2008 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN

CULTURAL RESOURCES TECHNICAL REPORT

VOLUME I

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SECTION 1.0
INTRODUCTION

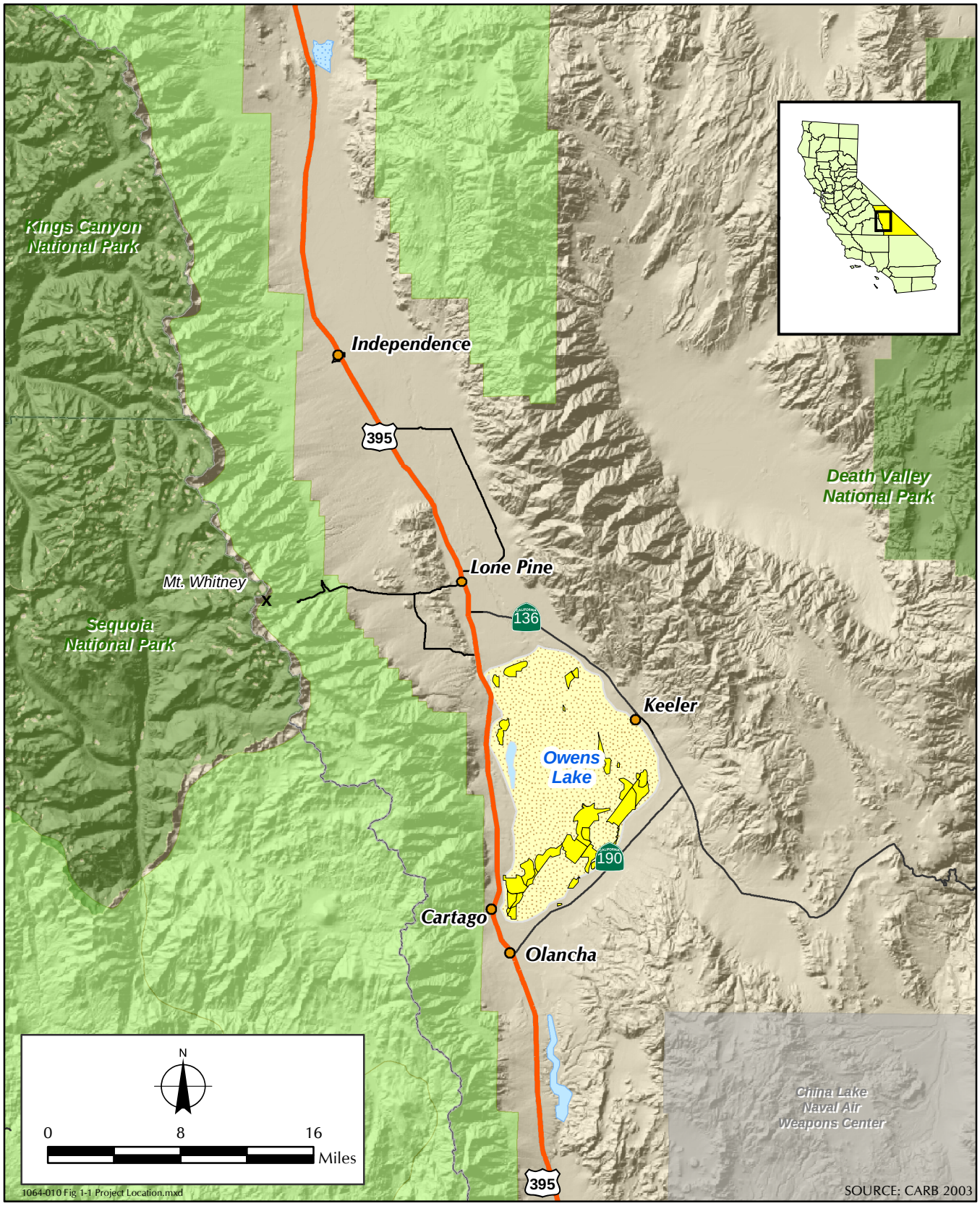
This Cultural Resources Technical Report was prepared to characterize the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2008 SIP) (proposed project) study area with respect to cultural resources and related planning and regulatory statutes and guidelines. The proposed project would require land modifications on the Owens dry lake bed to implement Dust Control Measures (DCMs) designed to reduce fugitive dust emissions consistent with the requirements of the National Ambient Air Quality Standards (NAAQS). The proposed project area includes a total of 15.1 square miles (9,664 acres) in Owens Valley, Inyo County, California (Figure 1-1, *Project Location*). Four DCMs, Shallow Flooding, Moat & Row, Managed Vegetation, and Gravel Cover, have the potential to be implemented in 12.7 square miles, 0.5 square mile of channel area may require DCMs, and 1.9 square miles of the study area may require implementation of DCMs after 2010.

1.1 GOAL OF THE PROPOSED PROJECT

The Great Basin Unified Air Pollution Control District (District) regulates fugitive dust (PM_{10}) emissions in the Owens Valley Planning Area consistent with the requirements of the NAAQS (Figure 1.1). The dried Owens Lake bed has been the largest single source of PM_{10} emissions in the United States for many years, with annual PM_{10} emissions of more than 80,000 tons and 24-hour concentrations as high as 130 times the federal air quality standard. In the five years from 2000 through 2004, of the 100 highest 24-hour PM_{10} value days measured in the entire United States, 78 days occurred at Owens Lake, 21 days occurred at Mono Lake, and 1 day occurred elsewhere (El Paso, Texas). The air pollution at Owens Lake and Mono Lake is caused by the City of Los Angeles's diversion of water from the Eastern Sierra. Water has historically been diverted from the lakes to the City of Los Angeles via the Los Angeles Aqueduct.

Exposed dry lake bed sediments are dispersed into the air by prevailing winds. These dust storms, with the highest episodes in the spring and fall months, have the potential to cause significant ecological and human health effects. The airborne particulate matter that exists in these dust storms is small enough to travel great distances and can be inhaled deeply by humans, which may result in serious respiratory ailments. The District estimates that approximately 40,000 permanent residents that live in or visit the area are affected by Owens Lake particulate emissions. In 1987, the U.S. Environmental Protection Agency (EPA) designated the Owens Valley Planning Area as non-attainment for the NAAQS for PM_{10}. The result of this designation was that a plan, known as a state implementation plan (SIP), was required to be prepared to demonstrate how the NAAQS would be attained. The proposed project is designed to improve air quality through the reduction of PM_{10} emissions in all of the communities in the Owens Valley, including the City of Ridgecrest in Kern County; Sequoia National Park; Death Valley National Park; the Manzanar National Historic Site; and the John Muir, Golden Trout, Dome Land, and South Sierra Wilderness areas. The proposed project may also improve air quality in more distant locations because, under certain circumstances, PM_{10} emissions from Owens Lake have been tracked to more densely populated sections of Southern California.

As a result of a SIP prepared by the District and approved by the U.S. EPA in 1998, the City of Los Angeles Department of Water and Power (LADWP) began constructing DCMs on the lake bed with a goal of implementing the controls necessary to meet the federal PM_{10} standards by the end of 2006. In the same 1998 SIP, the District committed to continue to study the lake bed and to revise



EIR Analysis Areas

FIGURE 1-1
Project Location

the SIP in 2003 to refine the actual areas necessary for control. Based on those additional studies, in November 2003, the Great Basin Governing Board adopted a revised SIP and ordered the LADWP to implement DCMs on 29.8 square miles of the Owens Lake bed by December 31, 2006.

In addition to requiring the LADWP to construct and begin operating 29.8 square miles of DCMs on the lake bed by the end of 2006, the 2003 SIP also contained provisions requiring the District to continue monitoring air pollution emissions from the lake bed and identify any additional areas beyond the 29.8 square miles that may require PM_{10} controls in order to meet the standards. The federal Clean Air Act requires all SIPs to contain "contingency measures" that will be implemented in case the initial control strategy (29.8 square miles of controls) fails to bring the facility (lake bed) into compliance. One such contingency measure was for the Air Pollution Control Officer (APCO) to complete a Supplemental Control Requirements (SCR) analysis and determination as to whether additional dust controls are required on the lake based on continuous air quality data collected.

Based on July 2002 through June 2004 data, on December 21, 2005, the APCO completed the 2003 SIP-required supplemental SCR analysis and issued an SCR determination that additional areas of the lake bed would require DCMs in order to meet the PM_{10} standards. Based on that SCR analysis, and subsequent discussions with the LADWP, an agreement with LADWP has been reached to construct the additional DCMs necessary to bring the lake bed into compliance with the NAAQS for PM_{10}. These additional DCMs beyond the 29.8 square miles completed at the end of 2006 are the subject of the proposed project.

1.2 PROJECT OBJECTIVES

The following objectives have been identified for the proposed project:

- Implement all Owens Lake bed PM_{10} control measures by April 1, 2010 pursuant to the revised 2008 SIP to achieve the NAAQS
- Revise the approved 2003 SIP by July 1, 2008
- Minimize (or compensate for) long-term, significant, adverse changes to sensitive resources within the natural and human environment
- Provide a high technical likelihood of success without substantial delay
- Conform substantially to adopted plans and policies and existing legal requirements
- Minimize the long-term consumption of natural resources
- Minimize the cost per ton of particulate pollution controlled
- Be consistent with the State of California's obligation to preserve and enhance the public trust values associated with Owens Lake

1.3 PURPOSE OF THE CULTURAL RESOURCES TECHNICAL REPORT

This Cultural Resources Technical Report was prepared to characterize the cultural resources that would potentially be affected by the implementation of the DCMs on the additional areas of the Owens Lake bed. In addition, land modifications required to accommodate the proposed project constitute a project pursuant to the State of California Environmental Quality Act (CEQA). The District is the lead agency for the proposed project pursuant to CEQA. The District and LADWP are joint project applicants. The proposed project would be subject to discretionary approval by the District Governing Board. Acting in their capacity as a lead agency under CEQA, the District would need to determine the potential for the proposed project to result in significant impacts, consider mitigation measures and alternatives capable of avoiding significant impacts, and take the

environmental effects of the proposed action into consideration as part of their decision-making process. This Cultural Resources Technical Report provides the substantial evidence upon which the required evaluation of feasibility, environmental analysis, and findings of fact in relation to cultural resources can be made.

1.4 INTENDED AUDIENCE

This Cultural Resources Technical Report summarizes the results of over 2,400 hours of field work for consideration by the project applicant, the lead agency, trustee and responsible agencies, and the public. The information contained in the Cultural Resources Technical Report has been an integral part of the project planning process effort to avoid and minimize impacts to cultural resources to the maximum extent practicable while attaining most of the basic objectives of the project. CEQA also requires that the lead agency seek the input of responsible and trustee agencies for cultural resources. This Cultural Resources Technical Report documents the coordination and informal consultation that has been undertaken with the Bureau of Land Management (BLM), California State Lands Commission (SLC), California Native American Heritage Commission, Inyo County Planning Department, the Natural History Museum of Los Angeles County, and representatives of local tribes that are interested in the region: Lone Pine Paiute-Shoshone, Big Pine, and Fort Independence. In addition, preparation of this report encompassed utilization of the Eastern Information Center at the University of California, Riverside, operated under contract to the California Department of Parks and Recreation Office of Historic Preservation, for the purpose of maintaining the federally and state-mandated California Historic Resources Inventory.

CEQA also requires that the information upon which the decision-making body will render their decision be made available for public review; however, location data for potentially significant archaeological resources will be made available on a "need to know" basis only to protect the resources. A complete copy of this Cultural Resources Technical Report has been provided to the Commission who holds the land in trust for the State of California, to the District to support the decision-making process, and to LADWP who will lease the lands from the Commission for the purpose of implementing DCMs. The location data for the archaeological resources will not be circulated for public review. In order to protect the sites from unauthorized excavation, looting, or vandalism, the Commission, the District, and DWP has been notified of the need to keep confidential the location of known archaeological resources beyond what is necessary. Records in the information centers are exempt from the California Public Records Act (Government Code Section 6250 et seq.). Government Code Section 6254.10 states that:

> Nothing in this chapter requires disclosure of records that relate to archaeological site information and reports maintained by, or in the possession of, the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency.

Along this line, Government Code Section 6254 explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Due to the sensitive nature of cultural resources described herein, the technical appendix to the report containing the archaeological site records and maps (Appendix A, *Archaeological Site Records*) is confidential and meant for informative purposes for the Commission, the District, and LADWP in the management of the property, including construction, operation, and maintenance of the DCMs.

1.5 SCOPE OF THE REPORT

The analysis of cultural resources consists of a summary of the regulatory framework that guides the decision-making process, a description of the methods used to characterize and evaluate cultural resources within the proposed project area, the results for baseline conditions for cultural resources, the potential for the proposed project to affect cultural resources, and opportunities to avoid and minimize the potential effects of the proposed project. This Cultural Resources Technical Report addresses related goals and policies of the Inyo County General Plan and each of the environmental issues considered in Appendix G of the State CEQA Guidelines for cultural resources:

- Unique paleontological resources or sites or unique geologic features
- Archaeological resources
- Historic resources
- Human remains and other potential Native American sacred sites

1.6 SOURCES OF RELEVANT INFORMATION

Information used in the preparation of this Cultural Resources Technical Report was derived from an extensive literature review, including published and gray literature; consultation with experts knowledgeable of the cultural resources identified as having the potential to occur within the proposed project area; consultation with responsible and trustee agencies; coordination with interested parties; field investigation; and spatial analysis based on geographic information system (GIS) data. The documentation of the field investigations is attached in a technical appendix containing Department of Parks and Recreation Historic Resources Inventory forms (DPR 523 series) (Appendix A). Sources of relevant information are cited in footnotes and compiled in Section 6, References.

1.7 WORKING DEFINITIONS

There are a number of technical terms that are used in the characterization of baseline conditions and assessment of the potential for the project to result in effects to cultural resources.

The National Register of Historic Places (NRHP) defines an ***archaeological site*** (or property) as "the place or places where the remnants of a past culture survive in a physical context that allows for the interpretation of these remains. Archaeological remains usually take the form of artifacts (e.g., fragments of tools or ceramic vessels), features (e.g., remnants of walls, cooking hearths, or trash middens), and ecological evidence (e.g., pollen remaining from plants that were in the area when the activities occurred)" (NPS 2000). ***Prehistoric archaeological sites*** represent the material remains of Native American societies and their activities. ***Ethnohistoric archaeological sites*** are defined as Native American settlements occupied after the arrival of European settlers in California. ***Historic archaeological sites*** reflect the activities of nonnative populations during the historic period. Under CEQA, archaeological sites may be treated as historical resources, unique archaeological resources, or non-unique archaeological resources (isolates). For organization of data, as well as clarity of presentation to the intended audience of this report, data and the analysis of the data have been organized chronologically, with prehistoric context and prehistoric period resources described in relation to archaeological resources, and historic context and historic period resources described in relation to historic resources.

A ***unique archaeological resource*** is an archaeological artifact, object, or site that has a high probability of meeting any of the following criteria (PRC Section 21083.2(g)):

- The archaeological resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- The archaeological resource has a special and particular quality such as being the oldest of its type or the best available example of its type.
- The archaeological resource is directly associated with a scientifically recognized important prehistoric or historic event or person.

An ***isolate*** is defined as an isolated artifact or small group of artifacts that appear to reflect a single event, loci, or activity and may lack identifiable context, but has the potential to add important information about a region, culture, or person. Isolates are categorically ineligible for the NRHP and California Register of Historic Resources (CRHR); their information potential has been exhausted by its recording or by its collection when appropriate. Isolates do not require avoidance or mitigation under CEQA.

A ***historical resource*** is defined by CEQA as any object, building, structure, site (including archaeological sites), area, place, record, or manuscript that is listed in, or is eligible for listing in, the CRHR; officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution; or identified as significant in a historic resource survey conducted in accordance with the requirements of the CRHR statute (Public Resources Code Section 5024.1(g)).

The ***historic period*** is defined as the period that begins with the arrival of the first nonnative population, and thus varies by area. The historic period in California began with the arrival of Spanish navigator Juan Rodriguez Cabrillo and his party, who anchored in San Diego Bay on September 28, 1542. However, archaeologists generally use the year 1782 as the beginning of the historic period.

The ***prehistoric period*** is defined as the era prior to 1542 AD.

A ***Native American sacred site*** is defined as an area that has been, and often continues to be, of religious significance to Native American peoples, such as an area where religious ceremonies are practiced or an area that is central to their origins as a people (NAHC 2006).

BP stands for "before present," which is defined as before 1950 and is used by archaeologists in conjunction with the commonly used term, AD (Renfrew and Bahn 2003).

A ***Phase I archaeological resources survey*** consists of a literature review (background research), consultation with the Native American Heritage Commission (NAHC), and field work. Field work consists of a physical inspection of the project area, generally through pedestrian surveys, or by other means when appropriate. The purpose of the Phase I is to identify the cultural resources known or likely to be present on the project site and in the immediate vicinity.

A ***Phase II archaeological investigation*** is conducted after the results of the Phase I indicate the presence of cultural resources. Phase II investigations are intended to evaluate the historical significance of historic and prehistoric archaeological sites, and require a comprehensive and detailed scope of work, a research design, and field work. Surface and subsurface testing is

conducted during Phase II investigations to collect the data necessary to establish historical significance of archaeological sites.

A ***Phase III data recovery*** is implemented on those archaeological sites that are determined to be significant after the completion of the Phase II investigations. Phase III efforts involve the collection of data intended to answer scientific or research questions that have been formulated during Phase II testing and formalized by a comprehensive Phase III research design. Most commonly, Phase III data collections are implemented on sites determined to be historically significant as a way to mitigate impacts caused by a proposed project.

SECTION 2.0
PROJECT DESCRIPTION

Consistent with the requirements of §15124 of the State of California Environmental Quality Act (CEQA) Guidelines, the project description of the 2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2008 SIP)[1] (proposed project) includes the precise location and boundaries of the proposed project, a brief characterization of the existing conditions at the proposed project site, and a statement of objectives for the proposed project. Detailed descriptions of the project elements; a general delineation of the proposed project's technical, economic, and environmental characteristics; and a statement describing the proposed project were provided in the Subsequent Environmental Impact Report (EIR) in support of the 2008 SIP.

2.1 PROJECT LOCATION

The proposed project includes 15.1 square miles within the 110-square-mile (70,000-acre) dry Owens Lake bed, located within the Owens Valley, Inyo County, California (Figure 2.1-1, *Regional Vicinity Map*). The proposed project site is located approximately 5 miles south of the Community of Lone Pine and approximately 61 miles south of the City of Bishop, approximately 10 miles to the west of Death Valley National Park, approximately 11 miles to the east of Sequoia National Park, and approximately 48 miles north of the City of Ridgecrest (Figure 2.1-1). The proposed project site lies southwest of the Inyo Mountains, northwest of the Coso Range, and east of Mount Whitney in the Sierra Nevada mountain range (Figure 2.1-1). The location of the proposed project site is depicted on seven U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangles: Bartlett, Vermillion Canyon, Owens Lake, Keeler, Dolomite, Lone Pine, and Olancha (USGS 1988) (Figure 2.1-2, *USGS 7.5-Minute Map Index*). The topography of the site is exceptionally flat with an approximate elevation ranging from 3,600 feet above mean sea level (msl) as defined by the historic shoreline to approximately 3,554 feet above msl as defined by the remnant existing brine pool. There is only a 46-foot difference between the highest and the lowest area of the 110-square-mile lake bed. The proposed project site is bounded on the north-northeast by State Highway 136, on the east by State Highway 136 and State Highway 190, on the south by the intersection of State Highway 190 and U.S. Highway 395, and on the west by U.S. Highway 395 (Figure 2.1-3, *Local Vicinity Map*). There are three communities in the vicinity of the proposed project site located in the unincorporated area of Inyo County, the community of Lone Pine to the north, the community of Keeler to the east, and the community of Olancha/Cartago to the southwest, and one designated Indian reservation, the Lone Pine Indian Reservation to the north (County of Inyo 2002) (Figure 2.1-3).

2.2 EXISTING CONDITIONS

The effects of surface water diversions on Owens Lake were described in the 1997 Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP Environmental Impact Report (1997 EIR) and are repeated here to create a context for understanding the environmental setting and the need for the proposed project (District 1997). The description provided in the 1997 EIR (District 1997) has been updated to reflect the implementation of the 2003 SIP (District 2003b) (Figure 2.2-1, *Previous SIP Implementation Areas Addressed in the 2008 SIP*).

[1] PM_{10} refers to particulate matter up to 10 micrometers in size, a regulated air emission pursuant to the federal Clean Air Act Amendments of 1990.

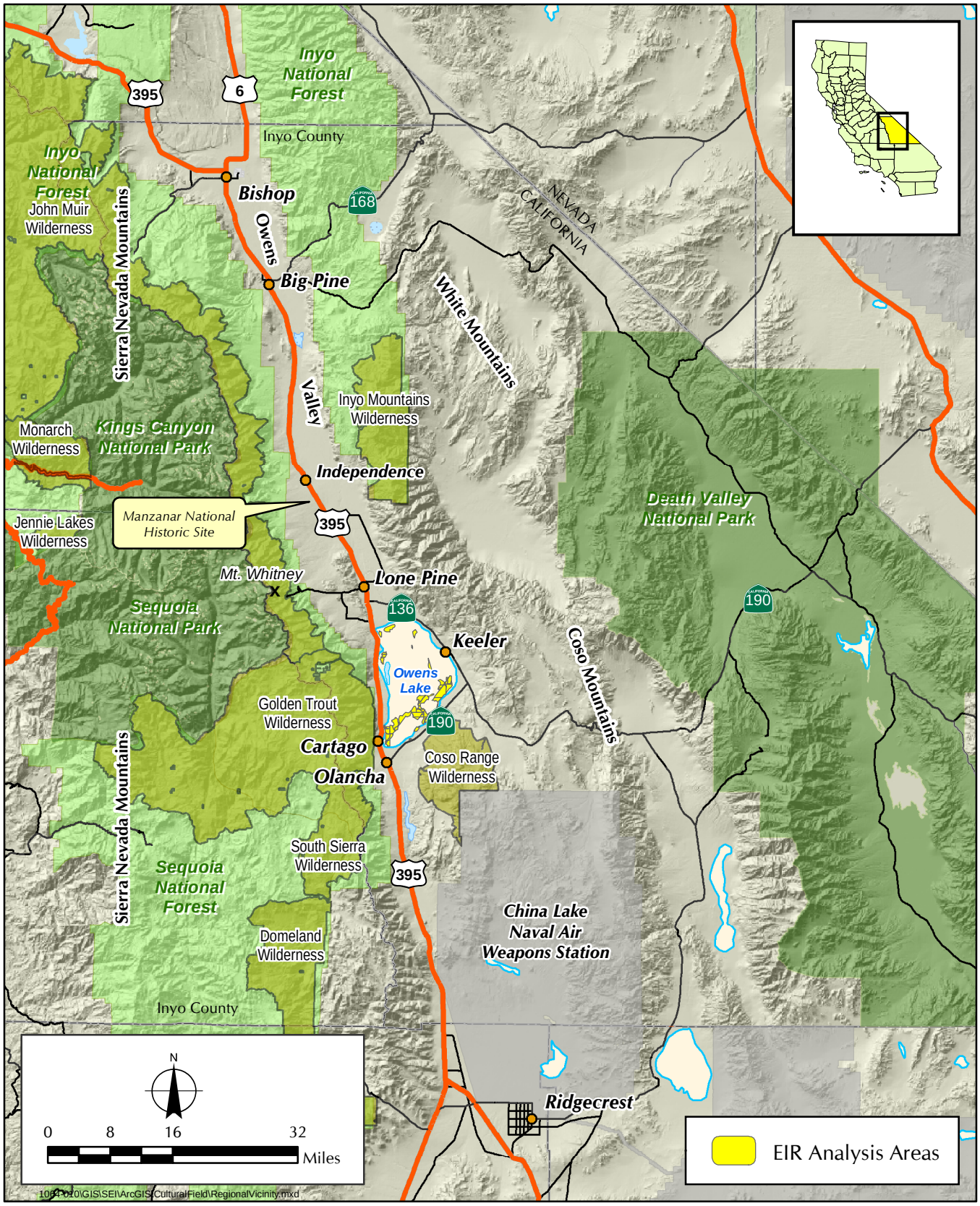


FIGURE 2.1-1
Regional Vicinity Map

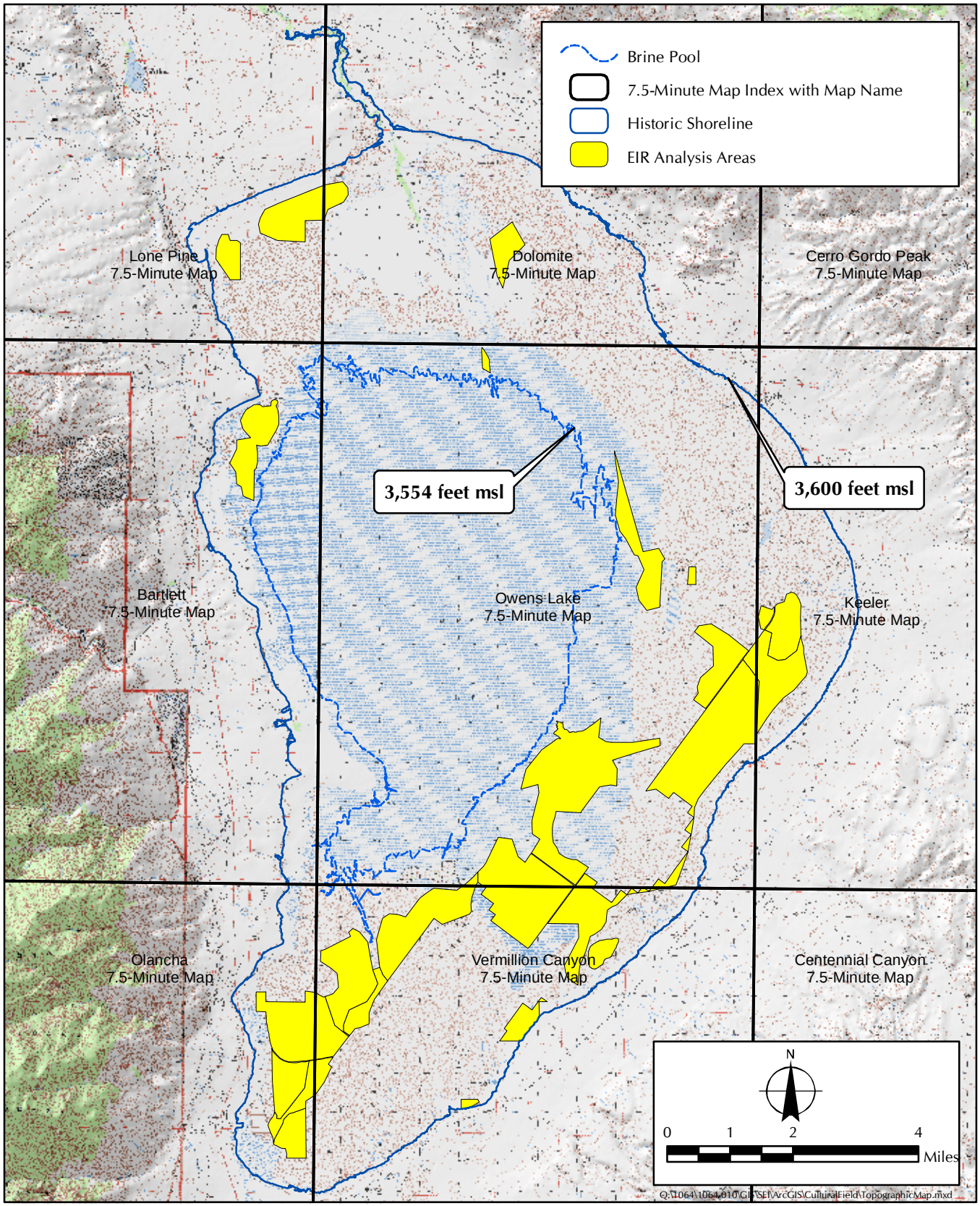


FIGURE 2.1-2
USGS 7.5-minute Map Index

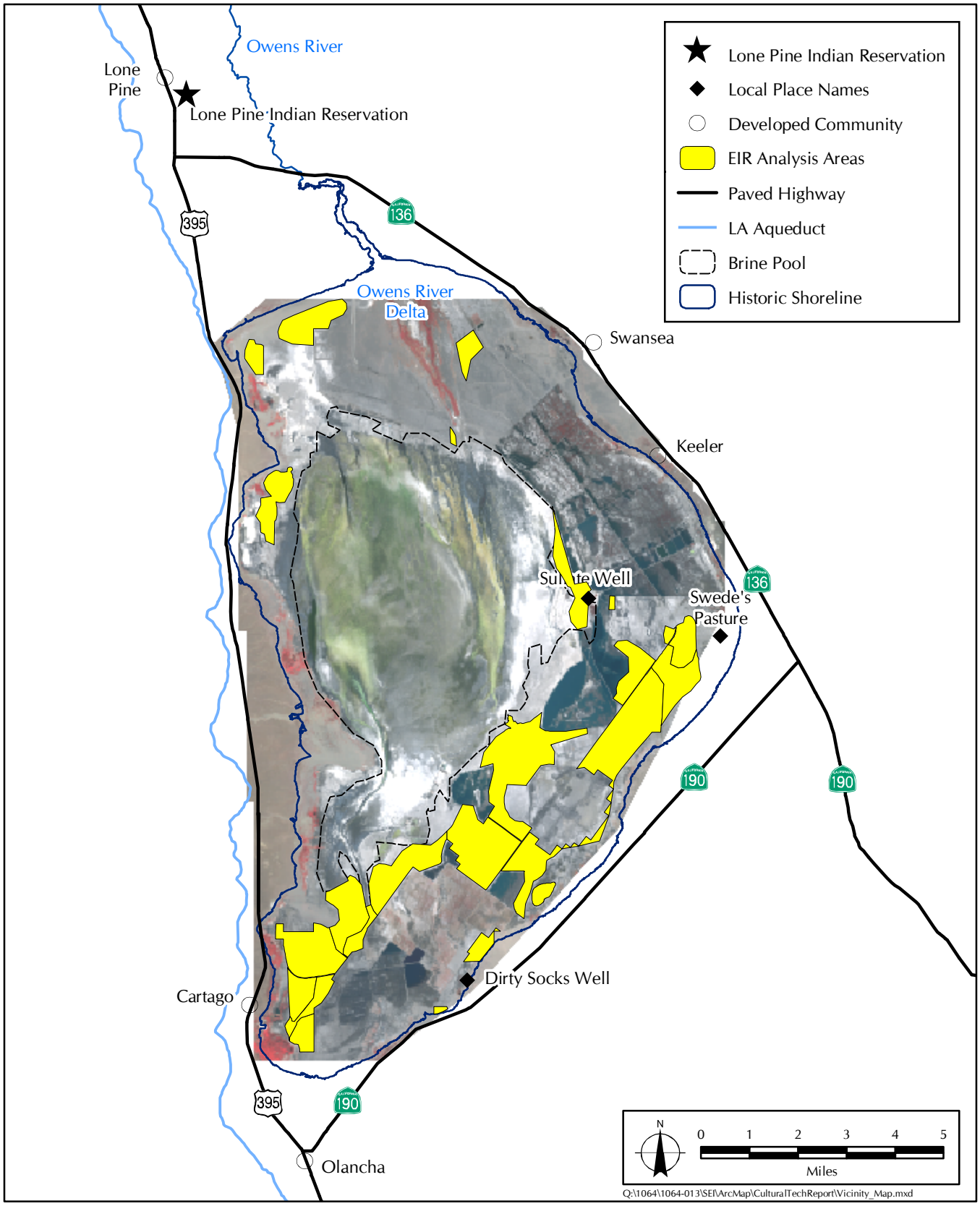


FIGURE 2.1-3
Local Vicinity Map

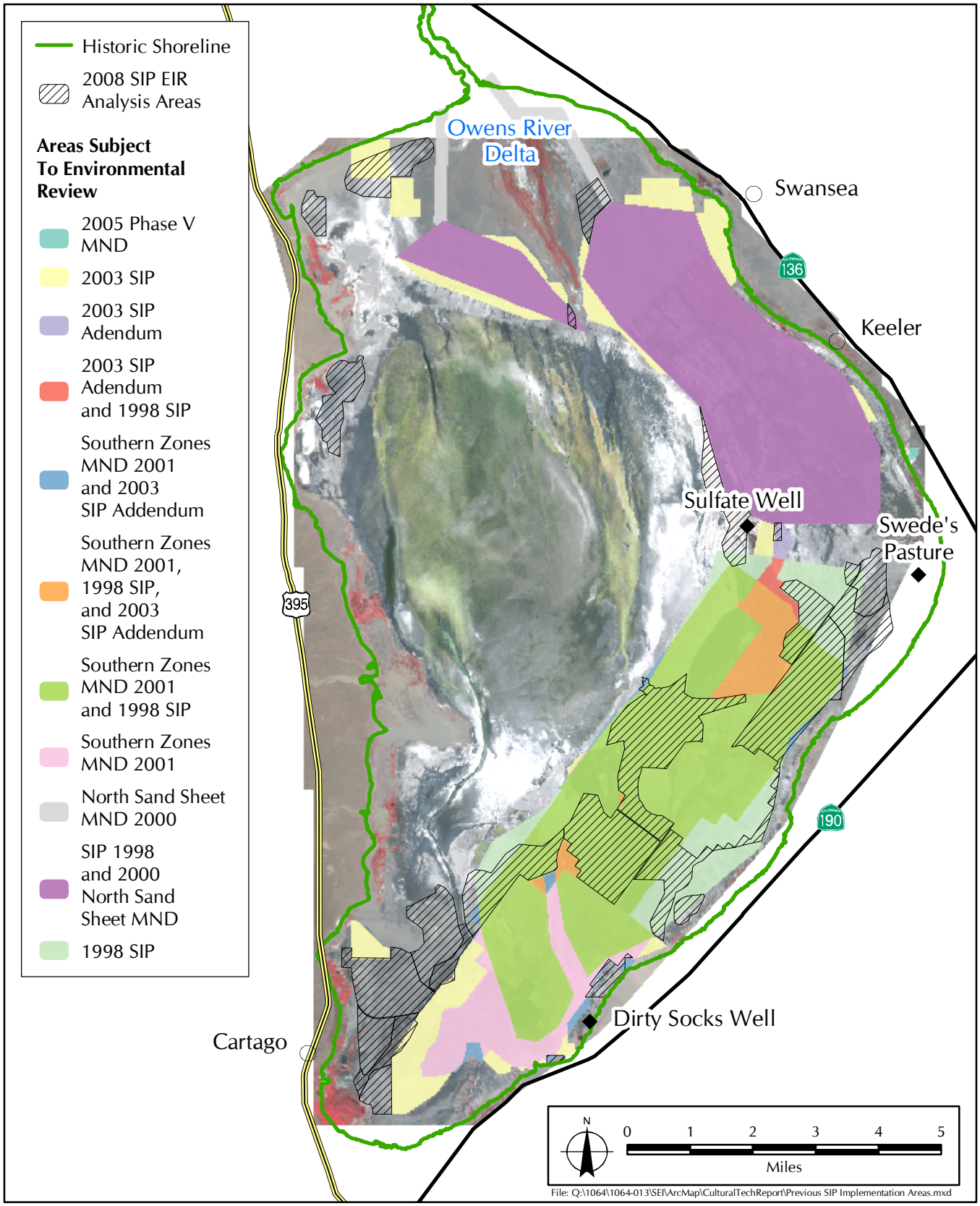


FIGURE 2.2-1

Previous SIP Implementation Areas Addressed in the 2008 SIP

The City of Los Angeles completed installation of the North Sand Sheet Shallow Flooding Project in 2001. That project resulted in the conversion of 13.5 square miles of primarily barren playa to shallow flooding. The affected area was described as Zones 1 and 2 in the 1998 SIP (District 1998). Pipelines, buried power lines, and access roads were developed in conjunction with the shallow flooding project. Specifically, a 210-foot-wide water conveyance pipeline corridor was developed to distribute water from the Los Angeles Aqueduct to the east side of the bed of Owens Lake. A 50-foot-wide power line easement and an 80-foot-wide north access road corridor were constructed. Compliant shallow flooding requires the maintenance of 75 percent surface-saturated soil or standing water within the control area between October 1 and June 30.

The City of Los Angeles completed installation of approximately 6 square miles of the Southern Zones Dust Control Project in 2002. That project resulted in the conversion of barren playa and transmontane alkaline meadow to Managed Vegetation and habitat Shallow Flooding. The Southern Zones Dust Control Project includes facilities appurtenant to the implementation of Dust Control Measures (DCMs), such as irrigation systems, drainage systems, power supply systems, and auxiliary facilities. Compliant Managed Vegetation consists of at least 50 percent of the land surface on each acre consisting of substantially evenly distributed live and dead vegetation. Managed Vegetation completed to date has been accomplished with saltgrass (*Distichlis spicata*).

In December 2006, the City of Los Angeles completed installation of Phase 5 of DCMs pursuant to the 2003 SIP to achieve a total of 29.8 square miles of dust controls, consisting of approximately 26 square miles of Shallow-flooded lake bed and 3.8 square miles of Managed Vegetation (Figure 2.2-2, *Completed Dust Control Areas, 2006*).

2.2.1 General Plan Land Use Designation and Zoning

Owens Lake is primarily owned and operated in trust for the people of the State of California by the State Lands Commission, and while not subject to local regulatory authority by the County of Inyo, the County's General Plan recognizes the location of state and federally owned lands at Owens Lake. The Land Use element of the Inyo County General Plan designates the proposed project area as Natural Resources and State and Federal Lands (County of Inyo 2001a).

