_stnds_9.htm.

Nordland, Ole J.
1977 Three Words That Built the Coachella Valley: Water, Will, Vision. In, *Historical Portraits of Riverside County*, John R. Brumgardt, edited by, pp. 54-64. Historical Commission Press, Riverside, California.

1978 Highpoints in District's History. In *Coachella Valley's Golden Years: The Early History of the Coachella Valley County Water District and Stories about the Discovery and Development of This Section of the Colorado Desert*, Ole J. Nordland, editor, p. 10. Revised Edition. Coachella Valley County Water District, Coachella, California.

Norris, Robert M. and Robert W. Webb
1976 *Geology of California*. Wiley & Sons, New York.

Office of Historic Preservation
1990 *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*. Department of Parks and Recreation, Office of Historic Preservation, Sacramento, California.

Patten, Michael A., Philip Unitt, and Guy McCaskie
1999 *Birds of the Salton Sea: Status, Biogeography, and Ecology*. University of California Press, Berkeley and U.S. Geological Survey, Riverside, California.

Pepper, Choral
1973 *Guidebook to the Colorado Desert of California, Including Palm Springs, Salton Sea, Indio, and the Colorado River*. The Ward Ritchie Press, Los Angeles.

Pourade, Richard F.
1971 *Anza Conquers the Desert: The Anza expeditions from Mexico to California and the Founding of San Francisco, 1774 to 1776*. Copley Books, San Diego.

Reid, Jefferson and Stephanie Whittlesey
1997 *The Archaeology of Ancient Arizona*. The University of Arizona Press: Tucson.

Rogers, Malcolm J.

1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. *San Diego Museum Papers,* Number 3.

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2): 157-198.

1958 San Dieguito Implements from the Terraces of the Rincon-Pantano and Relit Drainage System. *The Kiva* 24(1): 1-23.

1966 *Ancient Hunters of the Far West*. Richard Pourade, editor. Copley Press, San Diego, California.

Ross, Delmer G.

1992 Gold Road to La Paz: An Interpretive Guide to the Bradshaw Trail. *Tales of the Mojave Road* Number Nineteen. Tales of the Mojave Road Publishing Company, Essex, California.

Schaefer, Jerry

1994a The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. *Journal of California and Great Basin Anthropology* 16(1):60-80.

1994b The Stuff of Creation: Recent Approaches to Ceramics Analysis in the Colorado Desert. In, Recent Research along the Lower Colorado Desert, edited by Joseph A. Ezzo. *Technical Series* 51. Report prepared for USDI Bureau of Reclamation. Statistical Research, Tucson.

Schoenherr, Allan A.

1992 A Natural History of California. *California Natural History Guides*: 56. University of California Press, Berkeley.

Schroeder, Albert H.

1957 The Hakataya Cultural Tradition. *American Antiquity* 23:176-178.

1961 The Archaeological Excavations at Willow Beach, Arizona, 1950. *University of Utah, Anthropological Papers* 50.

Sharp, R. P.

1976 *Geology Field Guide to Southern California*. Kendall/Hunt Publishing, Dubuque, Iowa.

Spier, Leslie
1923 Southern Diegueno Customs. *University of California Publications in American Archaeology and Ethnology* 31(5):257-334. University of California Press: Berkeley.

Stone, Connie L.
1991 The Linear Oasis: Managing Cultural Resources Along the Lower Colorado River. *Monograph* No. 6. Bureau of Land Management, Phoenix, Arizona.

Sykes, Godfrey
1937 The Colorado Delta. *American Geographical Society Special Publications* No. 19. New York.

Toulouse, Julian H.
1971 *Bottle Makers and Their Marks*. The Blackburn Press, Caldwell, New Jersey.

Turner, Raymond M., Janice E. Bowers, and Tony L. Burgess
1995 *Sonoran Desert Plants: An Ecological Atlas*. University of Arizona Press, Tucson.

U.S. Department of Agriculture Soil Conservation Service
1979 *Soil Survey of Riverside County, California, Coachella Valley Area*. Department of the Interior, US Fish and Wildlife Service.

1979 *Soil Survey of Imperial County, California, Imperial Valley Area*. Department of the Interior, US Fish and Wildlife Service.

1987 *Wildlife of Salton Sea National Wildlife Refuge, California*. Department of the Interior, US Fish and Wildlife Service.

van Devender, Thomas
1990 Late Quaternary Vegetation and Climate of the Sonoran Desert, United States and Mexico. In, *Packrat Middens: The Last 40,000 years of Biotic Change*, Julio L. Betancourt, Thomas R. van Devender, and Paul S. Martin, editors. University of Arizona Press, Tucson.

Wallace, W. J.
1957 Archaeological Investigations in Death Valley National Monument. *University of California Archaeological Survey Reports* 42:7-22, Berkeley, California.

1962 Prehistoric Cultural Developments in the Southern California Deserts. *American Antiquity* 28(2): 172-180.

Wallace, W.
1955 A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11: 214–230.

Warren, Claude N.
1966 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2): 168-185.

Warren, C. N.
1968 Cultural Traditions and Ecological Adaptation on the Southern California Coast. In, Archaic Prehistory in the Western United States. *Eastern New Mexico Contributions in Anthropology* 1(3): 1–14.

Warren, Claude N. and R. H. Crabtree
1984 The Prehistory of the Southwestern Area. In, *Handbook of North American Indians*, Volume 11: Great Basin, W. L. d'Azevedo, editor. W. C. Sturtevant, Series Editor. Smithsonian Institution, Washington DC.

Warren, Claude N. And D. L. True
1961 The San Dieguito Complex and Its Place in California Prehistory. *University of California, Los Angeles, Archaeological Survey Annual Report* 1960-1961:246-307.

Warren, Elizabeth von Till, Robert H. Crabtree, Claude N. Warren, Martha Knack, and Richard McCarty
1979 *A Cultural Resources Overview of the Colorado Desert Planning Units*. Eric W. Ritter, General Editor. Prepared for U.S. Department of Interior, Bureau of Land Management, California Desert District, Riverside, California.

