

Appendix 2D

Best Management Practices, Management Plans, and Technical Studies

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Appendix 2D Best Management Practices, Management Plans, and Technical Studies

The Authority has incorporated numerous best management practices (BMPs) into the Project design. In addition, the Authority has identified various plans and technical studies that are being incorporated as components of the Project, including the Initial Sites Reservoir Fill Plan, Reservoir Management Plan, Land Management Plan, and Recreation Management Plan. This appendix describes the BMPs, management plans, and technical studies that are part of the Project. These BMPs, management plans, and technical studies are discussed further where relevant to particular impact analyses in Chapters 5 through 31.

2D.1 Best Management Practices

The Project BMPs include applicable design standards, criteria, and requirements; standard general practices for construction, operations, and maintenance; and resource-specific protocols for Project implementation. Table 2D-1 identifies the key features, responsible party(ies), and timing for implementation of each BMP.

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Table 2D-1. Best Management Practices

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-1	<p>Conformance with Applicable Design Standards and Building Codes</p>	<p>The Authority will ensure that the standards, guidelines, and codes (the most current applicable version at the time of implementation), which establish minimum design criteria and construction requirements for levees, pipelines, excavations and shoring, pumping stations, dams, grading, foundations, bridges, access roads, structures, and other facilities, will be followed by the Project engineers, where applicable, in the design of Project facilities and will be included as minimum standards in the construction specifications. The Project engineers will follow standards, guidelines, and code requirements that are legally mandated. Proposed design standards include, but may not be limited to, the following.</p> <ul style="list-style-type: none"> • Reservoir Roads and Bridges <ul style="list-style-type: none"> • American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" 2018, 7th edition. • AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 8th edition. • California Department of Transportation (Caltrans) California Amendments to the AASHTO LRFD Bridge Design Specifications). • Caltrans' Seismic Design Criteria (SDC) 2.0. ARS curve. • Caltrans Seismic Design Criteria, Version 2.0. April 2019. • Caltrans Highway Design Manual (HDM), 6th Edition. • Colusa and Glenn County Standards (described in Appendix 2C). • Conveyance Pipelines and Manifold <ul style="list-style-type: none"> • American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering, Volume 2, Chapter 9, Seismic Design for Railway Structures, 2008. • American Concrete Institute (ACI) 350 for hydraulic structures. • ACI 318 for miscellaneous, non-hydraulic, concrete structures, including building slabs and foundations. • American Water Works Association (AWWA) Concrete Pressure Pipe (M9) 3rd Edition. • AWWA Steel Pipe Guide for Design and Installation (M11) 5th Edition. • AWWA C200-05. • AWWA M11 Chapters 6, 8, 9, 12, 13. • AWWA C205, C207, C208, C214, 216, C217, C219, C222. • AWWA M-51. • American Society for Testing and Materials (ASTM) A1018/A1018M for specification of structural steel. • ASTM A516/A516M for specification of structural steel. • American Society of Civil Engineers (ASCE) 27-00, Standard Practice for Design of Precast Concrete Pipe for Jacking in Trenchless Construction. • ASCE Steel Penstock Design (Manual of Practice (MOP) 79). • American Society of Mechanical Engineers (ASME) • Boiler and Pressure Vessel Code (BPVC) Section VIII, Division 1, Part 2. • ASME 16.5 and ASME 16.47. • ASME BPVC, Section IX. 	<ul style="list-style-type: none"> • Authority • Design engineers • Construction contractors 	<ul style="list-style-type: none"> • Prior to and during construction 	<ul style="list-style-type: none"> • The Authority will review all Project facility designs to ensure the standards, guidelines, and codes listed above are included where appropriate. The Authority will ensure that the identified design standards are treated as the minimum standard for design and construction, unless more stringent requirements are enacted or promulgated. • Project engineers will provide all draft and final Project facility designs to the Authority for review. • A seismic monitoring array will be designed and implemented as part of the Project to monitor site seismic activity, including identifying any increase in seismicity rate that could be attributed to potential reservoir-triggered seismicity (RTS). 	<ul style="list-style-type: none"> • Department of Water Resources, Division of Safety of Dams • U.S. Army Corps of Engineers (USACE) • Central Valley Flood Protection Board (CVFPB)

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		<ul style="list-style-type: none"> • American Welding Society D1.1 for field welds. • CI/ASCE 36-01, Standard Construction Guidelines for Microtunneling. • New & O'Reilly 1992 or an equivalent method for settlement predictions. • Underground Technology Research Council (UTRC) 1997 Geotechnical Baseline Reports for Underground Construction – Suggested Guidelines and Practices. Reston: American Society of Civil Engineers. • UTRC 2006 Final Design Geotechnical Baseline Report. • Structures (non-hydraulic concrete, steel, and masonry structures) <ul style="list-style-type: none"> • current governing codes and standards applicable to the construction of buildings, structures, and appurtenances in the State of California (current California Building Code) (Title 24 California Code of Regulations; California Code of Regulations, Title 8). • The Masonry Society Building Code Requirements and Specifications for Masonry Structures (TMS 402). • Latest edition of the American National Standards Institute (ANSI)/American Institute of Steel Construction (AISC) Steel Construction Manual and the ANSI/AISC Specification for Structural Steel Buildings. • RCSC Specification for Structural Joints Using High Strength Bolts. • Electrical Supply <ul style="list-style-type: none"> • The point of interconnection, transmission, and substation design criteria, dependent on the point of interconnection option, will incorporate the following references. <ul style="list-style-type: none"> • California General Order 95, Rules for Overhead Electric Line Construction. • Western Area Power Administration Service and Generation. • Interconnection Requirements. • Pacific Gas and Electric Company (PG&E) Interconnection Requirements. • PG&E Substation Design Criteria. • The latest edition and addenda of the following publications, as applicable, will be incorporated in the design specifications codes and standards sections. <ul style="list-style-type: none"> • ANSI. • Institution of Electrical and Electronics Engineers, Inc. (IEEE). • Association of Edison Illuminating Companies. • Transmission Interconnections Handbook. • North America Electric Reliability Corporation Standards. • National Fire Protection Agency (NFPA) 70 National Electric Code. • National Electrical Safety Code (ANSI C2). • Transmission Lines <ul style="list-style-type: none"> • In addition to the point of interconnection requirements, transmission lines will be designed in accordance with the latest edition and addenda of the following publications, as applicable which will be incorporated in the design specifications. <ul style="list-style-type: none"> • California Building Code 2016, Title 24 Vol. 2. • ASCE-113 Substation Structure Design Guide. • ASCE/SEI 7-05 Minimum Design Loads for Buildings and Other Structures. • ANSI/AISC 41-10 Seismic Provisions for Structural Steel Buildings. 				

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		<ul style="list-style-type: none"> • Reservoir, Dam, and Inlet/Outlet Works: The dam embankments, foundations, abutments, and appurtenant facilities must be stable under design conditions of construction and reservoir operation including seismic. Applicable guidelines and requirements include the following. <ul style="list-style-type: none"> • ASTM C33 (2018) for aggregate for filters and drains and aggregate use in structural concrete. • California Department of Water Resources, Division of Safety of Dams Emergency Drawdown Criteria (DSOD). • International Building Code (IBC) (2018). Chapter 16 Structural Design. • USACE 1997 Tunnels and Shafts in Rocks, EM-2-1110-2901. • USACE 2000 Roller Compacted Concrete, EM 1110-2-2006. • USACE 2005 Stability Analysis of Concrete Structures, EM 1110-2-2100. • USACE 2018 Hydrologic Engineering Center, HEC-HMS Hydrologic Modeling System, Version 4.3. • Reclamation 1987 Design of Small Dams. • Reclamation 1989 Flood Hydrology Manual, First Edition. • Reclamation 2011 Design Standards No. 13, Embankment Dam Design Standards, Chapter 4: Static Stability Analysis Phase 4 (Final). • Reclamation 2011 Design Standards, No. 13, Embankment Dam Design Standards, Chapter 5: Protective Filters Phase 4 (Final). • Reclamation 2016 USBR Design Standards No. 6, Hydraulic and Mechanical Equipment, Chapter 12, Trashracks and Trashrack Cleaning Devices. • Slope Protection <ul style="list-style-type: none"> • USACE 2002 Coastal Engineering Manual. • Reclamation 1989 Flood Hydrology Manual. 				
BMP-2	Siting of Recreational Structures	<ul style="list-style-type: none"> • The downslope portion of recreation facilities within the recreation areas will be designed above the predicted wave run-up elevation. • The determination for location will be based on Project design studies. • If the predicted seiche wave run-up level will extend into a recreation area and inundate a facility, the Authority will relocate the recreation facility accordingly during final design. 	<ul style="list-style-type: none"> • Authority 	<ul style="list-style-type: none"> • Prior to Construction and during final design 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • County
BMP-3	Completion of Preconstruction Geotechnical Evaluations and Data Reports	<p>Preconstruction geotechnical evaluations and data reports will be prepared as follows to develop final construction contract documents:</p> <ul style="list-style-type: none"> • Geotechnical Data Reports: <ul style="list-style-type: none"> • Perform geotechnical laboratory testing on select samples to evaluate engineering and other properties of collected soils. • Prepare geotechnical data reports to document observations and findings of subsurface investigations and tests. • Geotechnical Interpretive reports to establish parameters for designing the Project. • Geotechnical Baseline Report for use by contractors to describe expected construction conditions and provide design and construction recommendations. 	<ul style="list-style-type: none"> • Geotechnical engineer 	<ul style="list-style-type: none"> • Prior to construction and during final design 	<ul style="list-style-type: none"> • The Authority will review and approve all geotechnical reports and implement subsequent measures as required based upon the results of these reports. 	<ul style="list-style-type: none"> • DSOD • County • Caltrans • Railroad • CVFPB • USACE
BMP-4	Verification and/or Relocation of Utilities and Infrastructure	<ul style="list-style-type: none"> • Confirm utility/infrastructure locations through consultation with utility service providers, preconstruction field surveys, and services such as Underground Service Alert. 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • Identify all utilities/ infrastructure prior to start of 	<ul style="list-style-type: none"> • Contractor will consult with utility service providers and cross check preconstruction field surveys to 	<ul style="list-style-type: none"> • None

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		<ul style="list-style-type: none"> Determine exact location of underground utilities by safe and acceptable means, including use of hand and modern techniques as well as customary types of equipment. Confirm the specific location of all high priority utilities (i.e., pipelines carrying petroleum products, oxygen, chlorine, toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter, or with normal operating measures, greater than 60 pounds per square inch gauge; and underground electric supply lines, conductors, or cables that have a potential to ground more than 300 volts that do not have effectively grounded sheaths) and such locations will be highlighted on all construction drawings. Identified size, color, and location of existing utilities will be included on all construction drawings and/or in health and safety officer materials. Stage utility line modifications and relocations in a manner that minimizes interruption of service. In places where utility lines will be relocated, existing corridors will be utilized to the greatest extent possible, in the following order of priority: (1) existing utility corridors; (2) highway and railroad corridors; and (3) new corridors. New poles or towers will be erected and cable-pulled prior to being connected to existing systems. Natural gas pipeline relocation will be constructed by one of several methods including cut-and-cover, trenching, or placement on at-grade saddles. Active natural gas wells in the water conveyance facilities area will be abandoned to a depth below construction excavation. Relocate utilities and infrastructure in a way that avoids or minimizes any effect on worker and public health and safety by protecting, supporting, or removing underground utilities as necessary to safeguard employees and notifying local fire departments if a gas utility is damaged causing a leak or suspected leak, or if damage to a utility results in a threat to public safety. Coordinate and provide design plans and construction phasing with railroad; establish communication protocol with railroad and/or have railroad staff person onsite during construction of facilities adjacent to or affecting the railroad line. 	<ul style="list-style-type: none"> Construction Management Team; Contractor Monitor Health and Safety Officer 	<ul style="list-style-type: none"> construction activities associated with any and all facilities During construction, the construction contractors will implement measures to avoid utilities/ infrastructure that are not being relocated Prior to construction relocate utilities/infrastructure if needed 	<ul style="list-style-type: none"> confirm exact location of underground utilities/infrastructure. The Authority or construction contractor monitor will perform regular site inspections to verify contractor compliance and retain inspection records in the Project file maintained by the Authority. Contractor-designated health and safety officer will provide written confirmation to the Authority that the utility lines/infrastructure have been adequately located, and excavation will not start until this confirmation has been received by the Authority. The Authority and Contractor will coordinate with all appropriate utility providers and local agencies to determine which utility lines will be relocated and the location of the relocated utility lines. Construction contractors will monitor the construction site(s) daily to ensure no damage occurs to utilities and if a utility is damaged which causes a threat to worker and public health and safety, construction contractors will notify the Authority and the local fire departments immediately and document the damage for the Project file to be maintained by the Authority. 	
BMP-5	Decommissioning of Natural Gas Wells	<ul style="list-style-type: none"> Follow California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CalGEM) Guidelines, Statutes and Regulations (California Code of Regulations, April 2019), which include the following. <ul style="list-style-type: none"> Prior to plugging and abandoning any oil and gas well or any other well under CalGEM’s jurisdiction, operators must submit a Notice of Intention to CalGEM. CalGEM will provide plugging requirements to minimize the potential for subsurface contamination and hazardous surface conditions. Comply with applicable plugging guidelines (i.e., Coiled Tubing Plugging Guidelines, Bentonite Plugging Guidelines) (https://www.conservation.ca.gov/calgem/for_operators). 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Site preparation as part of clearing and grubbing 	<ul style="list-style-type: none"> Permit and procedures per regulatory agency. 	<ul style="list-style-type: none"> CalGEM
BMP-6	Decommissioning of Water Wells	<ul style="list-style-type: none"> Wells will be decommissioned in the manner required by the local regulating jurisdiction or Department of Conservation to assure that the ground water supply is protected and preserved for further use and to eliminate the potential for physical hazard. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Site preparation as part of clearing and grubbing 	<ul style="list-style-type: none"> Authority to maintain files on the location condition and fill process for each well filled. 	<ul style="list-style-type: none"> Counties

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		<ul style="list-style-type: none"> Decommissioning of water wells will consist of the complete filling of the well in accordance with applicable requirements set out by the County that contains the well. Prior to decommissioning of a water well, evaluations will be conducted to assess its condition, details of construction, and whether there are obstructions that will interfere with the process of filling and sealing. Wells situated in unconsolidated material in an unconfirmed groundwater zone shall have the upper 20 feet of the well, sealed with suitable sealing material and the remainder shall be filled with suitable fill or sealing material. Fill material or sealing material placement will follow appropriate procedures as required by the applicable County. 				
BMP-7	Removal and/or Reuse of Materials from Abandoned Roads	<ul style="list-style-type: none"> Roads within the inundation area will be abandoned such that existing asphalt does not remain in the reservoir. Asphalt surfacing will be removed. Asphalt or other road materials will be reused, if appropriate, and would be pulverized, excavated, and used as aggregate base for other roads to reduce costs. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> Site preparation as part of clearing and grubbing 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
BMP-8	Performance of Environmental Site Assessments	<ul style="list-style-type: none"> Environmental site assessments (i.e., Phase I) will be performed in accordance with ASTM-Standard 1527-13 or E2247-16 for future development on or near any potentially hazardous or contaminated sites or following standard testing on buildings to be demolished for hazardous substances (e.g., lead and asbestos). Such Phase I environmental site assessments will be conducted prior to the purchase, transfer, retirement, or sale in fee or easement for land necessary for the Project. Subsequent actions, such as Phase II environmental site assessments in accordance with ASTM E1903-19, will be taken as necessary and appropriate based on findings of Phase I environmental site assessments. Phase II environmental site assessments will involve sample collection and analysis to identify and characterize contamination as needed. If Phase I and Phase II environmental site assessments reveal releases of hazardous substances that require remediation under applicable laws, a plan for design and implementation remediation (e.g., Remediation Plan), will be developed consistent with applicable laws and under oversight of Department of Toxic Substances Control (DTSC) and/or the Regional Board. This plan will include, but not be limited to, removal of underground storage tanks, drums, buried waste, or other items potentially associated with contamination, and will identify the proper storage, handling, transport, disposal, and remediation of designated and hazardous waste. Perform pre-demolition surveys for structures to be demolished within the construction footprint, characterize hazardous materials (including asbestos-containing material and lead-based paint), and dispose of them in accordance with applicable regulations. 	<ul style="list-style-type: none"> Authority Hazardous waste contractors, as needed 	<ul style="list-style-type: none"> Prior to and during construction 	<ul style="list-style-type: none"> The Authority will follow applicable ASTM procedures to ensure that concentrations of hazardous constituents, if present, have been identified and treated or removed as appropriate for their concentration and in compliance with applicable state and federal laws and regulations. An Authority-appointed qualified monitor will monitor the preconstruction and pre-demolition investigations to ensure surveys and characterization and disposal of hazardous materials are conducted according to the established procedure. The Authority will be responsible for the disposal and handling of hazardous materials in accordance with applicable laws. The Authority will be responsible for coordination of monitoring data from the qualified monitor to determine areas which contain hazardous materials. If hazardous materials are encountered, the Authority will determine whether the area can be avoided, soil and/or groundwater 	<ul style="list-style-type: none"> State Water Resources Control Board (State Water Board) DTSC Air Quality Management Districts (AQMDs) U.S. Environmental Protection Agency

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					<p>removed from the contaminated area can be remediated and contained in compliance with applicable state and federal laws and regulations, or if consultation with the regional DTSC office is required.</p> <ul style="list-style-type: none"> The qualified monitor will be responsible for reporting monitoring data from the preconstruction surveys to the Authority. Site-specific asbestos abatement work will meet the requirements of both the federal Clean Air Act and California Division of Occupational Safety and Health (Cal/OSHA) (California Code of Regulations [CCR] Title 8, Subchapter 4, Article 4, Section 1529). The applicable AQMD(s) will be notified 10 days prior to initiation of demolition activities of asbestos-containing materials. 	
BMP-9	Siting and Design of Onsite Wastewater Disposal Systems	<ul style="list-style-type: none"> Soil testing at locations of habitable structures will occur as part of final design. Final design of these structures will use an alternative wastewater disposal system, such as a mound system or pressure dose system, if needed, to overcome potential limiting soil and groundwater conditions, such that wastewater is appropriately disposed without contaminating groundwater and surface water, as required by county standards. 	<ul style="list-style-type: none"> Authority 	<ul style="list-style-type: none"> Prior to construction and during final design 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> County
BMP-10	Salvage, Stockpiling, and Replacement of Topsoil and Preparation of a Topsoil Storage and Handling Plan	<ul style="list-style-type: none"> Depending on the thickness of the topsoil at a given construction site, topsoil may be salvaged from construction work areas, stockpiled, and then applied over the surface of spoil and borrow areas to the maximum extent practicable. Exceptions to this measure are the Sites Reservoir inundation area; the inundation area of the TRR; areas smaller than 0.1 acre; areas of nonnative soil material where the top layer of soil does not consist of native topsoil; where the soil will be detrimental to plant growth; and any other areas identified by the soil scientist in evaluating topsoil characteristics. The detailed design of the Project-related construction activities will incorporate an evaluation, based on review of soil survey maps supplemented by field investigations and prepared by a qualified soil scientist, that documents existing soil properties, specifies the thickness of the topsoil that should be salvaged, and that identifies areas in which no topsoil should be salvaged. The soil scientist will use the exceptions listed above as the basis for identifying areas in which no topsoil should be salvaged. A qualified soil scientist will also prepare topsoil stockpiling and handling plans for the individual Project components, establishing such guidelines as the maximum allowable thickness of soil stockpiles, temporary stockpile 	<ul style="list-style-type: none"> Authority Contractors Soil monitor 	<ul style="list-style-type: none"> Development of topsoil storage and handling plans will be completed before construction begins. Salvaging, stockpiling, and reapplying of topsoil will occur throughout construction. 	<ul style="list-style-type: none"> The Authority will ensure that each plan is prepared by a qualified individual, that it adequately addresses all relevant activities and facilities, and that its specifications are properly executed during construction by the contractors. The qualified soil scientist will monitor excavation sites daily to determine the correct amount of topsoil to be removed. Additionally, they will monitor stockpile health and oversee reapplication and revegetation. Construction contractors will perform the salvaging, stockpiling, and replacing of topsoil during construction. 	<ul style="list-style-type: none"> None

