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Governor's Office of Planning and Research
State Clearinghouse and Planning Unit



Kate Gordon
Director

Memorandum

Date: February 24, 2020
To: All Reviewing Agencies
From: Scott Morgan, Director
Re: SCH # **2020019082**
Reclamation District 2091 Levee Improvement Project

The Lead Agency has corrected some information regarding the above-mentioned project. Please see the attached materials for more specific information. All other project information remains the same.

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CULTURAL RESOURCES ASSESSMENT

RECLAMATION DISTRICT 2091 LEVEE IMPROVEMENT PROJECT

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ABSTRACT

The California Department of Water Resources (DWR) Flood System Sustainability Branch repairs significant levee damage due to erosion, seepage, and/or stability deficiencies. Damaged levee sections were identified within the San Joaquin River Flood Control System, specifically Reclamation District (RD) 2091. The Project proposes repairs to address seepage and boil damage at five levee locations in Stanislaus County.

On behalf of DWR, Kleinfelder contracted with Parus Consulting, Inc. (Parus) to prepare this report to evaluate any cultural resources within the project area. Cultural resource is a general term that encompasses the National Historic Preservation Act's (NHPA) historic property and areas of traditional and cultural importance definitions, historical resources, unique archaeological resources, and tribal cultural resources defined under the California Environmental Quality Act (CEQA).

The project area is part of the State Plan of Flood Control (SPFC) levee system and is under the jurisdiction of the U.S. Army Corp of Engineers (USACE). Therefore, authorization from USACE is required, and this project is considered a federal undertaking. This study was completed in compliance with Section 106 of the NHPA, as well as CEQA. This report documents the literature review, Native American consultation, and field survey methods required for compliance with federal and State of California regulations.

Background research and literature review found no previously recorded cultural resources within the Area of Potential Effects (APE). However, prehistoric and historical cultural resources have been recorded within a 0.25-mile radius of the APE; including two prehistoric occupations sites (CA-STA-122 and CA-STA-171) that were determined eligible for listing on the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHP). Field surveys of the APE recorded the presence of one new resource, an earthen levee (West Jennings Road Levee No.1). A field evaluation recommends the resource as not eligible for listing on the NRHP nor the CRHR. Since former and current riparian areas within the San Joaquin Valley are considered to be highly sensitive for prehistoric and historic-era cultural resource, archaeological monitoring of ground disturbing activity is recommended to ensure that the proposed project will have no adverse effects on any cultural resources.

With the implementation of Construction Monitoring, this report study concludes a **Finding of No Effect** to archaeological or historical resources as defined by 36 CFR 800.16 (i) and recommends there will be **No Effect** or changes to any historic resources from this project as defined by CEQA.

ACRONYMS

ACHP	Advisory Council on Historic Preservation
A.D.	Anno Domini
APE	Area of Potential Effect
B.C.	Before Christ
CCIC	Central California Information Center
CCTS	Central California Taxonomic System
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
DWR	California Department of Water Resources
I-5	Interstate 5
LM	Levee Mile
m	Meters
MLD	Most Likely Descendant
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
Parus	Parus Consulting, Inc.
PRC	Public Resources Code
RD	Reclamation District
SHPO	State Historic Preservation Officer
SPFC	State Plan of Flood Control
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

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1. INTRODUCTION

On behalf of the California Department of Water Resources (DWR), Kleinfelder retained Parus Consulting, Inc. (Parus) to provide a Phase I cultural resource survey and field evaluation services for the Reclamation District 2091 Levee Improvement Project (“the project”). The project area is part of the State Plan of Flood Control (SPFC) levee system and is under the jurisdiction of the U.S. Army Corp of Engineers (USACE). Therefore, this study was completed in compliance with Section 106 of the National Historic Preservation Act (NHPA), as well as the California Environmental Quality Act (CEQA).

1.1 PROJECT DESCRIPTION

The DWR oversees the San Joaquin River Flood Control System. The Flood System Sustainability Branch of the DWR is responsible for repairs to significant levee damage due to erosion, seepage, and/or stability deficiencies. During inspections, five discreet locations within in Reclamation District (RD) 2091 were identified as in need of repair due to seepage or boil.

The project is located in Stanislaus County, California, approximately 3.2 miles (mi) east of the City of Patterson. The project vicinity is bound by the San Joaquin River on the west, the San Joaquin River East Levee on the north; Vivian Road, S. Carpenter Road and Crows Landing Road on the east; and Linwood Avenue and Simmons Road to the south (Figure 1). The Jennings Wastewater Treatment Facility (JEN) and the Stanislaus Regional Training Division are also located adjacent to portions of the project vicinity. The levee naming convention for the project is based on the miles a levee is from JEN. Activity locations are situated in Township 5 South, Range 8 East, Sections 3, 9, 15, 22, and 23; Mount Diablo Base Meridian of the U.S. Geological Survey (USGS) Brush Lake and Crows Landing 7.5 Minute Series Quadrangles (Figure 2).

Project initiation entails the staging of heavy equipment and repair materials, which is to occur on private agricultural lands regularly under tillage. Ingress and egress to staging and repair areas remain within the established prism of public and private roads. Repairs across the five locations may entail all or some of the following treatments: clearing, grubbing, and stripping of the berm; placement of a minimum of a 12-inch filter layer; placement of a 12-inch drain rock layer; placement of a geotextile cap to prevent movement of material into the drain rock. Compaction and contouring will return the repaired portion to pre-project dimensions. Project activity is expected to commence and conclude in one phase and all repairs are designed in accord with DWR Division of Flood Management Rural Levee Repair Guidelines.

1.2 AREA OF POTENTIAL EFFECTS (APE)

The physical location with the potential for impact to archaeological resources is designated as the Area of Potential Effects (APE). The environmental study limits for the project area constitutes an additional 0.25-mi search radius around the APE. An APE varies depending on the potential impacts of the project, the type of environmental clearance required, and the Lead Agency. The five repair locations (JENs 3.1, 4.8, 5.7, 6.1, 6.6) and the two Staging Areas comprise approximately 11.5 acres (ac.), the combined total of which constitutes the horizontal APE for this project (Figure 2). The vertical APE (i.e., associated with the engineering design of the project) is based upon the existing topography, site development history, preliminary project plans, and any potential visual impacts to any existing historic properties in the site vicinity. The vertical APE stated in Table 1 is based on 95% complete engineering design plans (4/26/2019).

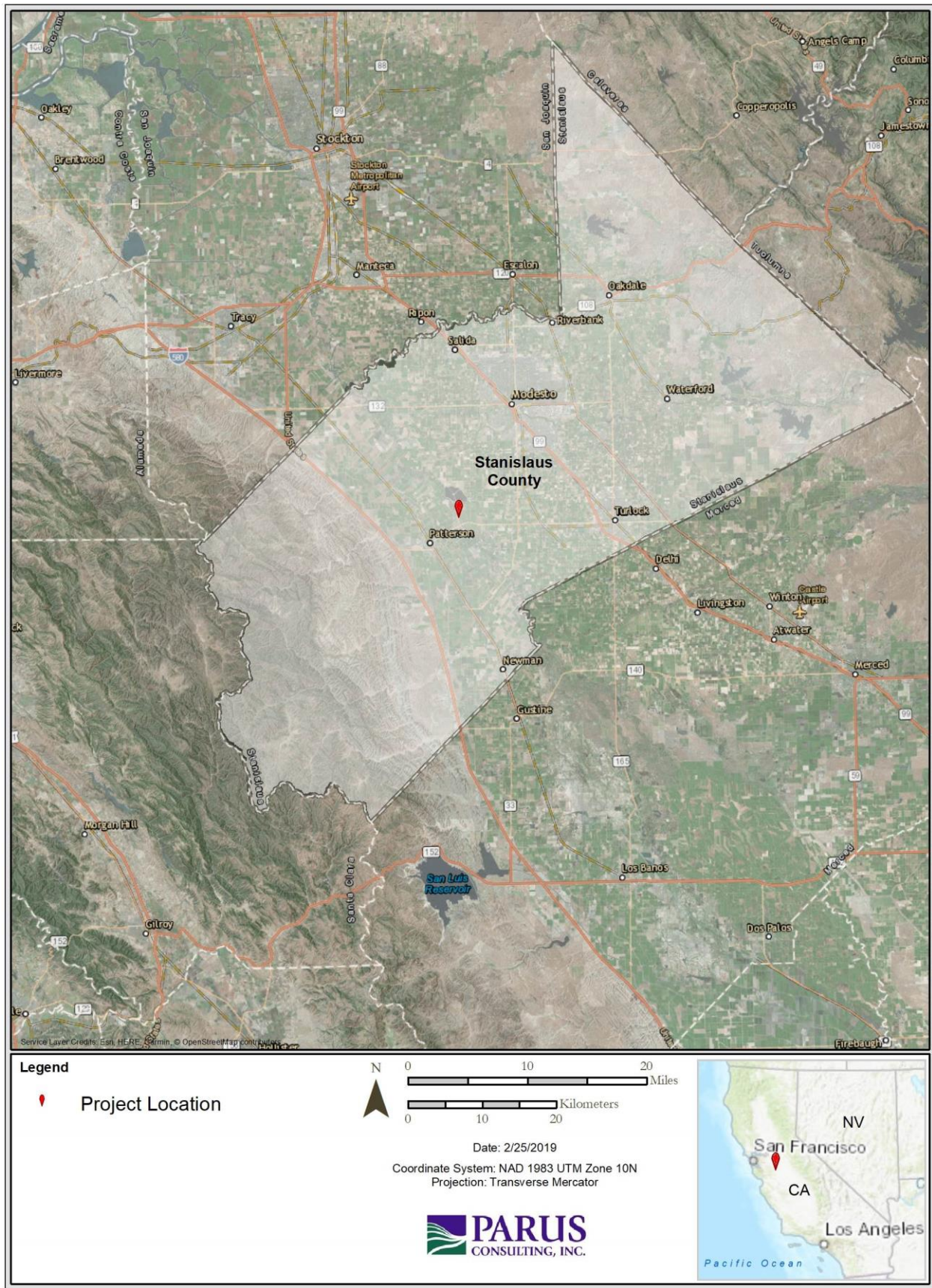


Figure 1. Project Location

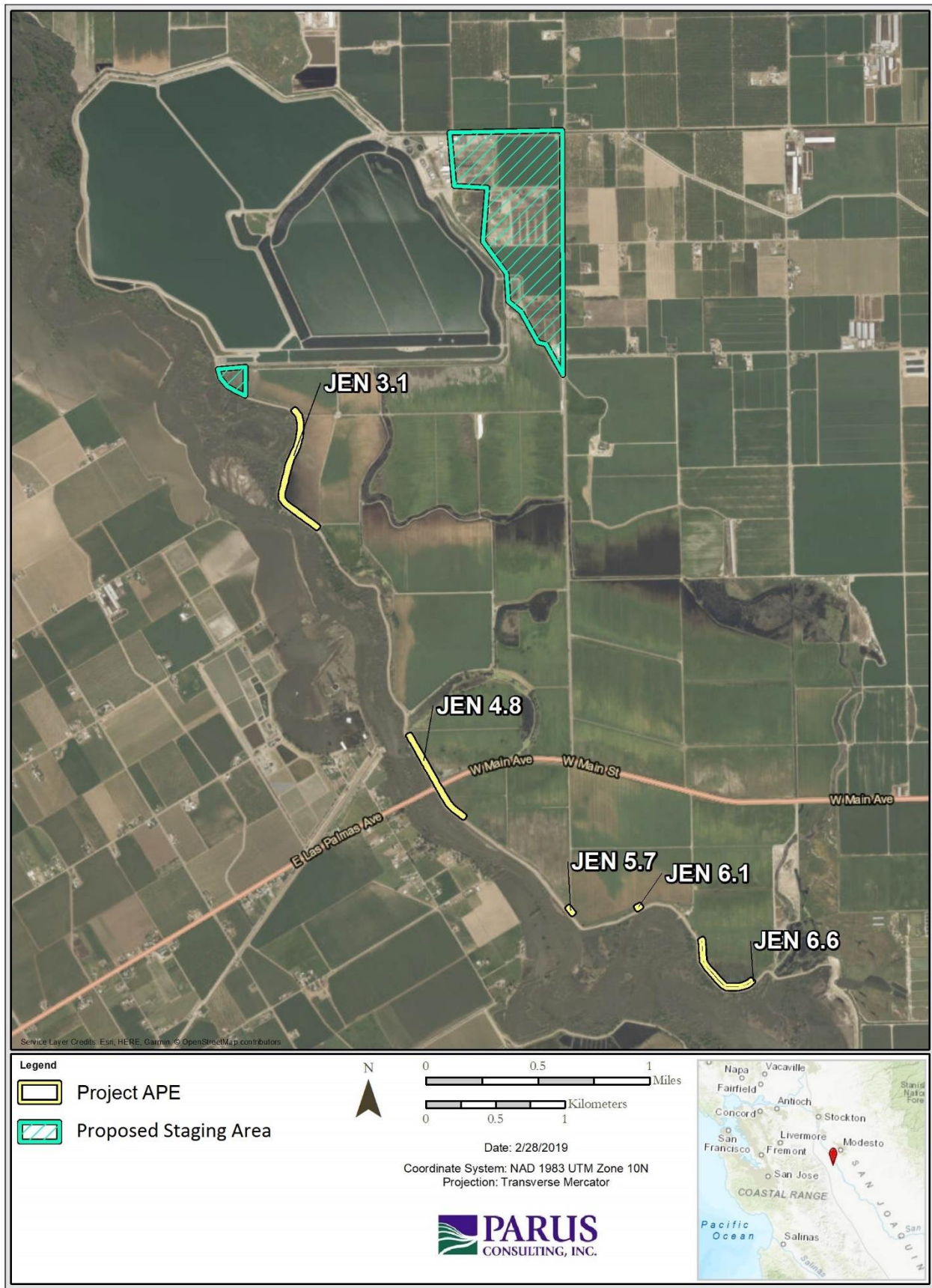


Figure 2: Area of Potential Effects

Table 1. APE Repair Locations and Dimensions

Location Identifier	Levee Mile (LM)		Vertical APE (Depth of disturbance above (+) and below (-) grade)
	Begin	End	
JEN 3.1	LM 2.87	LM 3.94	+13'5"/-6"
JEN 4.8	LM 4.50	LM 5.10	+13'5"/-6"
JEN 5.7	LM 5.70	LM 5.75	+13'5"/-6"
JEN 6.1	LM 6.08	LM 6.08	+13'5"/-6"
JEN 6.6	LM 6.38	LM 6.88	+13'5"/-6"

2. REGULATORY SETTING

2.1 FEDERAL REGULATIONS

Prehistoric and historical cultural resources, as well as areas of traditional religious and cultural importance to Native Americans, are protected during federal undertakings under Section 106 of 1966 as amended (36 Code of Federal Regulations [CFR] 800) of the NHPA, as well as Section 101(d)(6)(A) of the NHPA and through the National Environmental Policy Act (NEPA).

Section 106 requires Federal agencies to consider the impact that any federal undertakings may have on historic properties, and to provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on these potential impacts. Historic properties are defined as any district, site, building, structure, or object that is included or eligible for inclusion in the National Register of Historic Places (NRHP). Eligibility for inclusion in the NRHP is determined based on the following criteria:

“The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

- (A) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- (B) That are associated with the lives of persons significant in our past; or
- (C) That embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (D) That have yielded, or may be likely to yield, information important in prehistory or history. (National Register Bulletin, Section II, 1995)”

Cultural resources are considered significant if they are eligible for listing in the NRHP. Project impacts that physically damage or destroy all or part of a significant resource; impacts that change the character or use of a significant resource; impacts to physical features within a significant resource which contribute to its significance, or introduces visual, atmospheric, or audible elements that diminish the integrity of a significant resource are considered significant impacts to the environment, and steps to mitigate these impacts must be taken.