Waters, Michael R.
1979 The Lowland Patayan Tradition. In, *Hohokam and Patayan: Prehistory of Southwestern Arizona*, McGuire, Randall H. and Michael B. Schiffer, editors, pp. 275-297. Academic Press, New York.

Weeks and Grimmer
1995 *The Secretary of The Interior's Standards for the Treatment of Historic Properties: With Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services (Washington, D.C.).

Weide, David
1976a A Cultural Sequence for the Yuha Desert. In, Background to Prehistory of the Yuha Desert Region, P. J. Wilke, editor. *Ballena Press Anthropological Papers* No. 5.

1976b Regional Environmental History of the Yuha Desert Region. In, Background to the Prehistory of the Yuha Desert Region, P. J. Wilke, editor, pp. 9-20. *Ballena Press Anthropological Papers* No. 5.

White, C.
2012 Personal communication via email. May 31, 2012

Wilke, Philip J.
1976 Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California. *Contributions of the University of California Archaeological Research Facility* 38. University of California, Berkeley.

Wilson, Ken
2011 CSOLAR Development, Imperial Solar Energy Center, West and South Projects: An Assessment of Agricultural Development and Impacts on Cultural Resources in the Proposed Solar Fields. Letter provided by the Client.

Woerner, Lloyd
1989 The Creation of the Salton Sea: An Engineering Folly. *Journal of the West*, 28(1):109-112.

Zepeda-Herman, Carmen and Harry Price and Richard Shultz
2011 *Class III Cultural Resources Survey for the Imperial Solar Energy Center South Project, Imperial County, California*. Prepared for the Bureau of Land Management, El Centro Field Office by RECON Environmental.

APPENDIX A

Native American Heritage Commission Correspondence
Native American Contact/ Communication Log

Name	Tribe/ Affiliation	Type and Date	Comments
David Singleton	Native American Heritage Commission	Letter September 17, 2012	Requesting background information.
David Singleton	Native American Heritage Commission	Fax September 18, 2012.	Reply with information and contact list.
Preston J. Arrow-Weed	Ah-Mut-Pipa Foundation, Quechan Kumeyaay	Letter September 19, 2012	Requesting background information.
Preston J. Arrow-Weed	Ah-Mut-Pipa Foundation, Quechan Kumeyaay	E-mail October 22, 2012	Requesting background information. No response to date..
Preston J. Arrow-Weed	Ah-Mut-Pipa Foundation, Quechan Kumeyaay	Telephone November 5, 2012.	Reply stating that there were many resources near the project area.
John P. Bathke	Quenchan Indian Nation	Letter September 19, 2012	Requesting background information; no response to date.
John P. Bathke	Quenchan Indian Nation	E-mail October 22, 2012.	Requesting background information; email address not valid.
John P. Bathke	Quenchan Indian Nation	Telephone November 5, 2012; November 9, 2012	Requesting background information; no response to date. Manfred Scot called and requested the project information be sent to him.
Frank Brown	Inter-Tribal Cultural Resource Protection Council, Diegueno/	Letter September 19, 2012	Requesting background information.
Frank Brown	Inter-Tribal Cultural Resource Protection Council, Diegueno/ Kumeyaay	E-mail October 22, 2012.	Requesting background information; no response to date.

Name	Tribe/ Affiliation	Type and Date	Comments
Frank Brown	Inter-Tribal Cultural Resource Protection Council, Diegueno/ Kumeyaay	Telephone November 5, 2012.	Requesting background information; no response to date.
Leroy J. Elliott	Manzanita Band of Kumeyaay Nation	Letter September 19, 2012	Requesting background information.
Leroy J. Elliott	Manzanita Band of Kumeyaay Nation	E-mail October 22, 2012.	Requesting background information; no response to date.
Leroy J. Elliott	Manzanita Band of Kumeyaay Nation	Telephone November 5, 2012.	Number not valid.
Keeny Escalanti, Sr.	Fort Yuma Quechan Indian Nation	Letter September 19, 2012	Requesting background information.
Keeny Escalanti, Sr.	Fort Yuma Quechan Indian Nation	E-mail October 22, 2012.	Email not valid.
Keeny Escalanti, Sr.	Fort Yuma Quechan Indian Nation	Telephone November 5, 2012.	Requesting background information; Vernon Smith asked for the project information to be sent to him. No response to date.
Ralph Goff	Campo band of Mission Indians	Letter September 19, 2012	Requesting background information.
Ralph Goff	Campo band of Mission Indians	E-mail October 22, 2012.	Requesting background information; no response to date.
Ralph Goff	Campo band of Mission Indians	Telephone November 5, 2012.	Requesting background information; no response to date.
Carmen Lucas	Kwaaymii Laguna band of Mission Indians	Letter September 19, 2012	Requesting background information.
Carmen Lucas	Kwaaymii Laguna band of Mission Indians	E-mail October 22, 2012.	Requesting background information; no response to date.

Name	Tribe/ Affiliation	Type and Date	Comments
Carmen Lucas	Kwaaymii Laguna band of Mission Indians	Telephone November 5, 2012.	Requesting background information; no response to date.
H. Jill McCormick	Cocopah Indian Tribe	Letter September 19, 2012	Requesting background information.
H. Jill McCormick	Cocopah Indian Tribe	E-mail October 22, 2012.	Requesting background information; no response to date.
H. Jill McCormick	Cocopah Indian Tribe	Telephone November 5, 2012.	Could not leave message, mailbox full.
Will Micklin	Ewiiaapaayp Band of Kumeyaay Indians	Letter September 19, 2012	Requesting background information.
Will Micklin	Ewiiaapaayp Band of Kumeyaay Indians	E-mail October 22, 2012.	Requesting background information; no response to date.
Will Micklin	Ewiiaapaayp Band of Kumeyaay Indians	Telephone November 5, 2012.	Requesting background information; Desi Vela responded that Native American monitors be present if work is done out of the footprint. "This area is Kumeyaay territory as they use this area when Lake Cahuilla was present and after it was gone was a feud area against other tribes."
Bernice Paipa	Kumeyaay Cultural Repatriation Committee	Letter September 19, 2012	Requesting background information.
Bernice Paipa	Kumeyaay Cultural Repatriation Committee	E-mail October 22, 2012.	Requesting background information; no response to date.

