7.13 CULTURAL AND PALEONTOLOGICAL RESOURCES (NEW)

7.13 CULTURAL AND PALEONTOLOGICAL RESOURCES (NEW)

7.13.1 INTRODUCTION

7.13.1.1 Content

The proposed project analyzed in the Monterey Plus EIR was the Monterey Amendment and the Settlement Agreement. The Monterey Plus EIR considered five "elements" of the Monterey Amendment as follows:

- *Changes in the procedures for allocation of Table A water and surplus water among the SWP contractors;*
- *Approval to permanent transfers of 130,000 acre feet and retirement of 45,000 acre-feet of SWP long-term water supply contracts' Table A amounts;*
- *Transfer of property known as the "Kern Fan Element property" in Kern County;*
- *Water supply management practices; and*
- *Restructured water rates.*

This REIR has changed the description of the Kern Fan Element property transfer to be:

- *Transfer of property known as the "Kern Fan Element property" in Kern County and its development and continued use and operation as a locally owned and operated groundwater banking and recovery project.*

There are no revisions to the other elements of the Monterey Amendment or of the Settlement Agreement, and no changes have been made relating to them in this REIR. (See discussion in Introduction/Executive Summary.)

This REIR does not supersede the analysis of the Monterey Plus EIR but supplements the Monterey Plus EIR. The Monterey Plus EIR focused on the transfer of the KFE property, which was fully analyzed in the Monterey Plus EIR. This REIR did not identify any new impacts or changes to impacts caused by the transfer of the KFE property. Therefore, this REIR focuses on the development and continued use and operation of the KWB as a locally owned and operated groundwater banking and recovery project ("KWB activities").

The Monterey Plus DEIR Section 7.13 identified potential impacts to cultural and paleontological resources as a result of the transfer of the Kern Fan Element. Substantial new information is presented in this section, however, that replaces text from DEIR Section 7.13 that discusses KWB activities. All other text in DEIR Section 7.13 remains unchanged. In addition to the impacts discussed below, to the extent they apply, indirect impacts as a result of population growth are presented in Chapter 8, Growth-Inducing Impacts, and indirect impacts from potential cropping changes are presented in Section 10.1, Cumulative Environmental Impacts.

Table 7.13-1A identifies the potentially affected environmental resources from impacts of KWB activities on cultural and paleontological resources.

TABLE 7.13-1A

IMPACTS OF KWB ACTIVITIES ON CULTURAL AND PALEONTOLOGICAL RESOURCES

Proposed Project Element	Potentially Affected Environmental Resources	Impact Number
Monterey Amendment		
Transfer of Kern Fan Element lands, and KWB activities	Damage or destruction of cultural and paleontological resources associated with construction and operation of groundwater storage facilities	7.13-1

During public review of the Notice of Preparation for the Monterey Plus EIR, concerns were raised regarding impacts to resources of cultural significance to Native Americans and sites that occur or may occur within project areas, particularly reservoir fluctuation zones (Patrick Porgans and Associates, March 28, 2002).

7.13.1.2 Analytical Method

Cultural Resources

Archaeological resources evaluated for potential impacts were identified from previous environmental studies, and record searches at the appropriate information centers which are cited in this section. This analysis included a review of the environmental setting, impacts, and mitigation measures related to cultural resources, to the extent that they apply, presented in the 1997 Monterey Initial Study and Addendum for the KWB Habitat Conservation Plan/Natural Community Conservation Plan (KWB HCP/NCCP)(see Appendix 7-6a).

Paleontological Resources

Paleontological resources evaluated for potential impacts were identified from previous studies of rock units that underlie project areas, rock units similar to those under the project areas, and previous discoveries. Previous studies that provided information for the analysis are cited in this section. Specific to the KWB Lands, published geological and paleontological literature were reviewed to document the number and locations and previously recorded fossil sites from rock units exposed in and near the project site and vicinity, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the U.C. Berkeley Museum of Paleontology (UCMP) in Berkeley, California, on April 29, 2015.

Paleontological Resource Assessment Criteria

The potential paleontological importance of a project site can be assessed by identifying the paleontological importance of exposed rock units within the project site. Because the areal distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of a project site that are of higher and lower sensitivity for paleontological resources.

A paleontologically sensitive rock formation is one that has a high potential paleontological productivity rating and is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock formation refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the same formation. A specific rock formation within a given project site is most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the formation in other locations.

The tasks listed below were completed to establish the paleontological importance of each rock unit exposed at or near KWB Lands:

- The potential paleontological productivity of each rock formation was assessed, based on the density of fossil remains previously documented within the rock formation.
- The potential for rock formations at the project site to contain unique paleontological resources was considered.

Stratigraphic Inventory

Regional and local surficial geologic mapping and correlation of the various geologic units on KWB Lands and vicinity have been provided at a scale of 1:500,000 by Bartow,[1] 1:250,000 by Croft[2] (with detailed stratigraphic columns), 1:500,000 by Page[3] (with detailed stratigraphic columns), and 1:250,000 by Smith[4].

Paleontological Resource Inventory and Assessment by Rock Unit

Based on a record search conducted at UCMP, there are no previously recorded fossil localities within KWB Lands.[5]

7.13.1.3 Standards of Significance

The following standards of significance are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For purposes of this REIR, impacts on cultural and paleontological resources would be considered potentially significant if the KWB activities would:

- cause a substantial adverse change in the significance of a~~n~~ unique archaeological resource or historical resource pursuant to CEQA Guidelines Section 15064.5;
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- disturb any human remains, including those interred outside of formal cemeteries.

7.13.2 ENVIRONMENTAL SETTING

7.13.2.1 Definition of Cultural Resources

For the purposes of this analysis, the term “cultural resources” generally encompasses three broad categories: archaeological resources, historical resources, and Native American ethnic and cultural values and concerns. Archaeological resources are byproducts of human activities, either during prehistoric or historic times, and include human remains. In general, archaeological resources occur at or beneath the ground surface. There are exceptions, however, such as petroglyphs, bedrock milling slicks or mortars, or other features which are visible on exposed rocks. Historical resources are defined by their age and generally refer to events and features associated with Euroamerican settlement, primarily structures or other above-ground remains. A site may be both historical and archaeological, particularly if the materials within the site indicate occupation span long periods of time. The subject of Native American ethnic and cultural values and concerns covers a broad range of resources. Most prominent is the use of sacred and traditional lands by contemporary Native Americans for ceremonies, faunal and botanical resource exploitation, or other traditional activities. These areas often correspond to unrecorded archaeological and/or historical sites, such as rock art or petroglyph sites, or traditional funerary areas. Since the location of sacred and traditional lands or associated activities is often not disclosed, specific location information for many of these areas are unknown.

