WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2022
Grant Application
NOFO No. R22AS00020

Rosedale-Rio Bravo Water Storage District
Groundwater Banking Recovery Project

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1.1 Executive Summary

The Rosedale-Rio Bravo Water Storage District ("Rosedale", "RRBWSD", "District"), located in the southern San Joaquin Valley in Kern County, California, immediately west of the City of Bakersfield, proposes to utilize existing resources in a cost-share agreement with the US Bureau of Reclamation ("Reclamation", "USBR") to improve overall District system efficiency by better managing water supplies and bolstering drought resiliency efforts via the "*Groundwater Banking Recovery Project*" ("Project"). The Project will consist of the construction of three new extraction wells, additional conveyance facilities, and an integrated pest management plan on existing District recharge basins: the McCaslin Recharge Basins and the Bowling Recharge Basin.

Table 1: Project and Applicant Information

Project Information	
Date	October 5, 2021
Project Name	Groundwater Banking Recovery Project
Expected Completion	32 to 36 months (September 2025)
Near a Federal Facility?	No
Applicant Information	
Name	Dan Bartel
Title	Engineer-Manager, Rosedale-Rio Bravo Water Storage District
Applicant Category	Category A applicant
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City, County, State	Bakersfield, Kern, California

After a second consecutive year of extremely dry conditions, the State of California and Kern County have entered a state of drought emergency. Due to recent warm temperatures, dry soils, and sparse rainfall, the expected runoff water from snowmelt in the Sierra Nevada's have resulted in an unanticipated reduction of water supplies, with deliveries from the State Water Project ("SWP") reduced to five percent allocations. Water supplies in major reservoirs throughout the state are at low levels and legal and environmental restrictions have impaired the SWP's ability to move water through the Sacramento/San Joaquin Delta ("Delta"), making surface supplies increasingly less reliable to those south of the Delta. Rosedale has identified a need to improve recovery and return capacity of their groundwater recharge facilities, as water supplies continue to be limited and the District remains obligated to return water to certain partners every year. To meet required water demands, prepare for drought recovery, and comply with landmark Sustainable Groundwater Management Act ("SGMA") and other applicable groundwater legislations (SB-1938), RRBWSD is determined to take immediate action to bolster drought resiliency projects, such as the proposed Groundwater Banking Recovery Project, and mitigate the effects of drought conditions in the area.

Improved recovery and return conveyance capabilities provided by the Project will allow RRBWSD a reliable alternative source of water supply during dry years, allowing the District to meet return obligations to various conjunctive-use partnerships, and reduce demand on existing water supplies, such as SWP and CVP. The Project will be accomplished via the following three components:

1. McCaslin Recovery Project - Construction of two extraction wells on the McCaslin property (approximately 192 acres) and 6,500 linear feet of pipeline from 15 to 30 inches in diameter that would be plumbed into existing District conveyance pipelines and canals.
2. Bowling Recovery Project – Construction of one extraction well on the Bowling property (approximately 80 acres) and 1,200 linear feet of 15-inch diameter pipeline that would be plumbed into existing District conveyance pipelines and canals.
3. Integrated Pest Management Project - Installation of 10 owl boxes on recently constructed recharge ponds (McCaslin and Bowling). This will provide a non-pesticide option of rodent control to prevent pond berm failures that result in financial damages and loss of critical groundwater recharge activities.

These three Project components support the proactive approach set forth by the USBR to bolster drought resiliency efforts by increasing the flexibility of water conveyance and deliveries, facilitating access to water supplies in times of drought, and developing alternative water supplies to build resiliency to the impacts of drought. This Project meets the Objective of the Notice of Funding Opportunity No. R22AS00020 by leveraging District money and resources through cost sharing with Reclamation to develop projects that will increase the reliability of water supplies; improve water management; and provide benefits for fish, wildlife, and the environment to mitigate impacts caused by drought. This Project is expected to recover an average of **3,258 AFY** (or about 10,000 AF in each recovery year) and would proceed immediately upon notification of grant funding, break ground in October 2022 and could be completed by the end of December 2023. The proposed Project is not located on any Federal facilities.

1.2 Project Location and Background Data

RRBWSD is located in the southern San Joaquin Valley in Kern County, California, immediately west of the City of Bakersfield, and has a gross area of approximately 44,000 acres (Figure 1). The District lands are located within the Kern River Alluvial Fan where historic runoff created an efficient aquifer system from which the District recharges groundwater so as to support groundwater pumping for agricultural, municipal, and industrial uses. The District is an independent special district, organized on August 27, 1958, under the provisions of the California Water Storage District Law (Division 14 of the Water Code of the State of California) (the "Act"). The District's boundaries encompass a portion of the City of Bakersfield. The property within the District is agricultural, municipal and industrial. Of the total 44,000 acres, approximately 28,000 acres are currently in crops, which include forage, nuts, dairy, almonds, pistachios, and vegetables. The balance is a mix of open ground, rural development (0.25-10 acre lots), and light industrial businesses that mainly support the agricultural and petroleum

industries. These uses are served potable water by both individual and mutual domestic water wells.

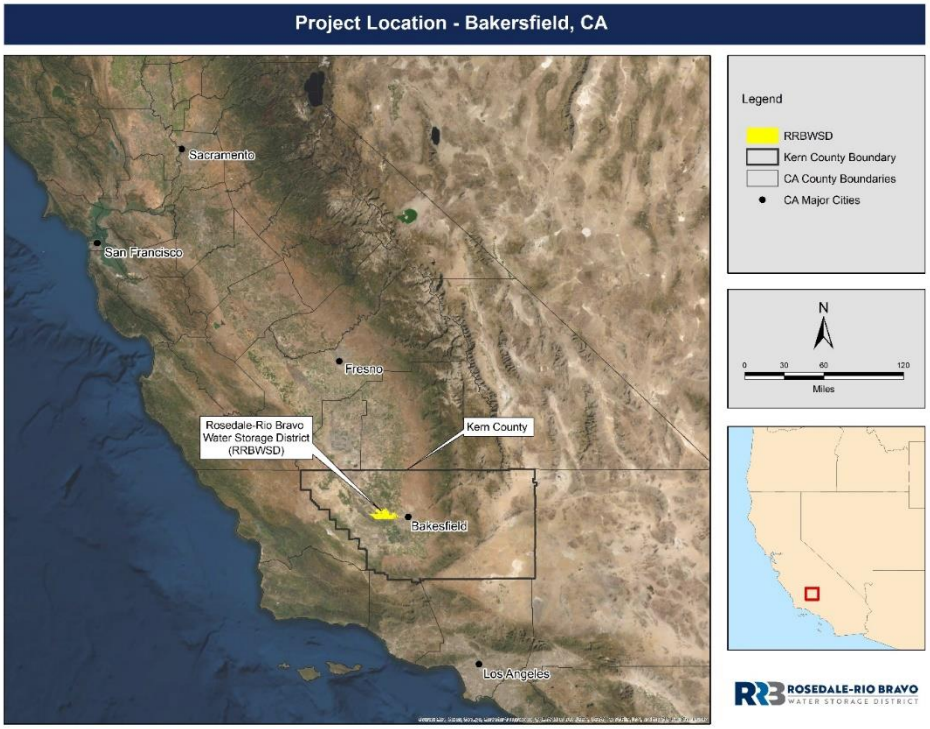


Figure 1: Groundwater Banking Recharge Project Location

In 1959, the voters within the District approved a general project consisting of the construction of recharge basins and water conveyance facilities capable of capturing water supplies and percolating those supplies into the underground aquifer for replenishment of water pumped by landowners within the District (the "Recharge Project"). The construction of the initial phases of the Recharge Project was completed in 1962. Additional improvements to the Recharge Project have been made and additional facilities and properties have been added since the original project was completed. Subsequent to the completion of construction of the Recharge Project, the District acquired a State Water Project ("SWP") water supply through the Kern County Water Agency (the "Agency"). RRBWSD has also been a historic user of surplus Friant-Kern Canal flows and a user of Kern River water via its contract with the Kern County Land Company (now City of Bakersfield) to serve irrigation demands and for groundwater recharge programs.

The District operates a water delivery system consisting of 25 miles earthen canals, 2 miles of pipelines, check structures, pipelines, 2000 acres of recharge basins, and 27 wells all designed for the primary function of groundwater banking and conjunctive use (recharge and recovery). There are approximately 20 connections to landowner irrigation systems that are used for in-lieu groundwater recharge purposes. The District acquires wet-year supplies via various contracts and banking programs, which require that a portion of the supplies are returned in dry years. Conveyance systems for banking return are a mix of pipelines and earthen canals, thus water evaporation and seepage reduce the project's return capabilities. The District and its landowners

are served by the Pacific Gas and Electric Company; the vast majority of energy used for groundwater recovery and conveyance is electrical based.

The District has developed and enjoys partnerships with many different state, federal, and local entities to help improve water management and meet future water demand needs. Currently and historically, RRBWSD has worked with the U.S. Department of the Interior, Bureau of Reclamation ("USBR") and Fish and Wildlife Service to provide water to the Kern National Wildlife Refuge ("KNWR") to the northwest of the District and to obtain water from the Central Valley Project ("CVP"). RRBWSD also partners with multiple Federal Friant-Kern water agencies for mutually beneficial recharge and recovery projects, namely: Arvin-Edison WSD, Kern-Tulare WD, and Delano-Earlimart ID. Below is a list of the various contracts involving RRBWSD and Federal agencies:

KNWR Purchase & Conveyance Agreements
Year 2007

CVP Short-Term/Temporary Water Service Contracts (non-CVP Contractor)

Year 1965, No. 14-06-200-769A	Year 1973, No. 14-06-200-4032
Year 1973, No. 14-06-200-229A	Year 1973, No. 14-06-200-7228A
Year 1973, No. 14-06-200-4162A	Year 1978, No. 14-06-200-229A
Year 1993, No. 3-07-20-W1058	Year 1995, No. 5-07-20-W12
Year 2001, No. 01-WC-20	Year 2003, No. 03-WC-20-2654
Year 2011, No. 11-WC-20-0090	Year 2011, No. 11-WC20-0104

Federal Exchange and Banking Agreements
Arvin-Edison WSD, 1997, 2003, 2009, 2011, 2012, 2013
Delano-Earlimart ID, 2009
Kern-Tulare WD, 2001, 2004, 2005, 2007
San Joaquin River Exchange Contractors Water Authority, 2017, 2019, 2020, 2021

The proposed Project is located within the District's boundaries and is composed of the McCaslin and Bowling groundwater banking areas (Figure 2), which will assist in providing recharge and return water to the above-mentioned partnerships during periods of drought.

McCaslin Recovery Project. The District has acquired approximately 192 acres of land, known as the McCaslin property, located in Kern County, California, about 5 miles west of the City of Bakersfield. The McCaslin Recovery Project latitude is {35°22'21.82"N} and longitude is {119°16'28.25"W}. The McCaslin property is also located adjacent to the Goose Lake Channel and the District's existing recharge facilities. The McCaslin property is in the process of being converted into a recharge basin for District groundwater storage. Under this proposal, the District intends to construct two new extraction wells and conveyance pipelines on the McCaslin recharge basin to provide additional recovery.

Bowling Recovery Project. The District has acquired approximately 40 acres of land, known as the Bowling property, located in Kern County, California, about 5 miles west of the City of Bakersfield. The Bowling Recovery Project latitude is {35°22'27.60"N} and longitude is {119°13'40.71"W}. The Bowling property is also located adjacent to the Goose Lake Channel and existing District groundwater recharge facilities. The Bowling property has been fallowed for at least 20 years and was converted into a pilot recharge pond in 2017. Under this proposal, the District intends to construct one new extraction well and conveyance pipelines on the Bowling recharge basin to provide additional recovery in dry years.

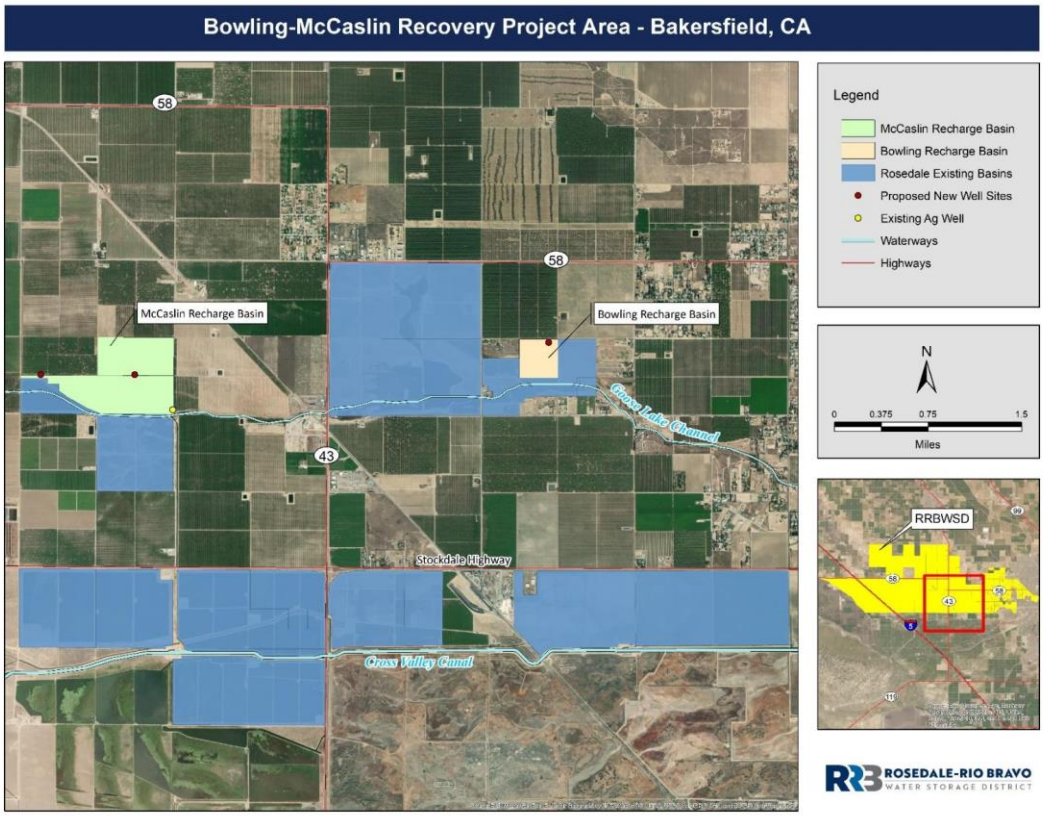


Figure 2: Groundwater Banking Recovery Project Area – Bowling and McCaslin

1.3 Technical Project Description

The Groundwater Banking Recovery Project is designed to improve overall District drought resiliency by increasing the District's ability to recover groundwater from storage within the Kern Fan area of the groundwater basin. This will be accomplished through the drilling and equipping of three production wells, two (2) on the McCaslin Recharge Property, and one (1) on the Bowling Recharge Facility, and the necessary conveyance facilities to connect to state and federal contractors. These properties currently operate as locations for recharge basins but have no facilities for recovering water to satisfy the contractual obligations of our federal and local agencies. The recovered groundwater as a direct result of the Project will provide additional water to:

- Support District obligations and exchanges (agricultural, municipal, and industrial).
- Provide enhanced protection against prolonged drought and climatic changes.
- Support third-party banking and transfer partners.

This Project meets the Objective of Section A.2 of the Funding Opportunity Announcement No. R22AS00020 by leveraging RRBWSD money and resources by cost sharing with Reclamation for developing project components that expand Drought Resiliency Projects that will increase the reliability of water supplies; and improve water management to mitigate impacts caused by drought. For Project implementation, RRBWSD is taking a five-step approach to handle the major tasks associated with the Project:

1. **Feasibility Study** – RRBWSD technical staff and consultants, have evaluated the feasibility of the projects as shown on the Project Summary Matrix and Water Management Program Score in Appendix A. The evaluation includes considering issues such as water system delivery effectiveness, construction reasonableness, environmental impacts, and cost.

2. **Environmental and Regulatory** – RRBWSD will take the necessary measures to satisfy federal and state environmental requirements and regulations. Using the environmental information obtained from various studies, required steps will be taken to meet CEQA and NEPA compliance and all necessary permit applications will be submitted. Refer to subsequent sections for further information on environmental and regulatory compliance.

3. **Design -** This task includes the preliminary and final designs of the facilities.

4. **Procurement & Installation -** This task includes procurement of materials, contractor bidding and selection, as well as construction, and installation.

5. **Inspection and Testing** – Upon completion of construction, a detailed inspection will occur, equipment training, testing and calibration, as well as a performance evaluation will be followed by a final report to provide an account of project progression and expenditures. In addition, any state and federal required project completion reports will be provided to the respective agencies. Ongoing monitoring of project performance and evaluation will be conducted to determine actual water conservation and energy benefits.

As with most major projects, many aspects or details from each of the listed steps require parallel progression and overlap is necessary to produce an efficient project schedule. It is estimated that the Project, including the environmental review, will be completed in approximately 28 months. Please see Appendix B for a preliminary Project Schedule. This project consists of the following specific components:

1. Well Drilling – RRBWSD seeks to drill three (3) conjunctive use recovery wells. At an estimated 5 cfs (cubic feet per second) per well, these wells can recover a total of 15 cfs, which correlates to a maximum of 10,860 acre-feet per year (AFY). The District has hired a hydrogeologist to perform a groundwater impact analysis to study any negative effects to current District facilities as well as Landowner Wells in the District. The District will use

previous logs from nearby wells, historical water levels in the area, water quality sampling data, and local knowledge to assist with well design and water quality implications. The District predicts that the well will be an approximate depth of 650-850 feet, with perforations from approximately 400-700 feet. Design is subject to change based on soils samples collected during the pilot hole drilling and the well development process. See Appendix E for an example of a similar well design in the area.

2. **Well Equipping –** RBWSD uses a standardized design when equipping its wells. Apart from the pump, which is designed specific to each well, each facility will have a Yaskawa U1000 Industrial Matrix Drives (VFD's), deep well air release, vacuum relief valve, sleeve coupling with joint harness, high pressure switch, pressure transmitter, sample port, wafer check valve, pressure gauge, flowmeter, butterfly valve, pipe supports, and a combination air vent. Well discharge piping will be 12-inch fusion bonded epoxy lined and coated steel piping. To protect the motor head from the elements as well as theft see Appendix F for typical well equipping design.

3. **Conveyance Connections -** RRBWSD currently has 3 main ways to convey recovered water. All of which run north-south and connect current recovery facilities to the Cross-Valley Canal. The water then can go west to the California Aqueduct to satisfy State Water demands or east to the Friant Kern Canal to satisfy Federal Water demands. A critical part of this project is connecting the new wells with current delivery facilities so that the water can be accessible for State and Federal Water Contractors in dry years. The first well located in the northwest of the McCaslin property will stub into 15" PVC line for approximately 1800 linear feet. To satisfy the capacity from the other well, and to accommodate future projects in the area, the pipe will then upsize to 27" PVC line for 4,000 linear feet. From there the pipe will upsize one more time to 30" PVC for 700 linear feet, where it will cross the Goose Lake Channel, and discharge into the Rosedale No. 2. Rosedale No.2 is an open channel canal the District uses for moving water north/south to and from the Cross Valley Canal. On the Bowling well a stub was tied in (2016) and will only require 1200 Linear Feet of 15" PVC to tie into the Central Intake Pipeline, which serves as another route to convey water to the Cross Valley Canal.
4. **Integrated Pest Management Project** - RRBWSD will acquire manufactured owl boxes and install them on 1.5-inch steel poles (as recommended by the manufacturer) along the perimeter of recently constructed recharge ponds (McCaslin and Bowling). This will provide a non-pesticide option of rodent control to prevent pond berm failures that result in financial damages and loss of critical groundwater recharge activities.

1.4 Performance Measures

Performance measurements will be a key instrument to quantifying water better managed and saved through this Project. After Project completion pertinent data will be included in our annual operations report with a monthly summary of recovery flowrates, and a summary of return obligations to state and federal contractors. The data will be compared with projected annual water recovered as calculated in this grant.

1.5 Evaluation Criteria

1.5.1 *Evaluation Criterion A-E.1.1. Project Benefits*

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits? The water savings benefit of the Project comes from Rosedale's ability to return stored water from in-District water banking facilities. Rosedale can access wet year water supplies for aquifer storage that is sufficient to weather prolonged drought periods. Because of Rosedale's conveyance connections, such as the Cross Valley Canal ("CVC") and Kern River, the District is able to bank and recharge contracted surface waters for neighboring entities, typically in exchange for a portion of the amount recharged. Due to extreme dry conditions, Rosedale has determined that the full utilization of local water resources and current banking programs and facilities are insufficient to meet water demands from partnerships with neighboring entities. The proposed Project provides improved return and recovery capabilities of banked wet period water, ensuring that neighboring entities receive a reliable source of return water during periods of drought. The Project seeks to construct 3 new extraction wells and conveyance pipelines that will be plumbed into existing District conveyance facilities. The typical lifespan of the wells, pumps, and electricals is 30 years, while the conveyance facilities are estimated to be about 50 years.

Will the project make additional water supplies available? One of the major benefits of this project is the ability for Rosedale to return banked water during periods of drought. The addition of more wells to Rosedale's existing recovery facilities will allow more water to be recharged and recovered on behalf of certain participants. The flow of the additional wells is estimated at 5 CFS per well, or 15 CFS between the three wells. In periods of extreme drought when surface water supplies are at a premium, a maximum of 10,860 AFY can be recovered. Rosedale has historically shown that 3 out of every 10 years are recovery years, the assumption within those years is that District Wells will be on for 12 months out of the year. To annualize that over a 10 year span you can multiply the max recovery (10,860 AFY) by 3 years and divide by 10 years for an average additional water supply of **3,258 AFY**.

RRBWSD'S average annual water supply (1993-2013) for agricultural use is about 108,000 AFY from various sources (i.e. Kern River, State Water Project, Central Valley Project, banked groundwater, exchanges, Safe Yield, and precipitation). By simply dividing the new supply of 3,258 AFY by the current District's supply of 108,000 AFY you can calculate the percentage of the total water supply from this project. See calculation below.

Estimated Amount of Additional Water Supply = 3,258 AFY **= 3% of total water supply**
Average Annual Water Supply = 108,000 AFY

When the Sustainable Groundwater Management Act was implemented in California in 2020, people finally started to realize how dire the water situation was. California is a state that is subject to prolonged droughts, but also extremely wet years. Unfortunately, the water storage isn't available in the state to satisfy demands in dry years, which is why this project is so important. District's that bank and utilize the underground aquifer for storage, need to be

prioritized, to help the state through prolonged droughts. This project not only builds drought resiliency for the District, but also up and down the state for Districts and Agencies that are reliant on surface water supplies.

Will the project improve the management of water supplies? Drilling and equipping three new wells and conveyance facilities is anticipated to increase the operational flexibility of the District to meet return partnership obligations. An increase in operational flexibility will improve Rosedale's overall management of groundwater resources, benefiting both Rosedale's landowners and neighboring districts. The estimated quantity of 3,258 AFY of water will be better managed with the implementation of the Project. Recovery and return improvements are crucial to the District because both the McCaslin and Bowling recharge basins currently do not have the sufficient capacity to make necessary return obligations. Creating a surface water supply in drought years will also improve the County and the State's operational flexibility as well as better water management during prolonged droughts. Please see the previous page for the explanation of the calculation.

Estimated Amount of Water Better Managed = 3,258 AFY **= 3% of water better managed**
Average Annual Water Supply = 108,000 AFY

The Groundwater Banking Recovery project will increase operational flexibility, by providing the District with more opportunities to bank in wet years, due to more capacity to recover surface water supplies during extended drought periods. With climatic changes and SGMA requirements, there is about an 11,000 AFY in shortage. The completion of this project would develop an additional 3,258 AFY (3% of annual District supply and assuming typical 2:1 banking program operations) which could reduce the shortage by about one-third.

Additional Water Supplies = 3,258 AFY **= 29% deficit reduction**
Water Deficit in the District = 11,000 AFY

The Project will provide return capacity for various state, federal, and local entity partnerships. Water managers associated with these entities will benefit from a reliable water supply during times of drought and fulfill their water recharge, transfer, and/or exchange agreements. Data collected during water recharge and recovery from the Project will be made available to any water managers involved. Aquifer parameters from pump testing data will be provided to the District's hydrogeologist for incorporation into the local groundwater model for impact analysis and future planning.

What is the estimated capacity of the new well(s), and how was the estimate calculated? The estimated flow capacities for the proposed three new wells are based on existing District wells located near the Project site, see detailed in Table 2 and Figure 3 below. While many of the flows in said table are above 5 CFS, varying groundwater conditions, and prolonged use of the wells decreases flow capacity. Therefore, to be conservative the District has selected an estimated flow of 5 CFS from each of the new well sites. That would coincide with a maximum of 10,860 AFY

(all 3 wells are on, 24 hrs a day, 365 days a year). Flowmeters are expected to be installed to accurately calculate Project flow capacity. Since the District doesn't direct deliver to landowners, the new wells will be used to provide a supplemental supply of water for Rosedale and various partnerships with state, federal, and local entities by returning a portion of previously wet period banked water during years of drought. The Kern County Subbasin has been labeled by the Department of Water Resource as a high priority basin, meaning one of the most reliant groundwater pumping basins. Drilling three more wells fits into the subbasin's Groundwater Sustainability Plan by creating operation flexibility and the availability of surface water supplies in dry years. Along with the opportunity to bank more water, this also coincides with our "Conjunctive Use Activity" in section 1.4.2.1 of Rosedale's Groundwater Sustainability Plan, which gives the District opportunity to participate in agreements and exchanges in the State Water Project and the Central Valley Project.

Table 2: Groundwater Banking Recovery Project Nearby Wells

Nearby Wells Information				
Well	Casing Size (inches)	Total Depth (ft)	Perforated Interval(s) (ft)	Average Flow (cfs)
ENNS-1	20 OD	475	185-455	6.3
ENNS-2	20 OD	750	460-740	5
ENNS-3	20 OD	440	180-420	5.6
SUP-2	20 ID	680	370-430, 460-630	6.5
SUP-4	20 ID	725	365-545, 570-610, 630-725	6.7
SUP-5	20 ID	690	370-560, 600-670	6.6
SUP-6	20 ID	940	410-610, 700-920	6.8

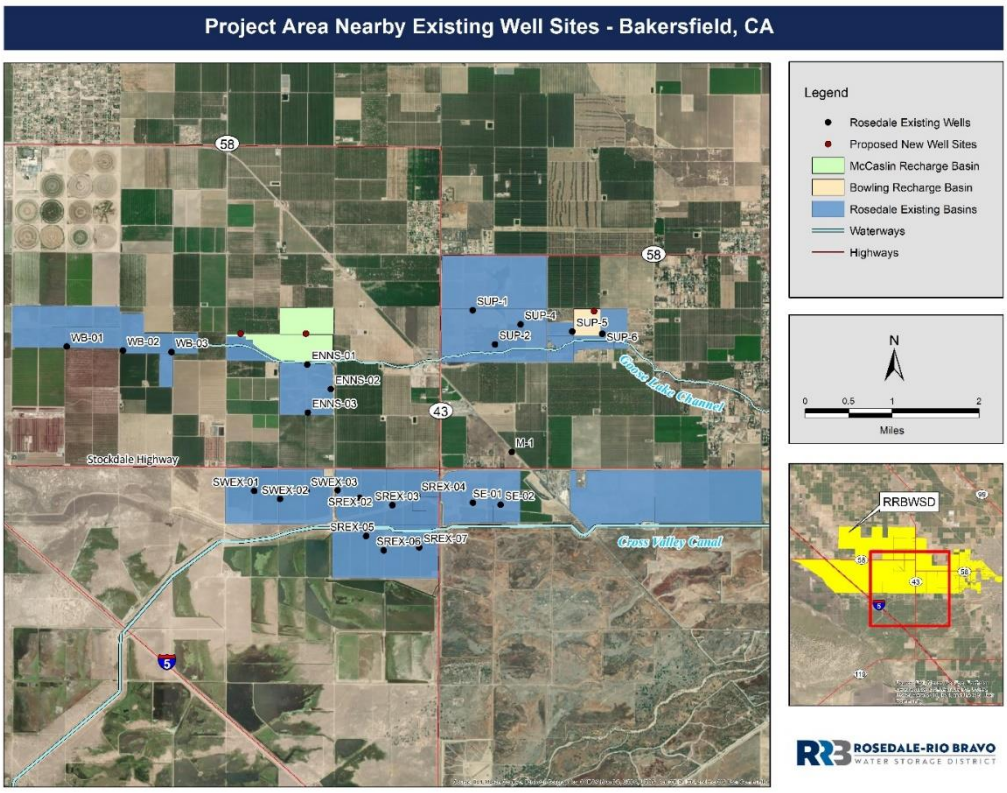


Figure 3: Groundwater Banking Recovery Project Nearby Wells Map

Please provide information documenting that proposed well(s) will not adversely impact the aquifer it/they are pumping from (overdraft or land subsidence). As previously stated, the Project seeks to provide recovery capacity from recharged water that was banked during wet years, where Rosedale retains a portion of water that was banked due to various exchange agreements with partners. The Project will not adversely impact the aquifer, overdraft, or cause land subsidence, as Rosedale intends to replenish groundwater supplies via multiple existing and future aquifer recharge facilities and projects (see Figure 3 for District well locations and nearby surface water supplies). The McCaslin and Bowling properties are in the process of being converted to groundwater recharge facilities and will be utilized in conjunction with Rosedale's existing 2,000 acres of recharge facilities. As part of its conjunctive-use project, Rosedale has developed a numerical groundwater flow model and robust groundwater level monitoring network that has been essential in evaluating, precluding, identifying, and mitigating groundwater level impacts from banking project recovery. A combination of agricultural, domestic, and monitoring wells are monitored monthly to ensure that water levels do not exceed established water level minimum thresholds and do not trigger undesirable results. Prior to construction of wells, impacts are evaluated on nearby wells. Operationally each year estimated impacts are analyzed as well.

The Project area is not currently experiencing aquifer overdraft or land subsidence, see Figures 4 and 5 for the most recent data regarding groundwater levels near the Project site and within Rosedale's Groundwater Sustainability Plan Management Area ("RRBMA").

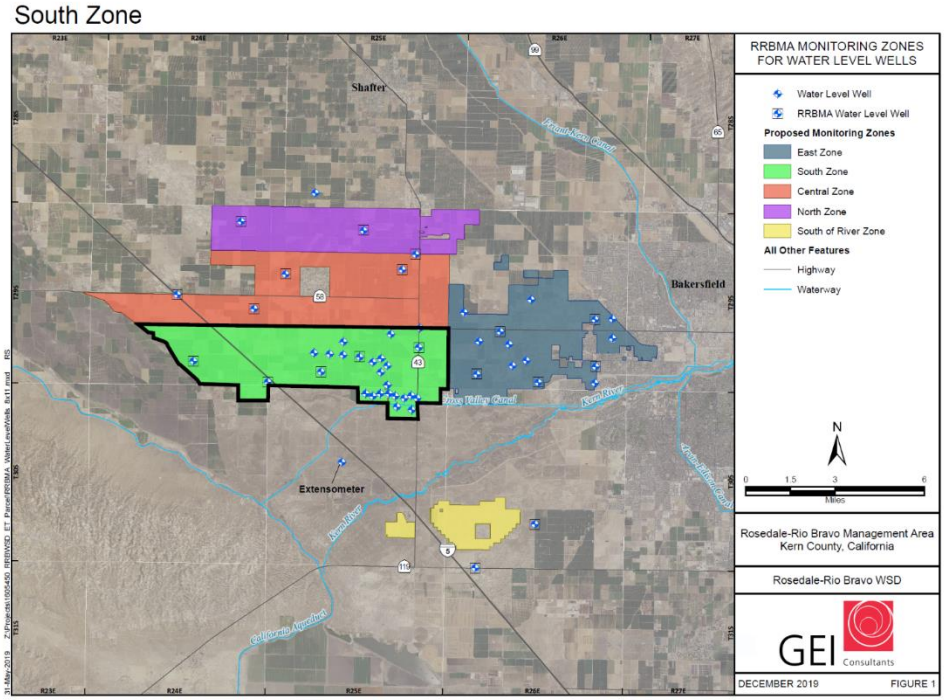


Figure 4: RRBMA South Zone Water Level Monitoring Map

Please describe the groundwater monitoring plan that will be undertaken and the associated monitoring triggers for mitigation actions. Mentioned above, Rosedale has implemented a

robust groundwater level monitoring plan to measure groundwater sustainability in the area. Groundwater levels are monitored monthly within different predetermined monitoring zones in the RRBMA (East Zone, South Zone, Central Zone, North Zone, and South of the River Zone) and offer reliable long-term data. Long-term groundwater hydrograph plots of potentiometric surfaces are updated each month with recent groundwater level data (see Figure 5 as an example) and are analyzed to ensure that water levels do not reach below the established minimum threshold causing undesirable results. Monitoring Committees, composed of representatives from adjoining entities and one RRBWSD representative, determine if impacts are likely to occur because of project operations. If undesirable results occur due to groundwater pumping, then the mitigation actions to prevent significant adverse impacts may include, but are not limited to the following:

1. Spreading out recovery areas.
2. Providing buffer areas between recovery wells and neighboring overlying users.
3. Limiting the monthly, seasonal, and/or annual recovery rate.
4. Providing sufficient recovery wells to allow rotation of recovery wells or the use of alternative wells.
5. Providing adequate well spacing.
6. Adjusting pumping rates or terminate pumping to reduce impacts
7. Imposing time restrictions between storage and extraction to allow for downward percolation of water to the aquifer

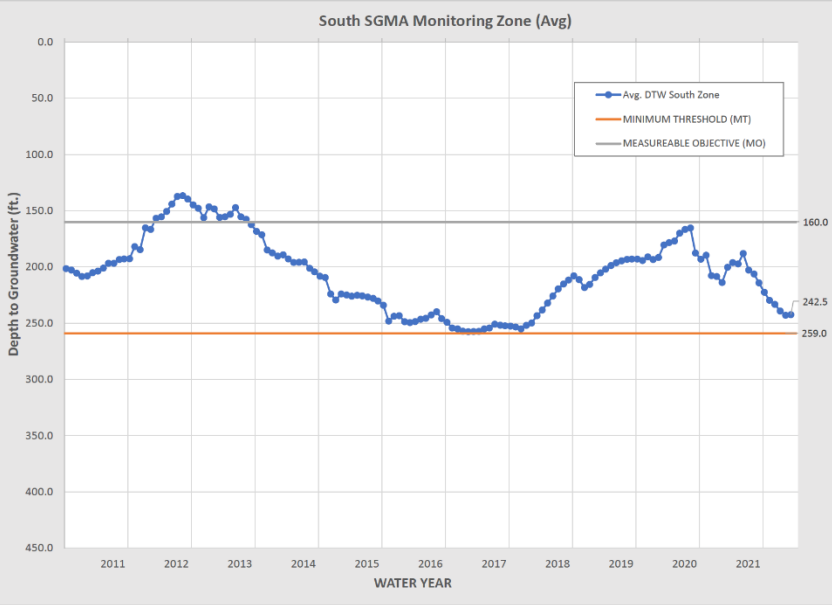


Figure 5: RRBMA South Zone Water Levels (2010-2021)

In addition to above mentioned mitigation measures, a Joint Operations Plan designates mitigation measures. A technical committee regularly monitors potential groundwater level impacts of banking project recovery operations on neighboring agricultural and domestic wells based on groundwater modeling. Specific triggers are set for potential mitigation actions, with significant impacts being avoided, eliminated, or mitigated by implementing one or more

corrective actions, including investigation of any claims and pump lowering, well replacement, and/or reduction or adjustment of banking project recovery operations, as appropriate.

1.5.2 *Evaluation Criteria B - E.1.2. Sustainability and Supplemental Benefits*

In addition to drought resiliency measures, does the proposed project include other natural hazard risk reductions for hazards such as wildfires or floods? While the proposed Project does not provide any immediate natural hazard reduction impacts, increasing water supplies throughout the state during drought years can provide beneficial use for fighting fires or offsetting subsidence in critical areas. Implementation of the Integrated Pest Management Project will reduce the incident of flooding from berm failure from rodent infestation, as well as to help keep recharge projects operating during flooding periods.

Does the proposed project include green or sustainable infrastructure to improve community climate resilience? The proposed Project will utilize high efficiency electric motors and VFD drives to best match supply and demand and not waste energy via manually back pressuring the system.

Will the proposed project establish and use a renewable energy source? The source of energy will be electricity provided by the Pacific Gas and Electric Company. Under California energy legislation a growing percentage of supplied energy must be supplied by local utilities. This Project will use renewable sources.

Does the proposed project seek to reduce or mitigate climate pollutions such as air or water pollution? The project will only employ electric motors, no fossil fuel engines so as not to contribute to air pollution and greenhouse gases.

Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation? The project will provide water supplies primarily for agricultural purposes which will provide sequestration by means of evapotranspiration that otherwise would not occur.

Does the proposed project have a conservation or management component that will promote healthy lands and soils or serve to protect water supplies and its associated uses? The Integrated Pest Management component of the Project will replace the typical use of pesticides to manage rodents with prey birds. Since operations create open water bodies by the employment of this tactic, few chemicals will impact local soils and water supplies.

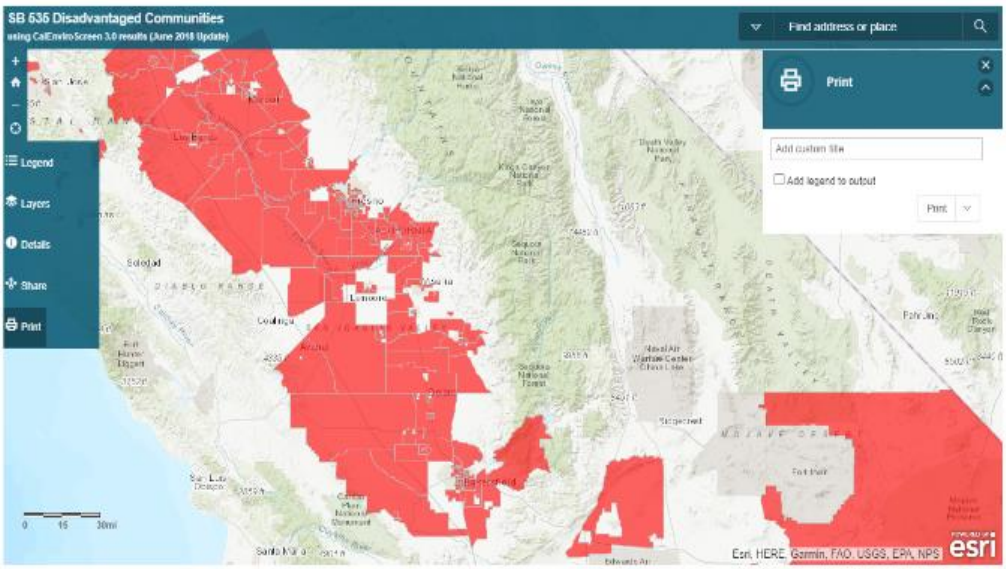
Does the proposed project contribute to climate change resiliency in other ways not described above? Unknown.

Will the proposed project serve or benefit a disadvantaged or historically underserved community? The District has groundwater banking projects with agencies that serve areas that include disadvantaged communities such as Rosedale, Lamont, Arvin, Delano, Firebaugh, Dos

Palos, Los Banos, Gustine, and Newman. These facilities would provide drought water supplies to these areas.

If the proposed project is providing benefits to a disadvantaged community, provide sufficient information to demonstrate that the community meets the applicable state criteria or meets the definition in Section 1015 of the Cooperative Watershed Act. All of the previously mentioned communities lie within the red area of the map, See Figure 6, which represent SB 535 Disadvantaged Communities designation. These areas are below 80% of the statewide median income.

Figure 6: SB 535 Disadvantaged Communities Designation Map



If the proposed project is providing benefits to an underserved community, provide sufficient information to demonstrate that the community meets the underserved definition in E.O. 13985. The area served by the project, southern San Joaquin Valley, is greater than 50% Latino which is an underserved community according to E.O. 13985.

Does the proposed project support tribal resilience to climate change and drought impacts or provide other tribal benefits? No tribes are in the District, so while the District strives to benefit tribes and native people wherever possible, this Project will be of no benefit to them.

Does the proposed project support Reclamation's tribal trust responsibilities or a Reclamation activity with a Tribe? Unknown.

Does the project seek to improve ecological climate change resiliency of a wetland, river, or stream to benefit to wildlife, fisheries, or habitats? The project will allow for captured water to be delivered at a later time. Thus, benefitting local water management, but also reducing demand from the SWP and CVP. By reducing demand from the Delta, the project will be supporting both the California Bay-Delta Conservation Plan and the San Joaquin River Restoration Program. The project in turn will benefit the Chinook Salmon, the federally endangered Delta Smelt, and the Longfin Smelt.

What are the types and quantities of environmental benefits provided, such as the types of species and the numbers benefited, acreage of habitat improved, restored, or protected, or the amount of additional stream flow added? How were these benefits calculated? The proposed Project seeks to implement approximately 10 Barn Owl boxes around the Project site in order to provide a safe and suitable habitat for owl nesting, while also providing rodent control for the Project and surrounding agricultural fields. A family of Barn Owls can consume thousands of rodents during a season, offering a natural alternative to rodenticides that are damaging to wildlife and the surrounding environment. Barn Owls are often found in and near agricultural fields and often nest in cavities such as holes in trees, burrows, and often human-made structures. The addition of Barn Owl boxes dispersed around approximately 270 acres of the Project site will greatly benefit the surrounding owl population, as Barn Owl habitats are often threatened by changes in agricultural fields. If each Barn Owl box can house up to 6 owl nestlings, then the proposed Project can provide additional habitat for up to 60 Barn Owls.

Will the proposed project reduce the likelihood of a species listing or otherwise improve the species status? Because the proposed Project site is mostly developed agriculture and recharge basin land cover, the site lacks native plant communities and special-status plant species. Therefore, no impacts to special-status plants or natural communities are expected to occur from implementing the proposed Project. Special status wildlife species that may have the potential to be impacted by the proposed Project include burrowing owl, Swainson's hawk, tricolored blackbird, and San Joaquin kit fox; however, the proposed Project is not expected to result in a substantial loss of habitat that would affect the ability of species to disperse throughout the proposed project site and surrounding habitats.

Will the project assist States and water users in complying with interstate compacts? The project will not provide any direct assistance to States and water users in complying with interstate compacts. Rosedale does participate in exchanges with water agencies who have rights to the Colorado River (Coachella Valley Water District, Metropolitan Water District).

Will the project benefit multiple sectors and/or users? Besides groundwater recharge, actual land use surrounding the Project area is mainly characterized by intensive agricultural activity. The proposed Project seeks to provide a reliable supply of water during periods of drought by recharging imported water during wet periods for later extraction. As water supplies become more limited, agricultural activity within and neighboring the District will be in need of a reliable water supply for irrigation. The proposed Project will have the ability to offset the high energy intensity of SWP deliveries in the summer and fall, and augment water supplies for Rosedale, as well as state, federal, and local entity partnerships when needed.

Will the project benefit a larger initiative to address sustainability of water supplies? The District has a plan set in place to reach SGMA requirements for drought preparedness, see SGMA Fact Sheet in Appendix G. With benchmarks set for projects and management actions the District plans to achieve sustainability as early as 2040. Rosedale's main path to sustainability has to do with the construction and implementation of projects. This project is extremely important because it can secure new partners, and with that, new opportunities to bring in water supplies. DWR has set guidelines for climate change in the next 50 years and how it will affect

the availability of water supplies. The demands and the projections have both been adjusted in the drought plan, and this project addresses those future water projections with climate change over a 50-year span.

1.5.3 *Evaluation Criteria C - E.1.3. Drought Planning and Preparedness*

Attach a copy of the applicable drought plan, or sections of the plan, as an appendix to your application. Rosedale-Rio Bravo Water Storage District has a comprehensive Groundwater Sustainability (SGMA) Plan that was submitted to DWR in 2020. This plan outlines a path to a sustainable water supply (drought, wet, and normal conditions) by 2040. The District has taken many considerations when writing this plan, including mitigation for severe drought periods, groundwater management plans, groundwater pumping restrictions, and climate change considerations over the next 50 years. See Appendix G for a copy of Rosedale's SGMA fact sheet. The full report can be found at https://www.rrbwsd.com/rosedale-groundwater-sustainability-planning.

Explain how the applicable plan addresses drought. As briefly mentioned in Section 1.5.1, the Rosedale-Rio Bravo Water Storage District has established the Rosedale-Rio Bravo Management Area ("RRBMA"), as part of multiple management areas that fall under the purview of the Kern Groundwater Authority Groundwater Sustainability Agency ("KGA", "GSA") for the purpose of complying with landmark SGMA requirements and addressing drought conditions in the Kern County Subbasin. Within the RRBMA there are approximately 40,000 acres of District land and 6,000 acres of non-District land ("White Lands"). Two advisory groups have been developed to offer collaboration in the management of groundwater sustainability: the White Lands Advisory Committee, made up of stakeholders not in the District, and the RRBMA Advisory Committee, made up of stakeholders within the District. These two advisory groups are made up of representatives from four key stakeholder groups: Agricultural, Urban, White Lands, Environmental justice, and Groundwater Banking. Meetings with these groups are held every other month and are geared towards the implementation of groundwater sustainability planning initiatives, drought preparedness, and discussions regarding the needs of the region.