2.2 STATE REGULATIONS

CEQA protects tribal cultural resources, unique archaeological resources, and historical resources under statutes 21074, 21083.2, 21084.1-3. A tribal cultural resource is defined as: “Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

- (1) Included or determined to be eligible for inclusion in the California Register of Historical Resources (CRHR).
- (2) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1. (CEQA Statutes and Guidelines, 21074[a][1], 2018)”

Unique archaeological resources are defined 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.
- (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person. (CEQA Statutes and Guidelines, 21083.2[g], 2018)”

Historical resources are defined as “...any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. (Public Resources Code [PRC] 5020.1(j)).” Historical resources are considered significant if they are eligible to be listed in the CRHR. A historical resource is considered eligible for listing in the CRHR if it meets 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 values.
- (4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC 5024.1[c]).”

For the remainder of this section, tribal cultural resources, unique archaeological resources, and historical resources will be collectively referred to as cultural resources, unless specifically quoted.

CEQA requires that a lead agency determine if a project will have a significant impact on cultural resources. Significant impacts to cultural resources are considered to be significant impacts on the environment under CEQA. A significant impact is defined as: “Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. (CEQA Statutes and Guidelines 15064.5[b][1], 2018).” Should it be determined that a project will cause significant impacts to a cultural resource, the lead agency may require reasonable efforts to preserve cultural resources in place or to be left undisturbed. To the extent that a cultural resource cannot be left undisturbed, mitigation measures are required. (CEQA Statutes and Guidelines 21083.2[a][b][c], 2018).

3. ENVIRONMENTAL SETTING

The APE is located in the San Joaquin Valley on a broad floodplain adjacent to the San Joaquin River. The following is a description of the geology, soils, climate, flora, and fauna of the project vicinity.

3.1 GEOLOGY AND SOILS

Regional Geology

The San Joaquin Valley, overall, has a slight slope that causes drainage to flow north into the Sacramento-San Joaquin Delta. The topography of the immediate region is generally flat with minimal local relief around the APE. The valley is bound on the west by the Coast Range, to the east by the Sierra Nevada Foothills, and by the Tehachapi Mountains to the south. The open valley floor extends northward for approximately 100 mi where it meets the Sacramento Valley.

Soils

The soil classification system that is most recognized is the National Resources Conservation Services (NRCS). The two soils series mapped within the project APE are the Columbia and Temple soils (NRCS, n.d.).

The Columbia series consists of very deep, moderately well drained soils consisting of coarse loamy, mixed, superactive, nonacid, thermic Oxyaquic Xerofluvents formed in alluvium from mixed sources. These soils are on flood plains and natural levees and have slopes of 0 to 8 percent (USDA n.d.).

The Temple series consists of (minimal) Humic Gley soils developed from stratified, moderately coarse and moderately fine textured predominantly granitic alluvium. They occur on nearly level to depressional, recently deposited floodplains under moisture living grass and herbaceous vegetation. Characteristically the Temple soils have dark gray granular medium and moderately fine textured A1 horizons, with moderate organic matter contents and mottled light olive gray moderately fine to fine textured B2 horizons. The A1 horizon is typically noncalcareous, but lime content increases with depth to moderate or strong, including some lime segregated into nodules (USDA n.d.).

3.2 CLIMATE

The San Joaquin Valley is characterized by a Mediterranean climate with hot, dry summers and cool, wet winters. Stanislaus County receives just over 12 inches of rain annually, with the majority falling between November and March (Stanislaus County 1994; TGBA 2008).

The project area lies within the San Joaquin Valley Air Basin (SJVAB), which is about 35-mi wide and 250-mi long. Since it is surrounded by mountain ranges from the east, west, and south, there is only an opening to the north. Airflow in the SJVAB is primarily influenced by marine air that flows through the Carquinez Straits where the San Joaquin-Sacramento Delta empties into the San Francisco Bay. Predominant winds are from the north during the summer and from the south during the winter, with average wind speeds of seven miles per hour. Due to the topography, air movement through and out of

the basin is restricted, resulting in pollutant accumulation over time. Frequent transport of pollutants into the SJVAB from upwind sources also contributes to poor air quality, primarily during the summer months.

3.3 FLORA AND FAUNA

The project vicinity consists of three common non-native plant communities/habitat types associated with the agricultural areas of the San Joaquin Valley: ruderal, irrigated cropland, and agricultural ditches. While areas of inundation do occur within the project footprint, no jurisdictional wetlands were identified.

Ruderal

Ruderal habitats are characterized by areas that are sparsely vegetated, typically dominated by short-lived annual and biennial, introduced grasses and broad-leaved forbs that are adapted to periodic disturbance. Ruderal habitat within the project vicinity occurs between the toe of the levee and the agricultural ditch or irrigated cropland habitat types.

Vegetation identified within the ruderal habitat of the project vicinity included non-hydrophytes including Russian thistle (*Salsola australis*), jimson weed (*Datura wrightii*), bull thistle (*Cirsium vulgare*), prickly wild lettuce (*Lactuca serriola*), and bermuda grass (*Cynodon dactylon*). Less dominant species occurring included stinkwort (*Dittrichia graveolens*), Italian ryegrass (*Festuca perennis*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), reed fescue (*Festuca arundinacea*), prostrate knotweed (*Polygonum aviculare*), English plantain (*Plantago lanceolata*), slender oats (*Avena barbata*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), hare barley (*Hordeum murinum* ssp. *leporinum*), and white stemmed filaree (*Erodium moschatum*).

A few mature, solitary valley oaks (*Quercus lobata*) are also located in the project APE. In order to complete the levee repair, these oaks may be trimmed or removed prior to construction. However, due to the small footprint of the trees relative to the overall project area, as well as their isolation from the riparian habitat, the removal of the trees is not anticipated to have a significant effect on environment.

Irrigated Cropland

Away from the levee walls and toe, irrigated cropland dominates the landscape in the project vicinity. The San Joaquin Valley yields one-third of all the produce grown in the United States; more than 230 crops comprise the Valley's diverse array of agricultural produce. The Valley harbors the world's largest amalgamation of Class 1 soils; which are ideal crop-growing soils. Agricultural lands are well suited to growing of grasses and other herbaceous plants that are grown and harvested for purposes, such as animal feed and human consumption. The majority of the adjacent lands are used for agriculture.

Irrigated lands within the project vicinity support a mature crop of triticale (*XTriticosecale rimpaui*), a hybrid wheat-rye grain grown primarily as forage for cows. Other dominant species within the area included hydrophytic grasses, forbs, and "grass-like" herbs and that can withstand the heavy irrigation including umbrella sedge (*Cyperus eragrostis*), watergrass (*Echinochloa crusgalli*), yellow bristlegrass (*Setaria pumila*), broadleaf pepper grass (*Lepidium latifolium*), and curly dock (*Rumex crispus*).

Agricultural Ditches

Present beyond the toe of the levee slope, and typically adjacent to irrigated croplands, is an engineered water-conveyance ditch. An expansive network of ditches snakes throughout the valley for the purposes of conveying irrigation water or collection of agricultural tail water. The width and depth of these features are highly variable, ranging from uniformly 2.5-feet (ft) wide and one-ft deep to considerably wider (from 6 to approximately 20-ft wide).

The edges of agricultural ditches near the APE are dominated by Bermuda grass. Vegetation within the ditch is dominated by hydrophytes and generally included species such as curly dock (*Rumex crispus*), dallisgrass (*Paspalum dilatatum*), yellow foxtail (*Setaria pumila*), sprangletop (*Leptochloa fusca*), and barnyard grass (*Echinochloa crus-galli*, aka watergrass). The deeper agricultural ditches are dominated by hard stemmed bulrush (*Schoenoplectus acutus* var. *occidentalis*) and broad leaf cattails (*Typha latifolia*) with the edges dominated by watergrass.

Wildlife

Locally common and expected species for the project vicinity include the following species: Sierran Treefrog (*Pseudacris sierra*), Western Fence Lizard (*Sceloporus occidentalis*), Mallard (*Anas platyrhynchos*), Red-shouldered Hawk (*Buteo lineatus*), Red-tailed Hawk (*Buteo jamaicensis*), Mourning Dove (*Zenaidura macroura*), Eurasian Collared-dove (*Streptopelia decaocto*), Northern Flicker (*Colaptes auratus*), Nuttall's Woodpecker (*Picoides nuttallii*), Black Phoebe (*Sayornis nigricans*), American Crow (*Corvus brachyrhynchos*), California Scrub-jay (*Aphelocoma californica*), Bushtit (*Psaltirparus minimus*), Oak Titmouse (*Baeolophus inornatus*), Northern Mockingbird (*Mimus polyglottos*), California Towhee (*Pipilo crissalis*), Song Sparrow (*Melospiza melodia*), Common Yellowthroat (*Geothlypis trichas*), Western Meadowlark (*Sturnella neglecta*), Brewer's Blackbird (*Euphagus cyanocephalus*), Red-winged Blackbird (*Agelaius phoeniceus*), California ground squirrel (*Otospermophilus beecheyi*), Pocket Gopher (*Thomomys bottae*), Desert Cottontail (*Sylvilagus audubonii*), Raccoon (*Procyon lotor*), Mule Deer (*Odocoileus hemionus*), Sacramento Splittail (*Pogonichthys macrolepidotus*), and Steelhead (*Oncorhynchus mykiss irideus*).

4. CULTURAL SETTING

4.1 PREHISTORIC SETTING

Stanislaus County lies within the San Joaquin Valley, which in turn makes up the southern half of the Central Valley. The archaeological record of this area is understood in the context of the Central Valley region as a whole. Since 1939, various chronological schemes have been set forth by researchers to organize the archaeological data of the region. The Delta sequence established by Lillard, Heizer, and Fenenga in 1939 provided a basic frame work of early, middle, and late horizons that later chronologies would expand and elaborate upon (Moratto 1984).

The Delta sequence was later refined and extended by Richard Beardsley in 1954 into the Central California Taxonomic System (CCTS), which resulted from the analysis of burial patterns, artifacts typologies, and site locations. However, the horizon system applied to the large region of Central California did not allow for much cultural variability at any point in time (Moratto 1984). Thus, this system was further refined to include a wide range of local and regional traditions, consisting of three

basic time periods: the Paleo-Indian, Archaic, and Emergent (Bennyhoff and Fredrickson 1994; Rosenthal, White, and Sutton 2007). This system was then further refined with calibrated radiocarbon dating to produce the current chronology (Gorza 2002; Meyer and Rosenthal 1997; Rosenthal, White, and Sutton 2007).

The resulting archaeological time periods identified for the APE include Paleo-Indian (11,500 to 8550 B.C.), Lower Archaic (8550 to 5550 B.C.), Middle Archaic (5550 to 550 B.C.), Upper Archaic (550 B.C. to 1100 A.D.), and Emergent (1100 A.D. to Historic) (Rosenthal, White, and Sutton 2007). The following summary describes the chronological sequence and cultural patterns observed in the Central Valley.

Paleo-Indian (11,500 to 8,550 B.C.)

The Paleo-Indian period is characterized by big game hunting and by highly mobile native populations. Due to heavy alluvial deposition in the time since this period, there exists little archaeological evidence of human occupation of the Central Valley on or near the ground surface for this time period (Moratto 1984). The earliest evidence comes from basally thinned and fluted projectile points found from scattered surface deposits, and primarily from localities in the southern portion of the San Joaquin Valley (Rosenthal, White, and Sutton 2007).

The Farmington complex, identified within Stanislaus and San Joaquin Counties, was previously thought to be representative of a pre-projectile point occupation of California. This lithic assemblage is characterized by large core tools and reworked flakes, hammerstones, choppers, crude plano-convex blades, and scrapers (Moratto 1984). This assemblage was later determined to be deposited in Holocene alluvial terraces rather than in Pleistocene glacial out wash and dated to approximately 12,000 to 7,000 years ago or 10,000 to 5,000 B.C. (Ritter, Hatoff, and Payen 1976; Rosenthal, White, and Sutton 2007). Therefore, the Farmington complex falls within the period that foliate and lanceolate points were produced, indicating that the complex is simply characteristic of tools specialized for non-hunting activities rather than evidence of a more ancient occupation of the region (Moratto 1984).

Lower Archaic (8,550 to 5,550 B.C.)

Similar to the Paleo-Indian period, archaeological evidence of occupation within the Central Valley is limited to isolated finds due to high sedimentation rates in the early and middle Holocene. Stemmed points, chipped stone crescents, and other flaked stone artifacts are common for the period, especially along the shore of the ancient Tulare Lake in the southern portion of the San Joaquin Valley (Rosenthal, White, and Sutton 2007).

Archaeological evidence of plant associated processing tools are all but absent from valley floor sites. However, milling slabs, hand-stones, and cobble-core tools are all commonly found in both the Sierra and Coast Ranges foothills during this period. Later in the Middle Archaic, distinctive settlement and subsistence patterns are observed between the foothills and the valley floor, but the relationship between these regions is not well understood in the Lower Archaic. Therefore, it is possible that the valley floor populations either heavily favored hunting large mammals, such as artiodactyls, as their primary food source; or that these sites are expressions of a seasonally structured settlement patterns (Rosenthal, White, and Sutton 2007)

Middle Archaic (5,550 to 550 B.C.)

Cultural deposits associated with the early Middle Archaic, as with the Paleo-Indian and Lower Archaic periods, remain relatively few in the valley floor due to high sedimentation rates of the middle Holocene. The earliest sites in the San Joaquin Valley date to 4950 to 3050 B.C. (Rosenthal, White, and Sutton 2007).

However, the late Middle Archaic is well represented within the Central Valley and reflects a shift towards more settled ways of life. The Windmill cultural pattern is considered representative of this period and is characterized by an increased emphasis on acorns, increasingly intensive procurement practices, the use of mortars and pestles, and a continuation of hunting and fishing activities (Rosenthal, White, and Sutton 2007; Stevens et al. 2009). Increasing residential stability is exemplified by increased presence of non-utilitarian artifacts, such as an abundance of trade objects, ground and polished charm stones, twined basketry, baked-clay artifacts, and worked shell and bone. Additionally, ventrally or dorsally extended burials, sophisticated material wealth, and grave goods are particularly indicative of the Windmill Pattern (Rosenthal, White, and Sutton 2007).

Upper Archaic (550 B.C. to 1100 A.D.)

Sociopolitical complexity continued to increase through the Upper Archaic Period, which coincides with the late Holocene and the onset of a stable, cooler, and wetter climate (Rosenthal, White, and Sutton 2007). This period is most often associated with the Berkeley pattern and distinguished by distinctive bone, stone, and shell artifacts; a heavy reliance on acorns as a food source; increased use and refinement of the mortar and pestle; stemless projectile points; flexed position burials accompanied with red ocher; and some cremations with grave goods for wealthy or high status individuals (Bennyhoff and Fredrickson 1994; Moratto 1984). Formalized and regular sustained trade between groups are firmly demonstrated for the first time. In many locations the shift to the Berkeley Pattern was more of a gradual transition to a different emphasis on certain material good or economic practices, rather than abrupt change. (Moratto 1984; Rosenthal, White, and Sutton 2007).

Emergent Period (1100 A.D. to Historic)

The Emergent Period is the most well represented period in the archaeological record in California. The Augustine Pattern is associated with this period and is characterized by significant technological and social developments (Bennyhoff and Fredrickson 1994; Rosenthal, White, and Sutton 2007), as well as the intensification of hunting, fishing, and gathering (especially of acorns) (Moratto 1984). Of particular note is the transition from dart and atlatl to the bow and arrow, as evidenced by the appearance of small projectile points, and an increase in the production of fishing implements as evidenced by the introduction of the harpoon (Fredrickson 1973).