Geologic units containing fossils (paleontological resources) are present in many locations. Most of the rock units containing fossils are sedimentary rocks. The type and distribution of fossils within a geologic unit provide valuable information that helps expand scientific knowledge about the range of plant and animal species and the ecosystems that were present millions of years ago.

7.13.2.2 Physical Setting in 1995

Archaeological Resources

Since the 1960s, several important studies have been conducted in the southern San Joaquin Valley. Riddell and Olsen's examination of Paleoindian projectile points in private collection from the Tulare Lake basin offered the first evidence of early Holocene use of the region.[6] Fredrickson and Grossman's excavation of KER-116 for the California Department of Water Resources (Department) also indicated a Paleoindian occupation.[7] Hartzell's reexamination of the Buena Vista Lake assemblages further refined the cultural chronology for the area,[8] the results of which were supported by Sutton and Des Lauriers' overview of obsidian research from the southern San Joaquin Valley. To summarize, hydration measurements from localities in the nearby foothills and sites in or adjacent to lakeshore settings suggest exploitation of lacustrine resources was greatest between ca. 2,500 to 1,000 years before present (BP), when those environments were most productive. Prior and subsequent to this time period, hydration readings on obsidian artifacts suggest sporadic exploitation of lakeshore resources.[9]

Numerous cultural chronologies for the southern San Joaquin Valley and nearby regions have been offered by archaeologists, however critical gaps in the extant prehistoric record still exist. Although the cultural sequences differ in some of the details or vary by several hundred years, in general they concur, and identify similar technological and socio-political developments in California prehistory. Currently, the regional cultural sequence is divided into five periods: Paleoindian, Millingstone, Early, Middle, and Late.

Archaeological evidence suggests that California was settled during the **Paleoindian Period** (ca. 12,000-8,000 BP). In the southern San Joaquin Valley, numerous marshes and grassland environments offered early populations opportunities to procure a variety of resources.[10]

Assemblages dating to the **Millingstone Period** (ca. 8,500 to 5,500 BP) show similarities to the San Dieguito complex of Southern California, and contain a variety of flaked and cobble tools. Associated fauna from KER-116 reflect a generalized subsistence strategy, which incorporated artiodactyls, lagomorphs, waterfowl, fish, and turtles.[11]

More definitive evidence of prehistoric populations occurs during the **Early Period** (ca. 5,500 BP to 2,600 BP). Collections from a number of sites in the region typically contain numerous handstones and millingstones, reflecting greater use of seeds and nuts in the diet. Most reconstructions of Early Period economies, however, stress exploitation of faunal resources, such as deer and rodents, or a range of waterfowl and fish species.[12]

An increase in the frequency of ground stone artifacts during the **Middle Period** (ca. 2,600 BP to 1,000 BP) indicates greater reliance on botanical resources than in earlier times. The presence of pestles in addition to handstones and millingstones suggests incorporation of resources such as roots or perhaps acorns, which have higher processing costs. Waterfowl, fresh water fish taxa, and terrestrial fauna remains indicate exploitation of lakeshore and upland territories. Recovery of artifacts manufactured from exotic materials, such as extra-local obsidian, implies trade with other groups from different regions.[13]

Likely ancestral to the ethnohistoric Emigdiano, Castac, Chumash, Tataviam, and Gabrieliño/Tongva cultures, the Late Period (ca. 1,000 to 500 BP) is marked by greater elaboration of social, political, and economic organization. A subsistence strategy based largely on fishing and hunting of marine resources further develops during this time. Affiliations between southern San Joaquin Valley and coastal California groups imply an expansion and intensification of exchange networks during the Late Period.[14]

Ethnographic research in the San Joaquin Valley and the lower Sierra Nevada foothills has identified three cultural groups in the area: the Northern Valley, Southern Valley, and Foothill Yokuts. The Southern Valley Yokuts included a large number of distinct small tribes. The traditional Southern Valley Yokuts' territory included the southern end of the San Joaquin Valley and the area around Tulare, Buena Vista, and Kern lakes. Subsistence practices emphasized lacustrine resources, including waterfowl, fish (trout, salmon, chub, perch, and suckers), turtles, mussels, roots, and seeds. Less important were terrestrial fauna, such as tule elk, pronghorn antelope, mule deer, jackrabbits, and ground squirrels.[15]

Early European exploration of the area and the advent of missions did not affect the Southern Valley Yokuts as much as it did tribes in other areas. In 1833, however, an outbreak of malaria took an estimated 75 percent of the native population. Subsequent annexation of California severely affected the Southern Valley Yokuts, as they were displaced and their land settled by immigrants.[16]

In the recent past, KWBA has cooperated with the Tinoqui-Chalola Council of Kitanemuk & Yowlumne Tejon Indians to allow the annual spirit walk to include walking across KWB Lands as part of the route from Beach Park to the Tule Elk State Natural Reserve.[17]

Paleontological Resources

The surficial geologic formations under KWB Lands are shown in Figure 7.13-1. Based on a review of geologic mapping, Younger Alluvium, Basin Deposits, and Stream Terrace Deposits are exposed at the surface of the KWB Lands.[18,19,20] These formations are underlain by Older Alluvium and Stream and Terrace Deposits, which are in turn underlain by the Tulare Formation. Each of these geologic formations is discussed in further detail below.

<u>Alluvium/Flood Basin Deposits/Stream Terrace Deposits</u>

These formations are of Holocene age (i.e., 11,700 years Before Present [B.P.] to Present Day). The younger alluvium generally consists of discontinuous beds of clay, silt, sand, and gravel. In the KWB area, the alluvium is finer grained and less permeable as it grades into fine-grained flood basin deposits underlying the historic beds of Buena Vista and Kern Lakes. The flood basin deposits consist of silt, silty clay, sandy clay, and clay interbedded with poorly permeable sand layers. The stream terrace deposits consist of sediments deposited along river channels and major streams, poorly sorted, from clay to boulder sized. The total thickness of these units may range from 150–1,000 feet.[21,22,23]

<u>Alluvium/Stream and Terrace Deposits</u>

These geologic formations are composed of up to 250 feet of Pleistocene-age (i.e., 2.6 million to 11,700 year B.P.) lenticular deposits of clay, silt, sand, and gravel that are loosely consolidated to cemented.[24,25]

Tulare Formation

The Tulare Formation is composed of continental rocks and alluvial fan, deltaic, flood plain, lake, and marsh deposits. The formation is of late Pliocene–early Pleistocene age. In the southwestern part of the San Joaquin Valley, the Tulare Formation may comprise up to 4,000 feet of sedimentary deposits. The lithology of the Tulare formation varies from place to place, depending on the kind of material that furnished the sediments and the conditions under which they were laid down; however, it generally contains unconsolidated clay, silt, sand, and gravel.[26,27]