As a result of historical and recent drought conditions, the RRBMA has projected a potential long-term water supply deficiency of about 20,116 AFY. Briefly mentioned in Section 1.5.2, DWR has set forth guidelines for climate change in the next 50 years and how it will impact the availability of water supplies. Climate change assessments included in RRBMA drought plan are adjusted according to these DWR guidelines and best available science that evaluates water supply vulnerabilities during drought. The RRBMA seeks to eliminate water supply deficiency over the next 20 years in a regressive fashion (more implementation over the first 10 years). Rosedale, with the participation of both advisory committees, are working together to develop and implement existing and future management actions and projects, such as the proposed Groundwater Banking Recovery Project, to bolster drought resiliency efforts in response to climate change stressors.

In conjunction with Rosedale's existing banking projects and groundwater sustainability management actions, the proposed Project will assist state, federal, and other local entity

partnerships while supporting the long-term drought planning effort set forth in the RRBMA GSP. The Project will be achieved by providing recovery and return capacity for the delivery of banked supply in a dry year. This will improve drought resiliency efforts by meeting return obligations and reducing demand on stressed SWP, CVP, and Kern River supplies, as well as improve operational efficiency, flexibility, and enhance supply reliability.

Describe how your proposed drought resiliency project is supported by an existing drought plan. The proposed Project is supported within Rosedale's existing GSP. Various projects, management actions, and adaptive management are detailed in the plan in order to meet measurable objectives, achieve sustainability, and bolster drought resiliency. All the considered projects and management actions help the RRBMA achieve its measurable objective goals for chronic lowering of groundwater levels, reduction in groundwater storage, degraded water quality, and land subsidence. For each project, conservative assumptions as to average annual yield are provided, recognizing that there will be more competition for supplies moving forward than in the past.

DWR has determined the Kern County Subbasin a critically over drafted subbasin of high and medium priority. SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. In combination with existing and future recharge projects and management actions, the proposed Project will assist in addressing basin prioritization set forth by DWR and SGMA requirements.

1.5.4 *Evaluation Criteria D - E.1.4. Severity of Actual or Potential Drought Impacts to be addressed by the Project*

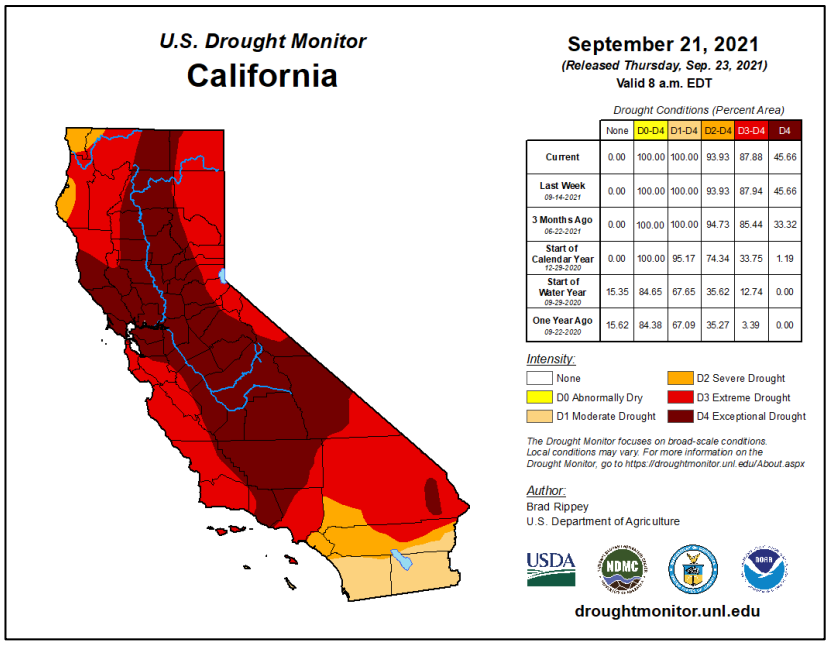
What are the ongoing or potential drought impacts to specific sectors in the project area if no action is taken, and how severe are those impacts? The project is surrounded mainly around the agricultural industry and the impacts from the Sustainable Groundwater Management Act (SGMA). To the extent that water levels fall another 50 feet below previous drought conditions, additional monetary impacts of $640M will be reconciled by district, agricultural, industrial, and municipal water users. These impacts are water availability and quality driven. Ongoing environmental impacts are addressed by SGMA and have significant impacts on the agriculture industry. Rosedale also participates in a Joint Operating Committee (JOC) which is a collective group of local water districts and agencies that aim to mitigate the loss of domestic well water use due to dropping groundwater levels. Along with the large monetary obligation, landowners will be provided less water, and be required to fallow more land to reduce demand on the groundwater basin. In the years 2012 through 2016 the entire Kern County Basin suffered a historical drought. Due to the water demand and lack of supply the groundwater aquifer endured significant losses, some water levels fell 200 feet in just four years. Fortunately, good hydrology and proactive efforts similar to this proposed project have helped water levels recover to an extent.

Describe existing or potential drought conditions in the project area. The State of California and Kern County have entered a state of drought emergency for a second year (2020-2021). Due to recent warm temperatures, dry soils, and sparse rainfall, the expected runoff water from

snowmelt in the Sierra Nevada's have resulted in an unanticipated reduction of water supplies, with deliveries from the SWP reduced to five percent allocations. Water supplies in major reservoirs throughout the state are at low levels and legal and environmental restrictions have impaired the SWP's ability to move water through the Delta.

The June 1, 2021 forecast issued by DWR for the Kern River runoff during the April through July snowmelt period was 17 percent of average, or approximately 80,000 acre-feet (af) into Isabella Reservoir. As of early July, the Northern Sierra Precipitation Eight-Station Index had received 23.2 inches of precipitation, or approximately 46 percent of average; the precipitation measured during January-February ranks as one of the lowest totals during that two-month span in the entire record of the Eight-Station Index; as of mid-June, all Sierra snow had essentially melted.

Figure 7: NDMC California Drought Monitor 2021



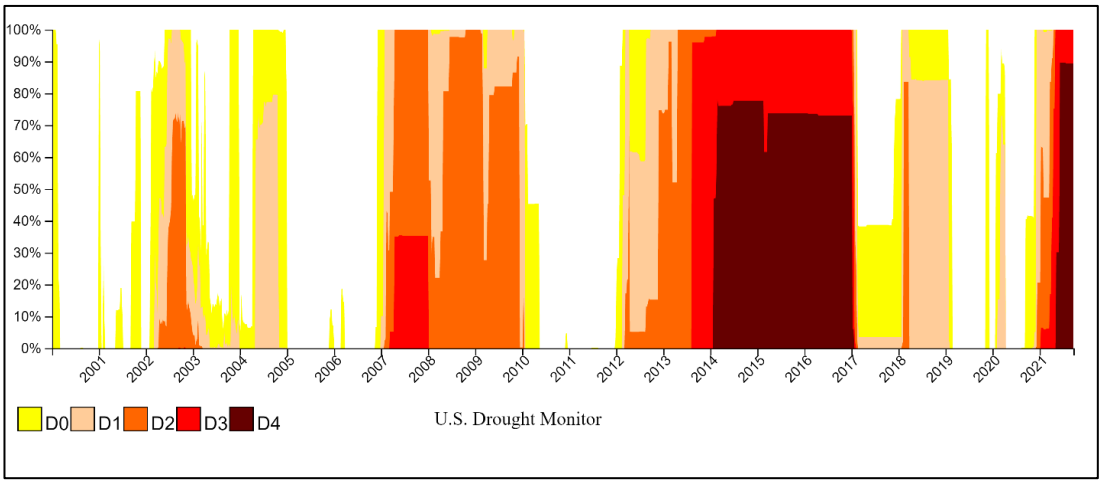


Figure 8: NDMC Kern County Drought Conditions (2000-2021)

According to the National Drought Mitigation Center ("NDMC"), the proposed Project area is currently undergoing exceptional drought (category D4) and has previously suffered exceptional drought from the years 2014-2017 (see Figures 7 and 8). During periods of drought, irrigation, municipal, and water storage districts often meet shortfalls in surface water supplies by pumping groundwater. Sustained groundwater pumping has contributed to land subsidence and decreases in groundwater elevation within areas of the Kern County subbasin. Although the Project area is not currently experiencing significant land subsidence and current groundwater levels are remaining just above minimum thresholds, as previously described in Section 1.5.1, Rosedale seeks to prepare and bolster drought resiliency measures in order to mitigate the effects of drought conditions within the Kern County subbasin.

Due to the above-described hydrology, limited water supplies were expected for this summer and fall. Rosedale has determined that full utilization of local water resources and current banking programs are insufficient to meet future water demands without implementing drought emergency measures. Rosedale has also determined that it is necessary to advance implementation of GSP management actions to help mitigate the existence of declined water levels in the groundwater basin. Benefits of the proposed Project will be experienced throughout the region. The ability to return banked wet year supplies during periods of drought will be able to meet return requirements and irrigation demands, increasing both supply reliability and economic viability.

1.5.5 *Evaluation Criteria E - E.1.5. Project Implementation*

Describe the implementation plan of the proposed project. With funding assistance from the Bureau of Reclamation in connection with a 2022 WaterSMART Grant, the District will proceed with implementing the proposed Project according to the estimated schedule. Please see Appendix B for a proposed Project Schedule.

It is the intention of the District to satisfy all CEQA and NEPA compliance requirements in January 2022 to February 2023, prior to any project groundbreaking activities of project components proposed under the project. An Environmental Impact Report (EIR) for similar components included in this grant application was circulated and certified in 2015 at a programmatic level. Supplemental CEQA review may be required.

Continued Project planning designs and procurement will be performed concurrently with project level CEQA and NEPA process. The District will contract with applicable engineering design firms to complete designs and specifications by January 2023. The bidding and contract administration will be handled by the District, while an appropriate design firm will be contracted by the District for the appropriate sections. Wherever possible, and as the schedule will allow, project component tasks are staggered to make the best use of time but as with all large projects efficient planning is required and therefore parallel efforts and overlap are unavoidable.

Once the project is CEQA and NEPA compliant, the construction activities for components to include ground disturbing activities will begin. Additionally, project activity will have to be

coordinated with normal District operations. The District plans to begin construction of the projects as early as February 2023 and finish construction by December 2023. Please refer to Appendix B for the full schedule.

Besides CEQA and NEPA requirements there are no other administrative actions required apart from the actions required by the SGMA legislation. Based on prior projects with Reclamation and other similar departments, no additional compliance costs have or need to be discussed.

Describe any permits that will be required, along with the process for obtaining such permits. There are two main required permits for this project. The first is required of all projects in California with ground disturbing activities, routine submissions of the Stormwater Pollution Prevention Plan (SWPPP). The other permit will be the well drilling permits requested by the County of Kern Environmental Health Department required for any drilling or constructing of new wells in the county. This is always handled by the well drilling contractor and never by the District. Due to the nature and location of selected project sites, we expect that no third-party approval or permits will be required from the state to break ground for the Project.

Identify and describe any engineering or design work performed specifically in support of the proposed project. The District will utilize a hydrogeologist as well as local groundwater knowledge and a civil engineering design consultant to create the wells, pumps, and conveyance design. Due to the fact that Rosedale has drilled similar wells in the area, the District anticipates minimal costs for the well design. Pump testing will assist in the pump and motor size design. The design work for the conveyance will be completed by a local engineering firm with local expertise, and who is familiar with District facilities.

Describe any new policies or administrative actions required to implement the project. The District does not anticipate any new policies or administrative actions required to implement the project.

1.5.6 *Evaluation Criteria F - E.1.6. Nexus to Reclamation*

Does the applicant have a water service, repayment, or O&M contract with Reclamation? The District receives Reclamation project water through the Central Valley Project via the Friant-Kern Canal and California Aqueduct. While the District does receive Reclamation water, the project only resides on District property, and doesn't involve any Reclamation facilities.

Will the proposed work benefit a Reclamation project area or activity? The District shares the Kern County Sub-basin with many Federal contract districts. Increases in Rosedale's operational efficiencies due to the proposed Project will indirectly and directly benefit multiple Federal contract districts. Water supplies banked in wet years can be returned to Federal contract districts via banking and exchange agreements, while reducing groundwater recovery costs that they pay as part of those project agreements. The proposed Project is also located within the CVP Place of Use and will help fulfill obligations to both state and federal water contractors.

Is the applicant a Tribe? No, the applicant is not a Tribe.

2. Project Budget

2.1 Funding Plan

1. ***How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).*** The District's cost-match will be covered by the District's capital facility improvement portion of the regular budget. The District maintains a capital improvement account and receives revenue through water sales and banking operations as well as land assessments.

2. ***Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs.*** The District will not assess any in-kind contributions to project costs.

3. ***What project expenses have been incurred?*** The District has incurred feasibility and conceptual design consultant costs from Zeiders Consulting and Harder Company for about $50,000.

4. ***Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment***. No funding partners are involved in the Project; thus, no letters of commitment were necessary.

5. ***Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards your 50 percent cost share unless otherwise allowed by statute.*** There are currently no other Federal partners for this proposed Project.

6. ***Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.*** There are no pending funding requests for this Project.

Table 1. Summary of non-Federal and Federal funding sources

Funding Source	**Funding Amount**
Non-Federal Entities	
Rosedale-Rio Bravo Water Storage District	$2,342,862
Rosedale-Rio Bravo Water Storage District (in-kind)	$ 0
Non-Federal Subtotal	**$2,342,862**
Requested Reclamation Funding	**$ 2,000,000**
Total Project Funding	***$4,342,862***

Table 2. Funding Group II funding request

Funding Group II Request			
	Year 1 (FY 2022)	**Year 2 (FY 2023)**	**Year 3 (FY 2024)**
Funding Requested	$500,000	$750,000	$750,000

Currently, there is no other funding request submitted or funding applications pending approval. The Project is a substantial construction project where Reclamation funding would increase the likelihood of successful project completion and continue a RRBWSD and USBR partnership. The Project directly makes available a quantifiable amount of additional water that can be used to meet increasing water demand. Although federal assistance is requested, if USBR declined to participate in the Project, RRBWSD would continue to seek other funding opportunities to move forward and attempt to complete the Project.

2.2 Budget Proposal

The estimated cost of the project including feasibility study, environmental assessments, all associated construction cost, CEQA documents and permits is $4,342,862. Please refer to Table 4. below for detailed estimated cost. RRBWSD is requesting approximately **$2,000,000** (or about 46% of total project costs) in federal funding from USBR for this Project. The Project will directly provide drought resiliency beyond twenty years and RRBWSD is estimated to provide 54% of project funding if the requested award amount is granted. At this time, RRBWSD is solely responsible for the funding of the Project.

Table 3. Funding Sources

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding	54%	$ 2,342,862
Reclamation Funding	46%	$ 2,000,000
Other Federal Funding	0%	$ 0
Total	**100%**	**$ 4,342,862**

Table 4. Budget Proposal

Item		Budget Item Description	RRBWSD Project Costs $/Unit	Unit	QTY	Budget RRBWSD Funding	Reclamation Funding	Total	Explanation of Estimate
1		*Contractual / Construction*						3,926,870	
	a	Well Drilling	528,125	LS	3	884,375	700,000	1,584,375	engineers est.
	b	Well Equipping	373,059	LS	3	369,177	750,000	1,119,177	engineers est.
	c	Conveyance / Tie-in	1,123,319	LS	1	587,319	536,000	1,123,319	engineers est.
	d	Environmental Projects	10,000	LS	10	100,000		100,000	engineers est.
2		*Environmental and Regulatory Compliance*						90,000	
	a	Reclamation NEPA Review	14,000	LS	1	0	14,000	14,000	USBR estimate
	b	Environmental studies, surveys, groundwater impact analysis, and biological education	76,000	LS	1	76,000		76,000	prior project
		E&R percent of total cost						2%	
3		*Engineering and Administration*						325,992	
	a	Engineering Design	192,179	LS	1	192,179		192,179	past project
	b	Staking and Testing	31,634	LS	1	31,634		31,634	past project
	c	Inspection	102,179	LS	1	102,179		102,179	past project
4		*Total*						4,342,862	0
	a	RRBWSD Contribution				2,342,862			
	b	Reclamation Contribution					2,000,000		
	c	Percent Funded by RRBWSD						54%	

2.3 Budget Narrative

The following is a description of the line items in the above table.

Contractual / Construction – Work in this section will be done by contractors and consultants. All required materials as shown in detailed project budgets from the feasibility study are shown in Appendices C and D.

Environmental and Regulatory Compliance - According to previous FOA guidelines, "…a minimum amount budgeted for environmental compliance should be equal to 1-2 percent of the total project costs." The District intends to work with Reclamation to determine the potential environmental effects the proposed Project may have in relation to NEPA, NHPA, ESA, and the Clean Water Act to ensure compliance with all applicable environmental laws. Based on inspection of the FOA, it is understood that Reclamation will determine who will perform the work under this category (i.e. Reclamation, the Applicant, or a consultant). For purposes of this grant proposal, based on previous projects performed by the District, it was assumed that the work would be performed at an estimated cost equal to 2% of the total project costs. The District will provide all funding related to environmental and regulatory compliance for the Project in regards to CEQA requirements.

a) This is the estimated cost to conduct project biological and cultural surveys by qualified consultants as required for CEQA and NEPA compliance.
b) This is the estimated cost to prepare all necessary studies, reports and other documents for the project. This includes the cost for environmental consultants.

Engineering and Administration - This is the estimated cost for engineering design and specifications for facility design, surveying and construction management (including inspection) as well as contractor construction activities for each component. Design is estimated at about 4% of total project costs, surveying and testing 1%, and inspection 2% for a combined 7.5% of project costs. This is consistent with prior District projects.

Total – These are the totals for RRBWSD contribution, Reclamation contribution, and the total estimated cost of the project.

2.4 Budget Form

Included in Appendix H is Form SF-424C, Budget Information-Construction Programs as specified by the FOA.

3. Environmental and Cultural Resources Compliance

The Groundwater Banking and Recovery Project consists of two project components, the McCaslin and Bowling groundwater banking areas, all of which are located within Rosedale's District boundaries and adjacent to the Goose Lake Channel. In general, all potential project sites and associated project activity will be located or conducted on existing facilities, right-of-ways, and lands that are routinely used, operated, and maintained. RRBWSD maintains and operates similar facilities on a regular basis. Maintenance and operation activities include, but are not limited to, grading canal roads and canal banks, repairing or replacing head gates, silt and vegetation maintenance, pump removal and repairs, ditch tending, vehicle and personnel traffic.

RRBWSD has certified an Environmental Impact Report ("EIR") according to the regulations and guidelines of the California Environmental Quality Act ("CEQA") on a programmatic basis and will proceed as required for project level CEQA compliance. Additionally, National Environmental Policy Act ("NEPA") compliance will be required if Federal funds are applied to the project. RRBWSD will assist and support the Bureau of Reclamation in the NEPA compliance process as necessary.

3.1 Impacts to Surrounding Environment

The proposed Project components are both near and within developed agriculture and recharge basin land cover. The area of construction activities for the Project is relatively small, as the only earth-disturbing activities for the Project include the construction of three new wells and pipelines on previously developed recharge basins and farm roadways, and the installation of 8-10 Barn Owl boxes. RRBWSD, as well as local contractors, have extensive experience with excavating activities and utilize best management practices concerning dust and erosion control. RRBWSD and/or contractors would access a water truck or portable pumps for necessary dust suppression. Dust impacts to the environment will be minimal, but will be evaluated according to CEQA and NEPA requirements.

All earth disturbing activities will be done absent of local irrigation or drain water in the affected canals or basins. Disturbed earth will have no contact with flowing water and therefore will have no impact on irrigation supply water or drain water. Project activities would not occur on natural streams or river channels. Additionally, Rosedale is in the process of conducting a groundwater impact analysis for the proposed additional recovery facilities at the McCaslin and Bowling recharge areas in order to evaluate potential changes in groundwater levels associated with the Project. Introduction of pumped groundwater from the Project into conveyance facilities, such as the California Aqueduct and CVC, would comply with any existing CVC and DWR's water quality policy provisions and current water quality criteria. Thus, there are no anticipated impacts to water quality and quantity from the implementation of the proposed Project, but potential impacts may be further evaluated according to CEQA and NEPA requirements.

As previously stated, all project activities will occur on routinely disturbed ground and therefore will have minimal or no impact to animal habitat. The presence of working facilities along with routine RRBWSD and farmer activities make it unlikely for animals to use project sites as habitat. However, the addition of Barn Owl boxes to the proposed Project site will provide a safe and suitable habitat for owl nesting, while also providing a natural alternative to rodent control for the Project and surrounding agricultural fields. Potential impacts to animal habitats will be evaluated according to CEQA and NEPA requirements. Prior to and throughout the duration of construction of the Project, any necessary biological or cultural surveys will be conducted by qualified personnel as required for CEQA and NEPA compliance.

3.2 Endangered or Threatened Species

Although all Project activities are going to be conducted on land that is routinely disturbed by farming operations and existing recharge basin land cover, Kern County is known to have habitat that can support endangered and threatened species. Based on previous biological surveys of the area, listed below are several special-status species that have been documented as having the potential to occur in or near the Project vicinity, see attached Appendix I for the McCaslin property biota report. However, by the limited nature of construction of the Project and frequent disturbance of land due to agricultural practices, the District does not expect to have any impact on these species or corresponding suitable habitat within the project sites.

1. Burrowing owl
2. Swainson's hawk
3. White-tailed kite
4. Western pond turtle
5. American badger
6. San Joaquin kit fox

Potential impacts to Endangered or Threatened Species will be evaluated according to CEQA and NEPA requirements. As part of the environmental work, the District will retain a certified biologist to conduct a biological reconnaissance survey and prepare a report to evaluate potential impacts to biological resources within the project sites. If potential impacts are identified, the District will follow recommendations by the biologist to reduce those impacts to a less than significant level.

3.3 Wetlands

According to the U.S. Fish and Wildlife Service National Wetlands Inventory, there are no wetlands within Project boundaries. There are, however, wetlands indicated in the nearby vicinity of the Project site, but they are not expected to be negatively impacted by the Project due to the limited nature of the ground disturbance.

3.4 Water Delivery System

RRBWSD operates a surface water delivery system with more than 25 miles of earthen canals. The water delivery system was developed in the 1970's. Many of the canal alignments have been realigned or modified over that time. Additionally, almost all of the check and gate structures have been replaced or updated over the same period in order to maintain a working water delivery system. Due to increases in water demand over time, additional water delivery features and enlargements have been constructed for better water management and increased operational flexibility.

3.5 Modification to System Features

There will be no modifications to an existing irrigation distribution system.

3.6 National Register of Historic Places

There are no registered historical landmarks within the project boundaries. RRBWSD does not have any knowledge of any other items that are listed or may be eligible for listing under the National Register of Historic Places. If Reclamation deems necessary, the District will retain a private cultural resources management consultant or arrange for Reclamation staff to carry out a consultation to evaluate if any buildings or structures are eligible under the National Register of Historic Places. The expectation is that no historical landmarks will be identified, as the Project will be constructed near actively disturbed agricultural lands and within active recharge basin land cover.

3.7 Archeological Sites

RRBWSD does not have any knowledge of known archeological sites within or in the vicinity of the proposed Project sites. A Class III Inventory/Phase I Survey was conducted by a cultural resources consultant for the McCaslin property in October of 2020, see attached Appendix J for the McCaslin property cultural report. The survey results determined a No Effect on Historic Properties/No Adverse Impact on Historical Resources. There has been over a century of ongoing farming operations and it is very unlikely that archaeological sites would be currently located or discovered within district boundaries. If Reclamation deems necessary, the District will work with Reclamation cultural resources staff to obtain clearance for archaeological sites within the project area. The District will retain a private cultural resources management consultant or arrange for Reclamation staff to carry out a consultation to conduct a Phase I intensive pedestrian cultural resource survey, and a cultural resources records search and Native American consultation to evaluate any impacts to cultural sites. Impacts to cultural resources are not expected. Nevertheless, the District is prepared to implement any necessary mitigation measures should cultural resources be identified for any component of the Project.

3.8 Other Environmental Concerns

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations? The proposed Project will not have a disproportionately high and adverse effect on low income or minority populations. Construction of the Project will support the agricultural-based economy in the Southern San Joaquin Valley and should only have positive impacts on low income or minority persons living in the region.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands? The proposed Project will not limit access to ceremonial use of Indian sacred site or result in other impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area? The proposed Project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native species in the region.

4. Required Permits or Approvals

Due to the nature and location of selected project sites, we expect that no third-party approval or permits will be required from the state in order to break ground for the Project. Contractors will be required to prepare and submit routine stormwater pollution prevention plans (SWPPP for EPA) and well drilling permits (County of Kern Environmental Health Department).

5. Official Resolution

The Rosedale-Rio Bravo Water Storage District Board of Directors approved Resolution No. 521 on September 14th, 2021.

RESOLUTION NO. 521

RESOLUTION OF THE BOARD OF DIRECTORS OF THE ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT WATER SMART GRANT APPLICATION

WHEREAS, Rosedale-Rio Bravo Water Storage District has prepared an application to apply for federal funding from the United States Department of the Interior, Bureau of Reclamation (Reclamation) to assist in the funding of certain Drought Resiliency Projects; and

WHEREAS, the funding opportunity provided by Reclamation through their Grant Program entitled "WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2022" Funding Opportunity Announcement No. is R22AS00020; and

WHEREAS, it is in the interests of Rosedale-Rio Bravo Water Storage District to apply for funding to assist with the costs of the construction of a District project ("the Groundwater Banking Recovery Project") which involves the drilling and equipping of 3 groundwater wells to improve overall drought resiliency by increasing groundwater recovery and flexibility in drought years.

THEREFORE, BE IT RESOLVED, the Rosedale-Rio Bravo Water Storage District Board of Directors have reviewed the application and support its submittal for Reclamation assisted funding. The Board of Directors approve Dan Bartel, General Manager-Engineer, as the official with legal authority to enter into a cooperative agreement with Reclamation and confirm that Rosedale-Rio Bravo Water Storage District is capable of providing the amount of funding specified in the application. Rosedale-Rio Bravo Water Storage District will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

PASSED APPROVED AND ADOPTED on this 14th day of September, 2021 by the following roll-call vote:

AYES: Directors Pierucci, Selvidge, Unruh, Millwee and Watts
NOES:
ABSENT:
ABSTAINED:

ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT

President/Board of Directors

ATTEST:

Secretary/Board of Directors

Appendix A – Project Summary Matrix

ROSEDALE -RIO BRAVO WATER STORAGE DISTRICT
PROJECT EVALUATION MATRIX

Component	Status		Financial						Implementation Complexity (Out of 10)
	Stage	Time to Full Implementation (Yrs)	Capital Cost	Annual Capital Cost	Annual O&M Cost	Total Annual Cost	Annual Water Benefit (AF)	Water Cost ($/AF)	
Kern River Intake	Complete		$ 720,000	$ 44,202	$ 14,400	$ 58,602	5,544	$ 8	3
Houghton Weir	Construction	<1	$ 1,050,000	$ 64,461	$ 21,000	$ 85,461	5,544	$ 12	5
Kern River - CVC Intake	Feasibility	2-5	$ 656,250	$ 40,288	$ 13,125	$ 53,413	2,772	$ 15	5
Nord Road Crossing Improvement	Complete		$ 500,000	$ 30,696	$ 10,000	$ 40,696	1,109	$ 28	3
West Basin Improvements	Complete		$ 300,000	$ 22,080	$ 9,000	$ 31,080	980	$ 32	2
Grimmway Ponds	Complete	<1	$ 450,000	$ 33,120	$ 40,500	$ 73,620	1,084	$ 68	2
Superior East 40 Acre Recharge Pond	Complete		$ 1,320,000	$ 97,152	$ 19,800	$ 116,952	880	$ 133	2
Stockdale East	Complete		$ 10,200,000	$ 750,720	$ 306,000	$ 1,056,720	4,158	$ 254	4
Fish Friendly Screens	Feasibility / Pilot project	7-10	$ 5,000,000	$ 306,958	$ 50,000	$ 356,958	1,000	$ 357	7
McCaslin/Bowling Recharge and Recovery	Design	1-2	$ 12,780,000	$ 940,608	$ 191,700	$ 1,132,308	2,898	$ 391	2
Onyx Ranch	Coordination	<1	$ 33,000,000	$ 1,864,000	$ 450,000	$ 2,314,000	6,000	$ 386	7
Palo Verde	Feasibility	7-10	$ 5,000,000	$ 306,958	$ 150,000	$ 456,958	1,000	$ 457	4
Western Service Area	Design	2-3	$ 5,080,000	$ 373,888	$ 152,400	$ 526,288	1,126	$ 467	3
Clifton Court Property	Feasibility	3-5	$ 8,000,000	$ 491,132	$ 240,000	$ 731,132	1,540	$ 475	5
BDCP	Environmental / Design	10-15				$ 3,000,000	5,980	$ 502	7
James R&R Project	Environmental	2-5	$ 15,750,000	$ 1,159,200	$ 472,500	$ 1,631,700	2,970	$ 549	6
Kern Fan Project	Design	2-4	$ 75,000,000	$ 5,520,000	$ 2,250,000	$ 7,770,000	9,960	$ 780	5
Sites	Environmental / Design	9-10	$ 9,706,000	$ 595,866	$ 98,000	$ 693,866	500	$ 1,388	7
Delta Wetlands	Feasibility	5-7	$ 19,175,000	$ 1,411,280	$ 575,250	$ 1,986,530	1,250	$ 1,589	7
			$ 203,687,250	**$ 14,052,609**	**$ 5,063,675**	**$ 22,116,284**	**56,294**	**$ 415**	

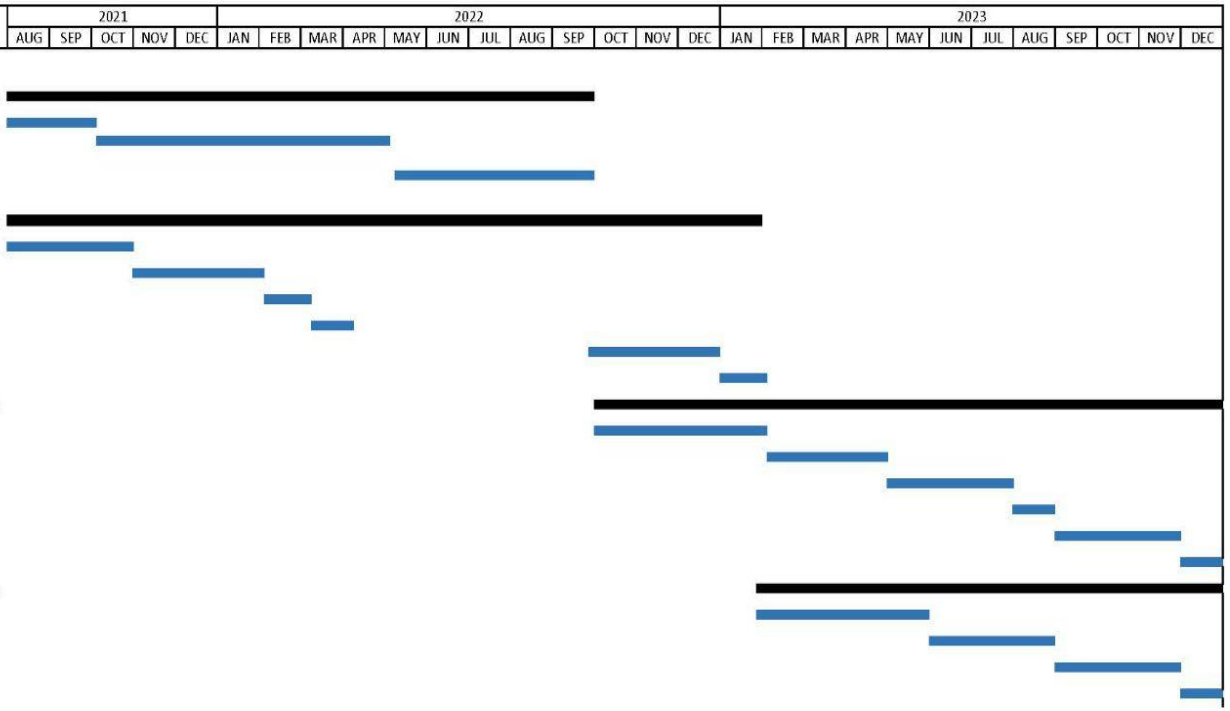
1. Scores represent level of effort required on a scale from 1 to 10, with 1 being easy and 10 being nearly impossible. Therefore, the lowest scores are the most likely to succeed and should receive the highest priority. Each category score is out of a possible 100.
2. Scores shown for CEQA represent level of effort for project implemented alone, not in combination with other projects. Final CEQA effort will be aggregate. Each level is multiplied times a difficulty factor
Sorted by $/AF

2021-09-29 fac. RRB Project Evaluation

Appendix B – Preliminary Project Schedule

Project: 2022 WaterSMART Schedule
Date: 10/2021

Task Name	Duration	Start	Finish
GROUNDWATER BANKING RECOVERY PROJECT			
USBR Grant Process	**304**	**08/01/21**	**09/30/22**
Grant Preparation	65	08/01/21	10/05/21
Award	180	10/05/21	04/03/22
Contracting	180	04/03/22	09/30/22
Environmental and Regulatory	**390**	**08/01/21**	**01/29/23**
Environmental Studies	90	08/01/21	10/30/21
Reports	90	10/30/21	01/28/22
CEQA Initial Study and Determination	30	01/28/22	02/27/22
CEQA Adoption	30	02/27/22	03/29/22
NEPA Environmental Assessment and Determination	90	10/01/22	12/30/22
NEPA Adoption	30	12/30/22	01/29/23
Well Drilling and Equipping	**450**	**10/01/22**	**12/25/23**
Design and Specifications	120	10/01/22	01/29/23
Procurement	90	01/29/23	04/29/23
Drilling	90	04/29/23	07/28/23
Pump Testing	30	07/28/23	08/27/23
Equipping	90	08/27/23	11/25/23
Inspection and Testing	30	11/25/23	12/25/23
Conveyance Facilities and Integrated Pest Management Project	**330**	**02/01/23**	**12/28/23**
Design and Specifications	90	02/01/23	05/02/23
Procurement	120	05/02/23	08/30/23
Installation	90	08/30/23	11/28/23
Inspection and Testing	30	11/28/23	12/28/23



Appendix C – Budget Backup

ROSEDALE RIO-BRAVO WATER STORAGE DISTRICT
McCaslin / Bowling Recovery Project Cost Estimate

PRELIMINARY COST ESTIMATE - CONVEYANCE

ITEM NO.	DESCRIPTION	UNIT PRICE	ESTIMATED QUANTITY	UNIT	TOTAL PRICE	COMMENTS
1	Mobilization/Demoblization	$25,000.00	1	L.S.	$25,000	Estimate
2	Develop Water Supply	$10,000.00	1	L.S.	$10,000	Estimate
3	SWPPP and PM-10 Compliance	$5,000.00	1	L.S.	$5,000	Estimate
4	Clearing and Grubbing	$1,200.00	27	ACRE	$32,400	Estimate
5	F&I 15" PVC Recovery Pipeline	$72.00	3,000.0	LF	$216,000	Estimate
6	F&I 27" PVC Recovery Pipeline	$115.00	4,015	LF	$461,725	Estimate
7	F&I 30" PVC Recovery Pipeline	$133.00	700	LF	$93,100	Estimate
8	Appurtances (45°, 90°, T's, Thrust Blocks, etc.)	$40,000.00	1	L.S.	$40,000	Estimate
9	Fresno Air Valves	$5,000.00	10	EA	$50,000	Estimate
10	Tie in to Rosedale Turnout No. 1	$20,000.00	1	L.S.	$20,000	Estimate
Goose Lake Channel Surface Water Tie-in						
11	F&I 27" BFV (8500 Grayline Valve w/SST)	$25,000.00	1	L.S.	$25,000	Estimate (30"
12	F&I 27" Appurtances (90° and Tee)	$10,000.00	1	L.S.	$10,000	Estimate
			SUBTOTAL		**$988,225**	
					$36,600.93	/acre
	Bond Costs		3	%	$29,647	
			SUBTOTAL		**$1,054,473**	
	Construction Staking and Testing		3	%	$31,634	
			SUBTOTAL		**$1,086,107**	
	Contingency		10	%	$105,447	
			SUBTOTAL		**$1,191,554**	
	Engineering, etc. (8%)		8	%	$84,358	
	TOTAL AMOUNT				**$1,275,912**	

PROJECT: ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT Date: 9/21/2021
Feature: Well Drilling
DRAFT-Preliminary

Item No.	Item Description	Quantity	Unit	Unit Price	Extension	
1.	Well Move-In, Move-Out, and Clean-up	1	EA	$ 15,000.00	$ 15,000.00	
2.	Drill Hole to 42-inch min. Diameter for Conductor Pipe	50	LF	$ 200.00	$ 10,000.00	
3.	Furnish, Install and Grout 36-inch Diameter Conductor Pipe	50	LF	$ 300.00	$ 15,000.00	
4.	Drill Pilot Hole to 18-inch max. Diameter	800	LF	$ 40.00	$ 32,000.00	
5.	Perfom E-log of Well	1	EA	$ 6,121.43	$ 6,121.43	
6.	Perform Caliper Log of Well	1	EA	$ 1,850.00	$ 1,850.00	
7.	Ream Pilot Hole to 32-inch min. Diameter (for 20" casing)	730	LF	$ 40.00	$ 29,200.00	
8.	Furnish and Install 20-inch Diameter HSLA - Corten Unperforated Well Casing	350	LF	$ 244.53	$ 85,585.50	
9.	Furnish and Install 20-inch Diameter HSLA - Corten Perforated Well Casing, Roscoe Moss FullFlo, 0.090"	450	LF	$ 336.41	$ 151,384.50	
10.	Furnish and Install Gravel Envelope	640	LF	$ 30.00	$ 19,200.00	
11.	Placement of Cement Grout Annular Seal	300	LF	$ 50.00	$ 15,000.00	
12.	Furnish and Install 3" Gravel Tube	315	LF	$ 10.79	$ 3,398.85	
13.	Furnish and Install 3" Air Vent Pipe	1	EA	$ 500.00	$ 500.00	
14.	Furnish and Install 3" Sounding Tube/Camera Port	490	LF	$ 33.16	$ 16,248.40	
15.	Swab and Airlift Well	48	HR	$ 350.00	$ 16,800.00	
16.	Develop Well - Pumping and Surging	60	HR	$ 300.00	$ 18,000.00	
17.	Test Pump of Well - Step-Drawdown and Continuous	36	HR	$ 300.00	$ 10,800.00	
18.	Video Log of Well	1	EA	$ 1,679.00	$ 1,679.00	
19.	Alignment/Deviation Survey	1	EA	$ 2,000.00	$ 2,000.00	
20.	Gyroscopic Survey	1	EA	$ 2,000.00	$ 2,000.00	
21.	Dynamic Flow Meter Survey	1	EA	$ 4,221.43	$ 4,221.43	
22.	Chemical Development	450	LF	$ 5.00	$ 2,250.00	
23.	Well Disinfection and Capping	1	EA	$ 1,000.00	$ 1,000.00	
					SUBTOTAL:	$ 459,239.11
24.	Contingency	15	%		$ 68,885.87	
					Total Construction Items:	$ 528,124.98
					3 wells	$ 1,584,374.93
25.	Design Engineering:	1	LS	$ 100,000.00	$ 100,000.00	
26.	Construction Testing:	1.5	%	$ 7,921.87	$ 8,000.00	
27.	Construction Assistance:	1	LS	$ 22,800.00	$ 23,000.00	
					Subtotal Engineering Items:	$ 131,000.00
					Total Drilling Costs (3 wells)	**$ 1,715,374.93**

PROJECT: ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT Date: 9/21/2021
Feature: Well Equipping
DRAFT-Preliminary

Item No.	Item Description	Quantity	Unit	Unit Price	Extension
1.	Well pad excavation and compaction	400	CY	$ 10.00	$ 4,000.00
2.	12' x 12' Pedestal-styule Concrete Pump Foundation	1	EA	$ 7,500.00	$ 7,500.00
3.	Furnish and install 350 HP Well Pumping Unit with Electric Motor	1	EA	$ 37,041.00	$ 37,041.00
4.	Furnish and Install 12-inch Steel Column Tube and Shaft	500	LF	$ 100.00	$ 50,000.00
5.	Furnish and Install Vertical Turbine Pumping Unit	1	EA	$ 43,073.00	$ 43,073.00
6.	Furnish and Install Suction Extension	1	EA	$ 1,250.00	$ 1,250.00
7.	Furnish and Install 12-inch steel discharge piping assembly, complete with valves, flowmeters, airvents coup	1	EA	$ 27,405.00	$ 27,405.00
8.	Furnish and install panel shade structure	1	EA	$ 8,500.00	$ 8,500.00
9.	furnish and install panel security structure	1	EA	$ 1,500.00	$ 1,500.00
10.	Furnish and Install Well Enclosure	1	EA	$ 19,130.00	$ 19,130.00
11.	Furnish and install electrical service (via pad mount transformer), metering panel, VFD control panel, instrun	1	EA	$ 125,000.00	$ 125,000.00
					$ -
					SUBTOTAL: **$ 324,399.00**
		15	%		$ 48,659.85
12.	Contingency:				Total Construction Items: **$ 373,058.85**
					3 wells **$ 1,119,176.55**
13.	Design Engineering:	1	LS	$ 50,000.00	$ 50,000.00
14.	Construction Testing:	1.5	%	$ 5,595.88	$ 6,000.00
15.	Construction Assistance:	1	LS	$ 22,800.00	$ 23,000.00
					Subtotal Engineering Items: **$ 79,000.00**
					Total Equipping Costs (3 wells) $ 1,198,176.55

Appendix D – Integrated Pest Management Project

TO: File
FROM: Rachelle Echeveria
DATE: October 1, 2021
RE: Tech Memo – Integrated Pest Management Project

The Integrated Pest Management Project ("Project") seeks to install 10 Barn Owl boxes around the McCaslin and Bowling recharge banking areas. The purpose of the Project is to provide a safe and suitable habitat for owl nesting, while also providing rodent control for the surrounding agricultural fields and to prevent recharge pond berm failure that result in financial damages and loss of critical groundwater recharge activities.

A family of Barn Owls can consume thousands of rodents during a season, offering a natural alternative to rodenticides that are damaging to wildlife and the surrounding environment. Barn Owls are often found in and near agricultural fields and often nest in cavities such as holes in trees, burrows, and often human-made structures. The addition of Barn Owl boxes dispersed across the McCaslin and Bowling recharge banking areas (approximately 270 acres in total) will greatly benefit the surrounding owl population, as Barn Owl habitats are often threatened by changes in agricultural fields.