2.3 PROJECT ELEMENTS

The proposed project addresses 15.1 square miles (9,664 acres) for the placement of potential DCMs to ensure that the Great Basin Unified Air Pollution Control District (District) will meet the National Ambient Air Quality Standards (NAAQS) after 2010. Pursuant to the 2003 SIP, the Air Pollution Control Officer (APCO) determined on December 21, 2005 that supplemental control requirements were required to meet the NAAQS. Based on discussions between the District and the City of Los Angeles Department of Water and Power (LADWP), DCMs will be required on at least 12.7 more square miles of dry lake bed and may be required on up to 15.1 square miles (Figure 2.3-1, *Proposed Project Elements*). The 15.1 square miles consists of 12.7 square miles of Supplemental Dust Control Areas (consisting of 9.2 square miles of Shallow Flooding and 3.5 square miles of Moat & Row DCMs), 0.5 square mile of channel area that may require DCMs, and 1.9 square miles of study area of which some or all may require controls after 2010. By 2010, a total of at least 42.57 square miles of DCMs are to be operational. As much as 44.92 square miles may require controls at some point. The purpose of this Cultural Resources Technical Report is to analyze, based on the proposed 2008 SIP, the impacts to cultural resources from the construction of supplemental DCMs on an additional 15.1 square miles of potentially emissive lake bed, which includes 12.7 square miles of mandatory DCM area, 0.5 square mile of channel area, and 1.9

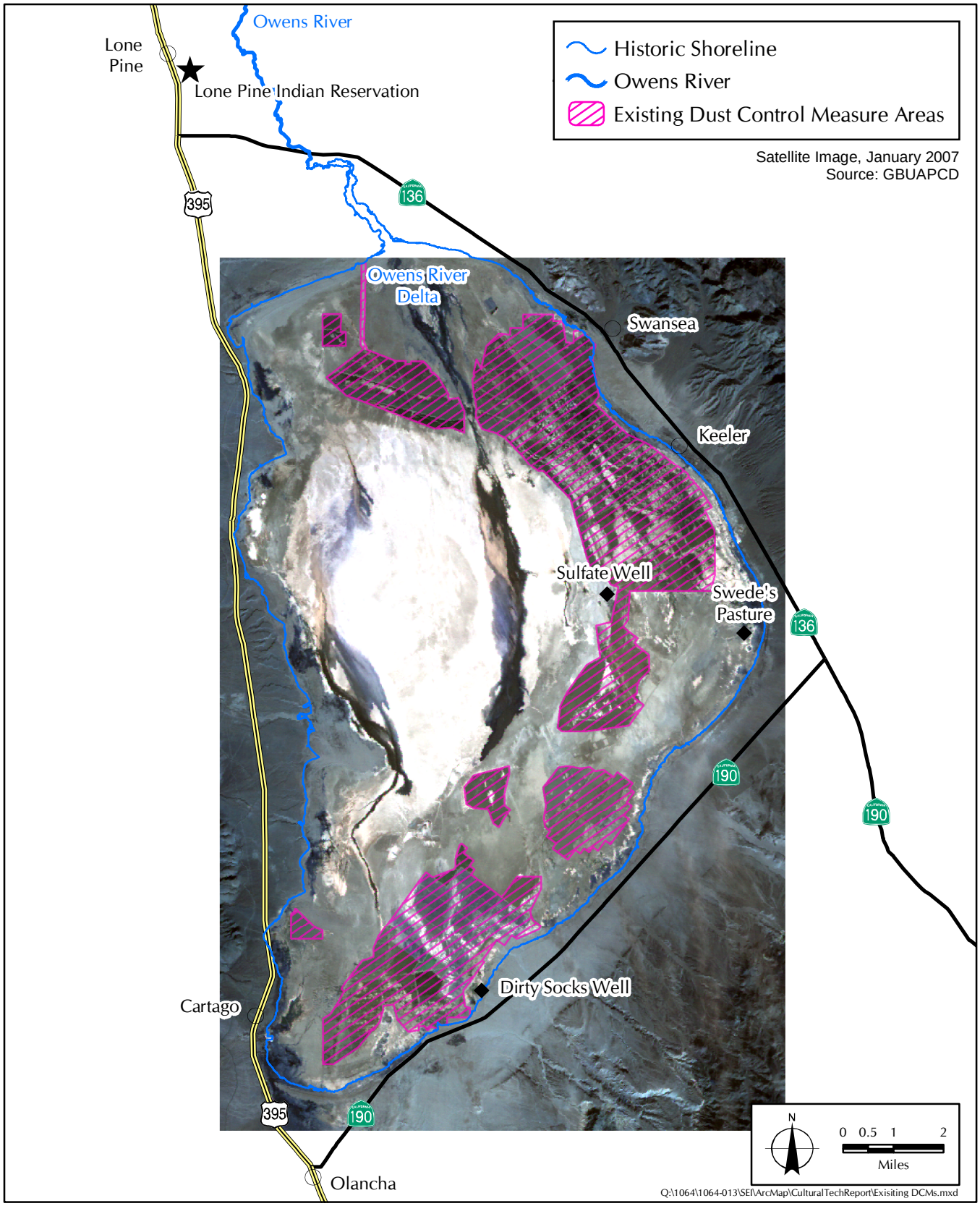


FIGURE 2.2-2

Completed Dust Control Areas, 2006

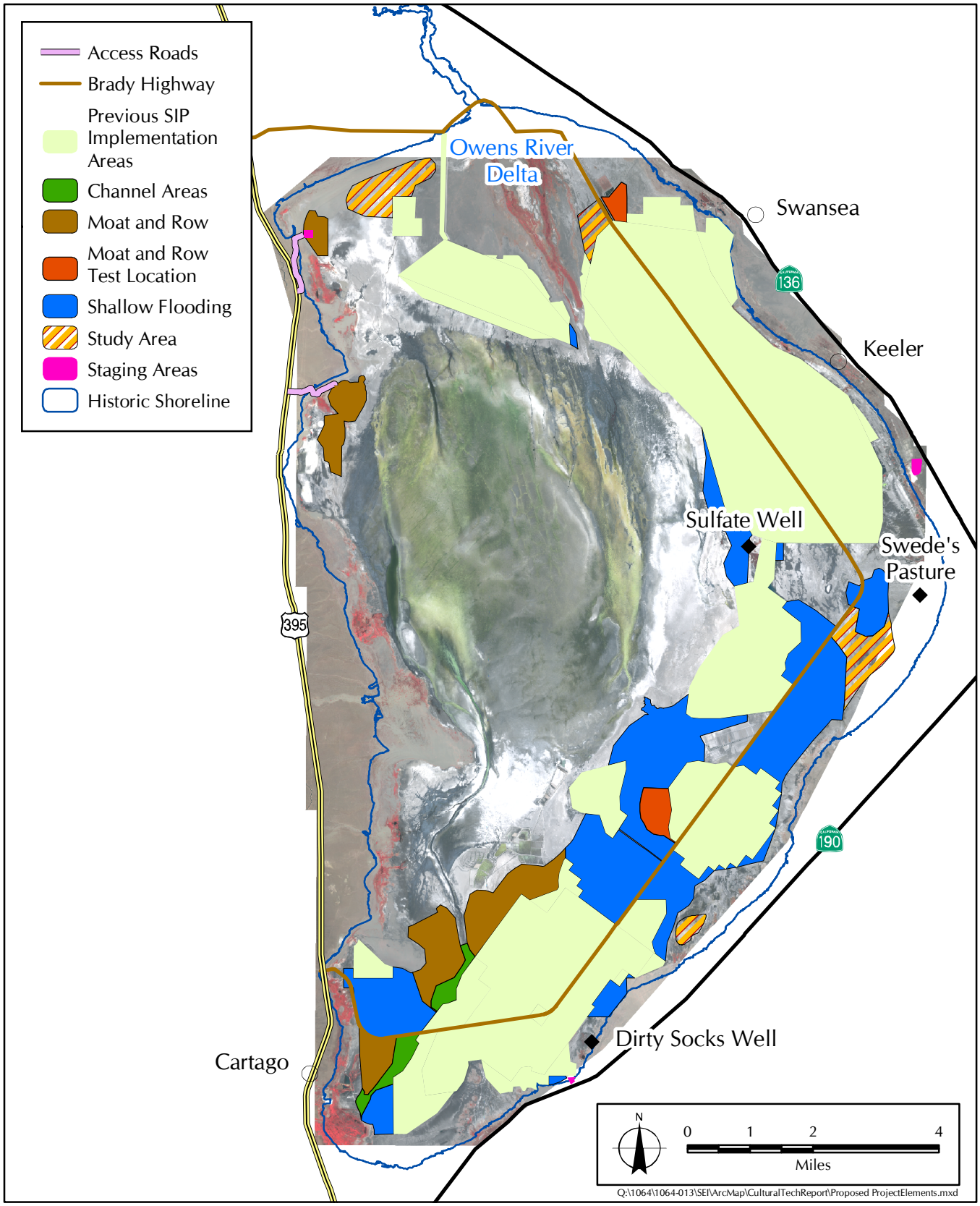


FIGURE 2.3-1

Proposed Project Elements

square miles of study area that may be emissive (Table 2.3-1, *Comparison of Proposed Project Elements*).

TABLE 2.3-1
COMPARISON OF PROPOSED PROJECT ELEMENTS

Supplemental Dust Control Area/Measure	Square Miles	Acres	Percentage
Shallow Flooding	9.2	5,888	61%
Moat & Row	3.5	2,240	23%
Study area	1.9	1,216	13%
Channel area	0.5	320	3%
Total proposed project area	15.1	9,664	100%

2.3.1 Shallow Flooding

This DCM consists of releasing water along the upper edge of the Owens Lake bed and allowing it to spread and flow down-gradient toward the center of the lake. To attain the required PM_{10} control efficiency, at least 75 percent of each square mile of the control area must be wetted to produce standing water or surface-saturated soil, between October 1 and June 30 of each year. It is estimated that about 4 acre-feet of water is required annually to control PM_{10} emissions from an acre of lake bed. Except for limited habitat maintenance flows, water would be turned off between July 1 and September 30 to allow for facility maintenance activities. This is typically a period when dust storms do not occur.

2.3.2 Moat & Row and Enhancements

The Moat & Row DCM is not a currently approved measure; the final form of this DCM would largely be determined from the results of testing at two locations on the lake bed that were previously permitted and underwent environmental review (Figure 2.3.2-1, *Moat & Row DCM*). The general form of the Moat & Row DCM is an array of earthen berms (rows) about 5 feet high with sloping sides and a base of about 11.6 feet, an access road on both sides of the row of approximately 14 feet, flanked on the other side by ditches (moats) about 4 feet deep and about 8.5 feet at the widest point (Figure 2.3.2-2, *Moat & Row Detail*). The Moat & Row DCM includes placement of a 5-foot-high sand fence on the top of the row. The sand fences would be constructed using Studded Galvanized T- Posts (for intermediate posts), 4 by 4-inch or 6 by 6-inch Treat Wood Posts (for the end posts), No. 8 Wire, and 2.5-inch-diameter PVC pipes. The PVC pipes would be used to increase the stability of the intermediate posts by extending their embedment length into the playa and would be installed below grade. The sand fence fabrics would be comprised of U.S. Fence Snow Fence materials (or equivalent materials) as utilized on the Moat & Row Demonstration Project. If guy wires are used to stabilize sand fences, sand fence fabric would be installed to fill in the gap between the guy wire and the sand fence posts. Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual Moat & Row elements would constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the Moat & Row array is intended to control emissions under the full range of principal wind directions. The predominant winds are from the north and the south with the north blowing wind the strongest, but less frequent. Initial pre-test modeling indicates that Moat & Row spacing would generally vary from 250 to 1,000 feet, depending on the surface soil type and the PM_{10} control effectiveness

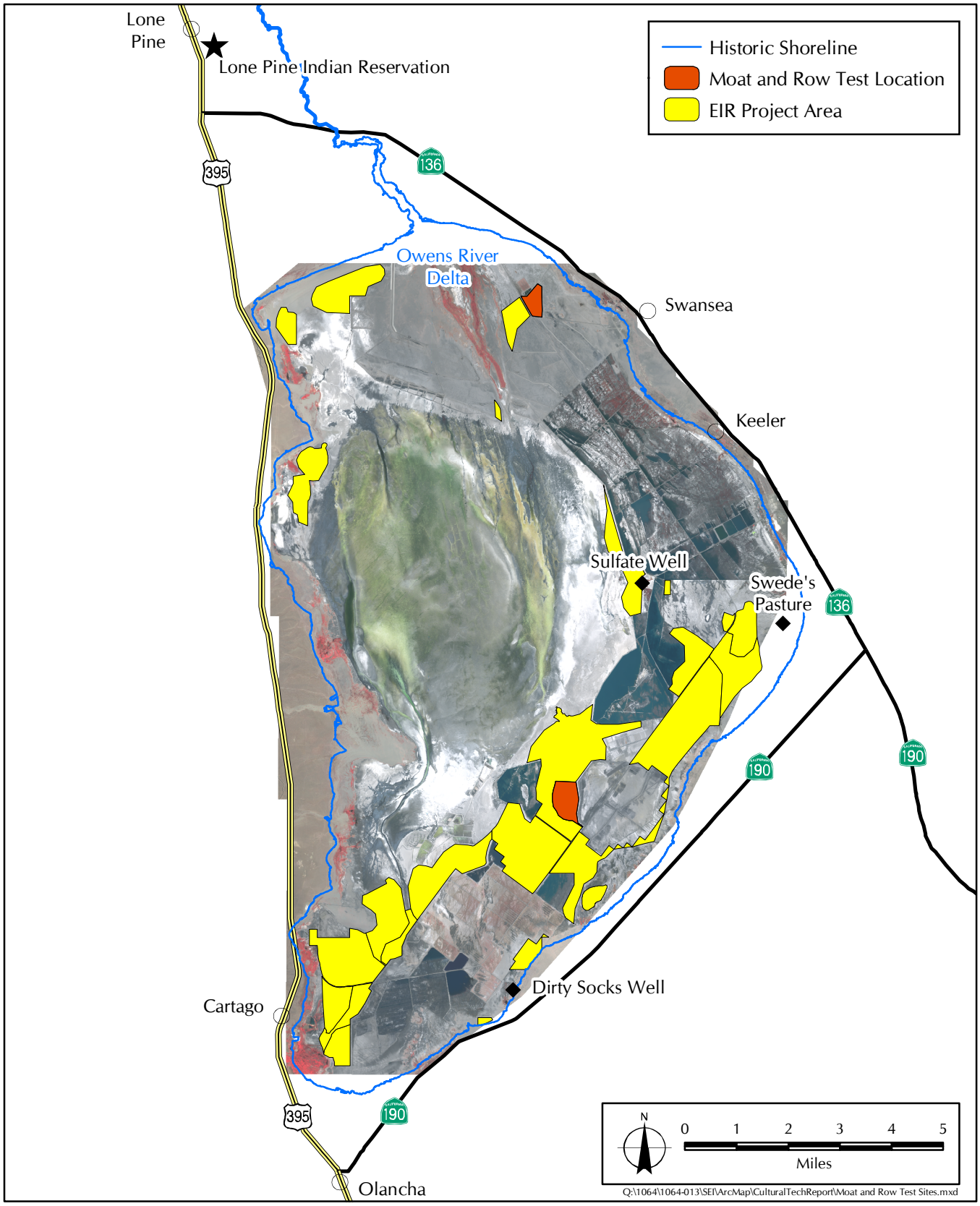


FIGURE 2.3.2-1

Moat & Row DCM

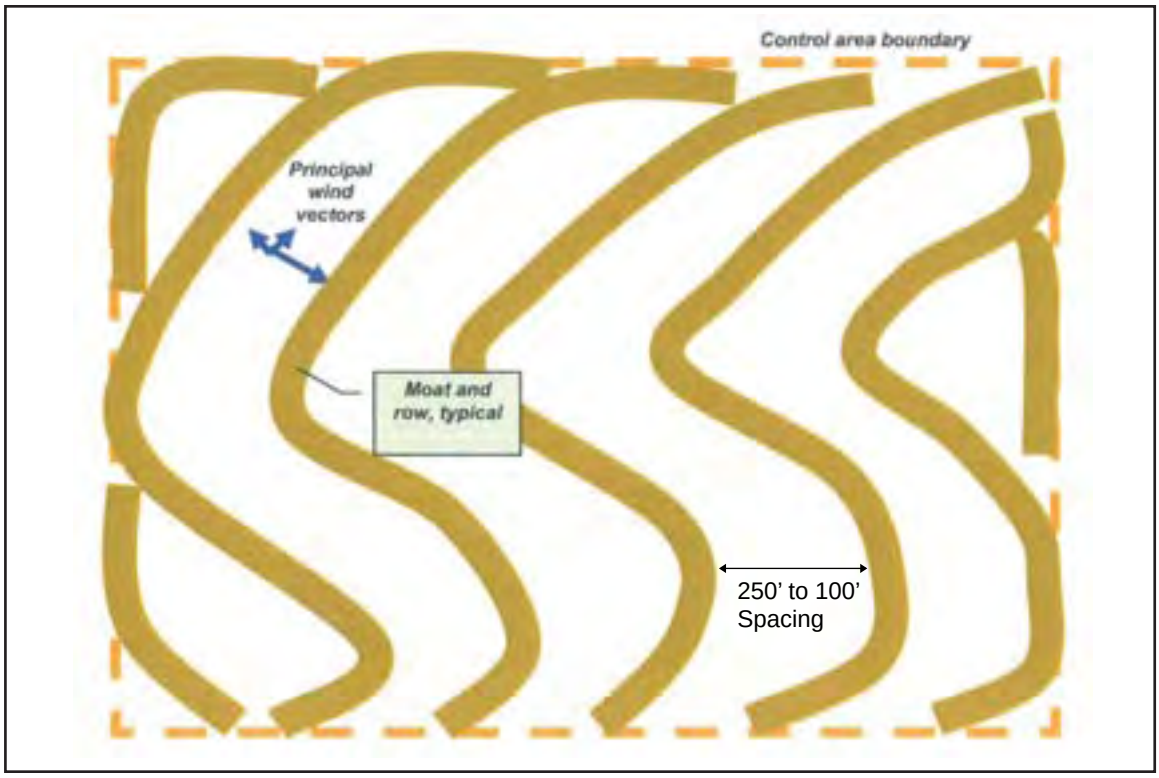


EXHIBIT 1
Moat & Row Array Plan View (Schematic)

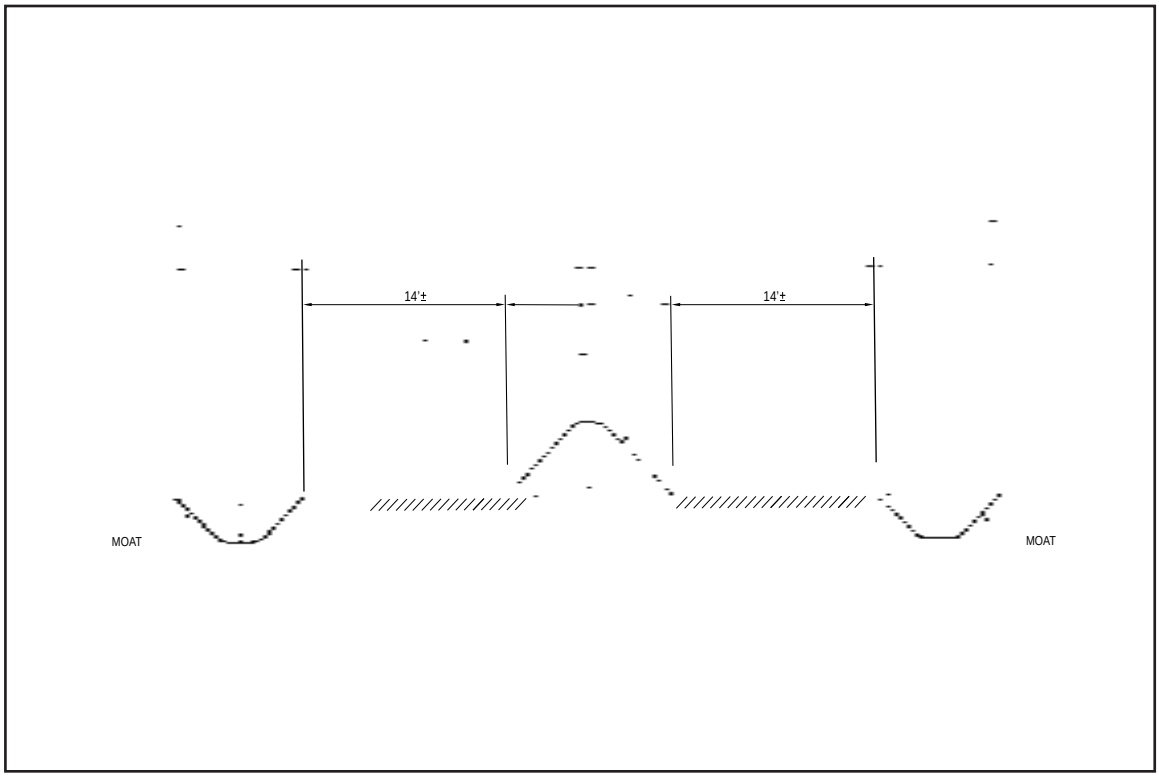


EXHIBIT 2
Profile of Moat & Row with Approximate Dimensions (Schematic)

FIGURE 2.3.2-2
Moat & Row Detail

required on the Moat & Row area. The effectiveness of the array may also be increased by adding Moats & Rows to the array by decreasing the distance between moats and rows within the array. In addition, the final maintenance regime and needs would be identified following the completion of the test areas. In the event that, after construction, monitoring indicates that Moat & Row areas do not contribute to shoreline violations, only maintenance actions would be required. For the purpose of this analysis, the moats are assumed to have sloped sides and it is assumed that they would not pose a barrier to wildlife movements. If moats were formed with vertical sides, additional environmental analysis would be required.

Enhancements

It is anticipated that the PM_{10} control effectiveness of Moat & Row would be enhanced by combining it with various approved DCMs and currently utilized measures, including Augmentation, Shallow Flooding, Application of Brine, Armoring, and Managed Vegetation. These enhancements would ensure that significant dust sources (hot spots) that may develop within these areas would be addressed. Any single method or combination of the enhancements could be implemented for both primary and secondary wind vector mitigation. The primary Moat & Row DCMs include earthen Moat & Row and a sand fence. Enhancements to these methods include Managed Vegetation and irrigation/fertigation as required, Shallow Flooding facilities, and enhancing existing vegetation and natural topographic and surface drainage features at Owens Lake. Moat & Row earthwork and sand fences may also be enhanced through a number of additional methods. These measures include placing sand fences on the open playa, adding bands of Managed Vegetation, adding water from surrounding Shallow Flooding dust control areas (DCAs), and enhancing or protecting existing vegetation and natural topographic and surface drainage features at Owens Lake. These enhancements may be added during Phase 7 construction or during a later phase.

Augmentation

This method involves addition of Moat & Row lines in between those originally constructed, either in a parallel or different direction. This would have the effect of shortening fetch in these areas, enhancing capture of mobile sand, and reducing the rate of dust emission. This method would be limited in placement of additional Moat & Rows to less than a 25-percent increase in Moats & Rows. If greater than 25 percent of additional Moat & Rows would be required, then additional environmental review would be required for that addition.

2.3.3 Dust Control Measure Alternatives

Two DCM alternatives, Managed Vegetation and Gravel Cover, have been proposed and are described here because these will be considered under the impact analysis. Both measures were previously implemented in the 2003 SIP.

Managed Vegetation

This DCM involves establishing a cover of locally adaptive native plant species evenly distributed on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Areas where this DCM has been implemented include an irrigation pipe layout, drip tube laterals, furrows, and flush fields. The field irrigation lines require excavation for the placement of buried primary submains from which water flows into a network of subsurface drip tubes, sprinklers, or

gated pipe, according to the irrigation plan used. In addition, Managed Vegetation would also require the construction of small berms where vegetation would be planted.

Gravel Cover

This measure consists of covering portions of the Owens Lake bed with a 4-inch layer of coarse gravel on emissive surfaces to protect them from the wind, thereby reducing dust emissions. Before the gravel is laid on the surface, a geotextile fabric may be placed between the soil and the gravel when necessary to prevent the settling of gravel into the lake bed sediment.

2.3.4 Channel Areas

In addition to the above listed DCMs, this report also addresses potential impacts to 0.5 square mile of channel areas (Figure 2.3-1). These areas contain natural drainage channels that have the potential to act as emissive areas, thus requiring DCMs. These areas may have potentially significant resource issues and regulatory constraints that could affect the type and location of DCMs within these areas.

2.3.5 Study Areas

Included in the total 15.1 square miles of the total project area are 1.9 square miles of study areas (Figure 2.3-1). These are areas where there is a suspicion of dust emissions, but where either the location or magnitude of emissions is uncertain. In order to provide as extensive an impact analysis as possible, these areas will be addressed as being emissive dust control areas. The District will continue to collect data in these four areas to determine their emissivity through the course of the project until 2010.

2.4 CONSTRUCTION SCENARIO

Development of the proposed project would require approximately 1.5 years to complete from August 2008 through March 2010. The new Moat & Row DCMs areas would be completed and fully operational by October 1, 2009, and the new Shallow Flooding DCMs area would be complete and operational by April 1, 2010.

The construction elements that would be required for the 15.1 square miles of new DCMs to meet the NAAQS standard for PM_{10} emissions by 2010 consists of eight primary activities:

- Site preparation (surface grading and earth moving)
- Berm construction and access road grading
- Irrigation and drainline construction (trenching, pipeline installation, trench backfilling)
- DCM area dewatering
- Irrigation system installation within the DCM areas
- Power line and DCM controls installation
- Moat & Row DCM shaping
- Shallow Flooding DCM flooding

Supporting activities would include fence installation, material delivery, and transportation of crews. All site preparation and construction activity would be undertaken in accordance with applicable federal, state, and County of Inyo codes.

SECTION 3.0
REGULATORY FRAMEWORK

This regulatory framework identifies the federal, state, and local statutes, ordinances, or policies that govern the conservation and protection of cultural resources that must be considered by the Great Basin Unified Air Pollution Control District (District) during the decision-making process for projects that have the potential to affect cultural resources.

3.1 FEDERAL

3.1.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) and its supporting federal regulations establish certain requirements that must be adhered to for any project "...financed, assisted, conducted or approved by a federal agency...." In making a decision on the issuance of federal grant monies or a permit to conduct work on federal lands for components of the proposed project, the federally designated lead agency pursuant to NEPA is required to "...determine whether the proposed action may significantly affect the quality of the human environment." Only those portions of the proposed project conducted on Bureau of Land Management (BLM) lands, which total approximately 11.44 acres, may require compliance with this regulation. Anticipated approvals from the BLM include temporary and permanent right-of-way grants on federal lands.

3.1.2 National Historic Preservation Act of 1966

Enacted in 1966 and amended in 2000, the National Historic Preservation Act (NHPA) declared a national policy of historic preservation and instituted a multi-faceted program, administered by the Secretary of the Interior, to encourage the achievement of preservation goals at the federal, state, and local levels (16 USC 470). The NHPA authorized the expansion and maintenance of the National Register of Historic Places (NRHP), established the position of State Historic Preservation Officer (SHPO) and provided for the designation of State Review Boards, set up a mechanism to certify local governments to carry out the purposes of the NHRA, assisted Native American tribes to preserve their cultural heritage, and created the Advisory Council on Historic Preservation (ACHP).

Section 106

Section 106 of the NHPA states that federal agencies with direct or indirect jurisdiction over federally funded, assisted, or licensed undertakings must take into account the effect of the undertaking on any historic property that is included in or eligible for inclusion in the NRHP, and that the ACHP must be afforded an opportunity to comment, through a process outlined in the ACHP regulations at 36 Code of Federal Regulations (CFR) Part 800, on such undertakings. The Section 106 process involves identification of significant historic resources within an "area of potential effect;" determination if the undertaking will cause an adverse effect on historic resources; and resolution of those adverse effects through execution of a Memorandum of Agreement. In addition to the ACHP, interested members of the public, including individuals, organizations, and agencies (such as the California Office of Historic Preservation), are provided with opportunities to participate in the process. Only those portions of the proposed project conducted on BLM lands, which total approximately 11.44 acres, may require compliance with this regulation. Anticipated approvals from the BLM include temporary and permanent right-of-way grants on federal lands.

National Register of Historic Places

The NRHP was established by the NHPA of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2). The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it is significant under one or more of the following criteria (36 CFR 60.4):

Criterion A: It is associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: It is associated with the lives of persons who are significant in our past.

Criterion C: It embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: It has yielded, or may be likely to yield, information important in prehistory or history.

Cemeteries, birthplaces, or graves of historic figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, and properties that are primarily commemorative in nature, are not considered eligible for the NRHP, unless they satisfy certain conditions. In general, a resource must be 50 years of age to be considered for the NRHP, unless it satisfies a standard of exceptional importance.

3.1.3 Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 sets provisions for the intentional removal and inadvertent discovery of human remains and other cultural items from federal and tribal lands. It clarifies the ownership of human remains and sets forth a process for repatriation of human remains and associated funerary objects and sacred religious objects to the Native American groups claiming to be lineal descendants or culturally affiliated with the remains or objects. It requires any federally funded institution housing Native American remains or artifacts to compile an inventory of all cultural items within the museum or with its agency, and to provide a summary to any Native American tribe claiming affiliation. Only those portions of the proposed project conducted on BLM lands, which total approximately 11.44 acres, may require compliance with this regulation. Anticipated approvals from the BLM include temporary and permanent right-of-way grants on federal lands.

3.2 STATE

3.2.1 California Environmental Quality Act

Pursuant to the California Environmental Quality Act (CEQA), a "historical resource" is a resource listed in, or eligible for listing in, the California Register of Historical Resources (CRHR) (PRC, Sections 21083.2 and 21084.1). In addition, resources included in a local register of historic resources or identified as significant in a local survey conducted in accordance with state guidelines are also considered historic resources under CEQA, unless a preponderance of the facts demonstrates otherwise. According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the CRHR or is not included in a local register or survey shall not preclude a Lead Agency, as defined by CEQA, from determining that the resource may be a historic resource as defined in California Public Resources Code (PRC) Section 5024.1.

CEQA applies to archaeological resources when 1) the archaeological resource satisfies the definition of a historical resource or 2) the archaeological resource satisfies the definition of a "unique archaeological resource." A unique archaeological resource is an archaeological artifact, object, or site that has a high probability of meeting any of the following criteria (PRC Section 21083.2(g)):

(1) The archaeological resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.

(2) The archaeological resource has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) The archaeological resource is directly associated with a scientifically recognized important prehistoric or historic event or person.

3.2.2 California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historic resources surveys or designated by local landmarks programs, may be nominated for inclusion in the CRHR. A resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria (PRC Section 5024.1(c)):

Criterion 1: It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Criterion 2: It is associated with the lives of persons important in our past.

Criterion 3: It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.

Criterion 4: It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to be recognizable as historic resources and to convey the reasons for their significance (OHP 2006). It is possible that a resource whose integrity does not satisfy NRHP criteria may still be eligible for listing in the CRHR. A resource that has lost its historic character or appearance may still have sufficient integrity for the CRHR if, under Criterion 4, it maintains the potential to yield significant scientific or historical information or specific data (OHP 2002). Resources that have achieved significance within the past 50 years may be also eligible for inclusion in the CRHR provided that enough time has lapsed to obtain a scholarly perspective on the events or individuals associated with the resource (OHP 2006).

3.2.3 Other State Statutes and Regulations

California Historical Landmarks

California Historical Landmarks (CHLs) are buildings, structures, sites, or places that have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value and that have been determined to have statewide historical significance by meeting at least one of the criteria listed below (OHP n.d. a). The resource also must be approved for designation by the County Board of Supervisors (or the City or Town Council in whose jurisdiction it is located); be recommended by the State Historical Resources Commission; and be officially designated by the Director of California State Parks. The specific standards now in use were first applied in the designation of CHL #770. CHLs #770 and above are automatically listed in the CRHR.

To be eligible for designation as a Landmark, a resource must meet at least one of the following criteria:

- The first, last, only, or most significant of its type in the state or within a large geographic region (Northern, Central, or Southern California).
- Associated with an individual or group having a profound influence on the history of California.
- A prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in a region of a pioneer architect, designer, or master builder.

California Points of Historical Interest

California Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value (OHP n.d. b). Points of Historical Interest designated after December 1997 and recommended by the State Historical

Resources Commission are also listed in the CRHR. No historic resource may be designated as both a Landmark and a Point. If a Point is later granted status as a Landmark, the Point designation will be retired. In practice, the Point designation program is most often used in localities that do not have a locally enacted cultural heritage or preservation ordinance.

To be eligible for designation as a Point of Historical Interest, a resource must meet at least one of the following criteria:

- The first, last, only, or most significant of its type within the local geographic region (city or county).
- Associated with an individual or group having a profound influence on the history of the local area.
- A prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in the local region of a pioneer architect, designer, or master builder.

Native American Heritage Commission

Section 5097.91 of the Public Resources Code established the Native American Heritage Commission (NAHC), whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Section 5097.98 of the Public Resources Code specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

Government Code Sections 6254(r) and 6254.10

These sections of the California Public Records Act were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a state or local agency."

Health and Safety Code, Sections 7050 and 7052

Health and Safety Code, Section 7050.5 declares that, in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbance must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

Penal Code, Section 622.5

Penal Code, Section 622.5 provides misdemeanor penalties for injuring or destroying objects of historic or archaeological interest located on public or private lands, but specifically excludes the landowner.

Public Resources Code, Section 5097.5

Public Resources Code, Section 5097.5 defines as a misdemeanor the unauthorized disturbance or removal of archaeological, historic, or paleontological resources located on public lands.

3.3 LOCAL

3.3.1 County of Inyo General Plan

The Land Use/Conservation/Open Space element of the County of Inyo General Plan sets forth the following goal in relation to cultural resources: "Preserve and promote the historic and prehistoric cultural heritage of the County" (County of Inyo 2001b). The County's Land Use/Conservation/Open Space element includes the following policies related to the preservation and promotion of the County's cultural heritage:

> Policy CUL-1.3, Protection of Cultural Resources: Preserve and protect key resources that have contributed to the social, political, and economic history and prehistory of the area, unless overriding considerations are warranted.
>
> Policy CUL-1.4, Regulatory Compliance: Development and/or demolition shall be reviewed in accordance with the requirements of CEQA and the National Historic Preservation Act.
>
> Policy CUL-1.5, Native American Consultation: The County and private organizations shall work with appropriate Native American groups when potential Native American resources could be affected by development proposals.

3.3.2 Inyo County Code, Title 9

Inyo County Code Title 9, Public Peace, Morals and Safety, states:

> No publicly or private sponsored project or action shall be expressly permitted by the county planning commission, hereinafter, 'the commission,' or any other county agency where the commission finds that any archaeological, paleontological, and historical features, or Native California Indian burial sites may be disturbed in any way by the project or action; provided, the commission many conditionally expressly permit the project or action if the project or action sponsor takes responsibility for preservation, protection, or relocation of the features or sites in accordance with a specific plan for preservation, protection, or relocation that shall be reviewed and approved by the commission after a public hearing. The public hearing shall be held, in the instance of Native California Indian burial sites, following the review and comment required by Section 9.52.020.

SECTION 4.0
STUDY METHODS

This section of the Cultural Resources Technical Report describes the methods employed in the characterization and evaluation of cultural resources at the 2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2008 SIP) (proposed project) site. The study methods were designed to provide the substantial evidence required to address the scope of analysis recommended in Appendix G of the State of California Environmental Quality Act (CEQA) Guidelines, including County of Inyo General Plan goals and policies related to cultural resources, including paleontological resources, prehistoric resources, historic resources, Native American sacred sites, and human remains.

4.1 PALEONTOLOGICAL RESOURCES

Sapphos Environmental, Inc. retained the services of Cogstone Resource Management, Inc. to assess paleontological resources. The results of the investigations of potential resources is documented in a separate technical report (Gust and Scott 2007).

4.2 PREHISTORIC AND HISTORIC RESOURCES

4.2.1 Record Search and Literature Review

A literature review was undertaken to determine if the proposed project would have the potential to adversely affect prehistoric and historic resources, thus requiring the consideration of avoidance and minimization, in accordance with Section 15064.5 of the State CEQA Guidelines. An archaeological records search was conducted at the Eastern Information Center (EIC), University of California, Riverside, for previously recorded archaeological resources within the proposed project area and within a 1-mile radius. Record searches were conducted on November 16, December 6, 2006, and March 14, 2007 (EIC 2006). The search included a literature review of all known relevant cultural resource surveys and excavation reports to ascertain potential archaeological resources within a 1-mile radius of the proposed project site. In addition, the California State Historic Resources Inventory (EIC 2006), the National Register of Historic Places (EIC 2006), the listing of California Historic Landmarks (EIC 2006), and the California Points of Historical Interest (EIC 2006) were searched to ascertain the presence of potential historic resources within the proposed project site.

4.2.2 Agency Consultation

Coordination was undertaken with the regulatory oversight and resource agencies and with experts in the field to further evaluate the potential presence of prehistoric and historic resources including the California Department of Parks and Recreation, Office of Historic Preservation, the Native American Heritage Commission (NAHC), the California State Lands Commission (CSLC), and Bureau of Land Management (BLM).

A total of 9,232.56 acres of the proposed project area are administered by CSLC, and 11.44 acres lie within lands administered by the BLM (Figure 4.2.2-1, *Property Ownership*). Consultation was undertaken with the Great Basin Unified Air Pollution Control District (District), CSLC, and BLM to review the scope of the proposed project, the potential for cultural resources to occur in the proposed project area, and field methods to be used in assessing the presence or absence of these resources. Following coordination with the agencies involved Sapphos Environmental, Inc. obtained a permit to

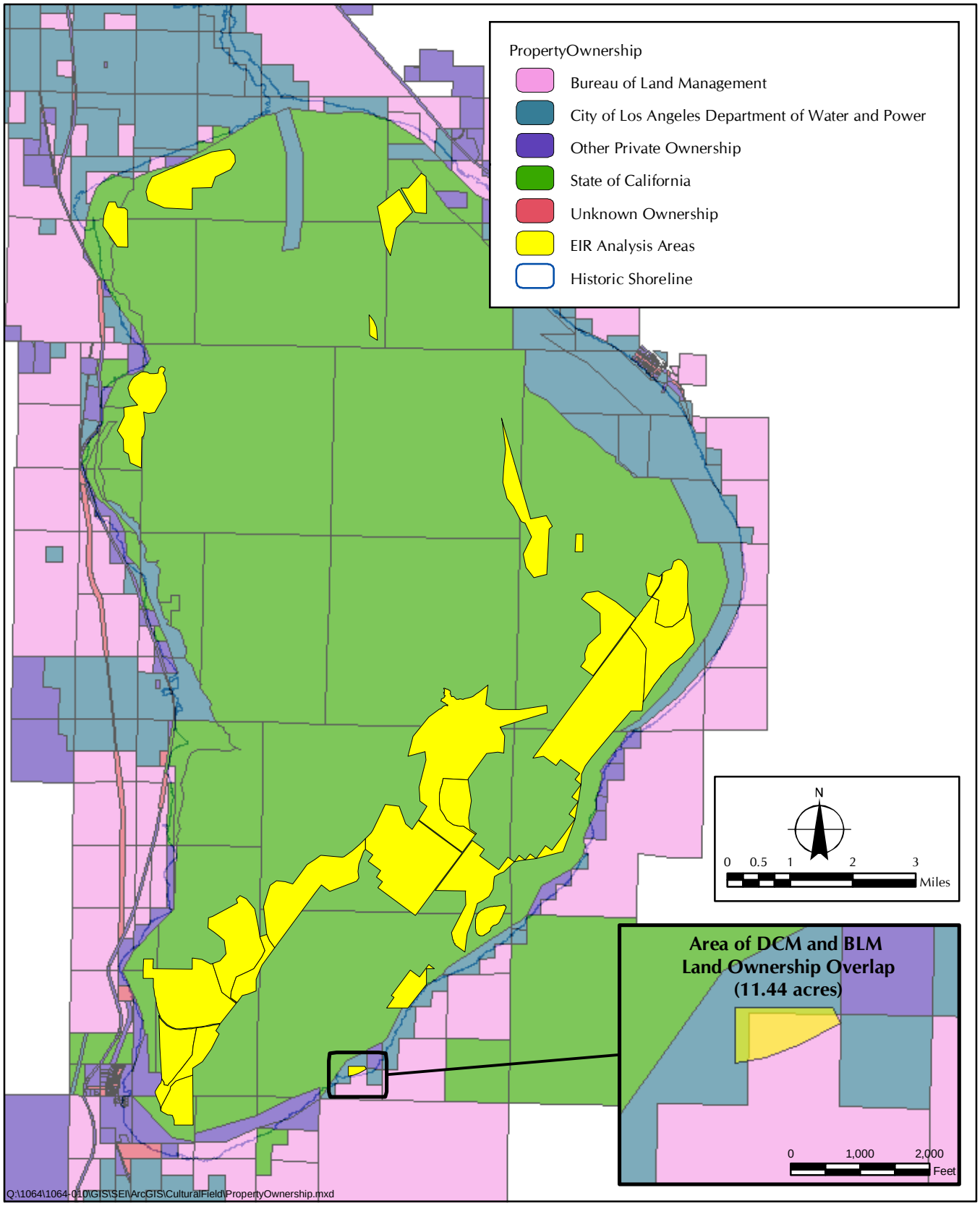


FIGURE 4.2.2-1
Property Ownership

work in lands administered by the CSLC and BLM. In addition, Sapphos Environmental, Inc. coordinated with U.S. Borax Inc. – Owens Lake Operations prior to working in the areas near the mining operation. The following documents reflect coordination that took place during the cultural resources surveys:

- California State Lands Commission. File Ref: PRC 8079.9: Right of Entry to Conduct Non-Invasive Surveys on State-Owened Sovereign Lands in the Historic Bed of Owens Lake, Inyo County
- Bureau of Land Management Cultural Use Permit (CA-04-28)
- Bureau of Land Management Field Work Authorization (CA-170-07-24), Bishop Office

4.2.3 Field Survey

Schedule and Field Conditions

Sapphos Environmental, Inc. conducted the first portion of the Phase I Archaeological Survey as stipulated by the contract with the District. This portion of the survey includes 6,355 acres (approximately two-thirds) of the 9,664 acres that comprise the total 2008 SIP area (Figure 4.2.3-1, *Cultural Resources Survey Area*, and Appendix B, *Survey Areas with Archaeological Sites and Isolates*). Surveys of the 320 acres of Moat & Row test areas by LADWP contractors. Sapphos Environmental, Inc. will complete the second portion of the surveys on the remaining 2,989 acres prior to project approval. The approximately 2,400 hours of survey work was conducted between January 22 and May 4, 2007, and was carried out in eight separate field rotations (Table 4.2.3-1, *Field Survey Personnel*).