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		<p>stabilization/revegetation measures, and procedures for topsoil handling during salvaging and reapplication.</p> <ul style="list-style-type: none"> The plans will also specify that, where practicable, the topsoil be salvaged, transported, and applied to its destination area in one operation (i.e., without stockpiling) to minimize degradation of soil structure and the increase in bulk density as a result of excessive handling. The stockpiling and handling plans will also specify maximum allowable stockpile sideslope gradients, seed mixes to control wind and water erosion, cover crop seed mixes to maintain soil organic matter and nutrient levels, and all other measures to avoid soil degradation and soil erosional losses caused by excavating, stockpiling, and transporting topsoil. For staging areas and similar areas in which topsoil will not be excavated or overcovered, the stockpiling and handling plans will describe how the soil will be decompacted or otherwise remediated after demobilization. 			<ul style="list-style-type: none"> The Authority will perform regular site inspections to verify contractor compliance with topsoil storage and handling plans. The Authority will incorporate reporting requirements into the topsoil storage and handling plans to be adhered to by the construction contractor. The qualified soil scientist will report results of excavation site and stockpile health monitoring to the Authority and report construction contractor adherence to storage and handling plans in a report delivered to Authority technical staff for analysis. 	
BMP-11	Management of Dredged Material	<ul style="list-style-type: none"> Prior to dredging, a chemical evaluation of Funks Reservoir water and sediment will be conducted to determine contaminant concentrations. This will help evaluate the suitability of dredged material for beneficial use and determine compliance with water quality standards. Based on the chemical characterization of Funks Reservoir sediment and water, onsite water treatment for contaminant removal may be required in the dredged material containment/dewatering areas. The type of treatment required will be specific to the characteristics of the dredged material and dredged material effluent. For example, treatment could include removing the material from the site and hauling it to a certified landfill for appropriate disposal. Following characterization of Funks Reservoir sediment and water quality, site investigations will be conducted to further inform the design and construction of the dredged material containment/dewatering areas (e.g., dike design) for containment of dredged material during dewatering and in storage areas, and evaluation of potential foundation settlement, groundwater levels, flow and direction, runoff patterns and adjacent drainage, will be considered in the investigations. The following general BMPs (or equally effective measures) for dredged material containment/dewatering areas will be implemented to avoid adverse effects on water quality through the discharge of dredged material or dredged material effluent to surface waters or surface water drainage courses: <ul style="list-style-type: none"> In siting the containment/dewatering facilities, sufficient surface area and dike/berm height with freeboard will be made available for retention of fine-grained material to maintain effluent water quality. The facilities will be designed with adequate volume to contain the total volume of sediment to be dredged. Wet dredged material within the containment/dewatering areas will not exceed the elevation of the berms, dikes, or similar containment feature of the dewatering area. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Before, during and following dredging of Funks Reservoir 	<ul style="list-style-type: none"> The Authority will incorporate monitoring/management requirements for operating the upland confined disposal areas. Effluent monitoring may be specified as a requirement under the Section 401 water quality certification or the State's Porter Cologne Water Quality Act. 	<ul style="list-style-type: none"> USACE State Water Board Regional Water Quality Control Board

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		<ul style="list-style-type: none"> If dewatering basins are used, a containment berm will be placed around the basin to prevent runoff of dredged material. A silt fence will be installed around the perimeter of the berm to further contain any runoff. Dredged material containment/dewatering areas will be returned to their pre-existing condition. If dredged material effluent from dewatering or sedimentation basins is discharged back into Funks Reservoir, the effluent discharge will be monitored and analyzed for water quality constituents including, but not limited to, suspended solids, turbidity, dissolved oxygen, and temperature pursuant to 401 Water Quality Certification or Waste Discharge Requirements. Dredged material will be screened prior to dewatering to remove debris and trash, which will be disposed of at an appropriate solid waste disposal facility. Dredged material not suitable for reuse will be disposed of at a permitted landfill site. 				
BMP-12	<p>Development and Implementation of Stormwater Pollution Prevention Plan(s) (SWPPP) and Obtainment of Coverage under Stormwater Construction General Permit (Stormwater and Non-stormwater) (Water Quality Order No. 2022-0057-DWQ/NPDES No. CAS000002 and any amendments thereto)</p>	<ul style="list-style-type: none"> For work areas that will be inundated or otherwise temporarily or permanently isolated from receiving waters, prepare and implement SWPPP(s) per State Water Board Stormwater Construction General Permit, which will include erosion control measures, sediment control measures, postconstruction erosion control measures, waste management measures, and non-stormwater management measures as described below. Erosion Control Measures (e.g., silt fencing, weed-free straw bale barriers, fiber rolls, storm drain inlet protection, hydraulic mulch, and stabilized construction entrances) <ul style="list-style-type: none"> No disturbed surfaces will be left without erosion control measures in place during the winter and spring months. Keep emergency erosion-control supplies onsite at all times during construction and have the contractor(s) use these emergency stockpiles as needed. Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities. To the extent feasible, retain native trees and vegetation to help stabilize hillsides, retain moisture, and reduce erosion. Plastic monofilament netting or similar material will not be used for erosion control. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. Materials used for erosion and silt control such as fencing, coir logs, coir rolls, etc., will be monitored to ensure they do not pass downstream, and the materials composing the barriers should not pose an entanglement risk to fish or wildlife. These limitations and monitoring requirements will be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package. Sediment Control Measures <ul style="list-style-type: none"> Sediment will be retained on site by a system of sediment basins, traps, or other appropriate measures. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Prior to any ground-disturbing activity Before and during construction Minimum of 5 years following completion of construction (for postconstruction stormwater management measures) 	<ul style="list-style-type: none"> The Authority and Contractors will prepare SWPPP(s). During construction, Contractors will be responsible for implementation of the SWPPP(s). Contractors will report to the Authority any deficiencies in compliance with the SWPPP(s) as well as any warnings or violations of the Construction General Permit received from the State Water Board. The Authority will evaluate these events as needed on a site-by-site basis to require the contractor to amend SWPPP(s) as needed to reduce the severity of and/or avoid the potentially significant impacts on the environment. 	<ul style="list-style-type: none"> State Water Board Regional Water Quality Control Board (RWQCB)

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		<ul style="list-style-type: none"> • Reduce runoff velocity on exposed slopes. Collect and direct surface run-on and runoff at non-erosive velocities to controlled drainage courses. • When ground-disturbing activities are required adjacent to surface water, wetlands, or aquatic habitat, the use of sediment and turbidity barriers, soil stabilization and revegetation of disturbed surfaces. • Reduce off-site sediment tracking by installing gravel on primary construction ingress/egress points, rumble plates, and/or truck tire washing. • Deposit or store excavated soil materials and tunnel muck away from drainage courses and protect from erosion by constructing berms along the downslope perimeter if rain events are forecast within 48 hours. • Management Measures for Construction Materials <ul style="list-style-type: none"> • Protect stockpiled construction materials that are not scheduled to be re-disturbed for at least 14 days or in advance of forecasted rain events by constructing berms along the downslope perimeter or by covering the stockpile. • Store chemicals in watertight containers. • Minimize exposure of construction materials to stormwater. • Designate refueling and equipment inspection/maintenance locations per Spill Prevention, Containment, and Countermeasure Plans (SPCCP) (i.e., located 150 feet from surface waters and sensitive habitats such as wetlands). • Waste Management Measures <ul style="list-style-type: none"> • Prevent off-site disposal or runoff of any rinse or wash waters. • Implement concrete and truck washout facilities and appropriately sized storage, treatment, and disposal practices. • Ensure the containment of sanitation facilities (e.g., portable toilets). • Clean or replace sanitation facilities (as necessary) and inspect regularly for leaks/spills. • Cover waste disposal containers during rain events and at end of every day. • Non-Stormwater Management Measures <ul style="list-style-type: none"> • Control all non-stormwater discharges during construction. • Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters. • Clean streets in such a manner as to prevent non-stormwater discharges from reaching surface water. • Discontinue the application of any erodible landscape material during rain, or within 2 days before a forecasted rain event. • Postconstruction Stormwater Management Measures <ul style="list-style-type: none"> • The Stormwater Construction General Permit requires that the SWPPP specify postconstruction stormwater management measures and runoff reduction measures that provide for a post-Project time of runoff concentration that is equal or greater than pre-Project time of concentration. • The postconstruction stormwater management measures must specify that BMPs be implemented to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed at the site. 				

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> A long-term maintenance plan for the postconstruction stormwater management measures must be described in the SWPPP and implemented for a minimum of 5 years following completion of construction (per Attachment 1, <i>Compliance with Post-Construction Requirements</i>, of the General Permit). The plan must describe the procedures to ensure that the postconstruction stormwater management measures are adequately maintained. During operations and maintenance, Project facilities including, but not limited to, roads (including access roads), other paved and unpaved surfaces, structures, and equipment, will be properly maintained so as to avoid the potential for erosion and sediment/siltation into local waterbodies and in compliance with all applicable federal, state, and local regulations. Project operation and maintenance erosion and sediment control plans will be prepared and implemented as determined necessary, depending on the specific activity and potential for erosion or other impacts. <ul style="list-style-type: none"> Drift and runoff from areas treated with herbicides, pesticides, and other chemicals that may be harmful to aquatic habitats will be controlled. Sediment control measures will include retaining sediment onsite by a system of sediment basins, traps, or other appropriate measures; reducing runoff velocity on exposed slopes; and collecting and directing surface run-on and runoff at non-erosive velocities to controlled drainage courses. Postconstruction erosion control measures will be implemented (such as silt fencing, fiber rolls, hydraulic mulch/seeding, and vegetative plantings) and monitored to minimize effects on water quality. Revegetation treatments will be integrated into grading plans to create favorable planting environments that will aid plant establishment and natural regeneration. To the extent feasible and practicable, local native plants that require little or no maintenance and do not create an extreme fire hazard will be used. 				
BMP-13	<p>Development and Implementation of Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures</p>	<ul style="list-style-type: none"> As part of the SWPPP, SPCCPs will be developed and implemented to ensure proper handling of hazardous or petroleum substances during construction and operation/maintenance, to minimize any spills of such substances, and to minimize adverse effects from any such spills should they occur. Multiple SPCCPs may be prepared for Project construction activities, each taking into account site-specific conditions, such as proximity to waterways and slope, type of materials being used for construction, and type of construction activity being performed (e.g., ground disturbing or other). Spill prevention kits will always be in proximity when hazardous materials will be used (e.g., crew trucks and other logical locations). For all fueling of stationary equipment at the construction sites, containments will be provided to the degree that any spill will not enter the channel or damage wetland or riparian vegetation. Refueling of construction equipment will occur only in designated areas that will be a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands. Equipment used in direct contact with water will be inspected daily for oil, grease, and other petroleum products prior to use. All equipment will be cleaned of 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Before, during, and throughout construction 	<ul style="list-style-type: none"> The Authority will monitor the development and implementation of the SPCCPs to minimize effects from spills of oil or oil-containing products during Project construction and operation. Colusa, Glenn, and Yolo Counties (reporting of unforeseen hazardous conditions). As part of each SPCCP, an inspection program which includes regularly scheduled inspections, evaluations, and testing by qualified personnel will be developed in accordance with USEPA's SPCC Guidance for Regional Inspectors. The Authority will review and approve all SPCCPs to ensure the above 	<ul style="list-style-type: none"> RWQCB Cal/OSHA

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<p>external petroleum products prior to beginning work where contact with water may occur in order to prevent the release of such products to surface waters.</p> <ul style="list-style-type: none"> • Equipment will not be serviced within the ordinary high-water mark or immediate floodplain of existing waterways (e.g., Funks Creek, Stone Corral Creek), unless the equipment stationed in these locations could not be readily relocated (e.g., pumps and generators). • Store hazardous materials in double containment. • Dispose of all hazardous and nonhazardous products following instructions and Material Safety Data Sheets and placed in nonleaking sealed containers until transport to an appropriate disposal facility. • Monitor onsite vehicles for fluid leaks and regular maintenance to reduce the chance of leakage. • Provide secondary containment (a prefabricated temporary containment mat, a temporary earthen berm, or other measure can provide containment) of bulk storage tanks having a capacity of more than 55 gallons. • The contractor will conduct sampling of runoff effluent when a leak, spill, or other discharge of non-visible pollutants is detected. • Provide equipment and materials necessary for cleanup of accidental spills onsite. • Clean up accidental spills and leaks immediately and dispose of properly. • The designated health and safety staff people will be trained in state and federal emergency response and spill containment techniques and will also be made aware of the state and federal pollution control laws, rules, and regulations applicable to their work. • Petroleum products will be stored in nonleaking containers at impervious storage sites from which an accidental spill cannot escape. • Absorbent pads, pillows, socks, booms, and other spill containment materials will be stored and maintained at the hazardous materials storage sites for use in the event of an accidental spill. • Contaminated absorbent pads, pillows, socks, booms, and other spill containment materials will be placed in nonleaking sealed containers until transport to an appropriate disposal facility. • When transferring oil or other hazardous materials from trucks to storage containers, absorbent pads, pillows, socks, booms, or other spill containment material will be placed under the transfer area. • Oil-absorbent booms will be used when equipment is used in or immediately adjacent to waters. • All reserve fuel supplies will be stored only within the confines of a designated staging area, to be located a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands. • Fuel transfers will take place a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands, and absorbent pads will be placed under the fuel transfer operation. • Staging areas will be designed to contain contaminants such as oil, grease, fuel, and other petroleum products so that should an accidental spill occur, contaminants do not drain toward receiving waters or storm drain inlets. 			<p>measures and practices are included and the SPCCPs are prepared in accordance with 40 CFR Part 112.</p> <ul style="list-style-type: none"> • During construction, the contractors will be responsible for implementation of the SPCCP as well as conducting inspections, evaluation, and testing required in each site-specific SPCCP. • The inspection program personnel will report to the Authority any deficiencies in compliance with the SPCCP as well as any spills of gasoline, diesel fuel, oil, or other related substance. The Authority will evaluate these events as needed on a site-by-site basis to amend SPCCPs as needed to reduce the severity of and/or avoid the potentially significant impacts on the public and environment. 	

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> All stationary equipment will be staged in staging areas and positioned over drip pans. In the event of an accidental spill, personnel will identify and secure the source of the discharge and contain the discharge with sorbents, sandbags, or other material from spill kits and will contact appropriate regulatory authorities (e.g., National Response Center will be contacted if the spill threatens navigable waters of the United States or adjoining shorelines, as well as other appropriate response personnel). 				
BMP-14	<p>Obtainment of Permit Coverage and Compliance with Requirements of Central Valley Regional Water Quality Control Board Order R5-2022-0006 (NPDES No. CAG995002 for Limited Threat Discharges to Surface Water) and State Water Resource Control Board Order 2003-0003-003-DWQ (Statewide General Waste Discharge Requirements For Discharges To Land With A Low Threat To Water Quality) (BMP-14 would require compliance with the existing permits and any amendments thereto.)</p>	<ul style="list-style-type: none"> Discharged surface water and groundwater from dewatering activities will meet permit water quality requirements to either surface water or land. Treatment for sediment or other pollutants may be required. Pre-discharge testing, monitoring, and reporting will be conducted in accordance with the permit. If treatment of dewatered surface water is necessary to meet permit effluent limitations, the appropriate treatment technology will be implemented. <ul style="list-style-type: none"> Treatment for reducing total suspended solids, settleable solids, and turbidity could include the following options, which are representative of typical sediment treatment methods: desilting basin; sediment trap; weir tank; dewatering tank; gravity bag filter; sand media filter. Pre-discharge testing may be required if contamination is suspected. In this case, water collected during dewatering will be tested for contamination prior to disposal in accordance with permit requirements. Discharge of dewatered surface water and groundwater to receiving waters will be done in manner that avoids causing erosion and scouring. Energy dissipation BMPs, such as riprap, plastic sheeting, or sandbags, will be installed at the discharge points of the dewatering system(s). Groundwater pumped as part of construction-related dewatering will be contained onsite during construction within bermed areas adjacent to construction areas to avoid impacts to surface waters. As necessary, the Authority will ensure that the water is pumped into Baker tanks or approved equivalent with either a filter or gel coagulant system or other containment to remove sediment as required. BMPs, as described in the SWPPP, will also be implemented to retain, treat, and dispose of groundwater. Measures will include, but are not limited to, the following. <ul style="list-style-type: none"> Directly conveying pumped groundwater to a suitable land disposal area capable of percolating flows. Retaining pumped groundwater in surface facilities to reduce turbidity and suspended sediment concentrations. If contamination is suspected, testing water collected during dewatering for contamination prior to disposal. Treating (i.e., flocculating) pumped groundwater to reduce turbidity and concentrations of suspended sediments if turbidity exceeds Central Valley RWQCB Order R5-2022-0006 thresholds. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Before and during construction 	<ul style="list-style-type: none"> The Authority will comply with monitoring and reporting requirements of the permit. 	<ul style="list-style-type: none"> State Water Board RWQCB

