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Record of Decision

B.F. Sisk Dam Safety of Dams Modification Project

Prepared by
United States Department of the Interior
Bureau of Reclamation
Mid Pacific Region

U.S. Department of the Interior
Bureau of Reclamation

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Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Record of Decision

B.F. Sisk Dam Safety of Dams Modification Project

Merced County, California

Recommended by: _____ Date: 11/21/2019

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Background

B.F. Sisk Dam is located on the west side of California's Central Valley just west of Santa Nella in Merced County, California. B.F. Sisk Dam was constructed to create the off-stream San Luis Reservoir, which provides supplemental storage capacity for the Central Valley Project (CVP) and State Water Project (SWP). San Luis Reservoir provides 2,027,840 acre-feet of water storage for the CVP and the SWP. The water stored in the reservoir is managed for State (55 percent) and Federal (45 percent) uses as part of the SWP and CVP, respectively. B.F Sisk Dam and San Luis Reservoir is part of the San Luis Joint-Use Complex or San Luis Unit, which was authorized by Congress in 1960 under the San Luis Act (Public Law [P.L.] 86-488). The dam is a zoned, earthfill structure 382 feet high with a crest length of 18,600 feet (approximately 3.5 miles) and a crest width of 30 feet; it contains 77,656,000 cubic yards of material. At a crest elevation of 554 feet above mean sea level, the maximum base width is 2,420 feet.

The United States Department of the Interior, Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) conducted several geological investigations at B.F. Sisk Dam because of its location near active faults. In 2006, Reclamation completed a risk analysis of B.F. Sisk Dam that evaluated dam stability in the event of seismic activity. The analysis concluded that significant- to high-seismic activity could result in sections of the dam slumping below the water line or allow cracking to develop through the embankment, which could lead to dam failure. Therefore, B.F. Sisk Dam did not meet Reclamation's Public Protection Guidelines. Reclamation initiated a Corrective Action Study in 2006 that resulted in the evaluation of multiple potential structural modifications and operational changes at B.F. Sisk Dam that were compiled and further reviewed in a Value Planning Study. Options that met the screening criteria were further developed by Reclamation and DWR to be carried forward as a stand-alone alternative or as a component of a combined alternative.

Purpose and Need

Reclamation and DWR have determined that actions to reduce risks from earthquakes to the public downstream of the dam are needed. The purpose of the B.F. Sisk Dam Safety of Dams Modification Project is to prevent destabilization of the dam embankment and to ensure dam stability, reduce safety concerns of the public downstream of the dam, and to maintain water supply deliveries to State and Federal water contractors.

Reclamation's Decision

Reclamation has decided to implement the Crest Raise Alternative as described in the B.F. Sisk Dam Safety of Dams Modification Project Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The Crest Raise Alternative will meet the requirements of Reclamation's Public Protection Guidelines and the project objectives.

Alternatives Considered

The alternatives evaluated in the EIS/EIR include no action, limiting reservoir storage by restricting the maximum water height, and raising a portion of the dam crest an additional 12 feet with stability berm and face filters.

Alternative 1 - No Action Alternative

Under the No Action Alternative, there would be no structural or operational changes to the dam. This alternative does nothing to reduce the risk of failure from overtopping due to large seismically-induced deformations of the dam. The dam would continue to be susceptible to liquefaction and strength loss, resulting in a reduction of the crest elevation caused by seismic loading and the seismic risk would remain unchanged.

Alternative 2 - Reservoir Restriction Alternative

The Reservoir Restriction Alternative would limit the storage of the reservoir by restricting the maximum water height. If the reservoir is maintained at a lower operating level, there is a lower probability of failure given an increase in allowable dam slumping that could occur in a seismic event before overtopping and a reduction of pressure on the embankment in areas where cracking could occur. This alternative may also reduce the consequences of dam failure by eliminating or reducing the total amount of possible floodwater that could be released from the dam during a seismicity-induced failure event. The reduction in total storage capacity in San Luis Reservoir would adversely impact water supply deliveries to CVP and SWP contractors. This reduction in water supply would not meet the project objectives. However, the Reservoir Restriction Alternative is analyzed in the EIS/EIR as a non-structural alternative to prevent destabilization of the dam embankment, ensure dam stability, and reduce safety concerns.

Construction associated with the Reservoir Restriction Alternative would be limited to revegetation of the reservoir rim between the current maximum reservoir water surface elevation and the restricted reservoir maximum surface elevation. Hydroseeding would take place over an 18-month period to establish vegetation along the new sections of reservoir rim.

The Reservoir Restriction Alternative would consist of a 55-foot reduction in the maximum water surface elevation of San Luis Reservoir from the current elevation of 544 feet to 489 feet. This would permanently reduce the maximum storage capacity of the reservoir from 2,027,840 acre feet to 1,383,000 acre feet.

Alternative 3 - Crest Raise Alternative

The Crest Raise Alternative would reduce safety concerns for the downstream public by reducing the likelihood of overtopping if slumping were to occur during a seismic event by increasing dam height. This alternative would also address dam failure due to earthquake-induced cracking. This alternative maintains water supply deliveries to State and Federal contractors through the CVP and SWP because it allows the reservoir to operate at its current maximum storage elevation.

The foundation that the dam is built on has been divided into sections: the right abutment, the left abutment, the north valley section, and the south valley section. The north and south valley sections are built on the alluvial channels of San Luis Creek and Cottonwood Creek that B.F. Sisk Dam impounds and consist of deposits of sands and gravels with clayey or silty fines. The abutments are primarily founded on bedrock (sandstone, shale, and conglomerate), which is covered by clayey slopewash in some locations. Studies completed have identified the potential for significant deformation (crest settlement) of the dam in the sections built on the alluvium and clayey slopewash during a seismic event.

This deformation potential would be addressed with the removal of the alluvium and clayey slopewash and placement of downstream stability berms keyed into bedrock. Additional embankment materials would be placed on the downstream slope of the dam crest to increase the crest height 12 feet. The material would be placed along the north and south valley sections of the dam alignment tapering to the existing crest elevation at the abutments. Construction of a filter around the existing spillway conduit is also included in this alternative. In addition to these modifications, development of a foundation shear key at the south valley section is under consideration as an optional additional feature of this alternative. The Crest Raise Alternative is the Preferred Alternative.

Environmentally Preferable Alternative

Section 1505.2(b) of the Council on Environmental Quality (CEQ) Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision. The environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources according to Council of Environmental Quality's (CEQ's) 40 Most Asked Questions Number 6(a). Although CEQ regulations require the identification of the environmentally preferred alternative, it is not required that this alternative be adopted.

The Reservoir Restriction Alternative has been identified as the environmentally preferable alternative because it would cause the least damage to the physical environment. The Reservoir Restriction Alternative would require minimal construction which would be completed with 18 months. Construction-related impacts would be due to the construction of temporary access roads to allow hydroseeding equipment access to the reservoir rim. The access roads would then be removed after the hydroseeding actions are completed.