By the end of the late Pliocene/early Pleistocene epochs, the ancient drainage way from the San Joaquin Valley to the ocean had closed, and the resulting impoundment of water formed a large lake as evidenced by the Corcoran Clay member of the Tulare Formation. The Corcoran Clay is present below the surface from the Kern River outlet channel on the west through the central and much of the eastern subbasin at depths of 300–650 feet.[28,29]

The Corcoran Clay is generally very fine grained; however, isolated, coarser zones are apparent from well drilling logs, particularly where the clay is less than 20 feet thick. Although the Corcoran Clay is generally conceptualized as a single, continuous layer of very low hydraulic conductivity, detailed analyses of well drilling logs show that the Corcoran clay zone is not homogeneous. In some areas it is better characterized as a zone of multiple clay layers interbedded with more permeable materials.[30]

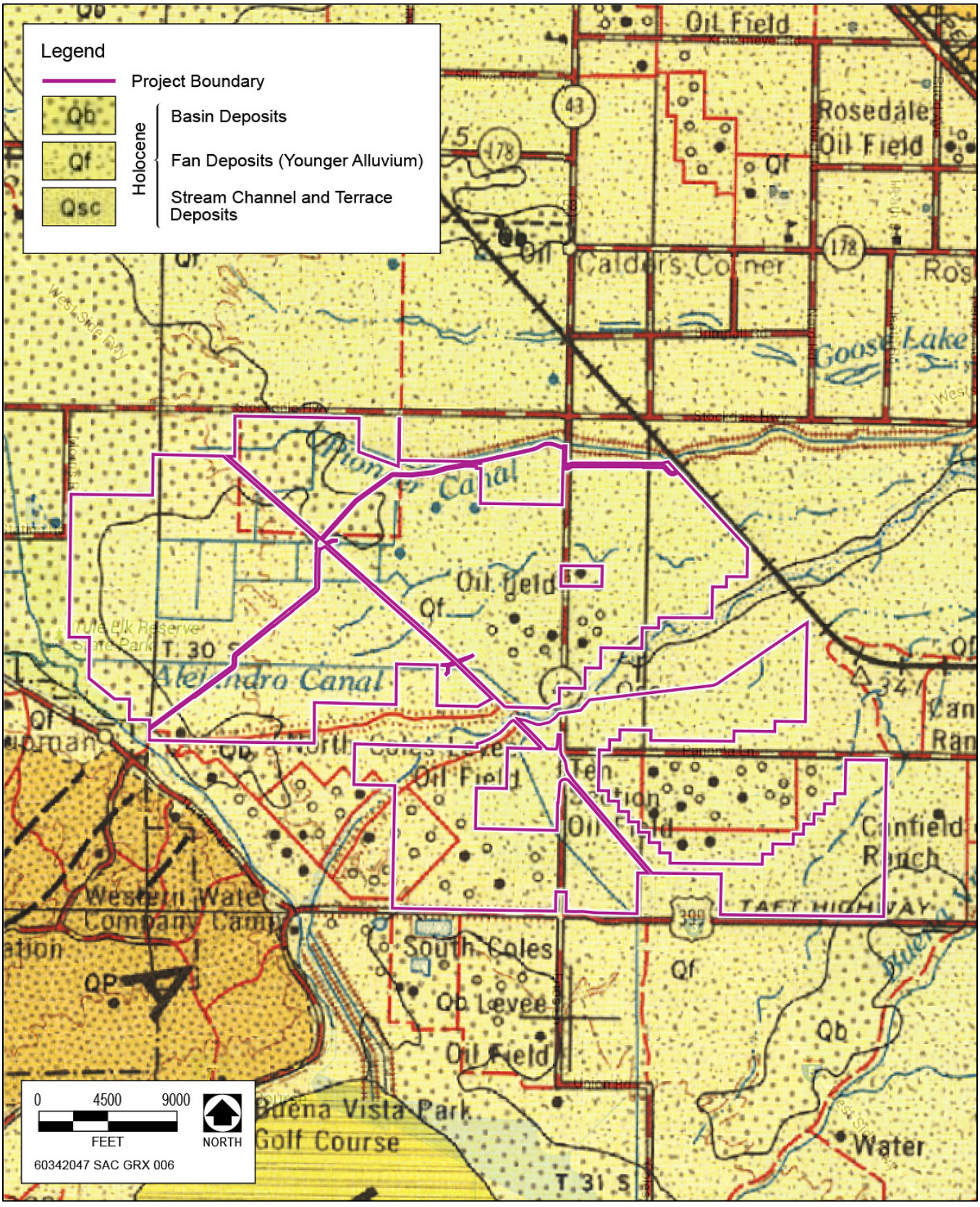
A search of the UCMP database indicates that vertebrate fossils have been recovered from the Tulare Formation from two localities in Kern County. One of those locations (V-6810) is within the Elk Hills, the eastern extent of which lies approximately 0.5 mile west of KWB Lands. This locality yielded specimens of *Equus occidentalis* (Western horse).[31] The UCMP database indicates that 8 other localities in Kings County yielded vertebrate fossils from the Tulare Formation.[32]

Croft[33] indicates that Pleistocene-age vertebrate fossils have been recovered from the Corcoran Clay member of the Tulare Formation at two locations. Teeth of an *Equus* (Irvingtonian or Rancholabrean age) were found in 1954 an excavation of the Madera Canal. In 1964, vertebrate remains in the Corcoran Clay were exposed by the San Canal excavation, about 15 miles northwest of Mendota. The fauna were determined to be either of middle Pleistocene (Irvingtonian) age or late Pleistocene (Rancholabrean) age.

In the Kettleman Hills—approximately 80 miles north of the project site in Kings County—hundreds of sand dollars, scallops, clams, and various fresh water mollusks (among other specimens) have been recovered from the Tulare Formation. The collection recorded by Woodring, et al.[34] includes 33 species of fresh water mollusks, 23 species of gastropods, and 10 species of pelecypods, in addition to 136 species of diatoms, two species of ostracodes, a horse, and miscellaneous fish.

In addition to vertebrate fossils, Page[35] presented reports from several other authors indicating the Tulare Formation contains specimens of the freshwater clams *Anodonta* and *Sphaerium kettlemanense,* the freshwater and brackish-water snail *Amnicola*, and the freshwater snails *Fluminicola, Planorbis, Pyrgulapsis, Valvata, Lithoglyphus*, and *Seminalis*.

Because of the large number of fossils that have been recovered from the Tulare Formation, it is considered to be of high paleontological sensitivity.