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-15	Performance of Site-Specific Drainage Evaluations, Design, and Implementation	<ul style="list-style-type: none"> • During Project design (35% completion or greater), Project civil engineers and professional hydrologists will coordinate with owners and operators of local drainage systems (e.g., Counties) and/or landowners served by existing drainage systems to evaluate pre- and post-Project drainage needs and design features to ensure local drainage infrastructure (e.g., ditches, pipes, culverts) will not be disrupted by Project facilities. • Site-specific drainage evaluations or studies will be prepared as part of final Project design. The drainage evaluations/studies will consider the design flows of any existing facilities that will be crossed by Project features and develop strategies to ensure equivalent functioning of the existing drainage system during and after construction. • These evaluations/studies will be applicable to aboveground facilities ultimately resulting in impervious surfaces, including, but not limited to: Funks and its PGP, TRR and its PGP, the administration and operations building, the maintenance and storage building, the Dunnigan Pipeline, Sacramento River discharge site, all roads (including the South Road) and impervious areas that might result due to recreation area construction or areas that will be substantially modified as a result of construction. • The drainage evaluations will demonstrate stormwater runoff detention or retention on site and/or conveyed to the nearest existing drainage facility. The drainage study will demonstrate that Project implementation will not result in increases in the peak flow runoff to adjacent lands or existing drainage facilities. Requirements of the study include the following. <ul style="list-style-type: none"> • Identification of pre-development hydrology based on site-specific conditions and local meteorology by using continuous simulation modeling techniques, published data or studies, or other established tools. • Quantification of post-development runoff volume and peak flow discharges. • Identification that the postconstruction rate, volume, and duration of runoff will not substantially exceed the pre-development rates and the pre-development hydrologic conditions will be replicated through site design, configuration, and other appropriate practices to the maximum extent technically feasible. • Identification and description of strategies and other appropriate practices (based on the pre-development hydrology) include potential relocation of facilities within the existing footprints, reduction in footprint sizes, and use of appropriate drainage systems and practices that mimic natural processes to infiltrate and recharge. • Strategies and appropriate practices may include green infrastructure, which captures, filters, or reduces stormwater (e.g., roadside plantings); low-impact development practices, which are systems and practices that use or mimic natural processes that result in infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat; bioswales; and infiltration basins. • Identification of features (e.g., ditches, curb and gutters, culverts) that are within 250 feet of seasonal wetlands and strategies and practices to maintain 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • Before construction 	<ul style="list-style-type: none"> • Submittal of evaluation to Counties. 	<ul style="list-style-type: none"> • RWQCB • Counties

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<p>the existing hydrology of the seasonal wetlands and ensure that contaminants from impervious surfaces are not channeled into seasonal wetlands.</p> <ul style="list-style-type: none"> Implementation of drainage evaluations/studies and any strategies and other appropriate practices identified will result in equivalent functioning of the existing drainage system during and after construction. 				
BMP-16	Development and Implementation of a Construction Equipment, Truck, and Traffic Management Plan (TMP)	<ul style="list-style-type: none"> Coordinate haul and access routes with all contractors when multiple facility sites are under construction concurrently, so that Project-generated construction traffic is dispersed to the extent practicable and necessary (as shown in Figure 2-35). Prohibit construction traffic in the community of Maxwell. Construction traffic, including commuting construction workers and deliveries of materials and equipment, will be prohibited on all streets in the community of Maxwell except Old Highway 99 and Maxwell Colusa Road. Specifically, construction traffic is prohibited on or south of Bismark Avenue and North Street to the north; west of Old Highway 99 to the east; north of Sycamore Street to the south; and on and east of Pacific Street and east of Sutton Road to the west. Construction traffic is also prohibited on Oak Street from Old Highway 99 to Sutton Road. Construction traffic is also prohibited south of Maxwell Colusa Road, on and west of East Avenue, on and north of Central Street, and on and west of Railroad Avenue. The Authority will work with the contractor(s) to develop a monitoring and reporting plan to ensure compliance with this measure. Install traffic control devices, as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones, where needed to maintain safe driving conditions, including use of signage to alert motorists and bicyclists of construction activities, potential hazards, and travel detours, and use flaggers when appropriate. During operations and maintenance, truck and other maintenance equipment will be maintained in good working condition and will be used in accordance with all applicable federal, state, and local regulations. The Authority will coordinate with the applicable jurisdictions, including local agencies for local roads, transit providers, and rail operators where applicable. Provide construction notification procedures for Glenn, Colusa, Yolo, and Tehama Counties' police, public works, fire departments, and other public service providers, and cycling organizations, bike shops, and schools. Inform contractors and subcontractors of work hours, modes and locations of transportation, and parking for construction workers. Describe the procedures for construction area evacuation in the case of an emergency declared by county or other local authorities. Identification of emergency routes available and open for county and other public emergency personnel. Designate areas where nighttime construction will occur, if needed. Posted information for contact in case of emergency or complaint. 	<ul style="list-style-type: none"> Authority Construction Management Team; Contractor construction monitor(s) 	<ul style="list-style-type: none"> Prior to, during, after construction 	<ul style="list-style-type: none"> The Authority will appoint a construction monitor to perform site inspections to verify contractor compliance with the TMP. Contractor should ensure that all TMP requirements are addressed; contractor will ensure that inspectors monitor traffic conditions while work is being performed to avoid impacts in excess of what was identified in the TMP. 	<ul style="list-style-type: none"> Counties Local Off-Site Emergency Responders (Sheriff, fire departments)
BMP-17	Implementation of Visual/Aesthetic Design,	<ul style="list-style-type: none"> Use native trees and shrubs for screening at the Project facilities that may substantially degrade the existing visual character of the site(s) in a manner that does not compromise facility access or safety and does not conflict with existing safety requirements of agencies (e.g., DSOD). 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Before, during, and after construction 	<ul style="list-style-type: none"> Include in construction plans for review and approval by the Authority. 	<ul style="list-style-type: none"> None

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
	Construction, and Operation Practices	<ul style="list-style-type: none"> • Incorporate high-quality site design that does not detract from the rural nature of the surroundings. New structures will be painted in a shade that is visually cohesive with the general surrounding area. Color selection will be made for the coloring of the most prevalent season. If the color selection is between two or three colors, one of the darker shades will be selected. This is because choosing a darker shade will allow the surface to recede and blend within the visual landscape, whereas lighter colors advance, or are more apparent, within the visual landscape. Choosing a darker color will also reduce the potential for glare. Therefore, coloring will be slightly darker unless aesthetic design treatments indicate another color selection is appropriate with the intent to specifically improve aesthetics. Paints will be of a dull, flat, or satin finish only. Appropriate paint type will be selected for the finished structures to ensure long-term durability of the painted surfaces. • If any concrete entrance signs, barriers, or landscape accents are to be located along public roadway, then such features will receive aesthetic treatments to ensure they enhance views associated with the Project. Aesthetic treatments may include mimicking natural material (e.g., stone or rock surfacing) and using integral color to reduce visibility, improve aesthetics, and to ensure that features blend with the landscape rather than creating a utilitarian-looking concrete element. • All required lighting during construction will be directional to minimize glare impacts to humans and wildlife. • All artificial outdoor lighting associated with the Project will be limited to safety and security requirements, designed using Illuminating Engineering Society's design guidelines and in compliance with International Dark-Sky Association approved fixtures. Light emitting diode (LED) lighting will avoid the use of blue-rich white light lamps and use a correlated color temperature that is no higher than 3,000 Kelvin. Wherever possible and pragmatic, the lighting designer will select fixtures and lighting control systems that conform to International Dark-Sky Association's Fixture Seal of Approval program. In addition, LED lights will use shielding to prevent nuisance glare and ensure that light spill does not affect sensitive residential viewers. Lights along perimeter roadways and pathways, as well as safety lighting at building entrances and loading areas, will employ shielding to minimize off-site light spill and glare and be screened and directed away from residences and adjacent uses to the highest degree possible. The use of nighttime lights along perimeter roadways and pathways will be minimized to the highest degree possible to ensure that spaces are not unnecessarily over lit, while still maintaining minimum adequate lighting to provide necessary visibility for security. For example, the amount of artificial light can be reduced by limiting the number of light posts in higher-use areas and by using hooded wall mounts on pathways that receive primarily pedestrian traffic. Technologies to reduce light pollution evolve over time and design measures that are currently available may help but may not be the most effective means of controlling light pollution once the Project is finalized. Therefore, all design measures used to reduce light pollution will employ the technologies available at the time of Project design to allow for the highest potential reduction in light pollution. 				

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-18	Development and Implementation of Fire Safety Plans for Prevention and Suppression/Control During Construction and Maintenance	<ul style="list-style-type: none"> • Prepare a fire safety plan, for review by counties and CAL FIRE, that specifies measures to minimize the potential for causing fires and that establishes safety procedures and protocols to minimize any damages or threats to public health and safety and the environment should a fire occur. This plan will include precautions to carry out during high-fire danger, a list of fire-suppression equipment and tools to have on hand, a description of available communications; procedures and policies for controlling any fires that are on the work site, and other related fire prevention and control procedures, specifications for the supply of water to have on hand, and descriptions of other actions that will reduce the risk of ignition and facilitate immediate control of an accidental fire. • Coordinate with applicable fire departments prior to construction activities to determine the appropriate type and amounts of fire equipment to be carried on vehicles. • Maintain fire-suppression equipment (e.g., fire extinguishers, fire blankets) at work locations and on equipment. • Construction personnel will be required to park vehicles away from dry vegetation. • If a fire should start, all appropriate fire protection agencies responsible will be contacted immediately. • Maintain a list of all major potential 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 potential major hazard. • Smoking will be allowed only in areas designated for smoking. • Gasoline-powered construction equipment with catalytic converters will be equipped with shielding or other acceptable fire prevention features. Internal combustion engines will be equipped with spark arrestors. • Welding sites will include fire prevention provisions. • The contractor will maintain contact with local firefighting agencies throughout the fire season for updates on fire conditions, and such fire conditions will be communicated daily to the onsite employees of the contractor and subcontractors daily. • Red Flag Warning events from the National Weather Service will be monitored daily and construction activities that have higher potential to result in wildfires (e.g., blasting or working in areas where vegetation has not been cleared) will cease. • Provide adequate and appropriate communication throughout the construction site(s) such as cell towers and radio repeater sites, operational radios, and/or operational telephones. • Communication equipment will be provided to all construction crews and monitors and equipment will be confirmed operational each day prior to initiating construction activities at each work site. • Water tanks and/or water trucks will be made available at active construction site(s) for fire protection during construction. 	<ul style="list-style-type: none"> • Authority • Fire suppression agencies • Contractors 	<ul style="list-style-type: none"> • Prior to and during construction • During maintenance 	<ul style="list-style-type: none"> • Authority (monitoring). • Fire protection agencies (report to them in the event of a fire). • Contractors (report fire incidents to the Authority). 	<ul style="list-style-type: none"> • State Fire Marshal • CAL FIRE • Local fire suppression agencies • Counties

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-19	Development and Implementation of Worker Occupational Health and Safety Plans	<ul style="list-style-type: none"> The Authority and Contractors will follow all required federal, state, and local occupational health and safety laws on the construction site(s) at all times. The contractor is responsible for means and methods to complete the work safely and is required to provide for public safety and to provide safe access for inspection and to Authority employees. CCR Title 8 and Cal/OSHA will have overall jurisdiction regarding Project safety, including tunneling. Mine Safety and Health Administration will have jurisdiction over quarry operations. Federal Bureau of Alcohol, Tobacco, and Firearms (ATF) will have jurisdiction over the handling of explosives related to blasting of excavations, including quarries. Provide and maintain construction equipment as required by CCR Title 8, including any special precautions based on the type of equipment being used. Provide Project-dedicated ambulance and medical technician/first-aid trailer office. Provide fire-fighting equipment (e.g., tools and fire extinguishers) on all vehicles as coordinated with and identified by appropriate fire departments. Provide adequate and appropriate communication throughout the construction site(s) such as cell towers and radio repeater sites, operational radios, and/or operational telephones. Communication equipment will be provided to all construction crews and monitors and equipment will be confirmed operational each day prior to initiating construction activities at each work site. Identify designated location(s) for helipads during construction and will be communicated to off-site emergency responders. Develop and implement a construction emergency action plan(s), which will include emergency notification flowcharts, notification procedures, and designated safety zones for workers for different types of emergencies that could occur during the construction of facilities (e.g., injuries to construction workers or fires) and communicate with off-site emergency responders. Off-site emergency responders will be made aware of the emergency supplies and equipment available on site for use by workers and first responders. A Public Information Officer or Media Contact along with a list of Cooperators will be made available and shared with emergency responding agencies (e.g., CAL FIRE). Provide description of symptoms and sources to Valley Fever to all workers, explain measures to reduce exposure (e.g., wetting soil, wearing masks), and provide medical contact information to the onsite medical personnel should workers develop potential symptoms of Valley Fever. Recorded any cases of Valley Fever, if they develop, by the onsite health and safety officer; implement tracing for the potential source to identify and communicate with workers that may have been unknowingly exposed; those workers will be re-informed of symptoms and/or have the discretion to be tested. 	<ul style="list-style-type: none"> Authority Construction Contractors 	<ul style="list-style-type: none"> During construction 	<ul style="list-style-type: none"> Construction monitors for each site will monitor construction operations to ensure the California Occupational Safety and Health Act of 1973, as administered by Cal/OSHA, will be followed as a minimum standard to protect workers. The construction monitors will report any deficiency in compliance by the construction contractor with the California Occupational Safety and Health Act of 1973 to the Authority immediately. 	<ul style="list-style-type: none"> Cal/OSHA Mine Safety and Health Administration ATF CAL FIRE Counties Local Off-Site Emergency Responders (Sheriff, fire departments)
BMP-20	Preparation and Implementation of Blast	Comply with all federal, state, and local requirements for blasting, including handling, transport, and storage of explosive blasting materials. These include, but may not be limited to, the following.	<ul style="list-style-type: none"> Contractor(s) 	<ul style="list-style-type: none"> Prior to construction Implemented during construction 	<ul style="list-style-type: none"> Authority (Monitoring) Contractors 	<ul style="list-style-type: none"> Bureau of Alcohol Tobacco, Firearms and Explosives

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
	Plans for Worker Health and Safety	<ul style="list-style-type: none"> • A county explosive permit. • California Highway Patrol (CHP) Hazardous Materials Transport License. • County Sheriff or Police or fire department for site-specific permits. • U.S. Department of Transportation and California Department of Motor Vehicles (CA DMV) Motor Carry Permit. • State of California Department of Justice Bureau of Firearms Licenses for each blaster. • A Blast Plan will be prepared for every blast performed at the quarries and will include appropriate handling of blasting materials, appropriate timing for clearing the quarry, redundant communications, and distances for safely distancing from the blast location. 				<ul style="list-style-type: none"> • Mine Safety and Health Administration • Counties • CA DMV • CHP • Cal/OSHA
BMP-21	Performance of Mosquito and Vector Control During Construction	<ul style="list-style-type: none"> • Coordinate with Glenn County Mosquito and Vector Control District (MVCD) and the Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) and Yolo County (Sacramento-Yolo Mosquito and Vector Control) related to implementation of standard local, state, and federal vector control requirements during construction of all facilities. BMPs during construction include the following. <ul style="list-style-type: none"> • Utilize water sources with mosquito predators for flooding. • Drain irrigation water into ditches or other water bodies with abundant mosquito predators. • Implement monitoring and sampling programs to detect early signs of mosquito population problems. • Limit standing water on all construction sites. • Use biological agents such as mosquito fish to limit larval mosquito populations. • Use larvicides and adulticides, as necessary. If larvicides and adulticides are required, the Authority will evaluate the effects of the chemicals and, if required, prepare a monitoring program for review by fish and wildlife agencies to evaluate effects, if any, application will have on macroinvertebrate and associated covered fish species. 	<ul style="list-style-type: none"> • Authority • Contractors • Mosquito and Vector Control Districts 	<ul style="list-style-type: none"> • Before and during construction 	<ul style="list-style-type: none"> • Contractors (during construction) 	<ul style="list-style-type: none"> • Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) • Glenn County MVCD • Yolo County (Sacramento-Yolo Mosquito and Vector Control)

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-22	Development and Implementation of a Construction Noise Abatement Plan	<p>Develop and implement a noise abatement plan to avoid or reduce construction-related noise impacts. This plan will incorporate the following of best noise control practices and measures during construction depending on site-specific conditions, construction activity, and location of nearest sensitive receptor.</p> <ul style="list-style-type: none"> • Prior to construction, designate a noise control coordinator and initiate a complaint/response tracking program. • Limit use of heavy equipment to daytime hours of 7:00 a.m. to 7:00 p.m. wherever possible. • Limit all vibratory and impact pile driving to daytime hours of 7:00 a.m. to 7:00 p.m. • Notify residents of nighttime work, if located within 1 mile of nighttime work areas. • Prohibit gasoline or diesel engines from having unmuffled exhaust. • Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation. • Prevent excessive noise by shutting down idle vehicles or equipment. • Locate, store, and maintain portable and stationary equipment as far as feasible from nearby residents to ensure that such residents are not exposed to onsite construction noise at unacceptable levels. • The following measures will be implemented on a site-specific basis, as applicable. <ul style="list-style-type: none"> • Use noise-reducing enclosures around stationary noise-generating equipment. • Construct barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission to noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and onsite construction equipment. • Use shrouds to reduce noise from pile driving. • Blasting at excavation sites will be conducted at a distance of at least 1,000 feet from the nearest noise-sensitive land use. • Select haul routes that affect the fewest number of people and implement the TMP, which avoids the community of Maxwell. 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • During construction • During operations 	<ul style="list-style-type: none"> • In the event of complaints by affected residents due to onsite construction noise generated during nighttime hours, the contractor will monitor noise levels intermittently (between 10:00 p.m. and 7:00 a.m.) at the dwelling unit of the person lodging the complaint. If measured construction noise during nighttime hours exceeds 45 dBA interior L_{max} or 5 dB above ambient noise, whichever is greater, at the dwelling unit, the construction contractor will implement additional sound-attenuating measures where feasible, such as limitations on the use of noise-generating equipment, or installation of additional temporary barriers or enclosures. Where the above-described strategies are ineffective in reducing noise to the identified levels or where it is infeasible to do so, the affected residents may be offered short-term relocation assistance for the duration of the time that nighttime noise levels are expected to exceed the specified levels. Exceptions to this commitment can be made for legally mandated warning devices, such as back-up alarms and warning horns. 	<ul style="list-style-type: none"> • Counties

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-23	Development and Implementation of an Underwater Construction Noise Control, Abatement, and Monitoring Plan	<ul style="list-style-type: none"> • Develop and implement an underwater sound control, abatement, and monitoring plan to avoid and minimize the effects of underwater construction noise on fish, particularly underwater noise effects associated with impact pile driving activities in the Sacramento River for Alternative 2. The plan will incorporate the following types of measures. <ul style="list-style-type: none"> • Restrict in-water work and bank work within 200 feet of the shoreline to the in-water work windows specified in construction BMPs. • Employ underwater noise-reducing methods using the best available and practicable technologies, such as use of vibratory rather than impact pile driving equipment when appropriate; using an impact pile driver to proof piles initially placed with a vibratory pile driver; employing noise attenuation using bubble curtains, air-filled fabric barriers, or isolation piles. Specific techniques to be used will be based on site-specific conditions. • Restricting in-water and near-shore impact pile driving to daytime hours (7:00 a.m. to 7:00 p.m.) to provide fish with a 12-hour quiet period between impact pile driving events. • Monitoring underwater noise levels during all pile-driving activities on land (within 200 feet of shore) and in water to ensure that peak and cumulative sound exposure levels during pile driving do not exceed the values that were estimated (using the National Marine Fisheries Service [NMFS] spreadsheet model) in support of the environmental permitting process. • Stopping pile driving for the day if underwater noise monitoring indicates that daily peak and cumulative sound exposure levels are being exceeded, and taking corrective actions (e.g., reducing the total number of strikes per day on subsequent days) until monitoring shows that daily peak and cumulative sound exposure levels are no longer being exceeded. • Monitoring the in-water work area for fish that may be showing signs of distress or injury as a result of pile driving activities. and stopping work when distressed or injured fish are observed. If stressed, injured, or dead fish are observed during pile driving, the Authority or its contractor(s) will reduce the number of strikes per day to ensure that fish are no longer showing signs of stress, injury, or mortality. 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • Prior to and During construction 	<ul style="list-style-type: none"> • Daily summaries of the hydroacoustic monitoring results. • Daily reporting of any occurrences of stressed, injured, or dead fish. 	<ul style="list-style-type: none"> • CDFW • NMFS