Due to the smaller construction footprint and shorter completion period, the Reservoir Restriction Alternative would admit less construction-related emissions and greenhouse gasses than the Crest Raise Alternative. The Reservoir Restriction Alternative would require fewer workers, and less vehicles and equipment than the Crest Raise Alternative which would have less impacts to traffic and transportation. Construction activities would occur within Merced County noise exemption hours and would not exceed noise thresholds. Therefore, there would not be a significant and unavoidable impact to noise unlike the Crest Raise Alternative. Due to the size and nature of the Reservoir Restriction Alternative, construction related impacts to special status

species, wildlife, and their habitats would be less than the Crest Raise Alternative. There would be no direct impacts to historic properties or historical resources under the Reservoir Restriction Alternative.

However, implementation of the Reservoir Restriction Alternative would cause a significant and unavoidable effects to water supply. South-of-Delta CVP and SWP deliveries are expected to decrease under the 55-foot Reservoir Restriction Alternative due to the reduced storage capacity of the San Luis Reservoir. The lower water levels could reduce water based recreation and result in the displacement of visitors at the Basalt and Dinosaur Point use areas, which could potentially create overcrowded conditions at other local and regional recreation sites.

Basis for Decision

The Crest Raise Alternative has been selected to be implemented which will reduce the dam safety risk. Raising the crest elevation 12 feet would increase the distance between the water surface and the dam crest (freeboard) to prevent reservoir overtopping and failure in the event of dam deformation. Installation of crack filters restrict the migration of soil materials through these cracks mitigating the potential for post seismic cracks to induce internal erosion within the dam embankment. Construction of the Crest Raise Alternative would be scheduled during times in the water year that San Luis Reservoir is typically drawn down to lower levels to avoid any adverse impact on storage capacity and water supply.

The decision to implement the Crest Raise Alternative is based on meeting the project objectives, potential environmental impacts, and implementation of mitigation to reduce environmental effects. This decision has been made based on the information and analysis in the EIS/EIR, and on the results of consultation and coordination with public agencies, tribes, special interest groups, and individuals. Indian Trust Assets are not found in the project area and there would be no impacts to Indian Trust Assets. The Crest Raise Alternative is the only alternative that meets all the project objectives. Although construction of the Crest Raise Alternative is anticipated to cause a significant and unavoidable effects from noise, the benefits that will be provided by the Crest Raise Alternative outweigh these adverse effects.

All practicable means to avoid, minimize, and compensate for potential adverse environmental effects, and measures to conserve federally listed species were analyzed and incorporated into the Crest Raise Alternative. These mitigation measures include, but are not limited to; various best management practices, pre-construction biological surveys, construction contractor environmental protection training, physical demarcation of sensitive habitat to be avoided during construction, and obtaining all required permits. Mitigation measures address recreation resources, vegetation and wildlife, special status species, air quality, climate change, aesthetics and visual resources, traffic and circulation, noise, water quality, and cultural resources. The adopted means to avoid and minimize environmental impacts potentially generated by the construction of the Crest Raise Alternative are described in the EIS/EIR and are listed below (Attachment A).

The San Luis Reservoir is an important CVP and SWP facility and a key component of California's water supply system. Therefore, proper functioning of the reservoir is critical to maintaining water distribution for Federal, State, and local uses. Under the Reservoir Restriction Alternative, the average annual water supply deliveries to south-of-Delta CVP and SWP contractors would be reduced in all water years. This alternative would substantially adversely impact water supply deliveries to CVP and SWP contractors. The reduction in water supply deliveries would not be able to be replaced reliably from other sources, such as groundwater pumping, water transfers, or new surface storage and no feasible mitigation has been identified to reduce these impacts. Groundwater banking and surface water transfers were evaluated and rejected as infeasible in the Accountability Report for the B.F. Sisk Dam Value Planning Study as a potential alternative to the Crest Raise Alternative. Development of new surface water storage at a different location to offset the lost capacity at San Luis Reservoir would generate numerous significant environmental impacts and require extensive time to implement and was determined to be infeasible. The Reservoir Restriction Alternative does not meet all the project objectives.

Under the No Action Alternative, there would be no change to reduce the risk of dam failure and the associated risk to continued water supply deliveries from the reservoir. Urban areas downstream of B.F. Sisk Dam would continue to be at risk of flooding. In the event of dam failure, water would no longer be stored in the reservoir and CVP and SWP deliveries would be reduced given the resulting reduction in south-of-Delta storage. If a dam failure were to occur major facilities and transportation corridors would be impacted until flood waters recede. Significant loss of life could occur, as well as injuries, illnesses, and the release of hazardous and toxic contaminants to the downstream floodplain. The No Action Alternative does not meet any of the project objectives.

Public Involvement

A public scoping meeting was held on September 23, 2009, in Gustine, allowing the public the opportunity to provide input regarding the preparation of the B.F. Sisk Dams Safety of Dams Modification Project EIS/EIR. Concerns raised during public scoping included: water quality impacts during and after project construction; flooding due to a major earthquake; loss of access to recreational areas and potential interference of daily park operations; construction and operational impacts to project area wildlife; and a change in dam storage capacity. Feedback received during public scoping, along with the studies completed as a part of the ongoing Corrective Action Study, including the Value Planning Study, were used to identify potential measures to address the purpose and need. These measures were then evaluated using screening criteria developed by the Reclamation and DWR. Options that sufficiently met each screening criteria were carried forward for consideration as a stand-alone alternative or as a component of a combined alternative.

The draft EIS/EIR was circulated for public review for 45 days beginning on April 12, 2019. Public meetings were held May 7, 2019 and May 8, 2019 in the cities of Sacramento and Los Banos, California. The public comment period concluded May 28, 2019. Five written comments were received from Federal, State, and local agencies. Reclamation, with input from DWR, considered all comments received regarding the project, and comments were addressed in the

final EIS/EIR. Chapter 3 of the final EIS/EIR contains the public and agency comments received along with responses to these comments while Chapter 4 presents revisions to the draft EIS/EIR text based on issues raised by comments, or corrections. Comments provided by Native American tribes during coordination were also considered.

Endangered Species Act

In a memo dated April 2, 2019, Reclamation initiated formal consultation with U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act (16 USC §1536). Reclamation has determined the project has the potential to affect the Federally-listed as endangered San Joaquin kit fox (*Vulpes macrotis mutica*), threatened California tiger salamander Central California Distinct Population Segment (*Ambystoma californiense*), and threatened California red-legged frog (*Rana draytonii*). A Biological Opinion was received August 29, 2019.

National Historic Preservation Act

Reclamation is responsible for complying with 54 U.S.C. § 306108, commonly known as Section 106 of the National Historic Preservation Act. Reclamation, in coordination with DWR, determined that implementation of the project may adversely affect historic properties. Due to the large area under consideration and the inaccessibility of some of these areas, Reclamation chose to phase its identification efforts pursuant to 36 CFR § 800.4(b)(2). Reclamation will continue its assessment of the potential adverse effect on historic properties and resolve any such effect through implementation of the Programmatic Agreement with the State Historic Preservation Officer pursuant to 36 CFR § 800.14(b)(1)(ii) executed on September 12, 2019.

Mitigation Measures

Reclamation and DWR have adopted all practicable means to avoid or minimize environmental effects from the Proposed Action and are committed to implementing the measures identified in the EIS/EIR. Though all practicable means to avoid or minimize adverse effects of the project have been adopted, residual significant effects from noise during the eight to ten-year construction period would remain. Attachment A to this Record of Decision includes a detailed description of the mitigation measures, the responsible agency, and the time and method of verification.