Populations during this period become larger and more sedentary with increased social stratification (Moratto 1984). Trade networks expand and become more sophisticated with increased trade of raw materials, such as obsidian cobbles, and adoption of the clam shell disk bead as a monetary unit (Fredrickson 1973; Moratto 1984; Rosenthal, White, and Sutton 2007).

The Augustine Pattern is also characterized by changes in interment practices. Pre-interment grave-pit burning with tightly flexed burials are observed in some regions with cremation also occurring for wealthy or high-status individuals (Fredrickson 1973; Rosenthal, White, and Sutton 2007). However, in the Northern San Joaquin Valley extended burials consistent with persistent traits of the Windmill Pattern are still observed during this period (Fredrickson 1973).

4.2 ETHNOGRAPHIC SETTING

Northern Valley Yokuts occupied most of the northern half of the San Joaquin Valley during late prehistoric and early historical times (Silverstein 1978). At the time of European contact, the Native American populations were organized into what was termed “tribelets” by ethnographers, which are defined as sovereign political village “communities” that defended a fixed territory under a single independent leader (a tribelet “chief”) (Kroeber 1932; Kroeber 1955). Primary settlements were situated on low mounds located on or near the banks of large rivers and consisted of approximately 200-500 residents or of smaller communities and hamlets with 2-3 households (Wallace 1978).

Due to the rapidity that the Native American population declined in the area following European contact, there is a paucity of reliable ethnographic information. Most of what is recorded is from the writings of early explorers, military men, and missionaries (Wallace 1978). By the mid-1800s the Northern Valley Yokut population, like many groups of California Native Americans, had been greatly reduced by disease, European violence, and relocation to Spanish missions. In particular, fur trappers passing through in the summer of 1833 brought malaria to the region which moved through the Native American population with incredible virulence. It is estimated that some 20,000 (75% of the population) California Indians were killed as a result (Moratto 1984; Wallace 1978).

The California Gold Rush and the subsequent settlement of the San Joaquin Valley dealt the final blow to the Northern Valley Yokuts. Native American populations within the San Joaquin Valley were affected not only by miners, but to an even greater extent by many ex-miners becoming interested in farming the rich soils of the region (Wallace 1978). As farming spread throughout the Valley, the Native American populations were easily pushed off of their ancestral hunting and food-gathering lands. While plans for Native American reservations were introduced in 1850, they were not initially ratified by United States Congress. This forced the remaining Northern Valley Yokuts, along with many other Native American groups, to become drifters or vagrants that sought work where they could for poor pay and housing. It was not until the situation for Native Americans in the region declined dramatically that reservations were finally authorized by Congress (Wallace 1978).

4.3 HISTORICAL SETTING

Spanish settlement of California began in 1769, beginning in Baja California moving north. Spanish expeditions throughout California identified potential mission and presidio locations and set about to bring the Native American population to the mission system. The first expedition into the northern San Joaquin Valley was led by Lieutenant Gabriel Moraga from San Juan Bautista mission. His party explored the region east of the San Joaquin River between the Mokelumne and Merced Rivers. The expedition is credited with naming both the San Joaquin and Merced River,s as well as the Kings River farther south (Clough and Secrest Jr. 1984; Gudde 1998; Hoover et al. 1990; Tinkham 1921). While this expedition did find suitable mission and presidio (military post) sites no action was taken to build them in the region (Tinkham 1921).

In 1821, Mexico won its independence from Spain and instituted a rule very different than that of the Spanish monarchy. The Mexican government prioritized land grants to settlers or *rancheros*, allowed trade with foreigners, and abolished the mission system in 1834 (Early California History: An Overview n.d.). Between 1843 and 1846, efforts increased to settle the region including the establishment of five Mexican land grants to establish ranchos in what is today Stanislaus County. The APE is located outside the boundaries of these land grants, but is located directly across the San Joaquin River from Rancho del Puerto, which was granted to Mariano and Pedro Hernandez in 1844. As was the common practice for a

ranchero, a small portion of the land was used for a residence and agriculture, while the majority was used for cattle grazing (ESA 2006; Wilcox 1999). By the 1850s, the Central Valley as a whole had become a vital source of meat, horses, and agricultural products that supplied the mining camps (Basin Research Associates 2014).

Stanislaus County was created from a portion of Tuolumne County in April of 1854 and had its boundaries modified in 1860, 1866, and 1868 to include increasing portions of Merced County. The county takes its name from the Stanislaus River, formerly named the River Laquismes. The river was re-named for Estanislao, a famous Yokut chief and Mission San Jose runaway known for leading a resistance effort against the mission system and for the battle he led against Mexican soldiers on the banks of that river. The county seat moved several times, but was eventually fixed at the city of Modesto in 1871 (Basin Research Associates 2014; Tinkham 1921). Early settlers of Stanislaus County primarily raised and sold hogs, horses, sheep, and cattle. However, impacts to the industry caused by natural events, such as floods and severe drought, and changes to laws allowing the free-range grazing of livestock forced many ranches into hard times. As a result, many in Stanislaus County turned to the cultivation of wheat as an alternative to ranching in the 1860s and 1870s (Tinkham 1921).

The nearby Rancho del Puerto was sold to Samuel Reed and Ruben Wade in 1864 and then again to John D. Patterson in 1866. The land continued to be used for ranching and Patterson made efforts to improve the production of the ranch by establishing a steamer landing on the San Joaquin River in 1869, located at what is today Las Palmas Bridge (Brotherton 1982; ESA 2006). The area was used as a cattle ranch until Patterson's heir, Thomas, developed the town of Patterson (circa 1910) which was incorporated in 1919. Thomas Patterson sold off plots of land in 10 to 20-ac. parcels and constructed an irrigation system that would change the primary focus of the area to agricultural production (Hoover et al. 1990; Peak and Associates, Inc. 1998). Laws changing the use of river water throughout the Central Valley had a profound impact on the types of production possible in the region. The passage of the Wright Act of 1887 was particularly significant in that it allowed for groups of farmers to form irrigation districts and granted them the power to divert water to dry fields as a means of flood control and water conservation. These irrigation districts were formed throughout the San Joaquin Valley, supporting the growth of the dairy industry and increasing diversity of crop selection in the early 20th century (Basin Research Associates 2014; EDAW, Inc. 2002).

The growing population and development of agriculture in the Central Valley was significantly impacted by recurrent flooding in the second half of the 19th century. Piecemeal construction of levees and other flood control measures were undertaken by individual land owners, but the need for collective levee building efforts was apparent. In 1861, the newly formed Board of Reclamation was given the power to create reclamation districts which consisted of collectives of smaller parcel owners. The Board of Reclamation was soon dissolved but the reclamation districts themselves persisted and were transferred to the counties, which then oversaw further reclamation efforts (Lund et al. 2007).

State and federal government funded flood control projects were focused on the Sacramento Valley and Sacramento-San Joaquin Delta as part of the larger Central Valley Project, authorized by Congress in 1917. Projects planned for the San Joaquin Valley were delayed due to the economic depression of the 1930s. Flood control systems continued to be constructed in a piecemeal fashion throughout the San Joaquin until the passage of the Flood Control Acts of 1944 and 1950. In 1953, a Memorandum of Understanding (MOU) was signed by the USACE and the State of California, which designated responsibilities for the construction, operation, and maintenance of the Central Valley Flood Protection

System to the SPFC. Today, the SPFC oversees approximately 1,600 mi of levee throughout the Central Valley today (Bradner and Singleton 2017).

5. RESEARCH METHODS

5.1 RECORD SEARCH AND LITERATURE REVIEW METHODS

A Record Search request was sent to the Central California Information Center (CCIC) of the California Historical Resources Information System (CHRIS) on February 4, 2019. The search included a 0.25-mi radius around the APE for previously recorded archaeological sites and previously conducted surveys.

The following resources were consulted at the CCIC:

- National Register of Historic Places – Listed and Determined eligible Properties (2012)
- California Register of Historical Resources (2012)
- California Points of Historical Interest (2012)
- California Historical Landmarks (2012)
- Directory of Properties in the Historic Property Data Files for Stanislaus County (2012)
- Handbook of North American Indians, Vol. 8, California (1970)

On February 19th, 2019, Parus cultural resources staff reviewed and collected relevant historical maps and project area specific information from the California State Library. Additional online resources including archives of historic maps, newspapers articles, archived historic accounts of the project area, and past environmental and cultural resource studies were searched for information about the project area.

5.2 RECORD SEARCH RESULTS

The result of the CCIC records search indicated one previous cultural resource study intersecting with one staging area within the APE and ten additional studies occurring within the 0.25-mi search radius (Tables 2 and 3). A summary of the report details is included in Confidential Appendix A.

Of the eleven reports generated within the search radius, seven were in support of water capture, conveyance, or treatment projects. The two remaining reports (ST-07484, ST-06950) were in support of improving fish passage and habitat.

The record search indicated the presence of seven cultural resources within the 0.25-mile search radius, but none within the APE. Two of the seven resources are prehistoric occupation sites (P-50-000207, P-50-000256) adjacent to the San Joaquin River. Both are determined eligible for listing in the NRHP and CRHR. Both sites are located adjacent to the San Joaquin River. Site CA-STA-122, was originally recorded in 1956, and again in 2003. The site recorders reported the presence of human remains and an obsidian blade that had been partially disturbed by mechanized equipment. CA-STA-171, although recorded as destroyed, documented the presence of human remains, ground and flaked stone artifacts, quartz crystals, and rectangular shell beads. A summary of cultural resource records are included in Confidential Appendix B.

Table 2. Previous Cultural Resource Studies within the APE and the 0.25-mile search radius

Report #	Authors	Title	Date
ST-00859	D. Chavez	An Archaeological Reconnaissance of the Robert's Ferry Reservoir and Water Extraction and Conveyance Systems, Stanislaus County, California: Phase II.	1976
ST-03482	Peak and Associates, Inc.	Cultural Resources Assessment of the Proposed Improvements of the City of Patterson Wastewater Treatment Facilities, Stanislaus County, California.	1998
ST-03630	T. Nave	Cultural Resources Survey for the Turlock Irrigation District Westside Transmission Line Project, Stanislaus and Merced Counties, California	1999
ST-04318	W. Self	Cultural Background Research for the +/- 34,000-Acre Modesto Wastewater Study Area and Archaeological Survey Assessment of the 327-acre 'Ho" Property within the Study Area, Stanislaus County, California.	2001
ST-04955	EDAW, Inc.	Archaeological Inventory of the Patterson Wastewater Treatment Facility Expansion Project, Stanislaus County, California.	2002
ST-06950	ESA	Patterson Irrigation District Fish Screen Project, Cultural Resources Inventory Report.	2006
ST-06713	M. Clark	Archaeological Reconnaissance and Initial Cultural Resources Evaluation for Phase 1A. Improvements at the City of Modesto Jennings Road Wastewater Treatment Plant, Stanislaus County, California	2008
ST-06713A	W. Wong	Initial Study/ Mitigated Negative Declaration	2008
ST-07277	M.R. Clark	Section 106 Cultural Resources Inventory for the City of Modesto Phase 2 BNR/Tertiary Wastewater Treatment Project, Stanislaus County, California	2010
ST-07484	ESA	Patterson Irrigation District Fish Screen Project, Expanded Phase I Identification and Survey Report	2011
ST-08341	Basin Research Associates	Historic Property Survey Report North Valley Regional Recycled Water Program (NVRWP) Vicinity of Patterson, Stanislaus County	2014

Table 3. Previously Recorded Cultural Resources within 0.25-mile radius of the APE

Primary #	Trinomial	Description	Recorded	NRHP/CRHR Eligibility
P-50-000207	CA-STA-122	Prehistoric site; lithic concentration, human remains, habitation site. Impacted by construction; site no longer extant.	1956/2003	Eligible
P-50-000256	CA-STA-171	Prehistoric site; lithic concentration, shell beads, human remains, habitation site. Impacted by construction; site no longer extant.	1971	Eligible
P-50-001718	NA	Las Palmas Avenue – Historical horticultural feature	1999	Not eligible
P-50-001879	NA	Historical refuse concentration; glass and ceramic bottle fragments	2002	Not eligible
P-50-002012	NA	Patterson Pump Station	2009	Not eligible
P-50-002045	NA	Isolated prehistoric human mandible	2011	Not eligible
P-50-002179	NA	Patterson Lift Irrigation System	2014	Not eligible

Parus reviewed the USGS topographic maps of the area from 1915 to 2015 (NETR 1915, 1916, 1919, 1941, 1943, 1954, 1973, 1981, 2012, 2015; Modesto West & Orestimba Quadrangles). This examination was performed for each of the five levee repair locations and for both Staging Areas. Between 1916 and 1954, Staging Area 1 and Staging Area 2 appear to be within the primary floodplains of the Stanislaus River. By 1954, a levee is present to the west and both Staging Areas appear to be surrounded by structural improvements. Moreover, both locations appear to be under tillage from 1954 through 2018.

Between 1914 and 1943, all five levee locations appear within the primary floodplain of the Stanislaus River. By 1943, the levee is present at all locations, except for JEN 3.1. The levee at JEN 3.1 is present by 1943.

5.3 NATIVE AMERICAN CONSULTATION

In accordance with PRC § 5097.91-5097-94, the Native American Heritage Commission (NAHC) maintains a catalog pertaining to places of special religious or social significance to Native Americans. In order to identify if places of religious or social significance exist within the APE, the NAHC was first contacted by Parus Consulting in December of 2016. The NAHC responded stating that the Sacred Lands File (SLF) search was negative and provided a list of individuals to be contacted regarding the project. The North Valley Yokuts and Southern Sierra Miwuk tribes were contacted at this time and no response was received from either party.

Due to the length of time between the initial NAHC SLF request and the estimated reporting date, Parus cultural resources staff contacted the NAHC again on January 22nd, 2019, requesting an additional search of their SLF. The NAHC replied on January 29th, 2019, stating that the search failed to indicate the presence of Native American sacred lands or traditional cultural properties in the immediate vicinity of the project area. However, the NAHC did provide contact information for seven possible tribes that may hold vested interests in the project and its location. Letters to the Calaveras Band of Mi-Wuk Indians, California Valley Miwok Tribe, Sheep Rancheria of Me-Wuk Indians of California, Northern Valley Yokuts Tribe, Southern Sierra Miwuk Nation, Tule River Indian Tribe, and Tuolumne Band of Me-Wuk Indians were sent on February 15th, 2019.

A response was received from the Tuolumne Band of Me-Wuk Indians on February 19th, 2019, stating that they were not aware of any cultural resources within the study area, but that they would like to be contacted should any cultural materials be identified during the course of the project.

Follow up phone calls were placed to the remaining six tribal contacts on February 28th, 2019. As of April 20, 2019, no additional responses were received. Any responses received by Parus for further tribal consultation on this project will be forwarded to Kleinfelder and DWR immediately upon receipt. Documents associated with all NAHC SLF requests, results, and subsequent tribal correspondence are included in Confidential Appendix C.

6. SURVEY METHODS AND RESULTS

6.1 Survey Methods

The APE was surveyed by Parus Consulting archaeologists Andrew Miller, MA (September 23rd, 2016), Alex Walton (May 21st, 2018) and Heather MacInnes MA, RPA (January 24th, 2019). The APE was accessed through the Secondary/Tertiary Waste Water Treatment Facility for the City of Modesto (Jennings Road) approximately 11 mi northeast of Patterson, California. The pedestrian survey methods applied were consistent with the Secretary of Interior standards and guidelines and covered the entirety of the APE in transects of 15 meters or less.