Source: Smith 1964[36]

Figure 7.13-1. Surficial Geologic Formations at the Kern Water Bank Site

Younger Alluvium/Flood Basin Deposits/Younger Stream and Terrace Deposits

The younger alluvium, flood basin deposits, and younger stream and terrace deposits are of Holocene age. To be considered a unique paleontological resource, a fossil must be more than 11,700 years old. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered "unique" paleontological resources. Therefore, these formations are not considered to be paleontologically sensitive.

Older Alluvium/Stream and Terrace Deposits

The older alluvium and older stream and terrace deposits are of Pleistocene age. The Pleistocene epoch, known as the "Great Ice Age," began approximately 2.6 million years ago. On the basis of Savage's[37] survey of vertebrate fauna from the nonmarine late Cenozoic deposits of the San Francisco Bay region, he concluded that two major divisions of Pleistocene-age fossils could be recognized: the Irvingtonian (older Pleistocene fauna) and the Rancholabrean (younger Pleistocene and Holocene fauna). These two divisions of Quaternary Cenozoic vertebrate fossils are widely recognized today in the field of paleontology. The age of the later Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species that are inhabitants of the same area today. In addition to bison, larger land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths.

Remains of vertebrate fossils have been found at several localities in older alluvium and stream and terrace deposits related to similar deposits at the KWB site. Excavations for the Arvin landfill approximately 25 miles southeast of KWB Lands (UCMP locality V-93068), which occurred in older alluvium, resulted in the recovery of 32 specimens from 9 different species (*Microtus, Neotoma, Canidae, Dipodomys, Thomomys, Squamata, Equus, Hyla*, and *Leporidae*).[38]

A deposit of Pleistocene mammals from older alluvium was reported by Cogstone[39] approximately 4.5 miles east of KWB Lands. This site yielded specimens of horse, deer, pronghorn, muskrat, seven kinds of rodents, two kinds of rabbits, bat, snake, bird, lizard, turtle, frog/toad, and a freshwater bivalve.

Jefferson[31,32] compiled a database of California late Pleistocene vertebrate fossils from published records, technical reports, unpublished manuscripts, information from colleagues, and inspection of paleontological collections at more than 40 public and private museums. Jefferson indicates that a recorded locality in the vicinity of Maricopa/Pentland, approximately 15 miles southwest of KWB Lands, yielded specimens from 46 different Rancholabrean-age species of lower nonmarine and avians, and 27 species of mammals, from older alluvial fan deposits. Jefferson also indicates that UCMP localities 1370, 1386, 7139, and 34001 all originated within the McKittrick Oil Field holdings west of KWB Lands, and have yielded specimens from over 70 Rancholabrean-age and younger species of lower nonmarine and avians, and 45 species of mammals.

In addition to the above, seven other UCMP localities have yielded Rancholabrean fauna from Pleistocene alluvial sediments in Kern County. Vertebrate specimens recovered included species of horse, bison, and rodent.[40]

Because of the large number of vertebrate fossils that have been recovered from the older alluvium and stream and terrace deposits, these formations are considered to be of high paleontological sensitivity.

7.13.2.3 Changes in Physical Setting between 1996 and 2014

The nature and types of cultural resources present generally do not change and, therefore, the environmental setting described under 1995 conditions would be the same under 1996–2014 conditions.

7.13.2.4 Regulatory Setting in 1995

The treatment of cultural resources is governed by federal, State, and local laws and guidelines. There are specific criteria for determining whether prehistoric and historic resources or objects, and traditional cultural sites are significant and/or protected by law. Federal and State significance criteria generally focus on the resource's integrity and uniqueness, its relationship to similar resources, and its potential to contribute important information to scholarly research. Some resources that do not meet federal significance criteria may be considered significant by State criteria. The laws and regulations seek to lessen impacts on significant prehistoric or historic resources. The federal, State, and local laws and guidelines for protecting historic resources are summarized below.

Federal

Federal laws for cultural resources are governed primarily by Section 106 of the National Historic Preservation Act of 1966 (amended in 1999 and 2014). The Code of Federal Regulations Title 36 includes specific information on the protection of historic resources. A historic property is defined to mean any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties, as well as localities that are of traditional religious and/or cultural importance to a Native American tribe or Native Hawaiian organization.

State

Archaeological Resources

CEQA and the State CEQA Guidelines also require lead agencies to consider whether projects will affect archaeological resources (Public Resources Code [PRC] Section 21083.2 and California Code of Regulations [CCR] Section 15064.5[c]). If an archaeological site is a historical resource meeting one of the above criteria, agencies shall follow the provisions of PRC Section 21084.1. If, however, an archaeological site does not meet these criteria, but does meet the definition of an “unique archaeological resource” as defined in PRC Section 21083.2(g), the resource must be considered under CEQA in compliance with PRC Section 21080.1. An unique archaeological resource is defined in PRC Section 21083.1(g) as “an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

2. Has a special and particular quality such as being the oldest of its type or the best available example of its type; or

3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.”

Native American Burials

California law protects Native American burials, skeletal remains and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code Section 7050.5, California PRC Sections 5097.94 *et seq*.). Section 7050.5(b) of the California Health and Safety code specifies protocol when human remains are discovered. These requirements have been incorporated into Section 15064.5(e) of the CEQA Guidelines.

Historical Resources

CEQA requires public agencies to consider the effects of proposed projects on both "historical resources" and "unique archaeological resources." Pursuant to PRC Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Section 21083.2 of the PRC also requires agencies to determine whether a proposed project would have a significant effect on "unique archaeological resources." Section 15064.5 of the State CEQA Guidelines (CCR Title 14, Chapter 3) provides additional guidance on how agencies are to determine the significance of impacts on historical and archaeological resources. Pending future evaluation of cultural resources against the criteria noted below, resources will be managed as though eligible.

Section 15064.5 of the State CEQA Guidelines defines a "historical resource" as a resource that meets at least one of the following three criteria:

- A resource listed in or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (CRHR), as defined in PRC Section 5024.1 and CCR Section 4850 et seq.;
- A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resources survey meeting the requirements of PRC Section 5024.1(g) – unless the preponderance of evidence demonstrates that it is not historically or culturally significant; or
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

PRC Section 21084.1 and Section 15064.5 (a)(4) also acknowledge that even if a resource does not meet the above criteria, this fact shall not preclude a lead agency from determining that the resources may be a historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

The CRHR was created in 1992 and is intended as an authoritative listing of the State's significant historical and archaeological resources (PRC Section 5024.1 and CCR Section 4852). The criteria for listing in the CRHR (codified in PRC Section 5024.1 and clarified in CCR Section 4852) are intended to serve as the definitive criteria for assessing the significance of historical resources for purposes of CEQA.

By definition, the CRHR includes the following resources:

- Listed in the NRHP,
- Formally determined eligible for listing in the NRHP,

- California Historical Landmarks beginning with #770, and
- California Points of Historical Interest beginning with those designated in January 1998.