Comments Submitted on the Final EIS/EIR

One comment letter was received from the U.S. Environmental Protection Agency during the 30-day review period for the Final EIS/EIR. The U.S. Environmental Protection Agency thanked Reclamation for responding to their comments and recommend continued coordination with the U.S. Army Corps of Engineers and wildlife agencies regarding ongoing permitting processes.

ATTACHMENT A

RECORD OF DECISION, B.F. SISK DAM SAFETY OF DAMS MODIFICATION PROJECT: SUMMARY OF ENVIRONMENTAL COMMITMENTS FOR THE CREST RAISE ALTERNATIVE (ALTERNATIVE 3)

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
AQ-1	**Reduce emissions from off-road construction equipment by using Tier 4 construction equipment** Impacts on air quality from construction activities will be reduced by using construction equipment compliant with the Tier 4 emission standards for off-road diesel engines instead of the fleet average for the San Joaquin Valley Air Basin. Records will be maintained by the construction contractor that demonstrate that actual emissions would not exceed the San Joaquin Valley Air Pollution Control District's (SJVAPCD) significance criteria and would be submitted to Reclamation monthly. If NOx emissions are forecasted to exceed thresholds, then changes will be made so that the threshold is not exceeded, or work will be stopped.	Reclamation and DWR	Documentation on file with DWR and Reclamation	Prior to and during construction
AQ-2	**Reduce exhaust emissions from on-road trucks** All haul trucks, vendor trucks, or other vehicles operating onsite with on-road engines will meet model year 2015 or better emission standards.	Reclamation and DWR	Documentation on file with DWR and Reclamation and field monitor verification	Prior to and during construction
AQ-3	**Implement Best Available Mitigation Measures for Construction Phase** As required by the SJVAPCD, the project must apply the following best available mitigation measures for the construction phase: • All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilize of dust emission using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. • All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.	Reclamation and DWR	Documentation on file with DWR and Reclamation and field monitor verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	• All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. • With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition. • When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. • All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. *(The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)* • Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. • Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. • An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicles trips per day by vehicles with three or more axles shall implement mitigation measures to prevent carryout and trackout.			
GHG-1	Reclamation will require the contractor to purchase carbon offsets before construction activities commence in an amount sufficient to reduce greenhouse gas (GHG) emissions to less than significant levels using DWR significance thresholds; a minimum of 120,575 metric tons carbon dioxide equivalent ($MTCO_2e$) would be required to reduce emissions below the project-level significance threshold. Only emission offsets generated as part of California Air Resources Board's (CARB's) Compliance Offset Protocols (developed for the Assembly Bill 32 cap-and-trade program) may be used to reduce GHG emissions. These protocols assure that offsets are real, permanent, quantifiable, verifiable, enforceable, and additional (Health and Safety Code Section 38562(d)). Registries selling approved offsets include the American Carbon Registry, the Climate Action Reserve, and the Verified Carbon Standard.	Reclamation and DWR	Documentation on file with DWR and Reclamation	Prior to construction
VIS-1	To reduce visual intrusion from light sources, Reclamation shall require the contractors to implement measures to reduce light and glare while meeting minimum safety and security standards. Light reduction measures must include: directing lighting downward to prevent spillover onto nearby areas, utilization of lighting fixtures with directional shielding to focus	Reclamation and DWR	Field monitor verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	on areas being lit, and a construction requirement that all lighting in areas not under active construction be shut off. To reduce the amount of glare, building finishes shall be subdued and earth-toned. Onsite mechanical equipment roofing materials, and any exposed vents or flashings must be constructed of non-glare finishes that minimizes reflectivity.			

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
NOI-1	A Noise Control Plan (NCP) will be developed by the construction contractor prior to the start of any construction activities to address increased noise levels as a result of the proposed project and alternatives. The NCP will identify the procedures for predicting construction noise levels at sensitive receptors and will describe the reduction measures required to minimize construction noise. The noise mitigation measures in the NCP will include, but are not limited to: • Appropriate level of sound attenuation will be used or constructed to minimize noise levels by at least 3 A-weighted decibels (dBA). Potential sound attenuation measures could include, but are not limited to stationary equipment and stockpiles, or otherwise placed between the source(s) of construction noise and noise-sensitive receptors, as appropriate. The feasible measures will be determined by the construction contractor based on an initial evaluation of each construction site. • Contractor will be responsible for maintaining equipment in best possible working condition and outfitting construction equipment with the most effective locally available commercial mufflers or other noise attenuation devices; • When feasible, the loudest construction activities will be conducted during Merced County construction noise exempt hours, between 7 a.m. and 6 p.m.; • Operation of construction equipment between the hours between 6 p.m. and 10 p.m. will be prohibited within 9,100 feet of the Subdivision off State Route (SR) 152. During the hours between 10 p.m. and 6 a.m. the operation of construction equipment will be prohibited within 9,550 feet of the Subdivision off SR 152. • Shutting down equipment that are queued or not in use for 5 minutes or more; • Pre-construction meeting with contractors and project managers to confirm that noise mitigation procedures are in place; • Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems; • The public will be kept informed of the construction hours and days; • List contact information for complaints and respond to noise complaints; and • An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise.	Reclamation and DWR	NCP on file with Reclamation and DWR. Field monitor verification	Plan development: prior to construction Plan implementation and monitoring: during construction
NOI-2	A Blasting Plan for construction shall be prepared and followed that includes the following: • Identification of blast officer;	Reclamation and DWR	Blasting Plan on file with Reclamation	Plan development: prior to issuing

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	• Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited; • Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting; • Description of means for transportation and on-site storage and security of explosives in accordance with local, State and Federal regulations; • Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation); • Traffic control standards and traffic safety measures (if applicable); • Required personal protective equipment; • Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger; • Procedures for handling, setting, wiring, and firing explosives; and procedures for handling misfires per Federal code; • Type and quantity of explosives and description of detonation device. • Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure; • Description of blast vibration and air blast monitoring programs; • Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan); • Emergency Action Plan to provide emergency telephone numbers and • directions to medical facilities. Procedures for action in the event of injury; • Material Safety Data Sheets for each explosive or other hazardous materials to be used; • Evidence of licensing, experience, qualifications of blasters, and description of insurance for the blasting work • A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls; • If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting;		and DWR Field monitor verification	construction contract Plan implementation and monitoring: during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	• Explosive materials shall be delivered in specially built vehicles marked with United Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting Department of Transportation rules within the same vehicle. Vehicles shall have at least two ten-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses with Hazmat endorsements, and drivers shall carry bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators; • The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required Federal explosives license must submit photographs and fingerprints with the application to ATF.			
NOI-3	A pre-construction noise survey will be completed during daytime and nighttime periods at multiple locations across the project area, including identified sensitive receptors, to establish background noise levels at those times. During construction, noise will be periodically monitored at these locations to assess any increases in noise levels that exceed the local noise ordinances. If noise levels are recorded exceeding the background noise level by 10 dBA between 6 p.m. and 10 p.m. or by 5 dBA between 10 p.m. and 7 a.m. or if noise complaints are received, an investigation will be conducted to determine the source of the noise. After the investigation, noise will be reduced using all feasible measures, including mitigation at the receiver impacted by the noise. Potential mitigation at the receiver would include building envelope improvements and acoustical window treatments. All mitigation requirements will be included in bid documents and construction contracts.	Reclamation and DWR	Field monitor verification	Survey: prior to construction Implementation and monitoring of noise reducing measures: during construction
TR-1	The following construction management actions will be documented in a temporary traffic control plan developed by the contractor as a requirement that will be included in its construction contract. The temporary traffic control plan will be submitted for California Department of Transportation review and approval during the Encroachment Permit process. Construction contractors shall install signage at intersections identified as	Reclamation and DWR	Field monitor verification and documentation on file with	Traffic Control, and Health and Safety Plan development: Prior to