TABLE 4.2.3-1
FIELD SURVEY PERSONNEL

Survey Date	Survey Personnel	Hours
January 22 to 26, 2007	Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. Chris Purtell, Mr. Clarus Backes	234
February 5 to 9, 2007	Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. John Elford, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	335
February 20 to 24, 2007	Ms. Natasha Tabares, Mr. John Elford, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	280
March 5 to 9, 2007	Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. John Elford, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	335
March 19 to March 23, 2007	Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. John Elford, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	335
April 2 to 6, 2007	Dr. Helen Wells, Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. Clarus Backes, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	391
April 16 to 19, 2007	Ms. Natasha Tabares, Ms. Amy Commendador-Dudgeon, Mr. John Elford, Mr. Brett Jones, Mr. Ron Norton, Mr. Chris Millington	335
April 30 to May 4, 2007	Ms. Natasha Tabares, Mr. John Elford, Mr. Brett Jones	168
	Total	**2,413**

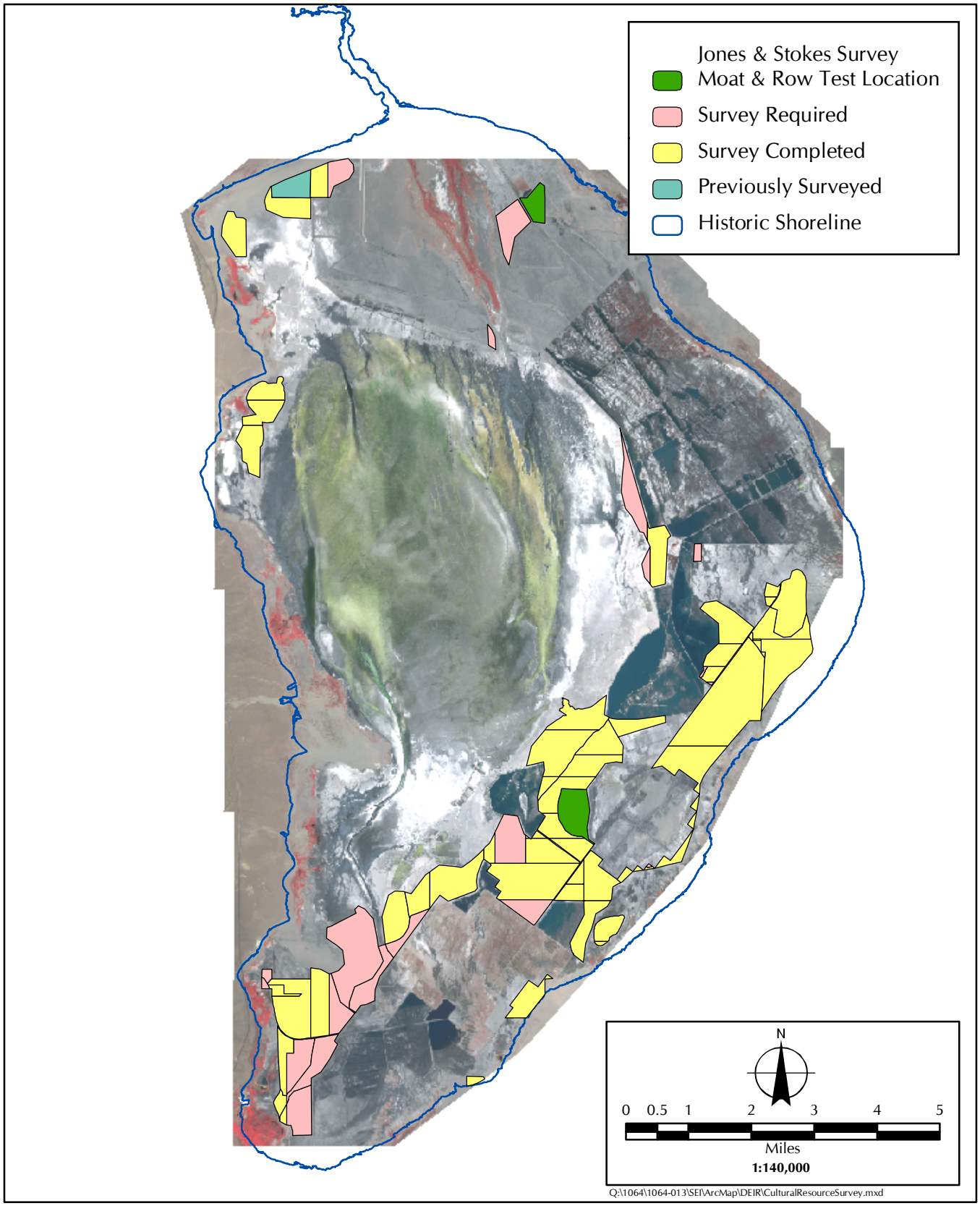


FIGURE 4.2.3-1

Cultural Resources Survey Areas

A small portion totaling 9 acres could not be surveyed at the time due to the presence of standing water in the area. A survey of the 9 acres will be completed in conjuction with the second portion of the field survey, which will be conducted from August to November 2007.

Weather conditions were favorable throughout most of the surveys; field work had to be interrupted only on February 7 and February 22, 2007, due to severe wind conditions and rain. Survey work continued the next day under circumstances that allowed for the accurate recording of the cultural resources.

Field Methods

The work was conducted under the direction of Ms. Natasha Tabares, with a crew size varying from three to six archaeologists and one to three Native American monitors (Appendix C, *Résumés*). Dr. Helen Hells participated during one of the field rotations and provided a peer review of this report. Prior to the field work, Sapphos Environmental, Inc. (Ms. Natasha Tabares and Mr. Chris Purtell) visited the proposed project site on January 17, 2007, to determine access to the area to be surveyed for cultural resources. As a result of the field inspection, it was determined that those areas subject to flooding during the rainy season would be prioritized for the upcoming survey efforts.

Survey areas were downloaded in a Trimble GeoExplorer Global Positioning System (GPS). In addition, hard copies of relevant U.S. Geological Survey (USGS) 7.5-minute series topographic maps with designated survey areas were used in the field (Appendix B). The survey areas were accessed by vehicle using the existing roads when possible. Survey areas that were not located near existing roads were accessed by foot. No vehicles were used in the lake bed outside existing roads. Surveys were conducted systematically with archaeologists spaced at 20-meter intervals. All areas were surveyed on foot with a field crew consisting of three to six archaeologists.

When an artifact was found, the crew examined the surrounding area to determine the extent of the cultural deposit. Following the criteria established by previous researchers (Jones and Stokes 2006c) for site designation in Owens Lake, it was determined that 10 artifacts in a 10 by 10 meter area would be considered a site. The same area with a lighter density of artifacts was treated as an isolate.

The distribution of the cultural material in the southwestern-most portion of the lake is complex, as the artifacts appear to be scattered along existing seasonal washes. Previous investigations have suggested that sites in this portion of the lake are secondary deposits, and therefore were not used in the analysis and interpretations used to address regional research themes (Jones and Stokes 2005c). However, important information may be obtained from this type of cultural deposits. Therefore, for management purposes, site boundaries were established following Stewart's (2002:219) definition. In this case, a site is conceived as a "device for organizing spatial distributions of artifacts and surface features on discrete landscapes, even if distributions are not continuous and clusters are spatially isolated from one another. [However, this requires] that spatial distributions and the internal variability of any locality be adequately documented."

All cultural resources were assigned temporary numbers, and their exact positions were recorded using Universal Transverse Mercator (UTM) coordinates to establish their position on the USGS topographic quadrangle maps. Resources were documented in the field using Department of Parks and Recreation (DPR 523 series) forms. Each cultural resource was photographed, and a sketch map was drawn for all the archaeological sites.

Sites and isolates were given field numbers using the prefix OL (Owens Lake). The numbering system is continuous for the archaeological sites. Isolate numbers are not always consecutive because some isolates were incorporated into sites and others were eliminated after analyzing the distribution of the cultural material in the lake (i.e., isolated flakes initially recorded in the southwestern-most portion of the lake were later eliminated due to the number of such instances observed). Obsidian flakes are ubiquitous in the southwestern-most portion of the lake, and there are thousands of obsidian pieces that do not exhibit cultural modification mixed with those that clearly show flake attributes. Because of the nature of the artifact distribution in the southwestern-most portion of the lake, isolated single flakes, or very sparse flake scatters consisting of less than 10 flakes in a 10 by 10 meter area were not recorded.

Some historic isolates were determined to be old enough to qualify as a historic archaeological isolate. Site records will be submitted to the EIC, located at University of California, Riverside, for assignment of primary numbers and permanent trinomial designations. Isolate records will also be submitted to the EIC for a primary number designation.

The results of the field survey were incorporated into a geographical information system (GIS) to produce a spatially accurate map of cultural resources. Locations of cultural resources were plotted with respect to the distribution of the Dust Control Measure (DCM) areas.

Collection Policies

During the current effort, artifacts that were considered to be at risk were collected. At-risk artifacts included projectile points, bifaces, and other artifacts that may be recognized as such by an untrained person, and therefore may be subject to unauthorized collection. On the lake bed, artifacts are also at risk from the effects of wind and water, which may make them unavailable for later study. Projectile points and bifaces have the potential to contribute information on chronology and lithic technology, but this can only be fully assessed through laboratory analysis.

Previous Phase I investigations on the Owens Lake bed followed non-collection procedures that are customary during initial surveys. Because most of the projectile points and bifaces recorded during these investigations were found as isolates, this policy has precluded the opportunity for future laboratory analysis. As isolates are categorically ineligible under the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR), Phase II evaluations are not required to address them, and it may be impossible to relocate them even if they are included in a research design. Therefore, during the current effort, the decision was made to collect these artifacts when they were initially identified, thus ensuring that important information about the prehistory of the Owens Valley would not be lost.

4.3 NATIVE AMERICAN SACRED SITES AND HUMAN REMAINS

4.3.1 Record Search and Literature Review

Coordination was initiated with the NAHC early in the planning process (Appendix D, *Documentation of Native American Consultation*). In particular, coordination was undertaken with the NAHC (Mr. David Singleton) regarding the presence of Native American burials in the area. As a result of the conversations with the NAHC, it was determined that no Native American burials or cultural resources were present in the proposed project area but that it was likely that cultural resources would be found during the survey (Singleton 2007). The NAHC was requested to conduct a record search of the Sacred

Lands File for the proposed project study area. The results of the search would be an indication of the presence of known Native American cultural resources existing within the proposed project study area. In addition, based on the recommendation of the NAHC, Sapphos Environmental, Inc. sent letters to interested Native American Tribes classified by the NAHC as the most likely descendants (MLD) from the proposed project area. The letter advised the tribes of the proposed project and its geographic area, and requested their acknowledgment of the letter, as well as any comments or concerns related to the proposed project. Although no written replies were received, Sapphos Environmental, Inc. and the District invited the Native American representatives listed by the NAHC to participate in a project initiation meeting on January 11, 2007.

4.3.2 Native American Participation

Native American tribes have been actively involved with the Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP since the project first started in 1997. Sapphos Environmental, Inc. and the District consider Native American participation an essential aspect of the cultural resources surveys in the area. Thus, in addition to the consultation with the NAHC, a project initiation meeting was held to provide information regarding the proposed project and the Phase I Archaeological Survey. Notice of this meeting was sent via regular mail to all the individuals suggested by the NAHC. In addition to providing information about the proposed project, the letter sent by Sapphos Environmental, Inc. also encouraged any comments or information regarding the presence of Native American sacred sites. The meeting was held on January 11, 2007, at the City of Los Angeles Department of Water and Power Keeler Office, 220 Cerro Gordo Street, Keeler, California. Two tribes that expressed interest in participating in the project were present at the meeting: the Big Pine and the Fort Independence tribes. Although no representatives from the Lone Pine tribe were present, they were later contacted via phone and e-mail. As a result of these conversations, it was determined that three tribes would participate as cultural monitors during the Phase I Archaeological Survey; Lone Pine-Paiute-Shoshone, Big Pine, and Fort Independence (Table 4.3.2-1, *Cultural Monitors Present during the Phase I Survey*).

TABLE 4.3.2-1
CULTURAL MONITORS PRESENT DURING THE PHASE I SURVEY

Survey Date	Native American Monitors
January 22 to 26, 2007	Ms. Kathy Bancroft, Ms. Priscilla Naylor, Ms. Theresa Stone
February 5 to 9, 2007	Mr. Harmey Bancroft, Ms. Sharyl Stephens
February 20 to 24, 2007	Mr. Clarence Spralt, Ms. Sharyl Stephens
March 5 to 9, 2007	Ms. Priscilla Naylor, Mr. Clarence Spralt
March 19 to 23, 2007	Mr. Harmey Bancroft, Mr. Clarence Spralt, Ms. Sharyl Stephens
April 2 to 6, 2007	Mr. Harmey Bancroft, Mr. Melvin Joseph, Ms. Priscilla Naylor, Mr. Clarence Spralt
April 16 to 19, 2007	Mr. Harmey Bancroft, Mr. Melvin Joseph, Ms. Priscilla Naylor
April 30 to May 4, 2007	Mr. Harmey Bancroft, Mr. Randy Rorick

Cultural monitors from the Lone Pine tribe were coordinated through Ms. Janice McRoberts, the Environmental Program Assistant to Mr. Wilfred Nabahe. Cultural monitors from the Big Pine tribe were coordinated through Mr. Bill Helmer, the Tribal Historic Preservation Officer. Additional coordination was undertaken with each individual monitor. Mr. Norman Wilder, administrator from the Fort Independence Tribe, coordinated the monitors from Fort Independence. Additional coordination was undertaken with each individual monitor.

All the Native American tribes present during the Phase I Archaeological Survey conducted to date will be contacted prior to implementation of the second portion of the survey, which will be performed from August to November 2007.

SECTION 5.0
RESULTS

5.1 CULTURAL RESOURCES

5.1.1 Physical History of Owens Lake

The Owens Valley, located in the southwestern Great Basin, extends for approximately 200 kilometers north-south and has a variable width between 15 and 40 kilometers. The valley is bounded on the west by the Sierra Nevada, on the east by the Inyo Mountains and White Mountains, and on the south by the Coso Range (Figure 1-1, *Project Location*).

Owens Lake is located at the southernmost portion of Owens Valley, and is part of a chain of lakes that was active during the Pleistocene, about 1.8 million years ago. The lake system extended from Mono Lake (previously a much larger lake known as Lake Russell) and continued south to Lake Manly. Mono Lake was the northernmost lake of the system until its level dropped prior to 35,000 years ago. After this time, the Owens Lake continued to be fed by Owens River and waters from the lake flowed through the Rose Valley and into China Lake to the south. China Lake overflowed into Searles Lake and Panamint Lake, and continued farther south into Lake Manly.

During the Late Pleistocene, Owens Lake was an open-basin lake reaching high stands between approximately 3,805 feet (1,160 meters) and approximately 3,756 feet (1,145 meters) above sea level, and a closed-basin lake during the Holocene. Originally thought of as a stable lake, combined studies of core and stratigraphy indicate a high frequency of water level oscillation, which had not been documented in other pluvial lake basins in the western United States (Bacon et al. 2005:17).[1] As previously stated, Owens Lake was a natural closed basin before its desiccation, and was fed by Owens River on the north, and by smaller streams from the Sierra Nevada, such as Bishop Creek, Cottonwood Creek, and Ash Creek. Other water sources included ephemeral streams from the Inyo and Coso Mountains to the east and south. Several small springs also occur around the shore and within the lake bed. Closed-basin conditions have prevailed throughout most of the lake's history, which imply that there is no transport of material, either water or sediment, except through evaporation or wind transport (Soil and Water West, Inc. 2001:3).

Bacon et al. (2005) identified the oscillations of Owens Lake between approximately 27,000 calibrated years before present (cal yr BP) to the present. Combination of these studies indicate a high stand of the lake at approximately 3,805 feet (1,160 meters) between 24,000 and 23,730 cal yr BP followed by a drop in water levels. A first possible desiccation event and/or very low water levels has been suggested based on a hiatus from sediment cores between approximately 18,920 and 15,590 cal yr BP (Benson et al. 2002) (but see Smith and Bischoff (1993) and Smith and Pratt (1957) for a different interpretation). A lower high stand of approximately 3,756 feet (1,145 meters) was registered between 15,700 and 15,000 cal yr BP (Orme and Orme 1993). Very shallow lake levels are also suggested by the presence of sediments that indicate subaerial conditions approximately 12,600 cal yr BP, when the lake registered elevations of approximately 3,608 feet (1,100 meters) (Benson et al. 2002:10-12). A second dry interval was recorded shortly after these low levels at approximately 11,200 cal yr BP. This

[1] As used by the authors, the term pluvial refers here to a "mean climatic regimen of sufficient duration to be represented in the physical or organic record, and in which the precipitation/evaporation ratio results in greater net moisture available for water bodies and organisms than is available in the same area today or in the preceding regimen (Flint 1971 cited by Bacon 2005:2).

was followed by a high stand that was not previously reported and that dropped quickly leaving shore lines at approximately 3,674 feet (1,120 meters) between 7860 and 7650 cal yr BP (Bacon et al. 2005). A third event of near-desiccation and shallow water levels was documented between 6500 and 4400 cal yr BP (Benson et al. 2002). Lake oscillations continued throughout the Late Holocene, and between 350 and 230 cal yr BP. Records indicate that the lake dried into a playa (Li et al. 2000).

During historic times, Owens Lake's highest stand reached approximately 3,600 feet in 1872 (Smith and Bischoff 1993). Water diversion for irrigation purposes in the late 1800s and early 1900s, in addition to dry climatic conditions, continued to lower the lake level, which rose again after the drought was over. The lake began its complete and final desiccation period after 1913 when the Owens River water was diverted to the Los Angeles Aqueduct by the City of Los Angeles Department of Water and Power (Smith and Bischoff 1993). By the mid 1920s, Owens Lake had become a dry playa, only to receive water on seven occasions due to unusually high runoff, in 1938, 1967, 1969, 1980, 1982, 1983, and 1986 (Stine 1994:1).

In sum, the history of desiccation at Owens Lake began as a consequence of climatic change accelerated due to irrigation, and ended as a result of water diversion, resulting into the modern Owens Lake playa (Saint-Amand et al. 1987).

Owens Lake Sediments

Several sub-environments have been described within the lake bed based on their morphological characteristics, sediment composition, groundwater, and location on the playa. Today, two main features, the historic shoreline and the brine pool, are evident in topographic maps and aerial photographs. The historic shoreline is considered to be located at 3,600 feet above sea level; while the brine pool is considered to be the lowest portion of the lake, located below approximately 3,553 feet.

Owens Lake has always been an alkaline body of water, and water evaporation has caused salt deposits to accumulate on the surface; these salts also migrate through capillarity from the lake's shallow water table (Soil and Water West, Inc. 2001:3). In addition, minerals develop and change into different types, depending on temperature and the presence of rain (Saint-Amand et al. 1987:114; Sharp and Glazner 1997), resulting in a mosaic of textures on the surface of the lake.

The thickness of lake deposits in the deepest portions of the basin range from 3,000 to over 10,000 feet (Soil and Water West, Inc. 2001:3). Currently, portions of the surface of the Owens Lake playa are characterized by a thin layer of windblown sand mixed with clay and an alkali crust, while the layer immediately beneath the surface does not contain any sand. The crust that forms on the surface curves above the clay forming a hard layer when it dries. The appearance and consistency of the crust varies throughout the year; during summer time, the upper strata of clay dries, forming polygons with open cracks in between that may reach up to 1 meter in depth (Saint-Amand et al. 1987:114).

Vegetation

Vegetation communities surrounding the Owens Valley are characteristic of those present in the Great Basin and are associated with the different elevations present in the area. Riparian systems are associated with streams that flow from the Sierra Nevada, with the Owens River delta in the northern portion of the lake, and near springs. Desert Scrub characterizes the area between 4,000 and 6,500 feet. Pinyon Woodland is present between 6,500 and 8,500 feet, and Upper Sage Brush dominates at higher elevations between approximately 8,500 and 9,500 feet (Bettinger 1982c:7-14, and Basgall and

McGuire 1988). Currently, vegetation in the immediate vicinity of the Owens Lake is dominated by Desert Scrub near the shoreline and occasionally on spring mounds located within the lake bed.

The variety of resources present within the valley prehistorically, was attractive for the native inhabitants, specifically, those areas in the vicinity of the lake characterized by riparian habitats supported a large variety of fauna, such as mammals, birds (including waterfowl), and reptiles. Fresh water mussels (*Anadonta* sp.) and the brine fly larvae (*Ephydra* sp.) were also present in other areas around the lake. Several plant species were also available and were used as food resources or as materials for basketry making (Bettinger 1982c, and Basgall and McGuire 1988).

Prehistoric Archaeological Sites and Owens Lake Level Fluctuations

Prior to investigations in the 1990s associated with dust control, Owens Lake was considered to be a perennial lake that had persisted as such throughout the Holocene. It was assumed that any cultural evidence would be found above the historic shoreline, which is considered to be located at approximately 3,600 feet. However, in 1994, Stine suggested that if the lake had experienced changes in its water levels at times of human occupation in the area, the presence of cultural materials below the historic shoreline would be expected. These then would have been covered by water during historic times (Stine 1994).

Following Stine's hypothesis, it is clear that fluctuations in the lake level are significant because they influence the distribution of those environments associated with the lake boundaries. Therefore, the availability of plant and animal resources is also determined by these water levels. As a consequence, human populations would also adjust their foraging rounds based on the location of those resources. For example, waterfowl habitats are known to be associated with salt lakes, and it is known that prehistoric hunters took advantage of this resource. In addition, plant resources located on the north portion of the lake, near the delta would have also provided a food source (Stine 1994).

Stine developed a reconstruction of lake levels during the Holocene, and indicates that between 2000 and 1000 cal yr BP, water levels at Owens lake were very low, and the lake probably was completely dry by 600 cal yr BP (Bacon et al. 2005 also indicate very low levels of the lake around 1000 cal yr BP). After this dry period, the lake recovered, as did other closed-basin lakes such as Mono, Silver, and Pyramid Lakes.

Stine identified four different beach lines located below the historic level shoreline at elevations of approximately 3,504 feet, 3,592 feet, 3,586 feet, and 3,584 feet. The idea that these shorelines could have originated during the nineteenth and twentieth centuries is discarded because the quick diversion of the river would not have allowed the formation of marked shorelines (Stine 1994:8). Although the Owens Valley is a tectonically active zone, and several faults have caused the distortion of pre-existing beach lines (Bacon et al. 2005:7), the presence of old shorelines is still relevant from an archaeological standpoint.

Evidence of archaeological sites that have been covered with water during certain times is supported by the presence of sites located below the historic shore lines. Stine specifically refers to one site (CA-INY-3541) located at approximately 3,586 feet, which appears to have been occupied between 2,000 and 1,000 years ago. Mehringer and Sheppard (1978) have also reported the presence of archaeological sites below the historic shoreline at Pyramid Lake. At Owens Lake, several sites have also been recorded in association with old spring mounds (See Wells 2003). Using chronological data from the archaeological assemblage, combined with the information presented by Stine, Jones and

Stokes (2005c) hypothesized that during low lake levels, occupational intensity around the springs was higher.

5.1.2 Regional Ethnography and Prehistoric Sequence

The Owens Valley area was primarily inhabited by the Owens Valley Paiute during prehistoric times; by the time of Euro-American contact Western Shoshone populations were also present in the area. Currently, descendants of both groups still live in the valley, mostly within the reservations. Three reservations are located near the Owens Valley PM_{10} Planning Area Demonstration of Attainment 2008 SIP (proposed project) site, just north of Owens Lake, Lone Pine, Big Pine, and Fort Independence. One of the earliest references to the Owens Valley Paiute and the Shoshone is that by Kroeber (1925); however, later ethnographic works by Steward (1933, 1934, and 1938), and Driver (1937) have become the standard reference for these groups.

Owens Valley Paiute

The Owens Valley Paiute inhabited the area located between the head waters of the Owens River (about 25 miles north of Bishop) to the south portion of Owens Lake. They spoke dialects of Mono, which is one of the divisions of the Western Numic segment of the Numic branch of Uto Aztecan languages (Liljeblad and Fowler 1986:412, and Miller 1986:98). Lamb (1958a:14-16, as cited in Liljeblad and Fowler 1986) divided the Mono speech forms present on both sides of the Sierras into three dialectical groups: Northwestern Mono, Northeastern Mono, and Southern Mono. The most widespread dialect was the Southern Mono, with a sub-dialect that was still known by some speakers in Lone Pine, Big Pine, and Fort Independence during the 1980s. However, Liljeblad and Fowler indicate that isolated groups that lived in areas near Euro-American towns had lost any knowledge of their native language by 1985 (Liljeblad and Fowler 1986:413).

Population density of the Owens Valley Paiute is higher and settlement patterns are more sedentary than that of any other group in the Great Basin, with population estimates before contact times ranging between 1,000 and 2,000 people (Chalfant 1933, Liljeblad and Fowler 1986, and Steward 1933). The Owens Valley Paiute lived in villages distributed along water courses. The number of villages was higher in the northern Owens Valley than the southern portion due to the presence of major water sources. In the southern Owens Valley, semi-permanent settlements were limited to those areas near springs and small streams at the foot of the mountains (Liljeblad and Fowler 1986:414).

The Owens Valley Paiute traveled throughout the year on a seasonal basis following available food resources. A wide variety of seeds, plants, and roots were part of their diet, as their territory extended through different environmental zones, but the seeds from the pinyon (*Pinus monophylla*) were a primary source of food (Steward 1938:52). These pine nuts would ripen in the fall and families traveled during October and November to pine nut-rich areas in the Inyo and White Mountains for collection and processing. Families would camp near nut caches in years of abundant crops; however, during scarce years, the nuts were carried to the villages in the valley floor (Bettinger 1975:61-62). Acorns are a more reliable crop and were preferred over the pine nuts; however, these were not readily available in the area. These were mostly obtained through trade and occasionally collected from the oaks that grew on the eastern slopes of the Sierra Nevada (Liljeblad and Fowler 1986:416).

Archaeological investigations and ethnographic studies have indicated that the Owens Valley Paiute practiced irrigation of wild plants, specifically hydrophytic species. Thus, irrigation during spring and summer months increased water flow to the areas that were naturally flooded (Bettinger 1975:61). Although early works such as those by Chalftant (1933) and Steward (1938) have suggested that this

practice was acquired post contact, Bettinger (1975:61), Lawton et al. (1976), and others have indicated that this was implemented in prehistoric times. Irrigation occurred by diverting streams to plots where the tubers of the groundnut (*Brodiaea capitata*) and spikerush (*Heleocharis* sp.) occurred naturally.

The diet of the Owens Valley Paiute Shoshone was complemented by hunting and fishing. Deer and mountain sheep, as well as rabbits, were hunted individually or during group hunts in the Sierras and White and Inyo Mountains (Steward 1933:252-256). Rabbit hunting was predominant; these were taken with bow and arrow or through rabbit drives (Liljeblad and Fowler 1986:418). Liljeblad and Fowler (1986:418) indicate that fishing was not a widespread practice; the Owens River contained small fish only and the lake was nearly devoid of it due to the high alkaline conditions. However, chronicles from Captain J.W. Davidson indicate that at least during the 1800s, large quantities of small fish were caught using sieve-like baskets and then dried in the sun (Wilke and Lawton 1976:29). In addition, Steward (1933:250-251) indicates that two types of fish, the Owens sucker (*Catostomus fumeiventris*) and the Owens tui chub (*Gila bicolor snyderi*), were in some instances an important part of the Paiute's diet. Steward (1933:256) and Wilke and Lawton (1976:30) also mention the consumption of a small brine fly (*Ephydra hians*), which is common in the Mono and Owens Lakes. Both the larvae and pupa were prepared differently, and were only an important source of food in Mono and Owens Lakes.

The Owens Valley Paiute practiced exogamy within the different villages, and marriage between any relatives was forbidden. Children were associated with their mother's village but could not marry within their father's village. Each village was composed of extended families that were considered to be all relatives (Steward 1933:294).

Western Shoshone

The Western Shoshone occupied a large territory that included the area immediately south and east of Owens Lake, extending north and northeast through Nevada and Utah (Steward 1938: Figure 1), sharing the territory near Owens Lake with the Owens Valley Paiute (Liljeblad and Fowler 1986:413, Figure 1). They spoke different varieties of Central Numic, which is a component of the Numic branch of the Uto-Aztecan family. Central Numic is composed of three different languages: Panamint, Shoshone, and Comanche (Thomas et al. 1986:262).

Estimates of Western Shoshone population are scant, and the best documented information comes from early writers (mostly early settlers and government officials) during the 1930s. Steward (1938:47) presents a population density of one person per 16.6 square miles adjacent to the northeast portion of Owens Lake, but does not provide any figures for the area immediately south of the lake. Shoshone population density was lower than that of the Owens Valley Paiute, and their degree of mobility was higher. According to Steward (1937:628-629), the valleys where most of the Shoshone populations resided were not abundant in resources, thus limiting the ability for large groups to remain in one place for longer periods of time. In addition, a high reliance on pine nuts, whose yield varied from year to year, generated a less sedentary way of life among the Shoshone. Other plants consumed by the Shoshone include a type of sunflower, which was available in an area near Keeler (Irwin 1980:17), and acorns from the Sierras. From spring to fall, the Shoshone traveled in small groups collecting food, following the availability of resources. During the winter months, groups of families stayed in warmer places near food caches, mostly pine nuts, and accessible water (Steward 1972:114, 115). According to Irwin (1980:xi), the Shoshone also practiced a form of incipient agriculture similar to the Owens Valley Paiute, consisting of the irrigation of wild plants.

Hunting activities were also part of the Shoshonean way of life. Bighorn sheep hunts were mostly carried out during the summer (Thomas 1983). During winter months, hunting activities were focused on migrating species. Steward (1938:81-82) described subsistence activities for the Shoshone at the Koso Hot Spring Village, located about 20 miles south of Owens Lake. He indicates that rabbit hunts were a common practice, and communal hunting of pronghorn (*Antilocarpa americana*) took place in areas where these animals were available, such as the Indian Wells Valley (south of Little Lake), and in some areas just south of Owens Lake.

Shoshone families were politically independent and remained isolated throughout most of the year (Steward 1938:56). However, marriage took place between families that had contact with one another, such as during plant collection trips or communal hunting. Marriage was more a contract between families than between individuals. The preferred arrangement for marriage among the Shoshone consisted of several marriages between the children of two families (Steward 1972:118-119).

5.1.2.1 Prehistoric Context

Archaeological sequences for the Great Basin are grouped into Early, Middle, and Late Holocene time frames, with period definitions varying by region. These chronological divisions correlate with climatic and environmental changes, and are continuously being refined as new data is collected and dating techniques are improved.

The main prehistoric sequence used in the Great Basin was developed during the 1970s by Bettinger and Taylor (1974) based on a series of radiocarbon dates obtained from Eastern California. Their sequence has been refined as more data is gathered from the region. In particular; investigations by Basgall and McGuire (1988) at the Lubkin Creek site (CA-INY-30) (Figure 5.1.2.1-1, *Locations of Known Prehistoric Sites Referenced in Text*) in the Owens Valley, have greatly contributed to the understanding of the archaeology of the region.

The Owens Valley archaeological sequence is applied in the area where the project is located, but an equivalent chronology with different time period names is used just south in the Mojave Desert area. Both chronologies are presented in Table 5.1.2.1-1, *Regional Chronology*. According to Warren, "Each period ends when a new diagnostic projectile point type first occurs, not when the characteristic point type no longer occurs" (2002:137).

TABLE 5.1.2.1-1
REGIONAL CHRONOLOGY

Epoch	Owens Valley Region	Mojave Desert Region	Dates
Early Holocene	Early	Lake Mojave	Pre ~ 7000 BP
Middle Holocene	Little Lake	Pinto	~7000 BP to ~3500 BP/3150 BP
Late Holocene	Newberry	Gypsum	~3150 BP to ~1350BP
	Haiwee	Rose Spring	~1350 BP to ~650 BP
	Marana	Late Prehistoric	~650 BP to Historic contact

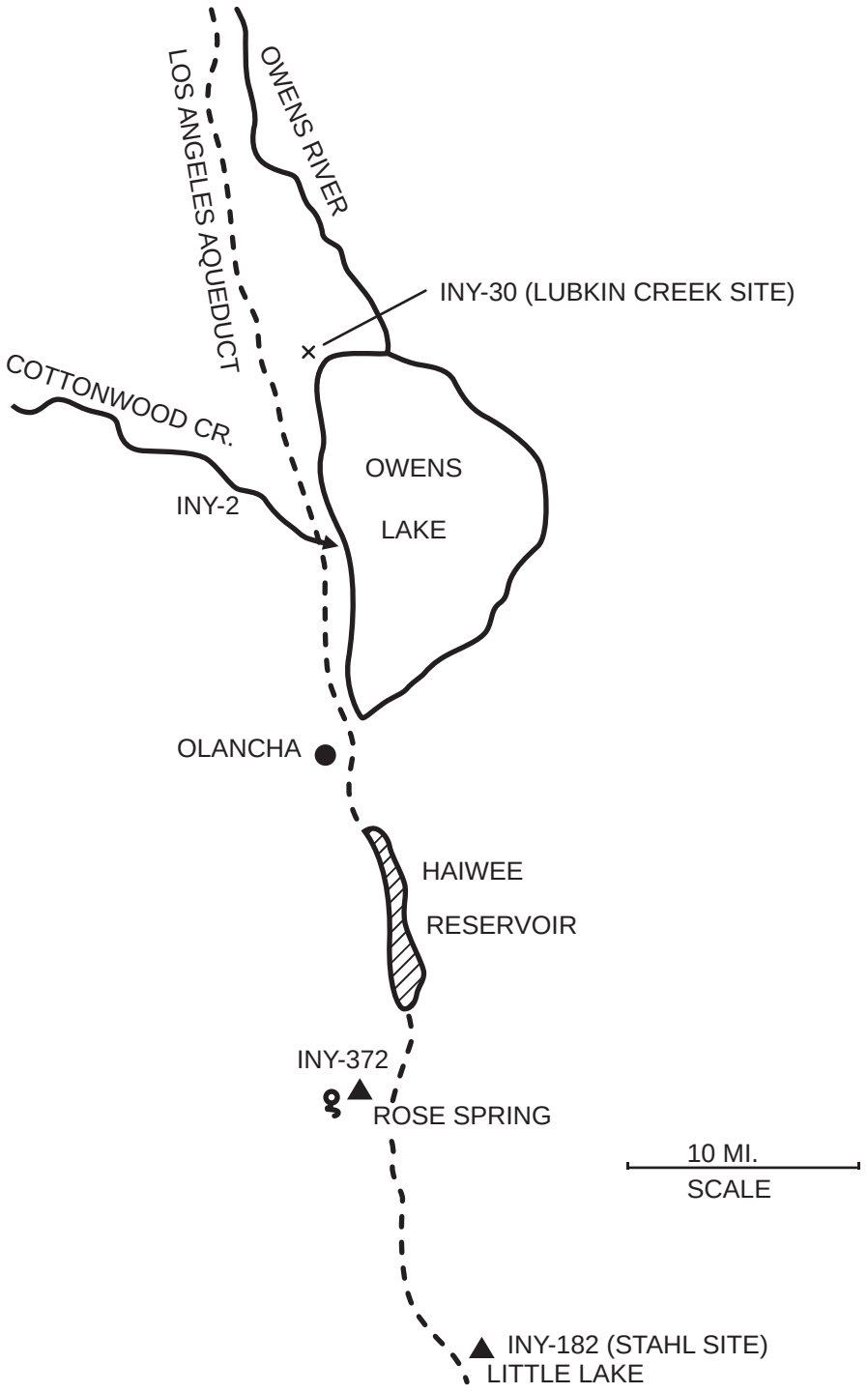


FIGURE 5.1.2.1-1
Locations of Known Prehistoric Sites Referenced in Text

Early Holocene

Early Period (Pre-7000 BP)

The number of archaeological sites in the western United States increases at the beginning of the Holocene period, about 11,000 years BP, and sites from the Early Holocene are found along the shorelines of Pleistocene dry lakes. The generally accepted date range for the Early Holocene is set as before 6000 BP (Bettinger and Taylor 1974), with more refined chronologies by Basgall and McGuire (1988) between 6600 and 10,000 BP, and Gilreath et al. (1987) between 9500 and 7000 BP. The Early Holocene is characterized by the presence of large-stemmed and concave points known as Lake Mojave and Silver Lake. These point type designations correspond to the dry lakes where they were first found (Campbell et al. 1937). The settlement patterns during the Early Holocene indicate that population groups were highly mobile.

Middle Holocene

Little Lake Period (7000 to 3500/3150 BP)

The starting point of the Middle Holocene is marked by a dryer and hotter climate throughout the deserts of the western United States. Under these conditions, the subsistence focus most likely shifted away from lakeshores toward upland resources as these lakes dried up. The Middle Holocene is characterized by the appearance of split-stemmed projectile points, such as the Pinto series and those similar to the Gatecliff series that has been defined for the central Great Basin (Thomas 1981).

Pinto series projectile points are smaller than Lake Mojave points, and their name derives from the Pinto Basin, where they were first defined (Campbell and Campbell 1935). Currently, there is controversy regarding the time frame associated with this period, because of lack of chronometric data and disagreement on the definition and dating of Pinto series points (see Warren 2002). Evidence of Little Lake and Lake Mojave occupation at CA-INY-30 (Figure 5.1.2.1-1), just northwest from Owens Lake, is sparse, and seems to indicate that both periods overlap (Basgall and McGuire 1988:357). The data consists of a few diagnostic artifacts and obsidian hydration data. The archaeological assemblage at the site indicates an emphasis on exploitation of animal resources (Basgall and McGuire 1988:342). Milling equipment is scant and is limited to pieces that appear to have had little use (Jones and Stokes 2002a:8-9). The presence of a variety of lithic materials obtained from distant sources and used for tool manufacturing, reflects extensive travels of possibly hundreds of kilometers (Basgall 1989, and Basgall and McGuire 1988).

Late Holocene

Newberry Period (3150 to 1350 BP)

During this period, climatic variations led to more favorable cooler and moister conditions. Archaeological data indicates that there is an increase in population and social complexity, and more evidence of trade networks is available. Although hunting of a variety of fauna continues to be an important part of the economy, there is an increase in the use of seeds as a food resource. Processing of seeds is evidenced by the presence of milling equipment in archaeological sites that date to this period. Larger settlements than those characteristic of the previous period are present. This period is characterized by Elko and Humboldt series projectile points, which appear to replace the Pinto points of the previous period.

Occupancy at CA-INY-30 (Figure 5.1.2.1-1) during the Newberry period is evidenced by the presence of Elko and Humboldt Basal-notched projectile points and radiocarbon dates from a structure floor that range from 1860 ± 70 to 1220 ± 70 years BP. Cultural material representing activity throughout the Newberry Period at CA-INY-30 suggest that the site was a "seasonally occupied residential base" (Basgall and McGuire 1988:350).

Haiwee Period (1350 to 650 BP)

Climatic conditions were variable during the Haiwee period, with temperate conditions followed by a series of droughts. This period is characterized by the introduction of smaller points, replacing the Elko and other large dart-size points from the previous period. These smaller points are known as Rose Spring (Lanning 1963) and Eastgate, and are often grouped together under the name Rosegate (Thomas 1981). The presence of these smaller projectile points coincides with the introduction of a remarkable technological advance, the bow and arrow (Yohe 1992, 1998). The variable climatic conditions may also be associated with the Numic expansion towards the later portion of the Haiwee period. It is hypothesized that Numic speakers spread from southeastern California throughout the Great Basin (Bettinger and Baumhoff 1982, Madsen and Rhode 1994, and Sutton 1996:239). Data from the Rose Spring Site (CA-INY-372) (Figure 5.1.2.1-1) in the Rose Valley, just south of Owens Lake, indicate that bow and arrow technology may have appeared around 1500 BP (Yohe 1992:53). Archaeological contexts also show the use of bedrock milling features, along with portable milling equipment.

Data from CA-INY-30 suggest that the site was used sporadically in a short-term basis (Basgall and McGuire 1988:350).

Marana Period (650 to Historic Contact, Circa 1770 AD)

This period is characterized by the first appearance of Desert side-notched and Cottonwood series projectile points. In addition, pottery appears for the first time represented by the Owens Valley brownware (Bettinger and Baumhoff 1982). During Marana times, population mobility decreased and the inhabitants of the Owens Valley adopted a more sedentary way of life, than that known for the rest Great Basin. This is evidenced by what has been interpreted as remains of villages in the archaeological record.

Data from CA-INY-30 (Figure 5.1.2.1-1) indicate that the most extensive period of occupation at this site occurred during the Marana period. Basgall and McGuire (1988:352) found three discrete midden deposits, structural (habitation floors) remains, and a large amount of Desert series projectile points and Owens Valley brownware pottery. In addition, over 150 diagnostic late prehistoric beads were recovered. The authors indicate that archaeological evidence at the site does not fit the definition of a village. Instead, they argue that CA-INY-30 was used intermittently for over 700 years, as a temporary habitation site or during short-term periods for food procurement and processing (Basgall and McGuire 1988:355-356).

5.1.2.2 Previously Recorded Archaeological Sites

Previous Research Conducted in the Owens Valley

Archaeological investigations in the Owens Valley began with works aimed at studying the Owens Valley Paiute. One of the earliest works is that by Mallery (1886, 1972), who made a recording of petroglyphs in the Owens Valley in the late 1800s. During the 1930s, Steward conducted ethnographic studies among this group and reported an archaeological site northwest of Keeler

(Steward 1933, Appendix 1, Map 1). Throughout the 1940s and 1950s, several studies were carried out in the region. Elizabeth and William H. Campbell worked along the shore lines of dry lakes in Southern California, and recorded two sites near the Owens Lake shoreline (Campbell 1949). Harry and Francis Riddell recorded several sites on the periphery of the lake, specifically on the east and west shoreline, and near the delta area (F. Riddell 1958, H. Riddell 1951, and Riddell and Riddell 1956).

Some of the work conducted during the 1950s and 1960s greatly contributed to the development of regional chronologies, and thus to the understanding of the area's prehistory. H. Riddell (1951) performed excavations at CA-INY-2 (the Cottonwood Creek Site) (Figure 5.1.2.1-1), which is located just west of Owens Lake on Cottonwood Creek. CA-INY-2 is the type site for the Cottonwood series projectile points and the Owens Valley Brownware (Riddell 1951). Cultural materials recovered from this site include protohistoric and historic artifacts, suggesting a Paiute village active during historic times. Another site, CA-INY-372 (the Rose Spring Site) (Figure 5.1.2.1-1), located about 10 miles south of Olancha on the south end of the lake, was excavated by the Riddells, and their work was compiled and published by Lanning (1963). CA-INY-372 is the site type for the Rose Spring series projectile points. Among the contributions of Lanning's works is his attempt to provide evidence of material culture change through time. More recent investigations at CA-INY-372 by Yohe (1992, 1998, and 2000) have contributed to a refinement of the regional chronology and a better understanding of the introduction of the bow and arrow technology in eastern California. Excavations at CA-INY-182 (the Stahl Site) (Figure 5.1.2.1-1) between 1948 and 1951 by Mark Harrington were published in 1957 (Harrington 1957). CA-INY-182 is located near Little Lake, about 13 miles south of CA-INY-372. Investigations at this site have greatly contributed to the interpretations of Mojave Desert archaeology.

During the 1970s, Bettinger's work in the Owens Valley began and has resulted in various publications (among others, Bettinger 1975, 1977, 1982a, 1982b, and 1983). Combined with information from different studies, Bettinger has addressed important issues about regional adaptations.