6.2 Survey Results

The archaeological survey accomplished 100 percent coverage of the APE. Ground surface visibility was good (100-90%) throughout the entire APE, as the levee is kept free of vegetation (Photographs 1-5). The survey was negative for the presence of tribal cultural resources and unique archaeological resources. The historical built environment was limited to the large earthen levee (West Jennings Levee

No.1), which was recorded on Department of Parks and Recreation Forms 523 Series (DPR). The DPR for the newly recorded site is included in Confidential Appendix D.

6.3 Newly Recorded Resources

West Jennings Road Levee No. 1

Context

This feature is situated on the east bank of the Stanislaus River in an open agricultural setting with a slope of approximately 3 degrees and a 0 degree aspect. This engineered feature exhibits a broad berm with an 11-degree slope leading up to a broad crown. It is a composite construction of compacted earth and imported gravels. It measures approximately 140-ft wide at the base of the berm and approximately 30-ft wide across the crown. The entire feature is free of substantial vegetation and is dressed almost in its entirety with imported road gravels. Overall, this feature is highly engineered and dominant within the immediate landscape.

Historical Significance Considerations

While small irrigation projects increased settlement and yields in the Central Valley, the passing of the Wright Act bolstered the formation of Irrigation Districts, particularly in Stanislaus County, which boasts the three first districts resulting from the Act in eastern Stanislaus County. Early ditches, levees, and dikes (c.1860-1900) were crude with wooden controls and highly vulnerable to annual freshet events. By 1910, these early structures were being replaced by features fortified with concrete fixtures and gunite linings all managed by Irrigation Districts. The increase in irrigation projects for the immediate region appears to be between 1910 and 1920.

The levee noted for this location was constructed between 1941 and 1943, which is rather late and near the end of government sponsored push for water projects in the Valley, indicating it was not an urgent or overly concerning area for flood control. While the nearby Patterson Pump District exhibits multiple appurtenances, such as water lifts, canals, levees, and pump houses essential to its complex operation system, this levee appears to stand as a simple improvement with the sole purpose of keeping the Stanislaus River to the west at bay in the wet season.

This levee segment exhibits a very wide berm, a shallow and gentle slope, and a broad crown; the entire feature is dressed in imported sub-angular gravels. Although this levee is within RD 2091 and is currently part of the SPFC complex, this portion appears constructed as part of the piecemeal flood control efforts of the early 20th century and not related to an extensively planned or comprehensive levee planned complex.

Based on the research reviewed for this project, this levee feature does not appear to retain a significant association to historical events (Criterion A); or persons (Criterion B) important in the past; properties significant as representatives of the manmade expression of culture or technology (Criterion C); or properties significant for their ability to yield important information about prehistory or history (Criterion D). The levee clearly retains integrity with regard to design, materials, workmanship, feeling, setting, and location. However, this levee is ubiquitous with hundreds of other segments and is not exceptional in any aspect of its integrity. Therefore, it is reasonable to conclude that this levee segment is not considered eligible to the NRHP, nor for the CRHR, at this time.

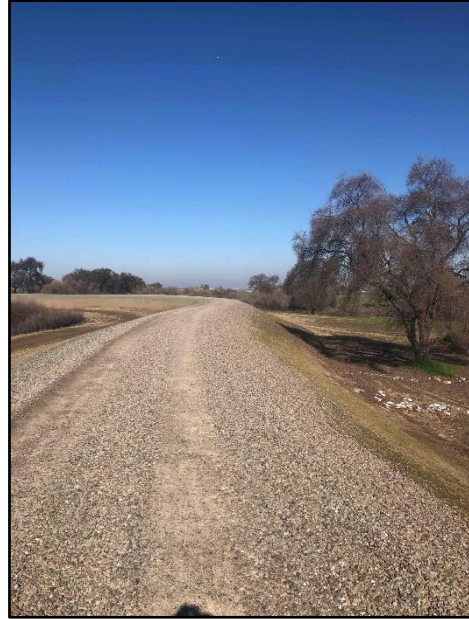
Management Considerations

Five segments of this feature are slated for repair due to boil and seepage issues. In locations where the levee will be physically removed (impacted), construction plans call for replacement with in-kind materials. Compaction and contouring will return the overall feature to its-pre-repair dimensions. It is recommended that the repairs proceed to preserve the structural integrity of the levee.

Photograph 1: JEN 3.1



Photograph 2: JEN 4.8



Photograph 3: JEN 5.7



Photograph 4: JEN 6.1



Photograph 5: JEN 6.6



7. CONCLUSIONS & RECOMMENDATIONS

6.1 NEPA – Finding of No Effect

The Lead Agency for this Project is the California DWR. As such, it is considered a Federal undertaking and is subject to NEPA and NHPA (as amended, 16 United States Code [USC] 470f). Cultural resources are considered during federal undertakings chiefly under Section 106 of NHPA, through its implementing regulations at 36 CFR 800 (Protection of Historic Properties). One historical feature, the West Jennings Road Levee No.1, was recorded within the APE as a result of survey efforts. This resource is determined as **Not Eligible** for the NRHP. Therefore, this study concludes a **Finding of No Effect** to archaeological or historical resources as defined by 36 CFR 800.16 (i).

6.2 CEQA - Finding of No Effect

CEQA aims to “develop and maintain a high-quality environment now and in the future, and take all action to protect, rehabilitate, and enhance the environmental quality of the state (PRC § 21001). The built environment, historical resources, and tribal cultural resources are part of the environment and as such, a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect of the environment (CCR 15064.5 (b)).

One resource is located within the APE, the aforementioned West Jennings Road Levee No. 1. This resource does not meet the threshold as a significant historical resource under CEQA. Therefore, this report recommends there will be **No Effect** or changes to any historical resources from this project.

6.3 RECOMMENDATIONS

Construction Monitoring

In general, former or current riparian areas within the San Joaquin Valley are considered highly sensitive for prehistoric and historic-era cultural resources. Due to the historic construction of the levee, the presence of previously intact prehistoric sites near the project APE, and the lack of previous cultural resource studies within the APE, negative impacts to cultural resources are possible. Therefore, archaeological monitoring of ground disturbing activity is recommended to ensure that the proposed project will have no adverse effect on any cultural resources.

Inadvertent Discoveries

Although the project area has been heavily modified by agricultural fields and levee maintenance, the potential for sub-surface discoveries of cultural resources remains.

In cases of inadvertent (unplanned) discovery of cultural resources or human remains, the following procedures are required:

1. If buried **cultural materials** are encountered during construction, **it is required that work stop in that area** until a qualified archaeologist can evaluate the nature and significance of the find [CCR 15064.5(f)].
 - a. A qualified archaeologist local to the project may be reached at Parus Consulting (916)-672-6696.
2. If **human remains** are encountered during future construction, **it is required that work stop immediately in that area** and notification be made to the Stanislaus County Coroner (CCR 15064.5(e) (1) (A); HSC Sec.7050.5).
 - a. Contact information for the Chief Deputy Coroner office at the time of this report:
Stanislaus County Coroner
921 Oakdale Rd, Modesto, CA. 95355
Phone: 209-567-4480
 - b. If the coroner determines the remains to likely be of Native American descent, the Coroner shall contact the NAHC within 24 hours and collaboratively determine the Most Likely Descendant (CCR 15064.5(e)(1)(B))

To avoid adverse impacts, the deposit may be secured and protected from damage until the appropriate treatment procedures can be implemented. Treatment plans may include, but are not limited to, changes to project plans to avoid the deposit, or the complete or partial excavation and removal of the deposit. Ground disturbing activities will not resume in the vicinity of the deposit until DWR has confirmed proper mitigation of any adverse effects to the deposit.

6.4 STATEMENT OF LIMITATIONS

This report has been prepared based on certain key assumptions made by Parus that substantially affect the conclusions and recommendations of the report. The assumptions, although thought to be reasonable and appropriate, may not be true in the future. The conclusions and recommendations of Parus are conditioned upon the following assumptions:

This cultural resource assessment was performed based on the current proposed APE and project guidelines as provided by DWR and Kleinfelder. Should either of these change, this document's conclusions and recommendations may have to be updated to reflect the new project parameters. This may include, but is not limited to, additional site visits and record searches.

This cultural resource assessment was performed based upon the information provided by the CCIC on February 4th, 2019, the by NAHC and listed associated or interested tribes, and direct observation by Parus cultural resources staff of the site conditions, as well as other information that is generally applicable as of February 28th, 2019. Therefore, the conclusion herein is applicable only to that time frame.

Information obtained from the aforementioned sources in this time frame are assumed to be correct and complete. Parus will not assume any liability for findings, or lack of findings, based on misrepresentation of information presented to the Parus cultural resource staff; or for items not visible, made available, accessible, or present at the site at the time of the survey of the project area.

Additional survey will be required if the project changes to include areas not previously surveyed.

8. PROFESSIONAL QUALIFICATIONS

Heather MacInnes, MA, RPA is the Principal Investigator and primary author for this project. She conducted the literature review, Native American consultation, and performed the pedestrian survey for the project. Ms. MacInnes meets and exceeds all requirements of the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (National Park Service 1983). Jaqueline Putnam (B.S.) authored the Environmental Setting portion of this report.

Dimitra Zalarvis-Chase is a Registered Professional Archaeologist (RPA) meeting the Secretary of the Interior standards as a Principal Investigator for both Prehistoric and Historical Archaeology. She has twelve years of cultural resource management experience throughout California and the southern Great Basin and is the owner of DZC Archaeology Consulting (est. 2010). As Principal and Project Manager, Ms. Zalarvis-Chase has completed cultural resource investigations under the regulatory framework of CEQA and Section 106/NHPA in both the private and public sectors. Specialized industry experience includes the energy and transportation sectors, construction monitoring, fire landscapes (WUI, BAER) and mine cleanup (CERCLA). Ms. Zalarvis-Chase served as editor and Senior Reviewer for this document.

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BIOLOGICAL ASSESSMENT

RD2091 LEVEE REPAIR PROJECT

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July 10, 2019

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ACRONYMS

BMP	Best Management Practices
CNDDDB	California Natural Diversity Database
CRLF	California red-legged frog
CTS	California tiger salamander
DWR	Department of Water Resources
ECCCCHCP	East Contra Costa County HCP
FSRP	Flood System Repair Project
GGS	Giant garter snake
I-5	Interstate 5
IPaC	Information for Planning and Consultation
LM	Levee Mile
NMFS	National Marine Fisheries Service
RD 2091	Reclamation District 2091
SJKF	San Joaquin kit fox
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VELB	Valley elderberry longhorn beetle

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APPENDIX

Appendix A: IPaC Species List

Appendix B: U.S. Fish and Wildlife Service Standardized Recommendations For Protection of The
Endangered San Joaquin Kit Fox

1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed Reclamation District 2091 (RD 2091) Levee Repair Project in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, or proposed species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This BA is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536 (c)). This BA addresses species that fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

Pursuant to Section 14 of the Rivers and Harbors Act of 1899, 33 U.S.C. 408 (Section 408), RD 2901 has requested permission from the US Army Corps of Engineers (Corps) to alter landside portions of the San Joaquin River levee that are subject to its jurisdiction.

The following federally listed species will be considered in this BA.

• steelhead - Central Valley DPS	<i>Oncorhynchus mykiss irideus</i>	Threatened
• Delta smelt	<i>Hypomesus transpacificus</i>	Threatened
• vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened
• vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Endangered
• valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Threatened
• blunt-nosed leopard lizard	<i>Gambelia silus</i>	Endangered
• giant garter snake	<i>Thamnophis gigas</i>	Threatened
• California red-legged frog	<i>Rana draytonii</i>	Threatened
• California tiger salamander	<i>Ambystoma californiense</i>	Threatened

The action addressed in this document does not fall in any designated or proposed critical habitat for any listed species.

2.0 CONSULTATION TO DATE

There has been no previous consultation with regulatory agencies for this project.

3.0 PROPOSED ACTION

3.1 Location

The proposed project is located approximately 3.2 miles east of the City of Patterson, in Stanislaus County, California. The project encompasses approximately 11.5 acres bounded by

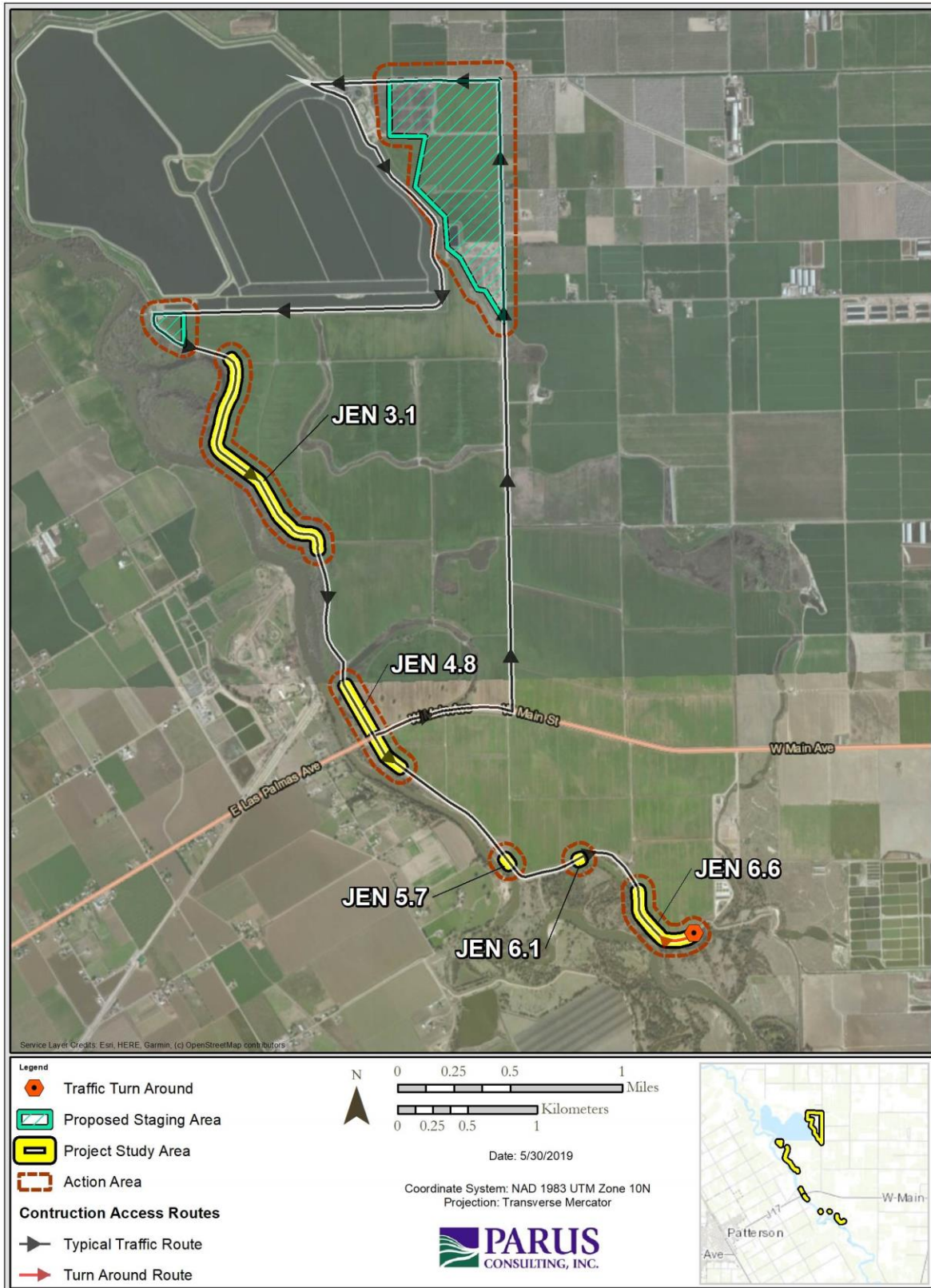
the San Joaquin River on the west, the San Joaquin River East Levee on the north, Vivian Road, S. Carpenter Road, and Crows Landing Road on the east, and Linwood Avenue and Simmons Road to the south (37.4871N, -121.062E) (Figure 1).