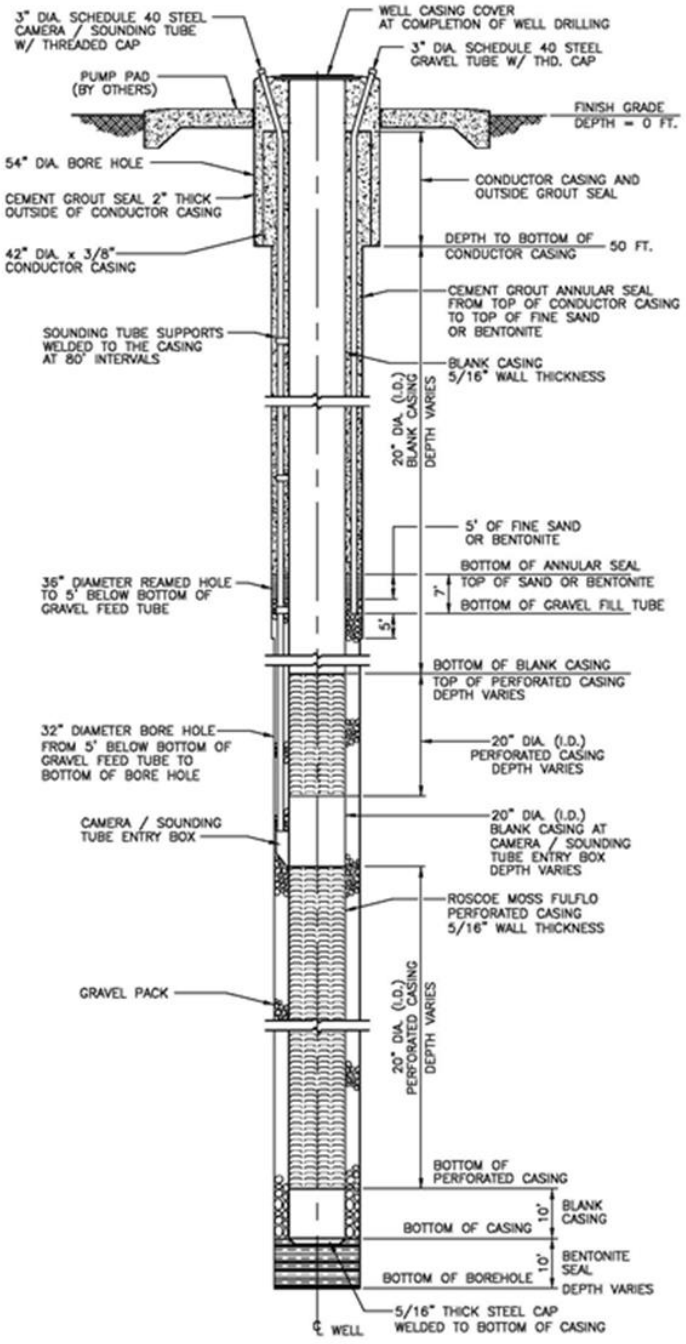
Implementing the Integrated Pest Management Project will achieve the following goals:

1. Help Barn Owls thrive by increasing the number of safe barn owl boxes deployed in the landscape and maintain them for future use
2. Lead to a reduction in harmful pesticide use
3. Build mutually beneficial relationships with the agricultural industry
4. Advance sustainability living in partnership with wildlife

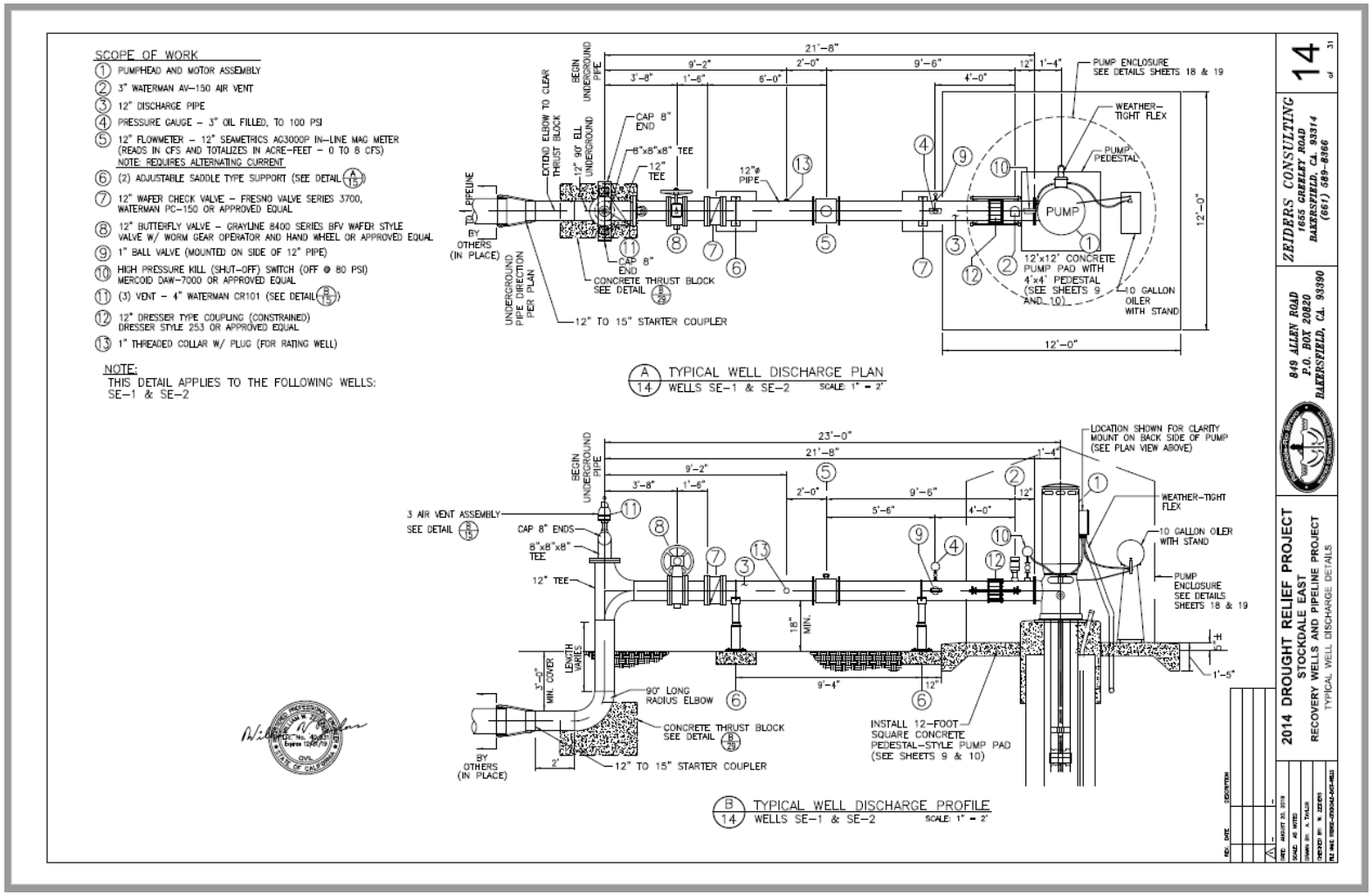
ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT

Item		Budget Item Description	$/Unit	Unit	QTY	Costs Prior
1		*Equipment*				
	a	Barn Owl Box/Pole	500	EA	10	5,000.00
	b	Barn Owl Box/Pole Installation	500	EA	10	5,000.00
	c			EA	1	0.00
	d			EA	1	0.00
	e			EA	1	0.00
	f			EA	1	0.00
2		*Contractual / Construction*				
	a			LS	1	0.00
	b			EA	1	0.00
					$	10,000.00

Appendix E – Typical Well Design Example



Appendix F – Well Equipping Layout



Appendix G – Rosedale SGMA Plan Fact Sheet

1. **SUSTAINABILITY GOAL**

The shortfall identified below is based upon projected water supplies over the implementation period(s). Rosedale has developed projects which generate over 27,000 AF of new water which will provide a balanced water supply for the Rosedale District by 2020. The Whiteland area will be balanced by 2040.

Sustainable Yield

District		
Native Yield	= 0.15 AF/Acre	= 6,268 AF
Precipitation	= 0.48 AF/Acre	= 19,854 AF
Project Water		= 70,315 AF
Demand (ITRC)		= 102,782 AF
Balance		**= - 6,345 AF**

White Land		
Native Yield	= 0.15 AF/Acre	= 1,022 AF
Precipitation	= 0.48 AF/Acre	= 2,784 AF
Project Water		= 2,165 AF
Demand (ITRC)		= 10,307 AF
Balance		**= - 4,335 AF**

2. **PROJECTS, MANAGEMENT ACTIONS & GLIDE PATH**

2020 Projects.

It is estimated that approximately **5,000 AFY** of additional supply could be developed by 2020 by the **West Basin Improvements** (60 acres) and **Stockdale East** (200 acres) recharge expansion projects. Total capital costs are approximately $13.2M and annual O&M costs are approximately $386,000. Total annualized cost is $1,341,000 or $268/AF (plus water cost).

2025 Projects.

It is estimated that approximately **11,500 AFY** could be on-line by 2025 through the implementation of **Recharge Pilot Projects**, **James Groundwater Storage Project**, and the **Onyx Project**. Total capital costs are approximately $38.8M and annual O&M costs are approximately $753,000. Total annualized cost is $3,223,000 or $280/AF (plus water cost for direct recharge projects).

2030 Projects.

It is estimated that another potential **10,000 AFY** is in development and could be on-line by 2030 through the implementation of the **Kern Fan Project**. Total capital costs are approximately $45M and annual O&M costs are approximately $1,350,000. Total annualized cost is $4,700,000 or $468/AF (plus water cost).

2035 Projects.

It is estimated that another potential **1,000 AFY** is in project development and could be on-line by 2035 (**Western Rosedale In-Lieu Service Area**). Total capital cost was approximately $5,100,000 and annual O&M costs are approximately $152,000. Total annualized cost is $526,000 or $467/AF (plus water cost)

2020 Management Actions.

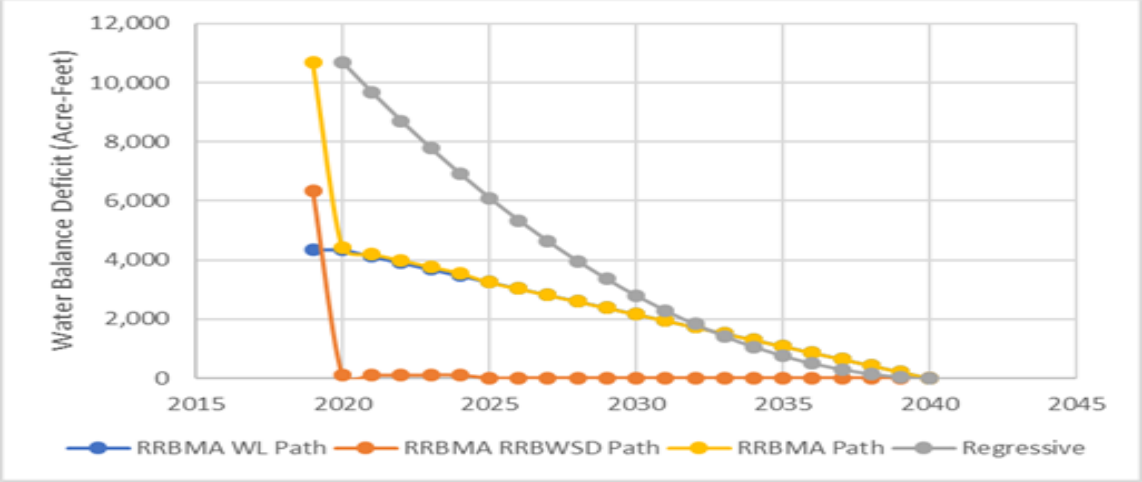
It is estimated that the **RRBWL demand reductions** will result in approximately 217 AFY of demand reduction starting in 2020. This approach would result in an imbalance reduction of **2,167 AFY** by 2030. **3rd party recharge and storage program** will result in approximately **1,250 AFY** of new supplies for the RRBMA starting in 2020.

2025 Management Actions.

It is estimated that the District demand reduction **Water Charge** could result in approximately **4,000 AFY** starting by 2025.

Glide Path

"The RRBMA has a projected a potential long-term water supply deficiency of about 10,680 AFY. The RRBMA seeks to eliminate that shortage over the next 20 years in a regressive fashion (aggressive in first 10 years) by a combination of projects and water management actions.



3. MINIMUM THRESHOLDS & MEASURABLE OBJECTIVES

Levels

Measurable Objective Depth = 148-248 ft. Minimum Threshold Depth = 256-329 ft.

Basis is the deepest levels experienced in 2012-2016 Drought.

"To the extent that further water level declines are experienced, additional reinvestment in groundwater facilities would be required and additional energy costs would be incurred, which would be deemed an undesirable result. Financial impact of a threshold scenarios of 0, 25, 50, 75, and 100 ft deeper than 2016 levels ($0M, $372M, $640M, $661M, $675M)

Quality

"The measurable objective will be any applicable beneficial use COC value that is less than the MCL and a value increase less than 10% of the 2015-2020 value. An Undesirable Result will exist if any applicable beneficial use COC value that is greater than the current MCL and value increase of greater than 10% from the 2015-2020 value."

Appendix H – SF-424C Budget Information

View Burden Statement

OMB Number: 4040-0008
Expiration Date: 02/28/2022

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	$	$	$
2. Land, structures, rights-of-way, appraisals, etc.	$	$	$
3. Relocation expenses and payments	$	$	$
4. Architectural and engineering fees	$ 325,992.00	$	$ 325,992.00
5. Other architectural and engineering fees	$	$	$
6. Project inspection fees	$	$	$
7. Site work	$	$	$
8. Demolition and removal	$	$	$
9. Construction	$ 3,926,870.00	$	$ 3,926,870.00
10. Equipment	$	$	$
11. Miscellaneous	$ 90,000.00	$	$ 90,000.00
12. SUBTOTAL *(sum of lines 1-11)*	$ 4,342,862.00	$	$ 4,342,862.00
13. Contingencies	$	$	$
14. SUBTOTAL	$ 4,342,862.00	$	$ 4,342,862.00
15. Project (program) income	$	$	$
16. TOTAL PROJECT COSTS *(subtract #15 from #14)*	$ 4,342,862.00	$	$ 4,342,862.00

FEDERAL FUNDING

17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.	Enter eligible costs from line 16c Multiply X 46 %	$ 1,997,716.52

Appendix I – Biota Report

MCCASLIN RECHARGE PONDS PROJECT

BIOLOGICAL RESOURCES ASSESSMENT

October 2020

PREPARED FOR

Rosedale Rio-Bravo Water Storage District
849 Allen Road
Bakersfield, CA 93314

PREPARED BY

SWCA Environmental Consultants
1422 Monterey Street, Suite C200
San Luis Obispo, CA 93401

Biological Resources Assessment for the McCaslin Recharge Ponds Kern County, California

Prepared for

Rosedale-Rio Bravo Water Storage District
849 Allen Road
Bakersfield, CA 93314
Attn: Dan Bartel, Assistant General Manager/Engineer

Prepared by

SWCA Environmental Consultants
1422 Monterey Street, Suite C200
San Luis Obispo, California 93401
(805) 549-7095
www.swca.com

SWCA Project No. 61929

October 12, 2020

CONTENTS

Figures

Tables

1 INTRODUCTION

1.1 Purpose and Scope

The purpose of this biological resources assessment (BRA) report is to describe and analyze the potential impacts to biological resources within the proposed work area for the proposed McCaslin Recharge Ponds (Project), which are one component to the overall Groundwater Banking and Conveyance Improvement Project, led by the Rosedale-Rio Bravo Water Storage District.

Overall, the scope of this analysis has taken into consideration sensitive habitats and special-status plant and animal species known to occur (or likely to occur) within or directly adjacent to the site, and potentially regulated jurisdictional features that may be present. The intent of this report is to assist the Rosedale-Rio Bravo Water Storage District District) with seeking grant funding with the U.S. Bureau of Reclamation for this component of the overall project, and this report would be sufficient for future environmental documents or agency coordination and consultation.

1.2 Project Description

The District recently acquired approximately 115 acres of land, known as the McCaslin Property located in the Kern County of the Southern San Joaquin Valley, west of the city of Bakersfield. In addition to the McCaslin Property, the District recently obtained an additional 80 acres that borders the northern boundary of the McCaslin Property. Herein, for ease of reference, the entire area is referred to as the Project site. As currently proposed, the District seeks to clear and grub the existing almond orchards, build recharge berms and inter-basin flow structures within the Project site. Specifically, this would include the construction of approximately 100 net acres of direct recharge ponds via the placement of 108,000 CY of compacted levees that are approximately 2-5 feet in height. As a result, upwards of 15,000 acre-feet per year (AFY) (typically 2 years in 10) of recharge water will be conveyed from pond to pond via 6 inter-basin check structures. Water would be conveyed into the facility by means of a newly constructed sluice gated intake and diversion weir within the Goose Lake Channel. Approximately 50 cubic feet per second (cfs) of intake capacity would be required to serve this site. The District's proposal for increased groundwater storage capabilities and better water management tools will more efficiently utilize surface water supplies in wet years and benefit the District's and Kern County Sub-basin's goal of groundwater sustainability.

The Project is located within the Tupman U.S. Geological Survey (USGS) 7.5-minute topographical quadrangle; Township 29 South, Range 25 East, Section 27, 28, and 34, East Mount Diablo Base and Meridian, County of Kern, State of California. Refer to Figure 1 and 2.

1.3 Biological Study Area

For the purposes of this report, the biological study area (BSA) encompasses the Project site and a visual survey buffer of 0.5-mile from the boundary of the property. The surrounding buffer of 0.5-mile was survey for the purposes of identifying any existing Swainson's hawk nests that may be in the area. Visual surveys were only conducted within property that is already owned by the District or within the legal public right-of-way. Surveys were not conducted from within any other privately owned agricultural orchards or other developed areas that were not owned by the District.

For the purposes of this analysis, SWCA considers the entire Project site will be impacted. This includes the existing plans for the McCaslin property and plans to be developed for the additional 80 acres of property adjacent and north of the McCaslin property proper.

Figure 1. Project Vicinity Map

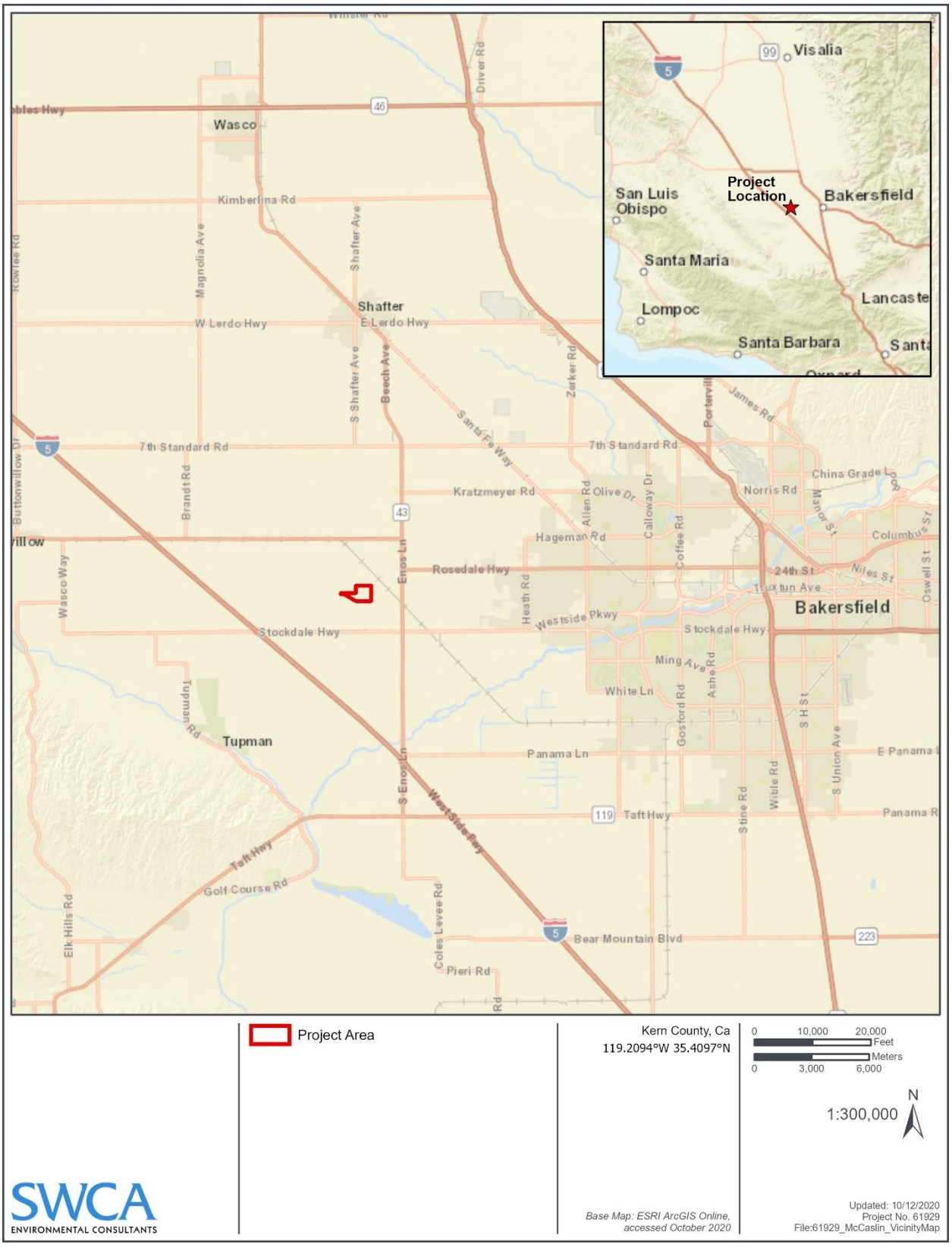
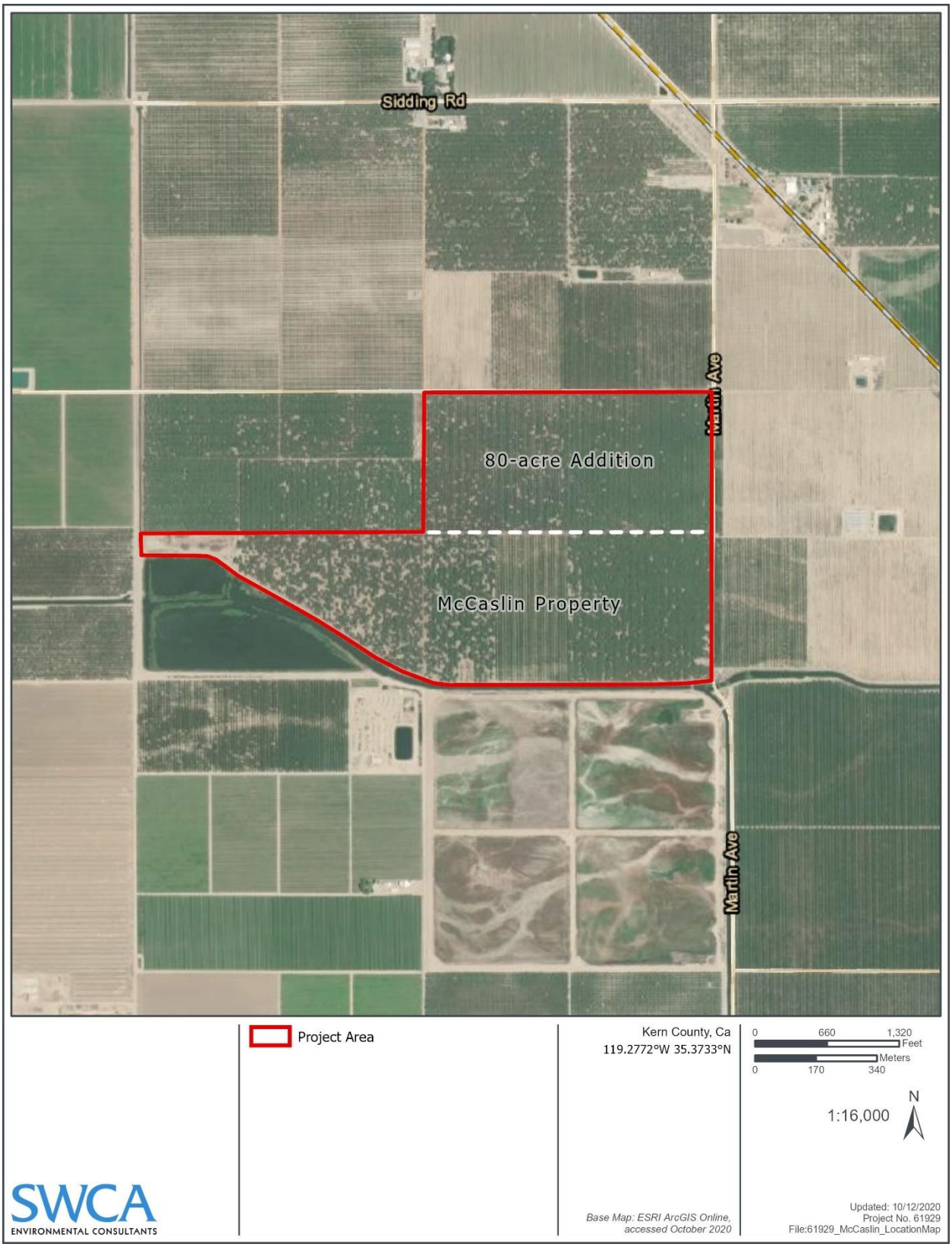


Figure 2. Project Location Map



1.4 Study Methodology

1.4.1 Database Query and Literature Review

Prior to conducting a field survey, SWCA conducted a review of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) to generate lists of special-status species with documented occurrences in the area. SWCA also utilized the CNDDB database to identify previously documented occurrences of plant and animal species within a 5-mile radius of the Project site. The CNPS Online Inventory of Rare and Endangered Plants (CNPS 2020) was also reviewed for other occurrence records of special-status plants in the region. Because these lists are regional in nature, an analysis of the range and habitat preferences of the listed species was conducted to identify which species have the potential to occur in or near the BSA. SWCA evaluated the elevation range, soil types, and habitat preferences of the identified species to determine which species have potential to occur within the BSA prior to conducting field surveys. Species with habitat present were closely considered for potential presence within the Project site. In terms of a literature search, SWCA reviewed the Stockdale Integrated Banking Project Draft Environmental Impact Report prepared by ESA (2013). SWCA also took into consideration recent studies and information generated by SWCA for the James Groundwater Recharge Project and Kern River Bike Path Western Extension, which are in the region.

1.4.2 Reconnaissance Survey

A reconnaissance level survey was conducted by Jon Claxton, SWCA Natural Resources Team Lead and Senior Biologist, Benjamin Ruiz on July 24, 2020. The survey consisted of a combination of walking and driving the perimeter of the McCaslin Property and additional 80 acres to the north. Based on discussion with the District, SWCA understands that the resource agencies may be concerned with the potential for raptor nesting within the actively farmed almond orchards. Therefore, surveyors entered the orchards to verify whether any existing raptor nests occur within the almond trees. SWCA biologists also visual surveyed the surrounding 0.5-mile buffer to identify existing raptor nest in the area. As mention in Section 1.3, these efforts were limited to property owned by the District, or public right-of-way. Surveyors utilized 10x42 binoculars and a spotting scope as needed. Within the Project site, SWCA also evaluated the area for the presence of any dens or burrowing activity within the Project site. Due to the existing site conditions, active agricultural practices, and overall lack of suitable habitat, SWCA did not conduct any focused species surveys.

2 ENVIRONMENTAL SETTING

2.1 Description of the Existing Biological and Physical Conditions

2.1.1 Biological Conditions

In total, the 195-acre Project site consists almost entirely of actively almond orchards (agriculture) and existing dirt roadways utilized for agricultural practices. Aerial basemap imagery of the study area that is contained within this report is representative of the study area conditions at the time of the survey. Specifically, the Project site consists of approximately 191 acres of actively managed almond orchards, and approximately 9.25 acres of developed/ruderal habitat. Non-native annual grassland and weedy species dominated areas of vegetation that were not almonds. Representative species include foxtail brome (*Bromus madritensis*), wild oat (*Avena fatua*), Mediterranean grass (*Schismus* spp.), rancher's fireweed (*Amsinckia menziesii*), and weedy species like black mustard (*Brassica nigra*) and Russian thistle (*Salsola tragus*). Due to the ongoing agricultural activities within the Project site, there was no evidence of small mammal burrows or dens within the Project site. The almond orchard trees were on average approximately 15-18 feet in height.

2.2 Physical Conditions

2.2.1 Topographical and Climatic Conditions

The Project site is flat and exhibits little change of topography. The elevation of the Project site is approximately 290 feet above mean sea level (AMSL). The Project site is located in the southern part of the San Joaquin Valley, which is bounded on the west by the Temblor Range, on the south by the San Emigdio and Tehachapi Mountains, on the east by the Sierra Nevada, and on the north by agricultural fields of San Joaquin Valley.

Climatic conditions in this region of the southern San Joaquin Valley are typical of a Mediterranean climate and are characterized by hot, dry summers and cold, moist winters. Average annual temperatures vary from a high mean temperature of 97 degrees Fahrenheit in July to a low mean temperature of 36 degrees Fahrenheit in December and January. Precipitation mainly occurs between October and April, with an average annual rainfall of 5.8 inches. The wettest month of the year is usually January, with an average rainfall of 1.4 inches. Yearly precipitation patterns are quite variable and this high variability coupled with extremes in temperature creates a harsh and unpredictable environment for a variety of plants and wildlife. The availability of water or soil moisture is a critical factor that determines the broad distribution of vegetation types and associated wildlife species in the region.

2.2.2 Soil Conditions

According to the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Survey (NRCS 2020) for northwestern Kern County (CA666), three different soil types occur within the Project site, including: Granoso loamy sand, (0 to 2 percent slopes), Wasco sandy loam, Wasco fine sandy loam, Westhaven fine sandy loam.

2.2.3 Hydrologic Conditions

Regional hydrology is mostly dependent upon the Kern River, which begins on the western slope of Mount Whitney in the southern Sierra Nevada and flows in a southwest direction where it terminates in the western portion of the southern San Joaquin Valley to the southwest of the Project site. Most of the Kern River water is diverted for agricultural or groundwater recharge. During extremely wet years, the Kern River reaches the flood channel located on the west of the valley floor and carries water into the Buena Vista Lake Basin.

The Project site, which is actively farmed, is currently served by a weir in the Goose Lake Channel, which receives water from the Kern River at the Kern River Turnout. The Project site is categorized by the Federal Emergency Management Agency (FEMA) as Flood Zone X, which consists of areas with a 0.2% chance of flooding. The USFWS National Wetland Inventory (NWI) identified the Goose Lake Channel as lake (lacustrine) habitat that is littoral with unconsolidated substrates that are intermittently flooded and impounded.

Figure 3. Soils Map

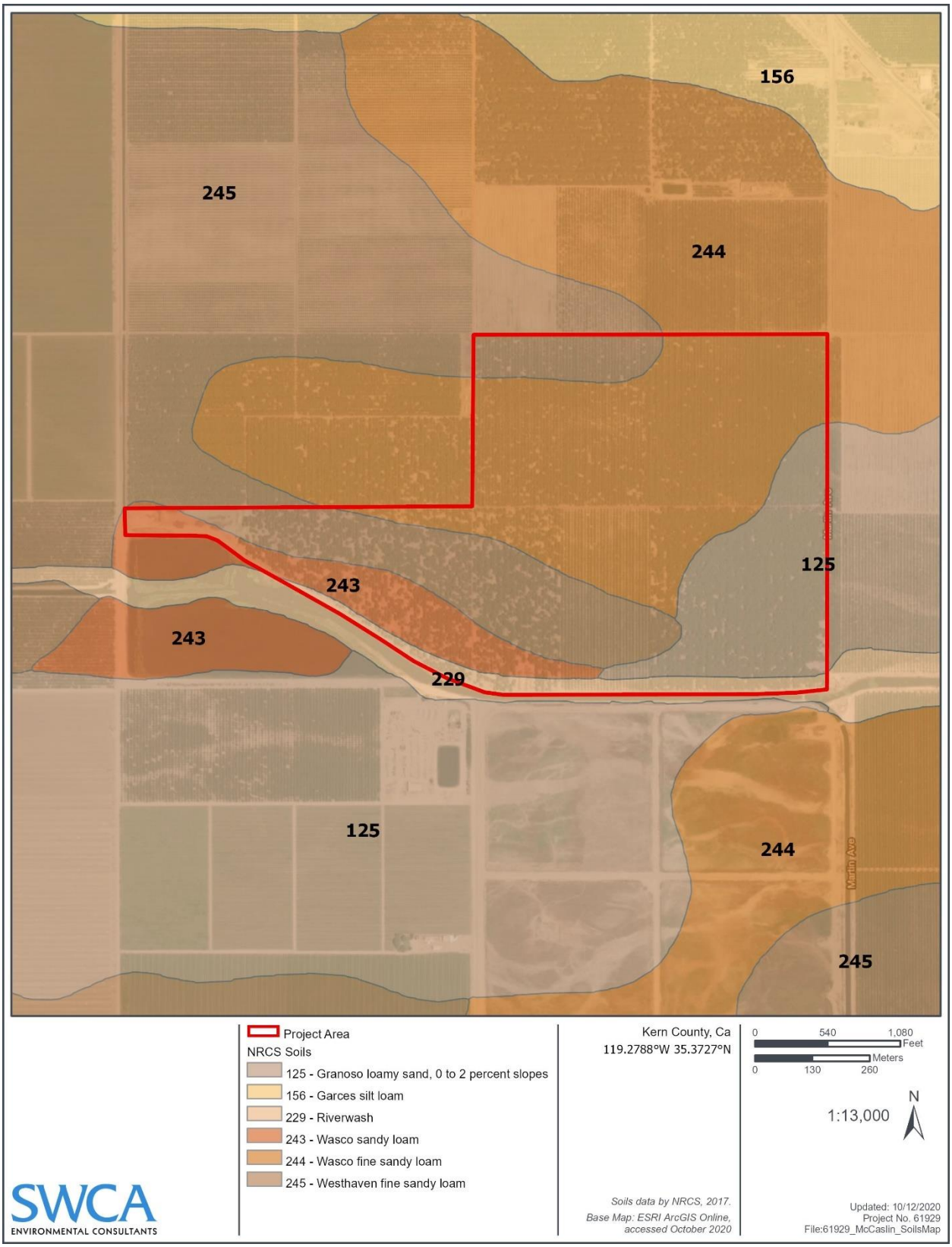
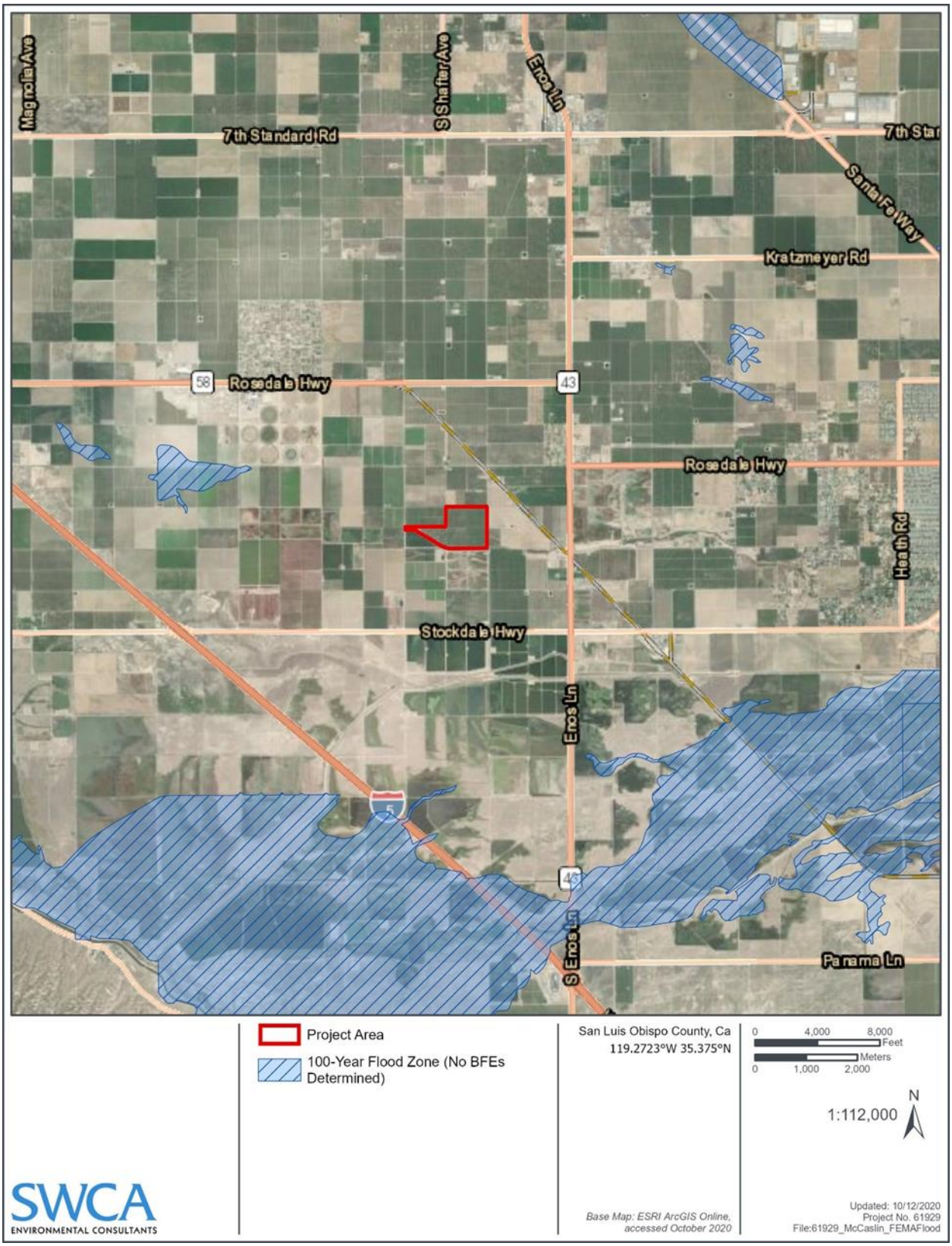


Figure 4. FEMA Flood Zones Map



2.3 Regional Species and Habitats and Natural Communities of Concern

Regional species of concern include "special-status species." Special-status species include taxa that are: 1) federally or state listed as endangered, threatened, or rare; 2) candidates for federal or state listing as endangered, threatened, or rare; 3) proposed for federal or state listing as endangered, threatened, or rare; or 4) considered special concern species by the federal government (i.e., former USFWS Federal Species of Concern) and CDFW (i.e., SSC species), or those that appear on the CNDDB Special Animals List (CNDDB 2020). Regional species of concern also include taxa afforded protection or considered sensitive under various laws (e.g., NEPA, CEQA, MBTA) or under Sections 3503 and 3503.5 of the California Fish and Game Code (e.g., nesting birds), and those taxa recognized as locally important or sensitive by CNPS (CNDDB 2020; CNPS 2020).

Habitats and natural communities of concern include those that are regulated or considered sensitive by federal, state, and/or local agencies or NEPA/CEQA. The known occurrences of sensitive species and sensitive habitats have been inventoried and mapped, to varying degrees of accuracy, by the CNDDB (CDFW 2020).

2.3.1 Regional Habitats and Natural Communities of Concern

The CNDDB (2020) documents regional habitats and natural communities of concern that are considered sensitive that occur within the search area. Figures 5 and 6 provide a graphical depiction of the location of the documented occurrences of these sensitive biological resources within a 5-mile radius to the project site. The following tables provide a general habitat description of these resources, as well as an evaluation as to whether these species and sensitive habitats have the potential to occur within the Project site. A determination of whether these habitats are present (HP) or absent (A) within the BSA helps to support the rationale.

2.3.2 Special-Status Plant Species

For the purposes of this section, special-status or "sensitive" plant species are defined as the following:

- Plants listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12 for listed plants and various notices in the Federal Register for proposed species).
- Plants that are candidates for possible future listing as threatened or endangered under the ESA.
- Plants that meet the definitions of rare or endangered species under CEQA (State CEQA Guidelines, Section 15380).
- Plants considered by the CNPS to be "rare, threatened, or endangered" in California (Lists 1B and 2 in CNPS 2013).
- Plants listed by CNPS as plants about which we need more information and plants of limited distribution (Lists 3 and 4 in CNPS 2013).
- Plants listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 CCR 670.5).
- Plants listed under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- Plants considered sensitive by other Federal agencies (i.e., U.S. Forest Service, Bureau of Land Management), state and local agencies, or jurisdictions.

Figure 5. CNDDB Plant Occurrences Map

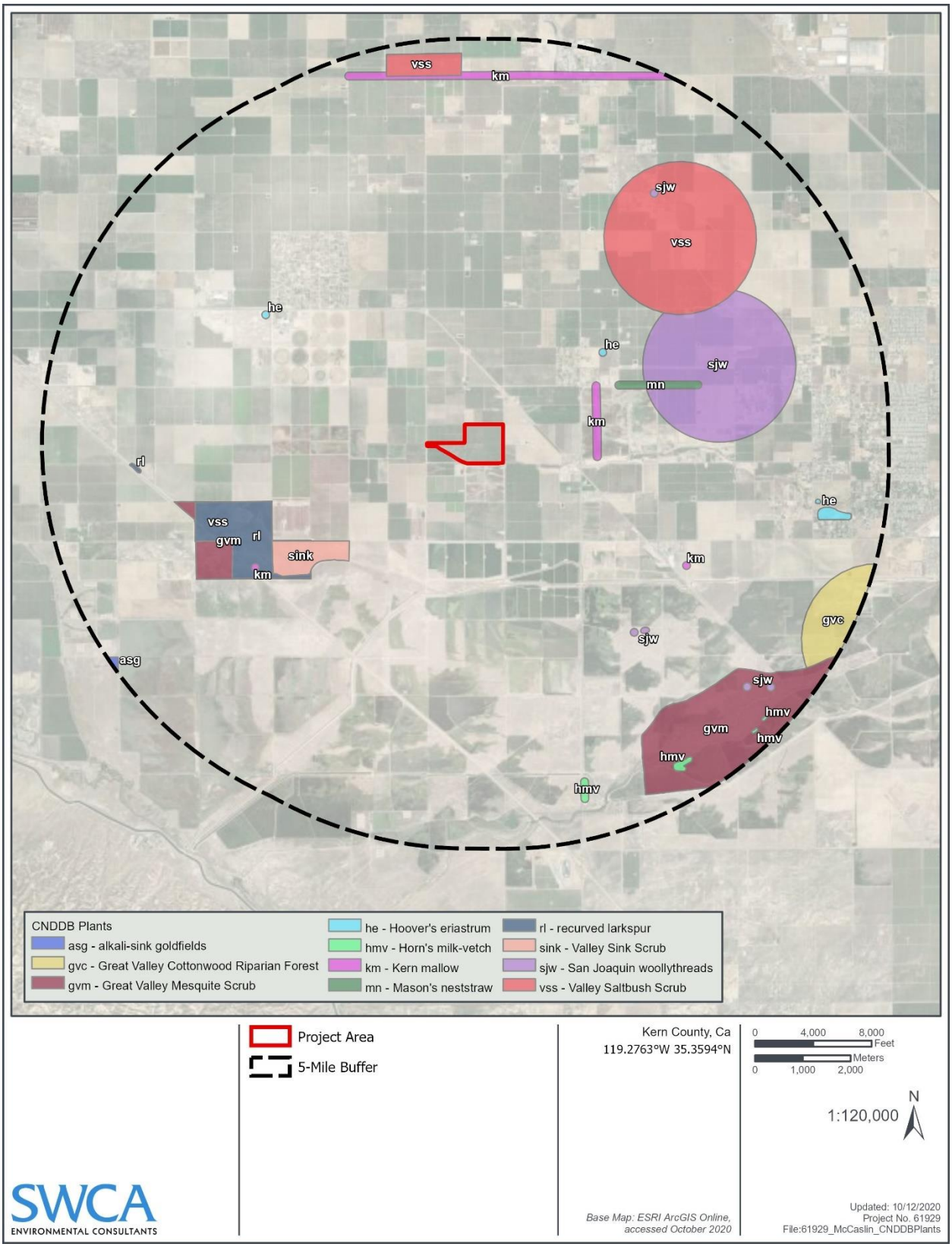
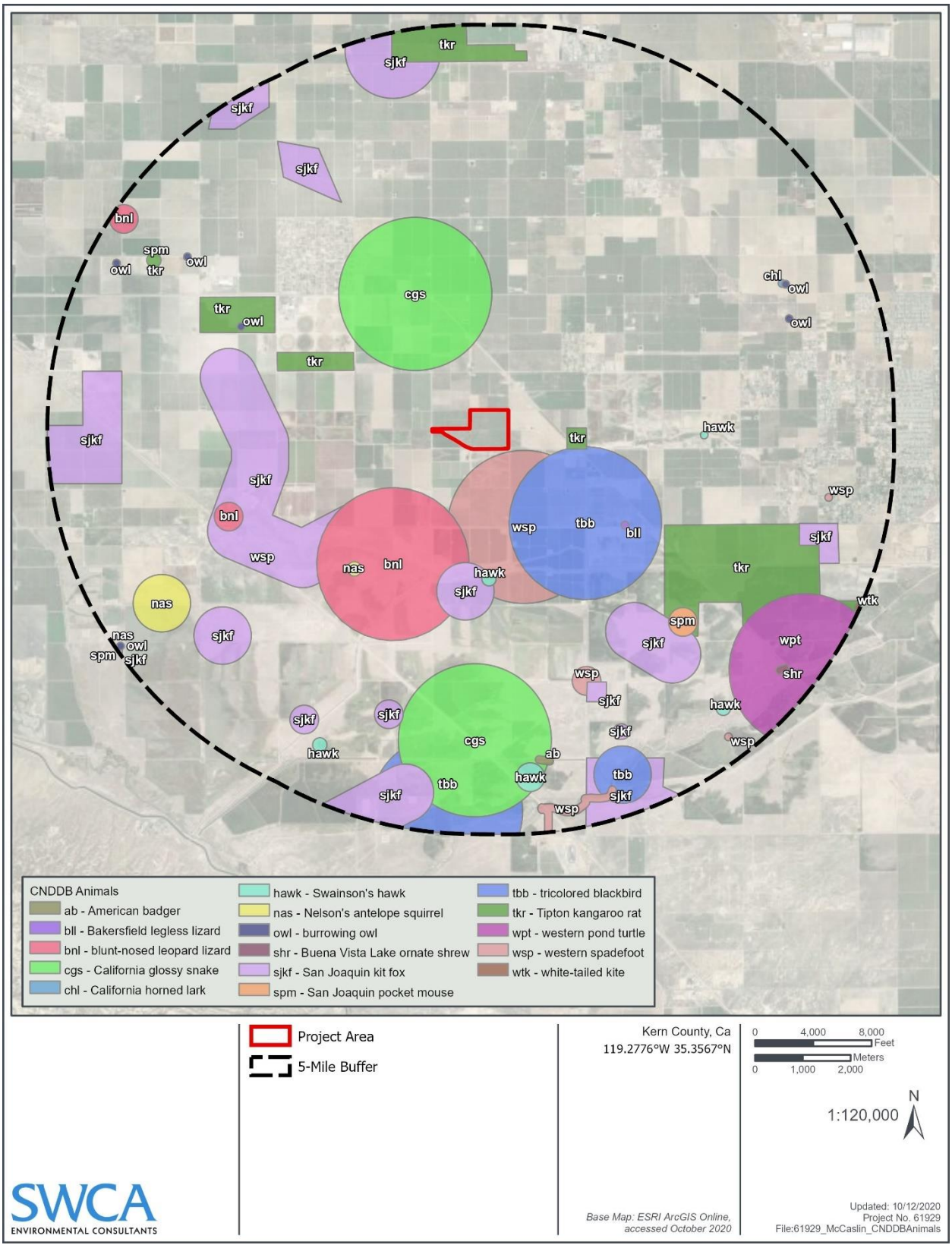


Figure 6. CNDDB Animal Occurrences Map



Based on a 5-mile radius query of the CNDDB a total of seven special-status plant species have been documented in the vicinity. Because the list of special-status plant species is considered regional, an analysis of the range and habitat preferences of the listed species was conducted to identify which species have the potential to occur in or near the BSA. The evaluation considered the existing conditions, elevation, and soils within the BSA. As a result of the best information available and the analysis conducted by SWCA, it was determined that no suitable habitat is present for the following 5 special-status plant species (shaded in grey within Table 4). Species outside of the 5-mile radius were not evaluated further because the BSA is located outside of their known geographic ranges and considered unlikely to occur.