Investigations in the Owens Valley area since the 1970s until present times have been the result of contract work generated by various projects that are required to comply with current state and federal laws and regulations. The cultural resources technical reports generated throughout the years include archaeological surveys, as well as testing and data recovery of prehistoric and historic archaeological resources, located adjacent to or within the Owens Lake bed. The outcomes of these reports have been addressed in a large number of environmental documents. These have been summarized in the 2003 and 2008 Initial Studies prepared in support of the Owens Lake PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (SIP) (District 2003a, 2007). During recent years most of the work has been done in support of the implementation of dust control measures in the lake, as stated by the PM_{10} Planning Area Demonstration of Attainment SIP (District 2003b, Forthcoming). Prior to the current survey, approximately 11.5 percent of the Owens Lake bed had been previously surveyed (Figure 5.1.2.2-1, *Previously Surveyed Areas*). A summary of these works is presented below.

Northern Portion of the Lake

Jones and Stokes (1997) conducted a survey of 1,900 acres throughout the northeastern and eastern portions of the lake. The survey areas consisted of randomly selected quadrants distributed on the different morphological zones present in the lake, the upper and lower playa, and the spring mounds. One prehistoric site and 19 isolates were recorded during the survey. The main objective of this study was to conduct an inventory and evaluation of the historic resources.

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FIGURE 5.1.2.2-1
Previously Surveyed Areas

Gallegos and Associates recorded 14 prehistoric sites on the Owens Lake playa and a water conveyance right-of-way in 2000 (Gallegos and Associates 2000a, 2000b). These sites were tested, and subsequently, the sparse lithic scatters were collected. Construction activities followed this effort and a monitoring plan was implemented (Jones and Stokes 2002e). During monitoring, Jones and Stokes (2002g) discovered 18 sites in the northeast margin of the Owens Lake playa (USGS Dolomite and Owens Lake Topographic Quadrangles). The sites were recorded, tested, and evaluated for significance. The evaluation revealed that the sites on an individual basis were not significant under the State California Environmental Quality Act (CEQA), but that the information recovered during the evaluation was important for addressing regional research questions.

Jones and Stokes (1997) conducted an inventory and evaluation of the historic resources present within and around the lake through research and field work on the east side of the lake. Two historic resources were evaluated for significance: the Natural Soda Product Company (NSPC, P14-5925) and a pipeline associated with the Inyo Development Company. The Natural Soda Product Company is located 2 miles south of Keeler, and was recommended as eligible for the National Register of Historic Places (NRHP) as a historic district. The Inyo Development Company, located between the towns of Swansea and Keeler, was determined not to be eligible for the NRHP or the California Register of Historic Resources (CRHR).

A total of 3.67 acres were surveyed for a monument on State Route 136, on the northeast portion of the lake [(USGS Dolomite Topographic Quadrangle, by Jones and Stokes (2002b)]. No cultural resources were found during this effort.

A cultural resources survey and evaluation was conducted for the Water Conveyance Pipeline Corridor, which extends for 4 miles from the Los Angeles Aqueduct to the Owens River (Gallegos and Associates 2000b). Nine resources were identified during the survey, and five of these were evaluated for significance through testing and surface collection. None of the sites evaluated were found eligible for the NRHP or the CRHR, and only one of them (CA-INY-5810) is located within the lake bed. The remaining sites include the Los Angeles Aqueduct (CA-INY-4591), which has been recommended for nomination to the NRHP. The Southern Pacific Mohave–Owenyo Line, has been previously evaluated and was found ineligible for nomination to the NRHP. The Inyo County Wagon Road (CA-INY-4590H), which has not been evaluated for nomination. In addition, one prehistoric site, CA-INY-30, has been previously evaluated and identified as eligible for the NRHP. During construction activities related to the pipeline corridor, one of the pipes burst and the water eroded the southern edge of the CA-INY-30. As a result, a data recovery program was implemented (Jones and Stokes 2002f).

Jones and Stokes (2005b) recorded the Swansea Pier, located just west of the town of Swansea, and conducted and evaluation of the resource. The study concluded that although the pier was associated with important persons associated with the history of mining and development in the Owens Valley, the pier is not eligible for listing in the CRHR or the NRHP. The Swansea Pier lacks integrity; there are no structure remains and no associated artifacts. The pier was associated with the mining operations at Cerro Gordo; however, due lack of integrity and distance from the smelter remnants, it cannot be considered as a contributor to the Cerro Gordo Historical Landmark.

After the recording of two sites, CA-INY-6659 and 6660, located west of Swansea on BLM lands, (Trans-Sierran Archaeological Research 2005), the sites were evaluated in conjunction with Phase V of the Owens Lake dust mitigation program (Jones and Stokes 2006b). The sites are located on the northeast portion of the lake, approximately 1 mile southwest from the town of Swansea. Both sites were determined to be secondary deposits and found to be ineligible for listing in the NRHP. The

results of the study indicate that no further investigation was required, unless intact subsurface deposits were encountered during construction activities.

In 2006, two buried cultural deposits (P5-Dolomite-4 and P-5 Dolomite 5) were encountered during monitoring activities for the Phase V construction program (Jones and Stokes 2006a). These deposits are located on the northeast portion of the lake about 0.5 mile west of the town of Swansea. Both sites were determined to be secondary deposits and found to be ineligible for listing in the NRHP. The results of the study indicate that no further investigation was required, unless intact subsurface deposits were encountered during construction activities.

Southern Portion of Lake

An evaluation of a wooden historic pipeline at Cartago was conducted by Jones and Stokes (2002c). The pipeline is an elevated structure that extended from the town of Keeler into the lake bed and was associated with the Inyo Chemical Company. As a result of the evaluation, it was determined that the remains of the plant and the company town represented only a small portion of the original structures and landscape, and that they lacked enough integrity to convey significance. Thus, neither the structural remains, nor the pipe were found to be eligible for the CRHR as a historic district. However, as part of the evaluation it was determined that remnants of the town still had potential to provide important archaeological information.

Wells (2000) conducted a survey for two new air monitoring sites on the southeast side of the lake. One isolate was identified during the survey.

In 2002, Jones and Stokes (2002d) conducted a survey of 80 acres in the south portion of the lake (USGS 7.5-minute series Vermillion topographic quadrangle). As a result, 15 isolates and a segment of the Cartago pipeline were recorded.

Eastern Portion of the Lake

Prior to the implementation of the Phase IV of the Owens Lake dust control mitigation program, Jones and Stokes (2004b) conducted a survey of 1,494 acres distributed along the eastern margin of the lake. As a result of the survey, 6 historic archaeological sites and 15 isolates were recorded. These resources were found not to be significant pursuant to CEQA. The area considered for the Phase IV was expanded, and an additional survey of 223 acres (USGS Lone Pine and Vermillion Topographic Quadrangles) was conducted by Jones and Stokes (2004a). No cultural resources were found during this survey.

A total of 200 acres were surveyed by Jones and Stokes in 2005 in support of Phase V construction activities at Owens Lake (Jones and Stokes 2005d). Cultural resources found as a result of the survey are limited to those features associated with the Natural Soda Products Company (NSP). Due to the construction of two buildings and support facilities in the area, further research was recommended to reduce the impacts to the NSP to a less-than-significant level under CEQA.

Materials for construction and operation of the Owens Lake Dust Control Mitigation Program are obtained from a surface shale mine located west of Highway 136. In 2005, the City of Los Angeles Department of Water and Power estimated that additional material would be needed and that a new mining area was required. Approximately 40 acres were surveyed by Jones and Stokes (2005a). Their results indicate that one cultural resource was located within the project area. The resource consists of the remnants of a road that possibly lead to three mine shafts located 4 miles east of the Owens Lake

shore. The study concluded that the road was recommended not eligible for listing in the NRHP or the CRHR, and therefore no mitigation was necessary.

Western Portion of the Lake

Sapphos Environmental, Inc. (2004) conducted a survey of 25.9 acres for two air quality monitoring stations located on the western margin of the lake. As a result of the survey, one prehistoric archaeological site and four isolates were recorded on the Bartlett point station. In addition, one previously recorded archaeological site was updated. Four prehistoric sites and four isolates were recorded during the survey for the Ash point station. Phase II investigations and a monitoring program were recommended prior to the implementation of the air quality monitoring stations.

Surveys including Multiple Portions of the Lake

In support of the 2003 SIP, Ancient Enterprises conducted a survey of 3,762 acres on the north areas of the lake, along the eastern shore and on the southernmost portion of the lake (Wells 2003). As a result of the survey, 23 prehistoric archeological sites, 2 historic archaeological sites, a segment of the Natural Soda Products Company (NSP, Site P-14-5925) proposed historic district, and 33 isolates were recorded. An additional 600 acres were also surveyed and subsequently removed from the project. Eight prehistoric sites, 1 historic resource, and 13 isolates were identified within the 660 acres. Phase II investigations were recommended for all of the prehistoric sites and additional archival research was recommended for the historic ones. Testing and evaluation of the 23 sites was conducted by Jones and Stokes (2005c). Three archaeological sites, CA-INY-6361, 6362, and 6599, which are located on the northeastern portion of the lake (USGS Dolomite Topographic Quadrangle), were found eligible for listing in the NRHP, and therefore eligible for the CRHR pursuant to CEQA. The remaining 20 sites and features associated with the NSP were found to be ineligible for listing in the CRHR.

Previously Recorded Archaeological Sites

Hundreds of archaeological sites have been recorded in the vicinity of Owens Lake, and over 200 sites have been identified within 1 mile of the historic shoreline. A comprehensive list of these sites is presented by Wells (2003:13-16).

Over 1,200 acres of the lake bed have been surveyed for cultural resources in support of implementation of dust control mitigation measures. As a result, 84 sites (including prehistoric and historic) and hundreds of isolates have been recorded below the 3,600 feet historic shoreline (Table 5.1.2.2-1, *Previously Recorded Archaeological Sites Located below the Historic Shoreline*, and Figure 5.1.2.2-2, *Previously Recorded Archaeological Sites and Isolates*).

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FIGURE 5.1.2.2-2
Previously Recorded Archaeological Sites and Isolates

TABLE 5.1.2.2-1
PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES LOCATED BELOW THE HISTORIC SHORELINE

Site Number	Site Number	Site Number
CA-INY-54	CA-INY-6071	CA-INY-6379
CA-INY-55	CA-INY-6072	CA-INY-6380
CA-INY-78	CA-INY-6073	CA-INY-6381
CA-INY-273	CA-INY-6074	CA-INY-6383
CA-INY-337	CA-INY-6075	CA-INY-6384
CA-INY-452	CA-INY-6076	CA-INY-6385
CA-INY-1518	CA-INY-6077	CA-INY-6386
CA-INY-5398	CA-INY-6078	CA-INY-6387
CA-INY-5790	CA-INY-6079	CA-INY-6388
CA-INY-5791	CA-INY-6080	CA-INY-6389
CA-INY-5792H	CA-INY-6248	CA-INY-6390
CA-INY-5795	CA-INY-6252	CA-INY-6391
CA-INY-5796	CA-INY-6264	CA-INY-6393
CA-INY-5798	CA-INY-6360	CA-INY-6513
CA-INY-5799	CA-INY-6361	CA-INY-6513
CA-INY-5799	CA-INY-6362	CA-INY-6520
CA-INY-5800	CA-INY-6363	CA-INY-6521
CA-INY-5801	CA-INY-6364	CA-INY-6522
CA-INY-5810	CA-INY-6365	CA-INY-6523
CA-INY-5929	CA-INY-6367	CA-INY-6524
CA-INY-5931	CA-INY-369	CA-INY-6599
CA-INY-6063H	CA-INY-370	CA-INY-6659
CA-INY-6064	CA-INY-6371	CA-INY-6660
CA-INY-6065	CA-INY-6372	CA-INY-6722
CA-INY-6066	CA-INY-6373	CA-INY-6723
CA-INY-6067	CA-INY-6374	CA-INY-6889
CA-INY-6068	CA-INY-6375H	CA-INY-7640H
CA-INY-6069	CA-INY-6377	CA-INY-7641H

5.1.2.3 Resource Characterization

A total of 5 prehistoric archaeological sites and 57 prehistoric isolates have been recorded to date (Table 5.1.2.3-1, *List of Prehistoric Archaeological Resources Recorded during the Phase I Survey*; Figure 5.1.2.3-1, *Location of Prehistoric Archaeological Sites and Isolates*; Appendix A, *Archaeological Site Records*; and Appendix E, *Catalog of Collected Artifacts*).

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FIGURE 5.1.2.3-1
Location of Prehistoric Archaeological Sites and Isolates

TABLE 5.1.2.3-1
LIST OF PREHISTORIC ARCHAEOLOGICAL RESOURCES RECORDED DURING THE PHASE I SURVEY

Field Number	Resource Description
Sites	
OL SITE 1	Lithic scatter
OL SITE 2	Lithic scatter
OL SITE 5	Lithic scatter with ground stone
OL SITE 6	Lithic scatter with ground stone
OL SITE 7	Lithic scatter with ground stone
Isolates	
OL ISO 1	Chert biface
OL ISO 2	Chert shatter
OL ISO 3	Lake Mojave obsidian projectile point
OL ISO 5	Two pieces of chert shatter
OL ISO 9	Oval pumice stone, possibly worked
OL ISO 14	Complete ground stone (mano)
OL ISO 15	Multidirectional basalt core/tool
OL ISO 16	Obsidian flake
OL ISO 18	Obsidian projectile point, possibly Elko-eared series
OL ISO 19	Obsidian projectile point, possibly Pinto series
OL ISO 20	Elko-eared obsidian projectile point
OL ISO 21	Incised stone
OL ISO 22	Obsidian flake with possible retouch
OL ISO 23	Obsidian flake
OL ISO 24	Obsidian biface fragment
OL ISO 25	Obsidian flake
OL ISO 26	Multidirectional rhyolite core
OL ISO 27	Chert biface
OL ISO 30	Obsidian flake
OL ISO 32	Obsidian biface
OL ISO 33	Obsidian flake
OL ISO 34	Obsidian biface fragment
OL ISO 35	Rose Spring Corner-notched obsidian projectile point
OL ISO 36	Possible ground stone
OL ISO 37	Obsidian flake
OL ISO 38	Obsidian flake
OL ISO 43	Obsidian flake
OL ISO 46	Obsidian flake
OL ISO 48	Obsidian biface fragment
OL ISO 50	Obsidian/chert projectile point, possibly Elko-eared series
OL ISO 51	Obsidian flake
OL ISO 52	Basalt flake
OL ISO 55	Lake Mohave obsidian projectile point
OL ISO 57	Cottonwood Leaf-shape obsidian projectile point
OL ISO 58	Obsidian flake
OL ISO 59	Obsidian flake
OL ISO 62	Obsidian flake
OL ISO 64	Basalt flake
OL ISO 65	Chert flake
OL ISO 71	Obsidian biface tip

TABLE 5.1.2.3-1
LIST OF PREHISTORIC ARCHAEOLOGICAL RESOURCES RECORDED DURING THE PHASE I SURVEY, Continued

Field Number	Resource Description
OL ISO 72	Obsidian biface tip
OL ISO 74	Obsidian biface base
OL ISO 75	Obsidian biface fragment
OL ISO 76	Obsidian biface midsection
OL ISO 79	Cottonwood Leaf-shape obsidian projectile point
OL ISO 81	Obsidian flake
OL ISO 82	Three obsidian flakes
OL ISO 83	Obsidian projectile point, possibly Elko series
OL ISO 84	Multidirectional obsidian core
OL ISO 85	Retouched chert flake
OL ISO 86	Chert biface midsection
OL ISO 87	Obsidian biface, possibly a Leaf-shaped projectile point
OL ISO 88	Multidirectional chert core
OL ISO 89	Large, narrow chert biface, possible knife
OL ISO 90	Obsidian biface fragment
OL ISO 100	Obsidian biface fragment
OL ISO 102	Obsidian projectile point, Pinto series

During the field survey, 26 diagnostic projectile points were observed and collected. These diagnostic artifacts provide invaluable information about the prehistory of the Owens Valley. Points were classified according to their morphological characteristics following Thomas (1981), Warren (2002), and Garfinkel and Yohe (2004). Some of the artifacts exhibit certain characteristics that are common among two point types and could only be tentatively classified. Chronological information through obsidian hydration analysis is necessary for more accurate temporal placements.

The projectile points found during the present survey represent all the time periods identified for the region. From youngest to oldest, the collection includes, Cottonwood Triangular series, Cottonwood Leaf-shape series, Rose Spring series, Elko series, Humboldt series, Pinto Series, Lake Mojave, and Silver Lake series. Four projectile points were classified as Borax series based only on their morphological characteristics. Non-temporally diagnostic Leaf-shaped projectile points were also noted. A general description of the point types found at the lake is presented below.

The Cottonwood series are small, unnotched arrow points with blade margins varying from excurvate to slightly incurvate. Named for the Cottonwood site (CA-INY-2) (Figure 5.1.2.1-1) in Inyo County, California, these points were originally noted by Riddell (1951), but were formally defined by Lanning (1963). Cottonwood series are thought to date from 1100 BP through the Historic period (Heizer and Hester 1978: 165), although Bettinger (1989:65) suggests a beginning date for Cottonwood points from Owens Valley that is slightly earlier, circa 1000 BP. Lanning identified two variants, Cottonwood Triangular points and Cottonwood Leaf-shape. Cottonwood Triangular points are mostly straight-sided with straight to convex to concave bases. Cottonwood Triangular points have been identified as the preform version of the Desert Side-notched types (Justice 2002:367). Cottonwood Leaf-shape variants are convex-sided with round bases (Lanning 1963:253).

The Rose Spring point type, named for the Rose Spring site (CA-INY-372) (Figure 5.1.2.1-1) in Owens Valley, California (Lanning 1963), was originally described by Heizer and Baumhoff (1961). This is a narrow triangular arrow point generally possessing an expanding stem, although examples are known with slightly contracting or straight stems (Justice 2002:320). Notches usually project from the corner of the base to the point's midline, while bases range from straight to moderately convex (Rosenthal and Eerkens 2003). Rose Spring points appear between 1500 and 1300 BP and persist until approximately 700 BP (Justice 2002). However, recent data from CA-INY-372 indicate that the use of Rose Spring series points continued in this region into the Marana period (Yohe 1992 and 1998, and see Wells and Tabares 2005:64). Suggestions of the Rose Spring points not only as indicative of technological changes but as potential ethnic markers have also been addressed (Adovasio and Andrews 1983:289). The Rose Spring designation however, is not universally accepted in the Great Basin. Thomas (1981) and Justice (2002:30) have used the term Rosegate to include the Rose Spring and the Eastgate variants. The name Rose Spring is more appropriate for the current investigation, considering that the type site for Rose Spring variants is about 15 miles south of Owens Lake.

Elko points are large, prominently-shouldered triangular points. The most commonly noted variants include the Elko Corner-notched, showing notches projecting from the corner of the base to the point's midline and a convex to slightly concave base, and the Elko Eared, showing a moderately to deeply concave base forming basal ears. In both cases, the bases of the points are generally narrower than their shoulders (Justice 2002, and Rosenthal and Eerkens 2003). These types were initially differentiated by Heizer and Baumhoff (1961). Elko points generally appear between 3500 and 3300 BP and persist until approximately 1400 BP (Justice 2002:304), and thus are most often associated with the Newberry period, although Gilreath and Hildebrandt (1997) have noted examples from the Coso Volcanic Field that date to the Middle Holocene.

The Humboldt type consists of a wide range of triangular lanceolate point forms, and was first defined by Heizer and Clewlow in the Humboldt Sink area of central Nevada (Heizer and Clewlow 1968). The Concave-base variant shows excurvate blade edges that are wider than the base, while the Basal-notched type is generally larger and trianguloid with large, straight to slightly incurving basal ears (Justice 2002:148). Overall, Humboldt points appear to span a range of dates from circa 8000 BP to later than 1400 BP, which has led some researchers (e.g., Justice 2002 and Thomas 1981) to question their utility as time markers. Humboldt points have been found in large numbers in sites associated with hunting locations, which are seldom stratified (Thomas 1981:37). The Basal-notched variety may show a more limited temporal distribution than the Concave-base type.

Leaf-shaped projectile points were also found during the current survey and have also been documented in previous investigations in the area. However, their temporal variation has not been adequately addressed, and therefore these are not considered good temporary markers. Basgall (2007:102) indicates that large, thick variations frequently appear associated with stemmed and Pinto variants, but points out that slimmer variants may occur at different time periods. A leaf-shaped point known as the Steamboat is morphologically similar to those found at Owens Lake (Walsh 2003:44). These points have been associated with the Newberry period, but occur north of the Owens Valley (Justice 2002:320). Leaf-shaped points were recorded from all levels at CA-INY-372 (Figure 5.1.2.1-1), the Rose Spring site (Lanning 1963).

The Pinto type generally includes thick, narrow-shouldered points with a concave or split stem that often terminates in basal ears; blade edges are straight to slightly excurvate and may be serrated. The Pinto type, which is often called Little Lake in the Owens Valley (after Bettinger and Taylor 1974), was originally described by Amsden (1935) in the Pinto Basin of Southern California. As with the Humboldt point, the Pinto type is associated with a wide range of time; Warren (2002) argues that

Pinto points occur over a 3,000-year span in the Mojave Desert, from approximately 4000 to 7000 BP, thereby overlapping the periods associated with both Lake Mojave stemmed and Elko points (see also Gilreath and Hildebrandt 1997).

Great Basin Stemmed series points include Lake Mojave and Silver Lake variants, both originally described by Amsden (1937). The Lake Mojave type generally exhibits an elongated diamond shape, often with weak shoulders and with a tapering stem that is longer than the blade. The Silver Lake point, by contrast, generally shows a more well-defined shoulder, a shorter stem and a convex base (Warren 2002). Many examples of both types show evidence of extensive resharpening, which may further decrease the size of the blade relative to the stem. Justice (2002:91) suggests ages for Great Basin Stemmed points ranging from the Paleoindian period, at approximately11,000 BP to the Early Archaic circa 8000 BP.

Borax Lake Widestem points were defined by Harrington (1948) based on a series of points found in Borax Lake, Lake County, California. These points have lateral margins with a square to rounded base, and a short blade with straight edges. Artifacts have been worked mostly by percussion and some specimens exhibit a fluted-like scar on the base (Harrington 1948:81-83, and Justice 2002:101). Borax Widestem points have been reported in Northern California, the Sierra Nevada, and the Mojave Desert, but are not a widely accepted type and more research is required. Dates attributed to the Borax Lake series range between 8000 to 5000 BP (Justice 2002:101, 108).

Prehistoric Sites and Site Summary

A total of five prehistoric archaeological sites have been located and recorded during the Phase I survey to date (Figure 5.1.2.3-1). The sites consist of the typical lithic scatters consistent with those previously recorded at the lake. Sites located on the western portion of the lake are dominated by obsidian, while the only site located on the eastern side of the lake is mostly composed of chert. The distribution of the prehistoric sites recorded during the current effort appears to form clusters in some areas of the lake. However, this may be a result of the areas that were selected for the survey, and not indicative of prehistoric settlement patterns. OL Site 1 is located at the southernmost portion of the lake, while OL Sites 5, 6, and 7 are located on the northwest portion of the lake. Only one site (OL Site 2) was recorded in the easternmost portion of the lake, about 6 miles south of Keeler.

OL Site 1

OL Site 1 is located at the southernmost portion of the lake in an area characterized by materials carried by seasonal small washes that run through the area (Figure 5.1.2.3-1; Appendix A; and Appendix B, Map 10). These areas consists of small angular to rounded pebbles varying in size from a few millimeters to up to 10 centimeters in length. In some of the washes, the pebbles, as well as the cultural material, are embedded in a matrix of silt. However, in some of the washes, the silt between the pebbles is nearly absent. Areas bounding the washes consist of a hard salt crust or a soft layer of silt and salt. Cultural materials are distributed along the washes and may have been deposited during rainy periods. Artifact concentrations were mapped and overlaid on aerial photographs. As expected, the distribution of the cultural materials (concentrations) coincides with the morphology of the washes depicted in the photographs. In spite of the fact that the hydrology of the lake is very active in this area, aerial photographs from 1995 show the same features as those observed in present times [Figure 5.1.2.3-2, *OL Site 1 (Satellite Image 2006)*, and Figure 5.1.2.3-3, *OL Site 1 (Satellite Image 1995)*], suggesting that the washes are restricted to specific areas and that little variation is present.

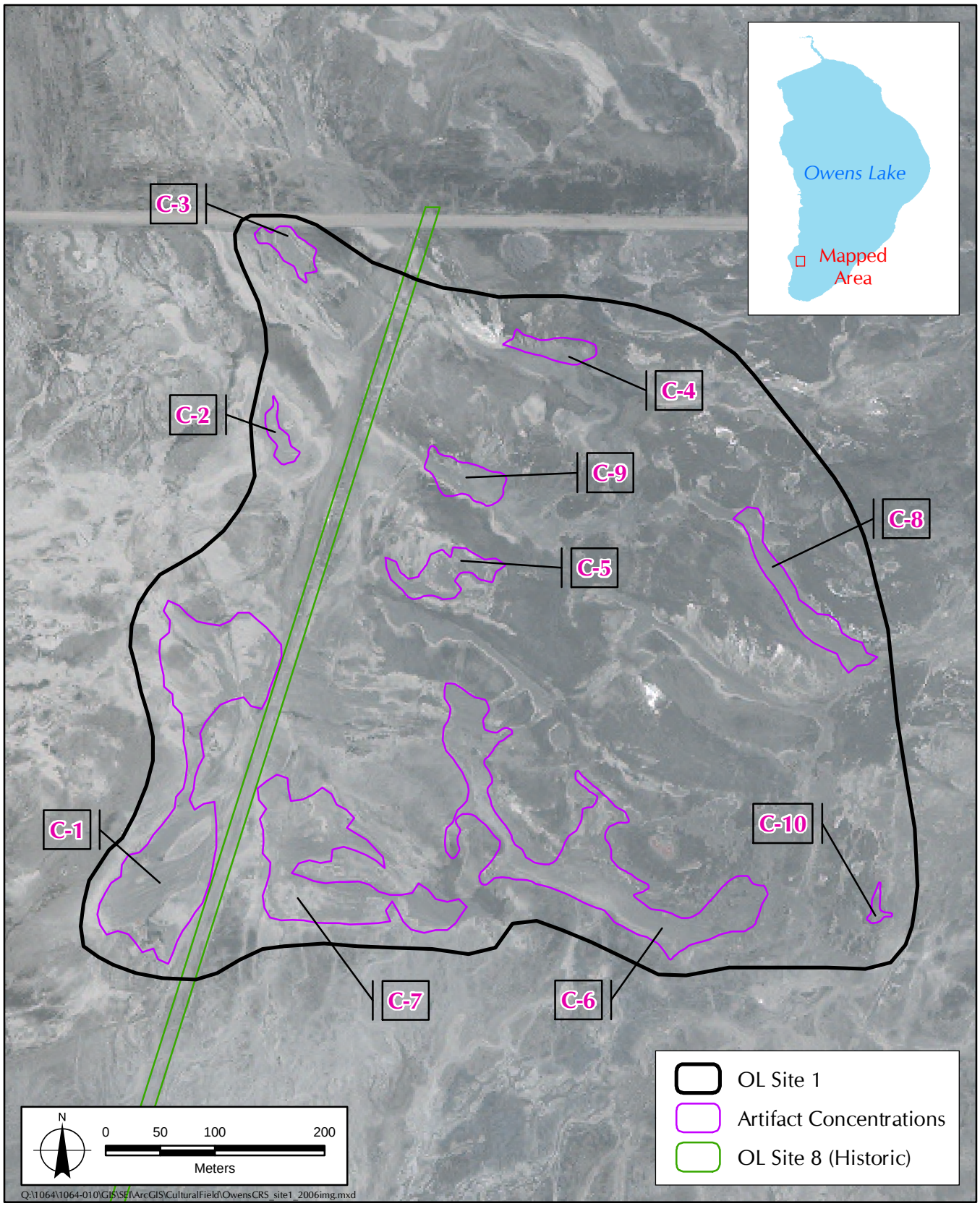


FIGURE 5.1.2.3-2

OL Site 1 (Satellite Image 2006)

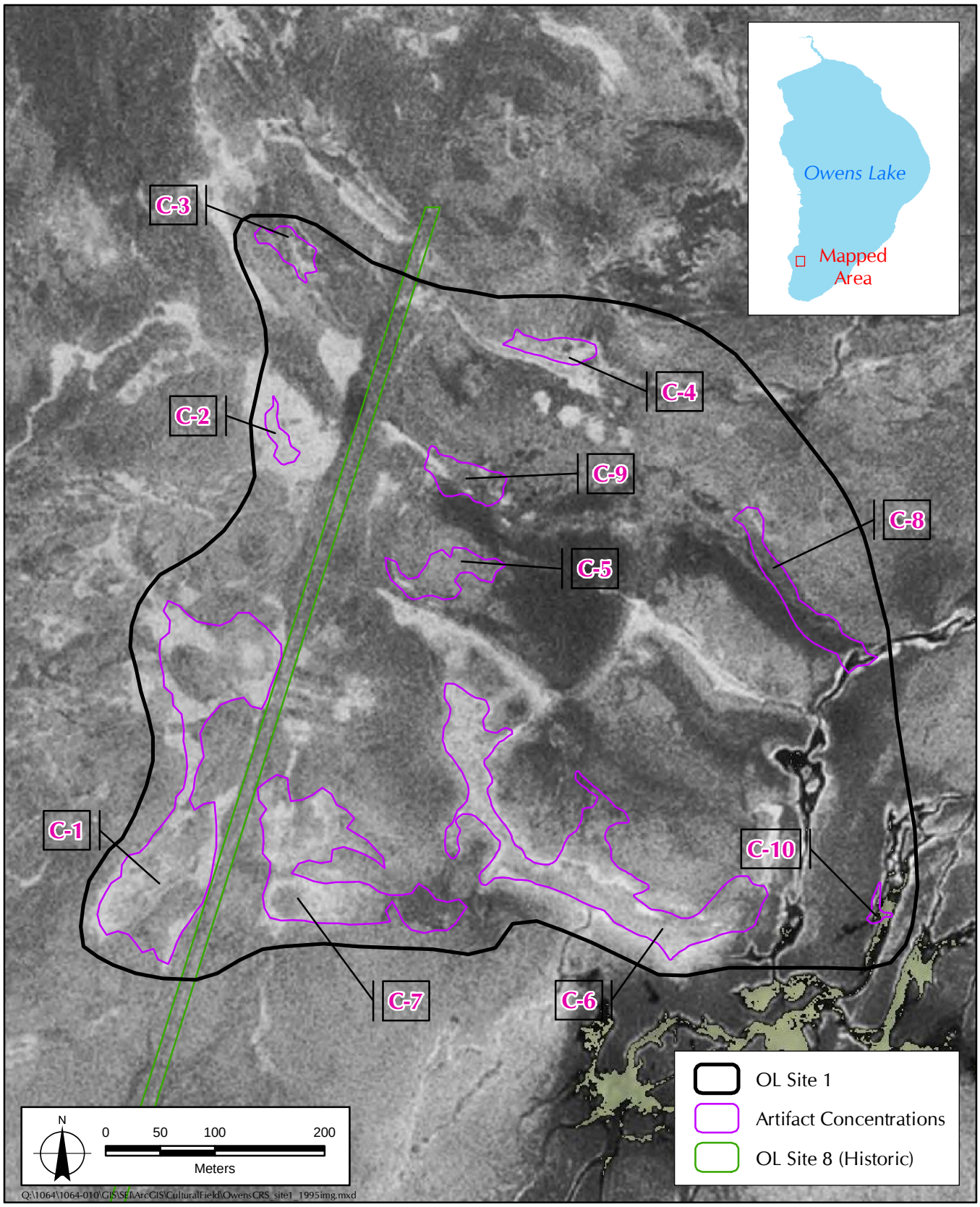


FIGURE 5.1.2.3-3

OL Site 1 (Satellite Image 1995)

This site covers an area of 600 by 750 meters and consists of a large lithic scatter composed of 10 concentrations, or areas where debitage is present. Material is dominated by obsidian (over 95 percent), followed by a small percentage of chert. There are hundreds of heavily weathered or what appears to be unmodified pieces of obsidian within the site. Concentrations were determined based on the presence of those pieces that clearly showed indication of having been culturally modified. Artifact density along these concentrations varies, from 10 flakes per 10 by 10 meter area, to 2 flakes per square meter. Cultural materials were distributed almost exclusively on the wash area; the salt flats adjacent to the washes were devoid of any artifacts for the most part. A total of eight artifacts were collected from this site.

Concentrations 1 and 9 have the highest concentration of tools and the best artifacts (flakes exhibit a lower degree of weathering and flake attributes are clearly recognizable). Artifact numbers do not necessarily correlate with the concentration numbers.

One historic site, OL Site 8H, extends across OL Site 1, and is described within the historic section.

Concentration 1. Cultural materials in Concentration 1 are distributed around and between two small mounds (possibly old springs) (Figure 5.1.2.3-2, See C1). There are 20+ large interior flakes (approximately 3 meters or more), and over 100 interior flakes of smaller size. Very few biface thinning flakes were noted, and no cores were observed. A total of 11 artifacts were recorded from this concentration, of those 4 were collected.

> Artifact 1-1: This artifact is a small obsidian biface that measures 2.5 centimeters in length, 1.4 centimeters in width, and 0.5 centimeter in thickness. Recent edge damage is noted along the margins.
>
> Artifact 1-2: This artifact is an obsidian biface tip that measures 3.2 centimeters in length, 2.6 centimeters in width, and 0.5 centimeter in thickness.
>
> Artifact 1-3: This artifact is an obsidian biface with a missing base; broken portion terminates in a hinge fracture. The piece is heavily weathered. Artifact 1-3 measures 3.9 centimeters in length, 2.6 centimeters in width, and 0.7 centimeter in thickness.
>
> Artifact 1-4 (Collected): This artifact is an obsidian projectile point measuring 3 centimeters in length, 1.8 centimeters in width, 0.6 centimeters in thickness, and weighing 3.1 grams. The point has been severely damaged along the margins and exhibits a concave base and incipient basal ears. One margin exhibits deep indentations as if the point had been used for cutting a hard object. Artifact 1-4 shows heavy weathering on one side, where flake scars are barely visible, the other side has little weathering and exhibits random flaking and several step fractures, indicating manufacturing errors. This artifact is asymmetrical in silhouette, profile, and cross section (Figure 5.1.2.3-4, *OL Site 1: Artifacts 1-4, 1-6, and 1-8*, and Appendix E).
>
> Artifact 1-5: This artifact is a biface tip made of banded obsidian, measuring 3.0 centimeters in length, 2.6 centimeters in width, and 0.7 centimeter in thickness. The artifact is very weathered.
>
> Artifact 1-6 (Collected): This artifact is a small corner-notched obsidian projectile point that exhibits the morphology of a Rose Spring point. Its very tip and part of the base are broken, precluding any accurate angle measurements. Specimen is 2.6 centimeters in length (incomplete), 2.0 centimeters in width, 0.5 centimeter in thickness, and weighs 2.5 grams. The

Artifact 1-4

Artifact 1-6

Artifact 1-8

FIGURE 5.1.2.3-4
OL Site 1: Artifacts 1-4, 1-6, and 1-8

point exhibits a triangular blade and it is asymmetrical in silhouette, and slightly asymmetrical in profile and cross section. Asymmetry may be due not to its manufacturing but to the damage present along the edges. The point is heavily weathered (Figure 5.1.2.3-4 and Appendix E).

Artifact 1-7: This artifact is an obsidian biface tip that measures 3.2 centimeters in length, 2.2 centimeters in width, and 0.7 centimeter in thickness. Artifact is moderately weathered.

Artifact 1-8 (Collected): This is a very weather obsidian projectile point. The artifact is 3.6 centimeters in length (incomplete), 1.8 centimeters in width, and 0.7 centimeter in thickness, and weighs 4.5 grams. Although a stem is suggested, this may be the result of a breakage near the base masked by the weathering, and not an intentional feature. The point exhibits damage along the entire margin. Artifact 1-8 can only be tentatively classified as a Leaf-shaped point (Figure 5.1.2.3-4 and Appendix E).

Artifact 1-9: This artifact is a very weathered obsidian biface; part of the base is broken. The specimen measures 2.7 centimeters in length, 1.8 centimeters in width, and 0.4 centimeter in thickness.

Artifact 1-10: This artifact is an obsidian biface tip measuring 2.5 centimeters in length, 2.4 centimeters in width, and 0.8 centimeter in thickness.

Artifact 1-11 (Collected): This artifact is a very weathered obsidian tool made from a deeply curved flake. Artifact 1-11 has the morphology of a crescent in silhouette (lunate shape). It is concave in profile and appears symmetric in cross section. Due to weathering flake scars are only insinuated, and the edges are blunted. The artifact is 4.6 centimeters in length, 1.9 centimeters in width, and 0.6 centimeter in thickness, and weighs 7.2 grams (Figure 5.1.2.3-5, *OL Site 1, Artifacts 1-11, 1-19, and 1-20*, and Appendix E).

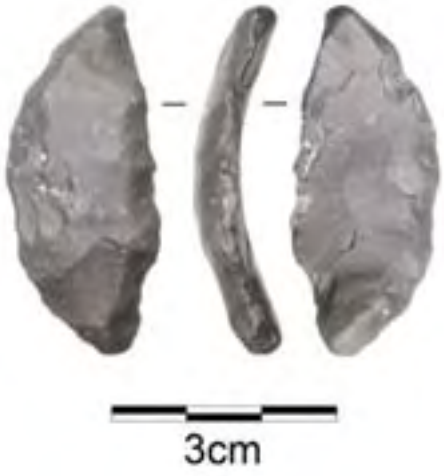
Concentration 2. Concentration 2 has a low density of artifacts (Figure 5.1.2.3-2, See C2). No tools were observed.

Concentration 3. Concentration 3 has a low density of artifacts (Figure 5.1.2.3-2, See C3). No tools were observed.

Concentration 4. Concentration 4 has a low density of artifacts (Figure 5.1.2.3-2, See C4). No tools were observed.

Concentration 5. Concentration 5 has a low density of artifacts (Figure 5.1.2.3-2, See C5). One tool (Artifact 1-31) was observed and collected.

Artifact 1-31 (Collected): This artifact is a leaf-shaped obsidian projectile point symmetrical in silhouette, and slightly curved in profile. The specimen is 4.8 centimeters in length, 2.4 centimeters in width (incomplete), and 0.6 centimeter in thickness, and weighs 7.3 grams. The point is very weathered and flake scars are only insinuated. Although the point is well made in general, two small lumps that were not removed during the thinning process are visible, one near the tip and one near the mid-section. One side has a hard thin layer of white material, probably a result of being in contact with the salt flats on the lake bed.



Artifact 1-11

Artifact 1-19

Artifact 1-20

FIGURE 5.1.2.3-5
OL Site 1: Artifacts 1-11, 1-19, and 1-20

Concentration 6. Concentration 6 has a low density of artifacts (Figure 5.1.2.3-2, See C6). Two tools were observed, Artifacts 1-15 and 1-27.

Artifact 1-15: This artifact is a flake tool that exhibits retouch (or damage due to use) along the edges. The flake exhibits a hinge fracture. Artifact 1-15 measures 2.9 centimeters in length, 1.5 centimeters in width, and 0.4 centimeter in thickness. This artifact is moderately weathered.

Artifact 1-27. This artifact is a small obsidian biface with a partial break at the base and a broken tip. The biface was made from a curved flake whose ventral side exhibits little work. The dorsal side has random flake scars. Artifact 1-27 measures 3.2 centimeters in length, 1.5 centimeters in width, and 0.3 centimeter in thickness.

Concentration 7. Concentration 7 is comprised of approximately 90 percent pebbles and 10 percent silty material (Figure 5.1.2.3-2, See C7). The majority of the pebbles and cultural material are not embedded in the sediment. Two tools, Artifacts 1-13 and 1-14, and one discrete accumulation of flakes, CS1, were noted in this concentration.

Artifact 1-13: This artifact is a biface base fragment, measuring 4.5 centimeters in length, 1.5 centimeters in width, and 0.7 centimeter in thickness.

Artifact 1-14: This artifact is a biface base fragment, measuring 1.8 centimeters in length, 1.6 centimeters in width, and 0.7 centimeter in thickness. This artifact is moderately weathered. CS1 is a concentration of obsidian flakes distributed over a 40 by 20 centimeter area. These flakes probably represent a "pothunter's cache" instead of a chipping station, since it is unlikely that the materials are *in-situ*. The concentration consists of nine obsidian interior flakes (between 2 and 4 centimeters) with few scars.

Concentration 8. Concentration 8 has a low density of artifacts (Figure 5.1.2.3-2, See C8). No tools were observed.

Concentration 9. Concentration 9 has nine tools, Artifacts 17, 18, 19, 20, 21, 22, 23, 24, and 25, and over 100 obsidian and chert flakes (Figure 5.1.2.3-2, See C9).

Artifact 1-17: This artifact is a flake tool that exhibits retouch (or damage due to use) along the edges. Artifact 1-17 measures 4.5 centimeters in length, 2.5 centimeters in width, and 1.0 centimeter in thickness.

Artifact 1-18: This artifact is a flake tool that exhibits retouch (or damage due to use) along the edges. Artifact 1-18 measures 2.2 centimeters in length, 1.7 centimeters in width, and 0.5 centimeter in thickness.

Artifact 1-19 (Collected): This artifact is a fragment of a drill made of chert; part of the base and part of the bit are present. Artifact 1-19 is 3.1 centimeters in length (fragment of bit portion is 1.5 centimeters), 1.8 centimeters in width (incomplete), and 0.6 centimeter in thickness, and weighs 2.5 grams. The proximal end appears to be the base of a Humboldt series projectile point that has been reworked to a long end (bit). One of the ears is missing and the tip of the bit is also missing. The lateral margins of the bit are still sharp and the bit is diamond shape in cross section. Specimen is moderately weathered but small pressure flake scars are still visible. This drill is similar to those found at CA-INY-30 (See Basgall and McGuire 1988, Plate 37) (Figure 5.1.2.3-5 and Appendix E).