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-24	Use of Design Features and Noise Control Practices to Reduce Operation and Maintenance Noise	<p>Pump station buildings and turbine housing will be designed and constructed such that operation noise levels at neighboring residential receptors do not exceed 45 dBA L_{eq}. Acoustical measures such as terrain shielding, enclosures, exhaust silencers, sound barriers, and acoustical building treatments will be incorporated into the facility design in order to meet this performance standard.</p> <p>In regard to maintenance equipment, the following best noise control practices will be followed.</p> <ul style="list-style-type: none"> • Limit use of heavy equipment to daytime hours of 7:00 a.m. to 7:00 p.m. wherever possible. • Prohibit gasoline or diesel engines from having unmuffled exhaust. • Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation. • Prevent excessive noise by shutting down idle vehicles or equipment. • Use noise-reducing enclosures around noise-generating equipment. 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • Prior to construction (design of pumping plants) • Operations and maintenance 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Counties
BMP-25	Preparation of an Emergency Action Plan for Reservoir Operations	<ul style="list-style-type: none"> • An Emergency Action Plan for Reservoir Operations will be prepared pursuant to the California Office of Emergency Services and consistent with California Water Code Sections 6160, 6161, and 6002.5 and will include emergency notification flowcharts, notification procedures, inundation maps, and response protocols for notifying downstream entities if an emergency release was anticipated to occur. Content of this plan will also include, but not be limited to, the following. <ul style="list-style-type: none"> • Specification of the dam owner’s responsibilities to ensure timely and effective action. Responsibilities of dam owners include surveillance (monitoring the condition of the dam) and notification (phoning local or state emergency management agency officials in charge of emergency response). • Inundation maps. Inundation maps show areas that may have to be evacuated in a dam emergency. The maps facilitate notification by displaying flood areas and estimated travel times for the floodwaters. • Definition of events that trigger emergency action. 	<ul style="list-style-type: none"> • Authority 	<ul style="list-style-type: none"> • Prior to and during operations; reviewed annually 	<ul style="list-style-type: none"> • These plans are typically reviewed annually and periodically tested through tabletop and functional exercises and drills. 	<ul style="list-style-type: none"> • California Office of Emergency Services • DSOD
BMP-26	Preparation and Implementation of an Electrical Power Guidelines and EMF Field Management Plan	<ul style="list-style-type: none"> • The Authority will specify that design and construction of power facilities be in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission (CPUC), EMF Design Guidelines for Electrical Facilities (2006). • Prepare a Field Management Plan that indicates the no-cost and low-cost EMF measures that will be installed as part of the final engineering design for the Project. (Required under CPUC Decision No. D. 06-01-042) (January 26, 2006) and CPUC General Order 131-D, Section X(A) (June 8, 1994). 	<ul style="list-style-type: none"> • Authority 	<ul style="list-style-type: none"> • Prior to and during construction 	<ul style="list-style-type: none"> • A Construction Monitor will regularly inspect construction activities to ensure design and construction of power facilities are in accordance with EMF guidance adopted by the CPUC. • The Field Management Plan will include evaluating the no-cost and low-cost measures considered for the Project, the measures adopted, and reasons that certain measures were not adopted, and will be prepared during detailed Project design. 	<ul style="list-style-type: none"> • CPUC • California Independent System Operators
BMP-27	Development and Implementation of a	<ul style="list-style-type: none"> • Prior to construction, the Authority will develop a construction equipment exhaust reduction plan to reduce criteria air pollutants from construction equipment. 	<ul style="list-style-type: none"> • Authority • Contractors 	<ul style="list-style-type: none"> • Prior to and during construction 	<ul style="list-style-type: none"> • The Authority will submit the reduction plan to the appropriate air 	<ul style="list-style-type: none"> • AQMDs /Air Pollution Control Districts (APCDs)

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	Construction Equipment Exhaust Reduction Plan	<ul style="list-style-type: none"> Control technology that achieves equivalent or greater reductions than those identified below may be specified as new emissions reduction technologies become available and cost-effective. Equipment used to construct Project facilities is equivalent to Tier 4 standards as follows: <ul style="list-style-type: none"> For conveyance facilities, all equipment less than 120 horsepower will be equivalent to Tier 4 final standards. For reservoir facilities, all equipment will be equivalent to Tier 4 final standards except mast rotary percussion drills, the auger drill rigs, and grouting drill rigs. To achieve the criteria pollutant emission rates equivalent to the usage as indicated above, contractors may utilize a combination of newer engines, aftermarket controls, and retrofits to achieve the performance standard noted above. Potential strategies for achieving this standard may also include the following. <ul style="list-style-type: none"> Electrification of equipment. Use of diesel particulate filters on non-electrified equipment. Use of compressed natural gas (CNG). The Authority will quantitatively demonstrate, through equipment-specific modeling, that the fleet-wide average achieves criteria pollutant emissions rates equivalent to the use of Tier 4 final standards as noted above. <ul style="list-style-type: none"> In addition to Tier 4 final standards, the following BMPs will be incorporated into the reduction plan. Minimize idling time either by shutting equipment off when not in use or limiting the time of idling to 3 minutes (5 minutes required by 13 CCR 2449[d][3], 2485). Provide clear signage that posts this requirement for workers at the entrances to the site. Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by an ASE-certified mechanic and determined to be running in proper condition before it is placed in operation. Prior to construction start for each major Project feature, the Authority will ensure that all on-road heavy-duty diesel trucks shall be operated in compliance with the emission standards per CCR Title 13, Section 2025. The Authority will also ensure that its construction contractor will operate on-road trucks with engines certified to the 2010 model year or newer heavy-duty diesel engine emissions standards. 	<ul style="list-style-type: none"> Project-area air districts 		<p>district for review prior to construction.</p> <ul style="list-style-type: none"> Ensure that emissions from all off-road diesel-powered equipment used on the Project site do not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringelmann [Based on the Ringelmann scale, which measures the density of smoke in the air]) will be repaired immediately. Non-compliant equipment will be documented, and a summary provided annually to the Authority and air district with jurisdiction over construction site(s). A visual inspection of all in-operation equipment will be made at least weekly by the contractor and witnessed monthly or more frequently by the Authority and a periodic summary of the visual survey results will be submitted by the contractor throughout the duration of the Project, except that the summary will not be required for any 30-day period in which no construction activity occurs. The summary will include the quantity and type of vehicles inspected, as well as the dates of each survey. The air districts or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure will supersede other air district or state rules or regulations. 	
BMP-28	Preparation and Implementation of Fugitive Dust Control Plans	<p>The following fugitive dust control measures are based on the Tehama County APCD fugitive PM10 mitigation measures from the 2015 Air Quality Planning and Permitting Handbook.</p> <ul style="list-style-type: none"> Land Clearing/Earth Moving: <ul style="list-style-type: none"> Water shall be applied by means of truck(s), hoses, and/or sprinklers as needed prior to any land clearing or earth movement to minimize dust emissions. Haul vehicles transporting soil into or out of the property shall be covered. 	<ul style="list-style-type: none"> Authority Contractor(s) 	<p>Prior to final design plans and bid documents. Prior to and during construction.</p>	<ul style="list-style-type: none"> The Authority will submit the dust reduction plan to the appropriate air district for review prior to construction. Monitoring equipment will be used to monitor dust conditions on construction site(s). Non-compliance will be documented, and a summary provided annually to 	<ul style="list-style-type: none"> AQMDs /APCDs

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> • A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. The telephone number of the local air district shall also be included and visible on the sign. • All excavation, grading, and/or earth moving activities shall be suspended when average wind speeds exceed 25 mph. • Visibly Dry Disturbed Soil Surface Areas: <ul style="list-style-type: none"> • All visibly dry disturbed soil surface areas of operation shall be treated with a dust palliative agent and/or watered to minimize dust emissions. • Paved Road Track out: <ul style="list-style-type: none"> • Existing roads and streets adjacent to the Project where there are Project construction vehicles actively entering from unpaved roads shall be cleaned at least once per day unless conditions warrant a greater frequency. • Visibly Dry Disturbed Unpaved Roads: <ul style="list-style-type: none"> • All visibly dry disturbed unpaved road surface areas of operation shall be watered to minimize dust emissions. • Unpaved roads shall be treated with soil stabilizers or surfactants to reduce dust emissions. • On-site vehicles shall be limited to a speed of 15-20 miles per hour on unpaved roads. • Haul roads shall be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application. • Vehicles Entering/Exiting Construction Area and Employee Vehicles: <ul style="list-style-type: none"> • Vehicles entering or exiting the construction area shall travel at a speed which minimizes dust emissions. • Construction workers shall park in designated parking areas(s) to help reduce dust emissions. • Soil Piles: <ul style="list-style-type: none"> • Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic, or other material may be required to further reduce dust emissions. This includes materials stored in piles for use in the concrete batch plant. 			<p>the Authority and air district with jurisdiction over construction site(s).</p> <ul style="list-style-type: none"> • The air districts or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure will supersede other air district or state rules or regulations. 	
BMP-29	Minimization of Asphalt and Concrete Batching Odors and GHG Emission	<ul style="list-style-type: none"> • The Authority will ensure that its construction contractor(s) establishes a 1-mile buffer for onsite asphalt batch plant operations during construction. • To ensure that the temporary asphalt batch plants do not generate odors that adversely affect existing sensitive receptors, the Authority or its construction contractor(s) will locate onsite asphalt batch plants at least 1 mile from the nearest sensitive receptors. A 1-mile buffer is the screening distance established by TCAPCD. • If asphalt is obtained from off-site commercial sources instead of onsite batch plants, this measure will not be required. • Minimize the amount of cement in concrete by specifying higher levels of cementitious material alternatives, larger aggregate, longer final set times, or lower maximum strength where appropriate. 	<ul style="list-style-type: none"> • Authority • Contractor(s) 	<ul style="list-style-type: none"> • Prior to final design plans and bid documents. • Prior to and during construction. 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • AQMDs /APCDs

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-30	Development and Implementation of Hazardous Materials Management Plans	<ul style="list-style-type: none"> • The Authority will ensure that each construction contractor develops and implements a hazardous materials management plan (HMMP) before beginning construction. • It is anticipated that multiple HMMPs will be prepared for the overall Project construction activities, each considering site-specific conditions such as hazardous materials present on site and known historic site contamination. • The HMMP will include, but not be limited to, the following measures or practices. <ul style="list-style-type: none"> • Fuel, oil, and other petroleum products will be stored only at designated sites. • Hazardous materials containment containers will be clearly labeled with the identity of the hazardous materials contained therein, handling and safety instructions, and emergency contact information. • Storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and/or with the permission of CDFW. • Material Safety Data Sheets will be made readily available to the contractor’s employees and other personnel at the work site. • The accumulation and temporary storage of hazardous wastes will not exceed 90 days. • Soils contaminated by spills or cleaning wastes will be contained and removed to an approved disposal site by an appropriately certified hazardous waste disposal contractor. • Hazardous waste generated at work sites, such as contaminated soil, will be segregated from other construction spoils and properly handled, hauled, and disposed of at an approved disposal facility by a licensed hazardous waste hauler in accordance with applicable law and regulations. The contractor will obtain permits required for such disposal. • Emergency spill containment and cleanup kits will be located at the work site. The contents of the kit will be appropriate to the type and quantities of chemicals or goods stored at the work site. 	<ul style="list-style-type: none"> • Authority • Contractors • Construction Monitor 	<ul style="list-style-type: none"> • Prior to and during construction • Post construction for substances used during operation and maintenance 	<ul style="list-style-type: none"> • The construction contractors will provide all HMMPs to the Authority for review and approval prior to commencing construction activities. • Maintain a database on known historic instances of contamination and results of any field inspections regarding the presence of hazardous chemicals. • The contractor will obtain permits required for hazardous waste generated at work sites to be disposed of at an approved facility by a licensed hazardous waste hauler in accordance with applicable law and regulations. • The Authority will monitor contractor development of HMMPs by including this requirement in construction contracts. • The Authority will review all HMMPs developed by the construction contractor to ensure compliance with this environmental commitment and inclusion of the measures and practices listed above. • During construction, the Construction Monitor will monitor implementation of specific protocol for the proper handling and disposal of hazardous materials of the measures and practices included in each HMMP by the construction contractor. • The Construction Monitor will immediately report any deficiencies in compliance with the HMMP to the Authority. • The construction contractor will report any inability to comply with the HMMP and any spills of hazardous waste to the Authority immediately. 	<ul style="list-style-type: none"> • City, county, state, and federal emergency response agencies. • Storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and/or with the permission of CDFW.
BMP-31	Implementation of Onsite Security Measures and/or Personnel at Construction Sites	<ul style="list-style-type: none"> • As appropriate, provide 24-hour onsite security either through technological means or personnel. • Monitor construction sites, including staging and equipment storage areas. • If private patrol security operators are hired to provide site security, these personnel will have appropriate licenses from the California Bureau of Security 	<ul style="list-style-type: none"> • Contractor(s) 	<ul style="list-style-type: none"> • Before and during construction. 	<ul style="list-style-type: none"> • None. 	<ul style="list-style-type: none"> • None

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<p>and Investigative Services. Individual security personnel will have a minimum-security guard registration license that meets the California Bureau of Security and Investigative Services requirements for training and continuation training as required for that license.</p> <ul style="list-style-type: none"> All security personnel will also receive environmental training similar to that of onsite construction workers so that they understand the environmental conditions and issues associated with the various areas for which they are responsible at a given time. 				
BMP-32	Notification of Construction Activities in Waterways	<ul style="list-style-type: none"> Before work begins in the Sacramento River for Alternative 2, post information at nearby marinas and public launch ramps. Specific locations of these notices will be determined by informed stakeholders. This information will include maintenance site location(s), maintenance schedules, speed limits, and identification of no-wake zone and/or detours, where applicable. Information on detours will include site-specific details regarding any temporary partial channel closures, including contacting boating organizations, marina operators, city or county parks departments, and California Department of Parks and Recreation (DPR), where applicable. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> At least 30 days prior to any work in waterways during construction, operations, and maintenance. 	<ul style="list-style-type: none"> The Authority will determine specific location and types of notices to be provided. Once these are determined, the Authority will contract with the appropriate construction contractor to implement notification and will then monitor implementation and ensure that posting of information is complete 30 days prior to in-water activities. 	<ul style="list-style-type: none"> Boating organizations Marina operators City or county parks departments DPR U.S. Coast Guard or USACE
BMP-33	Implementation of a Worker Environmental Awareness Program (WEAP)	<ul style="list-style-type: none"> All construction crews and contractors will attend WEAP training prior to working in the Project area. The WEAP training will include documentation and a review by qualified resource specialists of the special-status species and tribal, archaeological, historic built, paleontological, and other sensitive resources and areas within the area of disturbance for a particular facility; the locations of sensitive biological resources and their legal status and protections; measures to be implemented for avoidance of these sensitive resources; and review of other required environmentally related resources for all construction personnel working on site at a particular facility footprint. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> Prior to the onset of construction, including mobilization and vegetation clearing, and when new personnel are added to the Project. Construction tailgate briefings. 	<ul style="list-style-type: none"> A record of all personnel trained will be maintained by each contractor and submitted to the Authority. The Authority will present WEAP training documentation upon request by regulating or permitting agencies. 	<ul style="list-style-type: none"> CDFW U.S. Fish and Wildlife Service (USFWS) Authority
BMP-34	Development and Implementation of Fish Rescue and Salvage Plans for Funks Reservoir, Stone Corral Creek, Funks Creek, and CBD for Alternatives 1, 2, and 3; for Sacramento River for Alternative 2	<ul style="list-style-type: none"> Fish herding and/or rescue operations will occur at any in-water construction site where dewatering and resulting isolation of fish may occur (e.g., when dewatering creates isolated pools within the stream channel). The plans will identify the appropriate procedures (i.e., detailed fish collection, holding, handling, release, and relocation procedures and methods; and equipment) for herding and removing fish from the construction zone and preventing fish from re-entering the construction zone during construction, or prior to dewatering. Capture, handling, holding, release, and relocation measures will be consistent with the general guidelines and procedures set forth in Chapter 9 of the most recent edition of the CDFW California Salmonid Stream Habitat Restoration Manual (California Department of Fish and Game 2010) to minimize impacts to species. The appropriate fish collection method will be determined by a qualified fish biologist for all species of interest, in consultation with the designated resource agency biologist, and based on site-specific conditions prior to dewatering and other in-water construction activities. 	<ul style="list-style-type: none"> Authority Qualified fish biologist 	<ul style="list-style-type: none"> Prior to and during construction 	<ul style="list-style-type: none"> The Authority will oversee development of the Plans in coordination with the Agencies. The Authority will submit plans to the appropriate resource agencies (CDFW, USFWS, and the NMFS) for their review and acceptance. The fish rescue team will notify the contractor when the fish rescue has been completed and that dewatering can recommence. The results of the fish rescue and salvage operations (including date, time, location, comments, method of capture, fish species, number of fish, approximate age, condition, release location, and release time) will be reported to the 	<ul style="list-style-type: none"> CDFW USFWS NMFS