Name	Tribe/ Affiliation	Type and Date	Comments
Bernice Paipa	Kumeyaay Cultural Repatriation Committee	Telephone November 5, 2012.	Requesting background information; no response to date.
Gwendolyn Parada	La Posta Band of Mission Indians	Letter September 19, 2012	Requesting background information.
Gwendolyn Parada	La Posta Band of Mission Indians	E-mail October 22, 2012.	Requesting background information. Response asking for Native American monitor to be present during any ground disturbance.
Mary Resvaloso	Torres-Martinez Desert Cahuilla Indians	Letter September 19, 2012	Requesting background information.
Mary Resvaloso	Torres-Martinez Desert Cahuilla Indians	E-mail October 22, 2012.	Requesting background information. No response to date.
Mary Resvaloso	Torres-Martinez Desert Cahuilla Indians	Telephone November 5, 2012.	Requesting background information. Matthew Krystal asked for the information to be sent to him. No response to date.

APPENDIX B

SITE PHOTOGRAPHS

APPENDIX C

PERSONNEL QUALIFICATIONS

APPENDIX D

SCIC Records Search Results

APPENDIX E

Site Records

(CONFIDENTIAL)

APPENDIX F

CUP Parcels Cultural Resources Table

PALEONTOLOGICAL RESOURCES INVENTORY REPORT

Wistaria Ranch Solar Energy Center

Imperial County, California

Prepared For:

Wistaria Ranch Solar, LLC

Prepared By:

UltraSystems
environmental • management • planning

16431 Scientific Way
Irvine, CA 92618

May 2014

MANAGEMENT SUMMARY

Between September and December 2012, UltraSystems Environmental Inc. (UEI) and subcontractor CRM TECH performed a paleontological resource assessment on approximately 3,186.4 acres of agricultural land designated for the proposed Wistaria Ranch Solar Energy Center project near the unincorporated community of Mount Signal in southern Imperial County, California. The irregularly shaped project area extends approximately five miles north-south and four miles east-west between the New River and the U.S.-Mexican border, lying within Sections 27, 28, and 33-35, T16S R13E, and Sections 1-4, 11, 13-17, 23, and 24, T17S R13E, San Bernardino Baseline and Meridian.

This study is part of the environmental review process for the proposed project. The County of Imperial (County), as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA). The purpose of the study is to provide the County with the necessary information and analysis to determine whether the project would potentially disrupt or adversely affect any significant paleontological resources, as mandated by CEQA.

In order to identify any paleontological resource localities that may exist in or around the project area and to assess the possibility for such resources to be encountered in future excavation and construction activities, CRM TECH and UEI initiated records searches at the appropriate paleontological information repositories (the San Diego Museum of Natural History and the Colorado Desert District Stout Research Center), conducted a literature search and carried out a systematic field survey in accordance with the guidelines of the Society of Vertebrate Paleontology.

The results of these research procedures suggest that the proposed project's potential to impact significant, nonrenewable paleontological resources appears to be low in the disturbed surface sediments, but high in the undisturbed Ancient Lake Cahuilla sediments and older alluvium underneath. Therefore, it is recommended that earth-moving operations impacting five feet and deeper of soils within the project area be monitored by "spot-checking" up to two days per week by a qualified paleontologist to determine whether potentially fossiliferous sediments have been encountered. Continuous monitoring will become necessary in select areas if the potentially fossiliferous sediments are unearthed at shallower depths. Additionally, a program should be implemented to mitigate project impact on exposed paleontological resources. These recommendations apply to CUPs 13-0036 through 13-0052; as there were no resources observed during the field survey throughout the entire project site and the potential for these resources is regarded as low, the impact to paleontological resources on all of the 17 CUP sites is reduced to no significant impact with the implementation of the recommended mitigation measures.

This report was prepared March 2012. It was revised November 2013 with the input of Imperial County peer review, and in March 2014 with County's Conditional Use Permit modifications and Decommissioning statement.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

Between September and December 2012, UltraSystems Environmental Inc. (UEI) and subcontractor CRM TECH performed a paleontological resource assessment on approximately 3,186.4 acres of agricultural land designated for the proposed Wistaria Ranch Solar Energy Center project near the unincorporated community of Mount Signal in southern Imperial County, California (Figure 1). The irregularly shaped project area extends approximately five miles north-south and four miles east-west between the New River and the U.S.-Mexican border, lying within Sections 27, 28, and 33-35, T16S R13E, and Sections 1-4, 11, 13-17, 23, and 24, T17S R13E, San Bernardino Baseline and Meridian (Figure 2).

This study is part of the environmental review process for the proposed project. The County of Imperial, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the County with the necessary information and analysis to determine whether the project would potentially disrupt or adversely affect any significant paleontological resources, as mandated by CEQA.

In order to identify any paleontological resource localities that may exist in or around the project area and to assess the possibility for such resources to be encountered in future excavation and construction activities, CRM TECH and UEI initiated records searches at the appropriate paleontological information repositories (the San Diego Museum of Natural History and the Colorado Desert District Stout Research Center), conducted a literature search and carried out a systematic field survey in accordance with the guidelines of the Society of Vertebrate Paleontology. The following report is a complete account of the methods, results, and final conclusion and recommendations of this study.

PALEONTOLOGICAL RESOURCES

DEFINITION

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically regarded as older than 10,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene glaciation and the beginning of the current Holocene epoch.