Artifact 1-20 (Collected): This artifact is a small contracting-stem obsidian projectile point. It is very weathered and its margins are blunted, masking features, such as shoulders, ears, corner or side notches, which are essential to precisely characterize the point. Artifact 1-20 is 2.7 centimeters in length, 2.0 centimeters in width, and 0.6 centimeter in thickness, and weighs 3.6 grams. The specimen is asymmetrical in silhouette, and symmetrical in profile and cross section (Figure 5.1.2.3-5 and Appendix E).

Artifact 1-21 (Collected): This artifact is the tip of an obsidian biface. It is 2.7 centimeters in length (incomplete), 2.5 centimeters in width, and 6.5 centimeters in thickness, and weighs 4.3 grams. One side shows more weathering than the other one and both sides exhibit random flaking (Appendix E).

Artifact 1-22: This artifact is an obsidian biface fragment (margin) with excessive weathering. Flake scars are barely visible. Artifact 1-22 measures 3.2 centimeters in length, 1.8 centimeters in width, and 0.8 centimeter in thickness.

Artifact 1-23: This artifact is an obsidian biface tip with excessive weathering. Flake scars are barely visible. Artifact 1-23 measures 2.8 centimeters in length, 2.0 centimeters in width, and 0.8 centimeter in thickness.

Artifact 1-24 (Collected): This artifact is the distal end (bit) of a drill. It is 4.0 centimeters in length, 0.8 centimeter in width (incomplete), and 0.6 centimeter in thickness, and weighs 2.9 grams. The material of the drill could not be clearly established, it is either opaque obsidian or black chert. The artifact exhibits bifacially pressure flaking along the lateral edges. Artifact 1-24 has a diamond shape in cross section and the end of the bit has a rounded shape. This artifact is very similar to Artifact 1-19 described above (Figure 5.1.2.3-6, *OL Site 1: Artifacts 1-24, 1-29, and 1-32*, and Appendix E).

Artifact 1-25 (Collected): This artifact is an obsidian biface fragment. It has been broken lengthwise, leaving a clean curved break. Margin of biface is sinuous and exhibits signs of crushing. Percussion flaking is evident throughout. The artifact is 4.7 centimeters in length, 1.4 centimeters in width (incomplete), and 0.7 centimeter in thickness, and weighs 5.4 grams (Appendix E).

Concentration 10. Concentration 10 is a light lithic scatter, approximately 10 flakes on a 10 by 10 meter area (Figure 5.1.2.3-2, See C10). Some isolated flakes were noted to the north and east of this concentration, but they were not included within its boundaries. The lithic scatter fades to the north and east but these were not included into the concentration boundaries. One obsidian tool (Artifact 1-30) was recorded and collected.

Artifact 1-30 (Collected): This artifact is a fragment of a possible Humboldt series obsidian projectile point. The tip and one ear are missing. The specimen is 3.3 centimeters in length (incomplete), 2.3 centimeters in width, and 1.0 centimeter in thickness, and weighs 11.2 grams. This specimen is a robust point with basal ears, a wide base, and nearly straight margins. Although this artifact is very weathered, measurements and morphological characteristics coincide with the wide Humboldt Basal-notched type as described by Garfinkel and Yohe (2004:105, 111) (Appendix E).

Artifact 1-24

Artifact 1-29

Artifact 1-32

FIGURE 5.1.2.3-6
OL Site 1: Artifacts 1-24, 1-29, and 1-32

Artifacts Recorded Outside the Concentrations. A total of six artifacts were recorded just outside of the concentrations on areas not covered by gravel in the salt flats.

Artifact 1-12: This artifact is a heavily weathered obsidian biface tip, measuring 1.5 centimeters in length, 1.2 centimeters in width, and 0.3 centimeter in thickness.

Artifact 1-16: This artifact is a biface tip, measuring 2.2 centimeters in length, 1.4 centimeters in width, and 0.4 centimeter in thickness. Artifact is heavily weathered.

Artifact 1-26 (Collected): This artifact is an obsidian biface fragment (base missing), measuring is 3.9 centimeters in length (incomplete), 2.7 centimeters in width (incomplete), and 0.5 centimeter in thickness. It weighs 5.6 grams and is symmetrical in silhouette, profile, and cross section. Thinning and flake pattern suggests a finished product before breakage. The fragment exhibits a slightly oblique break, possibly along what could have been a notch. These types of breaks are associated with breakage at impact or during hafting (Titmus and Woods 1986, and Flenniken and Raymond 1986). Flake scars are clearly visible on one side of the biface; the other side is weathered but flake scars are still visible (Appendix E).

Artifact 1-28H: This artifact is most likely associated with OL Site 8H, but it is located over 300 meters to the east. Artifact 1-28H is a brown glass bottle with a screw cap still in place. This artifact was described as a disturbance to the prehistoric site in the site record. The body of the bottle is 5 inches tall, the neck is 5/8 inches tall, and the finish is 15/16 inch. The base of the bottle is oval and measures 2½ inches. Base has a series of numbers embossed in it: 79/0126/47. The bottle has one seam that extends from the base to the finish. The shoulder of the bottle is embossed with FEDERAL LAW PROHIBITS SALE _ _ REUSE OF THIS BOTTLE. The heel of bottle is embossed in the front and back with HALF PINT. Embossing of the bottle indicates a time of manufacturing between 1933 and 1964 (Fike 2002:14).

Artifact 1-29 (Collected): Artifact is tentatively classified as a leaf-shaped obsidian projectile point due to heavy weathering. However, a slight concavity is suggested at the base. One margin is blunted and the other margin exhibits a deep indentation (break) that extends from the edge of the point towards the center. The specimen is 4.0 centimeters in length, 1.9 centimeters in width, and 0.8 centimeter in thickness, and weighs 9.0 grams (Figure 5.1.2.3-6 and Appendix E).

Artifact 1-32 (Collected): This artifact is a leaf-shaped obsidian projectile point symmetrical in silhouette, and asymmetrical in profile and cross section. Its cross section is nearly plano-convex. The artifact is 5.0 centimeters in length, 2.0 centimeters in width, and 1.0 centimeter in thickness, and weighs 9.9 grams. Point is very weathered and flake scars are only insinuated. Some damage is visible along portions of the margin (Figure 5.1.2.3-6 and Appendix E).

Site Summary. In summary, OL Site 1 is an extensive site with multiple artifact concentrations and a total of 32 tools, including 1 Rose Spring series point, 1 Humboldt series point, 2 drill fragments, 1 very weathered tool in the shape of a crescent, 4 Leaf-shaped points, 18 biface fragments, 2 points that could not be classified, and 3 flake tools. In addition, one small concentration of artifacts that appear to indicate a pothunter's cache and one historic bottle were also noted. Three diagnostic artifacts provide an indication of a time frame for the site: two diagnostic projectile points, one Rose Spring series point, and one Humboldt point, as well as one drill fragment manufactured from a Humboldt point. The Rose Spring series points are normally associated with the Haiwee period. However, more recent data from

excavations at CA-INY-372 (Figure 5.1.2.1-1), indicate that these point type may have continued to be produced during more recent times, extending into the Marana period (Yohe 1992 and 1998, and see also Wells and Tabares 2005:74). Humboldt point series have been considered indicative of the Late Newberry and early Haiwee periods in the southwestern Great Basin. However, obsidian hydration analyses have indicated a wide range for these points. As a result, some researchers do not consider Humboldt points as valid time markers (e.g., Justice 2002 and Thomas 1981). Garfinkel and Yohe (2004) have suggested two variants for the Humboldt points, a narrow one and a wide one. Their research in the Stahl site (CA-INY-182) (Figure 5.1.2.1-1), located about 20 miles south of Owens Lake, have resulted in dates as early as the Little Lake period (Garfinkel and Yohe 2004). These dates were obtained from the narrow variant of the type, which led the authors to conclude that the two variants had different time ranges. Unfortunately, their conclusions do not appear to be consistent with data by other researchers (Wells and Tabares 2006:66, 74).

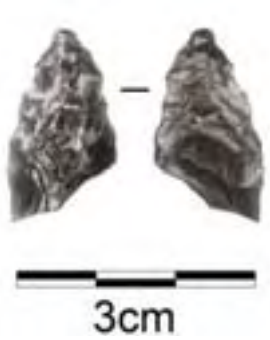
The temporal variation of the Leaf-shaped points has not been adequately addressed, and therefore these are not considered good temporary markers. Thus, an approximation to the time range represented at the site could only be obtained through obsidian hydration analysis. Furthermore, this would also be required to test the hypothesis of the different time ranges by Garfinkel and Yohe (2004) for the different Humboldt variants.

OL Site 2

OL Site 2 is located on the Owens Lake playa in an area covered with alluvium dominated by gravel (Figure 5.1.2.3-1; Appendix A; and Appendix B, Map 5). Vegetation present at the site includes grasses and shadscale. During the survey, only the portion of the site located directly in or adjacent to the survey area was recorded. Cultural materials were also noted northwest of the current site boundary; however, the survey was conducted during Snowy plover *(Charadrius alexandrinus)* nesting period and access to that portion of the site was restricted. In addition, a few scattered artifacts were noted following a line at least 150 meters to the southeast towards the sand dunes. It was considered that for management purposes the recording of the site as it is described here was adequate. The site consists of a lithic scatter distributed over two main loci, Locus 1 and Locus 2, and covering an area of 130 by 50 meters (Figure 5.1.2.3-1). Both loci are separated by a salt crust area devoid of artifacts. Four biface tips and over 60 pieces of chert and obsidian debitage, including core reduction and biface thinning flakes, were noted.

The lithic assemblage present at OL Site 2 consists of over 87 percent pieces of chert (46 interior flakes and 9 secondary flakes) and 10 percent pieces of obsidian (8 obsidian interior flakes). Five artifacts were observed at this site, three of which were collected.

> Artifact 2-1 (Collected): This artifact is an obsidian biface tip, measuring 2.5 centimeters in length, 1.2 centimeters in width, and 0.4 centimeter in thickness, and weighing 1.2 grams. The specimen is moderately weathered, but pressure flaking along the edges is still visible. The fragment is symmetrical in silhouette, profile, and cross section (Appendix E).
>
> Artifact 2-2 (Collected): This obsidian artifact has part of its base missing, but its morphological characteristics suggest a Cottonwood Leaf-shape projectile point. The specimen measures 2.5 centimeters in length (incomplete), 1.4 centimeters in width, and 0.4 centimeter in thickness, and weighs 1.0 gram. The artifact shows symmetry in silhouette and asymmetry in profile and cross section (cross section is plano convex). The artifact exhibits random pressure flaking on both sides and a slight curvature in profile (Figure 5.1.2.3-7, *OL Site 2: Artifact 2-2*, and Appendix E).



Artifact 2-2

FIGURE 5.1.2.3-7
OL Site 2: Artifact 2-2

Artifact 2-3: This artifact is a chert biface tip measuring 2.1 centimeters in length, 2.5 centimeters in width, and 0.6 centimeters in thickness. It exhibits a perverse fracture.

Artifact 2-4 (Collected): This artifact is a weathered obsidian biface tip with a waxy appearance. The artifact measures 2.5 centimeters in length (incomplete), 1.5 centimeters in width, and 0.3 centimeter in thickness, and weighs 1.4 grams. Pressure flake scars are visible along the margin. One margin has been heavily damaged and appears irregular (Appendix E).

Artifact 2-5: This artifact is a chert biface tip measuring 2.0 centimeters in length, 2.1 centimeters in width, and 0.7 centimeters in thickness.

Site Summary. In summary, OL Site 2 is a lithic scatter dominated by chert; five tools were noted at the site, including one diagnostic obsidian projectile point and four non-diagnostic bifaces. The point is a Cottonwood Leaf-shape type, which has been associated with the Marana period. This point is similar to those recovered from the Rose Spring site (CA-INY-372) (Figure 5.1.2.1-1), and described by Lanning (1963). This site extends to the southeast, and may join with CA-INY-6378 (Figure 5.1.2.2-2), which was described by Wells (2003:38) and evaluated by Jones and Stokes (2005c: Section 5-29). Obsidian hydration analyses and projectile point characterization for CA-INY-6378 indicated Newberry and Marana period components. The Marana component to the site coincides with the current findings at OL Site 2 located immediately to the west. Additional information regarding time of occupation can only be obtained through obsidian hydration analysis.

OL Site 5

OL Site 5 is located on the northwest portion of the lake and extends from the shoreline into the salt flats to the east (Figure 5.1.2.3-1; Appendix A; and Appendix B, Map 1). The shoreline is characterized by alluvium (medium to coarse sand with gravel), while the lake bed exhibits silty sediments with areas covered by a salt crust. Vegetation on site is limited to the sandy area and includes saltbush and shadscale. The western and southernmost boundaries of the site were arbitrarily defined by a decrease in artifact density; however, the site may continue on these two directions outside the survey area. The site is a large lithic scatter consisting of hundreds of pieces of debitage and over 28 tools scattered over a 750 by 320 meter area.

Over 90 percent of the material consists of obsidian, followed by chert, basalt, and rhyolite. All flake stages are represented at the site. The tools include complete projectile points and point fragments, biface fragments, cores, and ground stone. A historic component, consisting of a fragmented solarized bottle, was also observed. The highest density of lithic material appears to be in or directly adjacent to the historic Owens Lake shoreline, characterized by medium to coarse sand with gravels, and decreases moving east, towards the center of the lake, where the ground surface is covered by a layer of salt crust. Artifacts in the salt crust were nearly absent, with a few exceptions. Some artifacts appear heavily weathered, while others do not exhibit any weathering at all. A total of three, small discrete lithic concentrations (possibly pothunter's caches) were noted at the site. These are characterized by multiple large pieces of debitage distributed within a small area (30 by 30 centimeters in average), with weathered and unweathered pieces present. The distribution of these tools suggest pothunter's caches. A total of eight tools were collected, consisting of diagnostic projectile points and point fragments. Artifacts recorded in the site include, Artifacts 5-1 through 5-38. Artifacts 5-3, -7, -12, -15, -16, -19, -27, -29, and -31 are not described as they were determined to not be tools.

Artifact 5-1: This artifact is a possible multidirectional core made from a fine-grained igneous rock and it is very weathered. The artifact measures 7.2 centimeters in length, 6.5 centimeters in width, and 3 centimeters in thickness.

Artifact 5-2: This artifact is a double-sided granitic ground stone, located just outside of the survey area. The artifact measures 36 centimeters in length, 21 centimeters in width, and 12 centimeters in thickness. One side contains a ground surface with a depth of 7 centimeters, while the other side contains a ground surface with a depth of 8 centimeters. Neither side is smooth, possibly due to weathering of the rock.

Artifact 5-4: This artifact is an obsidian biface tip, measuring 2.8 centimeters in length, 1.2 centimeters in width, and 0.5 centimeter in thickness. The artifact tip is missing and the artifact is excessively weathered.

Artifact 5-5: The specimen is a possible granitic bowl fragment. The fragment measures 22.5 centimeters in length, 14.5 centimeters in width, and between 4 to 8 centimeters in thickness. The ground surface is 10 centimeters deep. The ground surface is not smooth due to weathering of the rock.

Artifact 5-6: This is a quartz core, containing a single platform and four large scars. Its dimensions are 6 centimeters in length, 5 centimeters in width, and 4 centimeters in thickness.

Artifact 5-8: This artifact is a chert biface midsection, poorly worked. It measures 3 centimeters in length, 3 centimeters in width, and 0.9 centimeter in thickness.

Artifact 5-9: This artifact is a scraper made of opaque obsidian or basalt. The material could not be identified in the field due to the artifact is covered with a thin layer of salt crust from the lake bed. One edge is thick, with no work, while the 'cutting' edge exhibits flake removal and has been thinned to form a sharp edge. The tool measures 9.5 centimeters in length, 7.5 centimeters in width, and 3.8 centimeters in thickness, and was made from a cobble.

Artifact 5-10: This is a scraper made of opaque obsidian or basalt. The artifact material could not be identified in the field due to being covered with a thin layer of lake bed salt crust. One margin has been worked to form a sharp edge. The tool was made from a cobble, and measures 7 centimeters in length, 5.5 centimeters in width, and 2.7 centimeters in thickness.

Artifact 5-11: This specimen is an obsidian biface tip that is excessively weathered. One margin exhibits clear retouching, while the other margin appears blunted. Random flaking was noted on both sides, and one side contains multiple step fractures. The very tip of the biface is missing. The artifact measures 4.3 centimeters in length, 3 centimeters in width, and 0.8 centimeter in thickness.

Artifact 5-13: This is a retouched chert flake measuring 2 centimeters in length, 1.7 centimeters in width, and 0.5 centimeter in thickness.

Artifact 5-14: This artifact is a chert biface midsection with a lenticular cross-section. Biface measures 2.4 centimeters in length, 2.2 centimeters in width, and 0.9 centimeter in thickness.

Artifact 5-17: The specimen is a retouched chert flake, measuring 3 centimeters in length, 2.4 centimeters in width, and 0.3 centimeter in thickness. Two obsidian flakes were observed in association, within a 10 by 10 centimeter area.

Artifact 5-18H: This artifact consists of over 30 fragments of a solarized amethyst bottle, scattered over a 50 by 50 centimeter area. No markings were evident on any of the pieces. Five pieces of metal wire were noted within the same deposit.

Artifact 5-20: This artifact is a retouched chert flake, measuring 4.2 centimeters in length, 2.3 centimeters in width, and 0.8 centimeter in thickness. The flake exhibits weathering on the dorsal surface. Four obsidian 'chunks' were noted in association with the flake; all pieces are over 2 centimeters in length.

Artifact 5-21 (Collected): This artifact is a fragment of an obsidian corner-notched projectile point. The base, one shoulder, and part of a blade are present. Artifact measures 2.5 centimeters in length (incomplete), 2.2 centimeters in width (incomplete), and 0.6 centimeter in thickness, and weighs 4.6 grams. Although the notch is clear, there is a bulge between the two ears, which is not typical of any of the projectile point series known for the Great Basin. The point fragment is heavily weathered and flake scars are barely visible. Symmetry in silhouette could not be determined, but fragment appears symmetrical in profile and cross section (Appendix E).

Artifact 5-22 (Collected): The artifact appears to be an obsidian point base, measuring 3.25 centimeters in length, 1.51 centimeters in width, and 0.68 centimeter in thickness. The artifact is excessively weathered and flake patterning is difficult to observe. Two obsidian flakes and one chert flake were noted in association with this artifact. All obsidian pieces are very weathered. This artifact was collected (Appendix E).

Artifact 5-23: This is an obsidian biface tip, measuring 2.7 centimeters in length, 2.6 centimeters in width, and 1.1 centimeters in thickness, with excessive weathering. The margin is blunted, but flake removal is still visible.

Artifact 5-24: This is an obsidian biface tip, measuring 2.2 centimeters in length, 1.9 centimeters in width, and 0.7 centimeter in thickness, with excessive weathering. Its very tip is missing.

Artifact 5-25: This artifact is a chert biface fragment, measuring 2.2 centimeters in length, 2 centimeters in width, and 0.7 centimeters in thickness. Only the midsection is present, exhibiting percussion flaking.

Artifact 5-26: This is an obsidian biface fragment, measuring 2.6 centimeters in length, 2 centimeters in width, and 0.6 centimeter in thickness. The tip and part of the midsection is present. The tip has been reworked and is rounded.

Artifact 5-28: This artifact is a biface fragment, measuring 2.2 centimeters in length, 1.5 centimeters in width, and 0.7 centimeter in thickness. One side shows multiple scars, while the other side is very weathered and exhibits multiple natural breaks.

Artifact 5-30: This artifact is a biface tip fragment made of red and black banded chert. The artifact measures 2.8 centimeters in length, 1.5 centimeters in width, and 0.4 centimeter in thickness. The artifact is very weathered.

Artifact 5-32 (Collected): This artifact is a corner-notched obsidian projectile point with a straight stem base, and very tip missing. The specimen is 3.2 centimeters long (incomplete), 2.6 centimeters wide, and 0.7 centimeter thick, and weighs 5.8 grams; its base is 0.6 centimeter long and 1.5 centimeters wide. The artifact is asymmetrical in silhouette, and symmetrical in profile and cross section. Lack of symmetry in silhouette and the high degree of weathering preclude any realistic angle measurements. Based on its morphological characteristics only, this point is similar to the Borax Lake cluster type described by Justice (2002:104, Figure 13). These types of points appear in Northern California, the Sierra Nevada, and the Mojave Desert. However, the Borax Lake cluster distribution is not clearly defined (Justice 2002:101). A Rose Spring variant was considered for this point; however, none of its characteristics coincide with those determined by Thomas (1981:25) (Figure 5.1.2.3-8, *OL Site 5: Artifacts 5-32, 5-33, and 5-34*, and Appendix E).

Artifact 5-33 (Collected): This artifact is an obsidian projectile point that exhibits the characteristics of both a Pinto and Elko series but does not fit adequately fit the description of either one. It is poorly made and exhibits an excurvate blade, basal ears, and sloping shoulders. Following Warren's (2002) key, thickness alone (> 0.64 centimeter) places the point within the Pinto category (using the Thomas key, the point would fall under the Gatecliff Split-stem, but see Vaughan and Warren 1987 for discussion). The artifact is 3.7 centimeters in length, 2.5 centimeters in width, and 1 centimeter in thickness, and weighs 7.9 grams. The point is poorly made, and is moderately asymmetrical in silhouette, and asymmetrical in profile and cross section. Thinning of point is uneven; one side exhibits a "lump" towards the center of the point that was not removed. Several step fractures are also visible on the same side indicating manufacturing errors. The basal ears are also uneven, with one being larger and more rounded than the other one. One side of the point is moderately weathered but flake scars are still visible. The other side exhibits less weathering and random pressure flaking (Figure 5.1.2.3-8 and Appendix E).

Artifact 5-34 (Collected): This artifact is the square base of a corner-notched obsidian projectile point. It exhibits one weak shoulder, while the other one is broken. The artifact is 2.8 centimeters in length (incomplete), 2.3 centimeters in width, and 0.8 centimeter in thickness, and weighs 4.3 grams. The base itself is 0.9 centimeter in length and 1.3 centimeters in width. The morphological characteristics of the base are similar to the Borax Lake cluster type described by Justice (2002:104, Figure 13). (See Artifact 5-32 above) (Figure 5.1.2.3-8 and Appendix E).

Artifact 5-35 (Collected): This artifact is a small Cottonwood Triangular point made of obsidian. The specimen is 2.1 centimeters in length, 0.8 centimeter in width, and 0.3 centimeter in thickness, and weighs 0.5 grams. The point is symmetrical in silhouette, profile, and cross section, and exhibits straight blades and a straight base. This artifact exhibits random pressure flaking (Figure 5.1.2.3-9, *OL Site 5: Artifacts 5-35, 5-36, and 5-37*, and Appendix E).

Artifact 5-36 (Collected): This artifact is the base and shoulders of an Elko Eared obsidian projectile point. The piece was detached with a straight break just above the shoulders. The specimen is 1.6 centimeters in length (incomplete), 3.0 centimeters in width, and 0.5 centimeter in thickness, and weighs 2.4 grams. The fragment is symmetrical in silhouette,

Artifact 5-32

Artifact 5-33

Artifact 5-34

FIGURE 5.1.2.3-8
OL Site 5: Artifacts 5-32, 5-33, and 5-34

Artifact 5-35

Artifact 5-36

Artifact 5-37

FIGURE 5.1.2.3-9
OL Site 5: Artifacts 5-35, 5-36, and 5-37

profile, and cross section. The artifact is moderately weathered. The less weathered side exhibits pressure flaking (Figure 5.1.2.3-9 and Appendix E).

Artifact 5-37 (Collected): This artifact is a corner-notched obsidian projectile point with a straight stem base, and one shoulder missing. The specimen is 2.9 centimeters in length, 2.1 centimeters in width, and 0.6 centimeter in thickness, and weighs 2.9 grams. Base is 0.9 centimeter in length and 1 centimeter in width. The artifact is symmetrical in profile and cross section. Based on its morphological characteristics only, this point is similar to the Borax Lake cluster type described by Justice (2002:104, Figure 13) (see description of Artifact 5-32). A Rose Spring variant was considered for this point; however, none of its characteristics coincide with those determined by Thomas (1981:25). Piece is heavily weathered and margins are blunted; flake scars are barely visible (Figure 5.1.2.3-9).

Artifact 5-38: Obsidian biface margin, measuring 2.0 centimeters in length, 1.6 centimeters in width, and 0.4 centimeters in thickness.

Site Summary. In summary, OL Site 5 is a lithic scatter with a total of 29 tools, including 4 diagnostic projectile points, 3 potentially diagnostic projectile points, 2 unidentified points, 10 bifaces, 2 ground stones, 2 cores, 2 possible scrapers, and 3 flake tools. In addition, one historic bottle was noted.

The diagnostic points suggest that activity at the site spans through several time periods, from as early as 7000 BP (Little Lake Period) all the way to the Marana period. A Haiwee period component appears absent from the assemblage. Diagnostic artifacts include one Cottonwood Triangular series point, two Elko series points, and one Pinto series point. Cottonwood Triangular points are associated with later deposits characteristic of the Marana period, and extending through historic times (Heizer and Hester 1978:165). Elko series are normally associated with the Newberry period. The earliest component at the site is represented by the Pinto series projectile points. This point type is also known as Little Lake and is normally associated with the Little Lake period. In addition, three projectile points were tentatively classified as Borax Lake based solely on their morphology. As with the Pinto series points, the time range assigned to these types is controversial. However, both points are thought to date from early periods.

OL Site 6

OL Site 6 extends from the Owens Lake shoreline to the salt flats (Figure 5.1.2.3-1; Appendix A; and Appendix B, Map 1). The shoreline is characterized by alluvium (fine to coarse sand with gravel) and aeolian sand. The topography slopes gently to the southeast. The salt flats are characterized by lake bed sediments covered by a salt crust. Vegetation on site is limited to the sandy area and includes saltbush and shadscale. The site is a lithic scatter consisting of 5 tools and 52+ pieces of debitage indicating core and biface reduction.

Lithic debitage present at the site includes 45 obsidian flakes, 4 basalt flakes, and 3 chert flakes. Some pieces exhibit weathering on one of the surfaces. Artifacts are distributed over two main areas, Locus A and Locus B. Locus A measures 25 by 25 meters and Locus B measures 14 by 27 meters. Artifact density outside of the loci decreases considerably to one flake in a 10 by 10 meter area. The site extends outside of the survey area to the north and west. Site disturbances include tire tracks across the northern portion of the site and evidence of livestock activity in Locus A. A barbed wire fence bisects the site from north to south. Artifacts noted at the site are described below, with the exception of Artifact 6-4, which was determined to not be a tool.

Artifact 6-1: This artifact consists of an obsidian biface tip. The artifact is very weathered, but the edges appear serrated. The tip measures 3 centimeters in length, 1.5 centimeters in width, and 0.4 centimeter in thickness.

Artifact 6-2: This artifact consists of a tan/orange chert biface tip, with the very tip missing. One side exhibits extensive flake removal while other side shows little work and some weathered step fractures. The tip measures 2.8 centimeters in length, 2.7 centimeters in width, and 0.6 centimeter in thickness.

Artifact 6-3: The artifact consists of a biface tip made of poor quality obsidian with visible inclusions. The very tip of the biface is slightly oblique. The biface measures 1.5 centimeters in length, 1.5 centimeters in width, and 0.35 centimeter in thickness.

Artifact 6-5: The artifact consists of a complete, unifacial handstone made of granite, measuring 12 centimeters in length, 10 centimeters in width, and 7 centimeters in thickness. The ground surface measures 8 by 5 centimeters.

Artifact 6-6: This artifact consists of an obsidian biface midsection, measuring 2.2 centimeters in length, 2.2 centimeters in width, and 0.4 centimeter in thickness.

Site Summary. This site is a lithic scatter with five non-diagnostic bifaces and one ground stone (handstone/mano). No diagnostic artifacts were noted at this site, and therefore a time range for the cultural deposit could not be addressed based on the current survey. Temporal information can only be obtained through obsidian hydration analysis of culturally modified obsidian material. The presence of groundstone is consistent with those sites previously recorded on the sandy areas near the shoreline and suggests that activities related to plant processing took place at the site.

OL Site 7

OL Site 7 is located in the same area as OL Site 5, and extends from the Owens Lake shoreline to the salt flats (Figure 5.1.2.3-1; Appendix A; and Appendix B, Map 1). The shoreline is characterized by alluvium (fine to coarse sand with gravels) and aeolian sand. In this portion of the lake, the topography slopes gently to the south. The salt flats are characterized by lake bed sediments covered by a white, salt crust. Vegetation on site is limited to the sandy area and includes saltbush and shadscale. The site consists of a low density lithic scatter with seven tools (Artifacts 7-1 through 7-7) and 65+ piece of debitage.

Tools present at the site include three obsidian biface fragments, a possible obsidian scraper, one granitic metate, and two handstones (mano). The lithic debitage materials are dominated by obsidian, with lower quantities of basalt and chert.

Artifact 7-1: This artifact is an obsidian biface tip, measuring 2.5 centimeters in length, 2.3 centimeters in width, and 0.5 centimeter in thickness, with excessive weathering. The flake scars are weathered, and the very tip is missing.

Artifact 7-2: This artifact is of a possible obsidian scraper, measuring 6.4 centimeters in length, 3.5 centimeters in width, and 3.4 centimeters in thickness.

Artifact 7-3: This artifact consists of a granitic millingstone (metate) broken into two pieces. The overall measurements are 38 centimeters in length, 22 centimeters in width, and 14

centimeters in thickness. The concave area is approximately 1 centimeter deep. Only a small portion of the ground surface is smooth, due to weathering. The ground surface measures 9 by 10 centimeters.

Artifact 7-4: This is an obsidian biface midsection, measuring 2.4 centimeters in length, 1.7 centimeters in width, and 0.7 centimeter in thickness. The artifact is excessively weathered and flake scars are barely visible.

Artifact 7-5: This artifact is an obsidian biface tip, measuring 1.1 centimeters in length, 1.0 centimeter in width, and 0.4 centimeter in thickness. The artifact is excessively weathered and the very tip is missing.

Artifact 7-6: This artifact consists of a handstone (mano) fragment made of vesicular basalt, measuring 6.2 centimeters in length, 4.5 centimeters in width, and 3.2 centimeters in thickness. The stone appears unifacially worked. Approximately half of the ground stone is present.

Artifact 7-7: This artifact is a possible unifacial handstone (mano) fragment. Ground surface is incipient indicating little use. The ground stone measures 5 centimeters in length, 4 centimeters in width, and 2.5 centimeters in thickness. This artifact was found within a discrete lithic concentration consisting of 23 obsidian flakes, 2 chert flakes, and 1 possibly fossilized bone fragment. This concentration appears to be a pothunter's cache due to the intact nature, though it lies within an area of recent water movement. The ground stone may have been used as a hammer stone.

Site Summary. This site is a lithic scatter with three non-diagnostic bifaces, three ground stones (handstone/mano), and one scraper. As with OL Site 6, no diagnostic artifacts were noted during the present survey, and therefore a time range for the cultural deposit cannot be addressed. This information can only be obtained through obsidian hydration analysis of culturally modified obsidian material. The presence of ground stone is consistent with those sites previously recorded on the sandy areas near the shoreline and suggests that activities related to plant processing took place at the site.

Prehistoric Isolates

Fifty-seven prehistoric isolates have been located and recorded to date (Figure 5.1.2.3-1). These consist of various pieces of lithic debitage, bifaces, or projectile points, found on the lake bed with no other artifacts in association. These isolates were found throughout the entire area survey, with no real patterning in their distribution. Nineteen isolates were collected, consisting of at-risk complete bifaces and diagnostic projectile points. The location of all the isolates, complete archaeological records, and detailed measurements of diagnostic artifacts are presented in Figure 5.1.3.2-1 and Appendices A, B, and E. Isolate numbers are discontinuous at times because some isolates were incorporated into sites and others were eliminated after analyzing the distribution of the cultural material in the lake (i.e., isolated flakes initially recorded in the southwestern-most portion of the lake were later eliminated due to the number of such instances observed and their spatial relationship to known resources).

Isolate 1 (Collected). This isolate is a well worked biface, made of white/grayish chert. The biface is 8.6 centimeters in length, 5.5 centimeters in width, and 0.9 centimeter in thickness, and weighs 43.2 grams. This artifact is symmetrical in silhouette, profile, and cross section. This isolate exhibits percussion flaking throughout and pressure flaking along the margins, giving the appearance of a serrated edge. One side has two small round impurities (less than 0.5 centimeter in diameter) in the

form of holes; the same side shows two flakes that terminated in step fractures. The base of the biface is convex and exhibits a break (Figure 5.1.2.3-10, *Isolates 1 and 18*).

Isolate 2. This isolate is a piece of chert shatter measuring 1.5 centimeters in length, 1 centimeter in width, and 0.5 centimeter in thickness.

Isolate 3. This isolate is a Lake Mojave obsidian projectile point, measuring 6.3 centimeters in length, 2.7 centimeters in width, and 0.7 centimeter in thickness. The point is plano-convex in profile, with evidence of percussion flaking. No pressure flaking was observed. It appears as if one of the point's faces was broken off. The point is moderately weathered. One interior obsidian flake measuring less than 5 centimeters was found in the vicinity of this point. This point was not collected.

Isolate 5.The isolate consists of two pieces of chert shatter. Both pieces are less than 2 centimeters long.

Isolate 9. This isolate is an oval pumice stone that could have been used as a tool in prehistoric times. The piece measures 10 centimeters in length, 6 centimeters in width, and 3 centimeters in thickness. The cultural nature of this piece is undetermined.

Isolate 14. This isolate is a complete ground stone (handstone/mano) found on a salt flat on the Owens Lake bed. The handstone is made of the local dolomite and measures 11 centimeters in length, 8 centimeters in width, and 4.5 centimeters in thickness. There is a flake scar on one side. The handstone is rectangular and appears to have been shaped on all sides; however, it is too weathered to determine use-wear patterns.

Isolate 15. This isolate is a multidirectional core/tool made of basalt. The flake scars are interrupted by impurities in the stone. The isolate dimensions are 8.8 centimeters in length, 7.7 centimeters in width, and 6.1 centimeters in thickness.

Isolate 16. This isolate consists of a secondary obsidian flake. The artifact measures 1.4 centimeters in length, 1.2 centimeters in width, and 0.3 centimeter in thickness.

Isolate 18 (Collected). This isolate is an almost complete, well-made obsidian projectile point measuring 3.3 centimeters in length (incomplete), 2 centimeters in width, and 0.5 centimeter in thickness. The point weighs 0.5 gram and its very tip is missing. The artifact has the morphological characteristics of an Elko eared point, showing a concave base and basal ears. However, the shoulders have been reworked and are barely insinuated. The point is symmetrical in silhouette, profile, and cross section, and exhibits pressure flaking along the edges (Figure 5.1.2.3-10).

Isolate 19 (Collected). This artifact is an obsidian projectile point that exhibits the characteristics of both a Pinto and an Elko series. It is poorly made and exhibits an excurvate blade and basal ears. The artifact is 5 centimeters in length, 2.4 centimeters in width, and 1 centimeter in thickness, and weighs 9.9 grams. The point is very asymmetrical in silhouette, profile, and cross section. Therefore, placing the point into either Thomas' (1981) or Warren's (2002) key is not possible due to the variation in measurements. However, based on thickness alone (> 0.64 centimeter), the point falls within the Pinto category as described by Warren (2002:235). In silhouette, the tip of the point curves slightly to one side. Thinning of the point is uneven; one side exhibits a "lump" that was not removed near the shoulder, and several step fractures. The other side shows a large (approximately 1 centimeter) flake scar that ended in a step fracture as well. Both shoulders are uneven. One side of the point is heavily

Isolate 1

Isolate 18

FIGURE 5.1.2.3-10
Isolates 1 and 18

weathered and has a white thin layer covering the entire artifact, probably the result of the artifact laying on top of the salt flats (Figure 5.1.2.3-11, *Isolate 19*).

Isolate 20 (Collected). This isolate is an Elko-eared obsidian projectile point, with one shoulder and the very tip missing. The broken tip exhibits rework, possibly an attempt to rejuvenate the point. The artifact exhibits a concave base, basal ears, and narrow notches, and non-patterned flaking on both sides. Isolate 20 is asymmetrical in silhouette, and symmetrical in profile and cross section. The point is 3.3 centimeters in length (incomplete), 2.7 centimeters in width (incomplete), and 0.5 centimeter in thickness, and weighs 4 grams. The breakage of the tip and at the notch suggest breakage at impact (Titmus and Woods 1986, and Flenniken and Raymond 1986) (Figure 5.1.2.3-12, *Isolates 20 and 24*).

Isolate 21. This isolate consists of a fine-grained sedimentary stone (possibly siltstone) with three parallel incisions on one side. The stone measures 16 centimeters in length, 7 centimeters in width, and 4 centimeters in thickness. The incisions are 3 centimeters in length and run lengthwise at one end of the stone. The incisions are bounded on one end by the border of the stone and on the other by a natural line running perpendicular to them.

Isolate 22. Isolate 22 is an obsidian interior flake showing possible retouch. The flake measures 3.5 centimeters in length, 2.5 centimeters in width, and 0.5 centimeters in thickness.

Isolate 23. This isolate is an obsidian interior flake. The flake measures 3.0 centimeters in length, 2.0 centimeters in width, and 0.3 centimeter in thickness.

Isolate 24 (Collected). This artifact is a very long, remarkably well-made obsidian biface broken at the base. Isolate 24 is 9.1 centimeters in length, 2.6 centimeters in width, and 0.6 centimeters in thickness, and weighs 16.3 grams. The artifact exhibits oblique pressure flaking and it is symmetrical in silhouette, profile and cross section. A small portion of the base (~ 0.5 centimeters) is present, suggesting an ear. The biface was carefully made, and flake patterning, symmetry, and thickness suggest a finished point. Although the missing base does not allow a precise characterization, the characteristics of this artifact are very similar to the Elko Corner-notched point from the Owens Lake bed reported by Wells (2003:58, 59) (Figure 5.1.2.3-12).

Isolate 25. This isolate is an obsidian secondary flake (approximately 15 percent of cortex), measuring 2.5 centimeters in length, 2.4 centimeters in width, and 0.3 centimeter in thickness.

Isolate 26. This isolate is a rhyolite multidirectional core measuring 6 centimeters in length, 8 centimeters in width, and 5 centimeters in thickness. The core was found just outside the survey area.

Isolate 27 (Collected). Isolate 27 is a biface made of mottled chert, measuring 6.7 centimeters in length, 3.9 centimeters in width, and 0.7 centimeter in thickness. The artifact weighs 20.3 grams, and is symmetrical in silhouette, profile, and cross section. This biface exhibits pressure flaking along the entire margin and has a concave base. This artifact was found in the Owens Lake bed adjacent to the soda evaporation ponds, just outside the survey area; it was collected because it is considered to be an at-risk artifact (Figure 5.1.2.3-13, *Isolate 27*).

Isolate 30. This isolate is as obsidian interior flake measuring 5 centimeters in length, 3 centimeters in width, and 1.5 centimeters in thickness.

Isolate 32 (Collected). This isolate is an obsidian biface, measuring 7.8 centimeters in length, 3.4 centimeters in width, and 0.9 centimeter in thickness. The artifact weighs 24.1 grams. It is symmetrical

Isolate 19

FIGURE 5.1.2.3-11
Isolate 19

Isolate 20

Isolate 24

FIGURE 5.1.2.3-12
Isolates 20 and 24

Isolate 27

FIGURE 5.1.2.3-13
Isolate 27

in silhouette, and slightly asymmetrical in profile and cross section, with a straight base. The biface exhibits percussion flaking only and grinding along the margins. One side shows a few flakes that terminated in step fractures. The other side appears to be fluted.

Isolate 33. The isolate is as obsidian interior flake, measuring 2.5 centimeters in length, 2.0 centimeters in width, and 0.3 centimeter in thickness.

Isolate 34 (Collected). This artifact is a long, well-made lanceolate obsidian biface broken at the base; the very tip is also missing. Isolate 34 is 6.7 centimeters in length (incomplete), 2.9 centimeters in width, and 0.9 centimeter in thickness, and weighs 17.4 grams. The artifact exhibits pressure flaking along the edges and has a plano-convex cross section. In silhouette, this artifact shows two indentations located 2.3 centimeters below the tip, suggesting incipient notches. The flake patterning, symmetry, and thickness of the artifact suggest a finished point.

Isolate 35 (Collected). This isolate is a Rose Spring Corner-notched obsidian projectile point. Its very tip and part of one shoulder are missing. The artifact is 2.8 centimeters in length, 2.2 centimeters in width, and 0.4 centimeter in thickness, and weighs 1.9 grams. In spite of the breaks, the point appears to have been symmetrical in silhouette, profile, and cross section. Isolate 35 exhibits straight margins and an expanding base. Although its morphological characteristics are clearly those of a Rose Spring, its basal width of 1.2 centimeters does not conform with Thomas' (1981:25) classification key. However, this exception to the rule is common (see Basgall and Giambastiani 1995:47, and Justice 2002:436, 437) (Appendix E).