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> • Prior to construction site dewatering, fish will be herded and/or captured and relocated to minimize direct mortality and other forms of take. • All fish rescue and salvage operations will be conducted under the guidance of a qualified fish biologist. These activities will occur as soon as possible after completion of the activity which results in fish being trapped. • Unless otherwise required by these permits, the Authority, in undertaking construction at the construction sites, will provide the following: <ul style="list-style-type: none"> • A minimum 7-day notice to the appropriate fish regulatory agencies, prior to an anticipated activity that could result in isolating fish, such as installation of a coffer dam. • A minimum 48-hour notice to the appropriate fish regulatory agencies of dewatering activities that are expected to require fish rescue. • Safe working access for the appropriate fish regulatory agency personnel to the construction site for the duration of implementation of the fish rescue plan. • Temporary cessation of dewatering if fish rescue workers determine that water levels may drop too quickly to allow successful rescue of fish. • A work site that is accessible and safe for fish-rescue workers. 			<p>appropriate resource agencies, as specified in the pertinent permits.</p> <ul style="list-style-type: none"> • Monitoring the implementation of the Fish Rescue and Salvage Plans and effectiveness of fish salvage and rescue will be species-, site-, and method-specific, and will be established within each Plan in coordination with the appropriate agencies. 	
BMP-35	<p>Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities</p>	<ul style="list-style-type: none"> • Prepare a construction monitoring plan for the protection of fish, wildlife, and plant species. The plan will include, but not be limited to the following elements. <ul style="list-style-type: none"> • Reference to applicable items in the SWPPP. • A summary of preconstruction surveys required for special-status species. • Descriptions of measures to be implemented. • Descriptions of monitoring parameters (e.g., turbidity), including the specific activities to be monitored (e.g., dredging, grading activities) and monitoring frequency and duration (e.g., once per hour during all in-water construction activities), as well as parameters and reporting criteria. • All in-water construction activities within the Sacramento River under Alternative 2 will be conducted during the allowable in-water work window of September 1 through October 15 and within non-anadromous waters (e.g., Funks Creek, Stone Corral Creek, CBD) from June 1 through October 15 for the protection of fish species. • Qualified biologists will monitor construction activities in sensitive natural communities and in areas identified as suitable habitat for special-status species. The biological monitors will have the authority to temporarily stop work in any area where a special-status species has been observed until that individual has passively or physically been moved outside of the work area, or if any measures are not functioning appropriately for the protection of fish, wildlife, or plant species. • Biological monitors will be professional biologists selected for their knowledge of the special-status species and natural communities that may be affected by construction activities. The qualifications of the biologist(s) will be submitted to the fish and wildlife agencies for review and written approval prior to initiating construction. 	<ul style="list-style-type: none"> • Authority 	<ul style="list-style-type: none"> • Prior to construction • Implementation of plan during construction 	<ul style="list-style-type: none"> • The Authority will appoint construction biological monitor(s) to oversee implementation of BMPs, mitigation measures, and requirements in permits and approvals by the agencies. The construction monitor will also perform inspections as necessary to ensure compliance by construction contractors with these measures and coordinate inspections by other appointed monitors and inspectors. • Prior to construction, the construction monitor will report to the Authority on the status of the monitoring plans. • During construction, the construction monitor will report to the Authority periodically or as agreed upon on the results of construction inspections related to the measures and compliance with wildlife agency requirements. • Water quality monitoring per SWPPP. • Construction monitor to maintain a daily log of construction activities, notes any problems identified and solutions implemented to rectify those problems, and notifications to 	<ul style="list-style-type: none"> • USFWS • NMFS • CDFW

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> • High-visibility temporary fencing, temporary signs, staking and flagging, or other visual barriers (pylons and flagging) will be used to identify sensitive biological resources and Project personnel will be advised to avoid disturbance of these areas. These areas will be identified during pre-activity surveys. Signs, staking/pylons, and flagging will be inspected by the biological monitor in accordance with permit conditions and mitigation measures and maintained as necessary. • On-site vehicles will be limited to a speed of 15-20 miles per hour on unpaved roads. Personnel driving vehicles in the Project area will observe the posted speed limit of 20 miles per hour (mph) on paved roads. • All ingress/egress at the Project site will be restricted to those routes identified in the Project plans and description. Construction vehicles and equipment will restrict off-road travel to the designated construction areas. • All vehicle parking will be restricted to established areas, existing roads, or other suitable areas. • All food-related trash will be disposed of in closed containers and removed from the work area daily during the work period. Personnel will not feed or otherwise attract fish or wildlife to the work site. • No firearms will be allowed on the Project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials. • To prevent harassment, injury, or mortality of sensitive wildlife, pets will not be permitted in the active construction area. • To prevent inadvertent entrapment of wildlife during construction, all excavated, steep-walled holes, trenches, or pits more than 1 foot deep will be covered at the close of each working day with plywood or similar material. Dirt will be shoveled around all the edges of the plywood or other material to prevent animals from crawling under it. In cases where trenches or pits cannot be covered, a section of the trench or pit will be partially backfilled to create an earthen ramp with a 3:1 slope. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If a special-status species is encountered during construction work, construction activities will be diverted away from the animal until it can be moved by a USFWS- or CDFW-approved biologist. • Plastic monofilament netting or similar material will not be used for erosion control, because smaller wildlife may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. This limitation will be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package. • All construction pipes, culverts, or similar structures; construction equipment; or construction debris left overnight in areas that may be occupied by wildlife will be inspected by the biological monitor prior to being used for construction. Such inspections will occur at the beginning of each day's activities, for those materials to be used or moved that day. 			<p>the construction superintendent and/or the fish and wildlife agencies regarding any exceedances of specific parameters (i.e., turbidity) or observations of special-status species. The monitoring log will also document construction start/end times, weather and general site conditions, and any other relevant information.</p>	
BMP-36	Control of Invasive Plant Species during Construction	<ul style="list-style-type: none"> • All construction crews and contractors will be educated during the WEAP training about the importance of not spreading invasive plants. 	<ul style="list-style-type: none"> • Authority • Qualified construction 	<ul style="list-style-type: none"> • Prior to construction 	<ul style="list-style-type: none"> • The Authority will monitor and manage invasive species locations throughout construction. 	<ul style="list-style-type: none"> • None

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		<ul style="list-style-type: none"> Localized infestations of invasive plants with a California Invasive Plant Council rating of moderate or high will be identified and mapped during the botanical surveys. These areas will be flagged and avoided during construction. If these areas cannot be avoided, vegetation will be removed and bagged for disposal at a waste facility prior to work in these areas. If areas to be cleared contain invasive plants, then chipped vegetation material from those areas will not be used for erosion control; in these cases, the material will be disposed of to minimize the spread of invasive plant propagules (e.g., burning, composting). Upon completion of the Project, all areas subject to temporary ground disturbances will be recontoured to pre-Project elevations, as appropriate and necessary, and revegetated with native vegetation to promote restoration of the area to pre-Project or better conditions. An area subject to "temporary" disturbance is any area that is disturbed to allow for construction of the Project but is not required for operation or maintenance of any Project-related infrastructure, will not be subject to further disturbance after Project completion, and has the potential to be revegetated. Infestations of invasive plant species will be targeted for control or eradication as part of the revegetation of temporarily disturbed construction areas. Appropriate methods and native plant species used to revegetate such areas will be determined on a site-specific basis in consultation with qualified biologists; site-specific characterization will include slope, soil, drainage, and exposure to determine appropriate plants. 	<ul style="list-style-type: none"> biological monitor(s) or biologists 	<ul style="list-style-type: none"> During construction and immediately post construction 	<ul style="list-style-type: none"> This information will be compiled into a report and used to inform the management of invasive species during operation and maintenance. 	
BMP-37	Shading of Work Lighting for Nighttime Work (Alternative 2 Discharge Location on Sacramento River)	<ul style="list-style-type: none"> If any nighttime construction work will be necessary, work lights will be shaded to minimize illumination of water in order to minimize disturbance to fish and wildlife species. 	<ul style="list-style-type: none"> Authority 	<ul style="list-style-type: none"> Before construction 	<ul style="list-style-type: none"> Included on construction design requirements. 	<ul style="list-style-type: none"> None
BMP-38	Notification of the FAA of Construction or Alterations	<ul style="list-style-type: none"> Project features and equipment will exceed 200 feet above ground level and therefore will require notification to the FAA (14 C.F.R. § 77.5, 14 C.F.R. § 77.9.) Additional Project features under 200 feet may require notification to the FAA as described in 14 C.F.R. § 77.9. Notices to the FAA will use FAA Form 7460-1: Notice of Proposed Construction of Alteration, which is available at FAA regional offices and online. The FAA may request supplemental notices, which must be filed on the prescribed FAA form and within FAA-specified time limits. This information will be used by the FAA to evaluate the effect of the proposed construction or alteration on safety in air commerce and the efficient use and preservation of navigable airspace and of airport traffic capacity at public use airports; to determine whether the effect of the proposed construction or alteration is a hazard to air navigation; to determine appropriate marking and lighting recommendations, using FAA Advisory Circular 70/7460-1: Obstruction Marking and Lighting; and to notify the aviation community of the construction or alteration of objects that affect the navigable airspace, including the revision of charts, when necessary. 	<ul style="list-style-type: none"> Authority Contractors 	<ul style="list-style-type: none"> At least 45 days prior to the start date of the proposed construction or alteration or when an application for construction permit is filed, whichever is earliest. 	<ul style="list-style-type: none"> The Authority and/or contractor(s) will complete FAA Form 7460-1: Notice of Proposed Construction of Alteration 45 days prior to the start date of the proposed construction or when an application for construction permit is filed, whichever is earliest. 	<ul style="list-style-type: none"> Federal Aviation Administration

Notes: AASHTO = American Association of State Highway and Transportation Officials; ACI = American Concrete Institute; ANSI = American National Standards Institute; APCD = Air Pollution Control Districts; AQMD: Air Quality Management District; ASCE = American Society of Civil Engineers; ASME = American Society of Mechanical Engineers; ASTM = American Society for Testing and Materials; ATF = Federal Bureau of Alcohol, Tobacco, and Firearms; AWWA = American Water Works Association; BMP = best management practice; BPVC = Boiler and Pressure Vessel Code; CA DMV = California Department of Motor Vehicles; CalGEM = California Department of Conservation, Division of Oil, Gas and Geothermal Resources; Cal/OSHA: California Division of Occupational Safety and Health; CHP = California Highway Patrol; CCR = California Code of Regulations; C.F.R. = Code of Federal Regulations; CNG = compressed natural gas; CVFPB = Central Valley Flood Protection Board; DPR = California Department of Parks and Recreation; DSOD = California Department of Water Resources, Division of Safety of Dams Emergency Drawdown Criteria; DTSC = Department of Toxic Substances Control; EMF = electric and magnetic field; FAA = Federal Aviation Administration; HDM = Caltrans Highway Design Manual; IBC = International Building Code; IEEE = Institution of Electrical and Electronics Engineers, Inc.; LED = light-emitting diode; LRFD = AASHTO Load and Resistance Factor Design; MOP = Manual of Practice; mph = miles per hour; MVCD = Glenn County Mosquito and Vector Control District; NFPA = National Fire Protection Agency; NMFS = National Marine Fisheries Service; PG&E: Pacific Gas and Electric Company; RTS = reservoir-triggered seismicity; SDC = Caltrans' Seismic Design Criteria; SPCCP = Spill Prevention, Containment, and Countermeasure Plans; State Water Board: State Water Resources Control Board; SWPPP = stormwater pollution prevention plan; TMP = traffic management plan; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service; UTRC = Underground Technology Research Council; WEAP = Worker Environmental Awareness Program.

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2D.2 Initial Sites Reservoir Fill Plan

Purpose: The Authority will prepare an Initial Sites Reservoir Fill Plan to describe the initial filling of the reservoir and the monitoring program for the Sites and Golden Gate Dams, saddle dams, saddle dikes, and areas around the reservoir during its initial filling. This document is required by the DSOD.

Outcomes: Implementing the Initial Sites Reservoir Fill Plan will allow the Authority to fill the reservoir safely and in accordance with DSOD standards.

Content: The Initial Sites Reservoir Fill Plan will describe:

- Initial filling rates and hold points.
- Visual monitoring and inspection paths and frequency.
- Instrumentation monitoring frequency, initial thresholds and actions.
- Roles and responsibilities.

Timing: The Authority will complete preparation of the Initial Sites Reservoir Fill Plan approximately 1 year prior to beginning to fill Sites Reservoir and submit the plan to DSOD for review and approval.

2D.3 Reservoir Management Plan

Purpose: The Authority will prepare a Reservoir Management Plan (RMP) to protect and maintain water quality during the operation of the reservoir. This plan will describe the management of water resources in Sites Reservoir, including monitoring water quality, fisheries management (i.e., managing reservoir to minimize accumulation of mercury and other metals in stocked fish), vector management, and management of invasive aquatic plant species.

Outcomes: Implementing the RMP will ensure the Authority identifies and implements water quality metrics, standards, testing and monitoring protocols, and actions to respond to water quality concerns (depending on monitoring results) to maintain and protect water quality. The RMP will also protect downstream habitats from spread of invasive aquatic plant species.

Content: The RMP will contain protocols for water quality monitoring, as part of a water quality monitoring program, including the frequency and location of measurements in the reservoir, the source water, and the reservoir discharge for certain water quality constituents. Water quality metrics, standards, testing, and protocols will follow information and guidance available from the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). The water quality monitoring program will focus on those water quality constituents that are likely to be affected by Project construction or operation (i.e., effects associated with the initial filling of Sites Reservoir and long-term management of water quality management after the reservoir is established). In addition to monitoring related to harmful algal blooms (HABs), methylmercury, metals, vertical water temperature profiling, and characterization of the Salt Pond, water quality

parameters including dissolved oxygen, pH, nutrients, chlorophyll-a, and water clarity will be measured routinely to help fully characterize and track water quality in Sites Reservoir over time. The RMP will also include measures to address emerging water quality concerns, such as protocols for invasive aquatic weed control, potential adjustments to inflow and release volumes, minimum reservoir storage levels, and inlet/outlet (I/O) port selection. The final RMP will be prepared after meetings and consultation with regulatory agencies and other stakeholders. The Authority has already developed testing and monitoring protocols for several water quality constituents, which are described in Sections 2D.3.1 through 2D.3.6 and incorporated into the impact analysis for Chapter 6, *Surface Water Quality*. In addition, mitigation measures in Chapter 6 also incorporate some of the information described below.

Timing: Preparation of the RMP will occur prior to initial filling of the reservoir. The timing of testing and monitoring will vary depending on the constituent analyzed, as described below. Furthermore, the RMP is, and will continue to be, revised throughout the operation of the reservoir. Revisions to the RMP will account for changes to operations, site-specific conditions, adaptive management actions and decisions, and future changes to regulations or methodologies for evaluating water quality constituents.

Additional water quality monitoring is included in Stone Corral Creek and Funks Creek Aquatic Study Plan (Aquatic Study Plan), as described in Section 2D.4, *Stone Corral Creek and Funks Creek Aquatic Study Plan and Adaptive Management*. The study plan for the creeks includes monitoring of general water quality parameters, metals (including mercury), cyanobacteria, cyanotoxins, nutrients, and water temperature.

2D.3.1 Harmful Algal Blooms

As described in Chapter 6, *Surface Water Quality*, the effects from the Sites Reservoir related to HABs have been determined to be less than significant. To ensure effects are minimized during the course of Project operations, the Project will implement a series of management actions for HABs if needed, as described below.

Water quality management in Sites Reservoir as it relates to HABs will include water quality monitoring and implementation of a HABs action plan (described below) to minimize the potential for adverse effects on beneficial uses of water in Sites Reservoir and downstream.

In addition to water quality monitoring and implementation of the HABs action plan, general informational signage on planktonic and benthic HABs will be placed in visible locations around the reservoir, as well as at Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, boating kiosks, the day-use boat ramp, and/or parking areas. The signage will include basic information regarding what HABs are, how to recognize planktonic blooms and benthic mats, the potential health effects of cyanotoxins, the common signs and symptoms of exposure to cyanotoxins, how to avoid recreational exposure to cyanotoxins, information about the potential health risks to pets, and where to find additional resources. All reservoir personnel will be made aware of the potential health risks of cyanotoxins and will be provided with the appropriate personal protective equipment, as needed, to reduce the potential for exposure to cyanotoxins.

1. Water Quality Monitoring

- a. Visual monitoring for benthic and planktonic HABs will occur monthly, at a minimum, beginning approximately April 1 and potentially continuing through November, if confirmed blooms are still present at the end of October. Monitoring will commence with the initial filling of Sites Reservoir. Monitoring will begin earlier than April 1 if blooms are suspected. Initial early-season monitoring will consist of visual inspection and water sampling. Visual monitoring will be implemented consistent with the Surface Water Ambient Monitoring Program's (SWAMP's) *Visual Guide to Observing Blooms* (California Water Quality Monitoring Council 2017a) in the *California Freshwater Harmful Algal Bloom Field Guide* (SWAMP HAB Field Guide) (California Water Quality Monitoring Council 2018). Visual inspection will be made at several locations including along the perimeter of the reservoir and near the I/O tower.
- b. It may be necessary to confirm that a suspected bloom is a cyanobacteria bloom rather than a non-toxic algal bloom. In this case, field microscopy will be used to identify if cyanobacteria are present; water samples will be collected at multiple locations within the reservoir and downstream for microscopic visualization consistent with standard operating procedures in the SWAMP HAB Field Guide. A qualified water quality specialist familiar with identifying cyanobacteria or otherwise appropriately trained person will be responsible for obtaining grab samples and visualizing the samples with a field microscope. If toxic benthic algal mats are suspected, their presence or absence will be confirmed with microscopy.

Qualified personnel conducting water sampling will follow all applicable steps of the standard operating procedure for site reconnaissance of the SWAMP HAB Field Guide (California Water Quality Monitoring Council 2017b) or develop a similar protocol to maintain consistency in sampling and record keeping. This standard operating procedure is intended to describe general and specific methods, procedures, and considerations for documenting the spatial and logistical aspects of each sampling site.

If a planktonic or benthic bloom is suspected or a HAB-related human or animal illness or fish or animal (including wildlife) death is suspected, the Authority will post "Caution" advisory signs (see HABs Action Plan step "c." in Sites RMP) in visible locations around the reservoir and at Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, boating kiosks, the day-use boat ramp, and parking areas. In addition, suspected blooms or HAB-related illnesses or deaths will be reported to the HABs Hotline (managed by the State Water Resources Control Board [State Water Board] and the Central Valley RWQCB) via one of the following methods:

- Online: Freshwater Bloom Incident Form
- Phone: 1 (844) 729-6466 (toll free)
- Email: CyanoHAB.Reports@waterboards.ca.gov

If potentially toxigenic benthic mats are suspected, photographs of the suspected mat(s) will be taken and submitted to CyanoHAB.Reports@waterboards.ca.gov with a bloom report ID number. Posting benthic trigger level signs will be coordinated with the State Water Board and/or the Central Valley RWQCB.

If the presence of cyanobacteria is confirmed, additional water samples will be taken for the purpose of laboratory analysis for cell density or the presence of cyanotoxins (specifically microcystins, anatoxin-a, and cylindrospermopsin) to determine if the trigger levels for planktonic (water column) HABs have been met (see Table 2D-2, or as amended or updated).

Where benthic HABs are confirmed, composite samples, consisting of multiple portions of different algal mats, will be collected for toxin analysis. Sample collection for laboratory analysis will follow the SWAMP HAB Field Guide standard operating procedure for sample collection for toxins (California Water Quality Monitoring Council 2017c).

- c. With confirmation of the presence of toxic cyanobacteria in suspected blooms, visual and water quality monitoring will continue weekly until cell density and cyanotoxin concentrations at any monitored location reaches the “Caution” action trigger level. When cell density or cyanotoxin concentration is at or above the Caution action trigger level identified in Table 2D-2, the HABs Action Plan will be implemented.

Table 2D-2: California Cyanobacteria and Harmful Algal Bloom Network Trigger Levels for Posting Planktonic Advisory Signs

Criteria	No Advisory ^a	Caution (Tier 1)	Warning (Tier 2)	Danger (Tier 3)
Total Microcystins ^b	< 0.8 µg/L	0.8 µg/L	6 µg/L	20 µg/L
Cylindrospermopsin	< 1 µg/L	1 µg/L	4 µg/L	17 µg/L
Anatoxin-a	Non-detect ^c	Detected ^c	20 µg/L	90 µg/L
Cell Density of Potential Toxin Producers	< 4,000 cells/mL	4,000 cells/mL	—	—
Site-Specific Indicators	No site-specific indicators present	Discoloration, scum, algal mats, soupy or paint-like appearance. Suspected illness	—	—

Source: California Water Quality Monitoring Council 2021.