- Horn's milk-vetch (*Astragalus hornii* var. *hornii*)
- recurved larkspur (*Delphinium recurvatum*)
- Kern mallow (*Eremalche kernensis*)
- Hoover's eriastrum (*Eriastrum hooveri*)
- Alkali-sink goldfields (*Lasthenia chrysantha*)
- San Joaquin woollythreads (*Monolopia congdonii*)
- Mason's neststraw (*Stylocline masonii*)

Although the surveys conducted within the BSA were not conducted within the appropriate blooming period for these species the BSA provides no habitat conditions for these species to occur as the impact area is entirely within active orchard fields and areas surrounding the orchard are frequently disturbed by typical agriculture practices. None of the above-mentioned species, or any other sensitive plant species, was observed. No further background or impact analysis of these species is provided within this report.

2.3.3 Special-Status Animal Species

For the purposes of this section, special-status or "sensitive" animal species are defined as the following:

- Animals listed or proposed for listing as threatened or endangered (including delisted species) under the ESA (50 CFR 17.11 for listed animals and various notices in the Federal Register for proposed species).
- Animals that are candidates for possible future listing as threatened or endangered under the ESA.
- Animals that meet the definitions of rare or endangered species under CEQA (State CEQA Guidelines, Section 15380).
- Animals listed or proposed for listing by the State of California as threatened and endangered under the CESA (14 CCR 670.5).
- Animal species that are fully protected in California (California Fish and Game Code, Section 3511 [birds], Section 4700 [mammals], Section 5050 [reptiles and amphibians], and Section 5515 [fish]).
- Birds protected by the MBTA, the Bald and Golden Eagle Protection Act, and/or California Fish and Game Code Section 3503.
- California Species of Special Concern to CDFW (Jennings and Hayes 1994 for amphibians and reptiles; Shuford and Gardali 2008 for birds; Williams 1986 for mammals).
- Other animal species considered USFWS Birds of Conservation Concern, on the CDFW Watch List, or otherwise included in the CDFW Special Animals List (CDFW 2009).

Based on the CNDDB, a total of 16 special-status animal species have been documented in the Project vicinity (CNDDB 2020). Because the list of special-status animal species is considered regional, an analysis of the range and habitat preferences of those species was conducted to identify which sensitive animal species have the potential to occur in or near the Project site. As a result of the best information available and the analysis conducted by SWCA, it was determined that the following 6 special-status animal taxa may occur within the BSA, including nesting migratory birds:

- burrowing owl (*Athene cunicularia*)
- Swainson's hawk (*Buteo swainsoni*)
- White-tailed kite (*Elanus leucurus*)
- western pond turtle (*Emys marmorata*)
- American badger (*Taxidea taxus*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)

Table 1. Natural Communities Evaluated for Potential Occurrence

Common Name	General Habitat Description	Habitat Present/ Absent	Rationale
Valley Sink Scrub	Occurs on sandy to loamy soils and alluvial fans of southern San Joaquin Valley and Carrizo Plains. Dominated by cattle spinach (*Atriplex polycarpa*).	A	**No Potential to Occur:** The BSA does not support valley sink scrub (i.e., areas dominated by cattle saltbush).
Valley Saltbush Scrub	Occurs on sandy to loamy soils in the southern and southwestern San Joaquin Valley and the Carrizo Plains of San Luis Obispo County. An open habitat with 10%–40% relative cover with a low growing herbaceous understory. Dominant species include cattle spinach, spiny saltbush (*Atriplex spinifera*), and arrowscale (*Atriplex phyllostegia*). Habitat extirpated from within its range due to agriculture conversion, groundwater pumping and flood control activities.	A	**No Potential to Occur:** The BSA does not support valley saltbush scrub (i.e., areas dominated by cattle spinach or spiny saltbush).
Valley Sacaton Grassland	A poorly drained and tussock forming grassland community dominated by valley sacaton (*Sporobolus airoides*) and saltgrass (*Distichlis spicata*). This plant community has been reduced along its range in the Tulare Lake Basin and along the San Joaquin Valley.	A	**No Potential to Occur:** The BSA does not support valley sacaton grassland (i.e., areas dominated by valley sacaton and saltgrass).
Great Valley Cottonwood Riparian Forest	Great Valley Cottonwood riparian plant community. Occurs along streams and tributaries of the Great Valley, at 15–2,000 meters AMSL.	A	**No Potential to Occur:** Though some Fremont cottonwood (*Populus fremontii*) individuals occur within the BSA within the Goose lake canal, a community dominated by cottonwoods was not observed during surveys.
Great Valley Mesquite Scrub	Great Valley Mesquite Scrub plant community occurs within the Sacramento and San Joaquin Valleys at elevations of 15-1,500 meters AMSL.	A	**No Potential to Occur:** The BSA does not support Great Valley Mesquite Scrub.

Table 2. Special-Status Plant Species Evaluated for Potential Occurrence within a 5-mile radius

Common Name	Scientific Name	Status Federal/ State/CNPS	General Habitat Description	Habitat Present/ Absent	Rationale
Horn's milk-vetch	*Astragalus hornii* var. *hornii*	–/–/1B.1	Annual herb that occurs in alkali playa, meadows, seeps and wetlands. Typically at elevations of 15–300 meters AMSL. Blooming period: May–June.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat for this species was not observed in the BSA.
recurved larkspur	*Delphinium recurvatum*	–/–/1B.2	Chenopod scrub, cismontane woodland, and valley and foothill grassland. Elevation: 3–790 meters AMSL. Blooming period: March–June.	A	**Suitable Conditions Present / Species Absent:** Suitable habitat for this species was not observed in the BSA.
Kern mallow	*Eremalche kernensis*	FE	Annual herb that occurs in chenopod scrub and valley and foothill grassland. Elevation: 70–1,290 meters AMSL. Blooming period: March–May.	A	**Suitable Conditions Present / Species Absent:** Suitable habitat for this species was not observed in the BSA.
Hoover's eriastrum	*Eriastrum hooveri*	DL/–/4.2	Annual herb belonging to the phlox family that occurs in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland 50–915 meters AMSL. Blooming period: March–July.	A	**Suitable Conditions Present / Species Absent:** Suitable habitat for this species was not observed in the BSA.
Alkali-sink goldfields	*Lasthenia chrysantha*	–/–/1B.1	Marshes and swamps (coastal salt), playas and vernal pools. Elevation: 1–1,220 meters AMSL. Blooming period: February–June	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat for this species was not observed in the BSA.
San Joaquin woollythreads	*Monolopia congdonii*	FE	Annual herb found in chenopod scrub and valley and foothill grassland habitat in sandy soils. Elevation: 60–800 meters AMSL. Blooming period: February–May.	A	**Suitable Conditions Present / Species Absent:** Suitable habitat for this species was not observed in the BSA.
Mason's neststraw	*Stylocline masonii*	–/–/1B.1	An annual herb that occurs in clay soil among chenopod scrub, coastal scrub and valley and foothill grassland. Elevation: 50–400 meters AMSL. Blooming period: March–April.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat for this species was not observed in the BSA.

Table 2. Special-Status Plant Species Evaluated for Potential Occurrence within a 5-mile radius

Common Name	Scientific Name	Status Federal/ State/CNPS	General Habitat Description	Habitat Present/ Absent	Rationale

General References: CNDDB RareFind 5, 5-mile radius search from BSA, accessed October 12, 2020.

Absent (A) – no habitat present and no further work needed. Habitat Present (HP) – habitat is, or may be present. The species may be present.
Present (P) – the species is present. Critical Habitat (CH) – project footprint is located within a designated critical habitat unit, but does not necessarily mean that appropriate habitat is present.

Status Codes: No Status (--);Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP); Federal Proposed Endangered (FPE); Federal Proposed Threatened (FPT); State Endangered (SE); State Threatened (ST); State Rare (SR); California Native Plant Society (CNPS): Rare, threatened, or endangered in California and elsewhere (Rank 1B); Rare, threatened, or endangered in California, but more common elsewhere (Rank 2); Plants that about which more information is needed (Rank 3); A watch list plant of limited distribution (Rank 4); Threat Code: Seriously endangered I California (over 80% of occurrences threatened / high degree and immediacy of threat) (.1); Fairly endangered in California (20-80% occurrences threatened) (.2); Not very endangered I California (<20% of occurrences threatened or no current threats known) (.3).

Table 3. Special-Status Animal Species Evaluated for Potential Occurrence

Common Name	Scientific Name	Status Federal/ State/Other	General Habitat Description	Habitat Present/ Absent	Rationale
Amphibians					
western spadefoot	*Spea hammondii*	–/–/SSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat and breeding areas were not observed.
Reptiles					
blunt-nosed leopard lizard	*Gambelia sila*	FE/SE/FP	Endemic to the San Joaquin Valley of central California. Inhabits open, sparsely vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills. Found in non-native grassland and Valley Sink Scrub communities. Also occurs in valley needlegrass grassland, alkali playa, and *Atriplex* grassland.	A	**Suitable Conditions Absent / Species Absent:** Protocol surveys were not deemed necessary as there is no suitable habitat within the BSA.
western pond turtle	*Emys marmorata*	–/–/SSC	Aquatic species occurs in wetlands, marshland, swamps, artificial flowing waters, standing and flowing waters from the Sacramento/San Joaquin Valleys, flowing and standing waters on the Klamath north coast and standing and flowing waters on the south coast.	P	**Suitable Conditions Present / Very Low Potential to Occur:** The immediate Project area does not contain suitable aquatic habitat for this species; however, during estivation, this species may travel up to 1,000 feet from an aquatic habitat and burrow. There is a possibility this species could occur within Goose Lake Channel but it is unlikely as there may not be sufficient standing water during periods of the year.
California glossy snake	*Arizona elegans occidentalis*	–/–/SSC	Nocturnal snake that inhabits arid scrub, rocky washes, grasslands, chaparral.	A	**Suitable Conditions Present / Potential to Occur:** No suitable habitat is present within the BSA and it is unlikely that the species would forage within the BSA.

Table 3. Special-Status Animal Species Evaluated for Potential Occurrence

Common Name	Scientific Name	Status Federal/ State/Other	General Habitat Description	Habitat Present/ Absent	Rationale
Birds					
Swainson's hawk (nesting)	*Buteo swainsoni*	–/ST/–	Swainson's hawks are known to occur throughout the Central Valley primarily along riparian systems. They most often nest in riparian areas in large trees but also will utilize lone trees and isolated cottonwood stands. Valley oak, Fremont cottonwood, walnut, and large willow are most often the trees used for nesting.	P	**Suitable Conditions Present / Species Absent:** The BSA provides no foraging habitat for this species. Isolated riparian areas immediately south of the Project site within Goose Lake Channel may provide suitable nesting habitat in the future, but no nests were identified during the July 2020 survey. It is very unlikely the species would nest within the active almond orchard fields.
white-tailed kite (nesting)	*Elanus leucurus*	–/–/FP	Kites inhabit fairly open country typically in cismontane woodland, riparian woodland, marshes, wetlands, valley and foothill grasslands and coastal scrub. Hovers above ground to hunt prey.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat necessary to support this species was not observed within the Project area. The species was also not observed during any of the field surveys conducted at the Project site. It is possible the species could occur over the Project site as an infrequent forager.
western burrowing owl (burrowing sites and some wintering sites)	*Athene cunicularia*	–/–/SSC	Open, dry grasslands, deserts, and scrublands. Subterranean nester, dependent upon burrowing mammals.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat necessary to support this species was not observed within the Project site.
California horned lark	*Eremophila alpestris actia*	–/–/WL	Inhabits marine intertidal splash zone communities, meadows, and seeps.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat necessary to support this species was not observed within the Project area. The species was also not observed during any of the field surveys conducted at the Project site.

Table 3. Special-Status Animal Species Evaluated for Potential Occurrence

Common Name	Scientific Name	Status Federal/ State/Other	General Habitat Description	Habitat Present/ Absent	Rationale
tricolored blackbird (nesting colony)	*Agelaius tricolor*	–/SC/SSC	Occurs in non-native vegetation in open cultivated lands and pastures as well as marshes. Requires freshwater marshes with cattails, tule, bulrushes, and sedges for breeding habitat.	A	**Suitable Conditions Absent / Species Absent:** Suitable habitat necessary to support this species was not observed within the Project area. The species was also not observed during the field survey conducted at the Project site.
Mammals					
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	FE/SE/–	Inhabits saltbush scrub and sink scrub communities in the Tulare Lake basin of the southern San Joaquin Valley. Also occurs in terrace grasslands lacking woody shrubs. Needs soft friable soils that escape seasonal flooding. Digs burrows in elevated soil mounds at bases of shrubs.	A	**Suitable Conditions Absent / Species Absent:** Protocol-level surveys for kangaroo rats were not necessary as there is no evidence of small mammal burrows or suitable habitat within the BSA.
Buena Vista Lake ornate shrew	*Sorex ornatus relictus*	FE/–/SSC	Inhabits marshlands and riparian areas in the Tulare Lake basin. Uses stumps and logs for cover.	A	**Suitable Conditions Absent / Species Absent:** Camera trapping surveys were not necessary for this species as there is no suitable habitat within the Project site.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE/ST/–	Inhabits annual grasslands or grassy open stages with scattered shrubs; needs friable sandy soils for burrowing, and suitable prey base.	P	**Suitable Conditions Present / Potential to Occur:** Marginally suitable foraging habitat is present within the agricultural and ruderal land within the Project site and adjacent areas. Due to the transitory nature of this species and the presence of marginally suitable habitat, there is a potential that this species may cross the Project site.

Table 3. Special-Status Animal Species Evaluated for Potential Occurrence

Common Name	Scientific Name	Status Federal/ State/Other	General Habitat Description	Habitat Present/ Absent	Rationale
Nelson's antelope squirrel	*Ammospermophilus nelsoni*	–/ST/–	Found in Western San Joaquin Valley from 200 to 1,200 feet AMSL on dry sparsely vegetated loam soils. Needs widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes. Digs burrows or use kangaroo rat burrows.	A	**Suitable Conditions Absent / Species Absent:** The Project site does not support any significant chenopod vegetation directly within the Project site although such habitat does exist on adjacent properties. The species was not identified during any of the field surveys conducted at the Project site.
San Joaquin pocket mouse	*Perognathus inornatus*	–/–/SA	Inhabits cismontane woodland, Mojavean desert scrub, and valley and foothill grassland	A	**Suitable Conditions Absent / Species Absent:** The Project site does not support any significant chenopod vegetation directly within the Project site although such habitat does exist in adjacent properties.
American badger	*Taxidea taxus*	–/–/SSC	Occurs in open stages of shrub, forest, and herbaceous habitats; needs uncultivated ground with friable soils.	A	**Suitable Conditions Absent / Species Absent:** The Project site does not support a large enough prey base for American badger. Ground squirrels are managed as part of standard agricultural practices.

General References: CNDDB RareFind 5, 5-mile radius search from BSA, accessed October 12, 2020.

Absent (A) – no habitat present and no further work needed. Habitat Present (HP) – habitat is, or may be present. The species may be present.
Present (P) – the species is present. Critical Habitat (CH) – project footprint is located within a designated critical habitat unit, but does not necessarily mean that appropriate habitat is present.

Status Codes: No status (–); Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP); Federal Proposed Endangered (FPE); Federal Proposed Threatened (FPT); Federal Critical Habitat (FCH); Proposed Federal Critical Habitat (PCH); Bald and Golden Eagle Protection Act (BGEPA); Migratory Bird Treaty Act (MBTA); Marine Mammal Protection Act (MMPA); State Fully Protected Species (FP); State Endangered (SE); State Candidate (SC); State Threatened (ST); State Candidate Threatened (SCT); California Fish and Game Code §3503 and §3503.5 (§); CDFW California Special Concern Species (SSC); Not formally listed but included in CDFW "Special Animal" List (SA); Not formally listed but included in CDFW "Watch List" (WL).

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3 IMPACT DISCUSSION AND RECOMMENDATIONS

The emphasis of this analysis is to identify sensitive biological resources that could be impacted by the proposed project, using a conservative approach assuming that direct impacts would be limited to the Project site, which includes the McCaslin property and the additional 80 acres to the north. The analysis also includes consideration to indirect impacts to raptor species within a 0.5-mile buffer from the Project site. The following analysis is intended to address the species questions provided within the Initial Study Checklist for projects subject to CEQA. The intent is for this analysis to be easily transferred to any future CEQA documentation, as needed.

3.1 Project Effect on Unique or Special-Status Species or their Habitats

Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

3.1.1 Plants

The surveys conducted within the BSA were not conducted within the appropriate blooming period for those special-status plant species that were considered. However, due to the frequent and long-term effects related to agricultural practices within the Project site, the BSA provides no suitable conditions for special-status plant species to occur. The Project site is frequently disturbed by grading activities, almond harvesting, herbicide application, etc. As currently proposed, the Project is expected to have no impact on sensitive plant species. No mitigation is necessary.

3.1.2 Wildlife

3.1.2.1 REPTILES

Western Pond Turtle

Western pond turtle was not identified within the Project area during any of the field surveys conducted in 2020; however, there is a very low potential that this species could occur in nearby water features and could utilize upland habitat to estivate during drought periods, or to lay a clutch of eggs. Western pond turtle may travel up to 1000 feet from their typical aquatic habitat to estivate. The following measures are recommended to avoid and minimize any potential impact to this species. These measures are intended to be inclusive of other sensitive species described in the following sections as well.

BIO-1 Prior to construction, a qualified biologist will provide an environmental awareness training session to all personnel. At a minimum, the training will include: 1) an overview of the regulatory requirements for the Project; 2) descriptions of the special-status species in the Project area and the importance of these species and their habitats; 3) the general measures that are being implemented to minimize environmental impacts; and 4) the boundaries within which equipment and personnel would be allowed to work during construction.

BIO-2 Prior to construction, a qualified biologist should conduct a pre-construction survey for the presence of sensitive species no earlier than 30 days before the start of construction.

BIO-3 If sensitive species are observed within the Project site during construction or the pre-activity survey, the District will immediately contact the appropriate agency(ies) under

whose jurisdiction the discovery falls to determine how to proceed and avoid take to the maximum extent practical.

BIO-4 During the site-disturbance and/or construction phase, any contractor or employee that inadvertently kills or injures a special-status species, or who finds any such animal either dead, injured, or entrapped, will be required to report the incident immediately to the District. The District will then immediately notify the appropriate agency(ies) under whose jurisdiction the discovery falls to determine how to proceed and avoid take to the maximum extent practical.

Implementation of BIO-1 through BIO-4 will reduce potential impacts to special-status reptiles to a level that is less than significant.

3.1.2.2 MAMMALS

San Joaquin Kit Fox

Although evidence of SJKF was not identified within the BSA, the presence of this species is inferred as the species is known to occur in the area and is highly mobile. SJKF have been identified approximately 2 miles to the south of the BSA based on the CNDDB records. Potential direct impacts may occur because of construction equipment activities.

Impacts to these species would be avoided and minimized by implementation of recommendations BIO-1 through BIO-4 in addition to the following:

BIO-5 To prevent inadvertent entrapment of San Joaquin kit fox or other animals during the construction phase of a Project, all excavated, steep-walled holes or trenches more than 2 feet deep will be inspected and covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks will be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured special-status species is discovered, the District will immediately contact the appropriate agency(ies) under whose jurisdiction the discovery falls to determine how to proceed and avoid take to the maximum extent practical.

BIO-6 During the site-disturbance and/or construction phase, all construction pipes, culverts, or similar structures or materials that contain a hole with a diameter of 3 inches or greater and that are stored at a construction site for one or more overnight periods will be thoroughly inspected for kit foxes and other special-status species before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered during this inspection, the pipe or culvert shall not be disturbed (other than to move it to a safe location if necessary) until after the kit fox has escaped.

BIO-7 Prior to, during, and after the site-disturbance and/or construction phase, use of pesticides or herbicides will be in compliance with all federal, state, and local regulations. This is necessary to minimize the probability of primary or secondary poisoning of endangered species utilizing adjacent habitats, and the depletion of prey upon which special-status species depend.

BIO-8 Any fencing installed during the project construction should meet the following specifications:

a. If a wire strand/pole design is used, the lowest strand should be no closer to the ground than 12 inches.

b. If a more solid wire mesh fence is used, 8 × 12–inch openings near the ground should be provided every 100 yards.

BIO-9 During construction, food related trash will be placed in enclosed containers and removed at the end of each work week. At the end of construction, all construction related trash and debris will be removed from the work site and properly disposed of.

Implementation of recommendations BIO-1 through BIO-9 will reduce potential impacts to San Joaquin kit fox to a level that is less than significant.

3.1.2.3 BIRDS

Swainson's Hawk

Protocol surveys for Swainson's hawk were not conducted as part of this study. Marginal habitat occurs within the Goose Lake Channel, and it is understood that the resource agencies have concerns that this species may nest within the active almond orchard. While there is no evidence of Swainson's hawk in this area, the species is highly migratory and there is a potential that nesting pairs in the future may occur in subsequent years prior to construction.

In addition to the implementation of recommendations BIO-1 and BIO-2, the following measure is recommended.

BIO-10 If during the pre-construction survey any active nests are discovered within 0.5 mile of the Project site, the District will coordinate with the appropriate agency(ies) to determine the appropriate construction setback distances. Construction-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.

Implementation of recommendations BIO-1, BIO-2 and BIO-10 will reduce potential impacts to Swainson's hawk to a level that is less than significant.

Burrowing Owl

Protocol surveys for burrowing owl were not conducted as part of this study; however, this species is known to occur in the area and may utilize the Project area or the surrounding habitat for denning purposes. No sign of this species was observed within the Project study area during the various field surveys that were conducted. Implementation of BIO-1 through BIO-4 will reduce potential impacts to bird species to a level that is less than significant.

Nesting Migratory Birds (Class Aves)

Project activities could have the potential to directly and/or indirectly impact a variety of nesting migratory bird species. Project activities, including vegetation removal, equipment use, and associated noise could impact nesting migratory birds and/or special-status bird species adjacent to the Project study area. No active nests were noted during surveys conducted in 2020. Implementation of recommendations BIO-1 through BIO-10 will reduce potential impacts to bird species to a level that is less than significant.

3.2 Project Effect on Extent, Diversity, or Quality of Native or other Important Vegetation

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Based on a query of the CNDDB, a number of sensitive vegetative communities have been recorded within 5 miles of the proposed Project (see Table 3). None of these sensitive vegetative communities are present within the Project site. The project is expected to have no affect on these resources. Therefore, no additional measures are necessary.

3.3 Project Effect on Wetland or Riparian Habitat

Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? (See Environmental Setting.)

A formal wetland delineation was not conducted as part of this study due to the lack of evidence of wetland features within the Project site, as defined by CWA Section 404. However, the Goose Lake Channel may be considered a federal and state jurisdictional feature. However, the hydrology of the channel is completely controlled through a weir that diverts water from the Kern River; thus, the channel is operated in a manner like irrigation canals that are not considered jurisdictional features. No avoidance and minimization measures are necessary.

3.4 Project Effect on Movement of Resident or Migratory Fish and Wildlife Species.

Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The proposed Project would not have any effect on the movement of resident species within the channel. There are no migratory fish species within the Kern River. No avoidance and minimization measures are necessary.

3.5 Project Effect on Local Policies or Ordinances Protecting Biological Resources

Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? (See Environmental Setting.)

The County General Plan (Kern County Planning Department 2007) includes the federal, state, and local statutes, ordinances, and policies that govern the conservation of biological resources that must be considered by the County during the environmental review process. The Land Use, Open Space, and Conservation Element of the Kern County General Plan provides for a variety of land uses that ensure future growth while simultaneously providing for the conservation of agricultural and natural resources. Section 1.10, “General Provisions,” of the Element provides goals, policies, and implementation measures for discretionary projects.

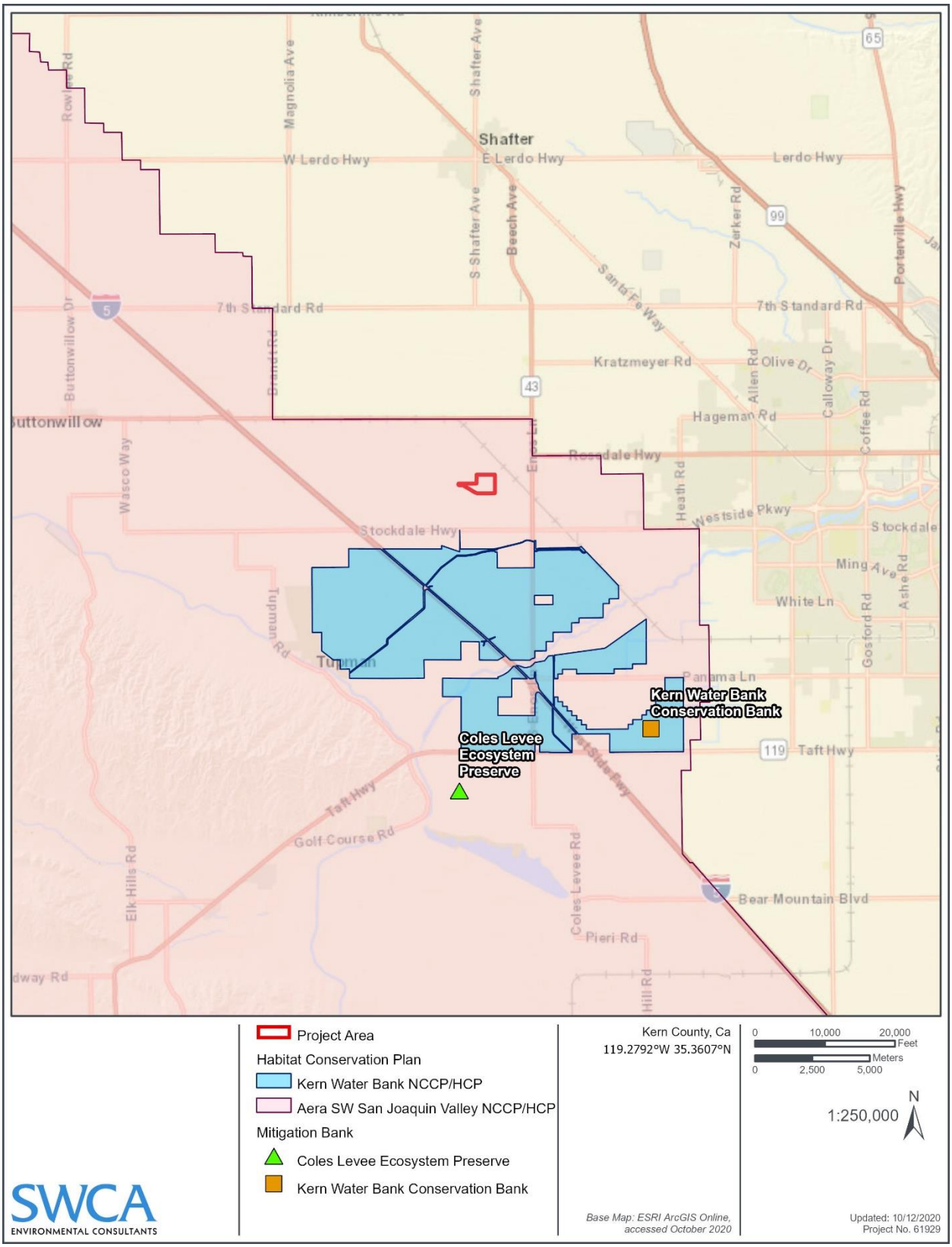
As currently proposed, the Project would not be in conflict with any of these General Provisions. No further measures are necessary.

3.6 Project Effect on Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan

Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? (See Environmental Setting.)

The proposed Project is outside of the boundaries of any HCP/NCCP or other approved local, regional, or state habitat conservation plans. Figure 7 below depicts the location of the project site to known HCP/NCCP or other approved local, regional, or state habitat conservation plan areas. No additional mitigation is necessary.

Figure 7. Location of Nearby HCP/NCCP or Mitigation Banks



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Appendix J – Cultural Report

Draft

CLASS III INVENTORY/PHASE I SURVEY, ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT, GROUNDWATER BANKING AND CONVEYANCE IMPROVEMENT PROJECT, KERN COUNTY, CALIFORNIA

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MANAGEMENT SUMMARY

An intensive Class III cultural resources inventory/Phase I survey was conducted for the Rosedale-Rio Bravo Water Storage District (RRBWSD) Groundwater Banking and Conveyance Improvement Project (Project), Kern County, California. This study was conducted by ASM Affiliates, Inc., with David S. Whitley, Ph.D., RPA, serving as principal investigator. Background studies and fieldwork for the survey were completed from June – July 2020. The study was undertaken to assist with the preparation of an environmental document consistent with the National Environmental Policy Act (NEPA) and with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 306108; 36 CFR Part 800), and well as the California Environmental Quality Act (CEQA). The proposed project is designed to improve the efficiency of the RRBWSD through better management of surface water supplies in wet years by increasing recharge pond capacity, increasing water conveyance capacity, and improving measurement and management systems. The Project area is located within the RRBWSD service area, within and west of Bakersfield, Kern County, California. The APE for the project involved 4 separate locations for different Project components. The horizontal APE in total was 196.5-acres (ac) while the vertical APE was 10-feet (ft).

A records search of site files and maps was conducted at the Southern San Joaquin Valley Archaeological Information Center (AIC), California State University, Bakersfield, and a search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed. These investigations determined that the study area had not been previously surveyed in its entirety and no sites or sacred lands were known within it. Two previously recorded historical resources, the Cross Valley Canal and the Goose Lake Slough/Rio Bravo Canal, had been recorded within the Project APE. Both resources had been previously determined not eligible for listing in the National Register of Historic Places (NRHP).

The Class III cultural resources inventory/Phase I survey fieldwork was conducted in July 2020. The two previously identified cultural resources were identified and their site record forms updated. No additional cultural resources were identified within the Project APE. Based on an evaluation of the two historical resources, they are recommended as not eligible for NRHP and California Register of Historical Resources (CRHR) listing.

1. INTRODUCTION AND REGULATORY CONTEXT

ASM Affiliates was retained by Rosedale-Rio Bravo Water Storage District (RRBWSD) to conduct an intensive Class III cultural resources inventory/Phase I survey for their proposed Groundwater Banking and Conveyance Improvement Project (Project), near Bakersfield, Kern County, California. The purpose of this investigation was to assist with compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 306108; 36 CFR Part 800), and with the California Environmental Quality Act (CEQA). The investigation was undertaken, specifically, to ensure that no significant adverse effects to historic properties or historical resources would occur as a result of the construction of this proposed project.

This current study included:

- A background records search and literature review to determine if any known archaeological sites were present in the proposed project areas and/or whether the project areas had been previously and systematically studied by archaeologists;
- A search of the NAHC *Sacred Lands File* to determine if any traditional cultural places or cultural landscapes have been identified within the project areas;
- An on-foot, intensive inventory of the study area to identify and record previously undiscovered cultural resources and to examine known sites; and
- A preliminary assessment of any such resources found within the project study areas.

This study was conducted by ASM Affiliates, Inc., of Tehachapi, California, from June to July 2020. David S. Whitley, Ph.D., RPA, served as principal investigator, with Shannon Davis, M.A., RPH, Architectural Historian. ASM Associate Archaeologist Robert Azpitarte, B.A., RPA, conducted the fieldwork, with assistance from ASM Assistant Archaeologists Maria Silva, B.A., Margarita Lemus, B.A., and Ross Way, B.A.

This manuscript constitutes a report on the Class III cultural resources inventory. Subsequent chapters provide background to the investigation, including historic context studies; the findings of the archival records search; a summary of the field surveying techniques employed; and the results of the fieldwork. We conclude with management recommendations for the Study Area.

1.1 PROJECT DESCRIPTION, LOCATION, AND AREA OF POTENTIAL EFFECT

The Groundwater Banking and Conveyance Improvement Project is designed to improve RRBWSD's overall system efficiency by better managing wet year water supplies and increasing the District's ability to capture and store high flow surface runoff within the Kern Fan groundwater basin. Funding for the project would be provided by a 2020 WaterSMART grant from the Bureau of Reclamation. The Project would involve constructing approximately 195-acres (ac) of recharge ponds, turnout and weir structures, and supervisory control and data acquisition (SCADA) system improvements, located in four separate areas of potential effect (APE; Figures 1, 2, and 3). Specifically, the Project consists of the following components:

1. **McCaslin Recharge Ponds and Weir**: RRBWSD seeks to augment its recharge pond operations by constructing approximately 195-ac of direct recharge ponds. It will accomplish this by placing levees approximately 2 and 5-feet (ft) high within and around the property. It is estimated that as much as 15,000 acre-feet per year (afy) of recharge water will be conveyed during extreme wet years (every 2 in 10 years), with a long-term average of at least 2,970 afy. The water will be conveyed from pond to pond by way of 6 inter-basin check structures. Water will be supplied to the facility by the Goose Lake Slough via a newly constructed sluice gated intake and diversion weir (McCaslin Weir). Approximately 50 cubic feet per second (cfs) of intake capacity would be required to serve the McCaslin Recharge Ponds site.

2. **Houghton Weir:** The Houghton Weir is undersized and is inadequate for current operations. RRBWSD seeks to replace and modernize the upstream Houghton Weir in order to deliver the required amount of water to the proposed McCaslin Recharge Ponds. The Houghton Weir currently consists of nine flashboard bays. RRBWSD seeks to replace them with three automated Langmann Gates equipped with a SCADA system which will run on solar powered batteries. These upgrades would provide the added capacity for the McCaslin Recharge Ponds and other recharge areas in the District. It is estimated that wet years would provide water supplies to the project 3 out of every 10 years. This would result in an average of 2,772 afy of additional stored groundwater.

3. **Kern River and Cross Valley Canals, Flow (CVC) Measurement and SCADA Improvements:** RRBWSD currently only conducts daily field measurements, essentially running blind. This necessitates conservative management operations to minimize potential facility and property damages from overtopping the system. Adding SCADA systems at critical inflow points (Cross Valley Canal Turnout and Kern River Turnout) will allow operators and managers to access real-time data and better manage the water potential. RRBWSD proposes installing data loggers with cellular-based transmitters to an existing flow meter and/or new water level transducers to allow for web-based data access at the above-mentioned two key locations.

The Groundwater Banking and Conveyance Improvement Project is located on the open flats of the San Joaquin Valley, within and west of the City of Bakersfield, Kern County, California. The McCaslin Recharge Ponds and Weir APE is the largest of the four Project components. It is located approximately 5-miles (mi) west of the City of Bakersfield near the intersection of Highway 43 and Stockdale Highway, on the north side of the Goose Lake Channel. Active agricultural fields/orchards surround this Project component. Elevation at this west end of the Project is approximately 330-ft above mean sea level (amsl). The Houghton Weir APE, also on the Goose Lake Channel, is within the suburban expanse of the City of Bakersfield, near the Westside Parkway at approximately 358-ft amsl. The SCADA improvements at the Kern River and CVC turn-outs are both further east, within the City of Bakersfield, at approximately 380-ft amsl. They are located near the junction of the Kern River, Goose Lake Channel, and Cross Valley Canal.

The Bureau of Reclamation, *Directives and Standards*, Appendix B (LND 02-01, p. B21) defines an APE as: "the geographic area(s) within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, is any such properties exist." The Bureau's

Mid-Pacific Region, General Scope of work for Cultural Resources Investigations in California (2012, unpaginated) requires: "cultural resources inventories of the entire APE scaled appropriately to the individual project circumstances." Based on consultation with Bureau staff, and with the exception of the McCaslin Recharge Ponds, the Project study area for this cultural resources inventory consists of the APE and buffers adequate to cover any construction and maintenance activities, or minor changes in the plans for such facilities, related to the building and operation of the Project and its component features. These are as follows:

> *McCaslin Recharge Ponds and Weir*: The horizontal APE for the McCaslin Recharge Ponds is approximately 195-ac. This includes the recharge ponds and all construction staging, work and access areas.
>
> *Houghton Weir*: Horizontal APE 50-meter (m) in diameter, or approximately 0.5-ac.
>
> *Kern River Canal Turn-out*: Horizontal APE 50-m in diameter, or approximately 0.5-ac.
>
> *Cross Valley Canal turn-out*: Horizontal APE 50-m in diameter, or approximately 0.5-ac.

The total horizontal APE is approximately 196.5-ac.

The vertical APE, consisting of the maximum depth of groundsurface disturbance for the McCaslin Recharge Ponds and weir, is 10-ft, the maximum depth of excavation.

1.2 REGULATORY CONTEXT

1.2.1 National Historic Preservation Act

The NHPA of 1966, as amended (54 United States Code 306108), is the primary federal legislation that outlines the federal government's responsibility to consider the effects of its actions on historic properties and affords the Advisory Council on Historic Preservation a reasonable opportunity to comment. Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 describes the process that the federal agency shall take to identify cultural resources and assess the level of effect that the proposed undertaking will have on historic properties. An undertaking is defined as a "…project, activity or program funded in whole or in part, under the direct or indirect jurisdiction of a federal agency." This includes projects that are carried out by, or on behalf of, the agency; those carried out with federal assistance; those requiring a federal permit, license, or approval; and those subject to state or local regulation administered pursuant to a delegation, or approval by, a federal agency (54 U.S.C. 306108).

A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Those cultural resources that are listed on, or are eligible for inclusion in, the National Register of Historic Places (NRHP) are referred to as historic properties. The criteria for NRHP eligibility are outlined at 36 CFR Part 60. Other applicable federal cultural resources laws and regulations that could apply include, but are not limited to, the Native American Graves Protection and Repatriation Act (NAGPRA), and the Archaeological Resources Protection Act (ARPA).

Compliance with Section 106 of the NHPA (36 CFR Part 800) follows a series of steps that are designed to identify and consult with interested parties, determine the APE, determine if historic properties are present within the APE, and assess the effects the undertaking will have on historic properties. Section 106 requires consultation with Indian Tribes concerning the identification of sites of religious or cultural significance and with individuals or groups who are entitled, or requested, to be consulting parties. The regulations at 36 CFR Part 800.5 require federal agencies to apply the criteria of adverse effect to the historic properties identified within the APE. The criteria of adverse effect, defined at 36 CFR Part 800.5(a)(1), states that:

> "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association."

The 36 CFR Part 800 regulations include consultation with the State Historic Preservation Officer (SHPO) to provide an opportunity to comment on, and concur with, the Reclamations' determinations. If the undertaking would result in adverse effects to historic properties, these adverse effects must be resolved in consultation with the SHPO and other parties identified during the Section 106 process before the undertaking can proceed to implementation.

1.2.2 National Register Criteria for Evaluation

The criteria for evaluation of NRHP eligibility are outlined at 36 CFR Part 60.4. A district, site, building, structure, or object must generally be at least 50 years old to be eligible for consideration as a historic property. That district, site, building, structure, or object must retain integrity of location, design, setting, materials, workmanship, feelings, and association as well as meet one of the following criteria to demonstrate its significance in American history, architecture, archeology, engineering, and culture. A district, site, building, structure, or object must:

> (A) be associated with events that have made a significant contribution to the broad patterns of history; or
>
> (B) be associated with the lives of people significant in our past; or
>
> (C) embody the distinct characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (D) have yielded, or may be likely to yield, information important in prehistory or history.

A site must have integrity and meet one of the four criteria of eligibility to demonstrate its historic associations in order to convey its significance. A property must be associated with one or more events important in the history or prehistory in order to be considered for listing under Criterion

A. Additionally, the specific association of the property, itself, must also be considered significant. Criterion B applies to properties associated with individuals whose specific contributions to the history can be identified and documented. Properties significant for their physical design or construction under Criterion C must have features with characteristics that exemplify such elements as architecture, landscape architecture, engineering, and artwork. Criterion D most commonly applies to properties that have the potential to answer, in whole or in part, important research questions about human history that can only be answered by the actual physical materials of cultural resources. A property eligible under Criterion D must demonstrate the potential to contain information relevant to the prehistory and history (National Register Bulletin 15).

A district, site, building, structure, or object may also be eligible for consideration as a historic property if that property meets the criteria considerations for properties generally less than 50 years old, in addition to possessing integrity and meeting the criteria for evaluation.

1.2.3 California Environmental Quality Act

CEQA is applicable to discretionary actions by state or local lead agencies. Under CEQA, lead agencies must analyze impacts to cultural resources. Significant impacts under CEQA occur when "historically significant" or "unique" cultural resources are adversely impacted, which occurs when such resources could be altered or destroyed through project implementation. Historically significant cultural resources are defined by eligibility for or by listing in the CRHR. In practice, the federal NRHP criteria for significance applied under Section 106 are generally (although not entirely) consistent with CRHR criteria (see PRC § 5024.1, Title 14 CCR, Section 4852 and § 15064.5(a)(3)).

Significant cultural resources are those archaeological resources and historical properties that:

(A) Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) Are associated with the lives of persons important in our past;

(C) Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(D) Have yielded, or may be likely to yield, information important in prehistory or history.

Unique resources under CEQA, in slight contrast, are those that represent:

> 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 (PRC § 21083.2(g)).

Preservation in place is the preferred approach under CEQA to mitigating adverse impacts to significant or unique cultural resources.

Figure 1. RRBWSD Groundwater Banking and Conveyance Improvement Project, Kern County, California.

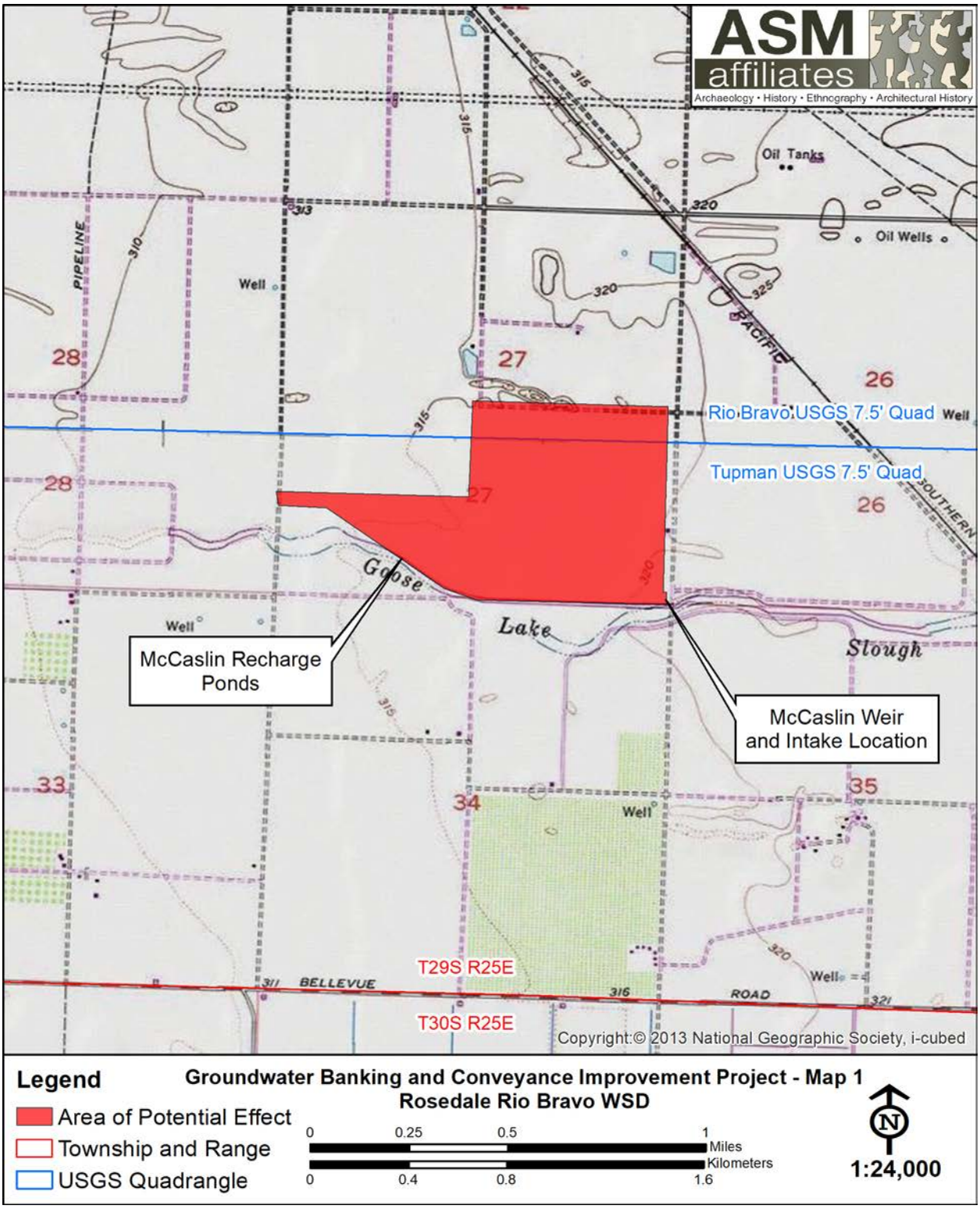

Figure 2. RRBWSD Groundwater Banking and Conveyance Improvement Project, western components.