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	dangerous in accordance with the California Manual on Uniform Traffic Control Devices guidelines warning motorists of slow moving construction traffic and lane closures, including SR 152, Basalt Road, and the Romero Visitor Center access road. Signage shall also be posted at these intersections one month in advance to allow motorists time to plan for delays or alternate routes. Construction contractors shall implement dust abatement and perform proper construction traffic management actions, including signage warning motorists of construction activity and traffic controls like flaggers or temporary traffic lights where construction equipment will be entering roadways, to reduce conflicts during periods of high traffic volume in and around each construction site and to avoid conflicts with emergency responders entering and existing the area during an emergency. In addition to the temporary traffic control plan, prior to the initiation of any construction actions, construction contractors shall develop and adhere to a health and safety plan outlining all applicable Occupational Safety and Health Administration requirements, important traffic safety plans including identification of emergency access routes in and through construction areas that would will need to be kept clear at all times during construction. The health and safety plan shall include coordination with emergency service personnel to ensure adequate mitigation for all impacts.		Reclamation and DWR	construction. Implementation and monitoring: during construction
HAZ-1	The construction contractor in coordination with the Lead Agencies shall work with the California Department of Parks and Recreation (CDPR) and the Central Valley Regional Water Quality Control Board (RWQCB) to review existing monitoring data of the San Luis Reservoir State Recreation Area (SRA) Leaking Underground Storage Tank (LUST) Cleanup Site to evaluate the potential for interacting with hazardous soil contamination during construction. If the construction contractor and the Lead Agencies (as the responsible party for this potential disturbance) determine that interaction with contaminated soil cannot be avoided and these construction actions could generate a release of this soil to nearby water bodies or elsewhere offsite, the construction contractor shall prepare a Contaminated Soil/Groundwater Remediation Plan. This remediation plan will detail the nature of the contaminants on site, measures required to avoid interaction with these contaminants including if necessary a pre-construction cleanup of the site, and a response action plan in the event of an inadvertent release of contaminated soils from the construction site. This plan will be submitted to the CDPR and the Central Valley RWQCB for review and approval prior to any construction taking place. In addition, the construction contractor shall also prepare a Spill Prevention and Response Plan for preventing spills and responding to chemical or hazardous substance spills. This plan will include spill prevention management, including employee training, hazardous substance inventory, and spill response equipment. The plan will also include a spill response plan, including evacuation procedures, spill containment and cleanup, and reporting a release.	Reclamation and DWR	Documentation on file with Reclamation and DWR, and field verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	Finally, the construction contractor shall prepare a Fire Prevention Plan to prevent a fire from occurring. The plan must include (Occupational Safety and Health Administration 2018): • A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard. • Procedures to control accumulations of flammable and combustible waste materials. • Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials. • The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires. • The name or job title of employees responsible for the control of fuel source hazards.			
HAZ-2	Construction contracts will include requirements for the contractor to prepare a construction safety plan prior to any construction activities in collaboration with seaplane base personnel to coordinate construction activities including: a schedule, coordination of personnel with aviation radios, and notice requirements. Also, consistent with Mitigation Measure TR-1, the contractor shall coordinate with emergency service personnel to ensure adequate mitigation for all impacts.	Reclamation and DWR	Documentation on file with Reclamation, and DWR	Construction Safety Plan development: Prior to construction. Implementation: during construction
HAZ-3	The construction contractor in coordination with the Lead Agencies shall notify the San Luis Seaplane Base administrator when a Notice to Airmen is required to be issued prior to the commencement of construction activities within the seaplane base and when high profile equipment will be used within safety zones.	Reclamation and DWR	Field monitor verification	During construction
HAZ-4	The Lead Agencies will include requirements in all construction contracts requiring the use of spark arrestors on all construction equipment. The contract shall also include requirements for the contractor to educate all construction workers about the risk of starting a wildfire and how to avoid it and who to contact in case a wildfire is started. In addition, restrictions shall be placed on smoking and campfires for any personnel utilizing Basalt Campground.	Reclamation and DWR	Documentation on file with Reclamation and DWR	Prior to and during construction
TERR-1	**Special-status Plant Species and Special-Status Natural Communities** Surveys of the project area for special-status plant species will be conducted during the identifiable blooming period prior to commencement of work. Special-status plants include: Arcuate bush-mallow (blooms April through September), big-scale balsamroot (blooms March through June), California alkali grass (blooms March through May), chaparral harebell (blooms May through June), Congdon's tarplant (blooms May through October),	Reclamation, and DWR	Field verification, and documentation on file with Reclamation and DWR.	Prior to construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	Hall's bush-mallow (blooms May through September), Hispid bird's beak (blooms June through September), Hospital Canyon larkspur (blooms March through June), Lemmon's jewelflower (blooms February through May), Lime Ridge navarretia (blooms May through June), round-leaved filaree (blooms March through May), shining navarretia (blooms April through July), and spiny-sepaled button-celery (bloom April through June). A qualified DWR biologist (qualified biologist) will be present prior to and during construction to ensure avoidance of impacts on special-status plant species and special-status natural communities by implementing one, or more, of the following, as appropriate, per the biologist's recommendation: a. Flag the population or natural community areas to be protected; b. Allow adequate buffers; and/or, c. Time construction or other activities during dormant and/or non-critical life cycle periods. For unavoidable impacts to special-status plant species, compensatory mitigation may be required based on recommendations of the qualified biologist. If any impacts occur to listed plant species, consultation with United States Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW) will be initiated. If deemed necessary based on the type and extent of special-status plant populations affected, compensatory mitigation will entail: • The protection, through land acquisition or a conservation easement, of a population of equal or greater size and health. Or, • If it is not feasible to acquire and preserve a known population of a special-status plant to be impacted, suitable unoccupied habitat capable of supporting the species will be acquired, and used to create a new population. For population creation, the following considerations will also be met: • Prior to unavoidable and permanent disturbance to a population of a special-status plant species, propagules shall be collected from the population to be disturbed. This may include seed collection or cuttings, and these propagules will be used to establish a new population on suitable, unoccupied habitat as described above. Transplantation may be attempted but will not be used as the primary means of plant salvage and new population creation. • Creation of new populations will require identifying suitable locations and researching and determining appropriate and viable propagation or planting techniques for the species. It will also require field and literature research to determine the appropriate seed sampling techniques and harvest numbers for acquisition of seed from existing populations.			