µg/L = microgram per liter.

^a For de-posting, all criteria for no advisory must be met for a minimum of 2 weeks. General awareness sign may remain posted and healthy water habits are still recommended.

^b Microcystins refers to the sum of all measured Microcystin congeners.

^c Using an analytical method that detects ≤ 1 µg/L anatoxin-a.

2. HABs Action Plan Reservoir

- a. Monitoring and water sampling frequency will increase from once a week to two times a week or as advised based on coordination with the State Water Board and/or Central Valley RWQCB when the “Caution” action trigger level is reached (per cell density or cyanotoxin concentrations).
- b. The Authority will coordinate with the State Water Board and/or the Central Valley RWQCB for posting advisory warning signs corresponding to the “Caution,” “Warning,” or “Danger” trigger level (as applicable based on cell density and cyanotoxin concentration). The information displayed on each of these three “types” of signs will be consistent with the Planktonic HAB Advisory Signs available on the California Water Quality Monitoring Council’s website but will also address boating restrictions.¹ Signs will be posted in multiple languages including English and Spanish.
 - The “Caution” sign will warn the public that harmful algae may be present in the reservoir and that swimming is allowed but should be avoided near algae and scum in the water. In addition, the sign will note the following:
 - boaters should exercise caution near visible algae in the water and avoid boating in areas of the reservoir where algae is present;
 - children should be kept away from algae in the water or on shore;
 - pets should not be allowed in the water or allowed to drink the water;
 - fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
 - shellfish from the reservoir should not be consumed; and
 - water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.
 - The “Warning” sign will warn that toxins from algae in the reservoir can harm people and kill animals. Further, the sign will note the following:
 - no boating is allowed;
 - no swimming is allowed;
 - stay away from scum, and cloudy or discolored areas in the reservoir;
 - pets should not be allowed to go into or drink the water, or go near scum;
 - fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
 - shellfish from the reservoir should not be consumed; and

¹ The Planktonic HAB advisory signs are available in both English and Spanish through the California Water Quality Monitoring Council at the following web address:
https://www.mywaterquality.ca.gov/habs/resources/habs_response.html.

- water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.
- The “Danger” sign will warn that toxins from algae in the reservoir can harm people and kill animals. Further, the sign will note that the following:
 - no boating is allowed;
 - stay out of the water until further notice;
 - do not touch scum in the water or on shore;
 - pets should not be allowed to go into or drink the water, or go near scum;
 - fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
 - shellfish from the reservoir should not be consumed; and
 - water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.

Advisory warning signs will be placed in visible locations around the reservoir, and at Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, boating kiosks, the day-use boat ramp, and parking areas. In addition, reservoir operations staff will be notified and informed of the potential health risks associated with cyanobacteria and cyanotoxins.

- c. Based on visual monitoring, if there are HABs near the I/O tower, water sampling will occur at multiple depths and locations in the vicinity of the tower and downstream, as necessary, to assess cyanobacteria and cyanotoxin concentrations. If cyanobacteria and cyanotoxins are confirmed near the I/O tower at a level at or exceeding the “Caution” action trigger level, reservoir releases will be made from deeper in the reservoir, as may be necessary to avoid high concentrations of cyanobacteria and cyanotoxins, while still considering other water quality objectives (e.g., water temperature for rice).
- d. If potentially toxigenic benthic HABs are present, benthic trigger level signs will be posted according to the following scenarios, consistent with the CCHAB Network’s *Benthic Mats (Toxic Algal Mats) Signs and Posting Guidelines* (California Water Quality Monitoring Council 2020):
 - Only benthic trigger level signs will be posted if there are no visible signs of planktonic bloom(s).
 - If planktonic advisory signs are already posted and there are visible signs of planktonic bloom, benthic signs will not be posted because benthic signs are more restrictive.
 - If there is no visible planktonic bloom, and water samples exceed only the “Caution” action trigger level but are below the “Danger” benthic trigger level, signs and planktonic “Caution” signs will be posted.

- The Authority will coordinate with the State Water Board and the Central Valley RWQCB for posting benthic HABs signs.
- e. Caution and safety procedures will be used to prevent direct human contact with a bloom. The SWAMP *Health and Safety Guide* (California Water Quality Monitoring Council 2017d) from the SWAMP HAB Field Guide will be consulted to provide information for personnel protection to minimize risks during water sampling.
 - f. Once the visual indicators and/or cyanotoxin concentrations in the reservoir are below the posting criteria for planktonic HABs or benthic HABs for a minimum of 2 consecutive weeks, advisory warning signs will be removed in coordination with the State Water Board and/or the Central Valley RWQCB.

If HABs become a consistent problem near the I/O tower, additional measures may be implemented to manage HABs and/or reduce the potential for release of high concentrations of cyanobacteria and cyanotoxins from Sites Reservoir. HABs prevention and intervention technology is evolving, and the success of any management strategy is generally site specific. As such, the Authority anticipates that if in-lake HABs management and control measures are required in the future due to recurrent blooms, multiple measures may be required for long-term HAB management, and employed measures may change over time. The selection of measures will be informed by the Sites Reservoir water quality monitoring program. Measures that may be considered and implemented prior to, or in the early stages of, HABs formation near the I/O tower include:

- **Hypolimnetic Oxygenation.** Oxygenation of the hypolimnion could help decrease internal nutrient loading by reducing the release of bottom-sediment nutrients. Reducing reservoir nutrients may help reduce the potential for the formation of HABs and/or the production of cyanotoxins at concentrations exceeding the trigger levels identified in Table 2D-2.
- **Flocculants.** Flocculants (e.g., aluminum sulfate, lanthanum clay [Phoslock[®]]) can help limit HABs by binding and settling out phosphorus. Considerations for flocculant treatment differ depending on the chemical used because some products may be toxic to aquatic organisms if improperly applied (Interstate Technology Regulatory Council 2023a; New England Interstate Water Pollution Control Commission 2015:22).
- **Algaecides.** Algaecides (e.g., copper sulfate, endothall, diquat) are effective against cyanobacteria for immediate, short-term control. Algaecides are regularly used in SWP aqueducts, forebays, and reservoirs for the treatment of algae and cyanobacteria (California Department of Water Resources 2023:2-3). Because algaecides kill cyanobacteria, treatment results in the release of cyanotoxins from toxic HABs (Interstate Technology Regulatory Council 2023b) and thus would only be used on an as-needed basis as spot applications in the early phase of a bloom.
- **Physical Barrier.** A physical barrier can be used to deflect planktonic HABs away from a water release outlet within a reservoir to reduce cyanobacteria and cyanotoxins releases. Surface booms or curtains have been used successfully in North America,

the United Kingdom, and Australia to keep surface blooms away from outlet structures (Chorus and Welker 2021:568). At Iron Gate Reservoir, for example, an impermeable curtain, which extended vertically several meters below the water's surface, created a preferential flow path under the curtain to the reservoir outlet resulting in deeper waters being released. This resulted in reductions of microcystin and cyanobacteria (i.e., *Microcystis* and *Aphanizomenon*) being released from the reservoir (PacifiCorp 2016:5-1).

2D.3.2 Methylmercury

The Authority will implement the following actions as part of the RMP to minimize reservoir methylmercury production and bioaccumulation of methylmercury in reservoir fish so that the average methylmercury concentrations in Sites Reservoir fish do not exceed 0.2 mg/kg sport fish objective². Most of these actions are recommended actions for new reservoirs by the State Water Board and Regional Water Quality Control Boards, as identified in the *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs* (State Water Resources Control Board 2017). The potential effectiveness of these recommended methylmercury reduction actions is supported by current research (State Water Resources Control Board 2017) but may be site-specific. Methylmercury reduction actions and fish tissue monitoring will be implemented in coordination with the State Water Board and Central Valley RWQCB, as required.

1. Remove vegetation (e.g., brush, trees) in the inundation area prior to initial Sites Reservoir filling to reduce organic carbon. The decomposition of organic carbon in flooded soil and vegetation fuels the microbial methylation of mercury (Hall et al. 2005; Kelly et al. 1997).
2. Do not stock Sites Reservoir with fish for the first 10 years following its initial filling to reduce the potential for methylmercury bioaccumulation in reservoir fish when methylmercury levels in the reservoir are expected to be highest.
3. Upon completion of the initial filling of Sites Reservoir, implement a fish sampling program to determine whether game fish are present (e.g., due to unauthorized fish stocking) and whether a population has become established (i.e., presence of reproductively mature fish and several year classes). This sampling program would include one or two surveys in spring or early summer using a single electrofishing crew. The survey would include several transects along the shoreline, likely in the vicinity of the boat ramps and campgrounds. Once it has been determined that a population of game fish has established in the reservoir, begin monitoring Sites Reservoir fish tissue methylmercury concentrations (as total mercury) via annual tissue sampling.

² The average methylmercury concentrations shall not exceed 0.2 milligrams per kilogram (mg/kg) fish tissue within a calendar year. The water quality objective must be applied to trophic level 3 or trophic level 4 fish, whichever is the highest existing trophic level in the water body. The objective applies to the wet weight concentration in skinless fillet. Freshwater trophic level 3 fish are between 150 to 500 millimeters (mm) in total length and trophic level 4 fish are between 200 to 500 mm in total length, or as additionally limited in size in accordance with the "legal size" set for recreational fishing, established by Title 14, California Code of Regulations 14 §§ 1 - 53.03.

Based on results from fish tissue monitoring, and in coordination with the State Water Board, Central Valley RWQCB, and the Office of Environmental Health Hazards Assessment, fish consumption warning signs will be posted in several visible locations around the reservoir if fish tissue concentrations exceed the 0.20 mg/kg wet weight (ww) sport fish objective³. As available in the reservoir, tissue from both sport and prey-sized fish from multiple species will be sampled in accordance with the State Water Board's SWAMP, Safe to Eat Workgroup protocol (State Water Resources Control Board 2021, 2022). Mercury in fish tissues will be analyzed according to the U.S. Environmental Protection Agency's Method 1630 (U.S. Environmental Protection Agency 1998, or as updated). The annual reservoir mercury monitoring program will continue for a minimum of 10 years following the first year of regulated reservoir stocking.

4. Manage reservoir water chemistry to control methylmercury production. The scope of water chemistry management actions would be informed by actions proven feasible and effective at reducing mercury methylation in other mercury-impaired reservoirs in the state. Ongoing monitoring, including aqueous and fish tissue methylmercury, will be implemented to assess the effectiveness of methylmercury reduction measures.

Water chemistry management actions may include the addition of an oxidant (e.g., dissolved oxygen) to the reservoir bottom waters (near the sediment-water interface) to reduce anoxia when the reservoir is stratified. Oxygen levels can be increased in the hypolimnion of a reservoir using a hypolimnetic oxygenation system (HOS). The use of HOS to reduce hypolimnetic anoxia may suppress mercury methylation and discharge to the hypolimnion in some reservoirs (State Water Resources Control Board 2017:7-42, 7-43); however, the effectiveness of this method in reducing fish tissue mercury concentrations is not clear based on results from studies to date. Seelos et al. (2021) found that after 4 consecutive years of operation of an HOS in two California reservoirs, Guadalupe and Stevens Creek, there was a significant, albeit modest, decrease in fish tissue mercury and that results suggested that this may have been due to oxygenation mixing nutrients into surface water and enhancing primary productivity, which indirectly affected mercury bioaccumulation by diluting concentrations in phytoplankton, rather than directly lowering methylmercury in the water column. In contrast, in Calero Reservoir, within the same watershed as Guadalupe Reservoir, near-continuous HOS operation during the 2014 dry season reduced hypolimnetic methylmercury but did not substantially reduce mercury concentrations in zooplankton or small fish (McCord et al. 2016). McCord et al. (2016) hypothesized that operational factors may have accounted for the lack of reduction in methylmercury bioaccumulation: (1) operation of the HOS after the onset of hypoxia below the epilimnion, which allowed the accumulation of methylmercury in the hypolimnion and metalimnion and subsequent mixing of the accumulated methylmercury into the epilimnion, making it available for uptake by phytoplankton; (2) a vertical gap between the oxygen diffuser line and the deepest

³ For evaluating compliance with the sport fish objective, monitoring will include representative trophic level 3 (TL4) fish species, if present, or trophic level 4 (TL3) fish if no TL4 fish are present in the reservoir. A sample will be considered either an analytical result from individual fish tissue or a composite of tissue from several fish. Sample sets for comparison with the sport fish objective shall include a range of TL3 fish between 150 to 500 mm total length and TL4 fish between 200 to 500 mm total length.

sediments left an hypoxic zone that acted as an ongoing source of methylmercury to the hypolimnion, which was then mixed into the water column by the bubble plume of the HOS; and (3) the HOS did not overcome the hypoxia in the metalimnion, which may have provided methylmercury to the epilimnion.

If an HOS is implemented at Sites Reservoir, the addition of oxygen would take place annually just prior to the onset of stratification until after reservoir turnover in late fall or early winter. Pilot studies within the reservoir will help inform the design (e.g., sizing, type of oxygenation system) and operation (i.e., design oxygen delivery rate) parameters that result in the most effective reduction of in-reservoir mercury methylation and fish tissue methylmercury concentrations while avoiding potential adverse effects on reservoir water quality. The Authority will retain a qualified water quality specialist and/or fisheries biologist with expertise in methylmercury management to design these studies.

5. Manage reservoir fisheries to reduce in-reservoir fish tissue methylmercury levels. The scope of fisheries management actions would be informed by actions proven feasible and effective at other mercury-impaired reservoirs in the state. Fisheries management actions could include the following.
 - a. Intensive fishing to reduce fish populations to provide more food resources for remaining fish. This will increase the growth rate in the remaining fish and reduce their methylmercury body burdens through somatic growth dilution.
 - b. Stock the reservoir with low-methylmercury prey fish for stocked predator fish to consume.
 - c. Stock more or different sport fish species, including lower trophic level sport fish.
 - d. Stock large, old predator fish from hatcheries that supply fish with low methylmercury concentrations.

To assess the effectiveness of methylmercury reduction actions after initial implementation, fish tissue methylmercury concentrations (as total mercury) will be monitored. Young fish will be sampled because they have accumulated methylmercury for a shorter time period relative to older, larger sport fish and therefore will better reflect recent mercury exposure (State Water Resources Control Board 2017). Fish tissue methylmercury concentrations in young fish will be assessed prior to implementation of any methylmercury reduction action.

To assess the effectiveness of fisheries management actions over the long term, ongoing monitoring of aqueous and fish tissue methylmercury in Sites Reservoir will be implemented per requirements or conditions in a water right order, Section 401 water quality certification issued pursuant to the Clean Water Act, or other appropriate order issued by the State Water Board and/or Central Valley RWQCB.

The Authority will coordinate with the Central Valley RWQCB to implement mercury/methylmercury control or reduction measures and monitor and report on fish tissue methylmercury, as required.

2D.3.3 Metals

The metals evaluation will focus on metals that may be affected by flow in the Sacramento River and that have concentrations that are close to or above water quality standards. These include aluminum, copper, iron, and lead. Hexavalent chromium will also be measured, at least for the first year, due to limited existing data for the Sacramento River. Generally, measurements will follow standard U.S. Environmental Protection Agency (USEPA) protocols. However, because the current USEPA standard protocol for measuring aluminum can result in extraction of forms of aluminum that are not biologically active (U.S. Environmental Protection Agency 2018:78, 79), aluminum could eventually also be measured using one of the procedures that are currently being evaluated as possible methods to better limit aluminum measurements to biologically active forms of the metal. Measurements of metal concentrations will be accompanied by measurements of pH, DOC, and hardness because these parameters influence water quality standards for aquatic life protection for some metals.

Past studies of metal concentrations in the Sacramento River have not focused on high flows that will be the source water for Sites Reservoir. Metal concentrations at the diversion(s) will be measured within 24 hours of the start of diversions at Red Bluff Pumping Plant (RBPP) and every 2 weeks during continuous diversions. Eventually these data will improve understanding of the circumstances that cause elevated concentrations and may allow some metal measurements to serve as surrogates for others. After 2 years of measuring metal concentrations in the diversions, the frequency of measurements will decrease to monthly.

Metal concentrations will also be measured near the I/O tower every other month on the surface, at mid-depth, and bottom third of the reservoir and in Stone Corral Creek approximately half a mile downstream from Sites Dam. For Stone Corral Creek, these measurements will also occur for a year prior to construction to better establish baseline conditions. In addition, metal concentrations in the main Sites Reservoir release, the Dunnigan Pipeline, and the Sacramento River upstream of the Sites discharge will be measured every other month when water from Sites Reservoir is being discharged to the Sacramento River. If Sites water is released to the CBD, metal concentrations will also be measured in CBD upstream of the Dunnigan Pipeline.

To evaluate the potential metal effects in Yolo Bypass, metal concentrations will be measured in samples collected at the downstream end of the CBD and at two locations in the Yolo Bypass, one in the Tule Canal and the other in the Toe Drain. Samples will be collected monthly during June–October to evaluate concentrations before and during the period of CBD discharge to the Yolo Bypass.

The metal measurements will be used to understand differences between intake and release concentrations and the effects of in-reservoir processes such as settling of suspended sediment and actions such as selection of I/O tower tier for releases. Measurements will also be used to determine if there are vertical differences in concentration, to understand the effect of TC Canal operations and conveyance volumes on metals concentrations, and to inform actions to be taken as described in Mitigation Measures WQ-2.1 and WQ-2.2.

As understanding of metal processes is refined over time and if concerns regarding metals are diminished, monitoring intensity may be reduced.

2D.3.4 Water Temperature

The I/O tower ports/tiers will be operated to meet a rice-growing temperature objective of 65°F or higher during the rice growing season (May through September). Warm releases will also benefit native fish in Funks Creek, which are accustomed to the warm temperatures present in this creek under baseline conditions. During March through October, vertical water temperature profiles will be measured once every 2 weeks at 5-foot intervals to inform decisions about which tiers of the I/O tower to use.

2D.3.5 Salt Pond

Data regarding the Salt Pond is limited regarding the flow and water quality of the salt springs that feed it. Prior to initial filling of Sites Reservoir, after land has been acquired, and during the construction phase, there will be monthly measurements of flow, electrical conductivity (EC), and metals (aluminum, copper, iron, lead, manganese, and nickel) for up to 1 year at the salt springs. These measurements will be collected in accordance with standard procedures and will provide a better understanding of the potential salt and mineral load from the salt springs. Water samples for these measurements will be taken from locations where water is emanating from these springs. One to three springs with the most discharge will be selected for sampling. Measurements will also be taken at a location in the pond distant from the springs to understand whether evapoconcentration or other spring input may be affecting water quality.

The amount of mixing of spring water with reservoir water is uncertain and will depend on EC, temperature, reservoir inflows, and reservoir releases. To determine whether saline spring water is accumulating at the bottom of the reservoir near Golden Gate Dam, EC measurements will be taken at the same times and locations in Sites Reservoir near the I/O tower as the metal concentrations measurements in Section 2D.3.3. In addition, EC will be measured twice a year deep in the reservoir near Golden Gate Dam.