The Action Area is defined as all areas that may be affected directly or indirectly by the Federal action. A buffer of 100 feet was applied to the Construction Area, as well as to all staging areas.

The Action Area is located in the Great Valley ecological region characterized by long, hot, dry summers and mild winters. More than half of the region is now in cropland, about three-fourths of which is irrigated.

The Construction will be on the landside of the east San Joaquin River levee and will not encroach into the channel geometry or affect channel hydraulics of the San Joaquin River. No slope protection will be placed on the waterside levee slopes. Vegetation along the approximately 3.5-mile repair section is primarily ruderal and abuts irrigated cropland. These vegetation types are typically dominated by short-lived annual and biennial introduced grasses and broad-leaved forbs that are adapted to periodic disturbance. Several valley oaks (*Quercus lobata*) that have been isolated from the adjacent riparian areas are also located in the construction area.

Figure 1: Action Area



3.0 Project Description

The Project consists of constructing seepage and stability berms at five locations to prevent ongoing seepage and increase levee stability, in accordance with the Rural Levee Repair Guidelines.

Repair measures will be implemented at each of the five sites and comprise the following:

- (1) clear, grub, and strip the berm;
- (2) place at least a 12-inch filter layer;
- (3) place at least a 12-inch layer of drain rock;
- (4) place a geotextile to prevent movement of berm materials into the drain rock.

Construction will occur over one construction season, from June through September of 2020. Construction at all five sites occurs from the landside. Repair sites are located at LM 3.18, 4.80, 5.73, 6.08, and 6.63.

3.1.1 Site JEN3.1, Levee Mile 3.18

Site JEN 3.1 (Photograph 1) extends from LM 2.87 to LM 3.94 and covers approximately 3.67 acres. Site JEN 3.1 has experienced severe seepage with several boils running clear water 30 feet from the landside toe. The repair will be approximately 5,718 feet and require approximately 16,403 cubic yards of material.



Photograph 1: Site JEN 3.1

3.1.2 Site JEN4.8, Levee Mile 04.80

Site JEN 4.8 (photograph 2) extends from LM 4.50 to 5.10 and covers approximately 3.6 acres. Site JEN 4.8 has experienced severe seepage and boils carrying material during past high-water events. In 1997, crushed rock and filter fabric were placed on an existing landside berm to control seepage, and sandbags were used to control the boils about 25 feet from the levee toe. The area sees high amounts of seepage and boils during every high-water event. The repair will be approximately 2,370 feet long, requiring approximately 22,284 cubic yards of material.



Photograph 2: Site JEN 4.8

3.1.3 Site JEN5.7, Levee Mile 5.73

Site Jen 5.7 (Photograph 3) extends from LM 5.70 to 5.75. It covers approximately .33 acres and has experienced several boils carrying a small amount of material about 25 feet from the landside toe. Seepage and boils have occurred during every high-water event. The length of the repair will be approximately 542 feet and requires approximately 2,138 cubic yards of material.



Photograph 3: Site Jen 5.7

3.1.4 Site JEN6.1, Levee Mile 06.08

The site at LM 6.08 (Photograph 4) has a 5-inch diameter boil that carries material during high flows. A sandbag ring has been placed around the boil during rain events. Rock and filter fabric have been used in the past to control seepage and boils carrying material. The repair length is approximately 253 feet, requiring approximately 570 cubic yards of material.



Photograph 4: Site Jen 6.1

3.1.5 Site JEN6.6, Levee Mile 6.63

Site Jen 6.6 (Photograph 5) extends from LM 6.38 to 6.88, and covers approximately 4.03 acres. It has experienced 17 boils, some running clear and some carrying materials. Severe seepage was noted in 1997. Jen 6.6 has experienced seepage and boils carrying material or running clear during past high-water events. Sand bag rings were used to control boils, while rocks and fabrics were used to control seepage. The repair will be approximately 2,155 feet long, requiring approximately 21,514 cubic yards of material.



Photograph 5: Site Jen 6.6

3.2 Proposed Action Elements

3.2.1 Site Access and Staging

Jennings Wastewater Treatment Facility is the designated staging area for the Proposed Action. This already developed area will be the sole location used for staging vehicles, plant materials, and construction equipment.

Deliveries will be made by concrete trucks, flatbed trucks, and tractor-trailer dump rigs. An estimated 1,258 truckloads of material will be delivered to the site. Truck routes will follow West Main Street and Jennings Road onto the Jennings Wastewater Treatment Facility and onto the levee.

3.2.2 Construction Activities

Prior to construction, all construction areas, including the staging area, will be fenced off to limit access onsite. Ruderal vegetation along with the few solitary valley oaks may be trimmed or removed, as necessary, to facilitate movement of equipment and levee repair operations. Any tree trimming or removal will adhere to all Federal, State, and local regulatory standards. Trash or concrete rubble will be removed and disposed of at an appropriate facility. Temporary erosion control methods will be used as needed to prevent soil from encroaching onto adjacent property. Disturbed areas will be seeded and mulched to prevent erosion following completion of the Proposed Action.

3.2.3 Construction Equipment

Construction work will occur during one construction season, beginning in June and ending in September. The work will begin with mobilization and site preparation, including transporting equipment such as, tractors, compactor, backhoe, dump trucks, scrapers, and graders to the site, and clearing and grubbing. Mobilization will take approximately one week. The construction period will begin with clearing and grubbing of levee followed by excavation and installation of filter and drainage rock, finishing with geotextile material. Rebuilding the levee crown and road will require an additional week. Demobilization will include removal of equipment and materials from the Proposed Action site, disposal of excess materials at appropriate facilities, and restoration of staging areas and temporary access roads to pre-project conditions. Demobilization activities will take an additional week to complete.

All construction will be conducted from the landside of the east San Joaquin River levee, and will not encroach into the channel geometry or affect channel hydraulics of the San Joaquin River. Therefore, no slope protection will be placed on the waterside levee slopes.

The following equipment is likely to be used for construction at each repair site:

- Scraper
- Compactor
- Grader
- Excavator
- Dump trucks
- Pickup trucks
- Loader
- Dozer

3.3 Conservation Measures

The following conservation measures will be implemented to avoid and minimize potential adverse effects of the Proposed Action:

3.3.1 Construction Fencing

Temporary construction fencing will be placed to mark the construction zone boundaries and to prevent construction equipment or personnel from entering adjacent areas.

3.3.2 Exclusion Fencing and Escape Ramps

While no special status species are expected in the Action Area, exclusion fencing will be used if needed. This need will be determined at the time of the preconstruction survey and will be determined by a qualified biologist.

During project excavation, escape ramps will be in place for any excavation deeper than 2 feet.

3.3.3 Preconstruction Surveys

If construction occurs during the bird nesting season (February 15 to September 15), a nesting bird survey will be completed prior to construction. No more than 14 days prior to the start of construction, a pedestrian nesting bird survey will be conducted of the project area. The survey will be completed by a competent qualified biologist and documented in a Preconstruction Bird Survey Report. The survey will be repeated in the event construction activity lapses for two weeks or more to ensure no birds have moved into the area. If active nests are found that would be affected by project construction, the location will be recorded and an avoidance buffer implemented on construction maps or temporary signage or fencing. The buffer area will remain in effect for the duration of construction, or until the nest is abandoned, or young have fledged as determined and documented by a competent, qualified biologist. No trimming or tree removal will occur until a qualified biologist has confirmed that the nest is abandoned, or young have fledged.

3.3.4 Construction Monitoring

Prior to construction, a qualified biologist will conduct a survey to determine the presence of any special status species. Additionally, a biological monitor will be onsite during all construction related activities. The monitor will have the authority to stop work if needed. The biological monitor will be responsible for the daily monitoring of any special status species, including but not limited to, checking around and under construction vehicles, checking excavation pits, inspecting pipes, culverts, or similar structures, and checking the Action Area for any indication of special status species. Daily activity logs will be maintained. The monitor will report to the lead agency.

If any special status species is found in the Action Area, all construction must stop in that area, and the qualified biologist will be contacted immediately.

3.3.5 Worker Environmental Awareness Training

All personnel will attend a Worker Environmental Awareness training session on special-status species that have the potential to occur in the Proposed Action. The training will provide information on the species' description, status, identification, habitat requirements, and procedures to be followed if special-status species are identified in the Proposed Action Area. Procedural handouts will also be provided.

3.3.6 Conservation Measures for San Joaquin Kit fox

Construction activities would involve temporary disturbance of potential migration routes for SJKF. The likelihood of SJKF using the Action Area is low. However, implementation of the following conservation measures will ensure that the Proposed Action will minimize potential effects to SJKF.

While no burrows were noted during any of the field visits, potential for burrows changes over time. As such, the USFWS Standardized Recommendations for Protection of The Endangered San Joaquin Kit Fox (Appendix B) will be implemented. These measures include:

- 1) Conducting preconstruction surveys by a qualified Biologist prior to the start of the project in order to identify any potential dens;
- 2) If occupied dens are discovered, exclusion zones will be implemented as directed by the qualified Biologist;
- 3) Construction activities will be conducted when there is the least chance of disturbance;
- 4) Biological monitoring will occur throughout the duration of the project;
- 5) Construction activities will stop at dusk

4.0 SPECIAL-STATUS SPECIES

4.1 Special-Status Species

The list of species considered in this assessment was identified by conducting a record search of the California Natural Diversity Database (CNDDDB), as well as the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC). Table 1 shows a combined list of the species identified in the database searches. No critical habitat was found for any of the listed species in the Action Area.

Table 1: Special-Status Species with Potential to Occur in the Action Area

Scientific Name	Common Name	Federal Listing Status	Identified List	Habitat
<i>Oncorhynchus mykiss irideus</i>	steelhead - Central Valley DPS	Threatened	CNDDDB, IPaC	Rivers and streams with cold water and gravel bottoms appropriate for spawning.
<i>Hypomesus transpacificus</i>	Delta smelt	Threatened	IPaC	Bays, tidal rivers, channels, and sloughs
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	Threatened	IPaC	Vernal pools
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	Endangered	IPaC	Vernal Pools
<i>Desmocerus californicus dimorphus</i>	valley elderberry longhorn beetle	Threatened	CNDDDB, IPaC	Elderberry shrubs along rivers and streams
<i>Gambelia silus</i>	blunt-nosed leopard lizard	Endangered	IPaC	Grasslands and alkali flats
<i>Thamnophis gigas</i>	giant garter snake	Threatened	IPaC	Marshes, sloughs, drainage canals, and irrigation ditches
<i>Rana draytonii</i>	California red-legged frog	Threatened	IPaC	Aquatic areas of mixed riparian and uplands dispersal types
<i>Ambystoma californiense</i>	California tiger salamander	Threatened	IPaC	Grasslands and low foothills with nearby vernal pools
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered	IPaC	Grasslands, scrub land, vernal pool meadows

4.2 Special-Status Fish Species

Historically, two special-status fish species occurred near the Proposed Action Area: steelhead (*Oncorhynchus mykiss irideus*) and Delta smelt (*Hypomesus transpacificus*). While steelhead are likely to inhabit the riverine system near the action area, Delta smelt are unlikely to occur. The

most recent confirmed occurrence of Delta smelt was in 2007, 40 miles north of the action area.

No work will be done in the wetlands, riparian corridors, or other habitats supporting any fish species.

4.3 Special-Status Branchiopods

Vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardii*) are listed on the IPaC findings. Vernal pool fairy shrimp are usually associated with vernal pools, but have also been found in alkali pools, seasonal drainages, and rock outcrops. Vernal pool tadpole shrimp can be found in a number of seasonal habitats including vernal pools, alkaline pools, and roadside ditches and ruts (ECCHCP).

CNDDDB record search findings did not show any presence of vernal pool fairy shrimp or vernal pool tadpole shrimp; however, both species were confirmed less than fifteen miles from the Proposed Action site, with the most recent occurrence in 2011.

No work will be conducted in or near any vernal pool or similar habitat that supports listed branchiopods.

4.4 Special-Status Wildlife

Several special-status wildlife species, including reptiles, invertebrates, and amphibians, are listed as having the potential to occur in the general Proposed Action vicinity. Of the database-listed special-status species, there is no onsite habitat to support any portion of their life history, although each may occur nearby along the San Joaquin River.

4.4.1 Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) are restricted to their host plant, elderberry, found along the riparian corridors of the Central Valley. There have been approximately 190 records of VELB from as far north as Shasta county down to Fresno county (USFWS). The last recorded occurrence of VELB in the Proposed Action Area was in 1984 and was identified by exit holes only. No adults were seen. A number of occurrences have been recorded in a 5-mile radius of the Proposed Action location, with the most recent occurrence recorded in 2009. No elderberry shrubs are located in the Proposed Action Area.

4.4.2 Blunt-Nosed Leopard Lizard

The San Joaquin Valley is one of the few locations where blunt-nosed leopard lizard (*Gambelia silus*) are found. Their primary habitat is open, sparsely vegetated areas that are not subject to seasonal inundation. They utilize small abandoned rodent burrows to shelter from temperature as well as predators. In the absence of burrows, they will construct shallow tunnels in berms or

under rocks. This species spends the cooler months underground, and emerges in late March or April (USFWS).

The blunt-nosed leopard lizard was listed on the IPaC database report but was not recorded in CNDDDB records. Per CNDDDB, an unconfirmed occurrence of blunt nosed leopard lizard was reported approximately 12 miles from the Proposed Action location. The last confirmed occurrence was located approximately 50 miles from the Proposed Action location in 1991. Due to the age and location of the recorded findings, and lack of suitable habitat, it is unlikely that blunt-nosed leopard lizard will occur in the Proposed Action Area.

4.4.3 Giant Garter Snake

Giant garter snake (*Thamnophis gigas*) (GGS) typically inhabit agricultural wetlands and waterways. These can include agricultural ditches, marshes, sloughs, and adjacent uplands. The distribution of the GGS formerly included the Proposed Action Area. However, this species is absent from the area between the southern edge of the San Francisco Bay Delta and the northern edge of Merced County.

No records have been found in the Proposed Action Area according to CNDDDB. The nearest recorded occurrence was in 1997 approximately 20 miles from the Proposed Action Area. The agricultural ditches on the project site are not connected to any known populations of GGS, and none have been recorded nearby.

4.4.4 California Red-legged Frog

California red-legged frog (*Rana draytonii*) (CRLF) are primarily associated with perennial ponds or pools and perennial or seasonal streams. Areas with the highest densities of CRLF have dense emergent or shoreline riparian vegetation loosely associated with moderately deep (greater than 2.3 ft), still, or slow-moving water. Vegetation that provides the most suitable habitat consists of willows, cattails, and bulrushes at or close to the water level, which shade a substantial area of the water (USFWS). No occurrences of CRLF have been documented in the Proposed Action Area. The nearest recorded occurrence was in 1993 approximately nine miles from the Proposed Action Area.

4.4.5 California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) (CTS) was listed in the findings of IPaC. Per CNDDDB record search, the last confirmed occurrence of California Tiger Salamander occurred less than 10 miles away from the Proposed Action location in 1994.

Found mostly in the central valley, CTS is restricted to grasslands and low foothills that are near vernal pools or wetlands. No suitable habitat is located on or adjacent to the Proposed Action Area.

4.4.6 San Joaquin Kit Fox

Originally found throughout the San Joaquin valley, the San Joaquin kit fox (*Vulpes macrotis mutica*) (SJKF) is now found only on the edges of the San Joaquin Valley. Habitat for SJKF includes valley grasslands and alkali sinks, including those areas around agricultural lands (Defenders of Wildlife, Brown et. al). While CNDDDB did not report SJKF in the Proposed Action Area, they are reported to the north and west of the Proposed Action, with the most recent occurrence in 2004 approximately 6 miles west of the Proposed Action location. No habitat conversions are proposed that would alter the potential for SJKF habitat. No dens, potential for dens, or signs of SJKF were noted in any of the field surveys. Given the current high utilization and high disturbance of the Action Area, any occurrence of SJKF in the Action Area would be transient in nature.