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	• A minimum ten-year monitoring plan with adaptive management will be implemented to document the success of creating new plant populations. Adequate funding for compensatory mitigation will be provided on an agreed-to schedule, following a discussion with the appropriate regulatory agencies, to ensure long-term protection and management of lands acquired or placed under conservation easement.			
TERR-2	**Valley Elderberry Longhorn Beetle** Prior to construction, the known stand of more than 25 elderberry shrubs and surrounding areas with suitable elderberry habitat would be surveyed to determine the current number of elderberry shrubs present, their stem diameters, and, if feasible, the presence and number of exit holes formed by valley elderberry longhorn beetle (VELB) as they exit the branch. Surveys are valid for two years. A 100-foot buffer around construction areas would also be surveyed for elderberry shrubs that could be affected by dust from construction. Areas containing elderberry shrubs with stems greater than 1-inch in diameter would be assumed to provide VELB habitat, protected with fencing, and avoided to the extent possible. Consultation with the USFWS through the Section 7 process may be required if shrubs cannot be avoided during construction. If shrubs cannot be avoided, removal measures would be implemented, including transplanting shrubs to a USFWS-approved conservation area, compensating for habitat loss at a ratio ranging from 1:1 to 8:1 depending on the diameter of the impacted elderberry stems and habitat type that they were removed from (riparian or non-riparian), under an Elderberry Mitigation Plan approved by USFWS, or purchasing credits at a USFWS-approved mitigation bank for VELB.	Reclamation, and DWR	Field verification, and documentation on file with Reclamation and DWR.	Prior to construction
TERR-3	**Special-Status Amphibians** Before and during construction: • The Proponent shall submit the name and credentials of a DWR biologist qualified to act as construction monitor to USFWS and CDFW for approval at least 15 days before construction work begins. General minimum qualifications are a 4-year degree in biological sciences and experience in surveying, identifying, and handling California tiger salamanders and California red-legged frogs. The qualified biologist shall be present at all times during construction. Consultation with the USFWS through the Section 7 process may be required to determine avoidance, conservation, and mitigation measures. • The USFWS and CDFW-approved biologist, under the appropriate Federal and State authorities (e.g. permitting and consultation), shall survey the work sites 2 weeks before the onset of construction. If California tiger salamanders or California red-legged frogs (or their tadpoles or eggs) are found, the approved biologist shall contact	Reclamation, and DWR	Field verification and documentation on file with Reclamation and DWR.	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	USFWS and CDFW to determine whether moving any of these life-stages is appropriate. If USFWS and CDFW approve moving the animals, the biologist shall be allowed sufficient time to move frogs and/or salamanders from the work sites before work begins. If these species are not identified, construction can proceed at these sites. The biologist shall use professional judgment to determine whether (and if so, when) the California tiger salamanders and/or frogs are to be moved. The biologist shall immediately inform the construction manager that work shall be halted, if necessary, to avert avoidable take of listed species. • The known location of California red-legged frogs and Willow Spring, the water source for the perennial frog pond, near the borrow area will be avoided during construction with a buffer of 250 feet to avoid modifying aquatic habitat that supports the frog population; or as otherwise approved by the resource agencies. • Areas impacted by construction will be monitored during construction to identify, capture, and relocate special-status amphibians, if present. • Areas beneath construction equipment and vehicles shall be inspected daily, prior to operation, for presence of special-status amphibians under tracks/tires and within machinery. If special-status amphibians are found a qualified biologist will capture and relocate animals from work sites. • Appropriate State and Federal permits for handling of special-status species will be acquired • If necessary, a detailed amphibian relocation plan will be prepared at least 3 weeks before the start of groundbreaking and submitted to CDFW and USFWS for review. The purpose of the plan is to standardize amphibian relocation methods and relocation sites. • A USFWS and CDFW-approved biologist shall be present at the active work sites until special-status amphibians have been removed, and habitat disturbance has been completed. Thereafter, the contractor shall designate a person to monitor onsite compliance with all minimization measures. A CDFW and USFWS-approved biologist shall ensure that this individual receives training consistent with USFWS requirements. • The project proponent and its contractors shall install frog-exclusion fencing (i.e., silt fences) around all construction areas that are within 100 feet of any identified ponds that provide potential special-status amphibian aquatic breeding habitat. During and			