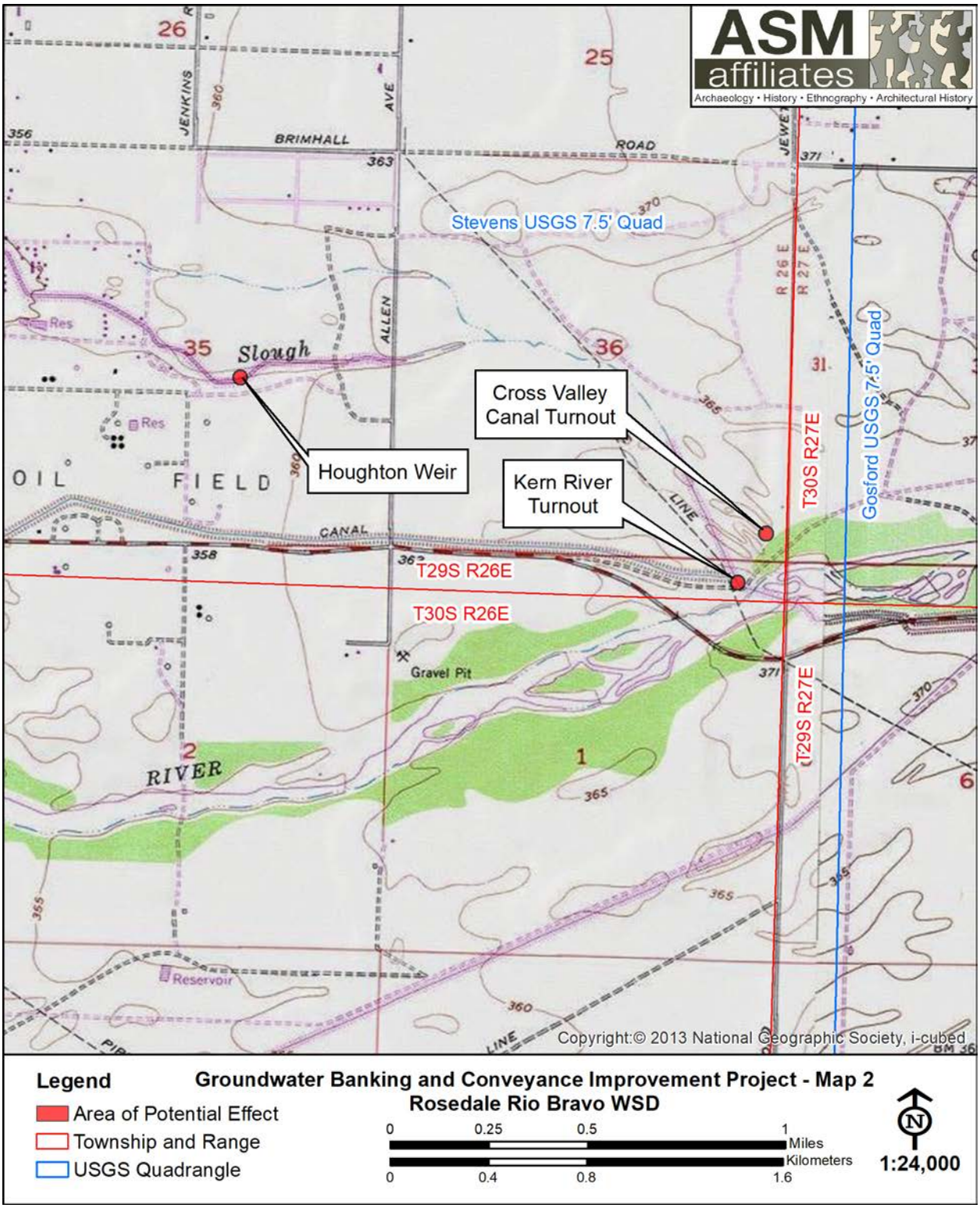

Figure 3. RRBWSD Groundwater Banking and Conveyance Improvement Project, eastern components.

2. ENVIRONMENTAL AND CULTUAL BACKGROUND

2.1 ENVIRONMENTAL BACKGROUND

The Groundwater Banking and Conveyance Improvement Project is located on the open flats of the San Joaquin Valley. Currently it may be characterized as a dry open valley bottom, but it is within the historical Kern River Delta, with the current (post-1868) Kern River channel a short distance to the south. Prior to reclamation and channelization, the region would have been a low lying, water rich area characterized by sloughs, marshes and swamps. Occasionally inundated by floodwaters, in most years the region would have been a swamp during the winter rainy season and marsh land during other parts of the year.

Historical and recent land-use has changed the vegetation that was once present within and near the project area, which now consists of orchards and agricultural fields (Figure 4a – 4d). Riparian Woodlands were likely present along Goose Lake Slough, which was channelized with the construction of the Isabella Reservoir and the Cross Valley Canal, and now operates as a controlled groundwater conveyance facility. Although the project area may have included the Valley Grassland community, depending upon drainage and seasonal storm systems, freshwater marshes are more likely to have been present (see Schoenherr 1992).

Figure 4a. McCaslin recharge ponds area, looking southwest.

Figure 4b. McCaslin weir and intake area, looking north.

Figure 4c Houghton Weir, looking southwest.

Figure 4d. Kern River and Cross Valley Canal intake improvements area, looking west.

2.2 GEOARCHAEOLOGICAL BACKGROUND

The study area, adjacent to the Goose Lake Slough and the Kern River, is located within the Kern River Delta, historically a marsh/swamp that experienced periodic but significant flooding. Notably, Bakersfield was originally called "Kern Island" because of its seasonal flooding and location within this web of marshes and sloughs. These floods were of sufficient intensity to have destroyed early irrigation ditches dug for farming in 1861-1862, along with a levee intended to prevent inundation of Bakersfield in 1868 (Lynch 2006), for example. One result of the 1868 flood was the migration of the Kern River northwest, skirting the growing town, to its current channel—a move likely aided by the east side levee. In addition to saving the town, this helped push the stream northwest of the original channel.

Due to the marsh/slough/swamp conditions of the delta, combined with this degree of periodic flooding, prehistoric use of this area emphasized higher ground, typically consisting of low rises on the otherwise flat valley floor (Whitley 2006), or the foothills surrounding the valley. Villages associated with Buena Vista Lake illustrate this pattern: all known historical and prehistoric villages are concentrated along the western margin of the lake, where the higher elevations of the Elk and Buena Vista Hills abut the lake margin, rather than along the other lake edges which were periodically flooded. This was especially true for winter-aggregation phase villages which were occupied during the most likely period for seasonal flooding. While village locations typically were adjacent to water, and they thus moved over time as stream channels changed or lakeshores

transgressed or regressed, (relatively) high ground was always a critical variable for anything other than ephemeral land use (such as hunting and gathering).

The study area is entirely low-lying, with no recorded sites in the vicinity. It is adjacent to Goose Lake Slough and north of the post-1868 Kern River channel, however, suggesting that it was periodically flooded. The Rio Bravo 1931, Tupman 1933, and Stevens 1932 historic USGS topographical quadrangles, in fact, indicate that it was then crossed by small east-west drainages, with even lower lying ponds in the surrounding fields. High/Very High archaeological sensitivity for the Project area is then suggested by the soils mapping of the county and a site sensitivity model derived from that data (Meyer et al. 2010).

2.3 ETHNOGRAPHIC BACKGROUND

Penutian-speaking Yokuts tribal groups occupied the southern San Joaquin Valley region and much of the nearby Sierra Nevada. Ethnographic information about the Yokuts was collected primarily by Powers (1971, 1976 [originally 1877]), Kroeber (1925), Gayton (1930, 1948), Driver (1937), Latta (1977) and Harrington (n.d.). For a variety of historical reasons, existing research information emphasizes the central Yokuts tribes who occupied both the valley and particularly the foothills of the Sierra. The northernmost tribes suffered from the influx of Euro-Americans during the Gold Rush and their populations were in substantial decline by the time ethnographic studies began in the early twentieth century. In contrast, the southernmost tribes were partially removed by the Spanish to missions and eventually absorbed into multi-tribal communities on the Sebastian Indian Reservation (on Tejon Ranch), and later the Tule River Reservation and Santa Rosa Rancheria to the north. The result is an unfortunate scarcity of ethnographic detail on southern Valley tribes, especially in relation to the rich information collected from the central foothills tribes where native speakers of the Yokuts dialects are still found. Regardless, the general details of indigenous life-ways were similar across the broad expanse of Yokuts territory, particularly in terms of environmentally influenced subsistence and adaptation and with regard to religion and belief, which were similar everywhere.

This scarcity of specific detail is particularly apparent for southern valley tribal group distribution. According to Kroeber (1925:478), the Tulamni occupied the edges of Buena Vista Lake and the southwestern end of the valley, the Hometwoli lived in and around Kern Lake to the east, the Tuhohi (or Chuxoxi) resided near the mouth of Kern River as it drained north into Tulare Lake, and Yauelmani territory comprised the southeastern side of the valley, extending north into Bakersfield proper. The study area then likely falls within Yauelmani territory. Kroeber identifies the villages of *Tsineuhiu*, west of Bakersfield on the Kern River, *Woilo* in Bakersfield proper, *Kuyo* south of Bakersfield, *Tulamniu*, at the northwestern edge of Buena Vista Lake, *Hoschiu* on Bitter Water Creek, and *Wogitiu*, near McKittrick. None of these villages are within or close to the Project APEs.

Most Yokuts groups, regardless of specific tribal affiliation, were organized as a recognized and distinct tribelet; a circumstance that almost certainly pertained to the tribal groups noted above. Tribelets were land-owning groups organized around a central village and linked by shared territory and descent from a common ancestor. The population of most tribelets ranged from about 150 to 500 peoples (Kroeber 1925).

Each tribelet was headed by a chief who was assisted by a variety of assistants, the most important of whom was the *winatum*, a herald or messenger and assistant chief. A shaman also served as religious officer. While shamans did not have any direct political authority, as Gayton (1930) has illustrated, they maintained substantial influence within their tribelet.

Shamanism is a religious system common to most Native American tribes. It involves a direct and personal relationship between the individual and the supernatural world enacted by entering a trance or hallucinatory state (usually based on the ingestion of psychotropic plants, such as jimsonweed or more typically native tobacco). Shamans were considered individuals with an unusual degree of supernatural power, serving as healers or curers, diviners, and controllers of natural phenomena (such as rain or thunder). Shamans also produced the rock art of this region, depicting the visions they experienced in vision quests believed to represent their spirit helpers and events in the supernatural realm (Whitley 1992, 2000). Most such sites are associated with their villages.

The centrality of shamanism to the religious and spiritual life of the Yokuts was demonstrated by the role of shamans in the yearly ceremonial round. The ritual round started in the spring with the jimsonweed ceremony, followed by the rattlesnake dance and (where appropriate) first salmon ceremony. After returning from seed camps, fall rituals began in the late summer with the mourning ceremony, followed by first seed and acorn rites and then the bear dance (Gayton 1930:379). In each case, shamans served as ceremonial officials responsible for specific dances involving a display of their supernatural powers (Kroeber 1925).

Subsistence practices varied from tribelet to tribelet based on the environment of residence. Throughout Native California, and Yokuts territory in general, the acorn was a primary dietary component, along with a variety of gathered seeds. Valley tribes augmented this resource with lacustrine and riverine foods, especially fish and wildfowl. As with many Native California tribes, the settlement and subsistence rounds included the winter aggregation into a few large villages, where stored resources (like acorns) served as staples, followed by dispersal into smaller camps, often occupied by extended families, where seasonally available resources would be gathered and consumed.

Although population estimates vary and population size was greatly affected by the introduction of Euro-American diseases and social disruption, the Yokuts were one of the largest, most successful groups in Native California. Cook (1978) estimates that the Yokuts region contained 27 percent of the aboriginal population in the state at the time of contact; other estimates are even higher. Many Yokuts continue to live in the region, especially in Tulare, Fresno and Kings counties to this day.

2.3.1 Significant Themes

The ethnographic period in the southern San Joaquin Valley extended from first Euro-American contact, in AD 1772, to the mid-1850s, when significant Euro-American movement into the region began and some tribal populations were moved onto reservations. The major significant historic themes during this period of significance involve the related topics of Historic-Aboriginal

Archaeology, and Native American Ethnic Heritage. More specifically, these concern the Adaptation of the Indigenous Population to Euro-American Encroachment and Settlement, and their Acculturation to Western Society. These processes included the impact of missionization on the San Joaquin Valley (circa 1800 to about 1845); the introduction of the horse and the development of a San Joaquin Valley "horse culture," including raiding onto the coast and Los Angeles Basin (after about 1810); the use of the region as a refuge for mission neophyte escapees (after 1820); responses to epidemics from introduced diseases (especially in the 1830s); armed resistance to Euro-American encroachment (in the 1840s and early 1850s); response to the incursions of miners (from about 1857 to 1865); and, ultimately, the adoption of the Euro-American society's economic system and subsistence practices and acculturation into that society. This last process likely had two manifestations: acculturation due to changes with movements onto reservations; and acculturation via the transition to wage labor working for small farms and ranches.

2.3.2 Associated Property Types

Site types that have been identified in the southern San Joaquin Valley in the general vicinity of the study area dating to the ethnographic period of significance primarily include villages and habitations, some of which contain cemeteries. The different social processes associated with this historical theme may be manifest in the material cultural record in terms of changing settlement patterns and village organization; the breakdown of traditional trading networks with their replacement by new economic relationships; changing subsistence practices, especially the introduction of agriculture initially via escaped mission neophytes; the use of Euro-American artifacts and materials rather than traditional tools and materials; and, possibly, changing mortuary practices.

Inasmuch as culture change is a primary intellectual interest in archaeology, ethnographic villages and habitations may be NRHP eligible under Criterion D, research potential. They may also be eligible under Criterion A, association with events contributing to broad patterns of history. Ethnographic sites, further, may be NRHP eligible as Traditional Cultural Properties due to potential continued connections to tribal descendants, and their resulting importance in traditional practices and beliefs, including their significance for historical memory, tribal- and self-identity formation, and tribal education. For Criteria A and D, eligibility requires site integrity (including the ability to convey historical association for Criterion A). These may include intact archaeological deposits for Criterion D, as well as setting and feel for Criterion A. Historical properties may lack physical integrity, as normally understood in heritage management, but still retain their significance to Native American tribes as Traditional Cultural Properties if they retain their tribal associations and uses.

2.4 ARCHAEOLOGICAL BACKGROUND

The southern San Joaquin Valley region has received minimal archaeological attention compared to other areas of the state. In part, this is because the majority of California archaeological work has concentrated in the Sacramento Delta, Santa Barbara Channel and central Mojave Desert areas (see Moratto 1984). Although knowledge of the southern San Joaquin Valley region's prehistory is limited, enough is known to determine that the archaeological record is broadly similar to south-

central California as a whole (see Gifford and Schenk 1926; Hewes 1941; Wedel 1941; Fenenga 1952; Elsasser 1962; Fredrickson and Grossman 1977; Schiffman and Garfinkel 1981). Based on these sources, the general prehistory of the region can be outlined as follows.

Initial occupation of the region occurred at least as early as the *Paleoindian Period*, or prior to about 10,000 YBP (years before present). Evidence of early use of the region is indicated by characteristic fluted and stemmed points found around the margin of Tulare Lake, in the foothills of the Sierra, and in the Mojave Desert proper. (In each case, these are locations many miles distant from the study areas.)

Both fluted and stemmed points are particularly common around the Tulare Lake margins, suggesting a terminal Pleistocene/early Holocene lakeshore adaptation similar to that found throughout the far west at the same time; little else is known about these earliest peoples. Although human occupation of the state is well-established during the Late Pleistocene, relatively little can be inferred about the nature and distribution of this occupation with a few exceptions. First, little evidence exists to support the idea that these Paleo-Indians peoples were big-game hunters, similar to those found on the Great Plains. Second, the western Mojave Desert evidence suggests small, very mobile populations that left a minimal archaeological signature.

Substantial evidence for human occupation of California first occurs during the middle Holocene, roughly 7,500 to 4,000 YBP. This period is known as the *Early Horizon*, or alternatively as the Early Millingstone along the Santa Barbara Channel. In the south, populations concentrated along the coast with minimal visible use of inland areas. Adaptation emphasized hard seeds and nuts with tool-kits dominated by mullers and grindstones (manos and metates). Additionally, little evidence for Early Horizon occupation exists in most inland portions of the state, partly due to a severe cold and dry paleoclimatic period occurring at this time. Regardless of specifics, Early Horizon population density was low with a subsistence adaptation more likely tied to plant food gathering than hunting.

Environmental conditions improved dramatically after about 4,000 YBP during the *Middle Horizon* (or Intermediate Period). This period known climatically as the Holocene Maximum (circa 3,800 YBP) and was characterized by significantly warmer and wetter conditions than previously experienced. Archaeologically, it was marked by large population increase and radiation into new environments along coastal and interior south-central California and the Mojave Desert (Whitley 2000). In the Delta region to the north, this same period of favorable environmental conditions was characterized by the appearance of the Windmiller culture which exhibited a high degree of ritual elaboration (especially in burial practices) and perhaps even rudimentary mound-building tradition (Meighan, personal communication, 1985). Along with ritual elaboration, Middle Horizon times experienced increasing subsistence specialization, perhaps correlating with the appearance of acorn processing technology. Penutian speaking peoples (including the Yokuts) are also posited to have entered the state roughly at the beginning of this period and, perhaps to have brought this technology with them (cf. Moratto 1984). Likewise it appears the so-called "Shoshonean Wedge" in southern California or the Takic speaking groups that include the Gabrielino/Fernandeño, Tataviam and Kitanemuk, may have moved into the region at this time, rather than at about 1,500 BP as first suggested by Kroeber (1925).

Evidence for Middle Horizon occupation of interior south-central California is substantial. For example, in northern Los Angeles County along the upper Santa Clara River, to the south of the San Joaquin Valley, the Agua Dulce village complex indicates occupation extending back to the Intermediate Period, when the population of the village may have been 50 or more people (King et al. n.d.). Similarly, inhabitation of the Hathaway Ranch region near Lake Piru, and the Newhall Ranch near Valencia, appears to date to the Intermediate Period (W & S Consultants 1994). To the west, little or no evidence exists for pre-Middle Horizon occupation in the upper Sisquoc and Cuyama River drainages; populations first appear there at roughly 3,500 YBP (Horne 1981). The Carrizo Plain, the valley immediately west of the San Joaquin, experienced a major population expansion during the Middle Horizon (W & S Consultants 2004; Whitley et al. 2007), and recently collected data indicates the Tehachapi Mountains region was first significantly occupied during the Middle Horizon (W&S Consultants 2006). A parallel can be drawn to the inland Ventura County region where a similar pattern has been identified (Whitley and Beaudry 1991), as well as the western Mojave Desert (Sutton 1988a, 1988b), the southern Sierra Nevada (W & S Consultants 1999), and the Coso Range region (Whitley et al. 1988). In all of these areas, a major expansion in settlement, the establishment of large site complexes and an increase in the range of environments exploited appear to have occurred sometime roughly around 4,000 years ago. Although most efforts to explain this expansion have focused on local circumstances and events, it is increasingly apparent this was a major southern California-wide occurrence and any explanation must be sought at a larger level of analysis (Whitley 2000). Additionally, evidence from the Carrizo Plain suggests the origins of the tribelet level of political organization developed during this period (W & S Consultants 2004; Whitley et al. 2007). Whether this same demographic process holds for the southern San Joaquin Valley, including the study area, is yet to be determined.

The beginning of the *Late Horizon* is set variously at 1,500 and 800 YBP, with a consensus for the shorter chronology. Increasing evidence suggests the importance of the Middle-Late Horizons transition (AD 800 to 1200) in the understanding of south-central California. This corresponds to the so-called Medieval Climatic Anomaly, a period of climatic instability that included major droughts and resulted in demographic disturbances across much of the west (Jones et al. 1999). It is also believed to have resulted in major population decline and abandonments across south-central California, involving as much as 90 percent of the interior populations in some regions including the Carrizo Plain (Whitley et al. 2007). It is not clear whether site abandonment was accompanied by a true reduction in population or an agglomeration of the same numbers of peoples into fewer but larger villages. What is clear is that Middle Period villages and settlements were widely dispersed across the landscape; many at locations that lack contemporary evidence of fresh water sources. Late Horizon sites, in contrast, are typically located where fresh water was available during the historical period, if not currently.

The subsequent Late Horizon can be best understood as a period of recovery from a major demographic collapse. One result is the development of regional archaeological cultures as the precursors to ethnographic Native California; suggesting that ethnographic life-ways recorded by anthropologists extend roughly 800 years into the past.

The position of southern San Joaquin Valley prehistory relative to patterns seen in surrounding areas is still somewhat unknown. The presence of large lake systems in the valley bottoms can be expected to have mediated some of the desiccation seen elsewhere. But, as the reconstruction of

Soda Lake in the nearby Carrizo Plain demonstrates (see Whitley et al. 2007), environmental perturbations had serious impacts on lake systems too. Identifying certain of the prehistoric demographic trends for the southern San Joaquin Valley and determining how these trends (if present) correlate with those seen elsewhere, is a current important research objective.

2.4.1 Significant Themes

Previous research and the nature of the prehistoric archaeological record suggest two significant themes, both of which fall under the general Prehistoric Archaeology area of significance. These are the Expansion of Prehistoric Populations and Their Adaptation to New Environments; and Adaptation to Changing Environmental Conditions.

The Expansion of Prehistoric Populations and Their Adaptation to New Environments theme primarily concerns the Middle Horizon/Holocene Maximum. Its period of significance runs from about 4,000 to 1,500 YBP. It involves a period during which the prehistoric population appears to have expanded into a variety of new regions, developing new adaptive strategies in the process.

The Adaptation to Changing Environmental Conditions theme is partly related to the Holocene Maximum, but especially to the Medieval Climatic Anomaly. The period of significance for this theme, accordingly, extends from about 4,000 to 800 YBP. This theme involves the apparent collapse of many inland populations, presumably with population movements to better environments such as the coast. It is not yet known whether the southern San Joaquin Valley, with its system of lakes, sloughs and swamps, experienced population decline or, more likely, population increase due to the relatively favorable conditions of this region during this period of environmental stress.

2.4.2 Associated Property Types

Given the physiographic and hydrographic nature of the southern San Joaquin Valley (low-lying alluvial flats prehistorically containing streams, sloughs, swamps and lakes), two primary site types can be expected for both themes: villages and camps, and resource exploitation/special activity areas. Archaeological evidence potentially pertinent to these themes could include settlement locations and sizes, trade patterns, and especially subsistence evidence.

Prehistoric sites would be primarily eligible under NRHP Criterion D, research potential. Eligibility would require integrity in the form of intact archaeological deposits, including preserved stratigraphic relationships, internal site features, and artifact associations.

2.5 HISTORICAL BACKGROUND

Spanish explorers first visited the southern end of the San Joaquin Valley in 1772, but its lengthy distance from the missions and presidios along the Pacific Coast delayed permanent settlement for many years, including during the Mexican period of control over the Californian region. In the 1840s, Mexican rancho owners along the Pacific Coast allowed their cattle to wander and graze in the San Joaquin Valley (JRP Historical Consulting 2009). The Mexican government granted the first ranchos in the southern part of the San Joaquin Valley in the early 1840s, but these did not

result in permanent settlement. It was not until the annexation of California in 1848 that the exploitation of the southern San Joaquin Valley began (Pacific Legacy 2006).

The discovery of gold in northern California in 1848 resulted in a dramatic increase of population, consisting in good part of fortune seekers and gold miners, who began to scour other parts of the state. Population throughout the area grew rapidly with this rush, with new immigrants ranching in the San Joaquin Valley to supply the miners and mining towns. Ranchers grazed cattle and sheep, and farmers dry-farmed or used limited irrigation to grow grain crops, leading to the creation of small agricultural communities throughout the valley (JRP Historical Consulting 2009).

After the American annexation of California, the southern San Joaquin Valley became significant as a center of food production for this new influx of people in California. The expansive unfenced and principally public foothill spaces were well suited for grazing both sheep and cattle (Boyd 1997). As the Sierra Nevada gold rush presented extensive financial opportunities, ranchers introduced new breeds of livestock, consisting of cattle, sheep and pig (Boyd 1997).

With the increase of ranching in the southern San Joaquin came the dramatic change in the landscape, as non-native grasses more beneficial for grazing and pasture replaced native flora (Preston 1981). After the passing of the Arkansas Act in 1850, efforts were made to reclaim small tracts of land in order to create more usable spaces for ranching. Eventually, as farming supplanted ranching as a more profitable enterprise, large tracts of land began to be reclaimed for agricultural use, aided in part by the extension of the railroad in the 1870s (Pacific Legacy 2006).

Following the passage of state-wide 'No-Fence' laws in 1874, ranching practices began to decline, while farming expanded in the San Joaquin Valley in both large land holdings and smaller, subdivided properties. As the farming population grew, so did the demand for irrigation. Settlers began reclamation of swampland in 1866 and built small dams across the Kern River to divert water into the fields. By 1880, 86 different groups were taking water from the Kern River. Ten years later, 15 major canals provided water to thousands of acres in Kern County.

As unproductive land was reclaimed in the southern San Joaquin Valley, grants were given to individuals who had both the resources and the finances to undertake the operation alone. A small agricultural settlement, founded by Colonel Thomas Baker in 1861 after procuring one such grant, took advantage of reclaimed swampland along the Kern River. This settlement became the City of Bakersfield in 1869, and quickly became the center of activity in the southern San Joaquin Valley, and in the newly formed Kern County. Located on the main stage road through the San Joaquin Valley, the town became a primary market and transportation hub for stock and crops, as well as a popular stopping point for travelers on the Los Angeles and Stockton Road. The Southern Pacific Railroad reached the Bakersfield area in 1873, connecting it with important market towns elsewhere in the state, dramatically impacting both agriculture and, eventually, oil production (Pacific Legacy 2006).

Three competing partnerships developed during this period which had a great impact on control of water, land reclamation and ultimately agricultural development in the San Joaquin Valley: Livermore and Chester, Haggin and Carr, and Miller and Lux, perhaps the most famous of the enterprises. Livermore and Chester were responsible, among other things, for developing the large

Hollister plow (three feet wide by two feet deep), pulled by a 40 mule team, which was used for ditch digging. Haggin and Carr were largely responsible for reclaiming the beds of the Buena Vista and Kern lakes, and for creating the Calloway Canal, which drained through the Rosedale area in Bakersfield to Goose Lake (Morgan 1914). Miller and Lux ultimately became one of the biggest private property holders in the country, controlling the rights to over 22,000 square miles, and their impacts were widespread. They recognized early-on that control of water would have important economic implications, and they played a major role in the water development of the state. They controlled, for example, over 100 miles of the San Joaquin River with the San Joaquin and Kings River Canal and Irrigation System (http://en.wikipedia.org/wiki/Henry_Miller(rancher)). They were also embroiled for many years in litigation against Haggin and Carr over control of the water rights to the Kern River. Descendants of Henry Miller continue to play a major role in California water rights, with his great grandson, George Nickel, Jr., the first to develop the concept of water banking, thus creating a system to buy and sell water (http://exiledonline.com/california-class-war-history-meet-the-oligarch-family-thats-been-scamming-taxpayers-for-150-years-and-counting/).

Numerous private irrigation systems were initially developed by individuals. The Wright Act of 1887, however, allowed the creation of public irrigation districts, greatly facilitating the funding and construction of water conveyance systems. The state-wide imbalance of water, with a drier southern and a wetter northern half of the state, and the problems that this entailed, were recognized as early as 1919, however. A report was completed in 1931, called the "State Water Plan," calling for a north-to-south water transfer. The Central Valley Act, passed by the California legislature in 1933, with a $170 million bond approved by voters that same year, was intended to initiate the implementation of that plan. The depths of the Great Depression prevented this from happening. The federal government then took over the Central Valley Project (CVP), as it was called, as a public works project, with construction beginning in 1935. The federal CVP was intended to supply water to Fresno, Tulare and Kern counties. Friant Dam, which created Millerton Lake, was completed in 1942. It supplies water for the Friant-Kern and Madera Canals. The Friant-Kern Canal, running along the east side of the valley, was constructed between 1945 and 1951 and is approximately 152-mi in length (https://water.ca.gov/Programs/State-Water-Project/History).

Although the CVP proved beneficial to San Joaquin Valley irrigation, a comprehensive, statewide water management system was still needed. The creation of the California Department of Water Resources in 1956 and the State Water Project (SWP) was the first step in this process. Construction of the Oroville Dam began in 1961, with the California Aqueduct built between 1963 and 1973. It now spans 444-mi from the San Joaquin-Sacramento River Delta in northern California south to Riverside County. It runs along the west side of the southern San Joaquin Valley (ibid).

2.5.1 Rosedale Area & RRBWSD History

The community of Rosedale is located immediately west of Bakersfield. It was formed in the late 1870s after investors enticed prospective buyers to lay claim to the land in the southern San Joaquin Valley. The dry climate of the valley and the rich soil it provided when irrigated from local water resources drew people to ranch and farm the land. The construction of the Calloway Canal in 1875 was an impetus for land sales in the area. People were drawn to the profitable irrigated land that this canal provided, sourcing its water supply from the Kern River. Marketing was particularly

focused on English settlers who emigrated from the United Kingdom to the area called "Rosedale" for its abundant natural supply of roses. S.W. Fergusson, manager of the Kern Land Company, printed ads in English newspapers proclaiming the abundance of farmland in Rosedale. In March 1890, the first English emigrants arrived in Rosedale and purchased land. By 1889, Rosedale had a town site and appeared to be growing. In the next few years, Rosedale residents suffered drought and the nation suffered financial panic in the mid-1890s. Colonization efforts failed by the turn of the twentieth century. Although the Santa Fe Railroad laid tracks through Rosedale in 1899, attempts at reviving the area failed (Lynch 2006).

Through the twentieth century, the Rosedale area became a quiet suburb of the growing city of Bakersfield. As irrigation efforts of the San Joaquin Valley increased in the twentieth century, more water districts, formed by local land-owners and farmers, were established.

The RRBWSD was founded in 1959, named after the community of Rosedale and the nineteenth-century Mexican moniker for the Kern River, "Rio Bravo" (Lynch 2006). It was created to construct and operate a groundwater recharge project to offset declining groundwater levels. These declines largely resulted from the construction of the Lake Isabella Dam on the Kern River, completed in 1954. Prior to the dam's completion, seasonal flooding occurred on average every three years and served to replenish groundwater in the Rosedale area. With the loss of those periodic flood waters, groundwater control was required (RRBWSD 1997). Today RRBWSD covers 44,150-ac and has an annual maximum recharge of 234,000 acres-feet. Approximately 27,000-ac of the RRBWSD consists of irrigated agricultural lands, with the remainder comprising rural development and light industry.

The first water recharge project was initiated by RRBWSD in 1959 and completed in 1962, directed at capturing water supplies and percolating them into the underground aquifer using recharge basins and water conveyance systems. The RRBWSD delivery system consists of 25-mi of earthen canals, 2-mi of pipeline and a number of check structures and wells, including approximately 20 connections to landowner irrigation systems used for in-lieu groundwater recharge (ibid).

The Goose Lake Slough, which branches off the Kern River to the south of the Rosedale area, was initially modified in 1874 when the head of the slough was cleaned and enlarged and a regulator was placed across it (Grunsky 1898). Channelization of the slough started with the construction of the Cross Valley Canal in 1975 and continued into the 1990s. It is currently entirely channelized and it terminates in a series of RRBWSD recharge basins. Renamed the Goose Lake Channel, it connects to both the Kern River and the Cross Valley Canal.

The Cross Valley Canal is the Kern County Water Agency's primary conduit for water delivered to and from the California Aqueduct (Kern County Water Agency 2014). The canal was built in 1975 and expanded between 2005 and 2012. It is now 21.5-mi in length (https://www.kcwa.com/projects/).

The sandy-bottomed Kern River proved very inefficient for moving water through the flats of the San Joaquin Valley. The Kern County Land (KCL) Company, successor to Miller and Lux, owned most of these rights. They created the concrete-lined Kern River Canal in 1963, which is south of

and parallels the current riverbed, to improve their water supply west of Bakersfield. The creation of the lined channel contributed to ground water problems in the City of Bakersfield. The City sued Tenneco in 1970, who had acquired KCL in 1967, obtaining their lands, infrastructure and water rights by legal settlement in 1976 for $18 million (Stetson 1975; Water Resources Department 2003). The City now operates the Kern River Canal and controls use of the Kern River through its boundaries, which is usually dry west of Highway 99.

2.5.2 Significant Themes

Development of Irrigated Agriculture in the San Joaquin Valley, 1852-1964

As identified by Caltrans in the *Water Conveyance Systems in California Historic Context Development and Evaluation Procedures*, the "Development of Irrigated Agriculture" is a historically significant theme or event in the history of California and the Central Valley region. Properties associated with this theme are most likely to be eligible under NRHP/CRHR criterion A/1. In the years following California's statehood and the gold rush, increasing population created a growing market for agricultural products. The total irrigated acreage in the state grew from 60,000-ac in 1860 to nearly 400,000-ac by 1880, an increase of more than 650 percent, and the San Joaquin Valley contained the highest percentage of that land (approximately 47 percent) (Caltrans 2000). Private water companies, land colonies, mutual water companies, and irrigation districts were established in the mid- to late nineteenth century to build irrigation systems to further develop the state's agriculture industry. Irrigation districts became the most influential of these organizations, especially after state legislation—the Wright Act of 1887—irrigation districts grew in number, power, as well as the actual amount of irrigated land throughout the state. Forty-nine irrigation districts were organized between 1887 and 1896, most of them located between Stockton and Bakersfield. However, by the late 1920s, only seven of the original districts were still in existence, among them the Modesto, Turlock, and Tulare irrigation districts (Caltrans 2000). Under the impetus of increased demand during World War I, agricultural production reached a new peak in 1920. Companies like Pacific Gas & Electric and San Joaquin Valley Light and Power helped finance large irrigation reservoirs to feed district canals in return for the power generated. By 1930, there were 94 active districts in California, and the land watered by these agencies mushroomed to 1.6 million acres (Caltrans 2000). Irrigation districts provided more than 90 percent of the surface water used for irrigation in the San Joaquin Valley before the Central Valley Project came online in the 1940s (Caltrans 2000). Most were located in the San Joaquin Valley, with the most successful in Modesto, Turlock, Merced, and Fresno.

The period of significance for this theme begins with the earliest developments of irrigated agriculture in the San Joaquin Valley, with the construction of the earliest earthen ditches in Visalia in 1852. Irrigated agriculture continues to be an important industry and influence in the Valley. The period of significance ends in 1964 following recommended guidance for closing a period of significance 50 years ago when activities continued to have importance, but no more specific date can be defined to end the historic period, and there is no justification for exceptional significance to extend the period of significance to an end date within the last 50 years (National Register of Historic Places 1997).

2.5.3 Associated Property Types

Water Conveyance Systems

Following the framework established by Caltrans in *Water Conveyance Systems in California Historic Context Development and Evaluation Procedures*, the water conveyance system is the property type that has the potential to reflect this theme and period. Components and features of water conveyance systems include diversion structures, conduits, flow control devices, cleansing devices, and associated resources and settings. Water Conveyance Systems that are associated with Development of Irrigated Agriculture in the San Joaquin Valley, 1852-1964 will be eligible under NRHP Criterion A/CRHR Criterion 1 for their association with this significant theme if:

- the association with the theme is important--simply because a water conveyance existed during the period of significance is not enough for that system to be eligible;
- the resource retains high overall integrity because of the high number of comparable examples. The property should retain most of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.
- Due to the nature of this type of resource, repairs and modifications are acceptable but not if those modifications substantially modified the resource.

Water Conveyance Systems that are associated with Development of Irrigated Agriculture in the San Joaquin Valley, 1852-1964 will be eligible under NRHP Criterion B/CRHR Criterion 2 for their association with this significant theme if:

- they associated with an important person's productive life *and* the property that is most closely associated with that person;
- the resource retains high overall integrity because of the high number of comparable examples. The property should retain most of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.
- Due to the nature of this type of resource, repairs and modifications are acceptable but not if those modifications substantially modified the resource.

Water conveyance systems will rarely be found eligible under Criterion B/2. In California notable names for which there might be associations with water planning, construction, or engineering include: Anthony Chabot, George Chaffey, Frederick Eaton, William Mulholland, George Maxwell, Robert Marshall, Elwood Mead and C. E. Grunsky (Caltrans 2000).

2.5.4 Technological Innovation in Irrigated Agriculture in California, 1852-1964

Properties associated with the technological innovation in irrigated agriculture in California are most likely to be eligible under NRHP/CRHR criterion C/3. Caltrans clearly defines the historic context for this theme in the "Legacy of Irrigation Canals" section of the context, while ASM has defined a period of significance based on the Caltrans context (Caltrans 2000). The below is a direct excerpt from the context:

The earliest irrigation water conveyances in California were roughly made, earthen ditches to divert water. Techniques used to construct irrigation canals have varied widely during the various periods of California's history, from the relatively short, hand-dug, early masonry and tile ditches, to horse-scraped and hand-dug earthen irrigation ditches, to the large concrete-lined, machine-formed irrigation canals of the middle decades of the twentieth century. Evidence of these changes in scale, methods of construction, and knowledge of engineering are reflected in the remaining physical resources found on the landscape today. Substantial regional variation exists with respect to the adoption and dissemination of the new technologies, such as where and when concrete replaced wood in the engineering works of major irrigation canals. These regional differences can be explained in part by cultural traditions with respect to water management, ownership of water rights, and environmental factors, but economics, politics, and the formation of particular types of irrigation institutions also played significant roles.

Older canals were often subject to substantial change over time. A common change was to expand the system in order to serve more acreage. Unless pumps are used, irrigation canals rely on gravity to move water, and they can provide service only to land lying below the canal's water level. As irrigated acreage expanded, water companies frequently consolidated smaller ditch systems, moved the point of diversion upstream, and built a high-line canal to service new acreage. In this manner, pioneer canals were often absorbed into larger systems, frequently by irrigation districts, to pull in more potentially irrigable lands. Segments of earlier irrigation systems might remain largely intact within the larger framework of a new irrigation system, or the changes could be such that the old separate irrigation system would become, in essence, a typical component of a new 1920s irrigation district canal.

Another important factor is that water is notoriously difficult to control; it can be, and frequently is, an engine of destruction. Flood waters, for example, repeatedly overwhelmed the flimsy wooden control structures built on nineteenth and early-twentieth century irrigation systems in the San Joaquin Valley. Canals were also often altered as a result of improvements designed to counteract the normal erosion that occurs from water moving through earth-lined canals. Improvements to stabilize canals ranged from realigning segments of the channel, to lining ditches or putting them in pipe, to replacement of checks, drops, culverts, or other regulation structures. These improvements were sometimes carried out system-wide, sometimes on a piecemeal basis. In light of the proclivity for change and the wide diversity of canal materials and modes of construction, adequate documentary research is essential to understand the evolution of an important irrigation canal and to assess its integrity (Caltrans 2000).

The period of significance for this theme begins with the earliest developments of irrigated agriculture in California, with the construction of the earliest earthen ditches in Visalia in 1852. Technological innovations in agricultural irrigation are ongoing, but the period of significance ends in 1964 following recommended guidance for closing a period of significance 50 years ago when activities continued to have importance, but no more specific date can be defined to end the historic period, and there is no justification for exceptional significance to extend the period of significance to an end date within the last 50 years (National Register of Historic Places 1997).

2.5.5 Associated Property Types

Water Conveyance Systems

Following the framework established by Caltrans in *Water Conveyance Systems in California Historic Context Development and Evaluation Procedures,* the water conveyance system is the property type that has the potential to reflect this theme and period. Components and features of water conveyance systems include diversion structures, conduits, flow control devices, cleansing devices, and associated resources and settings. Water Conveyance Systems that are associated with Technological Innovation in Irrigated Agriculture in California, 1852-1964 will be eligible under NRHP Criterion C/CRHR Criterion 3 for their association with this significant theme if they are/have:

- unique values;
- the best or good example of the property type as one that possess distinctive characteristics of the type and through those characteristics clearly illustrates at least one of the following;
    - the pattern of features common to a particular class of resources
    - the individuality or variation of features that occurs within the class;
    - the evolution of that class; or
    - the transition between classes of resources
- the earliest, best preserved, largest, or sole surviving example of particular types of water conveyance systems;
- a design innovation of evolutionary trends in engineering
- designed by a figure of acknowledged greatness in the field or by someone unknown whose workmanship is distinguishable from others by its style and quality *and* be a good example of that designer's work;
- the resource retains high overall integrity because of the high number of comparable examples. The property should retain most of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.

A large water conveyance system with multiple components will often be evaluated as a district rather than as a single property. An eligible historic district must possess a significant concentration or linkage of resources that are united historically or aesthetically by plan or physical development. It should be a significant and distinguishable entity, although its components need not possess individual distinction (Caltrans 2000).

3. ARCHIVAL RECORDS SEARCH

An archival records search was conducted at the California State University, Bakersfield, Southern San Joaquin Valley Archaeological Information Center (IC), by IC staff members to determine: (i) if prehistoric or historical archaeological sites had previously been recorded within the study area; (ii) if the project area had been systematically surveyed by archaeologists prior to the initiation of this field study; and/or (iii) whether the region of the field project was known to contain archaeological sites and to thereby be archaeologically sensitive. Additionally, a search of the NAHC *Sacred Lands File* was conducted in order to ascertain whether traditional cultural places or cultural landscapes had been identified within the project area of potential effect (APE). The results of this archival records search are summarized here.

The records search at the IC indicated that six previous archaeological surveys had been completed that covered portions of the APE (Table 1; Confidential Appendix A). An additional six previous archaeological surveys had been conducted within a 0.5-mi radius. No archaeological resources were identified within the Project APE according to the records search. Two previously recorded linear historical resources are however present: the Cross Valley Canal (P-15-008026) and the Goose Lake Slough/Rio Bravo Canal (P-15-0008121). These are discussed below. Two additional built environment resources are located within 0.5-mi of the APE (Table 3).

Table 1 Survey Reports Within the APE.

Report No	Year	Author (s)/Affiliation	Title
KE-00707	1988	Napton, L. Kyle and Greathouse, E.A./ California State University, Stanislaus Foundation, Institute for Archaeological Research	Cultural Resource Investigation of the Proposed Kern River Parkway Project, City of Bakersfield, Kern County, California
KE-00846	1994	Parr, Robert E./ Cultural Resource Facility, California State University, Bakersfield	Archaeological Assessment of 4,525.45 Acres of Land West of Bakersfield, Kern County, California
KE-00866	1992	Parr, Robert E. and Osborne, Richard/ Cultural Resource Facility, California State University, Bakersfield	Archaeological Survey Report for the Proposed Route Adoption Study on Highway 58, Bakersfield, Kern County, California
KE-01023	1996	The Planning Center	Preliminary Archaeological Resources Evaluation for Buena Vista, Bakersfield, California
KE-02807	1993	Herbert, Rand F./ JRP Historical Consulting Services	Historic Resource Evaluation Report: Tier 1, Route Adoption on Route 58 Between I-5 and State Route 99
KE-04262	2012	Hudlow, Scott M./ Hudlow Cultural Resource Associates	A Phase I Cultural Resources Survey for Proposed Plains LPG Service Pipeline Energy Gas Plant to Plains LPG Facility, Kern County and City of Shafter, California

Table 2 Survey Reports Within 0.5-Mi of the APE.

Report No	Year	Author (s)/Affiliation	Title
KE-01315	1988	Schiffman, Robert A./ Bakersfield College	Archaeological Investigation for 40 Acre Subdivision, Kern County, California
KE-01601	1989	Sutton, Mark Q. and Pruett, Catherine Lewis/ Cultural Resource Facility, California State University, Bakersfield	An Archaeological Survey of Sections 6 and 7, T.30S, R.27E for Oceanic, Inc.
KE-01728	1984	Uli, Jim and Schiffman, Robert A./ Bakersfield College	Archaeological Investigation of Proposed Rosedale Wastewater Sewage Treatment Plant, 1600 Acres Bakersfield, Kern County, California
KE-02390	1999	Hudlow, Scott M./ Hudlow Cultural Resource Associates	Negative Historic Property Survey Report: Southwest Bakersfield Bike Path Between Stockdale and Enos Lane
KE-02435	2000	Hudlow, Scott M./ Hudlow Cultural Resource Associates	A Historic Architectural Survey Report for the Southwest Bike Path and the Southern Pacific Rail Bridge over the Kern River, City of Bakersfield, California
KE-03483	2003	Hudlow, Scott M./ Hudlow Cultural Resource Associates	A Phase I Cultural Resource Survey Alliance Appraisal, Bardeen Partners, Kern County, California

Table 3 Resources Within 0.5-Mi of the APE.