The second category of "historical resources" under PRC Section 21084.1 includes those "deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1." Subdivision (g) of the statute provides that a resource identified as significant in a historical survey may be listed in the CRHR if the survey meets all of the following criteria:

- The survey has been or will be included in the State Historic Resources inventory;
- The survey and the survey documentation were prepared in accordance with procedures and requirements of the State Office of historic Preservation;
- The resource is evaluated and determined to have a significance rating of Category 1 to 5 on the DPR Historic Resources Inventory Form; and
- If the survey is 5 years or older at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historical resources which have become eligible or ineligible due to changed circumstances, or further documentation is provided on those resources which have been demolished or altered in a manner that substantially diminished the significance of the resource.

A resource is presumed to constitute an "historical resource" if it is included in a "local register of historical resources" meeting the above criteria, unless "the preponderance of evidence demonstrates that it is not historically or culturally significant' (CCR Section 15064.5[a][2]).

In addition to assessing whether historical resources potentially affected by a proposed project are listed in the CRHR or have been identified in a survey process meeting the requirements of PRC Section 5024.1(g), lead agencies have a responsibility to evaluate resources against the CRHR criteria for eligibility before making a finding as to a proposed project's impacts on historical resources (PRC Section 21084.1; CCR Section 15064.5[a][3]). A resource shall be considered historically significant if it is significant at the local, state, or national level under one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with the lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be determined eligible for listing in the CRHR, it must be historically significant and retain enough of its historic character or appearance to be recognizable as a historic resource and to convey the reasons of its significance. "Integrity" is defined as the retention of the resource's physical identify that existed during its period of significance. Integrity is determined by considering the location, design, setting, materials, workmanship, feeling, and association of the resource.

California Public Resources Code Section 5097.5

Unauthorized collection of fossils on land under state ownership or jurisdiction is considered a misdemeanor, punishable by fine and/or imprisonment. PRC Section 5097.5 states:

> A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.

Professional Paleontological Standards

The Society of Vertebrate Paleontology (SVP), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation.[41]

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, SVP[42] established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. All vertebrate fossils are generally categorized as being of potentially significant scientific value.

Local

General Plans

General Plans of the various counties and cities of the State of California contain goals and policies aimed at protecting cultural resources in the region.

Kern County

The *Kern County General Plan* includes extensive reviews of archaeological research, history, and ethnography in the county, and Native American concerns are noted (especially in regard to cemeteries). The appropriateness of using Native American monitors is indicated. The Plan notes that impacts may occur when development takes place without consideration of important resources, and it notes the prudence of using inventories and avoiding impacts to sites by various means.

7.13.2.5 Changes in Regulatory Setting between 1996 and 2014

Federal

Revisions to 36 CFR 800 were made in January 2001 and in August 2014 call for a significant increase in Native American consultation in the Section 106 process. Native American Tribes must now be consulted at all phases of work, including eligibility of prehistoric sites, which was not previously required.

State

California Senate Bill 297

This bill addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and

establishes the Native American Heritage Commission to resolve disputes regarding the disposition of such remains. It has been incorporated into Section 15064.5(e) of the State CEQA Guidelines.

California Natural Resources Agency Tribal Consultation Policy (2012)

The California Natural Resources Agency Tribal Consultation Policy was adopted pursuant to Executive Order B-10-11 requiring State departments to implement effective government-to-government consultation with California Indian Tribes so that Indian tribes and tribal communities can provide meaningful input into the development of projects, plans, and other activities that may affect tribal communities.

California Assembly Bill 52

Assembly Bill 52 was approved and chaptered into CEQA in September 2014. This law defines a new category of cultural resources that requires evaluation under CEQA Appendix G, Section V (Cultural Resources). Under this new legislation, a project that may cause a substantial adverse change in the significance of a tribal cultural resource would be a project that may have a significant effect on the environment. The law also requires lead agencies to consult with tribes on projects for which tribes request consultation.

The requirements of Assembly Bill 52 went into effect on July 1, 2015, and are applicable only to those projects that have a Notice of Preparation, Negative Declaration, or Mitigated Negative Declaration filed on or after that date. Therefore, KWB activities are not subject to the requirements of the law because the DEIR Notice of Preparation was issued in January 2003.

Local Plans

Metropolitan Bakersfield General Plan, Land Use Element

The *Metropolitan Bakersfield General Plan* (adopted in 2002 and amended in 2007) Land Use Element lists the following general policies that would be applicable to KWB activities:[43]

- **Policy 104:** As part of the environmental review procedure, an evaluation of the significance of paleontological, archaeological, and historical resources and the impact of proposed development on those resources shall be conducted and appropriate mitigation and monitoring included for development projects.
- **Policy 105:** Development on land containing known archaeological resources (i.e., high sensitivity areas) shall utilize methodology set forth, as described necessary by a qualified archaeologist, to locate proposed structures, paving, landscaping, and fill dirt in such a way as to preserve these resources undamaged for future generations when it is the recommendation of a qualified archaeologist that said resources be preserved in situ.
- **Policy 106:** The preservation of significant historical resources as identified on Table 4.10-1 shall be encouraged by developing and implementing incentives such as building and planning application permit fee waivers, Mills Act contracts, grants and loans, implementing the State Historic Building Code and other incentives as identified in the City's Historic Preservation Ordinance.
- **Policy 107:** The preservation of significant historical resources shall be promoted and other public agencies or private organizations shall be encouraged to assist in the purchase and/or relocation of sites, buildings, and structures deemed to be of historical significance.

No specific implementation measures are assigned to these policies, other than the following measure, which calls for following the requirements of the CEQA Guidelines:

- **Implementation Measure 7: Environmental Review.** Local guidelines for project processing shall reflect California Environmental Quality Act (CEQA) Guidelines which state that the environmental effects of a project must be taken into account as part of project consideration.[44]

The 2007 general plan update reserved a chapter (Chapter XIII) for a Historical Resources Element,[45] but policies and goals for cultural resources have not yet been developed.

Kern County General Plan

The following policy and implementation measures related to cultural resources from the Land Use, Open Space, and Conservation Element of the *Kern County General Plan* (adopted in 2004 and amended in 2009) would be applicable to KWB activities.[79,80]

- **Policy 25:** The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors.
  - **Implementation Measure K:** Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.
  - **Implementation Measure L:** The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act (CEQA).
  - **Implementation Measure N:** The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
  - **Implementation Measure O:** On a project specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

7.13.3 IMPACTS AND MITIGATION MEASURES

7.13-1 KWB activities could potentially result in damage and/or destruction of cultural and paleontological resources.