If monitoring indicates the possibility of substantial increases in EC in the reservoir release due to temporary entrainment of accumulated salt spring water, reservoir operations will be modified to prevent this phenomenon by gradually discharging accumulated spring water. Reservoir modifications will be made gradually and may include modifications to discharge volume or selection of I/O tower tiers. For example, releases from lower-level and higher-level tiers may be blended to ensure adequate water quality. As these modifications are made, EC of the reservoir discharge will be measured hourly with a continuous device recorder to ensure that EC remains below 1,000 $\mu\text{mhos/cm}$.

2D.3.6 Invasive Aquatic Plant and Invertebrate Species

2D.3.6.1 Invasive Aquatic Plants

The Authority will implement actions to control the spread of nonnative invasive aquatic plants (submerged and floating) in Sites Reservoir. These actions will be consistent with existing control methods employed by the California Department of Boating and Waterways (DBW) under the Aquatic Invasive Plant Control Program (AIPCP). There are two programs within the AIPCP, Floating Aquatic Vegetation (FAV) and Submersed Aquatic Vegetation (SAV), that include management and control methods and monitoring. Implementation of nonnative invasive

aquatic vegetation control will minimize potential for adverse effects of nonnative invasive aquatic plant species on Sites Reservoir and downstream habitats.

Typical nonnative aquatic invasive species targeted using the FAV control methods include water hyacinth (*Eichhornia crassipes*), South American spongeplant (*Limnobium laevigatum*) and Uruguay water primrose (*Ludwigia hexapetala*). Infestations of these plants can alter dissolved oxygen cycles, displace native plant species, shade shallow-water fish habitat, block waterways, and clog water intakes. Control methods for these species can include use of herbicides, mechanical (machine harvesting), biological (natural control agents, such as water hyacinth weevils), and hand picking. Monitoring included in this program includes checking herbicide-treated areas to ensure herbicide concentrations do not exceed allowable limits or have adverse effects on water quality. (California State Parks Division of Boating and Waterways 2021a).

The submersed nonnative aquatic invasive plant species targeted by the SAV control methods include Brazilian waterweed (*Egeria densa*), curlyleaf pondweed (*Potamogeton crispus*), Eurasian watermilfoil (*Myriophyllum spicatum*), and fanwort (*Cabomba caroliniana*). Coontail (*Ceratophyllum demersum*), which is native to California, is a submersed aquatic invasive plant species that DBW also targets. Infestations of submersed invasive plants can have similar effects as the floating invasive species, as well as reducing water flow and trapping sediment. Control of submersed aquatic invasive plants is primarily through the use of herbicides that are approved for aquatic use by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation. The other FAV control methods, particularly mechanical control, are not applicable for submersed species, because they readily spread by small fragments that can be left behind by machine harvesting. Monitoring included in this program includes checking herbicide-treated areas to ensure herbicide concentrations do not exceed allowable limits or have adverse effects on water quality. (California State Parks Division of Boating and Waterways 2021b).

2D.3.6.2 Invasive Aquatic Invertebrates

Invasive aquatic invertebrates including the New Zealand mudsnail (*Potamopyrgus antipodarum*), quagga mussels (*Dreissena rostriformis bugensis*), and zebra mussels (*Dreissena polymorpha*), as well as the Chinese mystery snail (*Cipangopaludina (=Bellamya) chinensis*), which is not currently listed as invasive (see Appendix 2D1, *Assessment of Mystery Snail Technical Memorandum*), are all nonnative freshwater invertebrates that compete with native and sport fish species for food. These invertebrates can be spread between waterbodies by attaching to boats, trailers, and recreational equipment or via standing water from an infested waterbody trapped in equipment or containers, including boat bilges, watercraft engines, and buckets. (California State Parks Division of Boating and Waterways 2021c; California Department of Fish and Wildlife 2021).

To minimize the potential for adverse effects of invasive aquatic invertebrates on Sites Reservoir and downstream habitats, the Authority will implement watercraft inspections at the reservoir. All watercraft and watercraft trailers intending to enter the reservoir will be inspected prior to launching. Inspection protocols will be consistent with the *Uniform Minimum Protocols and Standards for Watercraft Inspection and Decontamination Program for Dreissenid Mussels in the Western United States* (Pacific States Marine Fisheries Commission 2016) and inspectors

will be trained to identify invasive aquatic invertebrates as well as trained in the inspection protocol. If watercraft and associated equipment is suspected of having invasive aquatic invertebrates on board, access to the reservoir will be denied. In addition to the inspection program, the Authority will post signage at the day-use boat ramp, Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, and any additional future recreational areas at the reservoir, alerting boaters/recreationists to the harmful effects of invasive organisms on aquatic ecosystems, providing photographs to help with detection, and directing them to clean, drain, dry and inspect their watercraft and equipment for attached mussels, snails, or other potentially invasive organisms after recreating in any waterbody.

The reservoir will be monitored for dreissenid mussels (quagga and zebra mussels) in accordance with California Department of Fish and Wildlife's (CDFW's) recommended minimum early detection protocol (California Department of Fish and Wildlife 2020), which could include plankton tows, surface surveys, and/or surveys of artificial substrates depending on calcium concentrations in the water and substrate conditions. In addition, water samples will be collected at least once a year to check for the presence of invasive invertebrates using environmental DNA (eDNA) analysis. Optimal protocols for eDNA collection and analysis are under investigation, and studies indicate that eDNA analysis could be more sensitive than traditional methods (Amberg et al. 2019:96; Feist and Lance 2021; Marshall et al. 2022).

If invasive invertebrates are detected, findings will be reported to the CDFW invasive species program. Consistent with California Fish and Game Code Section 2301, if dreissenid mussels are detected in Sites Reservoir, the Authority, in cooperation with CDFW, will prepare and implement a plan to control or eradicate dreissenid mussels in the reservoir. At minimum, the plan will include the following:

- Methods for delineation of infestation, including both adult mussels and veligers.
- Methods for control or eradication of adult mussels and decontamination of water containing larval mussels.
- A systematic monitoring program to determine any changes in conditions.
- The requirement that the operator of the water supply system permit inspections by and cooperate with CDFW to update or revise control or eradication measures in the plan to address scientific advances in the methods of controlling or eradicating mussels and veligers.

2D.3.6.3 Vector Control

Coordinate with Glenn County Mosquito and Vector Control District (MVCD) and the Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) related to implementation of standard local, state, and federal vector control requirements during operation of all facilities. BMPs include:

- Implement monitoring and sampling programs to detect early signs of mosquito population problems.
- Use biological agents such as mosquito fish to limit larval mosquito populations.

- Use larvicides and adulticides, as necessary. If larvicides and adulticides are required, the Authority will evaluate the effects of the chemicals and, if required, prepare a monitoring program for review by fish and wildlife agencies to evaluate effects, if any, application will have on macroinvertebrate and associated covered fish species.

2D.3.7 Adaptive Management of Water Quality in Reservoir Releases

To optimize the quality of water released from Sites Reservoir, several types of actions may be taken:

- Improve water quality in the reservoir.
- Control withdrawal elevation.
- Modify release flows.

Results of monitoring within the reservoir, as described for the RMP (Section 2D.3), and monitoring in Stone Corral and Funks Creeks, as described for the Aquatic Study Plan (Section 2D.4), will indicate if actions should be taken to improve the quality of water released from Sites Reservoir. If water quality of releases becomes a concern, increased monitoring frequency may be warranted to better implement response actions.

2D.3.7.1 Improve Water Quality in the Reservoir

Potential methods to improve water quality in Sites Reservoir are described in the RMP framework text for specific water quality constituents above. For example, as described in Section 2D.3.1, *Harmful Algal Blooms*, if HABs became a consistent problem near the I/O tower, one or multiple measures may be taken to prevent or reduce HABs. For methylmercury (Section 2D.3.2), measures to remove vegetation prior to filling and measures to increase oxygen levels deep in the reservoir could reduce formation of methylmercury, although success of these measures is uncertain. Increased oxygen levels at the bottom of the reservoir could also limit release of other metals from bottom sediments that might be associated with anoxic conditions. Measures taken to improve water quality in the reservoir will be adapted according to what proves successful and may be modified to take advantage of new technology.

2D.3.7.2 Control Withdrawal Elevation

The primary way to control elevation of withdrawal will be through controlled opening and closing of I/O tower ports (centerlines at 340, 370, 390, 410, 430, and 450 feet elevation, with an additional outlet at 470 feet for Alternatives 1 and 3) and the low-level intake (centerline at 311 feet). In some circumstances, use of a physical barrier such as a curtain could also be useful in controlling location in the reservoir water column from which water would be drawn.

In general, the flexibility offered by the multiple I/O tower ports will make it possible to control the quality of water released from the reservoir in most circumstances despite the need to operate for multiple water quality constituents with potentially different optimal port openings. Possible constituents of concern and their location in the reservoir are:

- HABs and cyanotoxins—higher concentration near the surface. If HABs are present near the I/O tower, reservoir releases should be from deeper in the water column.

- Methylmercury and other metals—potentially higher concentrations at the bottom of the reservoir in association with low oxygen levels.
- Water temperature—optimal withdrawal elevations for water temperature will vary through the rice-growing season (May through September). During the spring, when reservoir temperatures would be cooler, ports closer to the water surface may need to be opened to release water that is 65°F or higher for rice-growing purposes.
- Salinity—small chance of slow accumulation of high-salinity water at the bottom of the reservoir. If this occurs, saline water should be released in a gradual manner from deep in the reservoir to prevent accumulation.

In general, it is expected that a port or a combination of ports will be available to meet the 65°F water temperature objective for rice and avoid releasing low-quality water. This is especially true when the reservoir storage is moderate or high or when HABs are not present near the I/O tower.

If HABs are near the I/O tower, releases from 33 feet or more below the surface will substantially reduce the chance of releasing cyanobacteria or cyanotoxins, although deeper withdrawals could make it more difficult to release 65°F water for rice-growing purposes. When releases are not used locally for rice, the 65°F or higher objective would not be applicable. In addition, the 65°F release objective is somewhat conservative because a certain amount of warming is expected between the Sites Reservoir release and field application. And, as described in Chapter 15, *Agriculture and Forestry Resources*, rice can still grow at water temperatures above approximately 58°F or 59°F.

When reservoir water surface elevation is greater than about 350 feet (approximately 160 TAF), it would still be possible to release from the port at 340 feet without requiring use of the low-level intake (311 feet centerline elevation). Under this circumstance, if HABs are present near the I/O tower, use of a curtain or similar device could allow water released from the port at 340 feet to come from deeper in the reservoir without resorting to withdrawals from the bottom of the reservoir using the low-level intake.

There may be some instances under conditions of low reservoir storage when it could be difficult to completely avoid releasing lower-quality water if present (e.g., higher metal concentrations from the bottom of the reservoir or HABs from near the surface of the reservoir). On rare occasions during periods of low water availability, reservoir storage may be drawn down and approach the operational dead pool of 60 TAF (water surface elevation of 323 feet). If reservoir levels approach operational dead pool, it would be necessary to make all releases from the low-level intake. At storage levels this low, HAB formation may be more of a concern, but some water quality concerns, such as those associated with anoxic conditions or temperatures too cool for rice, may be reduced. At low reservoir volume, methods to improve water quality, such as treatment for HABs, may become more effective. If reservoir levels necessitate use of the low-level intake, water quality monitoring may need to occur more frequently, and reliance on dilution for limiting downstream effects would become more important.

2D.3.7.3 Modify Release Flows

Under limited circumstances as described above, low reservoir volume could affect the quality of water released from the reservoir. If this occurs, releases could be modified to limit water quality effects.

Releases to Stone Corral Creek and Funks Creek

Water released from Sites Reservoir to Stone Corral Creek and Funks Creek would experience limited dilution by local accretions. Under existing 2020 baseline conditions, water quality in these creeks is not always optimal. Some metal concentrations are intermittently high, particularly during high flows, and salinity is moderately high. Additional water quality measurements associated with the Aquatic Study Plan and Mitigation Measure WQ-2.1 for Stone Corral Creek will help better characterize pre-Project conditions.

In general, low storage in Sites Reservoir is expected to occur during drier years, when 2020 baseline flow in the creeks would be limited. If water released from Sites Reservoir would cause deterioration of water quality in the creeks that could affect beneficial uses and reduce the ability to keep fish in good condition, releases to the creeks could be curtailed to better match the natural hydrograph expected to occur during dry years. In addition, because there is limited overlap between the HABs season and the time when water flows in the creeks under 2020 baseline conditions, releases to the creeks could be curtailed if, relative to baseline conditions in the creeks, high concentrations of cyanobacteria or cyanotoxins were present in the reservoir release without substantially modifying the natural hydrograph of the creeks. Actions affecting flow in Stone Corral Creek and Funks Creek would be made in consultation with CDFW.

Water Supply Releases

In general, dilution, downstream processes (e.g., algaecide use in canals), and existing 2020 baseline conditions (e.g., water quality in CBD) are expected to minimize any water quality effects associated with Sites Reservoir releases. Nonetheless, the timing or flow of the releases could be modified should conditions warrant.

2D.4 Stone Corral Creek and Funks Creek Aquatic Study Plan and Adaptive Management

The Authority is preparing an Aquatic Study Plan to guide technical studies to be conducted prior to and during construction activities, as well as ongoing monitoring during operations. Using information from these field studies, along with currently available information, the Authority will prepare a Funks Creek and Stone Corral Creek flow schedule that could be incorporated into the Reservoir Operations Plan and will identify the approach for releases, including release schedules and volumes, a monitoring plan, and an adaptive management plan to maintain fish in good condition consistent with California Fish and Game Code Section 5937 in Funks Creek and Stone Corral Creek. Releases into Funks Creek will be made through the transition manifold and a new pipeline that terminates at Funks Creek below the dam. These facilities will carry up to 100 cubic feet per second (cfs) with a release range of 0 to 100 cfs into Funks Creek. Releases into Stone Corral Creek will be made through the permanent outlet at

Sites Dam. This outlet will have a release range of 0 to 100 cfs, with an emergency release capacity of approximately 4,700 cfs.

The Aquatic Study Plan is being developed during the permitting and design process and will be adopted prior to land acquisition. Preparers of the plan are technical experts in consultation with fisheries experts from CDFW and U.S. Fish and Wildlife Service (USFWS). The Aquatic Study Plan, which will gather data ultimately used to adaptively manage flows released into Funks Creek and Stone Corral Creek, includes the following components further described below: fish monitoring, a SWAMP bioassessment study (including additional water quality monitoring), a hydrogeomorphic study, and a temperature study.

The hydrogeomorphic study will examine the current hydrologic regime of Funks Creek and Stone Corral Creek. In context with the studies from other disciplines (e.g., fish assemblages, SWAMP bioassessment), consideration will be given to when and how flows might be released, whether a portion of these flows are needed to maintain fluvial geomorphic processes (based on the findings from the geomorphic assessment), and what level of variability in base flows will satisfy California Fish and Game Code Section 5937 goals consistent with the goals and objectives of the Project. Various approaches to estimate minimum streamflows to maintain ecosystem and geomorphic function, such as “the functional flow” approach suggested by Yarnell et al. (2015), the Instream Flow Incremental Methodology (IFIM) (National Biological Service, U.S. Department of the Interior 1995), the CDFW Instream Flow Program, the California Environmental Flows Framework, and the Richter et al. (2011) approach will be investigated for their applicability to determine appropriate streamflows on Funks Creek and Stone Corral Creek. Coordination with CDFW, USFWS, and Colusa County will be required before a method is selected.

2D.4.1 Fish Assemblage and Available Habitats

Purpose: Maintain fish populations below the dam in good condition in compliance with Fish and Game Code 5937. Identify and document fish assemblages and methylmercury concentrations in fish tissue in Funks Creek and Stone Corral Creek (preconstruction baseline), then monitor to identify any departure from baseline and allow for adaptive management of releases (after construction and operation). Monitoring will include fish species presence, habitat use, and characterization of habitats available (e.g., spawning, rearing, foraging, and sheltering habitats) at varying flow levels.

Outcomes: Quantitative and qualitative monitoring data to fully characterize the fish species present (including abundance as catch per unit effort, condition factor, and distribution), and habitat available to inform the type of releases that would be made to Funks Creek and Stone Corral Creek under operating conditions.

Content: Describe and enumerate fish assemblages in Funks Creek and Stone Corral Creek. Characterize available spawning, rearing, foraging, and refuge habitat for native fishes following methods described in Meador et al. (1993).

Timing: Monitoring will occur once a year for 5 years before start of operations and will continue for 5 to 10 years after start of operations. The Authority and the permitting fish

agencies (USFWS and CDFW) will determine the frequency of the adaptive management report and timing of any adaptive management actions.

2D.4.2 Surface Water Ambient Monitoring Program Study

Purpose: Stream bioassessment monitoring is a method of evaluating and monitoring the environmental health and integrity of freshwater, wadable streams by using benthic macroinvertebrates (BMI), water quality parameters, and physical habitat (PHAB) conditions as indicators of stream condition. Bioassessments are especially useful in tracking the aquatic conditions before and after a project is implemented to determine the post-project Project effects on aquatic communities.

Outcomes: A SWAMP technical study (i.e., bioassessment) that focuses on the relationships between PHAB, water quality, BMI, and algal communities on the reaches downstream of Sites Reservoir on Funks Creek and Stone Corral Creek to inform the type of releases that should be made to the creeks under various operating conditions.

Content: Stream bioassessment monitoring will be conducted using the methods described in the 2016 version of the *SWAMP Standard Operating Procedures for the Collection of Field Data for Bioassessments of California Wadable Streams: Benthic Macroinvertebrates, Algae, and Physical Habitat* (Ode et al. 2016a) and SWAMP's *Supplemental Guidance for the SWAMP Bioassessment Field Protocol* (Ode et al. 2016b), or any updated version thereof.

Various metrics are available for scoring the health of both the BMI communities (e.g., the California Stream Condition Index [CSCI]) and overall PHAB (e.g., the PHAB Index of Physical Integrity [IPI]). The CSCI is a statewide biological scoring tool that translates BMI data into an overall measure of stream health (Rehn et al. 2015). The IPI combines eight geographic information systems–calculated metrics with 12 PHAB metrics to produce one overall IPI value (Rehn et al. 2018). Similar to the PHAB analysis, water quality results, as well as statewide diatom, soft algae, and hybrid Algal Stream Condition Index (ASCI) predictive biological indices and chlorophyll-a and ash-free dry mass, will be compared to key stressor thresholds that best highlight the conditions in the sampling reaches.

In addition to the standard SWAMP water quality data, additional water quality measurements will be taken to compare pre-Project to Project values and determine any effect of operational adjustments on sampled water quality constituents. These additional water quality measurements include cyanobacteria and cyanotoxins and a suite of total and dissolved metals and metalloids, along with some more basic water quality constituents, including dissolved organic carbon and hardness.

CSCI, PHAB, and IPI scores and water quality and algae indices described above will be included in the reporting effort, as well as a discussion of other relevant BMI metrics (e.g., taxa richness, composition, tolerance, functional feeding groups, and habit measures). A synthesis of BMI, water quality, and PHAB data will be included in the reporting process. The SWAMP Stream Habitat Characterization Form, Full Version field forms, as well as all output data, will be provided in appendix format, along with representative photography of the sampling reaches.