Isolate 36. The isolate is a possible unifacial grinding stone made of fine-grained volcanic material. One face has a smooth surface that exhibits a shiny luster when viewed against the sun. This surface was face down on the salt flat. The artifact measures 12 centimeters in length, 9.5 centimeters in width, and 4.6 centimeters in thickness. The worn surface measures 3 by 3 centimeters.

Isolate 37. This isolate is an obsidian biface thinning flake. The flake measures 4.7 centimeters in length, 3.9 centimeters in width, and 0.4 centimeter in thickness.

Isolate 38. This isolate is an obsidian interior flake, measuring 2.5 centimeters in length, 2.0 centimeters in width, and 0.4 centimeter in thickness.

Isolate 43. This is an interior obsidian flake, measuring 2.5 in length, 2.2 inches in width, and less than 5 centimeters in thickness.

Isolate 46. The isolate is an obsidian biface thinning flake. Flake measures 2.6 centimeters in length, 1.3 centimeters in width, and 0.3 centimeter in thickness.

Isolate 48. This isolate consists of an obsidian biface fragment. Isolate measures 1.7 centimeters in length, 1.3 centimeters in width, and 0.7 centimeter in thickness.

Isolate 50 (Collected). The morphological characteristics of this point suggest a possible Elko-eared projectile point. However, damage to the point and lack of symmetry in silhouette, profile, and cross section preclude any accurate angle measurements. This isolate is 4.5 centimeters in length (incomplete), 2.9 centimeters in width, and 0.8 centimeter in thickness, and weighs 6.2 grams. The material is difficult to determine due to weathering; it may either be an opaque obsidian or black chert. One ear and part of one of the shoulders are missing. The point is poorly made and has been heavily damaged. One margin exhibits deep indentations as if the point had been used for cutting a hard

object. The other margin is straight and the shoulder is clearly defined. One side of the point has a "lump", showing an uneven thinning process (Figure 5.1.2.3-14, *Isolates 50, 55, and 57*).

Isolate 51. This isolate is an obsidian interior flake measuring 5.5 centimeters in length, 3 centimeters in width, and 0.5 centimeter in thickness.

Isolate 52. This isolate is a late-stage basalt biface thinning flake. Flake measures 3.8 centimeters in length, 2.7 centimeters in width, and 0.5 centimeter in thickness.

Isolate 55 (Collected). This isolate is a Lake Mojave obsidian projectile point that measures 4.2 centimeters in length (incomplete), 2.3 centimeters in width, and 0.6 centimeter in thickness, and weighs 6.8 grams. This point has a blade that is much shorter than the stem, possibly due to resharpening, which is typical of the Lake Mojave series. The stem is broken at the very end and the tip exhibits a pointy termination. This point was made from opaque banded obsidian. The artifact exhibits percussion flaking and one only one of the margins appears retouched by pressure flaking. Despite the break at the base, the artifact appears to have been symmetrical in silhouette, profile, and cross section. Although part of the base is broken, this point is similar to those described by Warren (2002:131) (Figure 5.1.2.3-14).

Isolate 57 (Collected). This isolate is a small Cottonwood Leaf-shape obsidian projectile point that measures 1.9 centimeters in length, 1.2 centimeters in width, and 0.37 centimeter in thickness, and weighs 0.8 grams. This artifact is an expedient point made from a slightly curved flake, whose ventral side has little work. The point is symmetrical in silhouette and asymmetrical (plano-convex) in profile and cross section. The point exhibits pressure flaking throughout. Expedient forms such as these have been reported the western Mojave desert, as part of late assemblages (Walsh and Green 2002:246) (Figure 5.1.2.3-14).

Isolate 58. This isolate is an obsidian interior flake, measuring 2.2 centimeters in length, 1.2 centimeters in width, and 0.3 centimeter in thickness.

Isolate 59. This isolate is an obsidian tertiary flake. The flake is less than 3 centimeters in length.

Isolate 62. This isolate is an interior obsidian flake, measuring 2.3 centimeters in length, 1.5 centimeters in width, and 0.3 centimeter in thickness.

Isolate 64. This is a basalt interior flake with possible retouch along one edge, measuring 8.0 centimeters in length, 6.8 centimeters in width, and 1.0 centimeter in thickness.

Isolate 65. This is an interior chert flake, measuring 1.3 centimeters in length, 1.2 centimeters in width, and 0.1 centimeter in thickness.

Isolate 71. This isolate consists of an obsidian biface tip. The broken portion exhibits a hinge fracture. The artifact is well-weathered on one side and slightly weathered on the other. One margin exhibits possible retouch. Isolate 71 measures 3.2 centimeters in length, 2.3 centimeters in width, and 0.4 centimeter in thickness.

Isolate 72. This isolate is an obsidian biface fragment (base missing) measuring 6.2 centimeters in length, 2.7 centimeters in width, and 0.8 centimeter in thickness. The artifact is heavily weathered on both sides.

Isolate 50

Isolate 55

Isolate 57

FIGURE 5.1.2.3-14
Isolates 50, 55, and 57

Isolate 74. This isolate is an obsidian biface base measuring 3.3 centimeters in length, 2.4 centimeters in width, and 0.8 centimeter in thickness. The broken portion exhibits a hinge fracture.

Isolate 75. This isolate is an obsidian biface fragment (possibly a base). The artifact measures 2.5 centimeters in length, 2.4 centimeters in width, and 0.5 centimeter in thickness. It is heavily weathered.

Isolate 76. The isolate consists of an obsidian biface midsection, measuring 3.8 centimeters in length, 1.2 centimeters in width, and 0.6 centimeter in thickness. The artifact is heavily weathered.

Isolate 79 (Collected). This isolate is a small, narrow Cottonwood Leaf-shape obsidian projectile point that measures 2.5 centimeters in length, 0.8 centimeters in width, and 0.4 centimeter in thickness, and weighs 0.8 grams. The point is symmetrical in silhouette, profile, and cross section. The point exhibits pressure flaking throughout (Figure 5.1.2.3-15, *Isolates 79, 83, and 87*).

Isolate 81. This isolate is a late stage obsidian biface thinning flake. The flake measures 3.1 centimeters in length, 1.4 centimeters in width, and is less than 0.5 centimeter thick.

Isolate 82. The isolate consists of three obsidian interior flakes. All the pieces are less than 3.5 centimeters in length.

Isolate 83 (Collected). This isolate is an obsidian projectile point that has been reworked. The artifact measures 3.8 centimeters in length (incomplete), 2.8 centimeters in width, and 0.6 centimeters in thickness, and weighs 5.7 grams (Figure 5.1.2.3-15). The blade is excurvate and it narrows towards the tip as if to form the beginning of a drill. The very tip, one ear, and the base are broken. The flake removals along the entire edge (including the broken portions) also indicate reworking of the point. The remaining shoulder and its size suggest an al Elko series projectile point similar to that illustrated by Justice (2002:301, Figure 27.12).

Isolate 84. This isolate consists of a multidirectional obsidian core. The artifact is 5 centimeters in length, 2.7 centimeters in width, and 2.1 centimeters in thickness.

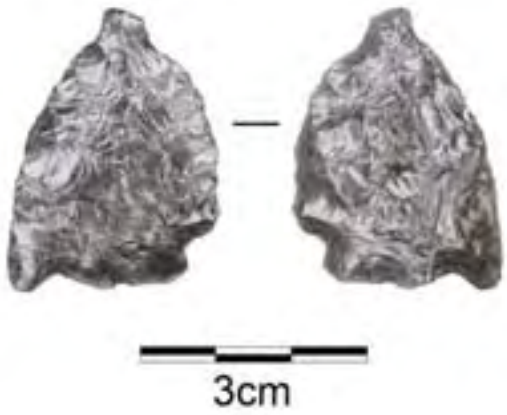
Isolate 85. This isolate is a retouched chert flake measuring 3.1 centimeters in length, 3.0 centimeters in width, and 1.0 centimeter in thickness. The piece has multiple inclusions.

Isolate 86. This isolate is the midsection of a chert biface fragment measuring 4 centimeters in length (incomplete), 4.3 centimeters in width, and 0.9 centimeter in thickness. The material is a poor quality chert with natural cracks, which caused several flake scars to end in step fractures.

Isolate 87 (Collected). The isolate is a small biface, possibly a Leaf-shaped obsidian point. The very tip and part of the base are missing. The artifact measures 3.1 centimeters in length (incomplete), 1.8 centimeters in width, and 0.6 centimeter in thickness, and weighs 3.8 grams. The biface is very weathered and flake scars are only insinuated in one side and barely visible on the other one. Recent edge damage (evident as fresh breaks) is present along one of the margins. Isolate 87 is symmetrical in silhouette, profile, and cross section (Figure 5.1.2.3-15).

Isolate 88. This isolate consists of a multidirectional chert core, measuring 5.8 centimeters in length, 4.3 centimeters in width, and 3.2 centimeters in thickness.

Isolate 79



Isolate 83

Isolate 87

FIGURE 5.1.2.3-15
Isolates 79, 83, and 87

Isolate 89 (Collected). This isolate is a rusty-colored chert biface, larger than any typeable point, and narrow (these types of artifacts were classified as knives by Basgall and McGuire 1988:176, 177, 178 at the CA-INY-30 site). The artifact measures 10.4 centimeters in length, 2.8 centimeters in width, and 0.71 centimeter in thickness, and weighs 26.1 grams. It exhibits a round base and the blade narrows to a point at approximately 8 centimeters from the base. Isolate 89 is slightly asymmetrical in silhouette (due to the uneven narrowing at the tip), and symmetrical in profile and cross section. The irregular narrowing at the tip may have been caused by an attempt to fix a breakage, since the material has several linear inclusions that could create points of weakness. The specimen was manufactured by percussion flaking only (Figure 5.1.2.3-16, *Isolates 89 and 102*).

Isolate 90 (Collected). This isolate is an obsidian biface fragment (base is broken), measuring 5.6 centimeters in length (incomplete), 3.4 centimeters in width, and 0.9 centimeter in thickness. Its weight is 15.8 grams. The very tip of the biface has been worked into a round end. Percussion flaking is clear on one side, but other side is heavily weathered. The fragment is asymmetrical in silhouette, and symmetrical in profile and cross section.

Isolate 100 (Collected). Isolate 100 is an obsidian biface broken at the base, measuring 4.2 centimeters in length (incomplete), 2.5 centimeters in width, and 0.8 centimeter in thickness, and weighing 7.7 grams. The artifact is very weathered and flake scars are barely visible. This fragment is symmetrical in silhouette and slightly asymmetrical in profile and cross section.

Isolate 102 (Collected). This isolate is an obsidian projectile point that shows morphological characteristics of both the Pinto and Elko series (Figure 5.1.2.3-16). However, application of Warren's (2002) key clearly identifies it as Pinto. The point measures 3.8 centimeters in length, 2.6 centimeters in width, and 0.9 centimeters in thickness, and weighs 7.8 grams. It is fairly symmetrical in silhouette, profile, and cross section. The artifact exhibits pressure flaking along portions of the flake. It has sloping shoulders and a slightly concave base. The base exhibits a large flake that terminated in a step fracture, suggesting a knapping error.

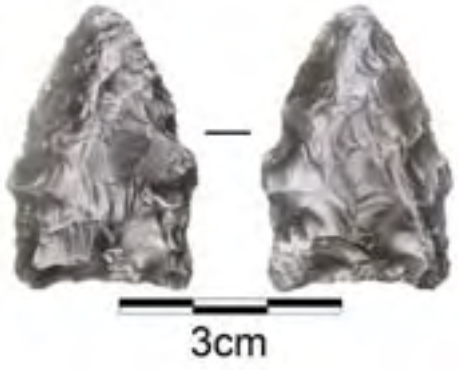
5.1.2.4 Discussion of Prehistoric Sites and Isolates

Distribution

The distribution of the prehistoric sites and isolates recorded during the current effort appears to form clusters in some areas of the lake (Figure 5.1.2.3-1). This may be a result of the required survey areas for the proposed project and are not indicative of prehistoric settlement patterns. However, some significant observations may be drawn from the newly acquired data. Those archaeological sites located on the northwest portion of the lake (OL Sites 5, 6, and 7) are located below the historic shoreline (characterized by sand and gravel) and extend onto the Owens Lake playa. Although the artifacts scattered along the playa may have resulted from erosion of the sites located at higher elevations, the co-occurrence of multiple artifact classes (such as ground stone and lithic debitage) within the sites in the playa suggests otherwise. These cultural deposits may be associated with old shorelines, such as those identified by Stine (1994). These findings are consistent with previous investigations (i.e., Wells, 2003), which have demonstrated that areas of cultural sensitivity were not restricted to those places above the historic shoreline.

One site (OL Site 1) was recorded on the southwestern portion of the lake. Although the distribution of the artifacts appears to be restricted to concentrations within the washes, two concentrations (Concentrations 1 and 9) exhibited an unusual number of tools. It is assumed that if the artifacts have all been transported and redeposited by water the ratio of tools to debitage should be similar

Isolate 89



Isolate 102

FIGURE 5.1.2.3-16
Isolates 89 and 102

throughout the drainages. The higher presence of tools warrants further examination. Phase II investigations may determine a depositional sequence for this portion of the lake and address the distribution of tools considering both natural processes and human activities.

One of the most intriguing finds at Owens Lake is the large number of isolated projectile points and non-diagnostic bifaces present throughout the lake bed. These findings were recorded during the surveys in 2003, during monitoring activities in later years, and during the current survey. It is expected that if these points have been washed out from sites on the shoreline, the Owens River, or on smaller drainages, a larger number of debitage pieces should also be present. Debitage usually outnumbers tools and a site washed into the lake should present similar frequencies as those from the site. Only on rare occasions, one or two flakes were noted in association with the points/bifaces. Although it is possible that both points/bifaces and debitage travel during rainy periods, and are subsequently sorted according to weight and/or shape, a higher amount of debitage should still be present. In addition, unauthorized collection (pothunting) of artifacts in the area is common, and would have focused on the points and bifaces. Thus, the current ratio of these artifacts to debitage is even more intriguing.

Understanding artifact distribution in the lake requires a better knowledge of the hydrological and geomorphological conditions of the lake combined with analysis of artifact distribution based on a compilation of the data currently available for the lake. Answers to these questions are out of the scope work, but could be addressed in future investigations.

Site Function

The prehistoric sites identified during the current survey are mostly lithic scatters, which suggest hunting activities. Evidence of plant processing was only noted in those sites located near the shoreline, in areas with sandy soil and vegetation. In general, this trend coincides with what has been noted in previous investigations, sites within the Owens Lake bed are characterized by lithics only, and sites near the shoreline have a wider arrange of artifact classes. Phase II investigations of the newly recorded sites, combined with previously recorded data will increase the information regarding site function along Owens lake shoreline and within the lake bed.

Chronology

During the present survey, a total of 26 chronologically sensitive or diagnostic projectile points were recorded, including artifacts found as isolates and within sites. Virtually all time periods associated with archaeological sites from the Great Basin are represented (Table 5.1.2.4-1, *Projectile Point Types Represented during the Phase I Survey*), and these findings agree with those from previous investigations (Walsh 2003).

TABLE 5.1.2.4-1
PROJECTILE POINT TYPES REPRESENTED DURING THE PHASE I SURVEY

Epoch	Owens Valley Region	Mojave Desert Region	Dates	Projectile Point Types*
Early Holocene	Early	Lake Mojave	Pre ~ 7000 BP	2 Lake Mojave
Middle Holocene	Little Lake	Pinto	~7000 BP to ~3500 BP/3150 BP	2 or possibly 3 Pinto 3 possible Borax Lake
Late Holocene	Newberry	Gypsum	~3150 BP to ~1350BP	4 or possibly 6 Elko 2 Humboldt*
	Haiwee	Rose Spring	~1350 BP to ~650 BP	2 Rose Spring
	Marana	Late Prehistoric	~650 BP to Historic contact	4 Cottonwood

NOTES:
* The four Leaf-shaped points need to be dated to more accurately place them in time.
** Humboldt points may represent activity during the Little Lake Period

An accurate classification of projectile points from the Owens Lake bed has sometimes been problematic due to the heavy weathering caused by wind and water, and the alkaline conditions of the lake. On occasion, heavily weathered artifacts do not show the features necessary for its proper classification, such as notches, shoulders, and/or basal indentations. In addition, weathering causes confusion when determining material types, since opaque obsidian can be mistaken for basalt or even dark chert. However, a remarkable number of points and non-diagnostic bifaces found during the current survey exhibited very little to no weathering, which facilitated the description and characterization of the artifacts.

As a result of the current survey, the Marana period is represented by four Cottonwood series projectile points, and evidence of the Haiwee period consists of two Rose Spring series points. The Newberry period had the highest representation with six Elko series points (two artifacts could only be tentatively classified as Elko due to their fragmentary nature). One Humboldt series point and a drill manufactured from a Humboldt series point are also representatives of the Newberry period and possibly the Little Lake period as well. The Little Lake period is represented by two Pinto series point and one point tentatively classified as Pinto. Two Lake Mohave points suggest activity during the Lake Mojave period. In addition, three points tentatively classified as Borax Lake series were also recorded. Although the time frame for these points is still not widely accepted, the estimated range of 8000 to 5000 BP places the Borax series points in the Little Lake period. The same is true for the four Leaf-shaped projectile points found during the survey, which are not considered reliable time markers. Hydration analysis of Leaf-shaped points compared with the dates from diagnostic points may provide a relative date for the Leaf-shaped specimens of the area. This information could be compared with similar data from other parts of the Great Basin.

It is possible that those archaeological sites that do not exhibit chronological continuity with only certain periods represented may indicate discontinuous occupations. On the other hand, sites that contain projectile points representing a wide range of time periods may be the result of steady occupation. Occupation of these archaeological sites may be tested through the classification of diagnostic artifacts and by submitting a selected sample of debitage for hydration and sourcing analysis.

5.1.3 Historic Resources

The results of the records searches on November 16, December 6, 2006, and March 14, 2007 at the Eastern Information Center at the University of California, Riverside, identified five historic archaeological sites previously recorded on the Owens Lake bed, below the historic shoreline: CA-INY-5792H, CA-INY-6063H, CA-INY-6375H, CA-INY-7640H, and CA-INY-7641H.

In addition, several historic resources have been recorded and or designated within 1 mile of the historic shoreline of the proposed project area and adjacent to the proposed project area (District 1997, Jones and Stokes 1997, Wells 2003, LADWP 2000, LADWP 2002, Nelson 2001, and District 2003b), including several resources that have been recognized as California Historical Landmarks or Points of Historical Interest. Some of these resources are associated with the historic town of Cartago (located at the southwestern-most portion of the lake). In addition to the historic resources associated with the town of Cartago, these resources include the Cartago Boat Landing (State Point of Historic Interest SPHI-INY-006), a portion of a wood stove pipeline related to salt extraction operations in the town, remnants of the California Alkali Company (also known as the Inyo Chemical Company), and other historic resources related to the initial settlement of the town (Jones and Stokes 2002c, and Jones and Stokes 2005c). Other historic resources within 1 mile of the historic shoreline of the proposed project area include (Jones and Stokes 1997): Natural Soda Products Company (NSPC), recommended as eligible for the NRHP; the towns of Keeler and Swansea; the historic settlement of Tramway and the various resources associated with them; the Owens Lake Silver–Lead Furnace (State Historic Landmark SHL-0752); the Saline Valley Salt Tram Historic Structure (NRHP 19-74000514); the Cottonwood Charcoal Kilns (State Historic Landmark SHL-537); and the Keeler End of the Line (State Point of Historic Interest SPHI-INY-004).

5.1.3.1 Historic Period

Exploration

The Spanish who controlled and colonized much of California never ventured beyond the western portion of the Sierra Nevada Mountains (Wehrey, J. 2006:2). The first Euro-Americans to visit the Owens Valley were probably mountain men and prospectors. The first organized expedition to the Owens Valley was conducted by Joseph Reddeford Walker around1834. Walker was a fur trapper who traversed the valley several times. In 1843, Walker led the J.B. Childs (Chiles) party to California by way of the Humboldt Sink, Walker Lake, Owens Valley, and Walker Pass. Walker followed the same passage in 1845 on John Fremont's third expedition through California. It was during this expedition that Fremont named the Owens Valley after his traveling companion, Dick Owens, even though it is believed that neither one of them had actually stepped foot in the valley (Wilke and Lawton 1976:9). One of the earliest surveys of the Owens Valley was conducted in 1855-56 by Henry Washington and A.W. von Schmidt, who were sent by the U.S. Bureau of Land Management and the State of California Surveyors Office (Wilke and Lawton 1976:9). The exploration of the Owens Valley by Euro-Americans is directly linked with the lives of the Native Americans, the Owens Valley Paiute, who lived in the area at the time of the first expeditions. The first explorers left scant records concerning these expeditions and the native populations of the Owens Valley. Nonetheless, Schmidt made the first description of the irrigation methods used by the Owens Valley Paiute (Lawton et al. 1976:23), and Captain J.W. Davidson during his expedition from Fort Tejon to the Owens Valley in 1859 also described the lives of the Paiute. As a result of his expeditions, Captain Davidson suggested that the government should protect the Native Americans and that a portion of land should be set aside for a

reservation, which from his point of view could be self-sustaining (Wilke and Lawton 1976:31). This was the first of many attempts to create reservations in the area.

Towns

Initial settlement of the Owens Lake region by Euro-Americans began in 1861, when Barton and Alney McGee introduced a small herd of cattle and built a log cabin in the area that would later become the town of Lone Pine (Jones and Stokes 1997:12). Beginning in the 1870s, the mining and soda extraction industries caused a number of towns to spring up around Owens Lake: Swansea and Keeler on the east shore of the lake were centers for silver smeltering and mineral extraction, while Olancha and Cartago on the western shore were important transportation centers for freight and raw materials moving in and out of the region (Figure 5.1.3.1-1, *Historic Period Resources*). The five towns of Lone Pine, Swansea, Keeler, Olancha, and Cartago, and associated industries, are described primarily based on the work by Jones and Stokes (1997) and supplemental sources of information.

Lone Pine

In 1860, a loosely organized prospecting camp known as the "Hill Party" was located in the area that would later become the town of Lone Pine (Figure 5.1.3.1-1), where independent prospectors searched for gold and silver (DeDecker 1966:41). In 1861, Barton and Alney McGee raised cattle and built a log cabin in the area (Jones and Stokes 1997:12). In the 1870s, Lone Pine was the commercial center providing goods and services to the mines located throughout the Owens Valley. On March 26, 1872, an earthquake took place on the eastern side of Sierra Nevada. Twenty-three deaths were reported and 52 of the 59 adobe houses in the town were destroyed. The earthquake forced the mountain range upward, relative to the valley, approximately 13 feet, while producing a lateral slide to the northwest by about 16 feet. The surface ruptured along a fault line that was noticeable for a distance of approximately 100 miles, and the quake could be felt as far away as San Diego (Fiero 1986:189). At Owens Lake, the shoreline at Swansea receded 150 feet, requiring an extension for the newly constructed steamboat wharf (DeDecker 1966:61).

Swansea

Swansea is located 9 miles southeast of Lone Pine along State Route 136 (Figure 5.1.3.1-1). Swansea, named for the town in Wales, held the smelter of the Owens Lake Company and was the final destination of the silver ore mined from Cerro Gordo (The South Wales Evening Post 1997). The smelter operated from 1869 through 1874 and at its peak produced 150 bars of silver ore per day weighing 83 pounds each. The Owens Lake Company owned the steamer Bessie Brady, and in 1872 the company constructed a 300-foot wharf for the steamer located at Swansea (Chalfant 1933:290). In 1874, the Owens Lake Company went bankrupt and the steamer Bessie Brady was sold and moved to Keeler. That same year a rain storm buried Swansea under several feet of mud and debris, and today all that remains of Swansea are the ruins of the brick smelter (Nadeau 1958:188).

Keeler

Keeler is located 15 miles southeast of Lone Pine along State Route 136 (Figure 5.1.3.1-1). In 1873, as part of the Cerro Gordo Freight Company's consolidation, a new wharf was constructed for the steamer Bessie Brady on the northeast shore of Owens Lake, in an area that would later be known as the town of Keeler. In1879, Captain Julius M. Keeler, acting on the behalf of David N. Hawley and other east coast financiers, formed the Owens Lake Mining and Milling Company. The group purchased the Union Consolidated Mine and made plans to construct a ten-stamp mill at the town of Keeler, locally

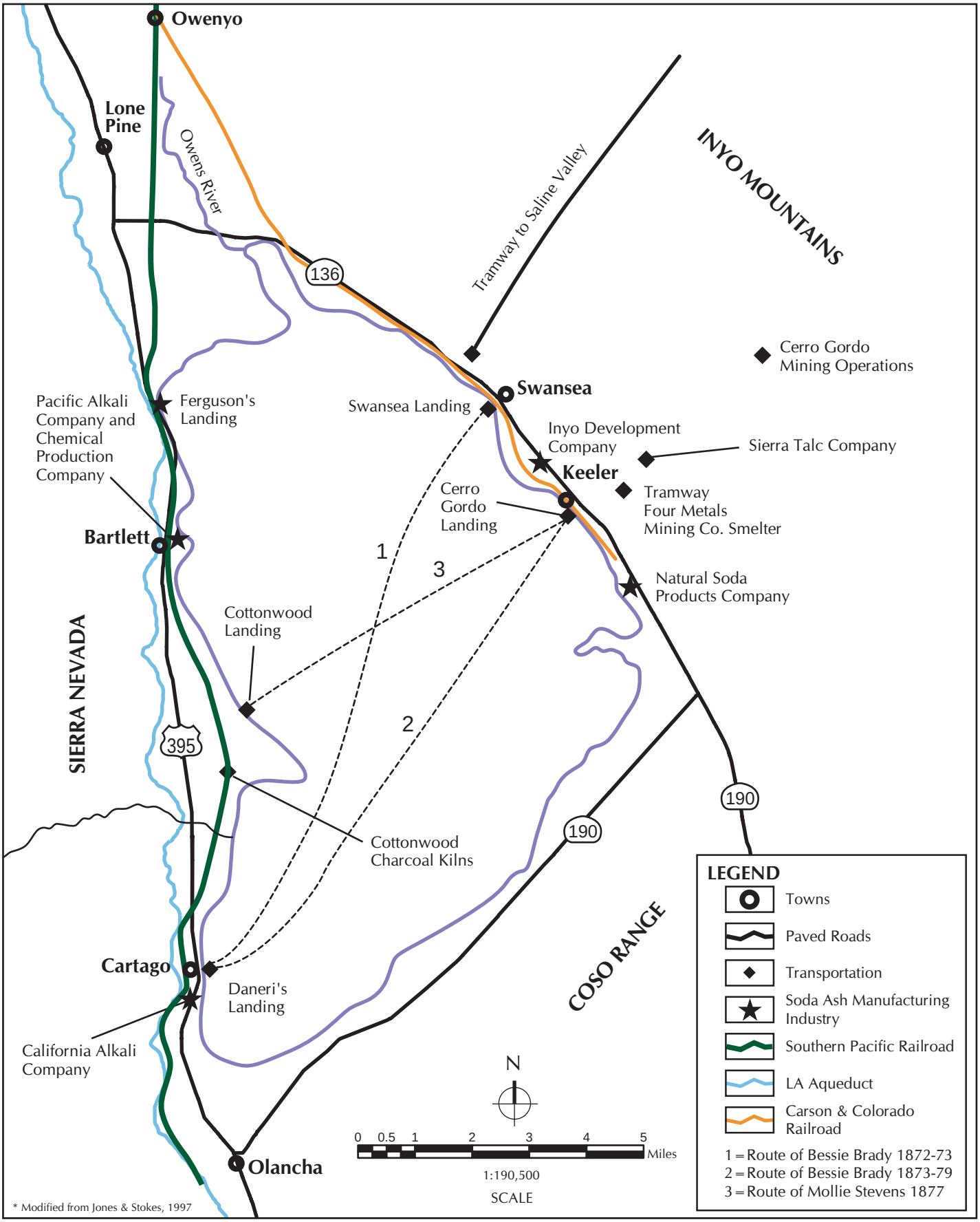


FIGURE 5.1.3.1-1
Historic Period Resources

known as Hawley. On March 1, 1880, with the ground breaking of the new mill, the site was renamed Keeler (Ligenenfelter 1962:4). In July of 1883, the Carson & Colorado Railroad line was completed at Keeler (Due 1951:259).

By 1920, Keeler was the wealthiest town in Inyo County. Keeler had schools, hotels, and a Chinatown district, and was the main depot for the Carson & Colorado Railroad (Krautter 1959). The community contained three chemical processing plants and produced 47,000 tons of soda ash bicarbonate each year, which constituted more than half of all the soda products consumed in the United States annually (Kahrl 1982:224).

Olancha

Olancha is located where the current U.S. Highway 395 intersects State Route 190 (Figure 5.1.3.1-1). Beginning in the late 1860s, the town, which included a stagecoach depot, was a principal logistical and transportation center between the Cerro Gordo silver mines and Los Angeles. After the mining operations at Cerro Gordo ceased, Olancha turned into an agricultural center, and with the arrival of Southern Pacific Railroad in 1910, became a hub for the distribution of materials used for the construction of the Los Angeles Aqueduct (Wright 2005). In1862, M.H. Farley built the first mill in the Owens Valley along Olancha Creek, approximately 0.5 mile south of the location that would later become the town (Roberts and Roberts 2004:535). The following year, Farley built a stamp mill, a blacksmith shop, and a sawmill, all which were burned down by local Native Americans in 1867.

Cartago

Cartago is located on U.S. Highway 395, approximately 18 miles south of the town of Lone Pine (Figure 5.1.3.1-1). Located on the south side of Owens Lake, the town was originally known as Daneri's Landing where the steamers Bessie Brady and Mollie Stevens were moored. The Cerro Gordo Freight Company was headquartered at Cartago, which was the starting point for mule trains transporting silver bullion south to Los Angeles (DeDecker 1966:61). The volume of bullion extracted from the mines so exceeded the capacity of the mule trains that in 1872 temporary housing was built at Cartago from the estimated 18,000 bars of silver awaiting shipment to Los Angeles. With the decline of silver production, and the arrival of the Southern Pacific Railroad, Cartago became a transportation center for the chemicals and soda products being processed at Owens Lake (Jones and Stokes 1997:13). The California Alkali Company plant was established in Cartago in 1917, but was closed down soon after the end of World War I, and was purchased by the Inyo Chemical Company in 1923. The Inyo Chemical Company processed soda products and chemicals, and operated an ice plant at Cartago (Pipkin 1974:2-3).

Transportation

Several distinct transportation industries, including trams, mule teams, boats, and railroads, played important roles in the industrial and economic histories of the Owens Lake region. The first three modes of transportation were needed to efficiently move raw materials and silver bullion to and from the Cerro Gordo mines. The fourth mode, the railroad, was not use intensively until the construction of the Los Angeles Aqueduct in the early twentieth century (Figure 5.1.3.1-1).

Tramway

The Leschen Aerial tramway and its support facilities are located along State Route 136, 7 miles east of Lone Pine (Figure 5.1.3.1-1). The tramway was constructed in 1913 to bring salt from the Saline Valley

over the Inyo Mountains to the eastern shore of Owens Lake, and later zinc ore from Cerro Gordo to Keeler. The electric-powered tram had an hourly capacity of 16 tons, and was 29,560 feet long from tower to tower. After 1920, the tram was used to bring limestone for the Natural Soda Product and Clark Chemical Plant at Bartlett. Later the tram was disassembled and sold to a Nevada firm, but was never used again (DeDecker 1966:65).

Mule Teams

In 1873, Mr. Belshaw, Mr. Beaudry, and Mr. Nadeau formed the Cerro Gordo Freight Company, with Nadeau receiving a three-year contract from Belshaw and Beaudry to run the freight operations. The new company purchased 80 wagons, each of which were said to hold as much cargo as a narrow gauge railroad box car. Nadeau set up a chain of way-stations for the mule teams between Cartago and Los Angeles, and the round trip took approximately three weeks. The Cerro Gordo Freight Company dissolved in 1881 (Chalfant 1933:312).

Steamboats

James Brady, the superintendent of the Owens Lake Silver-Lead Company at Swansea and a competitor of the Consolidated Union mine's Mr. Belshaw, came up with the idea of using a steamer to ferry silver bullion from Swansea to the town of Cartago (Figure 5.1.3.1-1). On June 27, 1872, the steamer Bessie Brady (named after Brady's daughter), made her maiden voyage carrying 700 bars of silver to Daneri's landing (Figure 5.1.3.1-1), later renamed Cartago. The new steamer took 3 days off the shipment time for bullion from Swansea to Cartago. The steamer was a financial success for many years, even though James Brady sold his interest in the Owens Lake Silver-Lead Company long before the steamer was able to generate large profits for the company. In 1873, Bessie Brady was sold to the Cerro Gordo Freight Company and moved to the newly constructed wharf at Keeler (DeDecker 1966:59).

In 1873, Colonel Sherman Stevens constructed a flume at Cottonwood Canyon, west of Owens Lake. By 1876, it was incorporated into the Inyo Lumber & Coal Company and flume was extended onto the Owens Lake shoreline. The company built its own steamer, named the Mollie Stevens after Colonel Stevens's daughter, in 1877. Smaller than the Bessie Brady, the Mollie Stevens made her maiden voyage in June of that year carrying 30,000 feet of lumber for the Union Consolidated Company (DeDecker 1966:61). However, with the decline of mining activities at Cerro Gordo the following year, the Molly Stevens was moored at Ferguson's Landing (Figure 5.1.3.1-1) and her engine was removed and sent to the Bessie Brady (Ligenenfelter 1962:4). In 1882, while she was being refurbished and refitted with the Molly Stevens' engine, a fire broke out and engulfed the Bessie Brady. The steamer was a total loss (Ligenenfelter 1962:4).

The Carson & Colorado Railroad

The Carson & Colorado Railroad was originally constructed to connect Virginia City with the Central Pacific Railroad at Reno, Nevada. The Virginia City line proved to be profitable, and the railroad wanted to expand the line south to take advantage of the mining boom along the eastern Sierras from the Candelaria Mountains to Owens Lake. In 1880, financed by D.O. Mills, William Ralston and William Sharon from San Francisco, the line was extended from Virginia City to Keeler (Due 1951:254). To save money, the financiers had a narrow gauge rail line constructed on the eastern side of the Sierras where the terrain was relatively flat. This line was completed to Keeler in 1883, and was known as the "Slim Princess" by the residents of the valley (Kahrl 1982:38).

The Carson & Colorado Railroad had hoped to complete the line to Mojave, but this was never realized. The Carson & Colorado Railroad controlled the line until its sale to the Southern Pacific on March 1, 1900. The narrow gauge line ran until 1911, when the Southern Pacific completed its line from Mojave to Owenyo (Due 1951:256-265).

Southern Pacific Railroad

The Southern Pacific Railroad purchased the narrow gauge line from the Carson & Colorado Railroad in 1900. The purchase started rumors in Los Angeles that the Southern Pacific would extend its line from Mojave to the Owens Valley, but due to poor economic conditions in the mining industry, the railroad instead extended its line west and connected Mojave with Bakersfield (Kahrl 1982:37). In 1907, the City of Los Angeles chose the Southern Pacific Railroad to build a line from Mojave to Owenyo, and to transport materials from Mojave to the Owens Valley for the City's planned aqueduct system. The Southern Pacific's bid to build the line was not the lowest, but the railroad was chosen because it controlled the right-of-way on land needed by the City to construct its aqueduct. In return for the contract, Southern Pacific offered the land to the City for five dollars an acre. The line shipped over a million tons of freight from Mojave to Owenyo during the construction of the aqueduct (Kahrl 1982:152). Eventually the freight traffic dropped as agricultural shipments from the Owens Valley were reduced due both to water being siphoned off from the Owens River and to the construction of U.S. Highway 395.

Los Angeles Aqueduct

In 1904 through May of 1905, the City of Los Angeles began to acquire land and water rights in Owens Valley. In 1907, the voters of Los Angeles approved a bond measure to build an aqueduct system that would divert water from the Owens River to Los Angeles (Smith 1974:5-7). The water from the Owens River was needed by the City's growing population, which had reached 100,000 by 1900 (Hundley 2001:141).

Beginning in 1908, William B. Mulholland, Chief Engineer and later the Superintendent of the Department of Water and Power for the City of Los Angeles, designed and supervised the construction of the Los Angeles Aqueduct. Worker's camps along the construction route brought temporary economic and population increases to the Owens Valley and to the small towns that dotted the route. In 1913, the aqueduct was completed (Kahrl 1982:158-161).

In the 1920s, drought and Los Angeles' rapidly growing population made increasing demands on water supplies, forcing the City to begin purchasing entire farms and ranches in the Owens Valley. The City constructed wells to pump the water from the aquifers below the valley's surface directly into the aqueduct system. The results of this action had a negative effect on the valley's economy, both in terms of agriculture and commerce. In the early 1920s, the aqueduct system was the target of periodic public protests and vandalism, including the dynamiting of aqueduct assets (Hundley 2001:165). To defuse the protests and stabilize the economy, the City of Los Angeles developed a lease back program to farmers and ranchers. By 1927, the City had leased back approximately 70 percent of their land holdings in the Owens Valley (Los Angeles Times Newspaper 1928).

The diversion of water from the Owens River by the Los Angeles Aqueduct coupled with the high level of evaporation to cause a rapid drop in the water level of Owens Lake. By 1930, the lake was virtually dry, resulting in the exposure of large deposits of solids salts, brines, and other minerals along the playa.

Industry

Cerro Gordo Mines

In 1865, a Mexican-American named Pablo Flores discovered the largest silver strike in California at Cerro Gordo (Fat Hill). The Cerro Gordo mines (Figure 5.1.3.1-1) produced over 15 million dollars worth of silver ore. The Cerro Gordo mines were located on the western slope of Buena Vista Peak in the southern Inyo Mountains (DeDecker 1966:57).

In 1866, Mortimer W. Belshaw, a mining engineer, and his partner Adbner B. Elder came from San Francisco and started the Union Mining Company by staking claims at Cerro Gordo and buying the Union Mine (Nadeau, R. 1958:188). Mr. Belshaw realized that the wealth of Cerro Gordo was not found by mining silver alone, but was made by owning the silver ore processing facilities, controlling transportation, and supplying water to the mines. Mr. Belshaw built a smelting furnace to process lead-ore from the Union Mine, and constructed a toll road on the only passable road (the Yellow Grade) to and from Cerro Gordo to Owens Lake. He also piped water in from the nearest natural spring, which he controlled, to Cerro Gordo. Through these efforts, Mr. Belshaw largely controlled the Cerro Gordo mines (Nadeau, R. 1958:188). By 1871, the town of Cerro Gordo was well established.

In 1870, Belshaw bought out Elder and formed a new partnership with Victor Beaudry, who had purchased a half interest in the Union Mine. Together Belshaw and Beaudry built a new smelting furnace, and by 1874 the smelting operation was producing 18 tons of bullion per day. The firewood required for increased smelting production at Cerro Gordo and at Owens Lake had stripped the surrounding forest lands bare on the Inyo Mountains by the mid-1870s (DeDecker 1966:62).

As shortages of natural resources increased, accompanied by the logistical problems caused by the remote location of the Cerro Gordo mines, competitive pressures accelerated among the various mining companies. Belshaw of the Union Consolidated Company increased the toll charges on the Yellow Grade, the only road from Cerro Gordo to Swansea, cutting the Owens Lake Silver-Lead Company's ore processing capacity in half. The Owens Lake Silver-Lead Company fought back in the courts and eventually won, but the production loss, court delays, and legal fees forced the company into bankruptcy in the spring of 1874. Belshaw and the Union Consolidated Company were also victims of court fights and legal fees in their attempt to protect their mining claims against outside interests. These actions forced the Union Consolidated Company to cease operations in 1878 (DeDecker 1966:65).

Cottonwood Charcoal Kilns

In the 1870s, smelting operations led to deforestation in the Inyo Mountains, and local mining companies required new sources of fuel if the silver smelting furnaces were to continue to operate. The Cottonwood Charcoal Kilns (Figure 5.1.3.1-1), located north of Cartago, were beehive kilns that turned wood into charcoal. The charcoal was transported across the lake at Cartago by the steamers Bessie Brady and Mollie Stevens, and then used as fuel for the silver smelting furnaces that supported the Cerro Gordo mines.

Soda Products Manufacturing Industry

Processing and manufacturing of soda minerals and compounds for industrial and commercial use in paint, glass, and detergent began at Owens Lake (Figure 5.1.3.1-1) in the 1880s. In the 1950s, most of the world's production of borax was derived from Owens Lake, Searles Lake, and the Kramer borate

mines (Calef 1951:59-60). The production of soda compounds, especially borax, has been influenced by world events: the First and Second World Wars brought about a rapid increase in domestic and world demand for soda minerals, corresponding in large price increases. This surge in demand for natural soda compounds forced plant owners to increase their capacities to meet both domestic and world demand (Jones and Stokes 1997:16).

Inyo Development Company

The Inyo Development Company began production in 1885 (Figure 5.1.3.1-1). The company's production facilities were located approximately 1 mile northwest of Keeler (Jones and Stokes 1997: Figure 8). In 1899, the company expanded its operations to include soda ash production through a natural evaporation process (University of Nevada, Reno n.d.). The company's targeted markets were the glass, soap, and borax industries, for which the company maintained a sales agent in San Francisco. Assets included vacant lots and buildings, 3,000 acres of land, production vats, furnaces, pipelines, and manufacturing equipment, and payroll records indicate that the company employed between 20 to 150 workers (University of Nevada, Reno n.d.). At their height, the facilities produced 20 tons of soda ash per day, but by 1920, the company had dissolved and the plant was sold to the California Alkali Company (Hamilton1920).