Common fossil remains include marine shells; the bones and teeth of fish, reptiles and mammals; leaf assemblages; and petrified wood. Fossil traces, another type of paleontological resource, include internal and external molds (impressions) and casts created by these organisms. These items can serve as important guides to the age of the rocks and sediments in which they are contained, and may prove useful in determining the temporal relationships between rock deposits from one area and those from another as

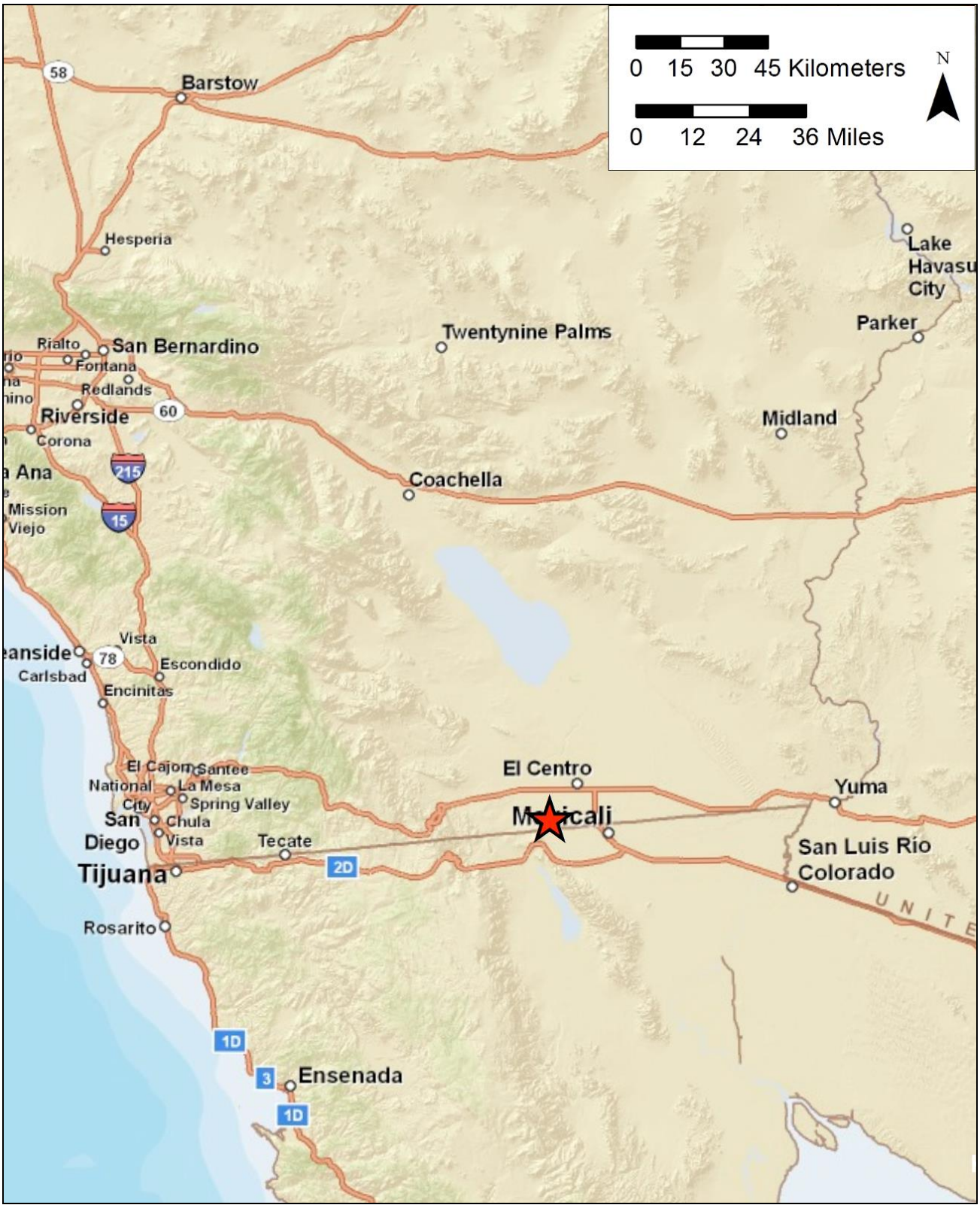

Figure 1. Project Vicinity.

Figure 2. Project Area Showing CUPs (based on USGS Heber and Mount Signal, Calif., 1:24,000 quadrangles).

well as the timing of geologic events. They can also provide information regarding evolutionary relationships, development trends and environmental conditions.

Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or because of human disturbances; however, they generally lay buried beneath the surficial soils. Thus, the absence of fossils on the surface does not preclude the possibility of their being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found below the surface.

SIGNIFICANCE CRITERIA

According to guidelines proposed by Eric Scott and Kathleen Springer (2003) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

1. The fossils provide information on the evolutionary relationships and developmental trends exhibited among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or the interactions between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; and/or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

PALEONTOLOGICAL SENSITIVITY

The fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical and biological factors. Skeletal matter with a high mineral content is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, conversely, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of certain parts of the organisms themselves. Consequently, paleontologists are unable to know with certainty the quantity of fossils or the quality of their preservation that might be present within any given geologic unit.

Sedimentary units, which are paleontologically sensitive, are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which

vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations within which they are enclosed and, with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine the formation's potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

The paleontological sensitivity for a geologic formation is determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. Determinations of paleontologic sensitivity must consider not only the potential for yielding vertebrate fossils but also the potential of yielding a few significant fossils that may provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology (1995) issued a set of standard guidelines intended to assist paleontologists to assess and mitigate any adverse effects/impacts to nonrenewable paleontological resources. The Society defined three potential categories of paleontological sensitivity for geologic units that might be impacted by a proposed project. These categories are described below, along with the criteria used to establish their sensitivity.

- **High sensitivity**: Rock (geologic) units assigned to this category are considered to have a high potential for significant nonrenewable vertebrate, invertebrate, marine, or plant fossils. Sedimentary rock units in this category contain a relatively high density of recorded fossil localities, have produced fossil remains in the vicinity, and are very likely to yield additional fossil remains.
- **Low sensitivity**: Rock units are assigned to this category when they have produced no or few recorded fossil localities and are not likely to yield any significant nonrenewable fossil remains.
- **Undetermined sensitivity**: Rock units are assigned to this category when there is limited exposure of the rock units in the area and/or the rock units have been poorly studied.