1996 — 2014

The KWB facilities include approximately 7,200 acres of recharge ponds, 85 recovery wells, an extensive network of monitoring wells, 36 miles of pipeline, and the 6-mile-long KWB Canal. The ponds consist of low earthen berms that pond water to depths of a few feet. The ponded water infiltrates into the alluvial fan for recharge into the aquifer. Water flows between the ponds in small channels; KWBA operators control the flow with small weir boxes. The recovery wells average about 750 feet deep and produce as much as 5,000 gallons per minute of water. They are distributed throughout the KWB Lands and are spaced approximately one-third mile apart. The 16- to 20-inch-diameter wells are powered with electric motors. Small diameter (15- to 36-inch-diameter) PVC pipelines transport water recovered from wells to existing canals or, in some cases, to large diameter (> 36 inch-diameter) pipelines. Approximately 31 miles of small-diameter and 5 miles of large-diameter pipeline have been constructed.

The KWB Canal was constructed to convey water both to the water bank ponds for recharge purposes and from the water bank wells for recovery purposes. The canal extends 6 miles from the Kern River on the east to the California Aqueduct on the west. Associated structures include headworks at the Kern River, a 100 cubic feet per second (cfs) pump station serving the Kern River area, a crossing under Enos Lane, a check structure, a 545 cfs pump station serving the eastern portions of the KWB, and diversion facilities at the California Aqueduct.

Between 1996 and 2014, maintenance and operational activities included the replacement of recovery wells and the servicing and maintenance of all wells involved in groundwater recovery. Periodic berm repair and mowing of the KWB Canal banks to control excessive vegetation growth were ongoing maintenance activities. Existing fencing was maintained and additional fencing installed as needed. Other management activities included trash cleanup and removal of illegally dumped materials, environmental cleanup, and monitoring of third-party operations and cleanup activities.[46,47,48,49,50,51,52] No previously unidentified archaeological resources were identified during KWB activities during 1996-2014 with the exception of isolates such as chert flakes and mano.[53,54,55] Furthermore, only historical isolates such as glass and ceramics have been found during KWB activities during 1996-2014.[56]

As discussed previously, prehistoric sites have been recorded on KWB Lands and paleontological deposits have been identified in the southern portion of the county. Some of these deposits are exposed while others are underground. Ground disturbance associated with the construction of groundwater storage facilities could expose paleontological resources. Prior to construction, archaeological investigations were completed in the Kern Fan Element and for the KWB Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). Some of these investigations recorded significant archaeological sites at or near KWB Lands.[57] Known cultural sites were avoided and no new cultural sites were discovered during ground-disturbing construction activities during 1996-2014. Mitigation measures were adopted to avoid and/or preserve existing cultural sites and to ensure that if previously unidentified archaeological resources were discovered during construction activities, that work would cease and a qualified archaeologist would examine the discovery and make recommendations for appropriate data recovery.

Therefore, the impact of KWB activities from 1996 to 2014 with regard to cultural resources was ***less than significant.***

Mitigation Measures

None required.

2015 — 2030

Near-term future KWB activities include construction of approximately 190 acres of recharge ponds and three wells under the ongoing Integrated Regional Water Management (IRWM) program (Kern Water Recharge and Recovery Project). Longer-term future construction of approximately 862 acres of additional recharge ponds and associated facilities is anticipated as part of full build-out. The IRWM program ponds have been sited. The locations of additional ponds are approximate but will be consistent with KWB HCP/NCCP requirements; final locations and areas will be determined as these facilities are designed. KWBA has also issued a Notice of Preparation in 2012 for the proposed Kern Water Bank Conservation and Storage Project, which would use existing facilities to divert water from the Kern River to increase reliability and enhance the dry-year water supply of KWBA's participating members through storage in the KWB. No new water conveyance facilities to convey KWB-recovered water are anticipated to be constructed by KWB participants; KWB participants already have facilities in place to convey and exchange recovered water.

In addition to the new recharge ponds, wells, and associated facilities, other potential ground-disturbing activities could include: fencing, constructing replacement recovery wells, installing and replacing pipeline, and installing weir boxes. Maintenance of existing and new basins, wells, and ancillary facilities would also take place.[58]

The KWB HCP/NCCP allows developed uses on about 4,000 acres of KWB Lands.[59] Developed uses include farming, permanent facilities for the KWB, and commerce. Approximately 490 acres are designated for possible commercial use. Between 1996 and 2014, no development occurred on the 490-acre parcel. The Settlement Agreement prohibits development of this parcel, so with KWB activities the parcel would remain undeveloped.

As a consequence of KWB activities, approximately 1,052 acres of land would be converted to recharge ponds and three wells constructed between 2015 and 2030. Construction of recharge ponds and associated berms could expose cultural resources to damage and/or destruction.

As shown in Figure 7.13-1 and discussed previously, the surface of KWB Lands is covered with Holocene-age basin and alluvial sediments. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered "unique" paleontological resources. Therefore, these formations are not considered to be paleontologically sensitive. Because these formations extend from 150 to 1,000 feet below the ground surface on KWB Lands, most of the proposed KWB activities would have no effect on unique paleontological resources. However, well depths on KWB Lands range from 300 to 1,400 feet below the ground surface. Therefore, well drilling and refurbishing activities associated with groundwater recharge, extraction, and monitoring may occur in the Older Alluvium, Older Stream and Terrace Deposits, and Tulare Formation. Because of the number of vertebrate fossils that have been recovered from these formations, they are considered paleontologically sensitive.

Therefore, the impact of KWB activities from 2015 to 2030 with regard to cultural resources and unique paleontological resources could be ***potentially significant.***

Mitigation Measures

Mitigation Measure 7.13-1a would reduce potentially significant impacts of KWB activities to cultural resources to less than significant. KWBA is obligated to carry out Mitigation Measure 7.13-1a (see Section 7.0.4.3.2, 2016 KWBA Resolution). Therefore, KWB activities from 2015 to 2030 with regard to cultural resources would be ***less than significant, with mitigation.***

Mitigation Measure 7.13-1b would reduce potentially significant impacts of KWB activities on unique paleontological resources to less than significant***.*** KWBA is obligated to carry out Mitigation Measure 7.13-1b (see Section 7.0.4.3.2, 2016 KWBA Resolution). Therefore, KWB activities with regard to unique paleontological resources would be ***less than significant, with mitigation.***