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	after rain events, an approved biologist will monitor work areas for the presence of special-status amphibians. • Reclamation shall provide compensation for permanent and temporary impacts on California tiger salamander and California red-legged frog aquatic habitat. Compensatory mitigation shall be provided for the loss of aquatic breeding sites that will be filled or otherwise directly affected by the project, as well as mitigate for any impacts on associated California red-legged frog upland habitat through compensatory mitigation. If possible, compensatory mitigation areas shall be located within a California red-legged Frog Recovery Area, as identified in the 2002 California Red-legged Frog Recovery Plan (USFWS 2002). • The total area, size and number of California red-legged frog or California tiger salamander mitigation ponds to be created will be based on a comparable loss of breeding sites (e.g., a minimum 1:1 replacement ratio) as a result of the project. These ponds shall concurrently satisfy wetland mitigation requirements identified in Mitigation Measure TERR-2. To the degree possible, new mitigation ponds that are created for California red-legged frog and California tiger salamander shall be hydrologically self-sustaining and shall not require a supplemental water supply.			
TERR-4	**Western Pond Turtle** Before construction activities begin, a qualified biologist shall conduct western pond turtle surveys within creeks and in other ponded areas affected by the project. Adjacent upland areas shall also be examined for evidence of nests as well as individual turtles. The project biologist shall be responsible for the survey and for the relocation of pond turtles, if found. Construction shall not proceed until a reasonable effort has been made to capture and relocate as many western pond turtles as possible to minimize take. However, some individuals may be undetected or enter sites after surveys and would be subject to injury or mortality. If a nest is observed, a biologist with the appropriate permits and prior approval from CDFW shall move eggs to a suitable location or facility for incubation, and release hatchlings into the creek system the following autumn.	Reclamation, and DWR	Field verification	Prior to construction
TERR-5	**San Joaquin Whipsnake** Before construction activities begin a qualified biologist shall conduct San Joaquin whipsnake surveys 2 weeks prior to construction activities within work sites and within 100 feet of disturbance areas. A qualified biologist shall relocate any San Joaquin whipsnakes to suitable habitat outside of areas of disturbance. There is possibility of snakes to move into the work sites after pre-construction surveys have checked the area and some individuals could be subject to mortality. If San Joaquin whipsnakes are detected in work sites during construction, activities and equipment travel shall cease in the immediate area	Reclamation, and DWR	Field verification	Prior to construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	of detection until the snake has left work site or has been relocated out of the area by a qualified biologist.			
TERR-6	**Nesting Bird Surveys** A qualified biologist would conduct nesting bird surveys prior to construction and supervise avoidance of nests during construction. The generally accepted nesting season extends from February 1 through September 15. If an active nest of a special-status bird is found, construction within 300 feet of the nest (500 feet for raptor nests, excluding Swainson's hawk) would be postponed until the nest is no longer active.	Reclamation, and DWR	Field verification	Prior to and during construction
TERR-7	**Swainson's Hawk** Prior to construction, surveys for active Swainson's hawk nests will be conducted in and around all potential nest trees within 0.5 mile of construction areas. If known or active nests are identified through preconstruction surveys or other means, a 0.5 mile no-disturbance buffer shall be established around all active nest sites if construction cannot be limited to occur outside the nesting season (February 15 through September 15). Buffer sizes may be reduced if approved by CDFW and active nest sites are monitored during construction by a qualified biologist. Permanent foraging habitat losses (i.e. grasslands) within one mile of active Swainson's hawk nests shall be compensated by preserving in perpetuity suitable foraging habitat at a ratio of 1:1. This includes permanently disturbed construction sites. The CDFW shall approve the location and types of habitats preserved.	Reclamation, and DWR	Field verification, and documentation on file with Reclamation and DWR.	Prior to and during construction
TERR-8	**Bald and Golden Eagles, and California Condor** The following measures address potential impacts on nesting eagles in the San Luis Reservoir vicinity. Prior to the initiation of construction, an Eagle Conservation Plan will need to be developed that details eagle protection guidelines specific to the San Luis Reservoir construction area. These protections will include, the initiation of pre-construction surveys by a USFWS-approved biologist for golden eagles and bald eagles initiating approximately two years prior to construction continuing through the construction period. These surveys will be completed across an area at a 5-mile radius from where impacts from the project occur, including construction areas. Any nesting sites identified during these surveys would be mapped and monitored for up to ten years, depending on the monitoring specifications identified within the plan. Whenever feasible, construction near recently active nest sites shall start outside the active nesting season. The nesting period for golden eagles is between January 15 and August 15 and bald eagles nest between January 1 and August 15. If groundbreaking activities begin during the nesting period, a qualified biologist shall perform a preconstruction survey 14 to 30 days before the start of each new construction phase to search for eagle nest sites within two miles of proposed activities. If active nests are not identified, no further action is required and	Reclamation, and DWR	Field verification, and documentation on file with Reclamation and DWR.	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	construction may proceed. If active nests are identified, the avoidance guidelines identified below shall be implemented. • For golden and bald eagles, construction contractors shall observe CDFW and USFWS avoidance guidelines, which stipulate a minimum 660 foot to 0.5-mile buffer zone depending upon the visibility and severity of the activity (e.g., earth-moving versus blasting) (USFWS 2007). Buffer zones shall remain until young have fledged. A qualified biologist will monitor the nest daily for one week to determine whether construction activities are disturbing nest behavior. If nest behavior appears normal, then weekly monitoring will continue until the nest is no longer active. If the nest appears disturbed, the biological monitor will increase the no-work buffer at their discretion to ensure normal nesting behavior. For activities conducted with agency approval within this buffer zone, a qualified biologist shall monitor construction activities and the eagle nest(s) to monitor eagle reactions to activities. If activities are deemed to have a negative effect on nesting eagles, the biologist shall immediately inform the construction manager that work should be halted, and CDFW and USFWS will be consulted. • CDFW and USFWS often allow construction activities that are initiated outside the nesting season to continue without cessation even if raptors such as eagles choose to nest within 500 feet of work activities. Thus, work at the dam construction site may continue if approved by CDFW and USFWS and a qualified biologist monitors the nest site during construction. • To compensate for the loss of grassland, which provides suitable foraging habitat for golden eagles and California condors, grasslands shall be enhanced or restored at a minimum ratio of 1:1. Restoration or enhancement of grassland habitat shall be conducted under a USFWS and CDFW-approved restoration/enhancement plan, and may be conducted on lands also used for mitigation for Swainson's hawk and/or San Joaquin kit fox.			
TERR-9	**Burrowing Owl** Prior to construction, surveys for burrowing owls would be conducted in areas supporting potentially suitable habitat. Any occupied burrows shall not be disturbed during the breeding season (February 1 through August 31). A minimum 160-foot-wide buffer shall be placed around occupied burrows during the nonbreeding season (September 1 through January 31), and a 250-foot-wide buffer shall be placed around occupied burrows during the breeding season. Ground- disturbing activities shall not occur within the designated buffers.	Reclamation, and DWR	Field verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	The project proponent shall implement the measures listed below for grassland habitats to avoid incidental take of burrowing owls. In advance of construction, a qualified biologist shall follow the current CDFW burrowing owl survey guidance to evaluate burrowing owl use. Measures shall apply to all construction activities near active nests or within potential burrowing owl nesting habitat, to avoid, minimize, or mitigate impacts on burrowing owls. Breeding season surveys shall be performed to determine the presence of burrowing owls for the purposes of inventory, monitoring, avoidance of take, and determining appropriate mitigation. In California the breeding season begins as early as February 1 and continues through August 31. Under the Burrowing Owl Consortium's multi-phase survey methodology, for areas within 500 feet of construction boundaries, a biologist shall: 1) perform a habitat assessment to identify essential components of burrowing owl habitat, including artificial nest features; 2) perform intensive burrow surveys in areas that are identified to provide suitable burrowing owl habitat, and; 3) perform at least four appropriately-timed breeding season surveys (four survey visits spread evenly [roughly every 3 weeks] during the peak of the breeding season, from April 15 to July 15) to document habitat use. Pre-construction surveys shall be used to assess the owl presence before site modification is scheduled to begin. Generally, initial pre-construction surveys should be conducted within 7 days, but no more than 30 days prior to ground-disturbing activities. Additional surveys may be required when the initial disturbance is followed by periods of inactivity or the development is phased spatially and/or temporally over the project area. Up to four or more survey visits performed on separate days may be required to assure with a high degree of certainty that site modification and grading will not take owls. The full extent of the pre-construction survey effort shall be described and mapped in detail (e.g., dates, time periods, area[s] covered, and methods employed) in a biological report that will provided for review to CDFW. In addition to the above survey requirements, the following measures shall be implemented to reduce project impacts to burrowing owls: • Construction exclusion areas (e.g., orange exclusion fence or signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the nonbreeding season (September 1 through January 31), the exclusion zone shall extend at least 160 feet around occupied burrows. During the breeding season (February 1 through August 31), exclusion areas shall extend 250 feet around occupied burrows (or farther if warranted to avoid nest abandonment). • If work or exclusion areas conflict with owl burrows, passive relocation of onsite owls could be implemented as an alternative, but only during the nonbreeding season and only with CDFW approval. The approach to owl relocation and burrow closure will vary depending on the number of occupied burrows. Passive relocation shall be accomplished by installing one-way doors on the entrances of burrows within 160 feet			