ENVIRONMENTAL SETTING

GEOLOGIC CONTEXT

The project area is located in the Imperial Valley, which occupies the southern portion of the Colorado Desert geomorphic province (Jenkins 1980; Harms 1996; Harden 2004). The Colorado Desert province is bounded on the southwest by the Peninsular Ranges Province, on the north by the eastern Transverse Ranges province, and on the northeast by the southern portion of the Mojave Desert province (*ibid*.). On the southeastern side, the Colorado Desert province widens through the Imperial Valley and into Arizona and Mexico (*ibid.*).

One of the major features found within the Colorado Desert province is the Salton Trough, a 290-kilometer-long (approx. 180 miles) structural depression containing the present-day Salton Sea. The depression extends from the San Gorgonio Pass area southward into Mexico to the Gulf of California. Some 4.5 to 5 million years ago, during the late Miocene and early Pliocene, the Salton Trough was a northward extension of the Gulf of California (Powell 1995). Eventually, it was cut off from the gulf by soils that formed a delta at the mouth of the Colorado River. This delta contains sediments that eroded from the Grand Canyon, and it grew to extend across the gulf, separating it from the Salton Trough. Although much of the Salton Trough is below sea level, the delta prevented any gulf waters from entering this low area. Conversely, the delta prevents any water in the trough from flowing to the gulf except when the trough is full and the water can flow over the delta.

The delta also determined, and changed, the direction of flow for the Colorado River. When the delta diverted the flow to the north, the river would fill the Salton Trough to form Ancient Lake Cahuilla. Once the water in the lake was high enough to reach the "rim" of the trough, it would flow over the western portion of the delta and head south through Baja California to the Gulf of California. When the flow of the river switched to the south, the Colorado River would run directly to the gulf and the waters in the Salton Trough would slowly evaporate, leaving behind a salt-encrusted basin at the lowest point.

As floods occurred on the Colorado River, the flow of water switched directions many times, leading to the development of a series of lakes filling the Salton Trough, and probably many more lakes that partially filled the basin, during Holocene times (Waters 1983; Laylander 1995, 1997; von Werlhof 2001). Waters (1983) found evidence of four major lake fillings between approximately A.D. 700 and 1500. This process is presumed to have occurred in late Pleistocene age as well.

These high lake stands filled the basin for different lengths of time, depending on the flow of water into the basin and the rate of evaporation (Waters 1983). The last lake to fill the Salton Basin was originally thought to have dried up in the late 1500s (*ibid*.; Wilke 1978). However, more recent findings indicate that another lake filled the basin after this date and eventually dried up around 1680-1700, after reaching a high water level of approximately 42 feet above mean sea level. At elevations ranging approximately from 5 to 50 feet below mean sea level, the project area is located entirely within the former lakebed of Ancient Lake Cahuilla, near the western lakeshore (Morton 1977; Dibblee 2008a; 2008b).

Freshwater shells from this last lake stand can be found today on the surface in many parts of the Salton Trough. The shells on the surface, however, are generally wind-blown, water-

carried, disturbed by agricultural activity, or otherwise not *in situ*. The surface of the Salton Trough, including the location of Ancient Lake Cahuilla, has been altered by natural and human forces over the 300-year period since the last in-filling. Thus, any shells on the surface generally are not significant. However, field reconnaissance is often needed to determine if the surface soils are recent or if former lakebed sediments are exposed on the surface.

Freshwater mollusk shells are expected to be found below the surface, and some of these, depending on the depth and other factors, may be the result of the earlier in-fillings of the lake, not just the last one. Although all of the sequences of lakes owe their existence to the water from the Colorado River, they occurred at different times and lasted for different lengths of time, and thus there may be changes in the lake faunas that could be used to differentiate one lake stand from another.

CURRENT NATURAL SETTING

Geographically, the project area lies on the southern edge of the Yuha Desert, which comprises the southeastern portion of the Imperial Valley and the Colorado Desert. Dictated by this geographic setting, the climate and environment of the region are typical of the Southern California desert country, marked by extremes in temperature and aridity. Temperatures in the Imperial Valley reach over 120 degrees Fahrenheit in summer, and dip to near freezing in winter. Average annual precipitation is less than five inches, and the average annual evaporation rate exceeds three feet.

The project area stretches across several miles of open land, mostly active agricultural fields, from the southwestern bank of the New River to the northern bank of the All-American Canal, immediately north of the U.S.-Mexican border. The location is approximately five miles southwest of the City of El Centro and five miles west of the twin cities of Calexico, California, and Mexicali, Baja California. The tiny rural community of Mount Signal is situated just to the west of the bulk of the project area. The Greeson Wash, a tributary to the New River, runs southeast-northwest through the central portion of the project area. The surrounding land use is mostly agricultural as well.

With the exception of small portions along the New River and the Greeson Wash, the entire project area was leveled and cleared in the past for agricultural purposes (Figure 3), and consequently the ground surface has been extensively disturbed. Most of the acreage is under cultivation, with such crops as Bermuda grass (*Cynodon dactylon*), Sudan grass (*Sorghum drummondii* var. *sudanesis*), and alfalfa (*Medicago sativa*) present at the time of the survey. The soil consists of light grayish fine sand, with freshwater shells observed in the soil in some of the agricultural fields and along the New River. Besides the crops, other vegetation found in the project area includes salt cedar (*Tamarix ramasissium*), cottonwood (*Populus fremonitti*), eucalyptus (*Eucalyptus* sp., probably blue gum *E. globulus*), arrow weed (*Pluchea sericea*), rabbitbrush (*Ericameria paniculata*), tumbleweed (*Salsla kali*) and various small desert grasses and shrubs, representing a mix of native and introduced species.

Figure 3. Typical landscape in the project area. (View to the south from the confluence of Wistaria Canal and Wistaria Lateral No. 4; photograph taken on October 4, 2012.)