The Chemical Production Company

The Chemical Production Company (Figure 5.1.3.1-1) began production in 1918, under the presidency of Lafayett M. Hughes. The plant was located approximately 9 miles south of Lone Pine, on the western shore of Owens Lake, and north of the California Alkali Company's plant. The company produced soda ash and was able to achieve a daily production rate of 20 tons per day. However, the company's process for manufacturing soda ash was a commercial failure and the plant closed within two months after starting operations (Hamilton 1920).

Natural Soda Products Company

In 1908, R.C. Paddock, Noah Wrinkle, and several other prominent investors formed the Natural Soda Products Company (NSPC) (Owens Valley Herald Newspaper 1908). The NSPC plant (Figure 5.1.3.1-1) was located on the eastern shore of Owens Lake, approximately 2 miles south of the town of Keeler (Jones and Stokes 1997:Figure 8). In 1912, the company was re-organized under the leadership of Bishop bankers Wilfred and Mark Watterson (Kahrl 1982:273-274). The NSPC facilities occupied both sides of the road which is now U.S. Highway 136; on the east side of the road was a processing mill, a mess hall, and barracks, and on the west side was the NSPC company town containing three dirt streets that housed the NSPC Hall and housings for the workers (O'Connell Family1995:32). By 1920, the plant was producing bicarbonate of soda and soda ash with a daily output of around 120 tons per day, or roughly 10,000 tons of dense soda ash per year (Hamilton 1920). The processing technique developed by Herbert and Noah Wrinkle involved pumping lake water into large solar tanks, which yielded a concentrated solution. The plant employed a total of 100 workers (Hamilton 1920). Operations continued until January of 1953 when the corporation was dissolved (Natural Soda Products Company 1953:3).

California Alkali Company

The California Alkali Company (Figure 5.1.3.1-1) began continuous operations in September of 1917. The company's plant was located in Cartago near the Southern Pacific Railroad depot on the western shore of Owens Lake. The company, which employed 100 men, was owned by Mortimer

Fleishhacker, president, and John F. Bush, vice president and general manager. Soda ash was produced by pouring lake water into clay vats and using solar evaporation to create concentrated brine. The plant's daily capacity was approximately100 tons of dense soda ash (Hamilton 1920).

A prohibition against the importation of German potash and soda ash was removed at the end of World War I. Small producers like the California Alkali Company could no longer compete against cheaper German produced soda ash, and the plant was forced to close (Pipkin 1974:2-3). In 1924, the plant and its facilities were sold to the Inyo Chemical Company (Jones and Stokes 1997:18).

The Inyo Chemical Company remodeled the plant and increased the production of soda ash and sodium bicarbonate. The company ceased using evaporation ponds and instead built wells into the playa and constructed a pipeline to pump brine back to the plant at Cartago (Harnes and Coons 1942 cited by Jones and Stokes 2002c).

Pacific Alkali Company

The Pacific Alkali Company plant (Figure 5.1.3.1-1), located on the western shore of Owens Lake approximately 9 miles south of Lone Pine, began operations in 1930. Harvey S. Mudd was the company's president, George E. White was general manager, and George Dub was the plant's superintendent. The process used to produce soda ash consisted of pumping Owens Lake water through 2.5 miles of 14-inch pipe into evaporation ponds that ranged in size from 15 to 50 acres. The plant produced roughly 1,000 tons of soda and 2,000 tons of borax per year, and was powered by electricity provided by the Los Angeles Bureau of Power and Light. The plant employed roughly 50 men (Bradey 1938). According to a manuscript by the Pittsburgh Plate Glass Company (cited by Jones and Stokes 1997:19), the Columbia-Southern Chemical Corporation acquired the plant from the Pacific Alkali Company in 1944 and remodeled it in 1958. The plant became part of the Pittsburgh Plate Glass Company and continued operations until the late 1970s.

Saline Valley Salt Deposit

The salt deposits were located in the Saline Valley east of the Inyo Mountains, approximately 13 miles northeast of Swansea and 50 miles by dirt road from Keeler. The property was originally operated by the Saline Salt Company, formed in 1911 by White Smith, and continued to operate under that name until 1913. From 1915 to 1919, the deposit was operated by the Owens Valley Salt Company. From 1926 through 1930, the property was operated by Sierra Salt Corporation with G.W. Russell, president, and A.S. Henderson the company's secretary (Bradey 1938).

The salt was transported from the Saline Valley to the mill by an aerial tramway (Figure 5.1.3.1-1). The tramway was completed in 1913, and in 1929, the tramway was refurbished by the Sierra Salt Corporation and extended 13 miles to the Tramway Station (Bradey 1938).

The Tramway Station was located northwest of Keeler adjacent to the Carson and Colorado narrow gauge railroad siding, later operated by the Southern Pacific Railroad. The station included employee housing and a mill, which contained driers, vibrating screens, packing equipment and automated weight scales (Bradey 1938). Due to high operating costs the tramway ceased operations in 1933 (Jones and Stokes 1997:13).

Sierra Talc Company

Formed in 1918 as the Inyo Talc Company, the company was renamed the Sierra Talc Company in 1919. The company built a mill in Keeler, which still stands today (Figure 5.1.3.1-1). The mill produced two types of high grade talc, including talc for the newly emerging home electric appliance market. During World War II, the company was the country's largest producer of high grade steatite talc for electric insulators. The company was the last industrial customer to use the narrow gauge railroad operated by the Southern Pacific Railroad. The company ceased operations in 1980 due to the lack of raw materials and to the logistical problems caused by the closure of the rail line at Keeler by the Southern Pacific Railroad (Jones & Stokes 1997:20).

5.1.3.2 Resource Characterization

A total of 6 historic archaeological sites and 30 historic isolates were recorded during the current survey efforts (Table 5.1.3.2-1, *Historic Archaeological Resources Recorded during the Phase I Survey*, and Figure 5.1.3.2-1, *Location of Historic Archaeological Sites and Isolates*). Five of the sites were newly recorded; the sixth site consists of the easternmost portion of a previously recorded site (14-8141). In general, these sites were dominated by wooden structures and occasionally metal. Several of the wood structures appear to be "swollen", and the original size was sometimes difficult to determine. This type of weathering is typical of Owens Lake, and it is caused by brines penetrating into wood by capillary action; later they evaporate and cause the wood to splinter. Earthen berms, as well as different kinds of artifacts, were also noted.

STATEMENT OF EXCLUSIVITY

The specific information contained in this graphic for the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (proposed project) shall not be made available to the general public due to the need to protect cultural resources. These Technical Appendices is intended exclusively for the use of the Great Basin Unified Air Pollution Control District, the California State Lands Commission, and the City of Los Angeles Department of Water and Power. In order to protect the sites from unauthorized excavation, looting, or vandalism, the Lead Agency shall not publicize the location of known archaeological resources beyond what is necessary. Section 6254(r) of the Government Code explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Section 6254.10 of the Government Code specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a state or local agency." Due to the sensitive nature of cultural resources described herein, this graphic is confidential and meant for informational purposes only for the Great Basin Unified Air Pollution Control District, the California State Lands Commission, the City of Los Angeles Department of Water and Power, and the Office Historic Preservation.

FIGURE 5.1.3.2-1
Location of Historic Archaeological Sites and isolates

TABLE 5.1.3.2-1
HISTORIC ARCHAEOLOGICAL RESOURCES RECORDED DURING THE PHASE I SURVEY

Field Number	Resource Description
Sites	
OL SITE 3H	Remnants of tramway and associated wooden structures
OL SITE 4H	Remnants of wooden sled/cart and associated artifacts
OL SITE 8H	Surface pipeline and associated historical debris
OL SITE 10H	Remnants of possible historic roadway or dock segment
OL SITE 11H	Remnants of historic roadway
P14-8141 (previously recorded)	Cartago townsite (updated segment)
Isolates	
OL ISO 4H	Brown glass bottle
OL ISO 6H	Clear glass bottle
OL ISO 7H	Anheuser-Bush brown glass beer bottle
OL ISO 8H	Brown glazed ceramic insulator
OL ISO 10H	Solarized amethyst glass bottle fragments
OL ISO 11H	Cluster of 50 cal military ammunition
OL ISO 12H	Solarized amethyst glass bottle
OL ISO 13H	Single round of 50 cal military ammunition
OL ISO 17H	Top section of utility pole with insulators
OL ISO 28H	Historic hoe
OL ISO 29H	Brown glass bottle
OL ISO 31H	Wood structure with 4 insulators
OL ISO 39H	Wooden structure
OL ISO 40H	Two wooden structures
OL ISO 41H	Brown glazed ceramic insulator
OL ISO 45H	Anheuser-Bush brown glass beer bottle
OL ISO 49H	Brown glass bottle
OL ISO 53H	Clear glass bottle
OL ISO 54H	Solarized glass fragment
OL ISO 56H	Brown glazed ceramic insulator
OL ISO 60H	Remnants of cast iron pump
OL ISO 67H	Top section of utility pole
OL ISO 68H	Enamelware cup
OL ISO 69H	Rectangular wooden structure
OL ISO 70H	Two standing utility poles with insulators
OL ISO 77H	Clear glass bottle
OL ISO 78H	Wooden structure
OL ISO 80H	Clear glass bottle

Historic Sites and Site Summary

OL Site 3H

OL Site 3H is located on the northern portion of the Owens Lake bed, over 0.5 mile east of the town of Bartlett (Figure 5.1.3.2-1). The site consists of a series of over 17 wooden trestles, possibly for a tram, and the remnants of nine wooden structures. Nine features have been identified, distributed over 3 loci, Locus A, B, and C. Remnants of the soda evaporation ponds are located just west of this feature near the historic shoreline (Figure 5.1.3.2-1). OL Site 3H is over 550 feet long by 185 feet wide. A

description of each feature and its components is presented below (Figure 5.1.3.2-2, *OL Site 3H*; Appendix A; and Appendix B, Map 3).

Locus A. This locus covers an area of 240 by 185 feet and has Features 1 through 6.

Feature 1: This feature consists of over 17 trestles made of wood (beams), possibly for a tram, extending from northwest to southeast. Trestles are *in situ* and still standing together and extending over 150 feet length. Each trestle is composed of 7 beams or wood planks, standing with a maximum of 3 feet above the current ground surface. The trestles are approximately 7 feet wide, and are held together with numerous box-type nails (maximum length of nails is 4½ inches). The distance between each trestle is approximately 9 feet 7 inches. The easternmost segment is lower and buried deeper into the sediment.

Feature 2A: This feature consists of two wood structures shaped in a half-moon, with a "cover" of wire (similar to a chain link fence). Feature has approximately 22 thin wood beams forming the internal skeleton frame of the structure, with a larger, longer beam serving as the base. The internal beams measure 1 by 8 inches, with a maximum length of 4 feet, and are attached to the base beam with metal nuts and bolts. The base beam measures 9 by 8 inches, with a length of 18 feet. The internal beams decrease in length from the center of the structure to the sides to form an arch. The wire fence covers one face of the wooden frame. The wood is in poor condition, looking almost as if it were unprocessed. This structure lies flat on the ground, and is filled in with sediment.

Feature 2B: This feature is similar in dimensions to Feature 2A, but the wood is in better condition. This one also contains approximately 22 thin wood beams forming the internal frame of the structure, but contains larger beams outlining the perimeter in the shape of a half-moon. Each internal beam is attached to the border beams with metal nuts and bolts. The wire fence covers one face of this frame. The lumber appears cut, and only the bottom portion is partially buried in sediment.

The maximum height of these structures is 4 feet, and the length is 18 feet. These structures may have been used as "debris traps" when the lake had water. They could have been placed on the sides of the trestles. However, this could not be confirmed during the present survey.

Feature 3: This feature is a wooden structure with "screen" type wire. Most of the structure is buried in sediment. This structure appears to be the same type as Features 2A and 2B. The only difference is that this one has not only wire, but metal mesh on one of the corners. The main beam on this structure measures 4 by 6 inches by 16 feet inches length.

Feature 4: This feature appears to be a similar structure to Features 2 and 3, but is highly disturbed. The wire is separated from the wood.

Feature 5: This feature is a long, wooden structure, almost completely buried in sediment. It consists of a series of small pieces of wood running across two parallel (longer) beams. The structure measures 2 feet 6 inches in width by 89 feet inches in length. This may have been a footing for a tram track.

Feature 6: This feature consists of a wall or wood floor, just exposed on the surface of the lake bed. The structure may have originally been horizontal or standing, and consists of several rows of planks joined together by larger beams. There is an accumulation of metal near the

PHOTO 1
Feature 1, looking southeast

PHOTO 2
Feature 2B, looking northeast

FIGURE 5.1.3.2-2
OL Site 3H

southwest corner of the structure. The maximum dimensions are 36 feet in length by 33 feet in width.

Locus B. This locus lies approximately 264 feet to the northwest of Locus A, and measures 100 by 45 feet in its maximum dimensions. Locus B consists of one feature, Feature 7.

Feature 7: This feature is the remnants of a wooden structure, consisting of a metal pipe, approximately 60 feet in length, surrounded by scattered wooden debris. An iron artifact with the appearance of a milk jar with a metal file placed on top was found in association with this structure. The milk jar was partially buried, with the visible portion measuring approximately 1 foot 1 inch in width by 6 inches in height. The spout measured 4 inches in height by 8 inches in diameter. Metal handles, measuring 1 inch in thickness by 8 inches in length, were welded to the sides of the jar. The metal file measured 1 foot 5 inches in length. Other artifacts found in association include iron bracers, metal pipe connectors, metal nuts and bolts, metal straps and fasteners, and cable supporters.

Locus C. This locus contains Features 8A and 8B, and Feature 9. Feature 8 is located approximately 130 feet southwest of Feature 8A. There are over 50 pieces of wood scattered between both features. All of the scattered wood is in poor condition, though some pieces still contain metal spikes.

Feature 8A: This feature is the remnants of a historic wood structure covering an area of 144 by 60 feet. The structure extends on a northeast-southwest direction. The feature consists of a plank structure and a support structure. The plank structure contains nine parallel wooden planks, each measuring 7 by 50 inches, bounded on the sides by longer wooden beams of approximately 50 inches in length. Some planks contain nails. The structure measures 100 inches by 50 inches. The support structure consists of four beams forming a square, with another beam serving as a cross brace running diagonally across the square. The beams making the square are 7 inches in width and approximately 6 feet in length.

Feature 8B: This feature contains the same type of feature as the plank structure in Feature 8A, and measures 100 by 50 inches.

Feature 9: This feature is the remnants of a historic wooden structure consisting of *in situ* ribbed, wooden beams on the eastern side, with scattered wooden beams to the west of the ribbed section. Two metal spikes were located in a small plank on the southern edge of the feature.

In addition to the features described above, several artifacts were noted at the site. These include broken glass, brick fragments, metal fragments, nails, hundreds of wood fragments, and one identification plate. There are four brick fragments, with the largest measuring 6½ by 4 by 4 inches. Bricks are yellow and were made using coarse material (sand and pebbles up to 3/8 inch in diameter). One brick fragment contains "CLEDE TININE" incused on one side. One base of a clear glass bottle was present with the maker's mark of Hazel-Atlas, placing it between 1920 and 1964 (Toulouse 1971). The identification plate is embossed with "GENERAL PETROLEUM CORPORATION, LOS ANGELES CALIFORNIA, 3957". It was made of copper alloy, and measured 1 5/8 x 1 1/16 inches.

OL Site 4H

OL Site 4H extends over an area of 110 feet by 25 feet. OL Site 4H consists of the base and top section of a wooden pull sled (Figure 5.1.3.2-1; Figure 5.1.3.2-3, *OL Site 4H*; Appendix A; and Appendix B, Map 7). The top portion is separated from the base and lays adjacent to the south. The base consists of a rectangular structure with metal slats lining the undercarriage, and metal rings bolted onto both sides of the east end. The base measures approximately 8 feet by 4 feet 6 inches by 1 foot in height. The top segment is also rectangular, measuring approximately 8 feet 6 inches by 4 feet 4 inches by 1 foot in height. The walls on the east and west ends of the top section consist of two thin, metal rods, attached perpendicularly to the north and south walls. On the top section is a metal bolt and washer inscribed with PATENT/MAY 10TH BE/CJ8 04 1/2 30. Both portions of the sled are in poor condition due to sun exposure and water damage. Adjacent to the east of the sled is a cluster of metal cables, possibly used to pull it with. A glass bottle and metal milk jug were found nearby.

A clear glass bottle was found approximately 10 feet east of the sled. The base is 2 inches in diameter, the body is 6 inches in length, the neck measures ¼ inch in length, and the finish is ½ inch in length. The base of the bottle contains stippling around the perimeter, which became common after the 1940s (Goodman 2002). Approximately 90 feet southeast of the sled is the remnant of a metal milk/water container measuring 15 inches in length by 9 inch diameter (body), and with a neck diameter of 4 inches. Impressed on the side is "C C".

OL Site 8H

OL Site 8H lies within prehistoric site OL Site 1, on the salt flats in the southwestern portion of the lake (Figure 5.1.3.2-4, *OL Site 8H*; Appendix A; and Appendix B, Map 10). OL Site 8H (Figure 5.1.3.2-1) is a historic alignment that extends for over 4,400 feet in a northeast/southwest direction and has a width of 45 feet. The site consists of wooden posts embedded at 125-foot intervals, along which are scatters of historical debris. There are three main Features (A, B, and C) associated with this alignment.

Feature A. This feature consists of a historic debris scatter over a 40 by 15 meter area. The scatter includes fragments of both red bricks and fire bricks and metal hardware (washers, bolts, springs, copper water fittings).

Feature B. This feature is also a historic debris scatter, spread over a 33 by 23 feet area. This scatter includes fragments of both red and fire bricks, metal mesh, bolts, and miscellaneous metal piping and joints. Two of the fire brick fragments are marked with LAP, and another contains three stars on one side.

Feature C. This feature consists of a segment of a steel water/oil pipeline within a wood and metal protective frame. The pipeline is 17 inches in diameter by approximately 422 inches in length. Around this pipeline is a protective frame with a poured masonry foundation, and iron "half-rounds" arching over the pipeline. Corrugated metal siding is still attached on some segments of the iron arches. Fire bricks support the pipeline, and red bricks line the internal perimeter of the foundation. The southernmost terminus of the structure consists of an enclosed wooden frame where the pipeline bottlenecks and turns downward into the ground. The overall dimension of this structure is 422 by 79 by 59 inches. Adjacent to this pipeline is a large open, metal tank extending below surface, filled with tar/water. The tank measures 65 by 76 by 35 inches. It is unknown how deep the tank goes. This structure and associated tank appear to be a heating compound for pipeline contents, possibly oil. All features are located in line with embedded wooden posts, which are placed at 125-foot intervals.

PHOTO 1
Overview, looking west

PHOTO 2
Detail of mounting bracket

FIGURE 5.1.3.2-3
OL Site 4H

PHOTO 1
Feature C, looking south

PHOTO 2
Feature C, looking west

FIGURE 5.1.3.2-4
OL Site 8H

Between all components are miscellaneous scatters of metal debris, including several alignments of metal bands/rings likely used to keep a pipeline or wooden support system in place.

OL Site 10H

OL Site 10H (Figure 5.1.3.2-1) is a historic structure consisting of a possible roadway or dock segment, extending northeast in a linear alignment from a modern access road (Figure 5.1.3.2-5, *OL Site 10H*; Appendix A; and Appendix B, Map 10). The structure extends for approximately 3,500 feet in a northeast-southwest direction, and is 100 feet wide. OL Site 10H consists of 26 Features (A-Z), which are described below.

Feature A. This feature consists of the remnants of a wooden 'barrel' or piling with rock (granite) footings. The diameter of the 'barrel' is 24 inches. Little of the 'barrel' remains, only an impression or salt crusted wood suggests the barrel shape. The majority of the boulders are between 10 and 20 inches. The overall dimensions of the feature are 69 inches northeast/southwest by 65 inches northwest/southeast.

Feature B. This feature is a cluster of granite boulders ranging from 8 to 18 inches in size. Some boulders are embedded in a semi-circular alignment, approximately 21 inches in diameter, suggesting they surrounded another 'barrel'/piling, but no wood remains. The overall dimensions are 68 inches north/south by 65 inches east/west. A green insulator is located approximately 59 inches south of the main boulder concentration. No maker's marks were observed on the insulator.

Feature C. This feature is a scatter of metal semi-circle rods that originally served as bands around lumber, possibly to keep it from expanding. Other miscellaneous metal fragments are scattered throughout as well. In the southern half of the feature, is another granite boulder concentration, forming a circular perimeter, with only sediment in the center (possibly serving the same purpose as Features A and B). The boulders are 8 to 14 inches. The internal diameter of the rock circle is 20 inches north/south by 17 inches east/west. The overall size of the rock cluster is 50 inches north/south by 45 inches east/west. The place where metal is scattered is raised above the surrounding ground surface, possibly from a previous berm placement or from sediment accumulation beneath debris. Two 2 by 4 pieces of lumber are embedded in the ground near each end of the scatter, rising only a few inches above the ground surface.

Feature D. This feature consists of a cluster of granite boulders forming a circle in the center, measuring 59 inches north/south by 50 inches east/west overall. The internal diameter of the circle is 20 inches northeast/southwest by 17 inches northwest/southeast.

Feature E. This feature consists of the remnants of a wooden 'barrel'/piling, surrounded by granite boulders. The 'barrel' is 22 inches diameter, placed subsurface so only the rim is visible. The center of the 'barrel'/piling is filled with sediment. 'Barrel'/piling consists of a circular perimeter of thin, wood slats with corroded metal on the outside surface. The overall dimensions of the feature are 50 inches north/south by 48 inches east/west. More than 20 granite boulders surround the 'barrel'/piling, as if serving as support for a larger structure. A nearly complete brown glazed ceramic insulator lies on the surface within the 'barrel'. No maker's marks were observed on the insulator.

Feature F. This feature is a granite boulder concentration with scattered metal rods and miscellaneous metal fragments. The scatter of metal fragments lies on a raised surface, a maximum 2 feet higher than the surrounding ground surface. Overall dimensions are 68 feet north/south by 19 feet east/west.

PHOTO 1
Feature M overview, looking southeast

PHOTO 2
Feature X

FIGURE 5.1.3.2-5
OL Site 10H

Feature G. This feature consists of a cluster of over 40 granite boulders ranging between 5 to 17 inches in size. Overall dimensions are 91 inches north/south by 80 inches east/west.

Feature H. This feature is also a cluster of 40+ granite boulders, with overall dimension of 99 inches east/west by 79 inches north/south.

Feature I. This feature is a subsurface 'barrel'/piling surrounded by granite boulders. The 'barrel'/piling is 26 inches in diameter. Approximately 6 inches of the rim are visible above the ground surface, showing thin wood slats. Some corroded metal fragments surround the wood. More than 20 granite boulders are located around and within the 'barrel'/piling, measuring 5 to 15 inches in size. Overall dimensions are 64 inches east/west by 53 inches north/south.

Feature J. This feature is a granite boulder concentration, measuring 83 inches north/south by 80 inches east/west, with over 30 boulders present. Approximately 15 feet southwest of the boulder concentration lies a metal band, possibly used to go around a 'barrel'/piling, consisting of two halves bolted together on opposite sides. The band measures 14 inches in diameter by 1¼ inches in width.

Feature K. This feature is a scatter of metal debris with some large tree trunk segments (tree trunks are not *in-situ*). Metal debris consists of metal semi-circle rods and miscellaneous corroded fragments. The rods likely served as bands around the tree trucks to keep from expanding when wet. On the south end of the feature is a boulder concentration, 81 inches in diameter with boulders ranging from 5 to 15 inches in size. No structure is evident in the boulder concentration. Adjacent to the boulder concentration are what appear to be segments of the outer rind of tree trunks attached/melded to the fragments of metal rods.

Feature L. This feature consists of the outline of boulders forming a rectangular shape, located on top of a mound. Boulders range in size from 5 to 20 inches. A large post/tree trunk lies lengthwise on the boulder outline, appearing as if it once stood in the center of the structure but has since fallen over. The trunk is 15 inches diameter by 24 feet in length. Wood, nails, and other metal debris lay scattered over the entire area. Fragments of frosted, solarized glass (likely from one bottle) are also scattered across the site. A white ceramic insulator fragment with BRYANT embossed on one side, and what appears to be a ceramic connector with BRUNT/N°4A embossed on the bottom was found within the feature. Solarized glass places this bottle between circa 1880 and 1925 (Lockhart 2006).

Feature M. This feature is a large, rectangular, wooden structure, consisting of vertically embedded pieces of lumber exposed between 6 to 25 inches above the ground surface. The interior of the structure is lined with granite boulders, some placed vertically, varying between 5 to 25 inches in size. Lumber fragments and metal debris are scattered approximately 5 meters east and west of the structure. The structure is located on a mound raised 3½ to 4 feet above the surrounding surface.

Feature N. This feature consists of a half-buried wood structure with wood posts and wood side walls. The main structure is a 13 by 6 feet rectangular enclosure. The posts are 6 by 8 inches, and are heavily water damaged. The wood side walls are 12 by 1 inches. The enclosure narrows towards the southern end, forming a funnel-like opening, which is capped by a large board measuring 4 inches by 12 feet. There is a trough structure attached to the north of the main enclosure, running roughly north/south. The west side of the trough is 26 feet long and the east side is 5 feet. The posts are 4 by 4 inches. There is a pile of boulders near the north end of the trough. This feature is almost completely buried, and the wood is heavily damaged.

Feature O. This feature is a 14 by 10 foot mound with large granite boulders. The rocks are scattered all over the mound with the highest concentration on the west half. There are some metal fragments on the east side of the feature.

Feature P. This feature is a boulder scatter over a 25 by 16 foot area.

Feature Q. This feature consists of a lumber and metal scatter over a 30 by 30 foot area. A 2-foot diameter concentration of corroded metal bolts and other hardware lies on the south end of feature. A brown glass bottle with cork closure and FRONTIER ASTHMA COMPANY embossed on one side was found in association.

Feature R. This feature is a boulder scatter over an approximately 84-inch diameter area.

Feature S. This feature is also a boulder scatter over an area measuring 97 inches east/west by 93 inches north/south.

Feature T. This feature consists of a scatter of wood, metal debris, and boulders distributed over an area measuring 41 feet north/south by 26 feet east/west.

Feature U. This feature is a scatter of metal half-circle rods and wood debris over an area measuring 19 feet north/south by 9 feet east/west.

Feature V. This feature is a scatter of boulders and three lumber pieces over an area measuring 21 by 17 feet.

Feature W. This feature consists of a scatter of wood and some boulders over an area measuring 21 by 7 feet. The wood pieces are long and thin, possibly serving as borders for a dock or roadway.

Feature X. This feature is a wooden structure measuring 20 feet north/south by 11 feet east/west, consisting of two parallel rows of lumber placed vertically into the ground, with only the tops visible above the ground surface. Four 10 by 14 inch pieces of lumber are placed perpendicularly over the base lumber. The four pieces of lumber on top are spaced approximately 60 inches apart. Two metal rods (rebar?) were drilled vertically down the center of each of the four upper lumber pieces. Miscellaneous metal and wood fragments lay scattered around the structure. A corroded metal valve handle was found approximately 8 feet northwest of the structure. The interior of the structure is filled with sediment.

There are intervals of double posts embedded vertically in the ground between Features V and X. The posts are approximately 2 by 8 inches, spaced 12 inches apart at approximately 9-foot intervals.

Features Y and Z are set apart from the rest of the features. These two features are located approximately 300 feet east of Features A through X.

Feature Y. This feature consists of wooden structural debris highly disturbed, scattered on a low mound measuring approximately 50 by 26 feet.

Feature Z. This feature is the remnants of a wooden structure measuring 20 feet 5 inches in length by 9 feet 2 inches in width by 2 feet in height. The structure is generally rectangular in shape with long pieces of lumber forming the perimeter. Lumber has been embedded vertically along the borders, extending above ground surface approximately 2 feet in height. The interior contains only sediment.

OL Site 11H

OL Site 11H (Figure 5.1.3.2-1) consists of the remnants of what appears to be a historic road (Figure 5.1.3.2-6, *OL Site 11H*; Appendix A; and Appendix B, Map 10). The road has eroded in some areas, leaving a discontinuous berm extending approximately 2,700 feet at 48 degrees from an existing access road. The road/berm is approximately 7 to 10 feet in width. On top of the berm are sections with red and fire brick borders, and/or asphalt and concrete borders (concrete made with large gravels). Some fire brick contains the marks LAPBS or PSP. All segments of the berm are covered with gravel, some exceeding 3 inches in size. The segments to the north are covered with dolomite gravel, while the south end consists of a mixture of granite and dolomite. The south end contains the most intact segments, with remnants of a wooden track, and a possible old culvert with timber wrapped by metal rings. The wooden track segment measures 39 by 8 feet, and consists of 4 by 6 inch lumber placed parallel to one another, and perpendicular to the berm it is on. The wooden culvert consists of four segments of timber encircled with thin metal rings, placed adjacent to one another on top of a low berm. The timber measures approximately 12 inches by 24 feet. The culvert measures 42 by 24 feet overall. The northern half contains smaller wooden culverts, along with several metal pipes placed at intervals, likely serving the same function. Approximately 37 feet west of the south end of the site, is a mound with a fire affected surface, measuring 15 feet in diameter. Scattered on and around the road are fragments of solarized glass and miscellaneous metal hardware and debris.

Site P14-8141 Cartago Townsite (Updated Site Segment)

Site P14-8141 (Figure 5.1.3.2-1) was previously recorded between 2000 and 2001, and described as a potential historic district (Dodd 2000/2001). The site consists of a portion of the town of Cartago located in the southwest portion of the lake. Only the southeastern portion of this site is located within the current survey area, which is described below (Figure 5.1.3.2-7, *Site 14-8141*, and Appendix B, Map 10). A more thorough update of the complete historic site falls out of the scope of this work.

The description of the site is taken directly from that offered by Dodd in the site record, and it is followed by an update of the portion recorded during the present effort.

> [The Cartago Townsite is a] potential historic district [containing] 33 buildings, 23 of which are non-contributors and 10 of which are contributors. It is a former company town comprised of residences built to house the employees and managers of the California Alkali Company (1917-1924) and the later the [sic] Inyo Chemical Company (1924-1932). The district also includes the ruins of the Company's soda works. It is a residential area of mostly modest single-family homes or small lots. All of the houses appear to be of wood frame construction. Many of the houses have mature trees, some have fenced yards. Subsequent to the closure of the soda plant, the townsite has been subject to infill by non-historic houses and mobile homes. Several of the original company residences and buildings have been demolished, several of the remaining buildings have been substantially altered. Some of the more recent residences occupy more than one lot. The original company houses and buildings are either modestly Craftsman or represent the transition between Queen Anne cottages and Craftsman bungalows. The streets of the community remain graveled and unpaved (Dodd 2000/2001: Primary Form).

The portion of the site observed during the field efforts consists of two sections of the levees associated with the Company's soda works. In this place the levees cover an area of approximately 1.5 by 2 kilometers, which appear marked in the USGS 7.5-minute series Olancha topographic quadrangle. Section 1 (Figure 5.1.3.2-7) extends over 1,600 feet in length, running generally east-west;

PHOTO 1
Overview of wooden tracks, looking northeast

PHOTO 2
Wooden culvert

FIGURE 5.1.3.2-6
OL Site 11H

PHOTO 1
Overview of Section 1, looking west

PHOTO 2
Section 2, looking north-northwest

FIGURE 5.1.3.2-7
Site 14-8141

approximately 232 feet of this section was exposed enough to provide a description of its attributes. The section consists of a 30-foot-wide berm bounded by wooden posts and planks. The posts are 4 by 4 inches, embedded vertically, and extending an average of 3 feet above the ground surface. The planks are placed perpendicularly to these posts, measuring 2 by 6 inches, with some extending over 18 feet inches length. There is a second row of posts in front (to the south) of the south wall of the berm. The wood is heavily weathered. The north side of the berm does not have any standing posts, though wood fragments are visible flat on the ground. The north side of the berm is level with the Owens Lake playa.

Section 2 (Figure 5.1.3.2-7) is outside of the survey area (located to the west) and consists of a berm that extends north-northwest/south-southeast. This berm is 4 feet high and 13 feet wide, bounded by wooden posts standing adjacent to one another. The posts are 2 by 9 inches and are heavily weathered. There are wooden beams placed perpendicularly to these posts, measuring 6 by 6 inches by 22 feet in length. The northernmost portion of the section is less weathered and exhibits iron bars or braces running along the width of the berm (perpendicular to it), from wall to wall. Braces are approximately 1 inch in diameter by 15 feet in length, and each brace contains a bolt and washer near the edge.

Sections 1 and 2 intersect, forming an obtuse angle. Near the area where they intersect are 15 concrete, square columns. The concrete has a high percentage (>50 percent) of gravel. The columns are 16 by 16 inches, with the highest extending approximately 3 feet above ground. The lower portion of the columns is very weathered. The columns appear to be the support/base to a structure that no longer exists. There is also a metal pipe coming out of the ground. The pipe is 6 feet tall and has an opening of 6 inches in diameter. There are two areas with fire affected bricks. Some bricks contain the mark STOCKTON. The southernmost brick accumulation contains thick, green glass fragments that appear to have been burnt some time in the past. A wooden pole and a second pipe are visible near the second brick accumulation. The pipe contains a makers' mark with only a portion that is legible, WAL_WORTH...

Historic Isolates

Thirty historic isolates have been located and recorded to date (Figure 5.1.3.2-1). These consist primarily of various glass bottles and bottle fragments, ceramic insulators, and wooden structures found on the lake bed with no other artifacts in association. These isolates were found throughout the entire area survey, with no real patterning in their distribution. The location of all the isolates and complete archaeological records are presented in Figure 5.1.3.2-1, Appendix A, and Appendix B.

Isolate 4H. This isolate was found on the southeast side of the Owens Lake bed, likely washed in during past flood events. The isolate is a brown glass bottle with a screw-top finish. The base is embossed with an "I" in a circle within a diamond, with a "15" on the left, a "9" on the right, and a "7" below the diamond. The maker's mark identifies it as Owens Illinois Glass Company, and the "15" identifies the plant as Okmulgee, Oklahoma, which closed by 1940, placing this bottle between 1929 and 1940 (Toulouse 1971:395, 403). The bottle measures 2.5 inches in diameter by 7 inches in height. The mouth of the finish measures 1 inch in diameter.

Isolate 6H. This isolate was found on the southeast side of the Owens Lake bed, likely washed in during past floods. The isolate is a clear glass bottle with cork closure, broken into three fragments. The glass has a very slight pink tint, with LYDIA E. PINKHAM/MEDICINE embossed on one side. The base of the bottle is oval, measuring 3 by 2 inches. The body measures 6 inches in height, the neck and finish measure 1 inch in height, and the mouth of the bottle measures 1 1/8 inches in external diameter

and 5/8 inches in internal diameter. No maker's mark was visible on the base, but according to Fike (2006:150), this brand and bottle was likely manufactured by the Owens Illinois Glass Company after 1929.

Isolate 7H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate consists of a short-neck Anheuser-Bush beer bottle made of brown glass. Shoulder of bottle is embossed with PLEASE DO NOT LITTER. The Anheuser-Bush symbol is embossed on the upper portion of the body, and NO DEPOSIT NO RETURN//NO REFILL is embossed around the lower portion of the body. Bottle body measures 2½ inches in diameter by 6¼ inches in height, the neck measures ¾ inches, finish measures ½ inches, and mouth measures 1 inch in external diameter and ¾ inches in internal diameter. A seam runs on both sides from the lip to the base of the bottle. The base of the bottle contains the maker's mark for Thatcher Manufacturing Company, dating from 1900 to the present (Toulouse 1971:496). NO DEPOSIT NO RETURN was first embossed on bottles after 1940, placing this bottle post-1940 (Fike 2002:15). Three additional bottles were found in the nearby area, distributed within a 25-meter radius from this isolate.

Isolate 8H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. This is a brown glazed ceramic insulator. LOCKE/44 is incised (incuse) on the skirt of the insulator. Insulator base measures 3½ inches in diameter, top measures 1¾ inches in diameter, and height is 3¼ inches. This type of insulator was manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. In this case, "44" may indicate the year of manufacturing (Gish 2000:131; Tod 1988:107).

Isolate 10H. This isolate consists of solarized glass bottle fragments, found on the southeast side of the Owens Lake bed. The base of the bottle is oval, measuring 2 by ¾ inches. The neck measures 1 inch, and the finish consists of a cork closure with an external diameter of 1 inch and an internal diameter of 3/8 inch. Only a fragment of the body is present. A portion of a brand is embossed on one side, consisting of a lowercase S/CAL. The solarized glass places this bottle between circa 1880 to 1925 (Fike 2002:14).

Isolate 11H. This isolate was found on the southeast side of the Owens Lake bed, and consists of four complete rounds and two discharged rounds of 50 cal military ammunition. Overall length of one round (bullet and casing) is 5 3/8 inches, base thickness is 1/16 inches, and base diameter is ¾ inches. The visible portion of the bullet extending from the casing measures 2 inches in length. Incised on the base of the munitions is SL/42. Several rusted clips were found in association with the rounds. This cluster of rounds was found scattered over an 18 by 10 inch area. The "S L" is likely identified as the St. Louis Ordnance Plant, St. Louis, Missouri, operated by Olin Corporation under the United States Cartridge Company name. It operated from 1941 to 1945 and again from 1952 to 1958 (Frigiola 2006). The "42" places the manufacture date in 1942.

Isolate 12H. This isolate was found on the southeast side of the Owens Lake bed. The isolate is a solarized, amethyst glass bottle with cork closure, heavily sun-altered on one side. There is a double seam on both sides, extending from finish to base. Seam curves slightly onto face of bottle toward the base. A seam is also present around the neck, where finish was attached. The base of the bottle contains a rough oval scar with a B/81. Bottle base measures 3¼ by 1½ inches, body height is 4 7/8 inches, bottle neck is 1 inch, finish is ¾ inch, and mouth measures 1 inch in external diameter and ¾ inch in internal diameter. The bottle is similar in shape to liquor flasks. The solarized glass places this bottle between circa 1880 to 1925 (Fike 2002:14).

Isolate 13H. This isolate was found on the southeast side of the Owens Lake bed. The isolate consists of one complete round of 50 cal military ammunition. Overall length of the round (bullet and casing) is 5 3/8 inches, base thickness is 1/16 inches, and base diameter is ¾ inch. The visible portion of the bullet extending from the casing measures 2 inches in length. Incised on the base of the munitions is SL /42. The "SL" is likely identified as the St. Louis Ordnance Plant, St. Louis, Missouri, operated by Olin Corporation under the United States Cartridge Company name. It operated from 1941 to 1945 and again from 1952 to 1958 (Frigiola 2006). The "42" places the manufacture date in 1942.

Isolate 17H. This isolate was found on the northwest side of the Owens Lake bed. The isolate consists of the remnant top section of a telephone pole with insulators. The section measures 5 feet 2½ inches overall, cross members measure 5 feet, with metal supports measuring 2 feet 5 inches, with ¾ inch hardware. Two brown glazed ceramic insulators are present, one whole and one fractured. The ceramic insulators measure 3 by 5 inches. Although no marks were visible, this insulator looks like Isolates 8H, 31H, and 41H, which had the mark LOCKE 44. This type of insulators were manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. The number 44 may indicate the year of manufacturing (Gish 2000:131; Tod 1988:107).

Isolate 28H. This isolate was found on the northwest side of the Owens Lake bed. The isolate is a solid metal (shaft and head) hoe. The shaft (handle) is 1 inch in diameter, with an overall length of 5 feet. The head of the hoe is 6¾ inches wide and 4 inches high. There is visible welding where the head is attached to the shaft, possibly representing repair. The head of the implement is corroded. The age of this hoe is unknown.

Isolate 29H. This isolate was found on the northwest side of the Owens Lake bed. The isolate is a brown glass bottle with a crown cap. Seam extends from base to finish on both sides. The base measures 2¾ inches, body measures 4½ inches, neck measures 2 inches, and the finish measures ¾ inches. The base of the bottle contains a maker's mark of a diamond within a circle, with an "I" in the center, identifying it as Owens Illinois Glass Company. To the left of the mark is a "4", to the right a "1", and at the base a "22". At the top of the mark is "Duraglas" in script. The "4" identifies the plant number as Clarksburg, West Virginia, which closed around 1945 (Toulouse 1971:395). The "Duraglas" places the manufacture post-1940 (Toulouse 1971:403). This bottle likely dates to 1940 to 1945.

Isolate 31H. This isolate was found on the northwest side of the Owens Lake bed. The isolate consists of a historic wood structure with four insulators. The wood structure lay flat and measures 16 feet 10 inches in length by 7 feet 9 inches in width, with a longer wooden beam running perpendicular in the center of the structure, measuring 22 feet 5 inches. Two brown, glazed ceramic insulators were located near the center of the structure. Another two, brown glazed insulators were found approximately 43 feet north-northwest attached to other wood beams. Three of the insulators have the mark LOCKE 44 incused. This type of insulator was manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. In this case, "44" may indicate the year of manufacturing (Gish 2000:131, and Tod 1988:107).

Isolate 39H. This isolate was found on the southeast side and towards the center of the Owens Lake bed, among miscellaneous wood pieces scattered across the terrain, possibly moved by a past flood event. No other artifacts were found in association. The isolate is a wooden structure consisting of seven wooden planks nailed perpendicular onto five or more pieces of lumber. The planks measure 2 by 12 by 168 inches. The lumber pieces serving as the base measure 6 by 6 by 132 inches. There is a large piece of lumber lying diagonally across the center of the structure, measuring 7 by 7 by 118

inches. This large piece of lumber contains three large bolts, with a "washer" inscribed with MOLINE IRON WORKS MALL 34 IN. On the north end of the structure, is a metal tray measuring 60½ by 23 5/8 by 3 inches. This tray contains five separate compartments, with 4 additional, deeper compartments moving perpendicular to them. The age of this structure could not be determined.