Site No.	Description
P-15-002050/ CA-KER-2050H	Southern Pacific Railroad
P-15-017761/ CA-KER-9798H	Pioneer Canal

The NAHC *Sacred Lands File* includes no sacred sites or tribal cultural resources within or near to the Project APE. Outreach letters were sent to tribes and tribal organizations on the NAHC contact list (Confidential Appendix A). Follow-up emails were also sent. No knowledge of or concern with tribal cultural resources was expressed by the groups and individuals contacted.

In addition to these sources, historical USGS topographical quadrangles and historical aerial photographs (at historicaerials.com) were examined to determine changes in land-use within the Project APE. These sources were particularly helpful in verifying the periods of construction and modification of linear historical structures.

The Goose Lake Slough was channelized and its course regularized between 1994 and 2017; it is now called the Goose Lake Channel. This canal was recorded in 1993 by JRP Historical Consulting as P-15-0008121, the Rio Bravo/Goose Lake Canal. It was evaluated for eligibility to the NRHP in 1997 and 2004 and was determined not eligible by consensus.

A portion of the Cross Valley Canal was completed in 1975 but it was extended and modified between 2005 and 2012. This historical resource was also recorded in 1993 by JRP Historical Consulting as P-15-0008026, the Cross Valley Canal. It was evaluated for eligibility to the NRHP in 1997 and 2004. It was determined not NRHP eligible by consensus.

4. METHODS AND RESULTS

The RRBWSD Groundwater Banking and Conveyance Improvement Project would construct recharge ponds, improve weir and intake structures, and add SCADA improvements to existing structures in order to better manage water resources. Construction access to each of these features will occur using existing road routes, and all project ground-surface disturbance will occur within previously disturbed areas. The APE was surveyed under the direction of David S. Whitley, Ph.D., RPA, by ASM Associate Archaeologist/Crew Chief Robert Azpitarte, B.A., with assistance in the field by ASM Assistant Archaeologists Maria Silva, B.A., Ross Way, A.A., and Margarita Lemus, B.A.

Survey was conducted in order to identify surface artifacts, archaeological indicators (e.g., shellfish or animal bone), historical features (e.g., water control structures), and/or archaeological deposits (e.g., organically enriched midden soil); to tabulate and record surface diagnostic artifacts and/or features; site sketch mapping; preliminary evaluation of site integrity; and site recording, following the California Office of Historic Preservation Instructions for Recording Historic Resources, using DPR 523 forms. Special attention was paid to rodent burrow back dirt piles, in the hope of identifying sub-surface soil conditions that might be indicative of archaeological features or remains. No cultural resources were collected during the survey.

Photographs were taken of the APE during the survey. All built environment resources were identified and photographed. GIS data points were taken of each cultural resource. Fieldwork for the Project was conducted in August 2020. Soils in the study area are sandy-silty alluvium with very few lithic clasts, reflecting a soils origin in deltaic and/or riverine hydrological processes. Surface visibility was excellent throughout the study area.

The McCaslin Recharge Ponds and Weir APE was examined with the field crew walking parallel transects across the fields at 15-m intervals. The other three Project components/APEs (Houghton Weir and Kern River Turnout and Cross Valley Canal Turnout) were surveyed using a 50-m radius around each proposed location, again with parallel transects walked at 15-m spacing, to ensure that access and staging areas were covered.

4.1 INVENTORY RESULTS

Two previously recorded cultural resources, the Goose Lake Slough/Rio Bravo Canal (P-15-0008121), and the Cross Valley Canal (P-15-0008026). No other cultural resources were identified within the APE. Site record form updates for these resources are included in Confidential Appendix B. Original records for the Goose Lake Slough and Cross Valley Canal are available in Confidential Appendix C.

4.1.1 P-15-008121 (Goose Lake Slough and Houghton Weir)

Two segments (A and B) of this previously recorded built environment resource were recorded during the Class III inventory/Phase I survey. The Goose Lake Slough, now Goose Lake Channel, is a water conveyance system with both earth- and concrete-lined, open-canal conduit and control

structures. The Houghton Weir control structure is located in Segment A. Segment B is the proposed location of the weir for the McCaslin Recharge Ponds.

The Goose Lake Slough was a natural drainage that first modified in 1874 when a regulator was built across the cleaned and enlarged head of Goose Lake Slough (Grunsky 1898). The slough itself remained unchanged for 80 years, until the mid-1950s when it was initially channelized in conjunction with the construction of Isabella Reservoir (Whitley et al. 2015). One segment of the canal was recorded by JRP Historical Consulting Services (JRP) in 1993 near Renfro Road. This segment of the canal was named the "Rio Bravo Canal" by JRP. They reported a dirt-lined canal with a top width of 58-ft, a bottom width of 38-ft, and a depth of 5-ft. Additionally, they recorded six corrugated steel culverts conveying water from the canal under Renfro Road.

Based on an examination of air photos, additional channelization and regularization of the course of the Goose Lake Slough continued between 1994 and 2017. Based on this imagery, all but a small segment in the approximate middle of the drainage had been straightened by 2017. Other changes include the construction of a series of ponds where the drainage is crossed by the Westside Parkway (currently being converted to the Highway 58 freeway extension to Interstate 5). The construction of the parkway, a 4-lane elevated freeway, likewise required the straightening of segments of the canal on both sides of this roadway.

Segment A consists of an approximately 100-ft long segment of the Goose Lake Slough with Houghton Weir at the center. The weir acts as a bottleneck in the Goose Lake Slough, creating a reservoir on the east side which is approximately 230-ft wide. On the west, the canal narrows to approximately 60-ft wide. The channel is earth-bottomed in this section of the canal. Broken concrete blocks have been placed along the floor and banks of the canal on the down-canal side of the weir as erosion control. It is unclear where the blocks originated, though it is possible they are from a previous demolished version of the weir.

The weir is approximately 40-ft long (north/northwest by south/southeast) and spans a constriction in the Goose Lake Slough. It consists of nine slightly angled flashboard bays with steel supports and a steel walkway over the top. The weir is anchored by concrete support walls on either side, built atop a concrete platform. The concrete support walls and base are approximately 15-ft wide. The overall height of the weir is approximately 9-ft high (12-ft total including the walkway handrail). Based on historic aerial imagery, the existing Houghton Weir was constructed sometime between 1952 and 1968. It was likely constructed when the Goose Lake Slough was initially channelized in the mid-1950s in conjunction with the construction of the Isabella Reservoir (Whitley et al. 2015).

Segment B is located approximately 6.5-mi west at the southeast corner of the proposed McCaslin Recharge Ponds, where they intersect the channel. The segment measures approximately 230-ft northeast by southwest and the west edge of the recorded segment ends at the Rosedale Turnout No. 1 Channel. The segment varies between 40-ft wide and 60-ft wide. The channel is earth-bottomed at this spot, which currently has no existing structures.

4.1.2 P-15-008026 (Cross Valley Canal)

The Cross Valley Canal was completed in 1975 to bring SWP water from the California Aqueduct to Bakersfield. It was originally 17-mi in length but it was extended and modified between 2005 and 2012. It is now approximately 21-mi long. Five segments of the original stretch of the canal were recorded in 1993 by JRP Historical Consulting who noted that it was all concrete lined.

A segment approximately 300-ft long was recorded during the current study, at the location of the turn-out to the Goose Lake Channel. The canal is concrete sided at this location with two small embayments serving as the turn-outs, immediately upstream of a major control structure with two downstream outlets. Examination of air photo imagery shows that this portion of the Cross Valley Canal experienced major modifications between 2005 and 2008, with the addition of a second small embayment/turn-out and the construction of a second downstream outlet on the canal. The segment of this canal and its control structures are then recent/contemporary in age.

5. SUMMARY AND NRHP/CRHR ELIGIBILITY EVALUATIONS

An intensive Class III cultural resources inventory/Phase I survey was conducted for the proposed RRBWSD Groundwater Banking and Conveyance Improvement Project, near Bakersfield, Kern County, California. A records search of site files and maps was conducted at the Southern San Joaquin Valley IC and a search of the NAHC *Sacred Lands File* was completed, with outreach letters sent to tribes and tribal organizations on the NAHC contact list. Two historical cultural resources, the Goose Lake Slough/Rio Bravo Canal (P-15-0008121) and the Cross Valley Canal (P-15-8026) had been recorded within the Project APE. Both resources had been previously determined not eligible for NRHP listing by consensus. No sacred sites or tribal cultural resources were identified within or adjacent to the Project APE.

Site record forms updates were completed for segments of the two previously recorded resources within the Project APE. No additional cultural resources of any kind were identified within the APE. NRHP eligibility evaluations of the two previously recorded resources are discussed below.

5.1 P-15-008121 (GOOSE LAKE SLOUGH/RIO BRAVO CANAL)

A segment of this resource was first recorded by JRP Historical Consulting in 1993. Its NRHP eligibility were evaluated by the Federal Highway Administration (FHWA) and Department of Energy (DOE) in 1997 and 2004 and it was determined not eligible by consensus in all cases. We concur with these previous determinations.

Two segments recorded during the current study are located in suburban Bakersfield. They reflect the channelization, modification and regularization of the direction and course of this water conveyance channel that have been ongoing since the 1950s. Although the use of the Goose Lake Slough for agricultural purposes was associated with an important historical event, the Development of Irrigation Agriculture in the San Joaquin Valley, and thus could be NRHP/CRHR eligible under Criterion A/1, the recorded segments lack integrity of design, materials, location, setting, feeling and association, and they are not eligible under this criterion for this reason. The segments are not associated with an important historical individual and therefore are not eligible under Criterion B/2. The two segments lack integrity of design and materials and represent components of a common property type that is not notable for either of these qualities; the segments are thus not eligible under Criterion C/3. The two segments, finally, cannot potentially contribute to our knowledge of history that is not better attained in archival materials, and they are not eligible under Criterion D/4.

The two recorded segments of P-15-0008121 are therefore recommended as not NRHP/CRHR eligible as historic properties or significant or unique historical resources.

5.2 P-15-008026 (CROSS VALLEY CANAL)

Five segments of this resource were recorded by JRP Historical Consulting in 1993. Their NRHP eligibility was evaluated by the FHWA and DOE in 1997 and 2004 and they were determined not eligible by consensus in all cases. We concur with these previous determinations.

The Cross Valley Canal was constructed in 1975 and, taken as a whole, it currently does not meet the age criterion for inclusion in the NRHP or the CRHR. The recorded segment, moreover, was heavily modified between 2005 and 2008 and is thus contemporary in age. The recorded segment of the Cross Valley Canal is recommended as not NRHP/CRHR eligible for these reasons.

5.3 RECOMMENDATIONS

Two cultural resources, the Goose Lake Slough/Rio Bravo Canal and the Cross Valley Canal, are located with the RRBWSD Groundwater Banking and Conveyance Improvement Project APE. The recorded segments of these two resources are recommended as not NRHP/CRHR eligible based on lack of integrity or age. A Determination of No Effect on Historic Properties/No Adverse Impact on Historical Resources is therefore recommended for this Project. In the unlikely event that cultural resources are encountered during the construction or operation of the proposed Project, however, it is recommended that an archaeologist be contacted to evaluate the discovery.

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2007 The Carrizo Collapse: Art and Politics in the Past. In *Collected Papers in Honor of the Achievements of Archaeologist Jay von Werlhof,* edited by Russell L. Kaldenberg, pp. 199-208. Maturango Museum Press No. 20. Ridgecrest, California.

Whitley, David S., Shannon Davis, Jennifer Gorman, and Peter A. Carey
2015 Class III Inventory/Phase I Survey, Rosedale-Rio Bravo Water Storage District, 2014 WaterSmart Project, Kern County, California. Prepared for Rosedale-Rio Bravo Water Storage District.

CONFIDENTIAL APPENDICES

CONFIDENTIAL APPENDIX A:

RECORDS SEARCH

CONFIDENTIAL APPENDIX B:

UPDATED DPR FORMS

CONFIDENTIAL APPENDIX C:

ORIGINAL DPR FORMS

CONFIDENTIAL APPENDIX A:

Records Search and Sacred Lands File Request

California Historical Resources Information System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

6/22/2020

David Whitley
ASM Affiliates
20424 West Valley Blvd., Suite A
Tehachapi, CA 93561

Re: Rosedale Rio Bravo WSD – WaterSmart2020 McCaslin Recharge Basin Project
Records Search File No.: 20-236

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Rio Bravo and Tupman USGS 7.5' quads. The following reflects the results of the records search for the project area and the 0.5 mile radius:

As indicated on the data request form, the locations of resources and reports are provided in the following format: ☐ custom GIS maps ☒ shapefiles

Resources within project area:	None
Resources within 0.5 mile radius:	P-15-02050
Reports within project area:	KE-00561, 00866, 01173, 01174, 01182, 01183, 01960, 02034, 02232, 02500, 04262, 04435, 04672
Reports within 0.5 mile radius:	KE-01215, 01728, 03483

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☐ enclosed	☐ not requested	☒ nothing listed
Archaeological Determinations of Eligibility:	☒ enclosed	☐ not requested	☐ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed

Caltrans Bridge Survey: Not available at SSJVIC; please see

http://www.dot.ca.gov/hq/structur/strmaint/historic.htm

Ethnographic Information: Not available at SSJVIC

Historical Literature: Not available at SSJVIC

Historical Maps: Not available at SSJVIC; please see
http://historicalmaps.arcgis.com/usgs/

Local Inventories: Not available at SSJVIC

GLO and/or Rancho Plat Maps: Not available at SSJVIC; please see
http://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1 and/or
http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items

Shipwreck Inventory: Not available at SSJVIC; please see
http://www.slc.ca.gov/Info/Shipwrecks.html

Soil Survey Maps: Not available at SSJVIC; please see
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Celeste M. Thomson
Coordinator

California Historical Resources Information System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

6/22/2020

David Whitley
ASM Affiliates
20424 West Valley Blvd., Suite A
Tehachapi, CA 93561

Re: Rosedale Rio Bravo WSD – WaterSmart2020 Weir and Turnouts
Records Search File No.: 20-237

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Gosford and Stevens USGS 7.5' quads. The following reflects the results of the records search for the project area and the 0.25 mile radius:

As indicated on the data request form, the locations of resources and reports are provided in the following format: ☐ custom GIS maps ☒ shapefiles

Resources within project area:	P-15-008026
Resources within 0.25 mile radius:	P-15-008121, 017761
Reports within project area:	KE-00561, 00707, 00846, 00866, 01023, 01182, 01183, 01960, 02232, 02276, 02277, 02807, 04435
Reports within 0.25 mile radius:	KE-01601, 02390, 02435, 04672

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☒ enclosed	☐ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed

Caltrans Bridge Survey: Not available at SSJVIC; please see

http://www.dot.ca.gov/hq/structur/strmaint/historic.htm

Ethnographic Information: Not available at SSJVIC

Historical Literature: Not available at SSJVIC

Historical Maps: Not available at SSJVIC; please see
http://historicalmaps.arcgis.com/usgs/

Local Inventories: Not available at SSJVIC

GLO and/or Rancho Plat Maps: Not available at SSJVIC; please see
http://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1 and/or
http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items

Shipwreck Inventory: Not available at SSJVIC; please see
http://www.slc.ca.gov/Info/Shipwrecks.html

Soil Survey Maps: Not available at SSJVIC; please see
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

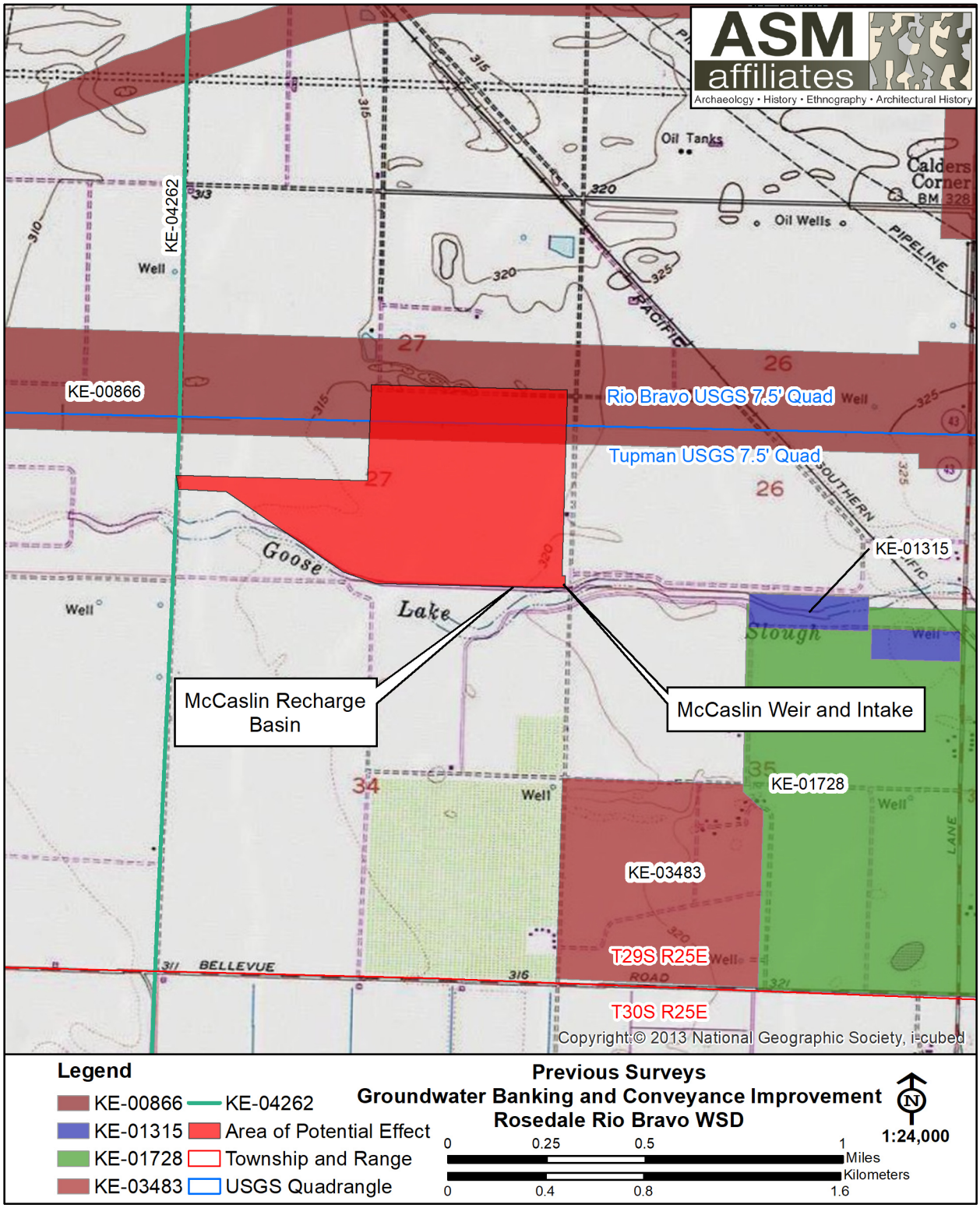
Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Celeste M. Thomson
Coordinator


ASM affiliates
Archaeology • History • Ethnography • Architectural History
KE-04262
KE-00866
KE-01315
KE-01728
KE-03483
Rio Bravo USGS 7.5' Quad
Tupman USGS 7.5' Quad
McCaslin Recharge Basin
McCaslin Weir and Intake
Oil Tanks
Oil Wells
Calders Corner
BM 328
PIPELINE
SOUTHERN PACIFIC
Goose Lake
Slough
BELLEVUE ROAD
LANE
T29S R25E
T30S R25E
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Legend
KE-00866
KE-04262
KE-01315
Area of Potential Effect
KE-01728
Township and Range
KE-03483
USGS Quadrangle
Previous Surveys
Groundwater Banking and Conveyance Improvement
Rosedale Rio Bravo WSD
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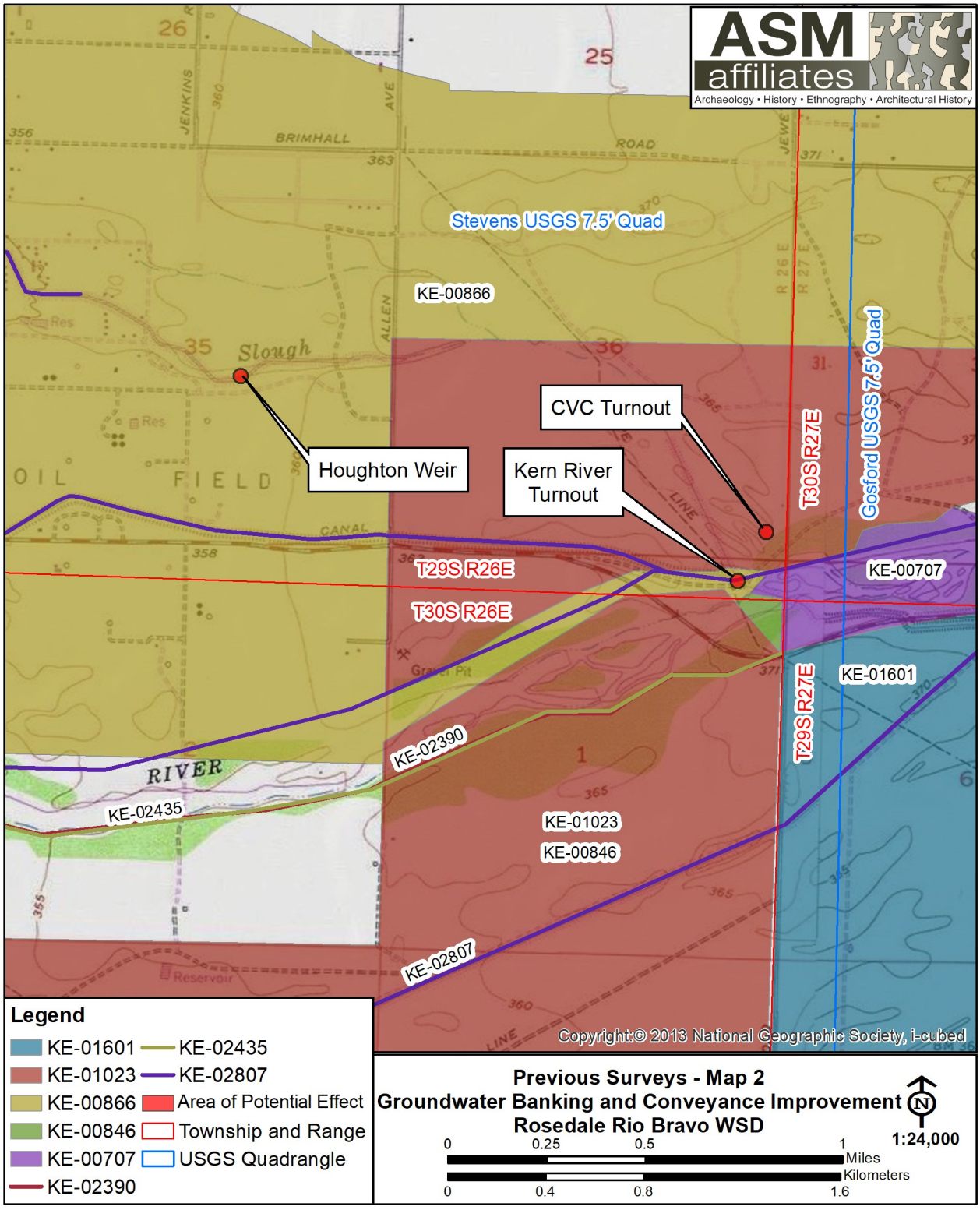
0 0.4 0.8 1.6 Kilometers


ASM affiliates
Archaeology • History • Ethnography • Architectural History
Stevens USGS 7.5' Quad
Gosford USGS 7.5' Quad
KE-00866
CVC Turnout
Houghton Weir
Kern River Turnout
T30S R27E
T29S R26E
T30S R26E
T29S R27E
KE-00707
KE-01601
KE-02390
KE-02435
KE-01023
KE-00846
KE-02807
Slough
OIL FIELD
RIVER
BRIMHALL ROAD
CANAL
Gravel Pit
Reservoir
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Legend
KE-01601
KE-01023
KE-00866
KE-00846
KE-00707
KE-02390
KE-02435
KE-02807
Area of Potential Effect
Township and Range
USGS Quadrangle
Previous Surveys - Map 2
Groundwater Banking and Conveyance Improvement
Rosedale Rio Bravo WSD
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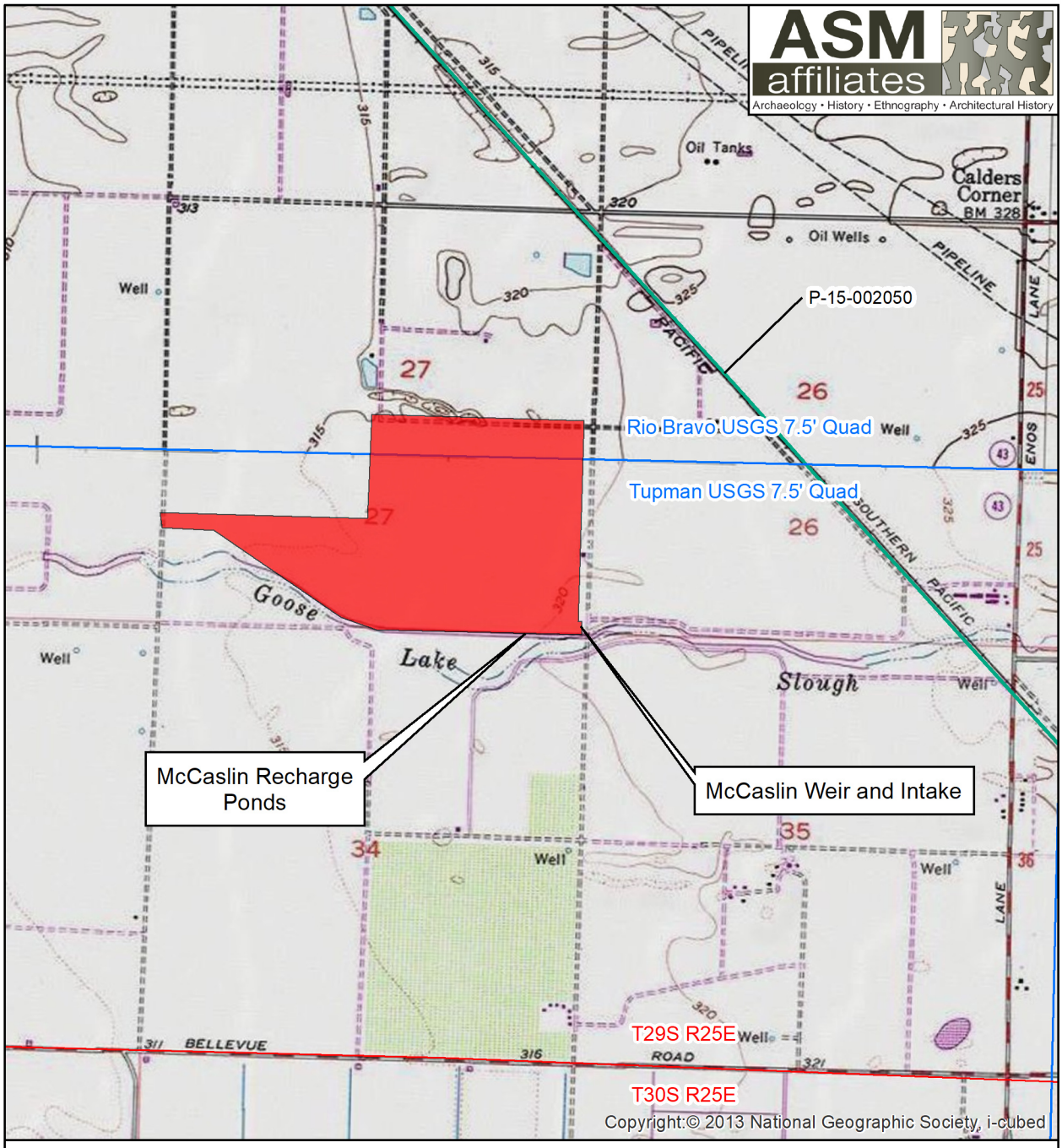

Legend

- P-15-002050
- Area of Potential Effect
- Township and Range
- USGS Quadrangle

Previously Recorded Resources - Map 1
Groundwater Banking and Conveyance Improvement Project
Rosedale Rio Bravo WSD

0 0.25 0.5 1 Miles
0 0.375 0.75 1.5 Kilometers

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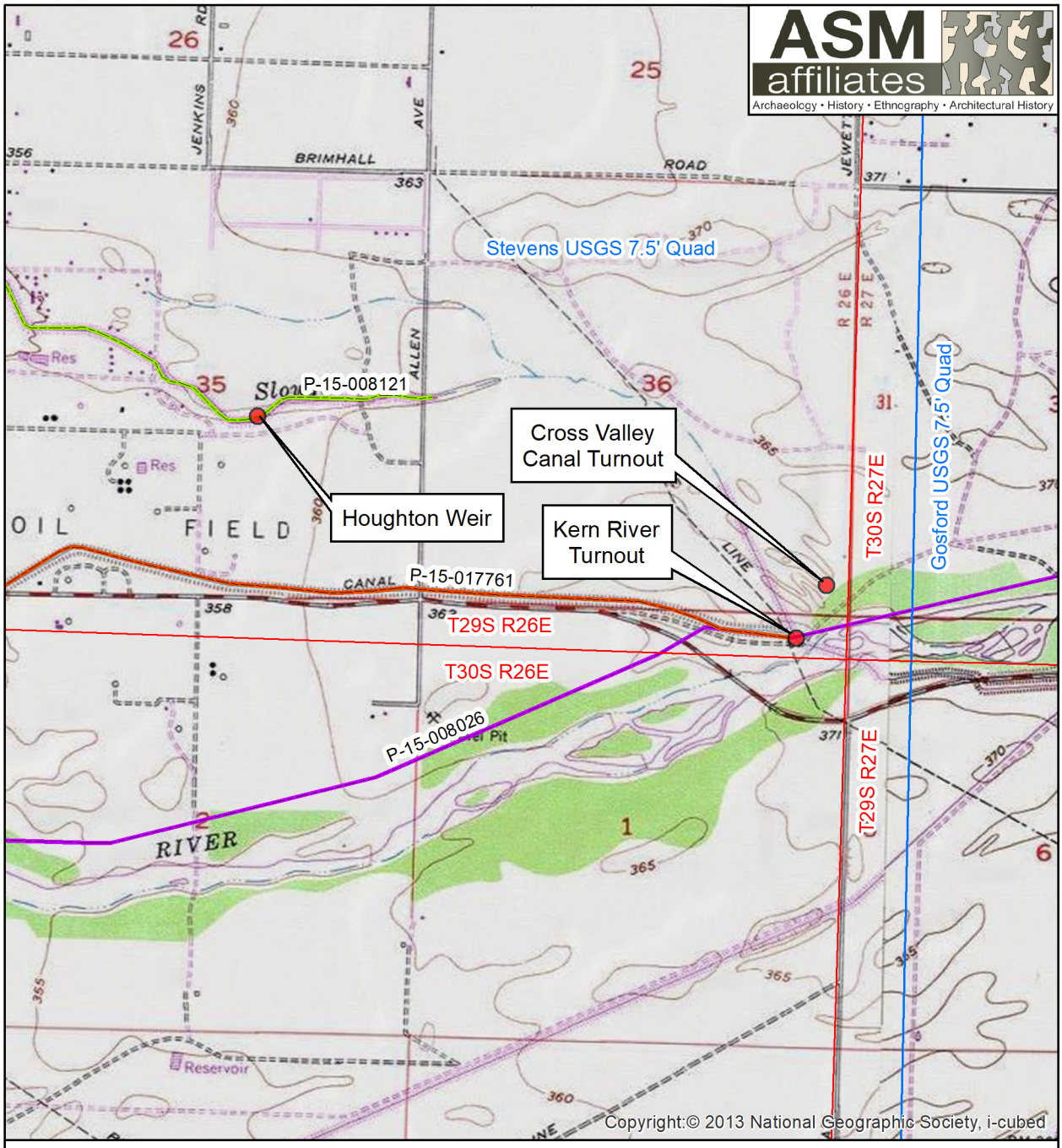

Previously Recorded Resources - Map 2
Groundwater Banking and Conveyance Improvement Project
Rosedale Rio Bravo WSD

Legend

- P-15-008026
- P-15-008121
- P-15-017761
- Area of Potential Effect
- Township and Range
- USGS Quadrangle

0 0.25 0.5 1 Miles
0 0.375 0.75 1.5 Kilometers

N

1:24,000

Report List

SSJVIC Record Search 20-237

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KE-00561	NADB-R - 1140183	1977	King, Chester and Craig, Stephen	Cultural Resources Technical Report Mo. 8 for the Draft Environmental Impact Report Point Conception LNG Project	Arthur D. Little, Inc.	15-000659, 15-000660, 15-000661, 15-000662, 15-000663, 15-000664, 15-000665, 15-000666, 15-000667, 15-000668, 15-000669
KE-00707	NADB-R - 1140404; Submitter - CSUS/IAR 88-6	1988	Napton, L. Kyle and Greathouse, E.A.	Cultural Resource Investigation of the Proposed Kern River Parkway Project, City of Bakersfield, Kern County, California	California State University, Stanislaus Foundation, Institute for Archaeological Research	
KE-00846	NADB-R - 1140789; Submitter - CRF-94-11	1994	Parr, Robert E.	Archaeological Assessment of 4,525.45 Acres of Land West of Bakersfield, Kern County, California	Cultural Resource Facility, California State University, Bakersfield	15-003958, 15-003960, 15-003961, 15-003962, 15-003963, 15-003964, 15-003965, 15-003966, 15-003967, 15-003968, 15-003969, 15-003970, 15-003971, 15-003972, 15-003973, 15-003974, 15-003975, 15-003976, 15-003977, 15-003978, 15-003979
KE-00866	NADB-R - 1140517; Submitter - CRF-91-39	1992	Parr, Robert E. and Osborne, Richard	Archaeological Survey Report for the Proposed Route Adoption Study on Highway 58, Bakersfield, Kern County, California	Cultural Resource Facility, California State University, Bakersfield	15-002243, 15-002503, 15-002504, 15-002694, 15-002707, 15-002874, 15-003057, 15-003058, 15-003068, 15-003069, 15-003070, 15-003071, 15-003072, 15-003073, 15-003088, 15-003090, 15-003092, 15-003093, 15-003102, 15-003103, 15-003104, 15-003105, 15-003106, 15-003107, 15-003108, 15-003109, 15-003110, 15-003111, 15-003112, 15-003113, 15-003114, 15-003115, 15-003116, 15-003117, 15-003118, 15-003150, 15-003162, 15-003282, 15-003290, 15-003291
KE-01023		1996	Unknown	Preliminary Archaeological Resources Evaluation for Buena Vista, Bakersfield, California	The Planning Center	
KE-01182		1980	Schiffman, Robert A. and Garfinkel, Alan P.	Draft - Archaeological Overview of Kern County	Bakersfield College	
KE-01183		1981	Schiffman, Robert A. and Garfinkel, Alan P.	Prehistory of Kern County - An Overview	Bakersfield College	
KE-01601	Submitter - CRF-89-9	1989	Sutton, Mark Q. and Pruett, Catherine Lewis	An Archaeological Survey of Sections 6 and 7, T.30S, R.27E for Oceanic, Inc.	Cultural Resource Facility, California State University, Bakersfield	

Report List

SSJVIC Record Search 20-237

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KE-01960		1986	Cleland, James H., Woods, Clyde M., Skinner, Elizabeth J., Kelly, Michael S., and Apple, Rebecca M.	Kern River Pipeline Cultural Resource Overview	Dames & Moore	
KE-02232		1961	Cawley	Cawley Manuscript	University of California, Berkeley	
KE-02276		1982	Theodoratus, D.J.	Ethnographic Cultural Resources Investigation of the Big Creek-Springville-Magunden and Big Creek-Rector-Vestal-Magunden Transmission Corridors in Fresno, Tulare, and Kern Counties	Theodoratus Cultural Research, Inc.	
KE-02277		1982	Theodoratus, D.J. and Marshall, Lynn	Historical Resources Investigation of the Big Creek-Springville-Magunden and Big Creek-Rector-Vestal-Magundent Transmission Corridors in Fresno, Tulare, and Kern Counties, California	Theodoratus Cultural Research, Inc.	
KE-02390		1999	Hudlow, Scott M.	Negative Historic Property Survey Report: Southwest Bakersfield Bike Path Between Stockale and Enos Lane	Hudlow Cultural Resource Associates	
KE-02435		2000	Hudlow, Scott M.	A Historic Architectural Survey Report for the Southwest Bike Path and the Southern Pacific Rail Bridge over the Kern River, City of Bakersfield, California	Hudlow Cultural Resource Associates	15-009577
KE-02807	Caltrans - 06-KER-58-R35.4/R52.3; Submitter - Contract No. 06G171	1993	Herbert, Rand F.	Historic Resource Evaluation Report: Tier 1, Route Adoption on Route 58 Between I-5 and State Route 99	JRP Historical Consulting Services	
KE-04435		2010	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey	Volume I: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Far Western Anthropological Research Group, Inc.	
KE-04435A		2010	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey S.	Volume II: Appendices A Geoarchaeological Overview and Assessment of Caltrans District 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Far Western Anthropological Research Group, Inc.	
KE-04672		2011	Greenwald, Alexandra	Archaeological Survey Report for the California High Speed Train Fresno to Bakersfield Section	URS Corporation	

Resource List

SSJVIC Record Search 20-237

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-15-008026		OHP Property Number - 110732; Resource Name - Cross Valley Canal	Structure	Historic	HP20	1993 (JRP Consulting, JRP Consulting); 1997	
P-15-008121		OHP Property Number - 074456; Resource Name - Goose Lake Slough; Resource Name - Rio Bravo Canal	Structure	Historic	HP20	1993 (JRP Consulting, JRP Consulting); 1997	
P-15-017761	CA-KER-009798H	Resource Name - IRWD-KRM-003-H; Pioneer Canal; OHP Property Number - 110719	Structure	Historic	HP20	1993 (JRP Historical Consulting, JRP Historical Consulting); 2012 (Kurt McLean, ESA)	KE-04538

Report List

SSJVIC Record Search 20-236

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KE-00561	NADB-R - 1140183	1977	King, Chester and Craig, Stephen	Cultural Resources Technical Report Mo. 8 for the Draft Environmental Impact Report Point Conception LNG Project	Arthur D. Little, Inc.	15-000659, 15-000660, 15-000661, 15-000662, 15-000663, 15-000664, 15-000665, 15-000666, 15-000667, 15-000668, 15-000669
KE-00866	NADB-R - 1140517; Submitter - CRF-91-39	1992	Parr, Robert E. and Osborne, Richard	Archaeological Survey Report for the Proposed Route Adoption Study on Highway 58, Bakersfield, Kern County, California	Cultural Resource Facility, California State University, Bakersfield	15-002243, 15-002503, 15-002504, 15-002694, 15-002707, 15-002874, 15-003057, 15-003058, 15-003068, 15-003069, 15-003070, 15-003071, 15-003072, 15-003073, 15-003088, 15-003090, 15-003092, 15-003093, 15-003102, 15-003103, 15-003104, 15-003105, 15-003106, 15-003107, 15-003108, 15-003109, 15-003110, 15-003111, 15-003112, 15-003113, 15-003114, 15-003115, 15-003116, 15-003117, 15-003118, 15-003150, 15-003162, 15-003282, 15-003290, 15-003291
KE-01173		1997	Barnhill, Glenn	Sale of Naval Petroleum Reserve No. 1 (Elk Hills)	Kern County Planning Department	
KE-01174		1997	Como, Anthony, Borgstrom, Carol, and Barnhill, Glenn	Draft - Supplemental Impact Statement/Program Environmental Impact Report for Sale of NPR -1 (Also Final)	United States Department of Energy	
KE-01182		1980	Schiffman, Robert A. and Garfinkel, Alan P.	Draft - Archaeological Overview of Kern County	Bakersfield College	
KE-01183		1981	Schiffman, Robert A. and Garfinkel, Alan P.	Prehistory of Kern County - An Overview	Bakersfield College	
KE-01315		1988	Schiffman, Robert A.	Archaeological Investigation for 40 Acre Subdivision, Kern County, California	Bakersfield College	
KE-01728		1984	Uli, Jim and Schiffman, Robert A.	Archaeological Investigation of Proposed Rosedale Wastewater Sewage Treatment Plant, 1600 Acres Bakersfield, Kern County, California	Bakersfield College	
KE-01960		1986	Cleland, James H., Woods, Clyde M., Skinner, Elizabeth J., Kelly, Michael S., and Apple, Rebecca M.	Kern River Pipeline Cultural Resource Overview	Dames & Moore	

Report List

SSJVIC Record Search 20-236

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KE-02034		1997	Jackson, Thomas L. and Shapiro, Lisa	Cultural Resources Management Plan Naval Petroleum Reserve No. 1, Elk Hills, Kern County, CA	Pacific Legacy, Inc.	15-000050, 15-000126, 15-000649, 15-000650, 15-000651, 15-000652, 15-000660, 15-000661, 15-000662, 15-000664, 15-002329, 15-002461, 15-002463, 15-002464, 15-003076, 15-003077, 15-003078, 15-003079, 15-003080, 15-003081, 15-003082, 15-003083, 15-003085, 15-003087, 15-003163, 15-003164, 15-003165, 15-003166, 15-003167, 15-003168, 15-003169, 15-003170, 15-003171, 15-003172, 15-003173, 15-003200, 15-003210, 15-003255, 15-003256, 15-003861
KE-02232		1961	Cawley	Cawley Manuscript	University of California, Berkeley	
KE-02500		1999	Nachmanoff, Jennifer, McKeehan, Judy, and Davy, Douglas M.	Cultural Resources Inventory of the Elk Hills Power Project, Kern County, California	Foster Wheeler Environmental Corporation	
KE-02500A		1998	Unknown	Elk Hills Power Project - Protocol for Cultural Resources Data Collection	Foster Wheeler Environemental Corporation	
KE-02500B		1999	Unknown	Application for Certification for Elk Hills Power Project Kern County, California - Volume I - Text	Foster Wheeler Environmental Corporation	
KE-03483		2003	Hudlow, Scott M.	A Phase I Cultural Resource Survey Alliance Appraisal, Bardeen Partners, Kern County, California	Hudlow Cultural Resource Associates	
KE-04262		2012	Hudlow, Scott M.	A Phase I Cultural Resources Survey for Proposed Plains LPG Service Pipeline Inergy Gas Plant to Plains LPG Facility, Kern County and City of Shafter, California	Hudlow Cultural Resource Associates	
KE-04435		2010	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey	Volume I: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Far Western Anthropological Research Group, Inc.	
KE-04435A		2010	Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey S.	Volume II: Appendices A Geoarchaeological Overview and Assessment of Caltrans District 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant	Far Western Anthropological Research Group, Inc.	