METHODS AND PROCEDURES

RECORDS SEARCHES

The records search service was provided by the Department of Paleontology of the San Diego Natural History Museum on September 21, 2012 and the Colorado Desert District Stout Research Center at the Anza-Borrego Desert State Park on October 1, 2012. These institutions maintain files of regional paleontological localities, along with supporting maps and documents. The records search results were used to identify geological exposures and formations, as well as known paleontological localities in the vicinity.

LITERATURE REVIEW

In conjunction with the records searches, a literature review was conducted using materials in the CRM TECH library, including unpublished reports produced during surveys of other properties in the Imperial Valley, and materials in the personal library of project geologist/ paleontologist Harry M. Quinn, M.S., California Professional Geologist #3477 (see Appendix 1 for further qualifications).

FIELD SURVEY

On October 1-5 and November 15-20, 2012, paleontological surveyors Daniel Ballester, Daniel Perez, Nina Gallardo, Jay Sander, Matthew Dames, Dave Smith, Todd Perry, Stephen O'Neil and Rocky Ciarmoli carried out the field survey under the direction of Harry M. Quinn. The survey was conducted on foot by walking parallel transects laid out across the project area at 15-meter (approximately 50-foot) intervals. Wider transects at 50-meter (approximately 150-foot) intervals were used to assess surface visibility where it appeared from the perimeters that the vegetation growth, including both agricultural crops and tall grasses, limited field access. In this way, the ground surface in the entire project area was systematically examined to determine soil types, verify the geological formations, and search for indications of paleontological remains. Depending on the density of vegetation cover, ground visibility ranged from poor (nearly 0%) to excellent (100%).

RESULTS AND FINDINGS

RECORDS SEARCHES

The records searches at the San Diego Natural History Museum and the Colorado Desert District Stout Research Center revealed no known fossil locality in the project area or within a one-mile radius (Murray 2012; Randall 2012; see Appendix 2). The nearest fossil localities identified in the records search results were found approximately five miles to the southwest, where shells of terrestrial invertebrates (e.g., freshwater snails and claims) and bone fragments of terrestrial vertebrates (e.g., mammals) were unearthed within the lacustrine deposits of the Ancient Lake Cahuilla beds during construction activities (Randall 2012). Nevertheless, both institutions point out that the lakebed sediments, within which the project area lies, have been previously determined to be at least moderately sensitive for nonrenewable paleontological resources, both vertebrates and invertebrates (Murray 2012; Randall 2012).

LITERATURE REVIEW

Surface Geology

According to existing geological mapping, the entire project area is located upon lakebed sediments of Ancient Lake Cahuilla and alluvium derived from these sediments (Strand 1962; Morton 1977: Plate 1; Dibblee 2008a). Morton (1977: Plate 1) describes the lakebed sediments as "tan and gray fossiliferous clay, silt, sand and gravel in conjunction with *Qal*." Dibblee (2008a) describes the sediments as a "thin series of tan-gray claystones, sands, and gravels deposited in former Lake Cahuilla, fossiliferous."

While both Morton and Dibblee maintain that the lakebed sediments are fossiliferous, the soils descriptions by Zimmerman (1981) do not include any mention of shell or any other

fossil materials. The soil descriptions by Knecht (1980), in contrast, do refer to shell remains contained within the different soil types. The description of soils encountered while drilling geotechnical borings at a nearby project site (Imperial Solar Energy Center-South, approximately two miles to the west) mentions fossils in only one of the 15 borings (LandMark Geo-Engineers and Geologists 2010). While LandMark Geo-Engineers and Geologists (*ibid.*) remark that the sample is fossiliferous, they give no description of the fossils that were found.

Because the western shoreline of Ancient Lake Cahuilla is near older Holocene alluvium and Plio-Pleistocene sediments, these older sediments likely are present at various depths below the lakebed sediments. The depths should increase eastward from the former shoreline to the deepest portion of the lake. Four of the geotechnical soil borings for a nearby project were drilled to 51.5 feet but, based on the descriptions of the boring samples, it cannot be determined if any of them encountered soils older than the Holocene-age lakebed sediments (LandMark Geo-Engineers and Geologists 2010).

Other samples from borings that were drilled up to 25 feet deep at the Imperial Solar Energy Center South project site were processed and examined, and they seem to indicate that only Holocene-age lakebed sediments are present in that area to that depth (Quinn et al. 2011). Additionally, older Holocene alluvium may interfinger with the lakebed sediments in some areas if they were deposited during a time when the lake was absent.

Soil Types

The surface soils in the project vicinity were mapped on an orthophotograph compiled in 1976, and the soil types present within the project area are identified as Types 102, 106, 110, 114, 115, 118, 122, 123, and 142, with Types 114 and 115 being the most prevalent (Zimmerman 1981:Map Sheets 28, 29). The Type 102 soil belongs to the Badland soils, consisting of barren land on unconsolidated, stratified alluvium (*ibid.*: 10). The Type 106 soil belongs to the Glenbar clay loam, develops on floodplains and valley floors, and has a water table of less than 60 inches below the surface (*ibid.*:12). The Type 110 soil belongs to the Holtville silty clay, develops on floodplains and valley floors, and also has a water table of 60 inches of less (*ibid.:*15).

The Type 114 soil belongs to the Imperial silty clay, and forms on flood plains, basin floors, and lakebeds. It also has a water table of less than 60 inches below the surface (Zimmerman 1981:18). The Type 115 soil belongs to the Imperial-Glenbar silty clay loam, wet, 0-2 percent slopes (*ibid.*:19). The Type 118 soil belongs to the Indio loam, and the Type 122 soil belongs to the Meloland very fine sandy loam, wet (*ibid.*:21). These soils form on flood plains or basin floors, and also have a water table of less than 60 inches. The Type 123 soil belongs to the Meloland and Holtville loams (*ibid.*:25). The Type 142 soil belongs to the Vint loamy very fine sand, wet. It also forms on basin floors and flood plains, with a water table of less than 60 inches (*ibid.*:36).