7.13-1a *KWBA will implement the following measures* to minimize potential adverse impacts on *cultural resources (see Appendix 7-6b, 2016 KWBA Resolution):*

a) *Prior to ground disturbance for new pond or well construction and associated facilities, an analysis to identify the potential presence of archaeological resources on the project site shall be conducted. The analysis shall include, at a minimum, a records check and literature survey from the appropriate California Historical Resources Information System (CHRIS) center and a Phase I Cultural Resources Investigation by an archaeologist meeting the Secretary of the Interior's Standards. If resources are known to exist on a project site, the analysis shall include an assessment of the resource and shall include measures for the in-situ protection, or the recovery, preservation, study, and curation of*

the resource, as appropriate. The analysis and the measures developed shall be consistent with the practices and intent described in Section 21083.2 et seq. of the Public Resources Code, as well as Sections 15064.5 et seq. and 15126.4(b) of the California Code of Regulations, and shall be consistent with current professional archaeological standards. The archaeologist shall prepare a report of the results of any study prepared, following accepted professional practice. Copies of the report shall be submitted to the KWBA and to the appropriate CHRIS information center. KWBA shall also consult, as appropriate, with the Native American Heritage Commission and appropriate Native American tribal representatives to address Native American cultural values with respect to archaeological contexts and places of traditional use or importance.

b) *As a condition of all contracts for new pond or well construction and associated facilities and prior to ground-disturbing activities, all earth-moving and excavation contractor employees shall attend an orientation session informing them of the potential for inadvertently discovered cultural resources and/or human remains and protection measures to be followed to prevent destruction of any and all cultural resources discovered on site. The applicant's designated project construction manager, a qualified archaeologist, and a qualified cultural resource manager/monitor from a local California Native American tribe shall conduct the orientation (unless the local tribe opts not to participate). The orientation will include information regarding the potential for objects to occur on site, a summary of applicable environmental law, procedures to follow if potential cultural resources are found, and the measures to be taken if cultural resources and/or human remains are unearthed as part of the project.*

c) *Construction areas for new ponds and wells and associated facilities shall be staked prior to earthmoving by a qualified archaeologist in consultation with the contractor to indicate the construction area, construction staging area, and buffer. No earthmoving, parking, or materials storage will be allowed outside the staked areas. Prior to construction, the archaeologist shall survey the area to identify any surface artifacts within the staked area. An archaeologist and qualified cultural resource manager/monitor from a local California Native American tribe (unless the local tribe opts not to participate) shall be present during any grubbing or topsoil grading within the staked area. If previously unknown buried cultural resources, such as flaked or ground stone, historic debris, building foundations, or nonhuman bone (unless determined to be from present day grazing operations), are discovered during ground-disturbing activities, work will stop in that area and within an appropriate buffer area, as determined by the archaeologist. The archaeologist shall assess the significance of the affected cultural resources and, if necessary, develop feasible and appropriate treatment measures in consultation with the project staff, such as avoidance, capping with geotextile and fill, or Phase III data recovery consistent with applicable standards adopted pursuant to the National Historic Preservation Act.*

d) *In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately, the area of the find shall be protected, and KWBA immediately shall notify the County Coroner of the find and comply with the provisions of PRC Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.*

7.13-1b. *KWBA will implement the following measures to minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources: (see Appendix 7-6b, 2016 KWBA Resolution):*

a) *Before the start of any well-drilling activities, KWBA shall retain a qualified paleontologist or other qualified individual to train all personnel involved with earthmoving and/or well drilling activities regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered (this training can take place at the same time as the orientation required by 7.13-1a).*

b) *In the event that paleontological resources are discovered, KWBA will notify a qualified paleontologist. The paleontologist will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in CEQA Guidelines Section 15064.5. If fossil or fossil bearing deposits are discovered during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by a qualified paleontologist. The paleontologist will notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If KWBA determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important. The plan will be submitted to KWBA for review and approval prior to implementation. The analysis and measures developed shall be consistent with the Conformable Impact Mitigation Guidelines developed by the Society of Vertebrate Paleontology and current professional paleontological standards.*

ENDNOTES

1. Bartow, J.A. 1991. The Cenozoic Evolution of the San Joaquin Valley, California. U.S. Geological Survey Professional Paper 1501. Washington, D.C.

2. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

3. Page, R.W. 1986. *Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections.* U.S. Geological Survey Professional Paper 1401-C. Washington, DC.

4. Smith, A.R. 1964. *Geologic Map of California Bakersfield Sheet.* California Division of Mines and Geology. Sacramento, CA.

5. University of California Museum of Paleontology. 2015. Paleontological Collections Database.

6. Riddell, F. A., and W. E. Pritchard. 1969. "An Early Man Site in the San Joaquin Valley, California." *American Antiquity* 34(2):21–130.

7. Fredrickson, D. A., and J. Grossman. 1966. *Radiocarbon Dating of an Early Site at Buena Vista Lake, California.* Paper presented at the Annual meeting of the Society for American Archaeology, Reno, NV.

8. Hartzell, L. 1992. *Hunter-Gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County, California.* Unpublished dissertation, University of California, Davis.

9. Erlandson, J. M. 1997. "The Middle Holocene along the California Coast." In J. E. Arnold, ed., *Archaeology of the California Coast during the Middle Holocene*, pages 1–10. Los Angeles: Regents of the University of California.

10. Fredrickson, D. A., and J. Grossman. 1966. *Radiocarbon Dating of an Early Site at Buena Vista Lake, California.* Paper presented at the Annual meeting of the Society for American Archaeology, Reno, NV.

11. King, C. 1990. *Evolution of Chumash Society*, New York: Garland Publishing.

12. Hartzell, L. 1992. *Hunter-Gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County, California.* Unpublished dissertation, University of California, Davis.

13. Hartzell, L. 1992. *Hunter-Gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County, California.* Unpublished dissertation, University of California, Davis.

14. Moratto, M. J. 1984. *California Archaeology.* Orlando, FL: Academic Press.

15. Wallace, W. J. 1978. "Southern Valley Yokuts." In R. F. Heizer, ed., *Handbook of North American Indians*, Vol. 8, California, pages 448–461. Washington, DC: Smithsonian Institution.

16. Wallace, W. J. 1978. “Southern Valley Yokuts.” In R. F. Heizer, ed., *Handbook of North American Indians*, Vol. 8, California, pages 448–461. Washington, DC: Smithsonian Institution.

17. Kern Water Bank Authority. 2005 (May 1). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2004 Annual Report and 2005–2006 Management Plan*. Bakersfield, CA.

18. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

19. Woodring, W.P., R. Stewart, and R.W. Richards. 1940. *Geology of the Kettleman Hills Oil Field, California; Stratigraphy, Paleontology, and Structure*. U.S. Geological Survey Professional Paper 195. Washington, DC.

20. Page, R. W. 1983. *Geology of the Tulare Formation and Other Continental Deposits, Kettleman City Area, San Joaquin County, California, with a Section on Ground-Water Management Considerations and Use of Texture Maps.* U.S. Geology Water-Resources Investigations Technical Report 83-4000. Sacramento, CA.

21. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

22. Woodring, W.P., R. Stewart, and R.W. Richards. 1940. *Geology of the Kettleman Hills Oil Field, California; Stratigraphy, Paleontology, and Structure*. U.S. Geological Survey Professional Paper 195. Washington, DC.