5.0 ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

San Joaquin kit fox habitat consists primarily of valley grasslands and alkali sinks in the San Joaquin Valley, but they also forage and move through agricultural areas. Factors that have contributed to the decline of the San Joaquin kit fox include habitat loss, degradation, and fragmentation due to agricultural, industrial, and urban developments. Predation, starvation, flooding, and drought are natural mortality factors. Human-induced mortality factors include shooting, trapping, poisoning, electrocution, road kills, and suffocation (Brown et al 2019). Extensive agricultural development has occurred in the past in the Action Area, but the current project would not change that development, nor increase any natural mortality factors. Habitat in the Action Area will be substantially the same after the project is complete. The following sections describes potential habitat in the project area.

5.1 Vegetation and Land Cover Types

Focused field surveys were conducted by qualified biologists and wetland ecologists along the Proposed Action site and staging areas on September 13, 2016, November 4, 2016, May 21, 2018, and January 24, 2019.

The Proposed Action Area (including staging areas) was surveyed for sensitive species habitat and wetlands. The walking survey included buffer areas within 100 feet of the Proposed Action Area.

The Proposed Action Area comprises three common non-native plant communities/habitat types associated with agricultural areas of the San Joaquin Valley. They are: ruderal, irrigated cropland, and agricultural ditches.

5.1.1 Ruderal

Ruderal habitats are characterized by areas that are sparsely vegetated, typically dominated by short-lived annual and biennial introduced grasses and broad-leaved forbs that are adapted to

periodic disturbance. Ruderal habitat in the Proposed Action occurs between the toe of the levee and the agricultural ditch or irrigated cropland habitat types.

Vegetation in the Proposed Action Area's ruderal habitat are dominated by non-hydrophytes, including Russian thistle (*Salsola australis*), jimson weed (*Datura wrightii*), bull thistle (*Cirsium vulgare*), prickly wild lettuce (*Lactuca serriola*), and bermuda grass (*Cynodon dactylon*).

Less dominant species include stinkwort (*Dittrichia graveolens*), Italian ryegrass (*Festuca perrenis*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), reed fescue (*Festuca arundinacea*), prostrate knotweed (*Polygonum aviculare*), English plantain (*Plantago lanceolata*), slender oats (*Avena barbata*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), hare barley (*Hordeum murinum* ssp. *leporinum*), and white stemmed filaree (*Erodium moschatum*).

A few mature valley oaks (*Quercus lobata*), remnants of the riparian oak habitats of the San Joaquin River flood plain that are now isolated from the extant riverine habitats by the levee, occur in the Proposed Action Area. In order to complete the levee repair, these oaks may be trimmed or removed prior to construction. However, due to the small footprint of the trees relative to the overall Proposed Action Area, as well as their isolation from the riparian habitat, the removal of the trees is not anticipated to have a significant effect on the environment.

5.1.2 Irrigated Cropland

Away from the levee walls and toe, irrigated cropland dominates the landscape in the Proposed Action Area. The San Joaquin Valley produces one-third of all the produce grown in the United States; more than 230 crops comprise the valley's diverse array of agricultural produce. The valley harbors the world's largest amalgamation of Class 1 soils, which are ideal crop-growing soils. Agricultural lands are well suited to growing of grasses and other herbaceous plants that are grown and harvested for purposes such as animal feed and human consumption. The majority of the adjacent lands are used for agriculture.

Irrigated lands surrounding the Proposed Action Area support crops of triticale (*XTriticosecale rimpaui*), a hybrid wheat-rye grain grown primarily as forage for cows. Other dominant species in the area include hydrophytic grasses, forbs, and "grass-like" herbs, and those that can withstand the heavy irrigation. These include umbrella sedge (*Cyperus eragrostis*), watergrass (*Echinochloa crusgalli*), yellow bristlegrass (*Setaria puumila*), broadleaf pepper grass (*Lepidium latifolium*), and curly dock (*Rumex crispus*).

5.1.3 Agricultural Ditches

Beyond the toe of the levee slope, and typically adjacent to irrigated croplands, an excavated agricultural ditch of variable width is a characteristic feature of the Proposed Action Area. Agricultural ditch habitat in the Proposed Action Area is characterized by a U-shaped excavated

ditch for irrigation or tail water for agricultural. Most of the ditch is 2.5 feet wide by one foot deep, but in some areas, considerably wider (6 to 20 feet wide). In the narrower sections, the ditch was mostly dry during the times of survey.

The edge of the ditch is dominated by Bermuda grass. Vegetation in the ditch is dominated by species such as curly dock (*Rumex crispus*), dallisgrass (*Paspalum dilatatum*), yellow foxtail (*Setaria pumila*), sprangletop (*Leptochloa fusca*), and barnyard grass (*Echinochloa crus-gallis*). The deeper agricultural ditches are dominated by hard stemmed bulrush (*Schoenoplectus acutus* var. *occidentalis*) and broad leaf cattail (*Typha latifolia*), with the edges dominated by barnyard grass.

5.2 San Joaquin Kit Fox

No CNDDDB records for SJKF occur in the Proposed Action Area. However, SJKF have been reported to the north and west of the Proposed Action Area. The most recent occurrence, in 2004, was recorded approximately six miles west of the Proposed Action Area.

No SJKF sightings or burrows, or ground squirrel burrows were noted during any of the surveys conducted. Continuous use of the levee roads for agricultural purposes, and consistent maintenance and squirrel abatement on the levees, make it unlikely for ground squirrel burrows to be available to kit foxes. The active removal may also reduce the availability of burrowing rodents for kit fox prey. It is possible that SJKF could occasionally move through the Action Area, but without suitable burrows, it is unlikely that they would remain or establish burrows in the area. Conservation measures, as described above, will be implemented to detect and minimize risks to the species.

5.3 Cumulative Effects

There are continuous activities that affect how the Proposed Action Area is used by SJKF. These activities include vegetation clearing, vehicle traffic on levee roads for agricultural and levee grooming purposes, and adjacent agricultural activities which seasonally change the structure and use of the Proposed Action Area. Ongoing maintenance and routine agricultural activities on and around the levee limit the use of the levee and surrounding area as a corridor or potential habitat for SJKF. The Proposed Action is consistent with ongoing agricultural and levee maintenance activities.

5.4 Impact Determination on Special-Status Species

The special-status species identified through records review were assessed for their likelihood to be impacted by the Proposed Action based upon previously documented occurrences, field surveys, habitat requirements, and the presence of suitable habitat in the Proposed Action footprint. Each species was ranked for its likelihood to be impacted by the Proposed Action: a “may affect, likely to adversely affect” rank was given for species where current field surveys have positively identified the species in the Proposed Action Area, where there have been

previously documented occurrences in the Proposed Action Area, and/or where essential habitat elements exist in the Proposed Action Area; a “may affect, not likely to adversely affect” rank was applied to species with no known observations in the Proposed Action Area or vicinity, as well as where habitat elements exist in the Proposed Action Area or vicinity. This ranking also applied If the quality of that habitat is degraded or poor, and/or the Proposed Action Area conditions and land uses deter use of the Proposed Action area. A “no effect” rank was given for species with no known observations in the Proposed Action Area or vicinity, and where no suitable habitat exists in the Proposed Action Area. The results of these analyses are summarized in Table 2. No special-status species was determined to have a “may affect, likely to adversely affect” likelihood of occurrence in the Proposed Action Area.

Table 2: Impact Determination on Special Status Species

Scientific Name	Common Name	Habitat	Determination
<i>Oncorhynchus mykiss irideus</i>	Steelhead - Central Valley DPS	Rivers and streams with cold water and gravel bottoms appropriate for spawning	No effects. Suitable habitat is not present in the Proposed Action Area.
<i>Hypomesus transpacificus</i>	Delta smelt	Bays, tidal rivers, channels, and sloughs	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Branchinecta lynchi</i>	Vernal Pool Fairy Shrimp	Vernal pools, alkali pools, seasonal drainages, rock outcrops	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	Vernal Pools, alkali pools, roadside ditches and ruts	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Elderberry along rivers and streams	No effects. Suitable habitat (elderberry shrubs) is not present in the Proposed Action Area
<i>Gambelia silus</i>	Blunt-nosed leopard lizard	Grasslands and alkali flats	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Thamnophis gigas</i>	Giant Garter Snake	Marshes, sloughs, drainage canals, and irrigation ditches	No effects. Ditch habitat in the project vicinity is not connected or near any known GGS occurrences.
<i>Rana draytonii</i>	California red-legged frog	Aquatic areas of mixed riparian and uplands dispersal types	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Ambystoma californiense</i>	California tiger salamander	Grasslands and low foothills with nearby vernal pools	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Grasslands, scrub land, vernal pool meadows	May affect, not likely to adversely affect. Suitable habitat is near the Proposed Action, however there are no records of SJKF in the vicinity. SJKF may transit the area.

5.5 Effects of the Action on San Joaquin Kit Fox and Critical Habitat

There is no critical habitat for SJKF in the Action Area.

Record searches of IPaC and CNDDDB indicated no recent records of SJKF in the Action Area. Surveys for suitable habitat detected no burrows or other signs of occupancy. Most likely due to the continual use and maintenance of the levee, no ground squirrels or ground squirrel holes were observed during the project surveys. The absence of burrows makes it unlikely that SJKF would remain in the project vicinity. The proposed Project would not reduce, degrade or fragment kit fox habitat, nor use rodenticides or introduce diseases which are primary threats to SJKF.

The Project would cause an increased risk of road-kill mortality to an individual SJKF moving through the Action Area. However, SJKF are primarily nocturnal, and providing worker environmental awareness training, limiting construction to daytime hours, and minimizing vehicle speeds on project access roads will effectively minimize risk. The presence of a biological monitor will ensure that workers are informed of the importance of recognizing this animal and avoiding harm to it.

Indirect effects to SJKF may occur from noise, increased construction traffic, vibration or other disruptions that may decrease prey, sheltering, or corridor movement availability. These disturbances would be confined to the relatively short construction period in the Action Area. Also, SJKF have been observed to adapt quickly to urban conditions and construction activities (e.g. populations in Bakersfield) and they are not expected to have long term effects from the levee repair.

Implementing the Proposed Project, along with Conservation Measures as described, **may affect, but is not likely to adversely affect** SJKF.

6.0 CONCLUSIONS

The Proposed Action of repairing levees along 11,038 feet of the San Joaquin River in Stanislaus County **may affect, but is not likely to adversely affect** San Joaquin Kit Fox.

This determination was made by qualified biologists based on a review of historical occurrences in the IPaC and CNDDDB, an evaluation of the extant habitat, and field surveys of the Action Area (September 13, 2016, November 4, 2016, May 21, 2018, and January 24, 2019). The evaluation showed no historical records of federally listed species on the site, generally unsuitable habitat, and a lack of specific indicators of occupancy or suitability for federally listed species.

Conservation Measures to avoid and minimize potential impacts to SJKF are specified above.

7.0 PROFESSIONAL QUALIFICATIONS

W.E. Haas, M.S. has over thirty years of experience as a California wildlife biologist, with a professional focus on the development of assessment and monitoring programs for federally protected species. He has implemented and supervised such programs for major studies supported by the California Department of Fish and Wildlife and California Department of Parks and Recreation, and he is a leading authority on the biology and ecology of several federally listed endangered species. Mr. Haas is a co-author of this report.

Brent Helm, Ph.D. is a wildlife biologist and wetlands ecologist. Mr. Helm conducted a delineation of waters of the United States, including wetlands, potentially under the jurisdiction of the United States Army Corps of Engineers under Section 404 and 404 (f) of the Clean Water act for this project. Mr. Helm is a co-author for this report.

Jackie Putnam, B.S. is an Assistant Project manager and environmental compliance specialist serving as a California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) analyst. Ms. Putnam conducted field surveys, literature and database review, and assisted in the wetland delineations for this project. Ms. Putnam is a co-author this report.

Tom Lagerquist, B.A., is a Principal Project Manager and environmental compliance specialist. Mr. Lagerquist has over 32 years of experience in managing multidisciplinary teams for siting, permitting, and natural resources evaluations of large infrastructure projects. Mr. Lagerquist directed the project team and provided quality assurance review.

E. J. Koford, M.S., is a Certified Wildlife Biologist with 25 years of experience evaluating project impacts to wildlife in California and is a co-author of this plan.

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BIOLOGICAL ASSESSMENT

RD2091 LEVEE REPAIR PROJECT

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ACRONYMS

BMP	Best Management Practices
CNDDDB	California Natural Diversity Database
CRLF	California red-legged frog
CTS	California tiger salamander
DWR	Department of Water Resources
ECCCCHCP	East Contra Costa County HCP
FSRP	Flood System Repair Project
GGS	Giant garter snake
I-5	Interstate 5
IPaC	Information for Planning and Consultation
LM	Levee Mile
NMFS	National Marine Fisheries Service
RD 2091	Reclamation District 2091
SJKF	San Joaquin kit fox
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VELB	Valley elderberry longhorn beetle

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APPENDIX

Appendix A: IPaC Species List

Appendix B: U.S. Fish and Wildlife Service Standardized Recommendations For Protection of The
Endangered San Joaquin Kit Fox

1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed Reclamation District 2091 (RD 2091) Levee Repair Project in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, or proposed species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This BA is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536 (c)). This BA addresses species that fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

Pursuant to Section 14 of the Rivers and Harbors Act of 1899, 33 U.S.C. 408 (Section 408), RD 2901 has requested permission from the US Army Corps of Engineers (Corps) to alter landside portions of the San Joaquin River levee that are subject to its jurisdiction.

The following federally listed species will be considered in this BA.

• steelhead - Central Valley DPS	<i>Oncorhynchus mykiss irideus</i>	Threatened
• Delta smelt	<i>Hypomesus transpacificus</i>	Threatened
• vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened
• vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Endangered
• valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Threatened
• blunt-nosed leopard lizard	<i>Gambelia silus</i>	Endangered
• giant garter snake	<i>Thamnophis gigas</i>	Threatened
• California red-legged frog	<i>Rana draytonii</i>	Threatened
• California tiger salamander	<i>Ambystoma californiense</i>	Threatened

The action addressed in this document does not fall in any designated or proposed critical habitat for any listed species.

2.0 CONSULTATION TO DATE

There has been no previous consultation with regulatory agencies for this project.