Based on Zimmerman's soil mapping, the majority of the project area appears to have a shallow water table, usually less than five feet below the surface.

FIELD SURVEY

During the field survey, freshwater shells and shell fragments of *Physa*. sp., *Tryoni*a sp., and *Anodonta* sp. were observed in some of the agricultural fields and along the New River, but no fish bone or other vertebrate remains were found. The ground surface within the project area has been extensively disturbed in the past, as mentioned above. Other than a few small areas along the New River and the Greeson Wash, only a remnant of the native landscape remains within the project boundaries.

DISCUSSION

In summary of the research results presented above, the surface deposits within the entire project area consist of lakebed sediments and soils derived from lakebed sediments or Recent alluvium. It is possible that older Holocene alluvium and Plio-Pleistocene sediments are present below the surface near the western boundary of the project area. Essentially all of the acreage within the project area has been farmed, and canals and roads now traverse the area, causing significant ground disturbance. During a paleontological monitoring program for the Imperial Solar Energy Center South project approximately two miles west of this location, the upper five feet of soil were found to be mostly contaminated, as demonstrated by the presence of introduced Asian clam shell fragments and modern trash such as plastic (Quinn et al. 2011).

Based on these findings, the upper layers of soil in most of the project area are unlikely to contain intact, potentially significant paleontological remains. Below these disturbed soils, however, Ancient Lake Cahuilla lakebed sediments are known to be present, which have proven to be fossiliferous and often preserve fossil remains of late Pleistocene and Holocene invertebrates (diatoms, pollen, foraminifera, ostracods, freshwater clams, and snails), small vertebrates (fish, amphibians, reptiles, birds, and small to medium-sized mammals), and even larger mammals, some of which are now extinct. These sediments, therefore, are sensitive for paleontological resources. It is also possible that Plio-Pleistocene sediments and older Holocene alluvium are present below the surface in the project area. These soils also could contain significant paleontological resources.

CONCLUSION AND RECOMMENDATIONS

CEQA guidelines (Title 14 CCR App. G, Sec. V(c)) require that public agencies in the State of California determine whether a proposed project would "directly or indirectly destroy a unique paleontological resource" during the environmental review process. The present study, conducted in compliance with this provision, is designed to identify any significant, non-renewable paleontological resources that may exist within or adjacent to the project area, and to assess the possibility for such resources to be encountered in future excavation and construction activities.

The results of the various research procedures completed during this study suggest that the proposed project's potential to impact significant, nonrenewable paleontological resources appears to be low in the disturbed surface sediments, but high in the undisturbed Ancient Lake Cahuilla sediments and older alluvium underneath. Therefore, it is recommended that earth-moving operations impacting the soils below five feet within the project area be monitored periodically, or "spot-checked," to determine whether undisturbed lakebed sediments have been encountered. During construction on the initial ten percent of total solar field grading, disturbance below 5' will be monitored through "spot-checking" two days per week. If within that period no paleontological findings meeting the San Bernardino County Museum significance criteria (Scott and Springer 2003; see page 4 of this report) are found, the Principal Paleontologist may review the procedures and, if warranted, reduce the rate of "spot-checking" to one day per week. If paleontologically sensitive soils, as defined by the Society of Vertebrate Paleontology (1995), are being impacted, or if paleontological resources meeting the San Bernardino County Museum significance criteria are encountered, they would be reported to the Principal Paleontologist and monitoring would be increased to full-time within a radius of 100 meters of the find. Full time monitoring may become necessary if the earth-moving operations continuously impact undisturbed paleontologically sensitive soils. A program to mitigate project impact on paleontological resources that are exposed shall be developed and implemented.

MITIGATION RECOMMENDATIONS

The mitigation program should be developed in accordance with the provisions of CEQA as well as the proposed guidelines of the Society of Vertebrate Paleontology (1995), and should include but not be limited to the following:

1. The excavation of areas identified as likely to contain paleontologic resources, such as the undisturbed Lake Cahuilla beds and any undisturbed subsurface older alluvium, should be monitored by a qualified paleontological monitor. The monitor should be prepared to quickly salvage fossils, if they are unearthed, to avoid construction delays, but must have the power to temporarily halt or divert construction equipment to allow for removal of abundant or large specimens.

2. Samples of sediments should be collected and processed to recover small invertebrate and vertebrate fossils.

3. Recovered specimens should be identified and curated at a repository with permanent retrievable storage that would allow for further research in the future.

4. A report of findings, including when appropriate an itemized inventory of recovered specimens and a discussion of their significance, should be prepared upon completion of the steps outlined above. The report and inventory, when submitted to the appropriate lead agency, will signify completion of the program to mitigate impacts on paleontologic resources.

CONDITIONAL USE PERMIT CONDITIONS

The Wistaria Ranch Solar Energy Center project consists of 17 CUPs. See Figure 2 for the locations of CUPs 13-0036 through 13-0052. Analysis of the field survey findings and the records search resulted in no findings of paleontological resources on the Wistaria project, with low potential to find paleontological resources in the upper layers of soil, throughout the project site. Therefor there are no unique differences in the resources found on any of the 17 individual CUPs that constitute the Wistaria Ranch Solar Energy Center project. The mitigation recommendations above apply to all CUPs equally.

DECOMMISSIONING STATEMENT

Decommissioning of the proposed Project is expected to take place approximately 30 years following commissioning. Activities related to decommissioning will consist of the removal of solar panels and related utility equipment. Ground disturbance to remove equipment during decommissioning will take place in the same locations as construction occurred, and therefore it is expected that no further disturbance of potential paleontological resources will take place during this decommissioning phase of the project. Due to the extensive disturbance by farming in the agricultural fields and the limited depth of disturbance for the proposed project, paleontological monitoring is not required on the agricultural fields unless disturbance occurred three feet or deeper.

REFERENCES

Dibblee, Thomas W., Jr.

2008a Geologic Map of the Coyote Wells and Heber 15 Minute Quadrangles, Imperial County, California (1:62,500). Dibblee Geology Center Map #DF-405. Santa Barbara Museum of Natural History, Santa Barbara, California.