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	of the project area. The one-way doors shall be left in place for 48 hours to ensure the owls have left the burrow. The burrows shall then be excavated with a qualified biologist present. Construction shall not proceed until the project area is deemed free of owls. • Unoccupied burrows within the immediate construction area shall be excavated using hand tools, and then filled to prevent reoccupation. The qualified biologist will be present during construction to continue examination of burrows. If any burrowing owls are discovered during the excavation, the excavation shall cease and the owl shall be allowed to escape. Excavation would be completed when the biological monitor confirms the burrow is empty. • Artificial nesting burrows will be provided as a temporary measure when natural burrows are lacking. To compensate for lost nest burrows, artificial burrows shall be provided outside the 160-foot buffer zone. The alternate burrows shall be monitored daily for 7 days to confirm that the owls have moved in and acclimated to the new burrow.			
TERR-10	**Tricolored Blackbird** Prior to construction, appropriately timed surveys for tricolored blackbirds would be conducted in areas supporting potentially suitable habitat within 0.25 mile of construction areas. Habitat within 0.25 mile of tricolored blackbird colonies will be avoided during nesting season, which can begin as early as mid-March and extend through August. If colonies cannot be avoided, CDFW shall be consulted to potentially reduce buffer distances with active monitoring during construction by a qualified biologist.	Reclamation, and DWR	Field verification	Prior to construction
TERR-11	**Special-Status Bats** Impacts to special-status bats shall be minimized by performing preconstruction surveys and creating no-disturbance buffers around active bat roosting sites. Before construction activities (i.e., ground clearing and grading, including trees or shrub removal) within 200 feet of trees that could support special-status bats, a qualified bat biologist shall survey for special-status bats. If no evidence of bats (i.e., direct observation, guano, staining, or strong odors) is observed, no further mitigation shall be required. If evidence of bats is observed, the following measures shall be implemented to avoid potential impacts on breeding populations: A no-disturbance buffer of 200 feet shall be created around active bat roosts during the breeding season (April 15 through August 15). Bat roosts initiated during construction are presumed to be unaffected by the indirect effects of noise and construction disturbances. However, the direct take of individuals will be prohibited.	Reclamation, and DWR	Field verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	Removal of trees showing evidence of active bat activity shall occur during the period least likely to affect bats, as determined and monitored by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula, and between August 15 and April 15 for maternity roosts). If the exclusion of bats from potential roost sites is necessary to prevent indirect impacts due to construction noise and human activity adjacent, bat exclusion activities (e.g., installation of netting to block roost entrances) shall also be conducted during these periods. If special-status bats are identified in the dam or special allowances must be made to relocate bats, DWR will coordinate the effort in advance with CDFW.			
TERR-12	**San Joaquin Kit Fox** San Joaquin kit fox would be affected by construction activities if animals are harmed or killed by equipment, their movement is blocked or their dens or other habitat is altered or destroyed. Consultation with the USFWS through the Section 7 process may be required to determine avoidance, conservation, and mitigation measures. Prior to construction, a qualified biologist will conduct surveys to identify potential dens more than 4 inches in diameter. A habitat assessment in 2010 found 195 potential kit fox dens in the San Luis Reservoir work area (Reclamation 2010c; see Appendix I, Biological Resources Appendix). If dens are located within the proposed work area, and cannot be avoided during construction activities, a USFWS- and CDFW-approved biologist will determine if the dens are occupied. If occupied dens are present within the proposed work, their disturbance and destruction shall be avoided. Exclusion zones will be implemented following the latest USFWS procedures (USFWS 2011). The Proponent shall implement San Joaquin kit fox protection measures. The following measures, which are intended to reduce direct and indirect project impacts on San Joaquin kit foxes, are derived from the *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999a) and the *Standardized Recommendations for Protection of the San Joaquin Kit Fox* (USFWS 1999b). The following measures shall be implemented for construction areas at San Luis Reservoir: Preconstruction surveys shall be conducted within 200 feet of work areas to identify potential San Joaquin kit fox dens or other refugia in and surrounding workstations. A qualified biologist shall conduct the survey for potential kit fox dens 14 to 30 days before construction begins. All identified potential dens shall be monitored for evidence of kit fox use by placing an inert tracking medium at den entrances and monitoring for at least 3 consecutive nights. If no activity is detected at these den sites, they shall be closed following guidance established in the USFWS *Standardized Recommendations* report (USFWS 1999b). If kit fox occupancy is determined at a given site during the pre-construction surveys or during the construction period, the construction manager should be immediately informed that work should be halted within 200 feet of the den and the USFWS contacted. Depending on the den type, reasonable and prudent measures to avoid effects to kit foxes	Reclamation, and DWR	Field verification	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	could include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence. Off-road vehicle and equipment movement will be limited to the project footprint. To compensate for permanent impacts to grassland, which provides habitat for San Joaquin kit fox, lands shall be acquired and covered by conservation easements or mitigation credits shall be purchased at a 2:1 mitigation ration, or other compensation ratios approved by the USFWS and the CDFW.			
TERR-13	**American Badger** Impacts on badgers within annual grasslands and oak woodland at San Luis Reservoir will be minimized through a combination of worker training, preconstruction surveys, and passively or actively relocating animals. Concurrent with other required surveys, during winter/spring months before new project activities, and concurrent with other preconstruction surveys (e.g., kit fox and burrowing owl), a qualified biologist shall perform a survey to identify the presence of active or inactive American badger dens. If this species is not found, no further mitigation shall be required. If badger dens are identified within the construction footprint during the surveys or afterwards, they shall be inspected and closed using the following methodology: When unoccupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacated dens shall be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials. If badger occupancy is determined at a given site within the work area, work activities at that site should be halted. Depending on the den type, reasonable and prudent measures to avoid harming badgers will be implemented and may include seasonal limitations on project construction near the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den at a later time to determine species presence or absence. Badgers may be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFW-approved exclusion methods. In unique situations it might be necessary to actively relocate badgers (e.g., using live traps) to protect individuals from potentially harmful situations. Such relocation would be performed with advance CDFW coordination and concurrence.	Reclamation, and DWR	Field verification	Prior to and during construction
TERR-14	**Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp** While project design is planned to avoid fill of seasonal wetlands and pools identified as suitable habitat for vernal pool crustaceans, if any vernal pool fairy shrimp or vernal pool tadpole shrimp habitat will be impacted, the project proponent may assume presence of the species. Consultation with the USFWS through the Section 7 process may be required	Reclamation, and DWR	Field verification, and documentation on file with	Prior to construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	to determine avoidance, conservation, and mitigation measures. Measures may include, but are not limited to, compensating for impacts at a 2:1 ratio for preservation and at a 1:1 ratio for creation.		Reclamation and DWR.	
TERR-15	**Contractor Environmental Awareness Training and Site Protection Measures.** All construction personnel working in biologically sensitive areas shall attend an environmental education program delivered by a qualified biologist prior to starting work. The training shall include an explanation as how to best avoid the accidental take of special-status plants and wildlife. The field meeting shall include species identification, life history, descriptions, and habitat requirements. The program shall include an explanation of Federal and State laws protecting endangered species, and avoidance and minimization methods being implemented to protect these species. A qualified biologist will be present on the site at all times during construction. The contractor shall provide closed garbage containers for the disposal of all trash items (e.g., wrappers, cans, bottles, food scraps). Work sites shall be cleaned of litter before closure each day, and placed in wildlife-proof garbage receptacles. Construction personnel shall not feed or otherwise attract any wildlife. No pets, excluding service animals, shall be allowed onsite or in construction areas. Nighttime vehicle traffic shall be kept to a minimum on non-maintained roads with a maximum speed of 15 miles per hour. To minimize disturbance to wildlife, temporary and permanent exterior lighting shall be installed such that: (a) lamps and reflectors are not visible from beyond the project site, (b) reflective glare will be minimized to the extent feasible; (c) illumination of the project and its immediate vicinity is minimized; (d) lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated; (e) all lighting shall be of minimum necessary brightness consistent with operational safety and security; (f) lights in areas not occupied on a continuous basis (such as maintenance areas) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied, and (g) the plan complies with local policies and ordinances.	Reclamation, and DWR	Field verification	Prior to and during construction
TERR-16	**Mitigation measures for special-status communities, including jurisdictional wetlands or waters, and streambeds and banks regulated by the CDFW, RWQCB, and United States Army Corps of Engineers (USACE), and native grassland.**	Reclamation, and DWR	Field verification, and documentation on file with	Prior to and during construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	Mitigation Measure TERR -16a. Final project design shall avoid and minimize the fill of wetlands and other waters to the greatest practicable extent. The following actions shall be performed to protect jurisdictional wetlands: 1. The distribution of Federal and State jurisdictional wetlands and waters; streambeds and banks regulated by CDFW; and sensitive habitat regulated by CDFW, shall be defined and avoided to the greatest possible extent. 2. Prior to construction, a qualified biologist shall delineate the extent of jurisdictional areas to be avoided in the field. Reclamation will designate areas to be avoided as "Restricted Areas" and protect them using highly visible fencing, rope, or flagging, as appropriate based on site conditions. No construction activities or disturbance will occur within restricted areas that are designated to protect wetlands. 3. Minimize the removal of riparian and wetland vegetation. Avoid disturbance of riparian and aquatic habitat north of the access road to the dam. 4. Minimize the removal or damage to purple needlegrass grassland. Avoid impacts to native grasslands in the staging area. *Mitigation Measure TERR-16b*. Where jurisdictional wetlands and other waters cannot be avoided, to offset temporary and permanent impacts that would occur as a result of the project, restoration and compensatory mitigation shall be provided as described below. A wetland mitigation and monitoring plan shall be developed in coordination with CDFW, USACE, and/or the RWQCB that details mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities; and other CDFW jurisdictional areas. The plan shall quantify the total acreage affected; provide for mitigation as described below to wetland or riparian habitat; annual success criteria; mitigation sites; monitoring and reporting requirements; and site-specific plans to compensate for wetland losses resulting from the project. Prior to construction, the aquatic structure of wetland and riparian areas to be disturbed will be photo-documented, and measurements of width, length, and depth will be recorded. DWR will recontour and revegetate disturbed portions of jurisdictional areas in areas temporarily affected by construction prior to demobilization by the contractor at the end of project construction. Creek banks will be recontoured to a more stable condition if necessary. Revegetation will include a palette of species native to the watershed area according to a revegetation plan to be developed by Reclamation and submitted to the USACE, CDFW, and RWQCB for approval. Following removal, woody trees habitat acreage would be replanted at a minimum 1:1 ratio, or as determined and agreed upon by the permitting agencies. Interim vegetation or other measures will be implemented as necessary to control erosion in disturbed areas prior to final revegetation.		Reclamation and DWR.	