3.0 PROPOSED ACTION

3.1 Location

The proposed project is located approximately 3.2 miles east of the City of Patterson, in Stanislaus County, California. The project encompasses approximately 11.5 acres bounded by

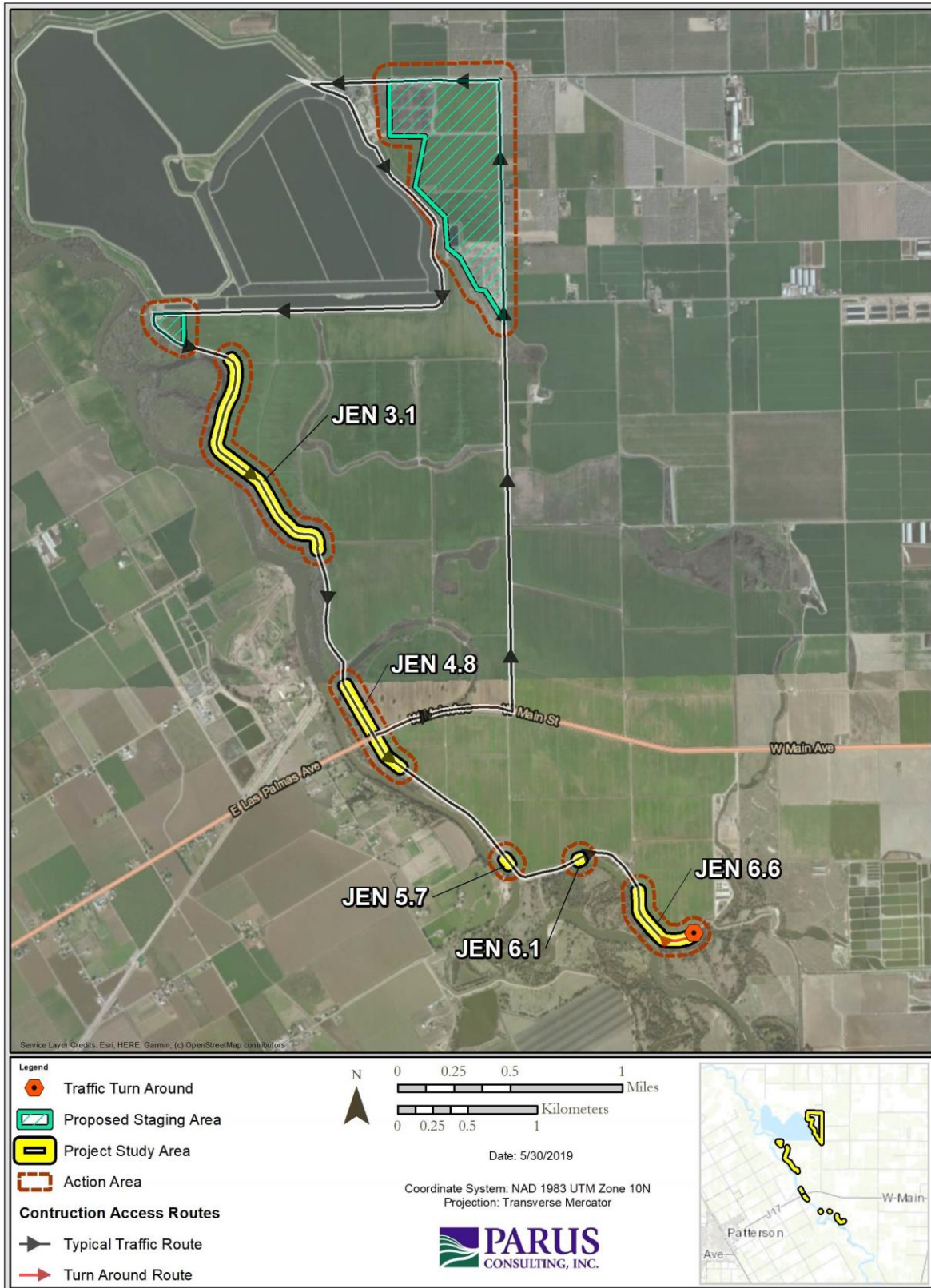
the San Joaquin River on the west, the San Joaquin River East Levee on the north, Vivian Road, S. Carpenter Road, and Crows Landing Road on the east, and Linwood Avenue and Simmons Road to the south (37.4871N, -121.062E) (Figure 1).

The Action Area is defined as all areas that may be affected directly or indirectly by the Federal action. A buffer of 100 feet was applied to the Construction Area, as well as to all staging areas.

The Action Area is located in the Great Valley ecological region characterized by long, hot, dry summers and mild winters. More than half of the region is now in cropland, about three-fourths of which is irrigated.

The Construction will be on the landside of the east San Joaquin River levee and will not encroach into the channel geometry or affect channel hydraulics of the San Joaquin River. No slope protection will be placed on the waterside levee slopes. Vegetation along the approximately 3.5-mile repair section is primarily ruderal and abuts irrigated cropland. These vegetation types are typically dominated by short-lived annual and biennial introduced grasses and broad-leaved forbs that are adapted to periodic disturbance. Several valley oaks (*Quercus lobata*) that have been isolated from the adjacent riparian areas are also located in the construction area.

Figure 1: Action Area



3.0 Project Description

The Project consists of constructing seepage and stability berms at five locations to prevent ongoing seepage and increase levee stability, in accordance with the Rural Levee Repair Guidelines.

Repair measures will be implemented at each of the five sites and comprise the following:

- (1) clear, grub, and strip the berm;
- (2) place at least a 12-inch filter layer;
- (3) place at least a 12-inch layer of drain rock;
- (4) place a geotextile to prevent movement of berm materials into the drain rock.

Construction will occur over one construction season, from June through September of 2020. Construction at all five sites occurs from the landside. Repair sites are located at LM 3.18, 4.80, 5.73, 6.08, and 6.63.

3.1.1 Site JEN3.1, Levee Mile 3.18

Site JEN 3.1 (Photograph 1) extends from LM 2.87 to LM 3.94 and covers approximately 3.67 acres. Site JEN 3.1 has experienced severe seepage with several boils running clear water 30 feet from the landside toe. The repair will be approximately 5,718 feet and require approximately 16,403 cubic yards of material.



Photograph 1: Site JEN 3.1

3.1.2 Site JEN4.8, Levee Mile 04.80

Site JEN 4.8 (photograph 2) extends from LM 4.50 to 5.10 and covers approximately 3.6 acres. Site JEN 4.8 has experienced severe seepage and boils carrying material during past high-water events. In 1997, crushed rock and filter fabric were placed on an existing landside berm to control seepage, and sandbags were used to control the boils about 25 feet from the levee toe. The area sees high amounts of seepage and boils during every high-water event. The repair will be approximately 2,370 feet long, requiring approximately 22,284 cubic yards of material.



Photograph 2: Site JEN 4.8

3.1.3 Site JEN5.7, Levee Mile 5.73

Site Jen 5.7 (Photograph 3) extends from LM 5.70 to 5.75. It covers approximately .33 acres and has experienced several boils carrying a small amount of material about 25 feet from the landside toe. Seepage and boils have occurred during every high-water event. The length of the repair will be approximately 542 feet and requires approximately 2,138 cubic yards of material.



Photograph 3: Site Jen 5.7

3.1.4 Site JEN6.1, Levee Mile 06.08

The site at LM 6.08 (Photograph 4) has a 5-inch diameter boil that carries material during high flows. A sandbag ring has been placed around the boil during rain events. Rock and filter fabric have been used in the past to control seepage and boils carrying material. The repair length is approximately 253 feet, requiring approximately 570 cubic yards of material.



Photograph 4: Site Jen 6.1

3.1.5 Site JEN6.6, Levee Mile 6.63

Site Jen 6.6 (Photograph 5) extends from LM 6.38 to 6.88, and covers approximately 4.03 acres. It has experienced 17 boils, some running clear and some carrying materials. Severe seepage was noted in 1997. Jen 6.6 has experienced seepage and boils carrying material or running clear during past high-water events. Sand bag rings were used to control boils, while rocks and fabrics were used to control seepage. The repair will be approximately 2,155 feet long, requiring approximately 21,514 cubic yards of material.



Photograph 5: Site Jen 6.6

3.2 Proposed Action Elements

3.2.1 Site Access and Staging

Jennings Wastewater Treatment Facility is the designated staging area for the Proposed Action. This already developed area will be the sole location used for staging vehicles, plant materials, and construction equipment.

Deliveries will be made by concrete trucks, flatbed trucks, and tractor-trailer dump rigs. An estimated 1,258 truckloads of material will be delivered to the site. Truck routes will follow West Main Street and Jennings Road onto the Jennings Wastewater Treatment Facility and onto the levee.

3.2.2 Construction Activities

Prior to construction, all construction areas, including the staging area, will be fenced off to limit access onsite. Ruderal vegetation along with the few solitary valley oaks may be trimmed or removed, as necessary, to facilitate movement of equipment and levee repair operations. Any tree trimming or removal will adhere to all Federal, State, and local regulatory standards. Trash or concrete rubble will be removed and disposed of at an appropriate facility. Temporary erosion control methods will be used as needed to prevent soil from encroaching onto adjacent property. Disturbed areas will be seeded and mulched to prevent erosion following completion of the Proposed Action.

3.2.3 Construction Equipment

Construction work will occur during one construction season, beginning in June and ending in September. The work will begin with mobilization and site preparation, including transporting equipment such as, tractors, compactor, backhoe, dump trucks, scrapers, and graders to the site, and clearing and grubbing. Mobilization will take approximately one week. The construction period will begin with clearing and grubbing of levee followed by excavation and installation of filter and drainage rock, finishing with geotextile material. Rebuilding the levee crown and road will require an additional week. Demobilization will include removal of equipment and materials from the Proposed Action site, disposal of excess materials at appropriate facilities, and restoration of staging areas and temporary access roads to pre-project conditions. Demobilization activities will take an additional week to complete.

All construction will be conducted from the landside of the east San Joaquin River levee, and will not encroach into the channel geometry or affect channel hydraulics of the San Joaquin River. Therefore, no slope protection will be placed on the waterside levee slopes.

The following equipment is likely to be used for construction at each repair site:

- Scraper
- Compactor
- Grader
- Excavator
- Dump trucks
- Pickup trucks
- Loader
- Dozer

3.3 Conservation Measures

The following conservation measures will be implemented to avoid and minimize potential adverse effects of the Proposed Action:

3.3.1 Construction Fencing

Temporary construction fencing will be placed to mark the construction zone boundaries and to prevent construction equipment or personnel from entering adjacent areas.

3.3.2 Exclusion Fencing and Escape Ramps

While no special status species are expected in the Action Area, exclusion fencing will be used if needed. This need will be determined at the time of the preconstruction survey and will be determined by a qualified biologist.

During project excavation, escape ramps will be in place for any excavation deeper than 2 feet.

3.3.3 Preconstruction Surveys

If construction occurs during the bird nesting season (February 15 to September 15), a nesting bird survey will be completed prior to construction. No more than 14 days prior to the start of construction, a pedestrian nesting bird survey will be conducted of the project area. The survey will be completed by a competent qualified biologist and documented in a Preconstruction Bird Survey Report. The survey will be repeated in the event construction activity lapses for two weeks or more to ensure no birds have moved into the area. If active nests are found that would be affected by project construction, the location will be recorded and an avoidance buffer implemented on construction maps or temporary signage or fencing. The buffer area will remain in effect for the duration of construction, or until the nest is abandoned, or young have fledged as determined and documented by a competent, qualified biologist. No trimming or tree removal will occur until a qualified biologist has confirmed that the nest is abandoned, or young have fledged.

3.3.4 Construction Monitoring

Prior to construction, a qualified biologist will conduct a survey to determine the presence of any special status species. Additionally, a biological monitor will be onsite during all construction related activities. The monitor will have the authority to stop work if needed. The biological monitor will be responsible for the daily monitoring of any special status species, including but not limited to, checking around and under construction vehicles, checking excavation pits, inspecting pipes, culverts, or similar structures, and checking the Action Area for any indication of special status species. Daily activity logs will be maintained. The monitor will report to the lead agency.

If any special status species is found in the Action Area, all construction must stop in that area, and the qualified biologist will be contacted immediately.

3.3.5 Worker Environmental Awareness Training

All personnel will attend a Worker Environmental Awareness training session on special-status species that have the potential to occur in the Proposed Action. The training will provide information on the species' description, status, identification, habitat requirements, and procedures to be followed if special-status species are identified in the Proposed Action Area. Procedural handouts will also be provided.

3.3.6 Conservation Measures for San Joaquin Kit fox

Construction activities would involve temporary disturbance of potential migration routes for SJKF. The likelihood of SJKF using the Action Area is low. However, implementation of the following conservation measures will ensure that the Proposed Action will minimize potential effects to SJKF.

While no burrows were noted during any of the field visits, potential for burrows changes over time. As such, the USFWS Standardized Recommendations for Protection of The Endangered San Joaquin Kit Fox (Appendix B) will be implemented. These measures include:

- 1) Conducting preconstruction surveys by a qualified Biologist prior to the start of the project in order to identify any potential dens;
- 2) If occupied dens are discovered, exclusion zones will be implemented as directed by the qualified Biologist;
- 3) Construction activities will be conducted when there is the least chance of disturbance;
- 4) Biological monitoring will occur throughout the duration of the project;
- 5) Construction activities will stop at dusk

4.0 SPECIAL-STATUS SPECIES

4.1 Special-Status Species

The list of species considered in this assessment was identified by conducting a record search of the California Natural Diversity Database (CNDDDB), as well as the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC). Table 1 shows a combined list of the species identified in the database searches. No critical habitat was found for any of the listed species in the Action Area.

Table 1: Special-Status Species with Potential to Occur in the Action Area

Scientific Name	Common Name	Federal Listing Status	Identified List	Habitat
<i>Oncorhynchus mykiss irideus</i>	steelhead - Central Valley DPS	Threatened	CNDDDB, IPaC	Rivers and streams with cold water and gravel bottoms appropriate for spawning.
<i>Hypomesus transpacificus</i>	Delta smelt	Threatened	IPaC	Bays, tidal rivers, channels, and sloughs
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	Threatened	IPaC	Vernal pools
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	Endangered	IPaC	Vernal Pools
<i>Desmocerus californicus dimorphus</i>	valley elderberry longhorn beetle	Threatened	CNDDDB, IPaC	Elderberry shrubs along rivers and streams
<i>Gambelia silus</i>	blunt-nosed leopard lizard	Endangered	IPaC	Grasslands and alkali flats
<i>Thamnophis gigas</i>	giant garter snake	Threatened	IPaC	Marshes, sloughs, drainage canals, and irrigation ditches
<i>Rana draytonii</i>	California red-legged frog	Threatened	IPaC	Aquatic areas of mixed riparian and uplands dispersal types
<i>Ambystoma californiense</i>	California tiger salamander	Threatened	IPaC	Grasslands and low foothills with nearby vernal pools
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered	IPaC	Grasslands, scrub land, vernal pool meadows

4.2 Special-Status Fish Species

Historically, two special-status fish species occurred near the Proposed Action Area: steelhead (*Oncorhynchus mykiss irideus*) and Delta smelt (*Hypomesus transpacificus*). While steelhead are likely to inhabit the riverine system near the action area, Delta smelt are unlikely to occur. The

most recent confirmed occurrence of Delta smelt was in 2007, 40 miles north of the action area.

No work will be done in the wetlands, riparian corridors, or other habitats supporting any fish species.

4.3 Special-Status Branchiopods

Vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardii*) are listed on the IPaC findings. Vernal pool fairy shrimp are usually associated with vernal pools, but have also been found in alkali pools, seasonal drainages, and rock outcrops. Vernal pool tadpole shrimp can be found in a number of seasonal habitats including vernal pools, alkaline pools, and roadside ditches and ruts (ECCHCP).

CNDDDB record search findings did not show any presence of vernal pool fairy shrimp or vernal pool tadpole shrimp; however, both species were confirmed less than fifteen miles from the Proposed Action site, with the most recent occurrence in 2011.

No work will be conducted in or near any vernal pool or similar habitat that supports listed branchiopods.

4.4 Special-Status Wildlife

Several special-status wildlife species, including reptiles, invertebrates, and amphibians, are listed as having the potential to occur in the general Proposed Action vicinity. Of the database-listed special-status species, there is no onsite habitat to support any portion of their life history, although each may occur nearby along the San Joaquin River.

4.4.1 Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) are restricted to their host plant, elderberry, found along the riparian corridors of the Central Valley. There have been approximately 190 records of VELB from as far north as Shasta county down to Fresno county (USFWS). The last recorded occurrence of VELB in the Proposed Action Area was in 1984 and was identified by exit holes only. No adults were seen. A number of occurrences have been recorded in a 5-mile radius of the Proposed Action location, with the most recent occurrence recorded in 2009. No elderberry shrubs are located in the Proposed Action Area.