2008b Geologic Map of the Plaster City and Brawley 15 Minute Quadrangles, Imperial County, California (1:62,500). Dibblee Geology Center Map #DF-406. Santa Barbara Museum of Natural History, Santa Barbara, California.

Harden, Deborah R.

2004 *California Geology*. Prentice Hall, Upper Saddle River, New Jersey.

Harms, Nancy S.

1996 *A Precollegiate Teachers Guide to California Geomorphic/Physiographic Provinces*. National Association of Geoscience Teachers, Far West Section, Concord, California.

Jenkins, Olaf P.

1980 Geomorphic Provinces Map of California. *California Geology* 32(2):40-41. California Division of Mines and Geology, Sacramento.

Knecht, Arnold A.

1980 *Soil Survey of Riverside County, California—Coachella Valley Area*. Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C.

LandMark Geo-Engineers and Geologists

2010 Geotechnical Investigation Report: Imperial Solar Energy Center South, Pulliam Road and Anza Road, Calexico, California; Appendix B: Soil Boring Logs. http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/elcentro/nepa/2010/ea/isec_south.Par.77863.File.dat/FAppDISECs_GeoSoils.pdf.

Laylander, Don

1995 The Chronology of Lake Cahuilla's Final Stand. *Proceedings of the Society for California Archaeology* (8):69-78.

1997 The Last Days of Lake Cahuilla: The Elmore Site. *Pacific Coast Archaeological Society Quarterly* 33(1/2):1-138.

Morton, Paul K.

1977 *Geology and Mineral Resources of Imperial County, California*. County Report No. 7. California Division of Mines and Geology, Sacramento.

Murray, Lyndon K.

2012 Records review letter report prepared by the Colorado Desert District Stout Research Center, Anza-Borrego Desert State Park, Borrego Springs, California. October 1, 2012.

Powell, Charles L., II
1995 *Paleontology and Significance of the Imperial Formation at Garnet Hill, Riverside County, California*. U.S. Geological Survey Open-File Report 95-489. Washington, D.C.

Quinn, Harry M., Michael Hogan, and Stephen O'Neil
2011 Paleontological Resources Monitoring Report: Geotechnical Borings B-1 through B-5, Imperial Solar Energy Center (South), near the Community of Mount Signal, Imperial County, California. Unpublished report prepared by CRM TECH (Project #2555) and UEI (Project #5817).

Randall, Kesler A.
2012 Wistaria Solar Project (CRM TECH Job #2649). Records review letter report prepared by the Department of Paleontology, San Diego Natural History Museum, San Diego, California. September 26, 2012.

Raup, David M., and Steven M. Stanley
1978 *Principle of Paleontology*. W. H. Freeman and Company, San Francisco.

Scott, Eric, and Kathleen Springer
2003 CEQA and Fossil Preservation in California. *Environmental Monitor* Fall:4-10. Association of Environmental Professionals, Sacramento, California.

Society of Vertebrate Paleontology
1995 Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22-27.

Strand, Rudolph G.
1962 Geologic Map of California, San Diego-El Centro Sheet (1:250,000). California Division of Mines and Geology, Sacramento.

von Werlhof, Jay
2001 Notes on the Desert Cahuilla and Their Yuman Neighbors. In L. R. McCown, G. A. Clopine, D. H. Bowers, J. von Werlhof, R. D. Simpson, R. V. May, and P. King (eds.): The Lake Le Conte Survey. *San Bernardino County Museum Association Quarterly* 48(3):21-35.

Waters, Michael R.
1983 Late Holocene Lacustrine Chronology and Archaeology of Ancient Lake Cahuilla. *Quaternary Research* 19:373-387.

Wilke, Philip J.

1978 *Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California*. Contributions of the University of California Archaeological Research Facility 38. University of California, Berkeley.

Zimmerman, Robert P.
1981 *Soil Survey of Imperial County, California, Imperial Valley Area*. Soil Conservation Service, U. S. Department of Agriculture, Washington, D.C. Reprinted by Imperial Irrigation District, Imperial, California.

APPENDIX 1

LEAD PERSONNEL QUALIFICATIONS

PROJECT GEOLOGIST / PALEONTOLOGIST
Harry M. Quinn, M.S., California Professional Geologist #3477

Education

1968 M.S., Geology, University of Southern California, Los Angeles, California.
1964 B.S, Geology, Long Beach State College, Long Beach.
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

Professional Experience

2000- Project Paleontologist, CRM TECH, Riverside/Colton, California.
1998- Project Archaeologist, CRM TECH, Riverside/Colton, California.
1992-1998 Independent Geological/Geoarchaeological/Environmental Consultant, Pinyon Pines, California.
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.
1988-1992 Project Geologist/Director of Environmental Services, STE, San Bernardino, California.
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

Previous Work Experience in Paleontology

1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

Memberships

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Association of Environmental Professionals; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

Publications in Geology

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

PALEONTOLOGICAL SURVEYOR / FIELD DIRECTOR
Daniel Ballester, B.A.

Education

1998 B.A., Anthropology, California State University, San Bernardino.
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.

Professional Experience

2002- Field Director, CRM TECH, Riverside/Colton, California.
- Report writing, site record preparation, and supervisory responsibilities over all aspects of fieldwork and field crew.

1999-2002 Project Archaeologist/Field Paleontologist, CRM TECH, Riverside, California.
- Survey, testing, data recovery, monitoring, and mapping.

1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.
- Two and a half months of excavations on Topomai village site, Marine Corp Air Station, Camp Pendleton.

1998 Field Crew, A.S.M. Affiliates, Encinitas, California.
- Two weeks of excavations on a site on Red Beach, Camp Pendleton, and two weeks of survey in Camp Pendleton, Otay Mesa, and Encinitas.

1998 Field Crew, Archaeological Research Unit, University of California, Riverside.
- Two weeks of survey in Anza Borrego Desert State Park and Eureka Valley, Death Valley National Park.

APPENDIX 2

RECORDS SEARCHES RESULTS