Isolate 40H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate consists of two wooden structures located approximately 1 meter apart. The southern structure is a utility pole segment with a cross-beam. The top of the pole contains a metal bracket with coiled wire at the tip, likely for an insulator. This central pole also contains several large bolts with washers inscribed with MALL 618 10. The cross-beam is stabilized by two metal supports approximately 1½ inches in width with ½-inch bolts. This structure measures 60½ by 60 inches. The northern structure is a wooden platform consisting of 2 by 4 beams nailed perpendicular onto a larger piece of lumber, measuring 55 by 52 inches. These structures do not appear *in situ* and likely were moved to their current location during a past flood event. The age of these features is unknown.

Isolate 41H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate is a brown glazed ceramic insulator. LOCKE/44 is incused on the base of one side. Insulator base is 3½ inches diameter, top is 1¾ inches, and height is 3¼ inches. This type of insulator was manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. In this case, "44" may indicate the year of manufacturing (Gish 2000:131, and Tod 1988:107).

Isolate 45H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate is a short-neck Anheuser-Bush beer bottle made of brown glass. Shoulder of bottle embossed with PLEASE DO NOT LITTER. The Anheuser-Bush symbol is embossed on the upper portion of the body, and NO DEPOSIT NO RETURN and NO REFILL is embossed around the lower portion of the body. Bottle body measures 2½ inches in diameter by 6¼ inches in height, neck measures ¾ inches, finish measures ½ inches, and mouth measures 1 inch in external diameter and ¾ inch in internal diameter. A seam runs on both sides from the lip to the base of the bottle. The base of the bottle contains the maker's mark for Thatcher Manufacturing Company, dating from 1900 to the present (Toulouse 1971:496). NO DEPOSIT NO RETURN was first embossed on bottles after 1940, placing these bottles post-1940 (Fike 2002:15).

Isolate 49H. This isolate is a brown glass bottle found on the southeast side of the Owens Lake bed. One shoulder is embossed with FEDERAL LAW FORBIDS SALE OR REUSE OF THIS BOTTLE. The other shoulder is embossed with FLEISCHMANN'S/Est [bird symbol] 1870. One heel is embossed with the markings HALF PINT. The base of the bottle measures 3 ½ by 1 5/8 inches, the height is 5¼ inches, the neck and finish measure 1¾ inches, and the external diameter of the mouth is 1 inch. The side seam extends onto the lip of the bottle, and a seam around the neck where the finish was attached and around the base of the heel is present. The base contains stippling within a rough oval scar, and the maker's mark of Metro Glass Company (M in a flattened hexagon), dating from 1949 to present (Toulouse 1971: 342-343).

Isolate 53H. This is a clear glass bottle, found on the southeast side of the Owens Lake bed. The bottle is a jug with the handle missing. The base measures 6 inches, the body is 9 inches, and the neck and finish is 2 inches. One shoulder is embossed with ONE GALLON. The base contains the maker's mark for Latchford-Marble Glass Company, dating from 1939 to 1957 (Toulouse 1971:332).

Isolate 54H. This isolate was found on the southeast side of the Owens Lake bed. This is a scatter of solarized glass fragments over a 20 by 10 meter area. The fragments appear to be from a flat dish. One rim fragment is incised with the mark MGK. The rim of the dish is not round but is angled in parts. The upper side of the dish has an undulating surface, while the base is flat. Also present is one fragment of clear 'window' glass. The solarized glass places this isolate between circa 1880 and 1925 (Fike 2002:14).

Isolate 56H. This isolate was found on the southeast side of the Owens Lake bed. The isolate is a glazed, brown ceramic insulator. No marks were visible. Insulator measured 3½ inches in length with a base diameter of 3¾ inches and a top diameter of 2¾ inches. Although no marks were visible, this insulator looks like Isolates 8H, 31H, and 41H, which had the mark LOCKE 44. This type of insulator was manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. The number "44" may indicate the year of manufacturing (Gish 2000:131; Tod 1988:107).

Isolate 60H. This isolate was found on the southwest side and towards the center of the Owens Lake bed. This isolate consists of the remnants of a cast iron pump with fittings, bolts, and mounting bracket. Overall dimensions of the pump are 64 inches east/west by 35 inches north/south. The main pump measures 21 by 14 by 12 inches. The inner diameter of the pump intake is 3¼ inches. The pump intake flange has four bolt holes. About 12 inches west of the main pump, is a metal fragment stamped with …975. The pump is extremely corroded and partially buried in silt. Approximately 8 feet east of the pump is a 36 inches segment of a cloth and rubber hose. The diameter of the hose is 6 inches. The main circular assembly is cast with 10-3-…or NO-3…/KROCH….

Isolate 67H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate is the top segment of a utility pole, measuring 59¾ inches by 59 inches in overall dimensions. The segment contains a metal bracket with coiled wire at the tip, likely for an insulator. This central pole also contains several large bolts with washers inscribed with MALL IRON WORKS…. The cross-beam is stabilized by two metal supports approximately 1½ inches in width with ½-inch bolts. Four wooden dowels, approximately 7 inches in length, are spaced at equal intervals across the main cross beam, also likely for insulators.

Isolate 68H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. This is a white enamel ware cup with handle, measuring 4 inches diameter at top, 2¾ inches diameter at base, and 2 inches in height. The base contains KER/(image)/SWEDEN/10 CM on the base. The isolate does not appear to be *in situ*, and was likely moved to its current location during past flood events. The age of this type of enamelware is currently being investigated.

Isolate 69H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate is a rectangular wooden structure with overall measurements of 167 by 148 by approximately 8 to 12 inches in thickness. Long beams form the perimeter of the structure, while shorter beams of varying length were placed inside to form a sort of 'wall' with a circular opening in the center. Miscellaneous wood beams are scattered to the northeast.

Isolate 70H. This isolate was found on the southeast side and towards the center of the Owens Lake bed. The isolate consists of two standing utility poles with complete hardware and cross beams. Each pole contains three brown glazed ceramic insulators with LOCKE/44 inscribed on the lower half. The poles are approximately 9 inches in diameter by 20 feet in height, and are spaced 135 feet apart at 277 degrees (Pole A to B). Pole B contains two upright support beams at the base; Pole A contains 1 upright support beam and another that has fallen. No other artifacts were found in association. The poles are

approximately 50 meters northwest of an access road/berm. The type of insulator mentioned above was manufactured by the Locke operation (Fred M. Locke). The single word LOCKE was first used in 1928 at the Baltimore plant, sometimes with suffixes for identification purposes. In this case, "44" may indicate the year of manufacturing (Gish 2000:131; Tod 1988:107).

Isolate 77H. This isolate was found near the center of the southern end of the Owens Lake bed, likely brought in during past flood events. The isolate is a clear glass bottle with a screw top finish, similar in shape to a liquor flask. Bottle body measures 4.75 inches, neck and finish measures 1.75 inches, and base measures 3.5 by 2.0 inches. The base contains embossing of numbers within a rectangle, though the numbers are difficult to read. RE-USE OF THIS BOTTLE//FORBIDDEN is embossed on the shoulders, and ONE PINT is embossed on the base of one side.

Isolate 78H. This isolate was found near the center of the southern end of the Owens Lake bed. It is a wooden structure, partially buried in the lake sediment. The structure consists of 9+ very weathered planks jutting vertically out of the ground, with box-type nails on the ends. Each plank is 2 by 12 by 4 inches in length. The overall structure measures 98 inches in width (east/west) by 111 inches in length (north/south). The structure is disturbed; the planks may have originally lain flat on the ground, but were uplifted during a flood or other event. It is difficult to determine if this structure is *in situ*, or was moved during a flood event.

Isolate 80H. This isolate was found the center of the southern end of the Owens Lake bed. The isolate is a clear glass bottle with an embossed design on both sides of the neck, and an embossed design around the heel. A seam runs around the shoulder and around the neck just below the finish. The seam on the side of the bottle does not extend to the finish. The base has a circular scar around a maker's mark, with stipliing along the perimeter. Bottle contains a continuous thread finish. The bottle measurements are as follows: base is 4 ¼ inches, body is 6 inches, neck is 2 ½ inches, finish is ½ inch, and bore is 2 inches. Maker's mark consists of a B in a circle, likely identified as Brockway Machine Bottle Company/Brockway Glass Company, and produced since 1925 (Toulouse 1971:59-62).

5.1.3.3 Discussion of Historic Sites and Isolates

The location of the historic archaeological sites found during the current survey suggests their association with the different industries operating at Owens Lake during the late 1800s and 1900s (Figure 5.1.3.2-1). However, historic isolates are distributed throughout the lake, and although they appear to be in clusters, this may reflect the distribution of the survey areas.

OL Site 3H, which is located on the northwest portion of the lake, approximately due east from the town of Bartlett and the remnants of evaporation ponds, appears to be associated with the production of borax. Based on its location, the wooden trestles present at the site suggest that these were part of the Pacific Alkali Company (Figure 5.1.3.1-1) or any of the other corporations that purchased the company at later times, such as the Columbia-Southern Chemical Corporation or the Pittsburgh Plate Glass Company. Unfortunately, during the current investigation, a specific date for the structures could not be determined. The only artifact from the site with a dateable maker's mark consists of a clear glass bottle made by the Hazel-Atlas Corporation between 1920 and 1964. However, the bottle may not have any relation to the time when the wooden structures were in use. Assuming that OL Site 3H was associated with the production of borax, it is suggested that the site was in use some time between 1926, when the Pacific Alkali Company started operations, and the 1970s when the plant operated under the Pittsburgh Plate Glass company. Today, the structures that were part of this borax production are still standing on the east side of the U.S. Highway 395.

Those sites located on the southern portion of the lake, OL Sites 8H, 10H, and 11H (and portions of site 14-8141), appear to be associated with activities that took place east of the town of Cartago (Figure 5.1.3.1-1). As with OL Site 3H, the sites could not be dated during the present survey, and therefore their association is strictly based on their location. The wooden posts and associated features, and what appears to be the remnants of old roads, are located northeast from where the California Alkali Company (Figure 5.1.3.1-1) was located and nearby what used to be Daneri's Landing (Figure 5.1.3.1-1). Thus, these sites may be the remnant soda works from the California Alkali Company, which operated between 1917 and 1924, and/or the Inyo Chemical Company, which was active from 1924 to 1932. The Inyo Chemical Company remodeled the plant and constructed 8 miles of pipeline to pump the brine back to the plant at Cartago. The remains of the wooden pipeline have been previously recorded approximately 1 mile southeast from where these sites are located (Jones and Stokes 2002c). It is possible that some of the structures may have been associated with Daneri's Landing, which was used by the Bessy Brady steamboat to transport silver from Swansea to Cartago between 1872 and 1873, and from Keeler to Cartago between 1873 and 1879.

Remnants of Site 14-8141, constitute the southernmost historic site observed to date during the current survey. As previously discussed, these are sections of the levees associated with the soda works from the California Alkali Company and/or the Inyo Chemical Company.

Several of the historic isolates could not be dated; however, some of the isolates exhibited marker's marks that could be used for a temporal designation. Dateable isolates are mostly represented by glass bottles and insulators, and some military ammunition, the majority of which appear to have been made during the mid-1940s.

Hundreds of pieces of what appears to be driftwood were noted throughout the lake, primarily on the west portion of the lake (east of the town of Bartlett) and in those areas located in the east central portion of the lake (southwest corner of the USGS 7.5-minute series Owens Lake topographic quadrangle). This wood is distributed forming continuous sinuous lines, as if following the edge of a body of water. In spite of the fact that the lake has been dry since the 1920s, unusually high runoff on seven occasions during 1938, 1967, 1969, 1980, 1982, 1983, and 1986 (Stine 1994:1) allowed water to enter the lake, thus driving the pieces of wood to settle into this pattern. The driftwood was restricted to the areas previously mentioned, and did not reach the southern portion of the lake.

In order to better characterize the historic archaeological sites and their placement within the history surrounding Owens Lake, an in-depth research of historic documents is necessary. Such research is beyond the scope of this work. Phase II investigations are recommended to complete the requisite research of historical documents to better characterize the historic archaeological sites and their relationship to the regional history.

5.1.4 Native American Sacred Lands

Native American Sacred Lands or Areas of Traditional Cultural Significance are defined by the NAHC as areas that have been, and often continue to be, of religious significance to Native American peoples, such as an area where religious ceremonies are practiced or an area that is central to their origins as people (NAHC 2007). Initial consultation with the NAHC failed to indicate the presence of any sacred sites in the proposed project area (Appendix D). The NAHC identified 12 tribal members and recommended that they be contacted for further information regarding the presence of cultural resources in the proposed project area. Letters sent to the individuals recommended by the NAHC did not result in any replies.

5.1.5 Cemeteries and Human Remains

Native American burial practices in the region are characterized by internments of single individuals in a flexed or semi-flexed position. Cremation was also practiced in the area. In the Owens Valley, Mono Basin, and Rose Valley areas, large rocks or milling equipment were sometimes placed over the burials to cover the internment. Although grave goods are frequently present, these appear in small quantities, and generally include projectile points from different time periods. In the Coso Range area, archaeological investigations suggest that for the most part burial practices mirrored those described above. However, grave goods were more abundant and characterized by perishables and basketry (from Halford and Carpenter 2005:27 based on Gilreath and Holanda 2000).

Based on a review of the available historic maps for the area (Keeler 1951, Lone Pine 1951, and Olancha 1956), no recorded cemeteries are located within the proposed project area. In addition, a record search was conducted at the Eastern Information Center located at the University of California, Riverside, on November 16 and December 6, 2006. The appropriate USGS 7.5-minute series topographic quadrangles were reviewed for the presence of Native American burials and/or cemeteries or former historic period cemeteries within the vicinity of the proposed project area. The results of these efforts found no known burials or cemeteries within the proposed project area; however, known Native American burial sites are located approximately between 2 and 3 miles from the proposed project area (Halford and Carpenter 2005, Singleton D. 2006a, b). No evidence of cemeteries or burial sites was found during the current survey.

5.2 IMPACT ANALYSIS

This analysis is based on the Phase I Archaeological survey of the 6,355 acres completed to date of the 9,244-acre proposed project area. For the purposes of this impact analysis, all identified sites are presumed to be significant.

5.2.1 Dust Control Measures

The purpose of this Cultural Resources Technical Report is to analyze, based on the proposed 2008 SIP, the potential for significant impacts to cultural resources from the construction, operation, and maintenance of DCMs on an additional 14.6 square miles of potentially emissive lake bed, which includes 12.2 square miles of mandatory DCM area, 0.5 square mile of channel area, and 1.9 square miles of study area that may be emissive. For the purposes of this analysis, all ground disturbance activities are considered to be limited to existing DCMs and related infrastructure on proposed new DCM areas of Owens Lake. These areas were identified by the District based on the Government Board Meeting Information conducted on December 4, 2006. The specific locations of the areas in which DCMs would be implemented are shown in Appendix B. All the archaeological resources recorded during the present survey are completely or partially located within the areas requiring dust control. Each of the DCMs involve modification of the ground surface through grading, flooding, planting, or the placement of gravel; therefore construction, operation, and maintenance of the DCMs is expected to adversely affect the prehistoric and historic archaeological sites. All the DCMs involve ground disturbance to some degree, including, but not limited to, leveling and precision grading activities, excavation of ditches, construction of berms, and movement of equipment throughout the lake bed.

Shallow Flooding

Implementation of the Shallow Flooding DCM would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. Flooding itself would not be expected to affect these resources; however, excavations for the berms and the compression of the sediment caused by the movement of heavy equipment during implementation of the measure would result in the destruction of a unique paleontological resource.

Implementation of the shallow flooding DCM would cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5 of the State CEQA Guidelines.

Shallow Flooding involves releasing water along the upper edge of the lake bed and allowing it to spread and flow down-gradient toward the center of the lake. To be effective, at least 75 percent of each square mile of the control area must be wetted to produce standing water or surface-saturated soil. This process would result in significant adverse impacts to the archaeological sites in several ways. First, the water flow into the site area would move and redistribute artifacts, resulting in loss of site integrity. Second, the shallow flooding would be expected to expedite the deterioration of the resource fabric, particularly those sites that are substantially composed of wood and metal. And lastly, covering the sites with water preludes further investigations for information important to prehistory or history. Investigations conducted to date have not addressed whether the potential for the site to generate information has been exhausted.

In addition to the effects of flooding itself, sites located at the edge of an area where shallow flooding would be implemented would be adversely impacted by the construction of the berms designed to contain the water. The construction of berms requires movement of earth and construction equipment, both of which would cause significant adverse impacts to the archaeological resources. Excavations would result in the displacement of artifacts and archaeological deposits, resulting in loss of site integrity. Excavations may also result in the loss of diagnostic artifacts, which are vital to the historical significance of a site, and heavy equipment movement would likely result in the breakage of artifacts.

Implementation of the Shallow Flooding DCM would cause a substantial adverse change in the significance of an historical resource as defined in §15064.5 of the State CEQA Guidelines. For the purposes of this impact analysis, all identified sites are presumed to be historical resources as defined in §15064.5 (a)(3)(D), as having yielded, or may be likely to yield, information important in prehistory or history. The significant adverse impacts are the same as those identified for an "archaeological resource".

Implementation of the Shallow Flooding DCM may result in the disturbance of human remains, including those interred outside formal cemeteries. Flooding the area would be expected to expedite the deterioration of human remains, and excavations may unearth and disturb unanticipated human burials.

Moat & Row

Implementation of the Moat & Row DCM would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. Excavations required for the berms and ditches, and the compression of the sediment caused by the movement of heavy equipment during implementation of the measure would result in the destruction of a unique paleontological resource.

Implementation of the Moat & Row DCM would cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5 of the State CEQA Guidelines.

Implementation of the Moat & Row DCM would involve the construction of earthen berms about 5 feet in height, flanked by ditches excavated about 4 feet below the current lake surface. Excavations would result in the displacement of artifacts and archaeological deposits, resulting in loss of site integrity. Excavations may also result in the loss of diagnostic artifacts, which are vital to the historical significance of a site. In addition, heavy equipment movement required to implement the measure would likely result in the breakage of artifacts.

Implementation of the Moat & Row DCM would cause a substantial adverse change in the significance of an historical resource as defined in §15064.5 of the State CEQA Guidelines. For the purposes of this impact analysis, all identified sites are presumed to be historical resources as defined in §15064.5 (a)(3)(D), as having yielded, or may be likely to yield, information important in prehistory or history. The significant adverse impacts are the same as those identified for an "archaeological resource".

Implementation of the Moat & Row DCM may result in the disturbance of human remains, including those interred outside formal cemeteries. Excavations may unearth and disturb unanticipated human burials.

Managed Vegetation

Implementation of the Managed Vegetation DCM would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. Excavations required for the berms and water conveyance systems, and the compression of the sediment caused by the movement of heavy equipment during implementation of the measure would result in the destruction of a unique paleontological resource.

Implementation of the Managed Vegetation DCM would cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5 of the State CEQA Guidelines.

Alternatives for the 2008 SIP include a combination of the Moat & Row with Managed Vegetation. Areas in which Managed Vegetation alone would be implemented at the proposed project site have not been selected. Previous implementation of this DCM at Owens Lake required excavation to facilitate the supply of water and earth removal for the construction of berms in the area where the vegetation was planted. Excavations required for the implementation of this DCM would result in site disturbance, including loss of site integrity, loss of diagnostic artifacts, and breakage of artifacts. Vegetation would also have the potential to fracture friable materials, as well as permanently obscure visibility and the ability to relocate resources.

Implementation of the Managed Vegetation DCM would cause a substantial adverse change in the significance of an historical resource as defined in §15064.5 of the State CEQA Guidelines. For the purposes of this impact analysis, all identified sites are presumed to be historical resources as defined in §15064.5 (a)(3)(D), as having yielded, or may be likely to yield, information important in prehistory or history. The significant adverse impacts are the same as those identified for an "archaeological resource".

Implementation of the Managed Vegetation DCM may result in the disturbance of human remains, including those interred outside formal cemeteries. Excavations for the berms and water conveyance

systems may unearth and disturb unanticipated human burials. Continual application of water to the vegetated areas would also be expected to expedite the deterioration of human remains

Gravel Cover

Implementation of the Gravel Cover DCM would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. The process of placing, distributing, and leveling the gravel on the surface of the lake bed, combined with compression of the sediment from heavy equipment movement would result in the destruction of a unique paleontological resource.

Implementation of the Gravel Cover DCM would cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5 of the State CEQA Guidelines.

This DCM involves the movement of equipment on the surface of the lake to place and evenly distribute gravel. The combined effect of the heavy equipment and the placement of gravel would result in significant adverse impacts to cultural resources located on the lake surface. The process of placing, distributing, and leveling the gravel on the surface of the lake bed would result in the displacement of artifacts, resulting in loss of site integrity, and the loss of diagnostic artifacts, which are vital to the historical significance of a site. The heavy equipment movement would also result in the breakage of artifacts.

Implementation of the gravel DCM would cause a substantial adverse change in the significance of an historical resource as defined in §15064.5 of the State CEQA Guidelines. For the purposes of this impact analysis, all identified sites are presumed to be historical resources as defined in §15064.5 (a)(3)(D), as having yielded, or may be likely to yield, information important in prehistory or history. The significant adverse impacts are the same as those identified for an "archaeological resource".

Implementation of the gravel DCM may result in the disturbance of human remains, including those interred outside formal cemeteries. The process of placing, distributing, and leveling the gravel on the surface of the lake bed, combined with compression of the sediment from heavy equipment movement would result in the disturbance of unanticipated human burials.

5.2.2 Impacts to Paleontological Resources

The impacts to paleontological resources are addressed by Gust and Scott (2007) in the EIR in support of the 2008 SIP.

5.2.3 Impacts to Prehistoric Resources

Prehistoric Archaeological Sites

The survey of 6,355 acres completed to date indicates that five prehistoric archaeological sites would be impacted by the implementation of the shallow flooding and moat and row DCMs. OL Site 1 (Appendix B, Map 10), located in the southernmost portion of the lake, and OL Site 2 (Appendix B, Map 5), located on the eastern mid-portion of the lake would be affected by Shallow Flooding. Both sites are characterized by lithic scatters. OL Sites 5, 6, and 7 (Appendix B, Map 1), which are located on the northwest portion of the lake, would be affected by the Moat & Row DCM. OL Sites 5 and 7 are characterized by lithic scatters with ground stone; OL Site 6 is a lithic scatter. Due to the sensitivity of the surrounding areas, it is anticipated that up to 15 additional archaeological sites will be located and recorded during the survey of the remaining portion of the proposed project area. For the purposes of

this report, these sites are presumed to be significant and it is presumed that they will also be significantly adversely impacted by the implementation of the DCMs.

Prehistoric Isolates

Isolates are categorically ineligible for listing in the NRHP and the CRHR. Their information potential has been exhausted by recording or by its collection when appropriate. Isolates do not require avoidance or mitigation under CEQA.

5.2.4 Impacts to Historic Resources

Historic Archaeological Sites

The survey of 6,355 acres completed to date indicates that five historic archaeological sites would be impacted by the implementation of shallow flooding and moat and row. OL Sites 4H, 8H, 10H, and 11H (Appendix B, Maps 7 and 10) are located in the southernmost portion of the lake, about 1.5 miles northeast of the town of Cartago. These sites are characterized by wooden structures and remnants of old roads and industrial equipment. OL Site 3H (Appendix B, Map 3), which is located about 0.5 mile east of the town of Bartlett, would be affected by the Moat & Row DCM. This site is characterized by wooden structures and associated artifacts.

Historic Isolates

Isolates are categorically ineligible for listing in the NRHP and the CRHR. Their information potential has been exhausted by recording or by its collection when appropriate. Isolates do not require avoidance or mitigation under CEQA.

5.2.5 Native American Sacred Lands

No known Native American sacred lands are located in the proposed project area; therefore, the proposed project would not be expected to directly or indirectly affect or destroy a Native American sacred site.

5.2.6 Cemeteries and Human Remains

There are no known cemeteries or human remains in the proposed project area. Although no human remains were discovered during the current survey, Native American burials have been reported in the vicinity of the area. The proposed project would not be expected to disturb any human remains, including those interred outside of formal cemeteries; however, the possibility for the accidental discovery of human remains during project implementation exists.

5.3 MITIGATION MEASURES

Mitigation and monitoring plans have been previously developed for the areas of the lake where DCMs were implemented. These plans include standard mitigation measures that also apply to the areas that were currently surveyed for the proposed project. The preferred mitigation measure under CEQA, as well as under the National Historic Preservation Act (NHPA), is avoidance. Sites that are avoided must also be protected from inadvertent impacts associated with construction. The standard mitigation measure for archaeological sites that cannot be avoided is the complete retrieval of

scientifically valuable information following an appropriate research design, including surface collections, subsurface investigations, data analysis, report preparation, and curation.

Avoidance of Archaeological Resources

Each of the DCMs proposed for implementation in the proposed project area has been evaluated for the potential of avoidance of the archaeological sites recorded during the current survey.

Shallow Flooding

In general, areas where Shallow Flooding would be implemented would be completely covered by water. In some cases, a percentage of the area (no more than 25 percent) may remain exposed without decreasing the effectiveness of the measure. The areas left exposed, however, are the portions of the impact areas with higher elevations, where no additional construction would be required to prevent water flow into these areas. Avoidance of archaeological sites located in areas where this DCM is planned is feasible for sites located in the higher elevation portions of the impact areas that are smaller than the 25 percent allowance for exposed areas. Archaeological sites recorded to date are not located on elevated portions of the terrain where shallow flooding would be implemented. It is assumed that the size of each of the sites in question exceeds the 25 percent allowance for exposed areas. Therefore, avoidance would not be feasible.

Isolating archaeological sites by constructing berms around them and flooding the areas surrounding the sites has also been considered. However, the cost of this measure greatly exceeds the cost of Phase II test and evaluation and Phase III data recovery.

Moat & Row

The Moat & Row DCM would require that spaces between each moat and row be approximately 200 feet for the measure to be effective. Archaeological sites located in areas where the Moat & Row DCM would be implemented can only be avoided if the extent of the site is less than 200 feet in the north-south direction. None of the archaeological sites recorded to date are smaller than 200 feet. Therefore, avoidance would not be feasible.

Managed Vegetation

This measure has been considered for use in conjunction with the Moat & Row DCM. Thus, site avoidance would only be possible if sites located in areas where Moat & Row with Managed Vegetation would be implemented are smaller than 200 feet in the north-south direction. None of the archaeological sites recorded to date are smaller than 200 feet. Therefore, avoidance would not feasible.

Gravel Cover

As with the previous measures, implementation of the Gravel Cover requires that only small areas be left exposed to be effective. It is assumed that the size of each of the sites in question exceeds the 25 percent allowance for exposed areas. Therefore, avoidance would not be feasible.

Mitigation Measures

Impacts to cultural resources as a result of the proposed project may be reduced to below the level of significance through implementation of the following mitigation measures.

Paleontological Resources

Measure Cultural-1, Paleontological Resources Construction Monitoring

The impacts to cultural resources related directly or indirectly to the destruction of a unique paleontological resource that has the potential to be present in older Pleistocene and late Holocene portions of geological units in the eastern and southern Owens Lake playa shall be reduced to below the level of significance through construction monitoring of ground-disturbing activities and salvage of paleontological resources. Ground-disturbing activities include, but are not limited to, drilling, excavation, trenching, and grading. Where any such activity is anticipated in older Pleistocene and late Holocene portions of geological units in the eastern and southern Owens Lake playa in conjunction with the construction of dust control measures, the Great Basin Unified Air Pollution Control District shall require construction monitoring. The Great Basin Unified Air Pollution Control District shall require that construction monitoring, salvage, and recovery of unique paleontological resources be consistent with standards for such recovery established by the Society of Vertebrate Paleontology:

- A qualified paleontologist shall be retained to provide professional paleontological services. The paleontologist shall be responsible for implementation of the mitigation plan and maintenance of professional standards of work.

- Shallow Flooding without any excavation does not require mitigation. However, planned grading, trenching, and excavation activities associated with Moat & Row (or flooding areas associated with older Pleistocene and Late Holocene portions of geological units in the eastern and southern Owens Lake playa) shall be monitored. Sediments located near the surface are recent and are not anticipated to be paleontologically sensitive. However, those sediments located approximately 4 feet or more below the surface may contain paleontological resources and shall be monitored. This measure may be modified by the qualified paleontologist for specific locations as the depth of recent sediments varies across the project area. In conjunction with the subsurface work, the monitor shall inspect exposed sediments, including microscopic examination of matrix, to determine if fossils are present. In addition, the qualified paleontologist shall be available on call to respond to unanticipated discoveries.

- The monitor may be a qualified paleontological monitor or a cross-trained archaeologist, biologist, or geologist working under the supervision of a qualified principal paleontologist. The function of the monitor is to identify potential resources and recover them with appropriate scientific data.

- Paleontological Resources Sensitivity Training is required for all project personnel if the monitor will not be present full-time. This 15 minute field training reviews what fossils are, what fossils might potentially be found, and the appropriate procedures to follow if fossils are found.

- Discovery of fossil-producing localities shall require that stratigraphic columns be measured and that geologic samples be taken for analysis.

- If fossil localities are discovered, the paleontologist shall collect controlled samples for processing. All fossils recovered shall be prepared, identified, and cataloged before donation to the accredited repository designated by the lead agency. The qualified paleontologist shall be required to secure a written agreement with a recognized repository, regarding the final disposition, permanent storage, and maintenance of any significant fossil remains and associated specimen data and corresponding geologic and geographic site data that might be recovered as a result of the specified monitoring program. The written agreement shall specify the level of treatment (i.e., preparation, identification, curation, cataloguing, etc.) required before the fossil collection would be accepted for storage. In addition, a technical report shall be completed. The final disposition of paleontological resources recovered on State lands must be approved by the California State Lands Commission.

- Within 90 days of the completion of the paleontological monitoring, the qualified paleontologist shall prepare a final mitigation report to be submitted to the Great Basin Unified Air Pollution Control District and the California State Lands Commission with an appended, itemized inventory of the specimens. The report shall include a list of specimens recovered, documentation of each locality, interpretation of fossils recovered, and any technical or specialist's reports as appendices. The report and inventory, when submitted to the Great Basin Unified Air Pollution Control District, shall signify the completion of the program to mitigate impacts to paleontological resources.

Archaeological and Historical Resources

The direct and indirect impacts to cultural resources related to substantial adverse changes to the significance of archaeological and historical resources resulting from implementation of the proposed project would be reduced to below the level of significance through the implementation of mitigation measures Cultural-2 and -3, which are in accordance with Section 15126.4 (b)(3) of the State CEQA Guidelines.

Measure Cultural-2, Cultural Resources Investigations

The Great Basin Unified Air Pollution Control District shall ensure that potentially impacted prehistoric and historic archaeological sites be assessed for significance, as defined by Public Resources Code Section 21083.2 or State of California Environmental Quality Act Guidelines Section 15064.5(a), through the implementation of Phase II investigations. Impacts to those sites found to be significant shall be mitigated to below the level of significance through a Phase III data recovery program. Resources found to be not significant shall not require mitigation.

Coordination with the California State Lands Commission shall be undertaken to mitigate impacts consistent with California State Lands Commission practices for the mitigation of archaeological sites that occur on lands under the jurisdiction of the California State Lands Commission, including California State Lands Commission approval and issuance of a permit for Phase II testing and Phase III data recovery program. The Great Basin Unified Air Pollution Control District shall consult with the State Historic Preservation Officer as required by 15064.5 (b) (5) of the State of California Environmental Quality Act Guidelines for state-owned historical resources. Construction shall not occur on state property until concurrence from the State Historic Preservation Officer is obtained concerning determinations of eligibility and that mitigation has reduced the impact to cultural

resources to a less than significant level. In addition, coordination with interested Native American tribes identified by the Native American Heritage Commission shall be undertaken. Local tribes shall be contacted by the qualified archaeologist specified for the project, and a Native American monitor(s) shall be retained to be present on site during all ground-disturbing activities, including but not limited to archaeological evaluation, excavation, Phase II investigations and Phase III data recovery (if needed), and construction activities. The Native American monitor(s) shall coordinate with the qualified project archaeologist, the Great Basin Unified Air Pollution Control District, and the City of Los Angeles Department of Water and Power to ensure responsible remediation of Native American sites and sacred materials. Should human remains be discovered, the California State Lands Commission shall be notified within 24 hours.

Phase II

Five (5) newly recorded prehistoric archaeological sites (OL Sites 1, 2, 5, 6, and 7), five (5) newly recorded historic archaeological sites (OL Sites 3H, 4H, 8H, 10H, and 11H), and any additional prehistoric or historic archaeological sites located on the 9,664-acre proposed project site shall be assessed for significance as defined by the State of California Environmental Quality Act through the implementation of Phase II investigations prior to the initiation of construction activities in those areas where the sites are located:

- Development of a research design that guides assessments of site significance and scientific potential. This design will be an update, expansion, and refinement of research designs that have guided previous Phase II evaluations in the study area.
- Mapping and systematic collection of a representative sample of surface artifacts
- Subsurface investigation through shovel test pits, surface scrapes, or 1 by 1 meter excavation units; a combination of such methods; or equivalent methods
- Analysis of recovered material to determine significance pursuant to the State of California Environmental Quality Act
- Preparation of a report, including evaluation of site significance and recommendations for mitigation if appropriate
- Transmittal of report to the Eastern Information Center at the University of California, Riverside
- Curation of artifact collection. The final disposition of collected artifacts from State lands is subject to approval by the California State Lands Commission

Phase III

A Phase III data recovery effort, in accordance with the State of California Environmental Quality Act (Section 21083.2 (d)), shall be implemented by the Great Basin Unified Air Pollution Control District for those sites determined to be significant, pursuant to the State of California Environmental Quality Act, through Phase II testing and evaluation. The Great Basin Unified Air Pollution Control District shall ensure that data recovery has been completed prior to the issuance of a construction permit for any area containing a site determined to be significant and for which it can be demonstrated that consequential scientific information can be recovered. The Phase III data recovery program shall include:

- Development of a comprehensive research design to answer questions addressed during the Phase II on a broader regional level and to provide a procedural framework for the collection of data at sites determined to be significant.

- Mapping and systematic collection of surface artifacts, possibly complete data recovered depending on site size
- Subsurface investigation through methods, such as controlled hand-excavation units, machine excavations, deep testing, or a combination of methods. When applicable, other techniques, such as geophysical testing methods may also be used
- Analysis of recovered material through visual inspection, and chemical analysis when applicable
- Preparation of a report
- Transmittal of report to involved parties and Eastern Information Center at the University of California, Riverside
- Curation of artifact collection. The final disposition of collected artifacts from State lands is subject to approval by the California State Lands Commission

Measure Cultural-3, Cultural Resources Monitoring Program

Impacts to surface and subsurface cultural resources not identified during the Phase I (survey), Phase II (testing and evaluation), or Phase III (data recovery) shall be mitigated through the implementation of a monitoring program during construction or any ground-disturbing activities. Native American consultation shall be undertaken as part of this mitigation measure. Previous monitoring efforts have demonstrated that there is a high potential for the unanticipated discovery of cultural resources during construction on the Owens Lake bed, even in those areas that have been previously surveyed. This is a consequence of the movement of sediment by wind and/or water across the lake bed, which results in the exposure and covering of cultural materials on the surface of the lake bed on a regular basis. Monitoring shall be required only during initial grading and earthmoving activities. The Great Basin Unified Air Pollution Control District shall require that the following program be implemented and that the requirement be duly noted in the plans and specifications:

- **Retain a Qualified Archaeologist.** A qualified archaeologist shall be retained to implement a monitoring and recovery program in any area identified as having the potential to contain unique archaeological resources as defined by Public Resources Code Section 21083.2 or historical resources as defined by the State of California Environmental Quality Act Guidelines Section 15064.5(a).

- **Agreement for Disposition of Recovered Artifacts.** The selected archaeologist shall be required to secure a written agreement with a recognized museum repository, such as the University of California, Davis and the San Bernardino County Museum, regarding the final disposition and permanent storage and maintenance of any unique archaeological resources or historical resources recovered as a result of the archaeological monitoring, as well as corresponding geographic site data that might be recovered as a result of the specified monitoring program. The written agreement shall specify the level of treatment (i.e, preparation, identification, curation, cataloging, etc.) required before the collection would be accepted for storage.

  The ultimate decision regarding the disposition of artifacts collected during Phase I (survey), Phase II (testing and evaluation), Phase III (data recovery), or monitoring efforts on lands administered by the California State Lands Commission shall be made by the California State Lands Commission. Artifacts collected during past efforts on California State Lands Commission lands have been sent to the University of California, Davis, if they had been recovered from a site that was eligible for the National Register of Historic Places or the California Register of Historical Resources. The California

State Lands Commission has indicated that those artifacts collected from sites that were not eligible for the National Register of Historic Places or the California Register of Historical Resources will be returned to the tribes. The final disposition of artifacts recovered from lands administered by other agencies (e.g. BLM) shall be determined in accordance with the policies of those agencies.

- **Preconstruction Briefing.** The selected archaeologist, or an equally qualified designee, shall attend a preconstruction briefing to provide information regarding regulatory requirements for the protection of unique archaeological resources, historical resources, and human remains. Construction personnel shall be briefed on procedures to be followed in the event that a unique archaeological resource, historical resource, or human remains are encountered during construction. An information package shall be provided for construction personnel not present at the initial preconstruction briefing. The archaeologist(s) shall be required to provide a telephone number where they can be reached by the construction contractor, as necessary.

- **Unanticipated Discovery of Human Remains on State Lands** (Public Resources Code 5097). The archaeologists shall ensure that all construction personnel shall be informed of the requirement to notify the coroner of the County within 24 hours of the discovery of human remains on state lands. Upon discovery of human remains, there shall be no further excavation or disturbance of the site or any that are reasonably suspected to overlie adjacent human remains until the following conditions are met:
  - The Inyo County Coroner has been informed and has determined that no investigation of the cause of death is required, and if the remains are of Native American origin, the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

- **Unanticipated Discovery of Human Remains on Federal Lands** (Native American Graves Protection and Repatriation Act). Whenever any person inadvertently discovers human remains on public lands, including lands administered by the Bureau of Land Management, 43 Code of Federal Regulations 10.4 requires the individual to notify the land manager in writing of such discovery. If the discovery occurs in connection with an authorized use, the activity that caused the discovery is to cease and the materials are to be protected until the land manager can respond to the situation. Upon receipt of written confirmation of the discovery, 43 Code of Federal Regulations 10.4 requires the manager to do the following: (1) certify receipt of the notification; (2) take immediate steps, if necessary to further protect the materials; (3) notify by telephone, with written confirmation, the tribes likely to be culturally affiliated with the materials; and (4) initiate consultation with such tribes. If, after consultation with tribes, the manager determines that the material will be adequately protected in situ, without the need to excavate or remove the material from the area of discovery, then the requirements under the Native American Graves Protection and Repatriation Act have been completed. The materials remain in federal ownership, adequately protected by the manager as provided for in the law. If, after consultation with tribes, the manager determines that the circumstances warrant intentional excavation or removal of the materials from the area of discovery, then 43 Code of Federal Regulations 10.3 applies, and the manager must complete the steps outlined therein for intentional excavations.

- **Construction Monitoring.** A qualified archaeologist shall monitor earthmoving activities in areas that are likely to contain unique archaeological resources or historical resources. The archaeologist shall be authorized to halt construction, if necessary, in the immediate area where buried cultural remains are encountered. Prior to the resumption of grading activities in the immediate vicinity of the cultural remains, the project proponent shall provide the archaeologist with the necessary resources to identify and implement a program for the appropriate disposition (as specified by Section 15064.5 (e) of the State of California Environmental Quality Act Guidelines).

- **Monitoring Report.** The monitor shall maintain daily monitoring logs that shall be submitted quarterly to the Great Basin Unified Air Pollution Control District. A complete set of the daily monitoring logs shall be kept on site throughout the earthmoving activities and be available for inspection. The daily monitoring log shall be keyed to a location map to indicate the area monitored, the date, assigned personnel, and the results of monitoring, including the recovery of archaeological material, sketches of recovered materials, and associated geographic site data. Within 90 days of the completion of the archaeological monitoring, a monitoring report shall be submitted to the Great Basin Unified Air Pollution Control District, the City of Los Angeles Department of Water and Power, the California State Lands Commission, and to the Eastern Information Center at the University of California, Riverside. The report, when submitted to the Great Basin Unified Air Pollution Control District, shall signify the completion of the program to mitigate impacts to unique archaeological resources or historical resources.

Human Remains

Implementation of the proposed project has the potential to result in direct impacts to unknown burial sites. Mitigation measure Cultural-2, which requires Phase II and Phase III archaeological investigations and Native American monitoring, and Cultural-3, which requires monitoring of all other ground-disturbing activities and specifies the statutory procedures to be followed in the event of the discovery of human remains, would mitigate impacts to unknown locations of human remains to a less than significant level.

Level of Significance after Mitigation

Implementation of mitigation measures Cultural-1 through Cultural-3 would reduce impacts to cultural resources related to an adverse change in the significance of a paleontological resource, an archaeological resource, an historical resource, or human remains to below the level of significance.

SECTION 6.0
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