Report List

SSJVIC Record Search 20-236

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KE-04672		2011	Greenwald, Alexandra	Archaeological Survey Report for the California High Speed Train Fresno to Bakersfield Section	URS Corporation	

Resource List

SSJVIC Record Search 20-236

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-15-002050	CA-KER-002050H	Resource Name - Southern Pacific Railroad, McKittrick Branch; Resource Name - Midway-Sunset 2; Resource Name - KS-1; Resource Name - FCG-27; Resource Name - Old Southern Pacific Railroad Grade; Resource Name - Asphalto Line of the South Pacific Railroad	Structure, Site	Historic	AH02; AH04; AH07; HP39	1985 (R. Apple, J. Underwood, Wirth Environmental Services); 1987 (R. Schiffman); 1994 (Bruce Steidl, Keith Colvin, Helen Johnson, Woodward-Clyde Cosultants); 1995 (R.E. Parr, Center for Archaeological Research, California State University, Bakersfield); 1996 (R. Tidmore, J. Gardner, R.E. Parr, J. Hinshaw, Center for Archaeological Research, California State University, Bakersfield); 1998 (B. Hatoff, P. Frazier, D. Lawler, Woodward-Clyde International-Americas); 1998 (P. Frazier, L. Wear, B. Hattoff, D. Lawler, Woodward-Clyde International-Americans); 1999; 1999 (Mike Aviña, Jones & Stokes Associates, Inc.); 1999 (B. Hatoff, B. Bass, D. Lawler, URS Greiner Woodward-Clyde); 2009 (K.R. Way, J.M. Hamad, J. Sprague, G. Sprague, Pacific Legacy, Inc.); 2009 (K.R. Way, J. Sprague, N. Sims, P. Sharp-Garcia, C. Davis, M. Armstrong, A Stevenson, Pacific Legacy, Inc.); 2010 (L. Hoffman, J. Covert, SWCA Environmental Consultants); 2011 (M. Dalope, S. Andrews, C. Whitley, J. Neal, ASM Affiliates, Inc.); 2012 (S. Andrews, ASM Affiliates, Inc.); 2012 (A. Bell, C. Rambo, C. Whitley, S. Escamilla, A. Troupin, R. Azpitrate, ASM Affiliates, Inc.); 2016 (P. Carey, ASM Affiliates, Inc.); 2018 (Marcos Ramos Ponciano, Andrew York, AECOM)	KE-00861, KE-00865, KE-01267, KE-01958, KE-01994, KE-02162, KE-02278, KE-02452, KE-02560, KE-04056, KE-04383, KE-04414, KE-04503, KE-05045

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

June 29, 2020

Peter Carey

ASM Affiliates

Via Email to: pcarey@asmaffiliates.com

Re: Rosedale Rio Bravo WSD WaterSmart2020 McCaslin Recharge Basin Project, Kern County

Dear Mr. Carey:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contacts List
June 29, 2020

Big Pine Paiute Tribe of the Owens Valley
James Rambeau, Sr., Chairperson
P.O. Box 700
Big Pine ,CA 93513
j.rambeau@bigpinepaiute.org
(760) 938-2003
(976) 938-2942 Fax
Paiute - Shoshone

Big Pine Paiute Tribe of Owens Valley
Sally Manning, Environmental Director
P.O. Box 700
Big Pine ,CA 93513
s.manning@bigpinepaiute.org
(760) 938-2003
(760) 938-2942 Fax
Paiute

Big Pine Paiute Tribe of the Owens Valley
Danelle Gutierrez THPO
P.O. Box 700
Big Pine ,CA 93513
d.gutierrez@bigpinepaiute.org
(760) 938-2003, ext. 228
(760) 938-2942 Fax
Paiute

Chumash Council of Bakersfield
Julio Quair, Chairperson
729 Texas Street
Bakersfield ,CA 93307
chumashtribe@sbcglobal.net
(661) 322-0121
Chumash

Fernandeno Tataviam Band of Mission Indians
Jairo F. Avila, THPO
1019 Second St., Suite 1
San Fernando ,CA 91340
jairo.avila@tataviam-nsn.us
(818) 837-0794 Office
(818) 837-0796 Fax
Fernandeno Tataviam

Kern Valley Indian Community
Julie Turner, Secretary
P.O. Box 1010
Lake Isabella ,CA 93240
(661) 340-0032 Cell
Kawaiisu
Tubatulabal

Kern Valley Indian Community
Robert Robinson, Chairperson
P.O. Box 1010
Lake Isabella ,CA 93240
bbutterbredt@gmail.com
(760) 378-2915 Cell
Tubatulabal
Kawaiisu

Kern Valley Indian Community
Brandy Kendricks
30741 Foxridge Court
Tehachapi ,CA 93561
krazykendricks@hotmail.com
(661) 821-1733
(661) 972-0445
Kawaiisu
Tubatulabal

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
115 Radio Street
Bakersfield ,CA 93305
2deedominguez@gmail.com
(626) 339-6785
Yowlumne
Kitanemuk

San Manuel Band of Mission Indians
Jessica Mauck, Director-CRM Dept.
26569 Community Center Drive
Highland ,CA 92346
jmauck@sanmanuel-nsn.gov
(909) 864-8933
Serrano

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code,Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans Tribes for the proposed:
Rosedale Rio Bravo WSD WaterSmart2020 McCaslin Recharge Basin Project, Kern County.

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Native American Heritage Commission
Native American Contacts List
June 29, 2020

Santa Rosa Rancheria Tachi Yokut Tribe
Leo Sisco, Chairperson
P.O. Box 8
Lemoore ,CA 93245
(559) 924-1278
(559) 924-3583 Fax

Tache
Tachi
Yokut

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct.
Salinas ,CA 93906
kwood8934@aol.com
(831) 443-9702

Foothill Yokuts
Mono
Wuksache

Tejon Indian Tribe
Octavio Escobedo III, Chairperson
P.O. Box 640
Arvin ,CA 93203
oescobedo@tejonindiantribe-nsn.gov
(661) 834-8566

Kitanemuk

yak tityu tityu yak tiłhini - Northern Chumash Tribe
Mona Olivas Tucker, Chairwoman
660 Camino Del Rey
Arroyo Grande ,CA 93420
olivas.mona@gmail.com
(805) 489-1052 Home
(805) 748-2121 Cell

Chumash

Tejon Indian Tribe
Colin Rambo, CRM Tech
P.O. Box 640
Arvin ,CA 93203
colin.rambo@tejonindiantribe-nsn.gov
(661) 834-8566
(484) 515-4790 Cell

Kitanemuk

Tubatulabals of Kern Valley
Robert L. Gomez, Jr., Tribal Chairperson
P.O. Box 226
Lake Isabella ,CA 93240
(760) 379-4590
(760) 379-4592 Fax

Tubatulabal

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville ,CA 93258
neil.peyron@tulerivertribe-nsn.gov
(559) 781-4271
(559) 781-4610 Fax

Yokuts

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code,Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans Tribes for the proposed:
Rosedale Rio Bravo WSD WaterSmart2020 McCaslin Recharge Basin Project, Kern County.

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Tribal Outreach
Project: WaterSmart 2020 Recharge Basin Project Project No.: 30580.02

Tribe:	Attempts:	Response:
Big Pine Paiute Tribe of the Owens Valley,	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Chumash Council of Bakersfield	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Fernando Tatavium Band of Mission Indians	**Mailer: 7/10/2020** **Email: 7/27/2020**	Email response: The project is situated outside the FTBMI's ancestral Tribal boundaries.
Kern Valley Indian Community	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Kitanemuk & Yowlumne Tejon Indians	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
San Manuel Band of Mission Indians	**Mailer: 7/10/2020** **Email: 7/27/2020**	Email response: The project is situated outside the SMBMI's ancestral Tribal boundaries.
Santa Rosa Indian Community of the Santa Rosa Rancheria	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Tejon Indian Tribe	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Tubatulabals of Kern County	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response

Tribal Outreach
Project: WaterSmart 2020 Recharge Basin Project Project No.: 30580.02

Tule River Indian Tribe	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Wuksache Indian Tribe/Eshom Valley Band	**Mailer: 7/10/2020** **Email: 7/27/2020**	No response
Northern Chumash Tribe	**Mailer: 7/10/2020** **Email: 7/27/2020**	Email response: The project is situated outside the NCT ancestral Tribal boundaries.

CONFIDENTIAL APPENDIX B:

Updated DPR Forms

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # P-15-008026
HRI #
Trinomial

***Resource Name or #:** Cross Valley Canal UPDATE
Recorded by: R. Azpitarte, M. Silva, M. Lemus **Date:** 9/25/2020
☐ Continuation ■ Update

P1. Other Identifier:
P2. Location: ■ **Not for Publication** ☐ **Unrestricted**
- **a. County:** Kern
- **b. USGS 7.5' Quad:** Stevens **Date:** 1977 **T**29S; **R**26E; SE¼ **of** SE¼ **of** Sec 36; M.D.B.M.;
- **c. Address**:
- **d**. **UTM**: (at center) **Zone** 11N**,** 306620**mE /** 3914505**mN** *All GPS data collected with Trimble GEOXH 2005 Series in NAD 83.*

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Segment of the Cross Valley Canal recorded during the current study is located at the turnout from the Cross Valley Canal to the Goose Lake Slough (Goose Lake Canal or Channel). The Cross Valley Canal was constructed in 1975 to move water from the California Aqueduct to urban Bakersfield (Agency Functions – Kern County Water Agency 2018, USBR 2018). The recorded segment is about 300-ft (northeast-southwest) in length. The width of the canal from the top width of the canal is approximately 48-ft, while the bottom width is estimated to be 30-ft (the canal was filled with water at the time of the recording). This segment of the Cross Valley Canal was heavily modified between 2005 and 2008 and is thus contemporary in age. This segment is therefore recommended as not NRHP or CRHR eligible since it does not meet the age criterion.

***P3b. Resource Attributes:** (List attributes and codes) HP20. Canal/Aqueduct
***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)
P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: (view, date, accession#)
Aerial view of Cross Valley Canal at turnout to Goose Lake Slough.

***P6. Date Constructed/Age and Source:**
☒ Historic ☐ Prehistoric ☐ Both
Constructed in 1975

***P7. Owner and Address:**
Rosedale-Rio Bravo Water Storage District
PO Box 20820
Bakersfield, CA 93390

***P8. Recorded by:** (Name, affiliation, and address)
R. Azpitarte, M. Silva, M. Lemus
ASM Affiliates, Inc.
2034 Corte Del Nogal
Carlsbad, CA 92011

***P9. Date Recorded:** 8/14/2020

***P10. Survey Type:** (Describe) Pedestrian Intensive

***P11. Report Citation:** (cite survey report and sources, or enter "none.")
Whitley and Carey (2020). Class III Inventory/Phase I Survey, Rosedale-Rio Bravo Water Storage District, Groundwater Banking and Conveyance Improvement Project, Kern County, California

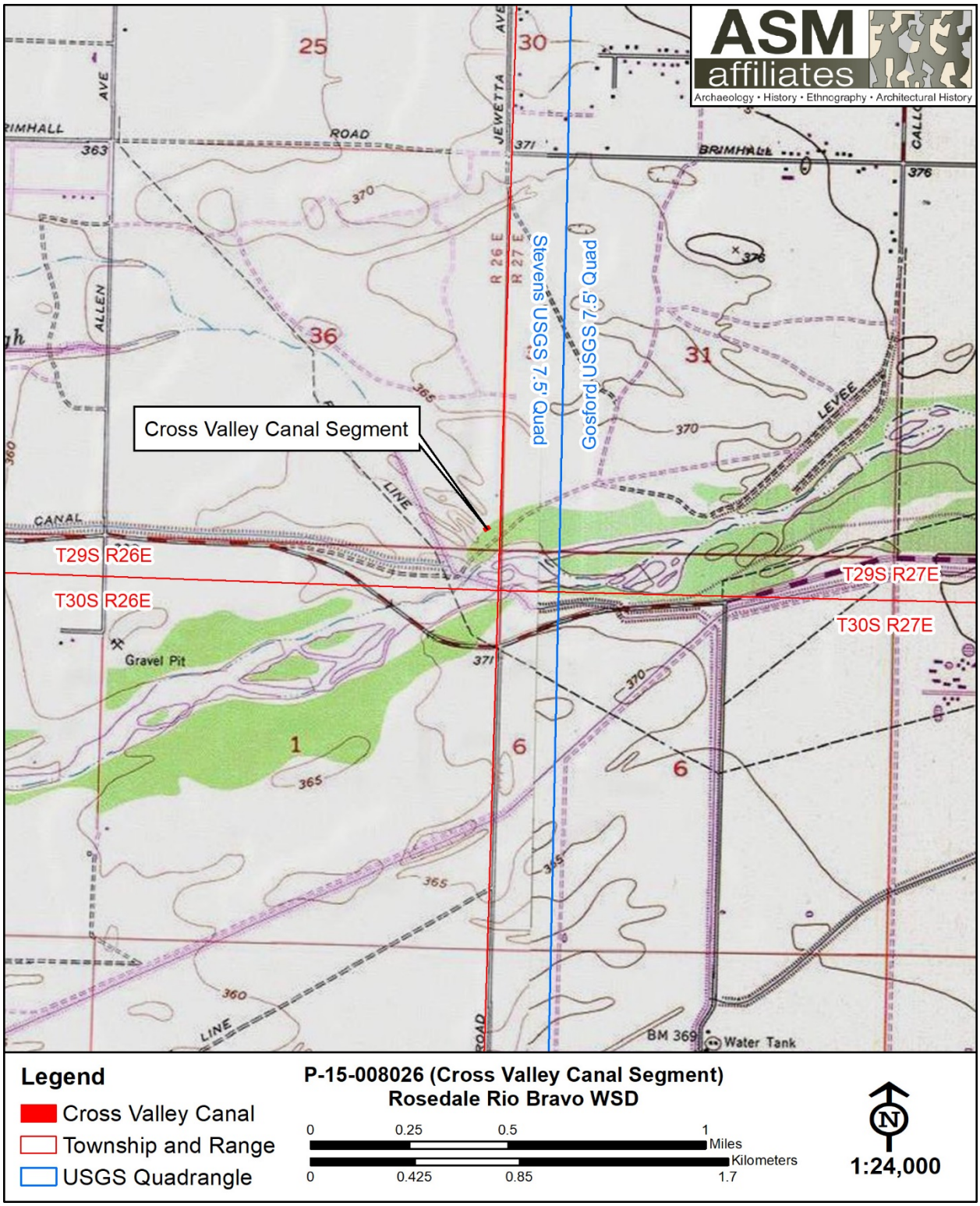
***Attachments:** ☐ NONE ☒ Location Map ☒ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-15-008121
HRI #
Trinomial

Drawn by: P. Carey

***Resource Name or #:** Goose Lake Slough UPDATE
Date of map: 1977



*Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-15-008026
HRI #
Trinomial

 ***Resource Name or # (Assigned by recorder)** Cross Valley Canal UPDATE
***Map Name:** P-15-008026 – Cross Valley Canal ***Scale:** 1:24,000 ***Date of Map:** 2020

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # P-15-008121
HRI #
Trinomial

***Resource Name or #:** Goose Lake Slough/Rio Bravo Canal UPDATE
Recorded by: R. Azpitarte, M. Silva, M. Lemus **Date:** 9/25/2020
☐ Continuation ■ Update

P1. **Other Identifier:** Goose Lake Canal, Goose Lake Channel, Rio Bravo Canal
P2. **Location:** ■ **Not for Publication** ☐ **Unrestricted**
- **a.** **County:** Kern
- **b.** **Segment A: USGS 7.5' Quad:** Tupman **Date:** 1977 **T**29S; **R**26E; NW¼ **of** SE¼ **of** Sec 35; M.D.B.M.;
  Segment B: USGS 7.5' Quad: Stevens **Date:** 1977 **T**29S; **R**25E; intersection of Sections 26, 27, 34, and 35, M.D.B.M.
- **c.** **Address**:
- **d.** **UTM**: **Segment A (at weir)**: **Zone** 11N**,** 304454**mE /** 3915162**mN; Segment B (center)**: **Zone** 11N**,** 293802**mE /** 3916327**mN**
  All GPS data collected with Trimble GEOXH 2005 Series in NAD 83.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Goose Lake Slough (Goose Lake Canal/Channel) was first modified in 1874 when a regulator was built across the cleaned and enlarged head of Goose Lake Slough (Grunsky 1898). The slough itself remained unchanged for 80 years until the mid-1950's when it was channelized in conjunction with the construction of Isabella Reservoir (Whitley et al. 2015). One segment of the canal was recorded by JRP Historical Consulting Services (JRP) in 1993 near Renfro Road. This segment of the canal was named the "Rio Bravo Canal" by JRP. They reported a dirt-lined canal with a top width of 58-ft, a bottom width of 38-ft, and a depth of 5-ft. Additionally, they recorded six corrugated steel culverts conveying water from the canal under Renfro Road. ASM recorded two separate segments (Segment A and Segment B) of Goose Lake Slough during the current survey. Houghton Weir is located within the Goose Lake Slough within Segment A, while Segment B only consists of a portion of the Goose Lake Slough itself.

(continued on page 2)

***P3b. Resource Attributes:** (List attributes and codes) HP20. Canal/Aqueduct
***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)
P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: (view, date, accession#)
Overview of Goose Lake Slough (Segment B), looking north.

***P6. Date Constructed/Age and Source:**
☒ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:**
Rosedale-Rio Bravo Water Storage District
PO Box 20820
Bakersfield, CA 93390

***P8. Recorded by:** (Name, affiliation, and address)
R. Azpitarte, M. Silva, M. Lemus
ASM Affiliates, Inc.
2034 Corte Del Nogal
Carlsbad, CA 92011

***P9. Date Recorded:** 8/13/2020

***P10. Survey Type:** (Describe) Pedestrian Intensive

***P11. Report Citation:** (cite survey report and sources, or enter "none.") Whitley and Carey (2020). Class III Inventory/Phase I Survey, Rosedale-Rio Bravo Water Storage District, Groundwater Banking and Conveyance Improvement Project, Kern County, California

***Attachments:** ☐ NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List):

L1. Historic and/or Common Name: Goose Lake Slough/Goose Lake Canal or Channel

L2a. Portion Described: □ Entire Resource ■ Segment □ Point Observation **Designation:** Segment A; Segment B

b. Location of point or segment: Segment A (at weir): **Zone** 11N**,** 304454**mE /** 3915162**mN; Segment B (center)**: **Zone** 11N**,** 293802**mE /** 3916327**mN**

L3. Description: Segment A consists of an approximately 100-ft long segment of the Goose Lake Slough with Houghton Weir at the center. The weir acts as a bottleneck in the Goose Lake Slough, creating a reservoir on the east side which is approximately 230-ft wide. On the west, the canal narrows to approximately 60-ft wide. Broken concrete blocks have been placed along the floor and banks of the canal on the down-canal side of the weir as erosion control. It is unclear where the blocks originated, though it is possible they are from a previous version of the weir.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- **a. Top Width**: Segment A (upstream of weir): ~220-ft; (downstream of weir): ~90-ft. Segment B: between 75-ft and 50-ft
- **b. Bottom Width:** Segment A (upstream of weir): ~195-ft; (downstream of weir): ~60-ft. Segment B: between ~50-ft and ~30-ft
- **c. Height or Depth:** Segment A: ~9-ft; Segment B: ~6-ft
- **d. Length of Segment:** Segment A: 130-ft (northeast-southwest); Segment B**:** 237-ft (northeast-southwest)

L5. Associated Resources: Houghton Weir: The weir is approximately 40-ft long (north/northwest by south/southeast) and spans a constriction in the Goose Lake Slough. It consists of nine slightly angled flashboard bays with steel supports and a steel walkway over the top. The weir is anchored by concrete support walls on either side and built atop a concrete platform. The concrete support walls and base are approximately 15-ft wide. The overall height of the weir is approximately 9-ft high (12-ft total including the walkway handrail). Based on historic aerial imagery, the Houghton Weir was constructed sometime between 1952 and 1968. It was likely constructed when the Goose Lake Slough was channelized in the mid-1950s in conjunction with the construction of the Isabella Reservoir (Whitley et al. 2018).

L6. Setting: Located on the open flats of the southern San Joaquin Valley east of the City of Bakersfield.

L7. Integrity Considerations: The two segments of the Goose Lake Slough/Channel lack integrity of design, setting, materials, location, association and feeling. They are recommended as not NRHP or CRHR eligible.

L8a. Photograph, Map or Drawing: See Continuation Sheet

L8b. Description of Photo, Map, or Drawing: See Continuation Sheet

L9. Remarks: Another segment of the Goose Lake Slough/Channel was determined not NRHP eligible by the FHWA and DOE in 1997 and 2004.

L10. Form Prepared by: P. Carey, ASM Affiliates Inc., 20424 W. Valley Blvd., Suite A, Tehachapi CA, 93561

Houghton Weir within Segment A, looking south.

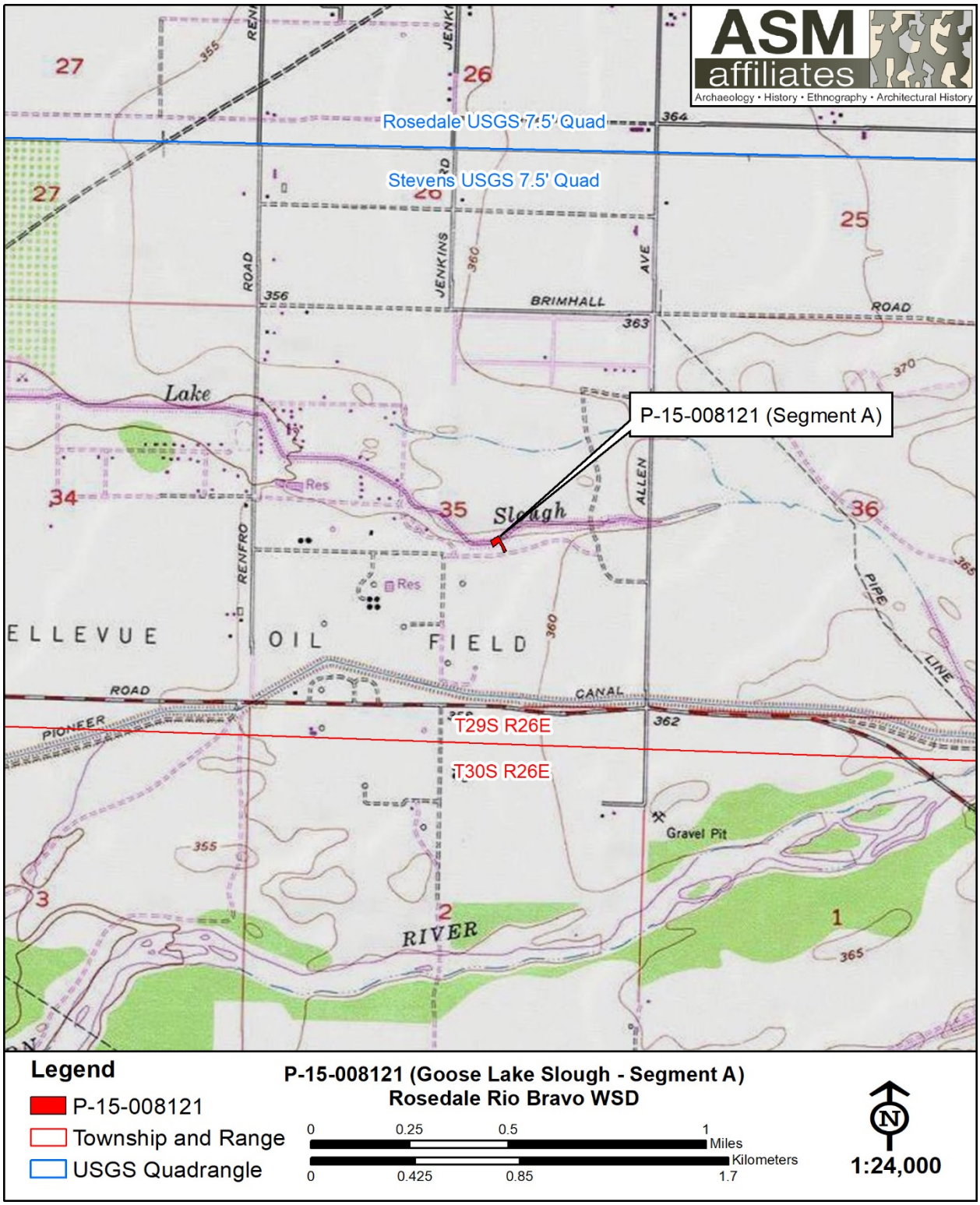
Houghton Weir from within Goose Lake Slough, looking northeast.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-15-008121
HRI #
Trinomial

Drawn by: P. Carey

***Resource Name or #:** Goose Lake Slough UPDATE
Date of map: 1977

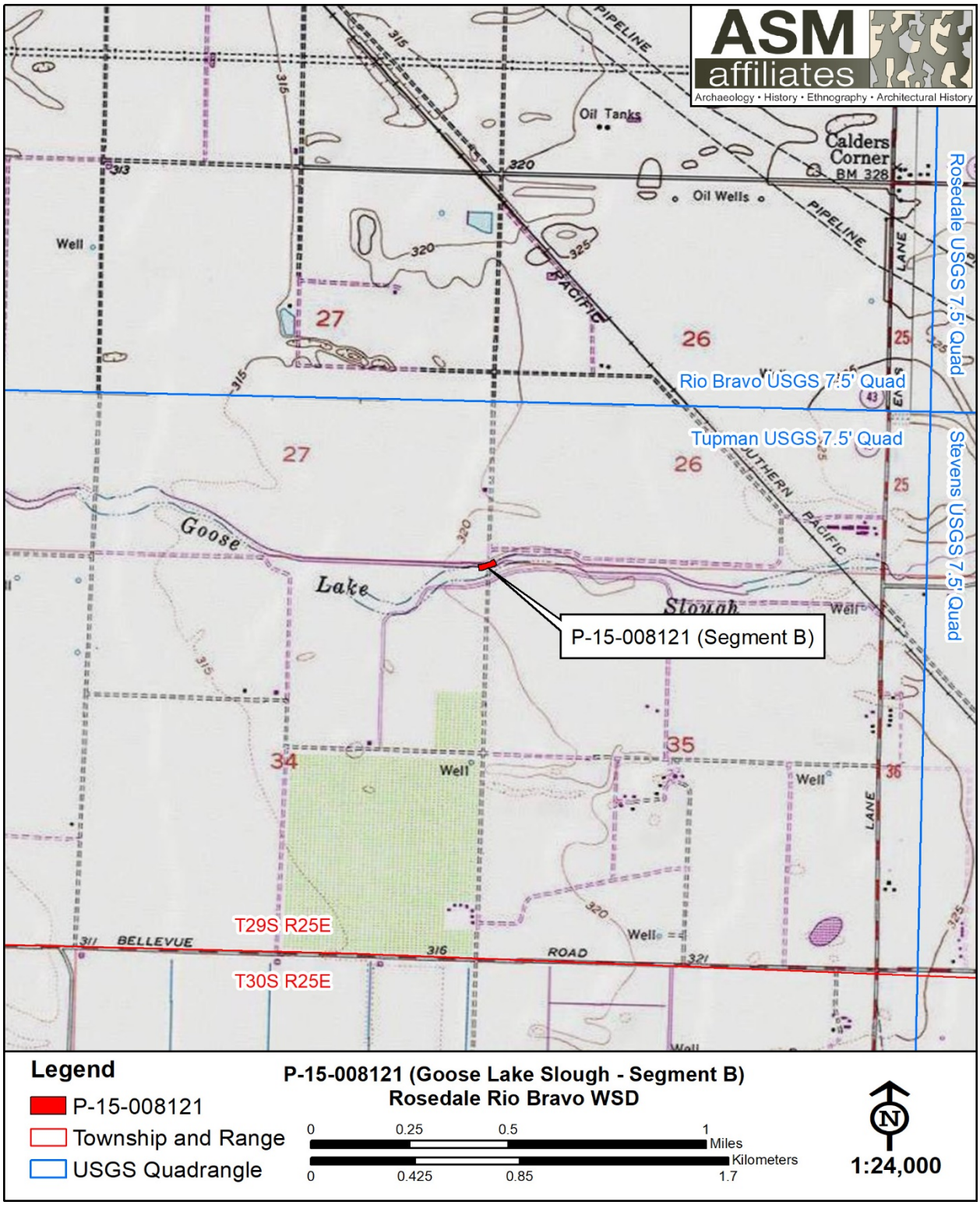


*Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-15-008121
HRI #
Trinomial

***Resource Name or #:** Goose Lake Slough UPDATE
Drawn by: P. Carey
Date of map: 1977



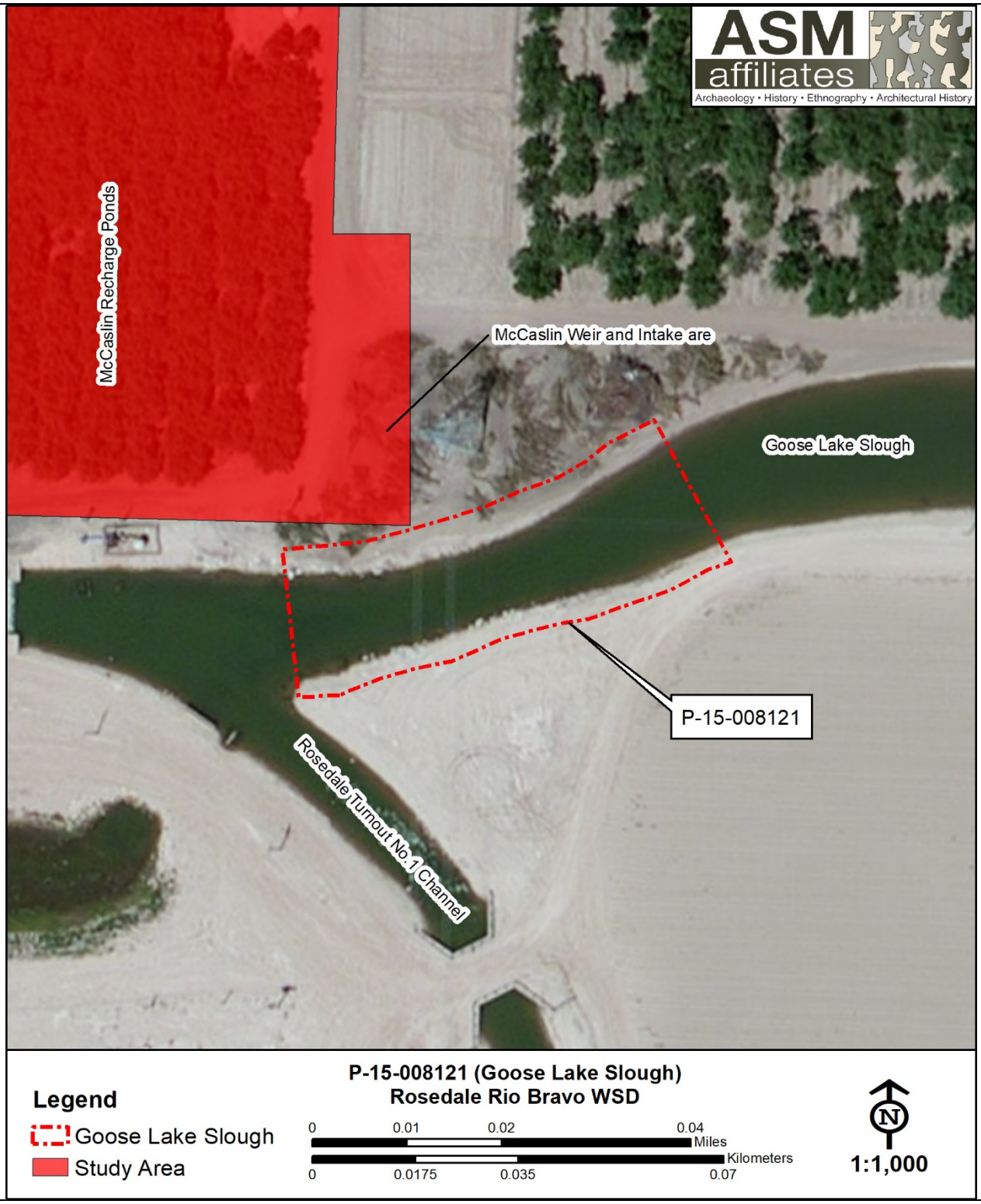
*Required Information


ASM affiliates
Archaeology • History • Ethnography • Architectural History
Houghton Weir
P-15-008121
Goose Lake Slough
P-15-008121 (Goose Lake Slough - Houghton Weir)
Rosedale Rio Bravo WSD
Legend
Houghton Weir
Goose Lake Slough
0 0.01 0.02 0.04 Miles
0 0.0175 0.035 0.07 Kilometers
N
1:1,000

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-15-008121
HRI #
Trinomial

Page 7 of 7 ***Resource Name or # (Assigned by recorder)** Goose Lake Slough UPDATE
***Map Name:** Goose Lake Slough – Segment B ***Scale:** 1:24,000 ***Date of Map:** 2020



CONFIDENTIAL APPENDIX C:

Original DPR Forms

Supplement

P-15-008026

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: CVC-1
PHOTO DATE: August 16, 1993

1. Name of Feature: Cross Valley Canal

2. Location of recordation: CVC-1 is located west of Enos Lane and south of the Stockdale Highway.

3. Other locations for recording this feature: CVC-2, CVC-3, CVC-4, and CVC-5

4. Structures at or near this location: Pumping Plant No. 2 of the Cross Valley Canal is located within the canal at this site. Also located nearby is the Rosedale-Rio Bravo Water Storage District Turnout No. 1.

5. Setting at this location: The area is surrounded by agricultural fields.

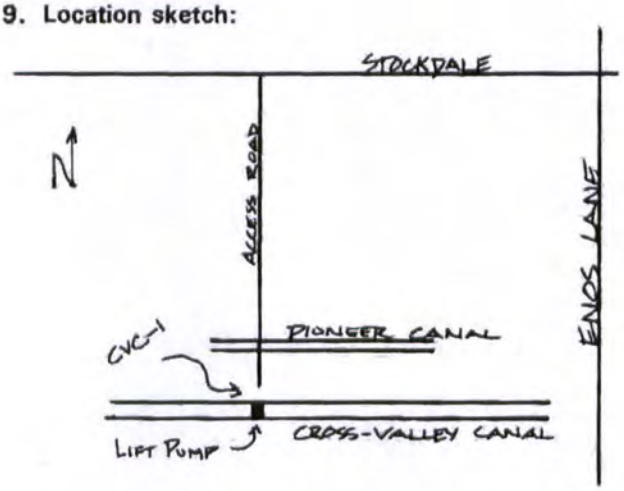
6. Integrity considerations for this feature: This section of the canal retains its original alignment and geometry, and is concrete lined.

7. Attributes at this location (measurements in feet):

Top width: Unable to measure - no access.
Bottom width: Unable to observe due to high flows
Height or Depth: Unable to observe due to high flows
Material: Concrete lined.

8. Sketch, in cross section:
Looking north.

9. Location sketch:



GOSFORD
STEVENS
TUPMAN

Supplement

P-15-008026

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: CVC-2
PHOTO DATE: August 16, 1993

1. Name of Feature: Cross Valley Canal

2. Location of recordation: CVC-2 is located south of where the Pioneer Canal crosses the Asphalto Branch of the SPRR, due south of an oil processing plant.

3. Other locations for recording this feature: CVC-1, CVC-3, CVC-4, and CVC-5

4. Structures at or near this location: Dirt access roads, bounded by chain-link fences, parallel the canal.

5. Setting at this location: The area surrounding the canal is agricultural.

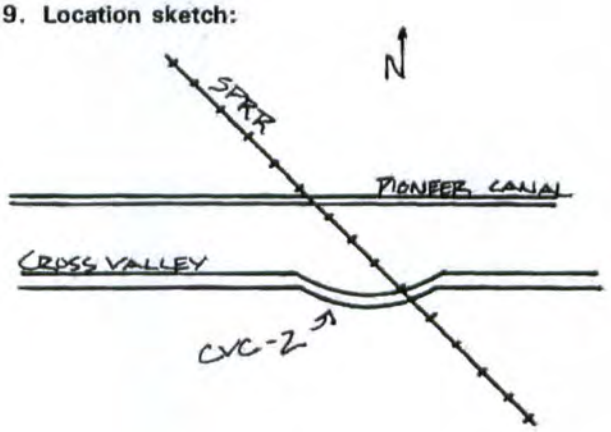
6. Integrity considerations for this feature: The canal appears to retain its original alignment, geometry, and materials.

7. Attributes at this location (measurements in feet):

Top width: Unable to measure - no access.
Bottom width: Unable to observe due to high flows
Height or Depth: Unable to observe due to high flows
Material: Concrete lined.

8. Sketch, in cross section:
Looking north.

9. Location sketch:



Supplement

P-15-008026

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: CVC-3
PHOTO DATE: August 16, 1993

1. **Name of Feature:** Cross Valley Canal

2. **Location of recordation:** CVC-3 is located where Coffee Road crosses the Cross Valley Canal.

3. **Other locations for recording this feature:** CVC-1, CVC-2, CVC-4, and CVC-5

4. **Structures at or near this location:** Pumping Plant No. 6 is located within the canal east of this point. A pipeline spans the canal to the southwest. Dirt access roads, bounded by fences, parallel the canal.

5. **Setting at this location:** A modern bridge carries Coffee Road across the Cross Valley Canal and the Kern River. There are commercial buildings located at Brimhall and Coffee roads, and Truxtun Avenue and Coffee Road. Northwest of Brimhall and Coffee roads are residences.

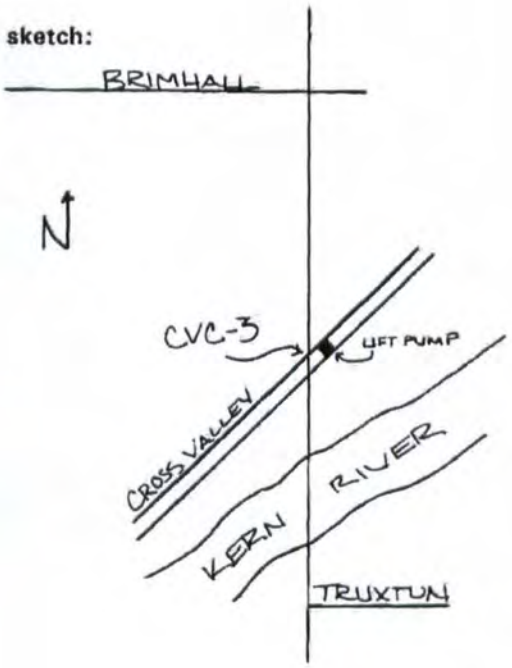
6. **Integrity considerations for this feature:** The canal appears to retain its original alignment, geometry, and materials.

7. **Attributes at this location (measurements in feet):**

Top width: Unable to measure - no access.
Bottom width: Unable to observe due to high flows
Height or Depth: Unable to observe due to high flows
Material: Concrete lined.

8. **Sketch, in cross section:**
Looking north.

9. **Location sketch:**



P-15-008026

Supplement

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: CVC-4
PHOTO DATE: August 17, 1993

1. Name of Feature: Cross Valley Canal

2. Location of recordation: CVC-4 is located where Highway 99 intersects the Cross Valley Canal.

3. Other locations for recording this feature: CVC-1, CVC-2, CVC-3, and CVC-5

4. Structures at or near this location: Pumping Plant No. 7 of the Cross Valley Canal is located near this site. Dirt access roads bounded by fences parallel the canal.

5. Setting at this location: To the north of the canal is a motel and golf range. An industrial complex is located to the west, Kern Road lies to the south, and the Highway 99 embankment is situated to the east.

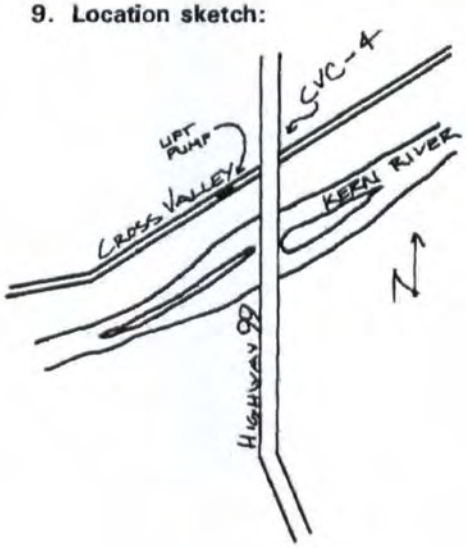
6. Integrity considerations for this feature: The canal appears to retain its original attributes.

7. Attributes at this location (measurements in feet):

Top width: Unable to measure - no access.
Bottom width: Unable to observe due to high flows
Height or Depth: Unable to observe due to high flows
Material: Dirt lined.

8. Sketch, in cross section:
Looking north.

9. Location sketch:



Supplement

P-15-008026

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: CVC-5
PHOTO DATE: August 18, 1993

1. **Name of Feature:** Cross Valley Canal (comparison site)

2. **Location of recordation:** CVC-5 is located at the upper reach of the Cross Valley Canal, just east of North Sillect Avenue and south of the Kern County Water Agency Headquarters.

3. **Other locations for recording this feature:** CVC-1, CVC-2, CVC-3, and CVC-4

4. **Structures at or near this location:** Dirt access roads bounded by fences parallel the canal.

5. **Setting at this location:** The Kern River lies to the east of the canal, and the Kern Regional Center and Pierce Road are situated to the west. Open fields and commercial buildings dominate the area.

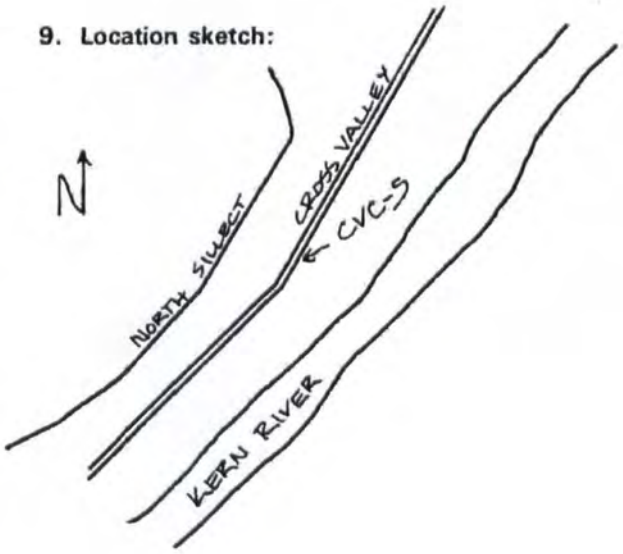
6. **Integrity considerations for this feature:** The canal appears to be original.

7. **Attributes at this location (measurements in feet):**

Top width: Unable to measure - no access.
Bottom width: Unable to observe due to high flows
Height or Depth: Unable to observe due to high flows
Material: Dirt lined.

8. **Sketch, in cross section:**
Looking north.

9. **Location sketch:**



P-15-008121

CANAL FEATURE INVENTORY FORM

Developed by JRP Historical Consulting Services

PROJECT: Highway 58 Route Adoption Study, Tier 1 EIS/R

LOCATION NO: RBC-1
PHOTO DATE: August 17, 1993

1. Name of Feature: Rio Bravo Canal

2. Location of recordation: RBC-1 is located where the canal crosses Renfro Road south of Brimhall Road.

3. Other locations for recording this feature: RBC-2, RBC-3

4. Structures at or near this location: Six corrugated steel pipe culverts convey the canal under Renfro Road.

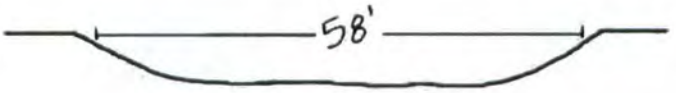
5. Setting at this location: Large lot residential parcels are located to the southwest and east of the canal. To the northwest is an orchard.

6. Integrity considerations for this feature: The canal passes under Renfro Road in six steel culvert pipes. There is a wooden plank walkway on the east side of Renfro.

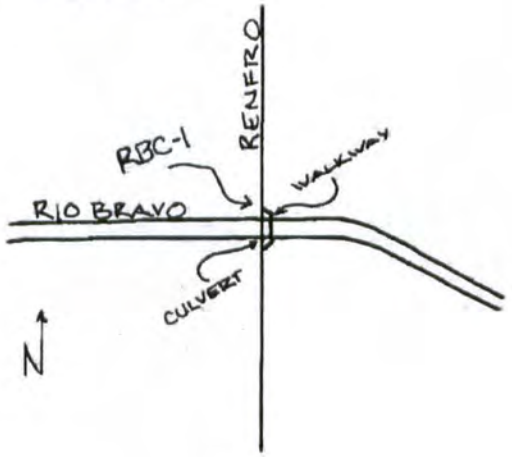
7. Attributes at this location (measurements in feet):

Top width: 58
Bottom width: 38
Height or Depth: 5 (below Renfro road grade)
Material: Dirt lined.

8. Sketch, in cross section:
Looking north.



9. Location sketch:



STEVENS

CONFIDENTIAL APPENDIX

C: Resumes

David S. Whitley, Ph.D., RPA

Director/Project Manager/Principal Investigator

Firm Name: ASM Affiliates, Inc., Tehachapi, California

Total Years of Experience: 43

Employment History:

2009-current	Director, ASM Affiliates, Inc., Carlsbad, California
1982-2009	Owner, W & S Consultants, cultural resource management consultants
1989-2000	Instructor, Division of Social Sciences and Humanities, UCLA Extension.
1987-1989	Postdoctoral Research Fellow, Rock Art Research Unit, Archaeology Department, University of the Witwatersrand.
1983-1987	Chief Archaeologist, Institute of Archaeology, and Lecturer, Dept. of Anthropology, UCLA.

Education:

Ph.D.	1982/Anthropology/University of California, Los Angeles
M.A.	1979/Geography/University of California, Los Angeles
B.A.	1976/Anthropology and Geography/University of California, Los Angeles

Additional Training:

2011	PASSPORT certification
1998	MSHA Certification, Surface Mining

Registrations:

1979	Register of Professional Archaeologists

Professional Memberships:

1981	American Anthropological Association
1977	Society for American Archaeology
1977	Society for California Archaeology
2010	Association of Environmental Professionals

Awards/Commendations:

2006	*Introduction to Rock Art Research* received *Choice* Outstanding Academic Book Award.
2004	Fulbright Senior Specialist Grant, Universidad de San Carlos, Guatemala.
2001	Thomas F. King Award for Excellence in Cultural Resource Management, Society for California Archaeology.
2000	*Art of the Shaman* (University of Utah Press) reached #4 on Amazon.com LA Best Seller list; French edition selected by U.S. State Department, African Section, as Ambassadorial Presentation volume.
1999	Listed in *Who's Who in America*
1997	Listed in *Who's Who among Hispanic Americans*
1999	Special Appreciation Award, California Indian Council.
1993	Fellow, American Anthropological Association.

1993	Special Appreciation Award, California Indian Council.
1991	Special Appreciation Award, Simi Valley Historical Society.
1989	Special Appreciation Award, Candelaria Indian Tribal Council.
1983	Golden Eagle Award, CINE Film Festival, Washington, D.C.
1983	Silver Medal, New York Film and Television Festival.
1983	Postdoctoral Research Fellowship, Association for Field Archaeology.
1976	A.B. degrees in Anthropology and Geography awarded Magna Cum Laude.
1971-1976	Honors at Entrance and College of Letters and Sciences Honors Program, UCLA.