23. Page, R. W. 1983. *Geology of the Tulare Formation and Other Continental Deposits, Kettleman City Area, San Joaquin County, California, with a Section on Ground-Water Management Considerations and Use of Texture Maps.* U.S. Geology Water-Resources Investigations Technical Report 83-4000. Sacramento, CA.

24. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

25. Woodring, W.P., R. Stewart, and R.W. Richards. 1940. *Geology of the Kettleman Hills Oil Field, California; Stratigraphy, Paleontology, and Structure*. U.S. Geological Survey Professional Paper 195. Washington, DC.

26. Page, R. W. 1983. *Geology of the Tulare Formation and Other Continental Deposits, Kettleman City Area, San Joaquin County, California, with a Section on Ground-Water Management Considerations and Use of Texture Maps.* U.S. Geology Water-Resources Investigations Technical Report 83-4000. Sacramento, CA.

27. Smith, A.R. 1964. *Geologic Map of California Bakersfield Sheet.* California Division of Mines and Geology. Sacramento, CA.

28. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

29. Woodring, W.P., R. Stewart, and R.W. Richards. 1940. *Geology of the Kettleman Hills Oil Field, California; Stratigraphy, Paleontology, and Structure*. U.S. Geological Survey Professional Paper 195. Washington, DC.

30. Page, R.W. 1986. *Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections.* U.S. Geological Survey Professional Paper 1401-C. Washington, DC.

31. University of California Museum of Paleontology. 2015. Paleontological Collections Database.

32. University of California Museum of Paleontology. 2015. Paleontological Collections Database.

33. Croft, M.G. 1972. *Subsurface Geology of the Late Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California.* U.S. Geological Survey Water-Supply Paper 1999-H. Washington, DC.

34. Woodring, W.P., R. Stewart, and R.W. Richards. 1940. *Geology of the Kettleman Hills Oil Field, California; Stratigraphy, Paleontology, and Structure*. U.S. Geological Survey Professional Paper 195. Washington, DC.

35. Page, R. W. 1983. *Geology of the Tulare Formation and Other Continental Deposits, Kettleman City Area, San Joaquin County, California, with a Section on Ground-Water Management Considerations and Use of Texture Maps.* U.S. Geology Water-Resources Investigations Technical Report 83-4000. Sacramento, CA.

36. Smith, A.R. 1964. *Geologic Map of California Bakersfield Sheet.* California Division of Mines and Geology. Sacramento, CA.

37. Savage, D.E. 1951. Late Cenozoic Vertebrates of the San Francisco Bay Region. University of California Publications, Bulletin of the Department of Geological Sciences 28(10):215–314.

38. University of California Museum of Paleontology. 2015. Paleontological Collections Database.

39. California Department of Transportation. 2011 (May). Paleontological Resources: Paleontological *Identification and Evaluation Report and Mitigation Plan for State Route 178 Widening Project.* Prepared by Cogstone Resource Management, Inc. Orange, CA.

40. University of California Museum of Paleontology. 2015. Paleontological Collections Database.

41. Society of Vertebrate Paleontology. 2016. Guidelines from the Ethics Education Committee for Collecting, Documenting and Curating Fossils. Available: http://vertpaleo.org/The-Society/Governance-Documents/Guidelines-from-the-Ethics-Education-Committee-for.aspx.

42. Society of Vertebrate Paleontology. 1995 (January). *Society for Vertebrate Paleontology News Bulletin,* Number 163. http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/SVP_1995.pdf.

43. Kern County. 2007 (December 11). *Metropolitan Bakersfield General Plan (Unincorporated Metropolitan Area)*, Land Use Element. Adopted by Kern County Board of Supervisors December 3, 2002; updated through December 11, 2007. Pages II-18 to II-19.

44. Kern County. 2007 (December 11). *Metropolitan Bakersfield General Plan (Unincorporated Metropolitan Area)*, Land Use Element. Adopted by Kern County Board of Supervisors December 3, 2002; updated through December 11, 2007. Page II-21.

45. Kern County. 2007 (December 11). *Metropolitan Bakersfield General Plan (Unincorporated Metropolitan Area),* Table of Contents. Adopted by Kern County Board of Supervisors December 3, 2002; updated through December 11, 2007. Page i.

46. Kern Water Bank Authority. 2007 (May 1). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2006 Annual Compliance Report and 2007–2008 Management Plan.* Bakersfield, CA. Pages 2 and 45–53.

47. Kern Water Bank Authority. 2009 (May 1). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2008 Compliance Report and Management Plan.* Bakersfield, CA. Pages 5 and 22–32.

48. Kern Water Bank Authority. 2010 (May 1). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2009 Compliance Report and 2010–2011 Management Plan.* Bakersfield, CA. Pages 5, 8, and 31–39.

49. Kern Water Bank Authority. 2011 (May 1). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2010 Compliance Report and 2011 Management Plan*. Bakersfield, CA. Pages 4, 7, and 23–28.

50. Kern Water Bank Authority. 2012 (May). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2011 Compliance Report and 2012 Management Plan.* Bakersfield*,* CA. Pages 9 and 25.

51. Kern Water Bank Authority. 2013 (May). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2012 Compliance Report and 2013 Management Plan*. Bakersfield, CA. Pages 7 and 25.

52. Kern Water Bank Authority. 2014 (May). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2013 Compliance Report and 2014 Management Plan*. Bakersfield, CA. Pages 7 and 25.

53. Pruett, C.L. 1997. Addendum 1: Emergency Flood Area. A Cultural Resources Assessment and Plan for the Kern Water Bank Authority Project near Bakersfield, Kern County, California. *Three Girls and a Shovel*, Bakersfield, CA.

54. Murphy, P. G. 1999. *Addendum V: Four New Berm Sites [location redacted]. A Cultural Resources Assessment and Plan for the Kern Water Bank Authority Project near Bakersfield, Kern County, California.* Three Girls and a Shovel, Bakersfield, CA.

55. Pruett, C. L. 1999. *Addendum VI: A Cultural Resources Assessment for New Berms [location redacted]. Kern County, California.* Three Girls and a Shovel, Bakersfield, CA.

56. Pruett, C.L. 1997. Addendum 1: Emergency Flood Area. A Cultural Resources Assessment and Plan for the Kern Water Bank Authority Project near Bakersfield, Kern County, California. *Three Girls and a Shovel*, Bakersfield, CA.

57. Kern Water Bank Authority. 1997 (October). *Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan, Volume II, Environmental Assessment*. Pages 52 and 53.

58. Kern Water Bank Authority. 2014 (May). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2013 Compliance Report and 2014 Management Plan*. Page 25.

59. Kern Water Bank Authority. 1997 (October). *Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan*.

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