4.4.2 Blunt-Nosed Leopard Lizard

The San Joaquin Valley is one of the few locations where blunt-nosed leopard lizard (*Gambelia silus*) are found. Their primary habitat is open, sparsely vegetated areas that are not subject to seasonal inundation. They utilize small abandoned rodent burrows to shelter from temperature as well as predators. In the absence of burrows, they will construct shallow tunnels in berms or

under rocks. This species spends the cooler months underground, and emerges in late March or April (USFWS).

The blunt-nosed leopard lizard was listed on the IPaC database report but was not recorded in CNDDDB records. Per CNDDDB, an unconfirmed occurrence of blunt nosed leopard lizard was reported approximately 12 miles from the Proposed Action location. The last confirmed occurrence was located approximately 50 miles from the Proposed Action location in 1991. Due to the age and location of the recorded findings, and lack of suitable habitat, it is unlikely that blunt-nosed leopard lizard will occur in the Proposed Action Area.

4.4.3 Giant Garter Snake

Giant garter snake (*Thamnophis gigas*) (GGS) typically inhabit agricultural wetlands and waterways. These can include agricultural ditches, marshes, sloughs, and adjacent uplands. The distribution of the GGS formerly included the Proposed Action Area. However, this species is absent from the area between the southern edge of the San Francisco Bay Delta and the northern edge of Merced County.

No records have been found in the Proposed Action Area according to CNDDDB. The nearest recorded occurrence was in 1997 approximately 20 miles from the Proposed Action Area. The agricultural ditches on the project site are not connected to any known populations of GGS, and none have been recorded nearby.

4.4.4 California Red-legged Frog

California red-legged frog (*Rana draytonii*) (CRLF) are primarily associated with perennial ponds or pools and perennial or seasonal streams. Areas with the highest densities of CRLF have dense emergent or shoreline riparian vegetation loosely associated with moderately deep (greater than 2.3 ft), still, or slow-moving water. Vegetation that provides the most suitable habitat consists of willows, cattails, and bulrushes at or close to the water level, which shade a substantial area of the water (USFWS). No occurrences of CRLF have been documented in the Proposed Action Area. The nearest recorded occurrence was in 1993 approximately nine miles from the Proposed Action Area.

4.4.5 California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) (CTS) was listed in the findings of IPaC. Per CNDDDB record search, the last confirmed occurrence of California Tiger Salamander occurred less than 10 miles away from the Proposed Action location in 1994.

Found mostly in the central valley, CTS is restricted to grasslands and low foothills that are near vernal pools or wetlands. No suitable habitat is located on or adjacent to the Proposed Action Area.

4.4.6 San Joaquin Kit Fox

Originally found throughout the San Joaquin valley, the San Joaquin kit fox (*Vulpes macrotis mutica*) (SJKF) is now found only on the edges of the San Joaquin Valley. Habitat for SJKF includes valley grasslands and alkali sinks, including those areas around agricultural lands (Defenders of Wildlife, Brown et. al). While CNDDDB did not report SJKF in the Proposed Action Area, they are reported to the north and west of the Proposed Action, with the most recent occurrence in 2004 approximately 6 miles west of the Proposed Action location. No habitat conversions are proposed that would alter the potential for SJKF habitat. No dens, potential for dens, or signs of SJKF were noted in any of the field surveys. Given the current high utilization and high disturbance of the Action Area, any occurrence of SJKF in the Action Area would be transient in nature.

5.0 ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

San Joaquin kit fox habitat consists primarily of valley grasslands and alkali sinks in the San Joaquin Valley, but they also forage and move through agricultural areas. Factors that have contributed to the decline of the San Joaquin kit fox include habitat loss, degradation, and fragmentation due to agricultural, industrial, and urban developments. Predation, starvation, flooding, and drought are natural mortality factors. Human-induced mortality factors include shooting, trapping, poisoning, electrocution, road kills, and suffocation (Brown et al 2019). Extensive agricultural development has occurred in the past in the Action Area, but the current project would not change that development, nor increase any natural mortality factors. Habitat in the Action Area will be substantially the same after the project is complete. The following sections describes potential habitat in the project area.

5.1 Vegetation and Land Cover Types

Focused field surveys were conducted by qualified biologists and wetland ecologists along the Proposed Action site and staging areas on September 13, 2016, November 4, 2016, May 21, 2018, and January 24, 2019.

The Proposed Action Area (including staging areas) was surveyed for sensitive species habitat and wetlands. The walking survey included buffer areas within 100 feet of the Proposed Action Area.

The Proposed Action Area comprises three common non-native plant communities/habitat types associated with agricultural areas of the San Joaquin Valley. They are: ruderal, irrigated cropland, and agricultural ditches.

5.1.1 Ruderal

Ruderal habitats are characterized by areas that are sparsely vegetated, typically dominated by short-lived annual and biennial introduced grasses and broad-leaved forbs that are adapted to

periodic disturbance. Ruderal habitat in the Proposed Action occurs between the toe of the levee and the agricultural ditch or irrigated cropland habitat types.

Vegetation in the Proposed Action Area's ruderal habitat are dominated by non-hydrophytes, including Russian thistle (*Salsola australis*), jimson weed (*Datura wrightii*), bull thistle (*Cirsium vulgare*), prickly wild lettuce (*Lactuca serriola*), and bermuda grass (*Cynodon dactylon*).

Less dominant species include stinkwort (*Dittrichia graveolens*), Italian ryegrass (*Festuca perrenis*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), reed fescue (*Festuca arundinacea*), prostrate knotweed (*Polygonum aviculare*), English plantain (*Plantago lanceolata*), slender oats (*Avena barbata*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), hare barley (*Hordeum murinum* ssp. *leporinum*), and white stemmed filaree (*Erodium moschatum*).

A few mature valley oaks (*Quercus lobata*), remnants of the riparian oak habitats of the San Joaquin River flood plain that are now isolated from the extant riverine habitats by the levee, occur in the Proposed Action Area. In order to complete the levee repair, these oaks may be trimmed or removed prior to construction. However, due to the small footprint of the trees relative to the overall Proposed Action Area, as well as their isolation from the riparian habitat, the removal of the trees is not anticipated to have a significant effect on the environment.

5.1.2 Irrigated Cropland

Away from the levee walls and toe, irrigated cropland dominates the landscape in the Proposed Action Area. The San Joaquin Valley produces one-third of all the produce grown in the United States; more than 230 crops comprise the valley's diverse array of agricultural produce. The valley harbors the world's largest amalgamation of Class 1 soils, which are ideal crop-growing soils. Agricultural lands are well suited to growing of grasses and other herbaceous plants that are grown and harvested for purposes such as animal feed and human consumption. The majority of the adjacent lands are used for agriculture.

Irrigated lands surrounding the Proposed Action Area support crops of triticale (*XTriticosecale rimpaui*), a hybrid wheat-rye grain grown primarily as forage for cows. Other dominant species in the area include hydrophytic grasses, forbs, and "grass-like" herbs, and those that can withstand the heavy irrigation. These include umbrella sedge (*Cyperus eragrostis*), watergrass (*Echinochloa crusgalli*), yellow bristlegrass (*Setaria puumila*), broadleaf pepper grass (*Lepidium latifolium*), and curly dock (*Rumex crispus*).

5.1.3 Agricultural Ditches

Beyond the toe of the levee slope, and typically adjacent to irrigated croplands, an excavated agricultural ditch of variable width is a characteristic feature of the Proposed Action Area. Agricultural ditch habitat in the Proposed Action Area is characterized by a U-shaped excavated

ditch for irrigation or tail water for agricultural. Most of the ditch is 2.5 feet wide by one foot deep, but in some areas, considerably wider (6 to 20 feet wide). In the narrower sections, the ditch was mostly dry during the times of survey.

The edge of the ditch is dominated by Bermuda grass. Vegetation in the ditch is dominated by species such as curly dock (*Rumex crispus*), dallisgrass (*Paspalum dilatatum*), yellow foxtail (*Setaria pumila*), sprangletop (*Leptochloa fusca*), and barnyard grass (*Echinochloa crus-gallis*). The deeper agricultural ditches are dominated by hard stemmed bulrush (*Schoenoplectus acutus* var. *occidentalis*) and broad leaf cattail (*Typha latifolia*), with the edges dominated by barnyard grass.

5.2 San Joaquin Kit Fox

No CNDDDB records for SJKF occur in the Proposed Action Area. However, SJKF have been reported to the north and west of the Proposed Action Area. The most recent occurrence, in 2004, was recorded approximately six miles west of the Proposed Action Area.

No SJKF sightings or burrows, or ground squirrel burrows were noted during any of the surveys conducted. Continuous use of the levee roads for agricultural purposes, and consistent maintenance and squirrel abatement on the levees, make it unlikely for ground squirrel burrows to be available to kit foxes. The active removal may also reduce the availability of burrowing rodents for kit fox prey. It is possible that SJKF could occasionally move through the Action Area, but without suitable burrows, it is unlikely that they would remain or establish burrows in the area. Conservation measures, as described above, will be implemented to detect and minimize risks to the species.

5.3 Cumulative Effects

There are continuous activities that affect how the Proposed Action Area is used by SJKF. These activities include vegetation clearing, vehicle traffic on levee roads for agricultural and levee grooming purposes, and adjacent agricultural activities which seasonally change the structure and use of the Proposed Action Area. Ongoing maintenance and routine agricultural activities on and around the levee limit the use of the levee and surrounding area as a corridor or potential habitat for SJKF. The Proposed Action is consistent with ongoing agricultural and levee maintenance activities.

5.4 Impact Determination on Special-Status Species

The special-status species identified through records review were assessed for their likelihood to be impacted by the Proposed Action based upon previously documented occurrences, field surveys, habitat requirements, and the presence of suitable habitat in the Proposed Action footprint. Each species was ranked for its likelihood to be impacted by the Proposed Action: a “may affect, likely to adversely affect” rank was given for species where current field surveys have positively identified the species in the Proposed Action Area, where there have been

previously documented occurrences in the Proposed Action Area, and/or where essential habitat elements exist in the Proposed Action Area; a “may affect, not likely to adversely affect” rank was applied to species with no known observations in the Proposed Action Area or vicinity, as well as where habitat elements exist in the Proposed Action Area or vicinity. This ranking also applied If the quality of that habitat is degraded or poor, and/or the Proposed Action Area conditions and land uses deter use of the Proposed Action area. A “no effect” rank was given for species with no known observations in the Proposed Action Area or vicinity, and where no suitable habitat exists in the Proposed Action Area. The results of these analyses are summarized in Table 2. No special-status species was determined to have a “may affect, likely to adversely affect” likelihood of occurrence in the Proposed Action Area.

Table 2: Impact Determination on Special Status Species

Scientific Name	Common Name	Habitat	Determination
<i>Oncorhynchus mykiss irideus</i>	Steelhead - Central Valley DPS	Rivers and streams with cold water and gravel bottoms appropriate for spawning	No effects. Suitable habitat is not present in the Proposed Action Area.
<i>Hypomesus transpacificus</i>	Delta smelt	Bays, tidal rivers, channels, and sloughs	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Branchinecta lynchi</i>	Vernal Pool Fairy Shrimp	Vernal pools, alkali pools, seasonal drainages, rock outcrops	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	Vernal Pools, alkali pools, roadside ditches and ruts	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Elderberry along rivers and streams	No effects. Suitable habitat (elderberry shrubs) is not present in the Proposed Action Area
<i>Gambelia silus</i>	Blunt-nosed leopard lizard	Grasslands and alkali flats	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Thamnophis gigas</i>	Giant Garter Snake	Marshes, sloughs, drainage canals, and irrigation ditches	No effects. Ditch habitat in the project vicinity is not connected or near any known GGS occurrences.
<i>Rana draytonii</i>	California red-legged frog	Aquatic areas of mixed riparian and uplands dispersal types	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Ambystoma californiense</i>	California tiger salamander	Grasslands and low foothills with nearby vernal pools	No effects. Suitable habitat is not present in the Proposed Action Area
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Grasslands, scrub land, vernal pool meadows	May affect, not likely to adversely affect. Suitable habitat is near the Proposed Action, however there are no records of SJKF in the vicinity. SJKF may transit the area.

5.5 Effects of the Action on San Joaquin Kit Fox and Critical Habitat

There is no critical habitat for SJKF in the Action Area.

Record searches of IPaC and CNDDDB indicated no recent records of SJKF in the Action Area. Surveys for suitable habitat detected no burrows or other signs of occupancy. Most likely due to the continual use and maintenance of the levee, no ground squirrels or ground squirrel holes were observed during the project surveys. The absence of burrows makes it unlikely that SJKF would remain in the project vicinity. The proposed Project would not reduce, degrade or fragment kit fox habitat, nor use rodenticides or introduce diseases which are primary threats to SJKF.

The Project would cause an increased risk of road-kill mortality to an individual SJKF moving through the Action Area. However, SJKF are primarily nocturnal, and providing worker environmental awareness training, limiting construction to daytime hours, and minimizing vehicle speeds on project access roads will effectively minimize risk. The presence of a biological monitor will ensure that workers are informed of the importance of recognizing this animal and avoiding harm to it.

Indirect effects to SJKF may occur from noise, increased construction traffic, vibration or other disruptions that may decrease prey, sheltering, or corridor movement availability. These disturbances would be confined to the relatively short construction period in the Action Area. Also, SJKF have been observed to adapt quickly to urban conditions and construction activities (e.g. populations in Bakersfield) and they are not expected to have long term effects from the levee repair.

Implementing the Proposed Project, along with Conservation Measures as described, **may affect, but is not likely to adversely affect** SJKF.

6.0 CONCLUSIONS

The Proposed Action of repairing levees along 11,038 feet of the San Joaquin River in Stanislaus County **may affect, but is not likely to adversely affect** San Joaquin Kit Fox.

This determination was made by qualified biologists based on a review of historical occurrences in the IPaC and CNDDDB, an evaluation of the extant habitat, and field surveys of the Action Area (September 13, 2016, November 4, 2016, May 21, 2018, and January 24, 2019) The evaluation showed no historical records of federally listed species on the site, generally unsuitable habitat, and a lack of specific indicators of occupancy or suitability for federally listed species.

Conservation Measures to avoid and minimize potential impacts to SJKF are specified above.

7.0 PROFESSIONAL QUALIFICATIONS

W.E. Haas, M.S. has over thirty years of experience as a California wildlife biologist, with a professional focus on the development of assessment and monitoring programs for federally protected species. He has implemented and supervised such programs for major studies supported by the California Department of Fish and Wildlife and California Department of Parks and Recreation, and he is a leading authority on the biology and ecology of several federally listed endangered species. Mr. Haas is a co-author of this report.

Brent Helm, Ph.D. is a wildlife biologist and wetlands ecologist. Mr. Helm conducted a delineation of waters of the United States, including wetlands, potentially under the jurisdiction of the United States Army Corps of Engineers under Section 404 and 404 (f) of the Clean Water act for this project. Mr. Helm is a co-author for this report.

Jackie Putnam, B.S. is an Assistant Project manager and environmental compliance specialist serving as a California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) analyst. Ms. Putnam conducted field surveys, literature and database review, and assisted in the wetland delineations for this project. Ms. Putnam is a co-author this report.

Tom Lagerquist, B.A., is a Principal Project Manager and environmental compliance specialist. Mr. Lagerquist has over 32 years of experience in managing multidisciplinary teams for siting, permitting, and natural resources evaluations of large infrastructure projects. Mr. Lagerquist directed the project team and provided quality assurance review.

E. J. Koford, M.S., is a Certified Wildlife Biologist with 25 years of experience evaluating project impacts to wildlife in California and is a co-author of this plan.

8.0 REFERENCES

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