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	Wetland and other waters impact in the construction area shall be compensated at a ratio of 2:1 or at a ratio agreed upon by the wetland permitting agencies. Compensatory mitigation shall be conducted by creating or restoring wetland and aquatic habitat at an agency-approved location on nearby lands or through purchasing mitigation credits at a USACE and/or CDFW-approved mitigation bank (depending on the resource). If mitigation is conducted on- or off-site, a five-year wetland mitigation and monitoring program for onsite and offsite mitigation shall be developed. Appropriate performance standards may include, but are not limited to: a 75 percent survival rate of restoration plantings; absence of invasive plant species; and a viable, self-sustaining creek or wetland system at the end of five years. A weed control plan for the project to limit the spread of noxious or invasive weeds shall also be developed. This plan would be consistent with current Integrated Pest Management Plans that are already in practice on lands surrounding the reservoir. Noxious or invasive weeds include those rated as "high" in invasiveness by the California Invasive Plant Council. The plan will include a baseline survey to identify the location and extent of invasive weeds in the project area prior to ground-disturbing activity, a plan to destroy existing invasive weeds in the construction area prior to initiation of ground-disturbing activity, weed-containment measures while the project is in progress, and monitoring and control of weeds following completion of construction.			
REC-1	**REC - 1: Campsite and Facilities Replacement.** Campsites closed at San Luis Reservoir during construction of the Crest Raise Alternative will be replaced at a 1:1 ratio at the San Luis Creek Use Area and then as necessary at the Los Banos Creek Use Area, including six American with Disabilities Act (ADA) accessible campsites and Recreational Vehicle (RV) accommodations. These new replacement campsites would be developed consistent with the new facilities considered in the *San Luis Reservoir SRA Resource Management Plan/General Plan (RMP/GP)* and will not exceed the quantities of new facilities considered in the RMP/GP at each Use Area. The new campsites would be constructed concurrent to the crest construction period during a period of low precipitation in order to reduce the risk of accidental leaks or spills, potential for soil contamination and to minimize erosion of loose materials in construction areas, as per Goal RES-WQ4 in the *San Luis Reservoir SRA RMP/GP* (Reclamation and CDPR 2013): • Design, construct, and maintain buildings, roads, trails, campsites, boat launches and marinas, and associated infrastructure to minimize stormwater runoff, promote groundwater recharge, and prevent soil erosion. The new campsites would be constructed within the San Luis Creek use area at the SRA on O'Neill Forebay. Reclamation will include this mitigation requirement in bid documents and construction contracts. In addition, Reclamation will work with CDPR to implement the following measure. The boat launches at the San Luis Creek and Dinosaur Point use areas would be expanded by addition of a launch lane and a boarding float at each area. In addition, a fish cleaning	Reclamation, and DWR	Documentation on file with Reclamation, and DWR, and field verification	Prior to construction

Measure No.	Mitigation Measure	Responsible Party	Method of Verification	Timing of Verification
	station, public storage lockers, and shower facilities would be developed at San Luis Creek man use area.			
CR-1	**Mitigation Measure CR-1: Implement a formal agreement document to govern National Historic Preservation Act (NHPA) Section 106 compliance and resolve any adverse effects/significant impacts to cultural resources** The Reservoir Restriction Alternative fails to meet one of three critical objectives under the Proposed Action because it would result in a reduction in San Luis Reservoir storage capacity that would adversely impact water supply deliveries to Central Valley Project and State Water Project contractors. The Crest Raise Alternative, which is the preferred alternative, meets each of the Proposed Action objectives. As efforts to identify historic properties are unable to be fully completed, and effects on historic properties cannot be fully determined prior to the approval of the Project, an agreement document was negotiated to satisfy NHPA Section 106 compliance. Additional surveys are needed to identify potential historic properties within the area of potential effects. These surveys will be managed under the agreement document. Due to the need for additional surveys, potential adverse effects/significant impacts to historic properties are not fully known. Reclamation negotiated a programmatic agreement with the State Historic Preservation Officer, which was executed on September 12, 2019. Reclamation will complete the additional historic property identification and evaluation efforts under the negotiated programmatic agreement, and any adverse effects to historic properties will be “resolved” through the completion of the Section 106 process, which will satisfy Federal lead agency requirements with respect to National Environmental Policy Act (NEPA). A process to avoid, minimize impacts to, and/or mitigate adverse effects to historic properties was formalized in the programmatic agreement document in compliance with 36 CFR Part 800.6(c). DWR will be a party to this agreement document.	Reclamation	Documentation on file with Reclamation	Prior to and during construction