Citizenship: USA

Languages: Spanish

References:

Mr. B. Joe Ashley, California Resources Corporation, Bakersfield, CA, (661) 301-6551

Dr. Ronald I. Dorn, Professor of Geography Arizona State University Tempe, AZ (480) 966-4245

Dr. Kelley Hays-Gilpin, Associate Professor, Department of Anthropology, Northern Arizona University, (520) 523-6564

Professional Profile:

Dr. Whitley specializes in the prehistoric archaeology and ethnography of far western North America, with particular interests in sacred sites, rock art, chronometrics and cultural heritage management. He has also worked in southern Africa, the European Upper Paleolithic and Guatemala. He has also directed a number of historical archaeological projects involving mining properties, water conveyance systems, and industrial archaeology in California. His professional publications include 17 books/monographs and approximately 100 articles and chapters. Included among his recent books are *The Rock Art of California* (University of Utah Press, 2000), the edited volume *Handbook of Rock Art Research* (AltaMira Press, 2001), and *Introduction to Rock Art Research* (Left Coast Press, 2005, second edition 2011), which received a *Choice* Outstanding Academic Book Award for 2006. His latest book is *Cave Paintings and the Human Spirit*: *The Origin of Creativity and Belief* (Prometheus Books, 2009). His publications have been translated into 5 languages beyond English.

Dr. Whitley has written nominations for 460 sites that are now listed on the National Register of Historic Places (NRHP), and the 100 site Carrizo Plain Archaeological National Historic Landmark (NHL) district, approved in 2012. Whitley has served as an expert witness in litigation and arbitration in California, Washington state, Nevada, Texas and Montana. He served on the State of California, Historical Resources Commission, in 1986 – 1987. For a decade he served on the Council of Directors of the ICOMOS International Rock Art Committee, and has served as the Secretary of the International Union of Prehistoric and Protohistoric Sciences (IUPPS) Prehistoric Art Committee. In 2001 he received the Thomas King Award from the Society for California Archaeology for Excellence in Cultural Resource Management.

Research Specializations

Hunter-gatherer ethnography, ethnohistory & archaeology
Religion and art
Culture and cognition/ Evolutionary psychology
Western North America, southern Africa, Mesoamerica
Method, theory and philosophy of science

Selected Project Experience:

Cultural Resource Studies, Hungry Valley State Vehicular Recreation Area, Gorman, California
CLIENT: California State Parks
Directed the survey of 845-acres and the field assessment of 135 previously recorded sites within the 18,000-acres Hungry Valley SVRA, especially with respect to OHV damage. Responsible for client coordination, field assessment methodology and analysis and final report, including management recommendations.

Muroc School Renovation Project, Edwards AFB, Kern County, California
Client: Muroc Joint Unified School District
Directed an archaeological survey of a 100-acres campus containing 4 schools and coordinated with architectural historians on the documentation and recording of over 50 buildings, for NHPA Section 106 compliance. Responsible for completing the final report, including recommended determination of effects. Conducted SHPO and tribal consultation for and under delegated authority by the Muroc JUSD.

Phase I Survey of 1,000-acres and 5-mile Tie-Line for the Alamo Springs Solar Project, Kern and Kings Counties, California
CLIENT: Ecology and Environment, Inc.
Responsible for directing a Phase I survey/Class III inventory for a proposed 100-acres solar project on the Kettleman Plain. Managed the survey, report writing, management recommendations and client coordination.

Rock Art Damage Assessment, Fort Hunter-Liggett, Monterey County, California
CLIENT: Colorado State University
Directed the documentation of two pictographs and an associated midden site, and assessed damages resulting from small-arms fire to these sites. Completed the final report, including mitigation measures and managements recommendations.

Phase I Survey of Approximately 480 Acres in the Mojave Desert for the Apollo Solar Projects, Kern County, CA Project Manager
CLIENT: Quad Knopf, Inc.
Responsible for an intensive Phase I cultural resources survey for a proposed 480-acre solar project. Managed the survey, recommendation of eligibility, client coordination, and prepared the final report which included management and mitigation recommendations.

Phase I Survey of Approximately 266 Acres & Phase II Significance Evaluations for 10 Historic Sites in the Mojave Desert for the Inyokern Solar Project, Kern County, CA Project Manager
CLIENT: Quad Knopf, Inc.
Responsible for an intensive Phase I survey and Phase II determination of eligibility for a proposed 266-acre solar project. Managed the survey and determinations of significance, client coordination, and prepared the final report, which included management and mitigation recommendations.

Class III Inventory of a Linear Project Area for Perdito Mine Road Construction, Inyo County, CA Project Manager
CLIENT: Silver Standard Resources, Inc.
Responsible for an intensive Class III inventory for a proposed 160-acre mining project. Managed the survey, client coordination, and prepared the final report, which included management and mitigation recommendations.

Phase I Survey and Phase II Test Excavations, Tejon Grapevine Study Area, Kern County, CA Project Manager
CLIENT: Tejon Ranchcorp

Coordinated Phase I archaeological survey of 15,315 acres and determinations of significance/test excavations for 19 sites for CEQA compliance, including crew assignment and scheduling, coordination of paleontological studies, consultation with agency personnel, and preparation of draft and final reports.

Henrietta Solar Project, Lemoore, Kings County, CA
Project Manager
CLIENT: Ecology and Environment, Inc.
Coordinated Phase I survey/Class III inventory and monitoring for 800-acres solar project involving Native American tribal outreach, preparation of a Cultural Resources Mitigation Monitoring Reporting Program (MMRP) and Worker Environmental Awareness Program (WEAP) training, and construction monitoring, including crew assignment and scheduling, consultation with agency personnel, and preparation of draft and final reports.

Rio Lobo 3D Geophysical Survey, Kings and Fresno counties, CA
Project Manager
CLIENT: California Resources Corporation
Coordinated Class III cultural resources inventory and paleontological survey of 115 linear miles of geophysical transects in the North Dome Oil Field for NHPA compliance, including crew assignment and scheduling, consultation with agency and applicant personnel, and preparation of draft and final reports.

Class III Inventories and NRHP Eligibility Evaluations, Kern, Kings and Fresno Counties, CA
Project Manager
CLIENT: Occidental of Elk Hills, Inc./Vintage Production California/California Resources Corporation
Coordinated on-call contracts involving Class III large-scale block surveys for NHPA compliance and NRHP eligibility evaluations, including crew assignment and scheduling, consultation with agency personnel, and preparation of draft and final reports. Over 20,000 cumulative acres surveyed, and 40 sites evaluated for NRHP eligibility.

California Valley Solar Ranch Phase II Test Excavation and Construction Monitoring, San Luis Obispo County, CA
Project Manager
CLIENT: Ecology and Environment, Inc.
Coordinated a contract involving a Phase II test excavation for CEQA and NHPA compliance, preparation of a Cultural Resources Mitigation Monitoring Reporting Program (MMRP) and Worker Environmental Awareness Program (WEAP) training, and construction monitoring, including crew assignment and scheduling, consultation with agency personnel, and preparation of draft and final reports.

Kern River Pipeline Mountain Pass Class III Inventory, San Bernardino County, CA
Project Manager
CLIENT: Ecology and Environment, Inc.
Coordinated a contract involving an inventory of an 8.65-mile lateral ROW and 24.5 miles of access roads, including crew assignment and scheduling, consultation with BLM and Molycorp Mine personnel, and preparation of draft and final reports.

Coso NHL Management Plan, NAVFAC Southwest, Inyo County, CA
Co-Principal Investigator and Report Co-Author
CLIENT: NAWS China Lake
Prepared a management plan for the Coso NHL district, a 57-square-mile area containing the largest concentration of petroglyph sites in North America. This has involved coordination with stakeholders, including Native American tribes, development of management and conservation protocols, and identification and prioritization of future preservation tasks for the only rock art NHL situated west of the Rockies.

SDG&E On-Call Cultural Resource Studies and Sunrise Powerlink Archaeological Monitoring, San Diego County, CA
Project Manager
CLIENT: SDG&E and Burns and McDonnell Engineering
Coordinated a contract to provide archaeological services for powerline installation and maintenance projects involving 37 site evaluations for NRHP/CRHR eligibility and archaeological monitoring for the construction of the 118-mile-long Sunrise Powerlink transmission line from Imperial County to the coast in San Diego. Oversaw project coordination, assignment and scheduling of personnel, preparation of technical reports and Historic Properties Treatment Plan, and provided technical expertise in prehistory and Federal compliance.

Draft Environmental Impact Statement for the Marine Corps' MAGTF Land Expansion, San Bernardino County, CA
Co-Principal investigator and Co-Author
CLIENT: TEC Inc.
Prepared a cultural resources sections of a NEPA draft EIS for a proposed 150,000-acre land expansion.

Tejon Mountain Village Project, Kern and Los Angeles counties, CA
Principal Investigator and Report Author
CLIENT: DMB Pacific Ventures for Tejon Mountain Village LLC
Completed a Phase I survey of 28,000 acres and Phase II testing of 37 prehistoric and 3 historic sites, for CEQA and NHPA Section 106 compliance.

Archaeological Assessment of CA-INY-434 and -7117, Inyo County, CA
Principal Investigator and Field Director
CLIENT: Epsilon Systems Solutions
Prepared a condition assessments of petroglyph sites CA-INY-434 and -7117, involving site documentation and mapping, evaluation of current conditions and identification of natural and cultural impacts to the sites, and management recommendations for long-term preservation.

Centennial Project Survey and Testing, Los Angeles County, CA
Principal Investigator
CLIENT: Centennial Partners, LLC.
Conducted a Phase I survey of 16,000 acres and Phase II testing of 22 prehistoric sites for CEQA compliance.

Professional Appointments

2012-	Senior Research Fellow, Rock Art Research Institute, University of the Witwatersrand, Johannesburg.
2007 –	Secretary, Prehistoric Committee, International Union of Prehistoric and Protohistoric Sciences (IUPPS).
2006-2012	Advisory Board, Institute of Cognition and Culture, Queen's University, Belfast.
2003-	Adjunct Professor, School of Geographical Sciences, Arizona State University.
2002-2009	Series Editor, AltaMira Press, Archaeology of Religion.
1996-2008	Chair/Organizer, Society for American Archaeology, Rock Art Interest Group.
1996-2009	Chauvet Cave Research Advisory Committee, Ministere de la Culture, France.
1996-2009	Archaeological & Anthropological Advisor, Ventura County Cultural Heritage Board.
1992-2004	United States Representative, International Council on Monuments and Sites (ICOMOS), Comité International d'Art Rupestre (CAR), Council of Directors,1997-2004.
1986-1987	Prehistoric Archaeologist, State of California Historical Resources Commission.

Editorial Advisory Boards:

Time and Mind: Journal of Archaeology, Consciousness and Culture
Heritage & Society (formerly *Heritage Management*)
California Archaeology
American Archaeology Magazine (2008-2011)
Australian Archaeology

Publications - Books:

2011 *Introduction to Rock Art Research*, second revised edition. Walnut Creek: Left Coast Press, Inc.

2009 *Cave Paintings and the Human Spirit: The Origin of Creativity and Belief*. New York: Prometheus Books.

2008 *Belief in the Past: Theoretical Approaches to the Archaeology of Religion*, ed. DS Whitley & K Hays-Gilpin. Walnut Creek: Left Coast Press, Inc.

2006 *The Archaeology of Ayer's Rock, Inyo County, California*, by DS Whitley, TK Whitley and JM Simon. Ridgecrest: Maturango Museum Publication #19.

2005 *Introduction to Rock Art Research*. Walnut Creek: Left Coast Press, Inc.

2005 *Discovering North American Rock Art*, ed. L Loendorf, C Chippindale, & DS Whitley. Tucson: University of Arizona Press.

2001 *Handbook of Rock Art Research*, ed. DS Whitley. Walnut Creek: AltaMira Press.

2000 *The Art of the Shaman: Rock Art of California*. Salt Lake City: Univ. of Utah Press.

2000 *L'Art des Chamanes de Californie: Le Monde des Amerindien*. Paris: Editions du Seuil.

2000 *Arheologija Spolov*. Ljubljana: Skuc.

1998 *Reader in Archaeological Theory: Postprocessual and Cognitive Approaches*, ed. D.S. Whitley. London: Routledge.

1998 *Reader in Gender Archaeology*. ed. K. Hays-Gilpin and D.S. Whitley. London: Routledge.

1998 *Following the Shaman's Path: A Walking Tour of Little Petroglyph Canyon*. Ridgecrest: Maturango Museum.

1996 *Guide to Rock Art Sites: Southern California and Southern Nevada*. Missoula, MT: Mountain Press Publishing, Inc.

1994 *New Light on Old Art: Recent Advances in Hunter-Gatherer Rock Art Research*,ed. DS Whitley

and LL Loendorf. UCLA Institute of Archaeology, Mon. 36.

1989 *Investigaciones Arqueológicas en la Costa Sur de Guatemala*, ed. DS Whitley and MP Beaudry. UCLA Institute of Archaeology, Mon. 31.

1982 *Pictographs of the Coso Region: Analysis and Interpretation of the Coso Painted Style*, ed. RA Schiffman, DS Whitley et al. Bakersfield College Publications in Archaeology No. 2. (2nd edition 1986; Coyote Press, Salinas).

1980 *Inland Chumash Archaeological Investigations*, ed DS Whitley, EL McCann and CW Clewlow, Jr. UCLA Institute of Archaeology, Mon. 15.

1979 *Archaeological Investigations at the Ring Brothers Site Complex, Thousand Oaks, California*, ed. CW Clewlow, Jr., DS Whitley and EL McCann. UCLA Institute of Archaeology, Mon. 13.

1979 *The Archaeology of Oak Park, Ventura County, California, Volume III*, ed CW Clewlow, Jr. and DS Whitley. UCLA Institute of Archaeology, Mon. 11.

Professional Papers/Peer Reviewed Journals

2017 Climate Change, Rock Coatings and the Archaeological Record, with C. Santoro and D. Valenzuela. *Elements* 13(3):183-186.

2016 Advances in rapid condition assessments of rock art sites: Rock Art Stability Index (RASI). *Journal of Archaeological Science: Reports* http://dx.doi.org/10.1016/j.jasrep.2016.06.032.

2014 Jay von Werlhof's Trail of Dreams. *Pacific Coast Archaeological Society Quarterly* (In Press).

2013 Rock Art Dating and the Peopling of the Americas. *Journal of Archaeology* 2013(713159):1-15.

2013 Archaeologists, Indians, and Evolutionary Psychology: Aspects of Rock Art Research. *Time and Mind* 6:81-88.

2010 The Coso Petroglyph Chronology, by DS Whitley and RI Dorn. *Pacific Coast Archaeological Society Quarterly* 43:135-157.

2008 The Rock Art Stability Index (RASI): Improving the Sustainability of Rock Art Sites, by R.I. Dorn et al. *Heritage Management* 1:37-70.

2008 Archaeological Evidence for Conceptual Metaphors as Enduring Knowledge Structures. *Time and Mind* 1(1):7-30.

2006 A New Strategy for Analyzing the Chronometry of Constructed Rock Features in Deserts, by N Cerveny et al. *Geoarchaeology* 21(3):281-303.

2006 Sympathetic Magic in Western North American Rock Art, by J Keyser & DS Whitley. *American Antiquity* 71(1):3-26.

2003 Faith in the Past: Debating an archaeology of religion, DS Whitley & J Keyser. *Antiquity* 77:415-

424.

1999 Sally's Rockshelter and the Archaeology of the Vision Quest, by D.S. Whitley et al; *Cambridge Archaeological Journal* 9:221-246.

1998 Cognitive Neuroscience, Shamanism and the Rock Art of Native California. *Anthropology of Consciousness* 9:22-37.

1994 By the Hunter, For the Gatherer: Art, Social Relations and Subsistence Change in the Great Basin. *World Archaeology* 25:356-373.

1993 New Perspectives on the Clovis vs. Pre-Clovis Controversy, by DS Whitley and RI Dorn. *American Antiquity* 58:626-647.

1992 *Prehistory and Post-Positivist Science: A Prolegomenon to Cognitive Archaeology. Archaeological Method and Theory*, Volume 4: 57-100.

1992 Shamanism and Rock Art in Far Western North America. *Cambridge Archaeological Journal* 2:89-113.

1992 New Approach to the Radiocarbon Dating of Rock Varnish, with Examples from Drylands, by RI Dorn et al, *Annals Assoc. American Geographers* 82:136-151.

1989 Archaeology after the Revolution: The ideological use of the past in the development of Mexican nationalism. *Latin American Reports* 5(2):10-22.

1988 Cation-Ratio Dating of Petroglyphs Using PIXE, by DS Whitley and RI Dorn, *Nuclear Instruments and Methods in Physics Research* B35:410-414.

1988 The Late Prehistoric Period in the Coso Range and Environs, by DS Whitley et al. *Pacific Coast Archaeological Society Quarterly* 24(1):2-10.

1987 Socioreligious Context and Rock Art in East-Central California. *Journal of Anthropological Archaeology* 6:159-188.

1987 Rock art chronology in eastern California, by DS Whitley and RI Dorn. *World Archaeology* 19:150-164.

1986 Cation-Ratio and Accelerator Radiocarbon Dating of Rock Varnish on Mojave Artifacts and Landforms, by RI Dorn et al. *Science* 231:830-833.

1985 Spatial Autocorrelation Tests and the Classic Maya Collapse: Methods and Inferences, by DS Whitley and WAV Clark. *Journal of Archaeological Science* 12:377-395.

1985 El Balsamo Residential Investigations: A Pilot Project and Research Issues, by BL Starke et al. *American Anthropologist* 87:100-111.

1984 Chronometric and relative age-determination of petroglyphs in the Western United States, by

RI Dorn and DS Whitley. *Annals, Association of American Geographers* 74:308-322.

1984 The Use of Relative Repatination in the Chronological Ordering of Petroglyph Assemblages, by D Whitley et al. *Journal of New World Archaeology* 4(3):19-25.

1984 Chemical and Micromorphological Analysis of Rock Art Pigments from the Western Great Basin, by DS Whitley and RI Dorn. *Journal of New World Archaeology* 4(3):48-51.

1984 An Unusual Petroglyph from Horse Creek, Tulare County, California, by F Fenenga et al. *Journal of New World Archaeology* 4(3):52-58.

1983 Cation-ratio dating of petroglyphs from the Western United States, North America, by RI Dorn and DS Whitley. *Nature* 302:816-818.

1982 Notes on the Coso Petroglyphs, the Etiological Mythology of the Western Shoshone, and the Interpretation of Rock Art. *Journal of California and Great Basin Anthropology* 4:262-271.

Book and Monograph Chapters

2017 Rock Art of North America. In *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*, edited by B. David and I. McNiven. Oxford University Press: Oxford (in press).

2015 The Origins of Artistic Genius and the Archaeology of Emotional Difference, with C.M.T. Whitley. In B. Putova and V. Soukup, editors, pp. 232 – 246*, The Genesis of Creativity and the Origin of the Human Mind*. Prague: Karolinum House Publishing.

2014 North American Rock Art. In *Encyclopedia of Global Archaeology*, C. Smith, editor, pp. 5415-5426 Heidelberg: Springer.

2014 Future directions in hunter-gatherer research: hunter-gatherer religion and ritual. In *Oxford Handbook of the Archaeology and Anthropology of Hunter-Gatherers*. V. Cummings, P. Jordan and M. Zvelebil, eds. Oxford University Press, Oxford. (In Press).

2012 In suspect terrain: Dating rock engravings. In *A Companion to Rock Art*, J. McDonald and P. Veth, eds., pp. 605-624. Oxford: Wiley Blackwell.

2012 Ways of knowing and ways of seeing: Spiritual agents and the origins of Native American rock art. In *Working with Rock Art: Recording, Presenting and Understanding Rock Art Using Indigenous Knowledge*, B. Smith, K. Helskog and D. Morris, eds., pp. 186-199. Johannesburg: WITS University Press.

2012 The earliest rock art in Far Western North America, by DS Whitley and RI Dorn. In J. Clottes, ed, pp. 585-590, *L'Art Pleistocene dans le monde. Prehistoire, Art et Societes, Bulletin de la Societe Prehistorique Ariege-Pyranees, LXV-LXVI.*

2012 A Land of Visions and Dreams, with T.K. Whitley. In Issues in *Contemporary California Archaeology*, T. Jones and J. Perry, eds., pp. 255-314. Left Coast Press,

Walnut Creek.

2011 Rock Art, Religion and Ritual. In *Oxford Handbook of the Archaeology of Ritual and Religion*, ed. Tim Insoll, pp. 307-326. Oxford: Oxford University Press.

2010 Art and belief: The ever-changing and the never-changing in the Far West. In *Seeing and Knowing: Understanding rock art with and without ethnography*, ed. G. Blundell, C. Chippindale and B. Smith, pp. 108-129. Johannesburg: Witwatersrand University Press.

2009 Re-reading People of the Eland. In *The Eland's People: New Perspectives in the Rock Art of the Maloti-Drakensberg Bushmen, Essays in Memory of Patricia Vinnicombe*, ed. P. Mitchell and B. Smith, pp. 193-203. Johannesburg: Wits University Press.

2009 The Past in the Present Tense: Aspects of Contemporary California Archaeology. In *Festschrift for Paul Ezell*, ed. R. Kaldenberg. *San Bernardino: San Bernardino County Museum Association Quarterly* 54(4):74-81.

2008 The Long View of Old Art: Rock Art in the 22nd Century. In *Proceedings of "Set in Stone: A Binational Workshop on Petroglyph Management in the United States and Mexico,"* ed. Joseph Sanchez, pp. ix-xvi. Albuquerque: National Park Service, Petroglyph National Monument.

2008 Religion Beyond Icon, Burial and Monument: An Introduction, by D Whitley and K Hays-Gilpin. In *Belief in the Past: Theoretical Approaches to the Archaeology of Religion*, ed. DS Whitley & K Hays-Gilpin, pp. 11-22. Walnut Creek: Left Coast Press, Inc.

2008 Cognition, Emotion and Belief: First Steps in an Archaeology of Religion. In *Belief in the Past: Theoretical Approaches to the Archaeology of Religion*, ed. DS Whitley & K Hays-Gilpin, pp. 85-104. Walnut Creek: Left Coast Press, Inc.

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2005 The Iconography of Bighorn Sheep Petroglyphs in the Western Great Basin. In *Onwards and Upwards: Papers in Honor of Clement W. Meighan*, ed. K. Johnson, pp. 191-205. Stansbury Press, Chico.

2005 Rock Art Analysis (with L. Loendorf). In *Handbook of Archaeological Methods, Vol. II*, ed. H Maschner and C Chippindale, pp. 919-973. Lanham, NJ: AltaMira Press.

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2005 The Discovery of North American Rock Art and Its Meaning, by L Loendorf, C Chippindale and DS Whitley, pp. 3-11 in *Discovering North American Rock Art*,eds L Loendorf C Chippindale & DS Whitley, pp. 161-180. Tucson: University of Arizona Press.

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2000 Bemalte Schluchten, pp. 76-81 in *Am Anfang War Das Bild*, ed. by A. Damm. Copenhagen: United Exhibits Group. (Danish edition: Bemalede Kløfter, pp. 76-81 in På Sporet Af Mennesket, ed. by A. Damm. Copenhagen: United Exhibits Group, 2001.)

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1991 Chiefs on the Coast: Developing Chiefdoms in the Tiquisate Region in Ethnographic Perspective, by DS Whitley and MP Beaudry, pp. 101-120. In *The Formation of Complex Society in Southeastern Mesoamerica*, ed. W Fowler. Boca Raton: CRC Press.

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1988 Bears and Baskets: Aspects of Shamanism in North American Rock Art, pp. 34 45. In *The State of the Art: Advances in World Rock Art*, ed. TA Dowson. Johannesburg: Archaeology Department, University of the Witwatersrand.

1988 Obsidian Hydration Dates from the Coso Range, pp. 75-77. In *Obsidian Dates IV*, ed. CW Meighan and JL Scalise. UCLA Institute of Archaeology, Monograph 29.

1982 Practical Mapping for the Field Archaeologist, pp. 14-22. In *Practical Archaeology: Field and Laboratory Techniques and Archaeological Logistics*, ed. BD Dillon. UCLA Institute of Archaeology, Archaeological Research Tools #2.

1982 Introduction, by DS Whitley and RA Schiffman, pp. 1-4. In *Pictographs of the Coso Region: Analysis and Interpretation of the Coso Painted Style*, ed. RA Schiffman, DS Whitley et al. Bakersfield College Publications in Archaeology 2.

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1980 Preliminary Investigations at a Site Complex on the North Ranch, Westlake, Ventura County, California, by DS Whitley et al, pp. 43-120. In *Inland Chumash Archaeological Investigations*, ed. DS Whitley, EL McCann and CW Clewlow, Jr. UCLA Institute of Archaeology, Monograph 15.

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1980 Intra-Site Variability on Ven-261: A Test Case, by DS Whitley et al, pp. 167-186. In *Inland Chumash Archaeological Investigations*, ed. DS Whitley, EL McCann and CW Clewlow, Jr. UCLA Institute of Archaeology, Monograph 15.

1979 Introduction to Oak Park Prehistory, by CW Clewlow, Jr. and DS Whitley, pp.1-5. In *The Archaeology of Oak Park, Ventura County, California*, Volume III, ed. CW Clewlow, Jr. and DS Whitley. UCLA Institute of Archaeology, Mon. 11.

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1979 Preliminary Excavations at CA-Ven-122, by DS Whitley et al, pp. 84-130. In *The Archaeology of Oak Park, Ventura County, California,* Volume III, ed. CW Clewlow, Jr. and DS Whitley. UCLA Institute of Archaeology, Monograph 11.

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1979 The Organizational Structure of the Lulapin and Humaliwo, by DS Whitley and CW Clewlow, Jr., pp. 149-174. In *The Archaeology of Oak Park, Ventura County, California*, Volume III, ed. CW Clewlow, Jr. and DS Whitley. UCLA Institute of Archaeology, Monograph 11.

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1979 Artifacts from the Ring Brothers Site Complex, by DS Whitley et al, pp. 11-100. In *Archaeological Investigations at the Ring Brothers Site Complex, Thousand Oaks, California*, ed. CW Clewlow,

Jr., DS Whitley and EL McCann. UCLA Institute of Archaeology, Monograph 13.

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1979 Perspectives on the Ring Brothers Site Complex and the Archaeology of the Arroyo Conejo, by DS Whitley and CW Clewlow, Jr., pp. 111-126. In *Archaeological Investigations at the Ring Brothers Site Complex, Thousand Oaks, California*, ed. CW Clewlow, Jr., DS Whitley and EL McCann. UCLA Institute of Archaeology, Monograph 13.

List of Additional Publications on Request

Teaching Experience:

North American Prehistory	North American Ethnography
Eastern Mesoamerica (Maya sphere)	Western Mesoamerica (Aztec sphere)
California Prehistory	California Ethnography
Archaeological Field Training	World Rock Art

1989-2005 Instructor, Division of Social Sciences and Humanities, University of California, Los Angeles Extension
1987-1989 Post-doctoral Fellow, University of the Witwatersrand, South Africa
1983-1987 Chief Archaeologist/ Lecturer, University of California, Los Angeles

Film & Recording Credits:

2006 Archaeological consultant, “A Light in the Darkness” feature film, Bearsmouth Productions.
1998 Executive producer, Giant Records artist Chris Ward, "Angels Fly" CD.
1997-8 Archaeological consultant, "Visions on Stone" video, Maturango Museum.
1992 Executive producer, Giant Records artist Chris Ward, "Faith 'Aint Faith" CD.
1991-2 Anthropological consultant, "Blackfeather/Mystic" TV pilot, Hearst Entertainment/CBS.
1986 Senior script writer, "Invitation to Adventure", Institute of Archaeology, UCLA.
1986 Archaeological consultant, "Vibes" Columbia Pictures feature film.
1982 Script writer, "Rock Art Treasures of Ancient America", Dave Caldwell Productions.
1982 Script consultant, "Rock Art from the Mountains of Fire", RUJAC Productions.

Photo Awards & Credits:

Awards: Director's Award; 2nd Place, Action Photography; 3rd Place, Photo Journalism, Ventura County Fair, 2006.

Photo spreads: *California High School Rodeo Magazine* (various issues, 2005-6).
American Archaeology Magazine 1(3), Fall 1997, pp. 19-23.
Discover Magazine 19(6), June 1998, pp. 52-58.
Discovering Archaeology Magazine 2(4), September 2000, pp.18-21.
Shaman's Drum Magazine 56, Fall 2000, pp.16-29.
American Archaeology Magazine, 5(1), Spring 2001, pp. 26-27.

Cover photos: *Mind in Many Places* (Ralph Allison, 1999).
Prehistoric Art: The Symbolic Journey of Humankind (Randall White, 2003).

Professional Manuscript Reviews:

Antiquity
Journal of Anthropological Archaeology
Journal of Archaeological Science
Nuclear Instruments and Methods in Physics Research
Journal of California and Great Basin Anthropology
Cambridge Archaeological Journal
Canadian Journal of Archaeology
South African Humanities
Southern African Archaeological Bulletin
Before Farming
Journal of Archaeological Method & Theory
Journal of California Archaeology
Reviews in Anthropology
Hunter Gatherer Research
Animals
Environmental Archaeology: Journal of Human Palaeoecology
MIT Press
University of New Mexico Press
Cambridge University Press
University of Utah Press
Stanford University Press
Sage Publications
Routledge Press
University of Chicago Press

American Antiquity
Geographical Analysis
Studies in Conservation
Ancient Mesoamerica
Chungara
Plains Anthropologist
Journal of Social Archaeology
Expedition Magazine
Time & Mind
Current Anthropology
The Kiva
Australian Archaeology
The Arts
Archaeological Dialogues
Journal of Arid Environments
World Archaeology
University of Chicago Press
Texas A&M University Press
Smithsonian Institution Press
AltaMira Press
Rowman & Littlefield
Left Coast Press
University of Arizona Press
University of British Columbia Press

Research Proposal Reviews:

National Science Centre, Poland
Australian Research Council
Chilean National Science and Technology Commission (FONDECYT)
John Simon Guggenheim Foundation
National Endowment for the Humanities
National Geographic Society
Schools of the Pacific Foundation
LSB Leakey Foundation
Association for Field Archaeology
Lawrence Livermore Laboratory – University of California Program
National Park Service, National Center for Preservation Technology & Training
South African National Research Foundation
McDonald Institute for Archaeological Research, Cambridge University, England
Dumbarton Oaks

Robert Azpitarte

Associate Archaeologist

Firm Name: ASM Affiliates, Inc., Tehachapi, California

Total Years of Experience: 8

Employment History:

2015-2019	ASM Affiliates, Inc., Associate Archaeologist
2017	Petra Resource Management, Field Technician
2011-2015	ASM Affiliates, Inc., Field Technician

Education:

B.A.	2012/Anthropology/California State University, Bakersfield
B.A.	2012/Art (Studio)/California State University, Bakersfield

Additional Training:

2018	PASSPORT Training
2016	CRC South Training

Professional Memberships or Affiliations:

2011-2018	Society for California Archaeology
2018	Society for American Archaeology
2012-2018	CSU Bakersfield Alumni Association

Professional Profile:

Mr. Azpitarte has held a number of positions of increased responsibility within the field of cultural resources management since 2011. Mr. Azpitarte has spent eight years documenting prehistoric and historic sites in California's Central Valley including numerous survey, testing, and data recovery projects. Mr. Azpitarte has also participated in Great Basin fieldwork in eastern and northern Nevada, as well as work in the lower and upper Mojave regions. Currently, Mr. Azpitarte serves ASM as an Associate Archaeologist.

Select Project Experience:

MOC Sharks Tooth Lease Survey, Kern County, CA
Crew Chief
CLIENT: Macpherson Oil Company
Conducted a Class III Inventory survey for approximately 356-acres near Round Mountain, California. Recorded and completed site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation (NHPA). *Reference*: Corey Eskew, Project Manager (ceskew@macphersonenergy.com).

Crimson Woodward Lease Survey, Kern County, CA
Crew Chief
CLIENT: Crimson Resource Management
Conducted a Class III Inventory survey for approximately 128-acres near Maricopa, California. Recorded and completed site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and

summarizes the archaeological record for this study area. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation (NHPA) in anticipation of future work within the lease. *Reference*: Benny Hathaway, Special Projects Advisor (BHathaway@crimsonrm.com).

AEWSD Ground Water Metering Project, Kern County, CA
Crew Chief
CLIENT: Arvin-Edison Water Storage District
Conducted a Class III Inventory survey for approximately 51 existing water wells across the southeastern Southern San Joaquín Valley, California. Recorded and completed site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and the California Environmental Protection Act (CEQA). *Reference*: Mark Dawson, P.E., Engineer (mdawson@aewsd.org).

San Lauren Project, Kern County, CA
Crew Chief
CLIENT: Quad Knopf, Inc.
Conducted a Class III Inventory survey for approximately 160-acres in Bakersfield, California. Recorded and completed site record forms for newly identified and previously identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to provide compliance with the California Environmental Quality Act (CEQA). *Reference*: Chris Mynk, Principal Planner/ Project Manager (Christopher.Mynk@qkinc.com).

EPD Solar Weedpatch and Shafter Camp Project, Kern County, CA
Crew Chief
CLIENT: EPD Solutions
Phase II test excavations and determinations of significance were conducted at historic Weed Patch or Sunset Farm Labor Camp, and the Shafter Farm Labor Camp. Recorded and completed site record forms for the previously identified sites; assessed the current condition of each cultural resource; mapped associated camp features; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to provide compliance with the California Environmental Quality Act (CEQA) as well as the Kern County General Plan for the Weed Patch and Shafter Solar Projects. *Reference*: Jeremy Krout, President (admin@epdsolutions.com).

Gettysburg Solar Survey, Kern County, CA
Crew Chief
CLIENT: Quad Knopf, Inc.
Conducted a Class III Inventory survey for approximately 160-acres near Willow Springs, California. Recorded and completed site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to provide compliance with the California Environmental Quality Act (CEQA). *Reference*: Jaymie L. Brauer, Principal Planner/ Project Manager (Jaymie.Brauer@qkinc.com).

Pier East Area Survey, Tulare County, CA
Crew Chief
CLIENT: Tule River Indian Tribe
Conducted a Class III Inventory survey for approximately 250-acres within the Tule River Indian Tribe Reservations, California. Recorded and completed site records updates and site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. *Reference*: Kerri Vera, TRIR Department of Environmental Protection (tuleriverenv@yahoo.com).

Pier East Timber Salvage Project, Tulare County, CA
Crew Chief
CLIENT: Tule River Indian Tribe
Conducted a Class III Inventory survey for approximately 565-acres within the Tule River Indian Tribe Reservations, California. Completed site records updates and site record forms for previously identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. *Reference*: Kerri Vera, TRIR Department of Environmental Protection (tuleriverenv@yahoo.com).

Red Rock Canyon Ricardo Complex, Kern County, CA
Crew Chief
CLIENT: California State Parks, OHMV Division
Conducted a Class III Inventory survey for approximately 451-acres within the Red Rock Canyon State Park, California. Completing site records updates and site record forms for newly identified and previously identified sites; assessed the current condition of each cultural resource; mapped and recovered artifacts in danger of destruction or illicit collection by park visitors; cataloged and processed the recovered artifacts and additional artifacts at the Visitor Center for curation; and completed a technical report that documents and summarizes the archaeological record for this study area. *Reference*: Peggy Ronning, Museum Curator (Peggy.Ronning@parks.ca.gov).

CRC KNDU Facility Repair, Kings and Fresno County, CA
Crew Chief
CLIENT: California Resources Corporation
Conducted a Class III Inventory survey for approximately 777-acres near Kettleman City, California. Recorded and completed site record forms for newly identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The inventory was undertaken in anticipation of future repairs to facilities within the Kettleman North Dome Unit. *Reference*: Palmira Hernandez, Regulatory Advisor (palmira.hernandez@crc.com).

Sand Ridge Preserve Project, Kern County, CA
Crew Chief
CLIENT: Center for Natural Lands Management
Conducted a Class III Inventory survey for approximately 56-acres of the Sand Ridge Preserve in Bakersfield, California. Recorded and completed site record forms for newly identified and previously identified sites; assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation Act (NHPA). *Reference*: Greg Warrick, Preserve Manager (gwarrick@cnlm.org).

ENE First Solar, Kern County, CA
Crew Chief
CLIENT: Ecology and Environment, Inc.
Conducted a Class III Inventory survey for approximately 3,019-acres near Rosamond, California. Recorded and updated 65 cultural resources within the proposed solar array blocks. assessed the current condition of each cultural resource; mapped artifacts and site locations; and completed a technical report that documents and summarizes the archaeological record for this study area. The study was undertaken to assist with compliance with the California Environmental Quality Act (CEQA) and Section 106 of the National Historic Preservation (NHPA). *Reference*: David Plumpton, Planner (DPlumpton@ene.com).

CRC Kettleman North Dome Block Surveys, Kings and Fresno counties, CA
Crew Chief
CLIENT: California Resources Corporation

Conducted a Class III Inventory survey for approximately 473-acres within the Kettleman North Dome Unit (KNDU) Oilfield near Kettleman City, California. The project included the identification and recordation of historic sites. Subsequently processed and compiled data for an inventory report following Department of Interior standards.

CRC Kettleman North Dome Reworks Project, Kings County, CA
Crew Chief
CLIENT: California Resources Corporation
Conducted a Class III Inventory survey and monitored five well pads for the KNDU Reworks Project within the Kettleman North Dome Unit (KNDU) Oilfield near Kettleman City, California. The project included the identification and recordation of historic sites. Subsequently processed and compiled data for an inventory report following Department of Interior standards.

Alamo Springs Solar Survey, Kings County, CA
Crew Chief
CLIENT: Ecology and Environment, Inc.
Conducted a Class III Inventory survey for approximately 1000-acres and a 4.9-mile gen-tie corridor near Kettleman City, California. Subsequently compiled and processed data for a survey report following Department of Interior standards.

Southern California Edison Doble V2, San Bernardino County, CA
Crew Chief
CLIENT: CH2M Hill
Participated in Class III Inventory survey and site relocation for approximately 15-miles of a transmission corridor in Lucerne Valley and San Bernardino Mountains. Site updates were undertaken for 37 previously recorded sites. Data complied during project was processed and submitted upon completion of survey.

Sultana CSD Well and Pipeline Project, Tulare County, CA
Crew Chief
CLIENT: Provost & Pritchard Consulting Group
Conducted a Class III Inventory survey for 160-acres near and within Sultana, California. Participated in NRHP Eligibility recordation for identified sites within the project area. Subsequently processed inventory and compiled data for an inventory report following Department of Interior standards.

HRSA Family Healthcare Network Project, Kings County, CA
Crew Chief
CLIENT: Provost & Pritchard Consulting Group
Conducted Phase II subsurface testing of approximately 2-acres in Hanford, California. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Inyokern Solar Project, Kern County, CA
Crew Chief
CLIENT: Quad Knopf Inc.
Conducted a Phase I/Class III Inventory of 200-acres, as well as NRHP evaluations of 10 historic sites located within Inyokern. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Rio Bravo and Wildwood Solar Projects, Kern County, CA
Crew Chief
CLIENT: Ecology and Environment, Inc.
Monitored the construction of multiple solar arrays near Buttonwillow and Wasco, California. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Silver Standard Perdito Mine Project, Inyo County, CA
Crew Chief
CLIENT: Silver Standard Resources Inc.
Conducted a Phase I/Class III Inventory of 40-acres within the Inyo Mountains. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

KWBA New Pioneer Turn-out and Ponds Project, Kern County, CA
Crew Chief
CLIENT: Kern Water Banking Authority
Conducted a Phase I/Class III Inventory of 220-acres on Kern Water Banking Authority (KWBA) managed land near Bakersfield, California. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

CRC Section 20D Powerline and Pipeline Removal Project, Kern County, CA
Crew Chief
CLIENT: California Resources Corporation
Conducted a Phase I/Class III Inventory of 118-acres, as well as NRHP evaluations of four historic sites within the Midway-Sunset Oilfield. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Hungry Valley Site Relocation Project, Kern and Ventura counties, CA
Crew Chief
CLIENT: California State Parks, Off-Highway Motor Vehicle Recreation Division
Conducted site relocations within 18,780-acres of Hungry Valley SVRA and 845-acres of newly acquired SVRA property. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

BVWSD Palms Project, Kern County, CA
Crew Chief
CLIENT: GEI Consulting, Inc.
Conducted a Phase I/Class III Inventory for 1,110-acres for the Buena Vista Water Storage District (BVWSD). Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Henrietta Solar Project, Kings County, CA
Crew Chief
CLIENT: SunPower Corporation
Conducted construction of a solar power generation facility on 670-acres in unincorporated Kings County, near Lemoore, California. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Mediacom Fiberoptic Cable Project, Kern County, CA
Crew Chief
CLIENT: Mediacom Communications Corporation
Conducted Phase II excavations for eight prehistoric sites along Hwy. 178 within the Kern River Valley. Additionally, a Phase I/Class III Inventory survey was conducted for 11-acres along Freeman Junction. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Tejon Centennial Project, Los Angeles County, CA
Crew Chief
CLIENT: Centennial Founders, LLC
Managed a field crew and conducted Phase II excavations for 20 prehistoric sites. Additionally, a Phase I/Class III Inventory survey was conducted for 768-acres within Tejon Ranch. Subsequently processed inventory data and lab results to compile an inventory report following Department of Interior standards.

Chico Martinez 3 APDs Construction Monitoring, Kern County, CA
Field Technician
CILENT: California Resources Corporation
Monitored oil well pad construction for culturally sensitive materials during ground disturbing activities. Participated in recording (site/material recognition, artifact collection, GIS site mapping) of relevant materials.

Vintage Rio Lobo 3D Geophysical Survey Class III Inventory, Kettleman Hills, Kings and Fresno counties, CA
Field Technician
CLIENT: Vintage Production California
Assisted with the fieldwork (pedestrian survey, site recognition, GIS site mapping, and additional site recording) for a 9,000-acre study area.

Grapevine Project Phase II Testing, Kern County, CA
Field Technician
CLIENT: Tejon Ranch Corporation
Assisted in Phase II site excavation (STP; 1x1-m units), GIS site mapping, and data recording for 19 prehistoric archaeological sites.

Middlewater Pipeline Survey Class III Inventory, Kern County, CA
Field Technician
CLIENT: Quad Knopf
Assisted with the fieldwork (pedestrian survey, site recognition, GIS site mapping, and additional site recording) for this project.

Class III Inventory for Rochester Mining District, Pershing County, NV
Field Technician
CILENT: Rye Patch Gold/Enviroscientists
Assisted with pedestrian survey, site recording, GIS site mapping, and additional site documentation.

Class III Inventory for BLM Rock Art, Lincoln County, NV
Field Technician
CLIENT: Bureau of Land Management, Caliente Field Office
Conducted pedestrian survey, site recognition, GIS site mapping, general prehistoric site recording for 10,000 acres study area, including identification and recordation of prehistoric and historic rock art.

Phase I Survey for Grapevine Project, Kern County, CA
Field Technician
CLIENT: Tejon Ranch Corporation
Conducted archival record searches at the Southern San Joaquin Valley Information Center and assisted with the pedestrian survey, site recognition, GIS site mapping, additional site recording for 15,000-acre study area.

Class III Inventory for Section 6D, Kern County, CA
Field Technician
CLIENT: Occidental of Elk Hills
Assisted in archival record searches at the Southern San Joaquin Valley Information Center, and assisted with the pedestrian survey, site recognition, GIS site mapping, and additional site recording for 640-acre study area.

Class III Inventory for Sections 2D, 4D, 5D, 9D, 12D, 18H, and 31G, Kern County, CA
Field Technician
CLIENT: Occidental of Elk Hills

Assisted in archival record searches at the Southern San Joaquin Valley Information Center and assisted with pedestrian survey, site recognition, GIS site mapping, and additional site recording for 3620-acre study area.

Class III Inventory for Sections 24B, 30B, and 22Z, Kern County, CA
Field Technician
Assisted in archival record searches at the Southern San Joaquin Valley Information Center, and fieldwork (pedestrian survey, site recognition, GIS site mapping, and additional site recording) for 1860 acres study area.

Phase I Survey for Blackwell Solar Park, Kings County, CA
Field Technician
CLIENT: Frontier Renewables
Assisted in archival record searches at the Southern San Joaquin Valley Information Center and pedestrian survey, site recognition, GIS site mapping, and additional site recording for 260-acre study area.

Class III Inventory for Mabry Project, Kern County, CA
Field Technician
CLIENT: Robert A. Booher Consulting
Assisted in archival record searches at the Southern San Joaquin Valley Information Center and pedestrian survey, site recognition, GIS site mapping, and additional site recording for 160-acre study area.

Class III Inventory for Venoco 3D Seismic Survey, Kern County, CA
Field Technician
CLIENT: Robert A. Booher Consulting
Assisted in archival record searches at the Southern San Joaquin Valley Information Center and pedestrian survey, site recognition, GIS site mapping, and additional site recording for this project.

Class III Inventory for Sections 21B, 27B, 29B and 36B, Kern County, CA
Field Technician
CLIENT: Occidental of Elk Hills
Assisted in archival record searches at the Southern San Joaquin Valley Information Center and pedestrian survey, site recognition, GIS site mapping, and additional site recording for 2460-acre study area.