The ultimate goal of the bioassessment study is to evaluate the environmental condition of both Funks Creek and Stone Corral Creek by using the indicators of stream condition, as described above. This information, along with the other studies described above, will inform the type of releases that should be made to Funks Creek and Stone Corral Creek under operating conditions.

Timing: Pre-operation monitoring will occur in the spring during three sampling events over the course of 5 years. Post-operation monitoring will occur in a similar manner (three sampling events over 5 years) after operation activities are initiated. The Authority and the relevant permitting agencies (CDFW, USFWS, and Colusa County) will determine if the frequency of monitoring can be shortened after the second post-operational sampling event. The bioassessment specialists responsible for conducting the bioassessment surveys will coordinate directly with the agencies to develop appropriate performance standards and success criteria for the BMI communities and PHAB conditions on Funks Creek and Stone Corral Creek. The additional water quality measurements will be taken twice a year, once during a high-flow period and once during a low-flow period, at the upstream and downstream bioassessment sampling locations on each creek. Sampling will occur during the same years as the rest of the bioassessment studies.

2D.4.3 Flow Characterization and Geomorphic Study

Purpose: The purpose of the flow characterization and geomorphic studies will be to characterize historic and present-day flows, including baseflow during the summer months, on Funks Creek and Stone Corral Creek; geomorphic characteristics (including substrate composition); and flow levels necessary for channel maintenance.

Outcomes: A hydrogeomorphic technical study with quantitative and qualitative monitoring data to fully characterizing the existing hydrologic regime of Funks Creek and Stone Corral Creek, as well as the overall type and abundance of sediment available for aquatic organisms, will be developed. The study results will inform the type of releases that should be made under operating conditions, as well as potential gravel deficiencies as a result of Project operations.

Content: In order to inform the appropriate streamflows for the creeks under inquiry, a geomorphic assessment of the reaches of interest (i.e., the stream reaches below the dams) will constitute the first step in the analysis. The channel segments upstream of the dams will also be examined to provide a greater understanding of the local watershed geomorphic characteristics. The focus of the geomorphic assessment will be to determine the dominant geomorphic processes, document the landforms and channel bed topography, and determine how the observed morphology of each creek is influenced by the hydrologic regime and the surrounding land uses. Likewise, collection of geomorphic information will aid in the determination of overall channel stability for each creek. Geomorphic indicators that will be collected would include the following:

- Channel Classification (determining if the reaches of interest are transport-limited or supply-limited).
- Local Watershed Inputs (determining any major inputs of sediment and runoff; identifying any land use changes that could alter the balance of sediment supply and

runoff that could lead to future instability; and documenting any other anthropogenic features [such as pipe outfalls, rock slope protection, grade control structures, etc.]

- Hydrologic and Flow Patterns (identifying whether streamflow is perennial, intermittent, or ephemeral).
- Riparian Vegetation Condition (describing the general health of the riparian area, focusing on the amount and type of vegetative cover).
- Bankfull Width and Depth and Wetted Width (determining the hydraulic capacity of the channels by recording the geomorphic or “effective” bankfull surface).
- Bank Instability and Bank Characteristics (identifying areas fluvial erosion [erosion associated with flowing water] and bank failure [erosion associated with gravitational forces and weakening processes], as well as characteristics such as bank height, bank angle, and bank composition).
- Channel Bed Substrate Composition and Embeddedness (determining the size of the substrate materials on the channel bed, and the degree to which these materials are embedded—these conditions indicate how frequently the channel substrate is mobilized).
- Channel Complexity (determining the presence or absence of gravel bar development and evidence of scour and/or deposition; pool, riffle, and flatwater habitats containing in-channel structures [e.g., instream woody material] that create complexity and habitat niches for aquatic organisms).
- Degree of Channel Incision and Stage of Channel Evolution (determining how incised the channels are, providing a template for understanding geomorphic responses and processes within the immediate watershed, and identifying the evolutionary stage of the channels in order to predict future channel change).
- Cross Section and Longitudinal Profile Surveys (conducting topographic surveying as necessary to document baseline conditions).

Timing: The fieldwork required to complete the hydrogeomorphic surveys will occur prior to construction of dams on Funks Creek and Stone Corral Creek to establish the unaltered hydraulic regime and unaltered geomorphic conditions. Postconstruction monitoring will occur on a regular (pre-approved) basis for 5 years after start of operations. The Authority and the relevant agencies (CDFW, USFWS, and Colusa County) will determine if the frequency of monitoring can be shortened after 3 years. The specialists responsible for conducting the hydrogeomorphic surveys will coordinate directly with the agencies to develop appropriate performance standards and success criteria for the hydrologic conditions (i.e., habitat flow releases) and geomorphic conditions on both Funks Creek and Stone Corral Creek. The Authority and the permitting agencies will determine the timing of any adaptive management actions.

2D.4.4 Temperature Study

Purpose: To define temperatures under baseline conditions and flow and storage effects on temperature in Funks Creek and Stone Corral Creek under postconstruction conditions.

Outcomes: Temperature measurements before and after construction will be collected to evaluate the following.

- The temperatures that support the aquatic community under baseline conditions.
- The combination of reservoir storage and discharge needed to maintain appropriate temperatures to maintain fish in good condition in Stone Corral Creek and Funks Creek downstream of Sites Reservoir after the start of operation.

Content: Once access to Stone Corral Creek is obtained, a temperature probe will be installed in Stone Corral Creek near the Sites Dam release, and three additional probes will be installed downstream at the same locations as the bioassessment sampling locations.

Once access to Funks Creek is obtained, a temperature probe will be installed in Funks Creek at the location of the I/O tower release to Funks Creek, and two additional probes will be installed downstream at the same locations as the bioassessment sampling locations.

As described in the RMP, once construction is complete, water temperature profiles will be measured near Golden Gate Dam once every 2 weeks at 5-foot depth intervals to inform decisions about which ports of the I/O tower to use during March through October.

The temperature probes in the creeks will continuously record hourly temperatures. Temperatures recorded prior to reservoir construction will likely be close to the equilibrium values that will be expected based on ambient meteorological conditions. These temperatures will be used along with specific fish requirements to develop target temperature ranges for postconstruction conditions.

Temperatures recorded after reservoir construction will be used along with flow and storage data to determine flow and storage effects on creek temperatures. If creek temperatures cannot be accurately estimated with flow, storage, and the reservoir temperature profiles, water temperature modeling will be performed for Sites Reservoir, Funks Creek, and Stone Corral Creek. If modeling is necessary, models will be calibrated with the measured flow, storage, and temperature data.

Water released into Stone Corral Creek will originate from the bottom of Sites Reservoir and will likely be cooler than equilibrium values during months when the reservoir is stratified. The biggest differential between release temperatures and equilibrium values will occur when the reservoir is full and ambient air temperature conditions are high. If it is determined that flow should be maintained in Stone Corral Creek at times when releases will be relatively cool compared to temperatures under baseline conditions, lower flows will allow the water to warm farther upstream than higher flows.

Water released to Funks Creek will originate from the I/O tower and, when the reservoir is stratified, will be warmer than the water released to Stone Corral Creek. The temperatures will be warmer because the withdrawals will come from higher in the reservoir and, as described in Section 2D.3, *Reservoir Management Plan*, the I/O tower port openings will be chosen to provide 65°F or higher water temperatures during the rice growing season (May through September).

Timing: Water temperature measurements will occur before and during operation. Measurements during the initial fill period will be useful for evaluating water temperature under low-storage

conditions. Reservoir profile measurements and measurements at the Stone Corral Creek and Funks Creek releases may need to continue long term. Measurements downstream of the release locations could be discontinued if the following conditions are met:

- Sites Reservoir has made releases for at least 2 years when the reservoir was at least 75% full.
- Temperature effects are found to have little effect on native fish (e.g., if only short sections of the creeks below the dams experience temperature effects) or if flow and storage effects on creek temperatures are understood well enough that average daily creek temperatures can be estimated within 3°F based on meteorological conditions, flow, reservoir storage, and reservoir temperature profiles.

2D.5 Sediment Monitoring Plan and Adaptive Management for Sediment Diverted from the Sacramento River

Purpose: To validate modeling results and analyses presented in this Final EIR/EIS, a sediment monitoring plan will be prepared and implemented. Implementation of this plan will contribute to understanding the effect(s) of entrainment and capture of sediment by the Project's diversions to Sites Reservoir and help determine whether a management response is necessary to reintroduce that sediment to the system.

Outcomes: The sediment monitoring plan will provide data necessary to refine understanding of real-time effects on sediment transport and its subsequent effect on fishery resources (i.e., migration rates, rates of predation, and foraging success). It will support recommendations with respect to the need for management actions. A Sediment Technical Team (STT) will be established in cooperation with the water (Central Valley RWQCB, California Department of Water Resources [DWR], and Reclamation) and fish agencies (National Marine Fisheries Service [NMFS], USFWS, and CDFW) to assist with design of the plan.

Content: The sediment monitoring plan will consist of sediment monitoring and studies to assess the movement of sediment at the RBPP and Hamilton City Pump Station intakes and quantify amounts of entrained sediment. The results of the monitoring will be used to model sediment movement and determine whether sediment management actions are needed to address the effects of incremental loss of sediment (e.g., the need for and feasibility of reintroducing sediment to the river or Delta will be considered).

Timing: Monitoring will begin a minimum of 5 years before start of operations and will continue for 5 years after start of operations. Modeling will rely on existing sediment transport models and will begin as soon as the STT determines sufficient data are available to inform the models. The Authority, in collaboration with the fish agencies (NMFS, USFWS, and CDFW), will determine the frequency of the sediment management report and timing of any management actions determined to be necessary.

Chapter 11, *Aquatic Biological Resources*, contains a discussion of the potential effects of reducing sediment load in the Sacramento River, particularly as it affects turbidity in the Delta.

See in particular the discussion in Section 11.2.3.2, *Habitat Conditions and Environmental Stressors in Delta and Suisun Bay/Marsh*, and the discussion of Impact FISH-8. Those discussions suggest entrainment of sediment at the two diversion locations may increase from about 3% of the sediment load in the Sacramento River under the No Project Alternative to less than 5% under the Project alternatives, but that the effect of that on the system is uncertain. Sites Reservoir will also capture sediment in Stone Corral Creek and Funks Creek from above the reservoir, which otherwise may have contributed to the sediment load in the Sacramento River via the Colusa Basin Drain and Knights Landing Outfall. However, there is uncertainty in the estimates of sediment loss due to the Project operations, so the Authority is committed to establishing a monitoring plan to characterize sediment loads in the vicinity of the diversions and to quantify the amounts of sediment that are entrained by the diversions and captured by the reservoir.

The studies are expected to span a period of 10 years. This would include 5 years pre-Project to establish baseline sediment loads in the vicinity of the diversions and contribution from Stone Corral Creek and Funks Creek over a variety of water-year types and 5 years after operations are initiated to verify the quantities of sediment diverted at each of the diversion locations and sediment captured by Sites Reservoir. The Authority will collaborate with the water agencies (RWQCB, DWR, and Reclamation) and fish agencies to ensure the study design meets their needs and expectations. The Authority will prepare annual reports of its monitoring plan and make them publicly available.

The Authority is also committed to collaborating with the water agencies, fish agencies, and Delta Stewardship Council, including its Science Program and Interagency Implementing Committee, to determine what actions, if any, may be needed to address the incremental loss of sediment at the diversions and sediment capture by the reservoir and its effects on fishery resources.

2D.6 Fish Monitoring and Technical Studies Plan and Adaptive Management for Diversions

As part of the adaptive management plan, the Authority will implement a fish monitoring and technical studies plan to validate modeling results and analyses presented throughout this Final EIR/EIS. These studies will assess (but are not limited to) the following.

- Enhanced temperature control.
- Fish screens and entrainment risk at RBPP and Hamilton City Pump Station.
- Bend Bridge pulse flow protection.
- Minimum bypass flows in the Sacramento River at Wilkins Slough.
- Fremont Weir Notch Project.

The overarching purpose of these technical studies is to validate analyses conducted in this Final EIR/EIS, refine and understand the mechanism(s) by which Project operations affect aquatic resources in high-flow conditions, and explore ways in which Project operations can further

benefit fish populations. Specific parameters for each technical study will be developed as part of individual study plans, with the approval of the permitting fish agencies (i.e., NMFS, USFWS, and CDFW). These parameters may consist of assessing factors such as whether diversion operations have resulted in statistically significant changes in monitored variables (e.g., fish distribution and migration survival).

The technical studies will be developed by the Authority through the Adaptive Management Science Team (AMS Team) with input from the Adaptive Management Committee (AMC). The AMC will be a multi-agency team that includes representatives from Reclamation, the Authority, Glenn-Colusa Irrigation District, Tehama-Colusa Canal Authority, NMFS, USFWS, and CDFW. Sub-teams may be necessary to address groups of related studies. The AMC, including the permitting fish agencies (NMFS, USFWS, and CDFW), will oversee the adaptive management process and science program, vetting recommendations from the AMS Team and products developed during the technical studies (e.g., study plans, annual reports, and final reports), with independent peer review of key products, and, where possible, will integrate with or include ongoing studies at existing Project facilities. Measures, such as limiting capture methods or the handling of listed species, may be required, if applicable, by the permitting agencies for the studies. The results of these studies will be used in conjunction with existing and new aquatic monitoring efforts to inform real-time Project operations and adjustments or refinements in Project operations for protection of fish species.

Several aquatic monitoring elements are required to support the technical studies and could include rotary screw trapping, entrainment/impingement monitoring, fish attraction to screens during releases of water from Sites Reservoir, and presence of fish in forebays following fish screen overtopping events. Like the technical studies previously described, aquatic monitoring will be implemented by the AMS Team and overseen by the Authority, with input from the multi-agency AMC. Sub-teams may be formed to address different aquatic monitoring elements. Through their representatives within the AMC, the permitting fish agencies will have opportunities for independent peer review of products developed during the process (e.g., monitoring plans and annual reports). The monitoring program will also be used to monitor the effects of the Project on fish species as climate change is manifest and provide information to the adaptive management program to identify and assess the feasibility of potential responses to climate change.

2D.6.1 Enhanced Temperature Control in the Upper Sacramento River

One of the anticipated benefits of the Project is the ability for Reclamation to use its resources in Sites Reservoir to conserve water in Shasta Lake for the purpose of conserving the cold-water pool and enhancing its ability to control temperatures on salmon spawning grounds below Keswick Dam. It will accomplish this by delivering contract water to its Sacramento River Settlement Contractors from Sites Reservoir and retaining that volume of water in Shasta Lake for release in the late summer and fall to assist in temperature control and flow stability in the river below Keswick. The Authority expects Reclamation will lead these investigations as it is the responsible agency for compliance with State Water Board Water Rights Order 90-5 and the temperature requirements in the biological opinions that address long-term operations of the CVP. Nevertheless, the Authority will assist Reclamation with the evaluation of exchanges to

monitor their effects on reservoir operations and aid in the development of criteria for deciding when and how exchanges could be executed.

2D.6.2 Fish Screen and Entrainment at the Red Bluff Pumping Plant and the Hamilton City Pumping Plant Study

Purpose: The fish screen and entrainment at the RBPP and the Hamilton City Pump Station study will address fish survival associated with diversion facility operations at the RBPP and Hamilton City Pump Station intakes under actual operating conditions in high Sacramento River flow conditions when Project diversions would occur.

The fish screens at RBPP and Hamilton City Pump Station are existing, authorized fish screens that have undergone extensive study to ensure they each meet NMFS and CDFW fish screen performance criteria under a range of flows in the Sacramento River. The studies proposed here would be focused on diversions at these locations during high winter flow conditions when Project diversions would occur. Although these facilities are authorized to operate in high winter flow conditions, they do so infrequently. Additional studies would verify the facilities' performance during high winter flow conditions under which the Project would be diverting in the future. **Outcomes:** The technical studies will describe factors such as juvenile salmonid migration survival in high flow conditions prior to Project operations, compliance with protective criteria for screen hydraulics in high flow conditions, and changes resulting from initial and continued Project operations in high flow conditions. Additional studies will provide data and reports to document compliance with NMFS and CDFW fish screen performance criteria in high-flow conditions when Project diversions would occur; the studies will be submitted to NMFS, USFWS, and CDFW for review and to inform adjustments or refinements in Project operations for the protection of fish species. The AMS Team will analyze and synthesize results in cooperation with resource agencies to determine if and what actions may be needed to address screen performance (e.g., adjustments in diversion operations timing) and will consult with the AMC to develop recommendations to be forwarded for consideration by the Authority.

Content: The technical study will meet agency data collection and reporting requirements and will consist of at least four parts: a fish distribution and density study, a juvenile salmonid survival rates study, a predator density and distribution study, and a long-term hydraulic fish screen evaluation study.

Timing: Studies will commence subsequent to approval of the Project and continue as proposed by the AMS Team and approved by the Authority as appropriate for the specific study. Some field studies may not begin until Project operations commence if the objective of the specific study is to evaluate Project operations.

2D.6.3 Bend Bridge Pulse Flow Protection Study

Purpose: The purposes of this study are to determine the best criteria for initiating and terminating the pulse protection measure and how much of each pulse needs to be protected to ensure the fish experience the benefit of a pulse.

Outcomes: Adaptive management will be used to refine, evaluate, and adjust the criteria for initiation and termination of diversions during pulse flow events. The Authority anticipates use

of a measure that detects fish movement in response to a pulse flow event to initiate the pulse protection measure. Its goal is to provide the benefit of the pulse to migrating fish while minimizing unnecessary foregone opportunities to divert water to storage. These studies will determine whether a fish detection measure is feasible and, if not, what other criteria may be employed to optimize the opportunity to divert flows without diminishing the benefit of a pulse in flows for fish. For example, absent an executable fish criterion, the Authority will rely on predicted pulse events as described in Chapter 2, *Project Description and Alternatives*, and will use the adaptive management process to refine those criteria.

Content: The technical study will meet agency data collection and reporting requirements and will be designed with input and collaboration from the fish agencies. The study will begin with a thorough evaluation of data from the USFWS Red Bluff Diversion Dam (RBDD) juvenile fish monitoring program to determine whether reliable indicators of a fish pulse can be detected and incorporated into an operations scenario consistent with outcomes discussed above. The technical studies may also include targeted studies using marked fish to better understand the stimuli that initiate fish movement and to develop a better understanding of the benefits of a pulse event. Studies will also investigate how much of pulse flow needs to be protected before pumping may resume. For example, does the rate of migration (e.g., fish per hour) change over the course of the pulse? Is there a magnitude of flow at which the benefit of the pulse begins to diminish? And what are the effects on migrating fish if pumping is resumed before a pulse has passed (i.e., evaluate the proposed 7-day criterion in Chapter 2, *Project Description and Alternatives*). In addition to investigation of fish movement, the study plan will evaluate other criteria initiating and terminating pulse protection measures (e.g., the AMS Team could work with the National Oceanic and Atmospheric Administration's California and Nevada River Forecast Center to investigate ways to integrate storm forecasts and fish monitoring to help define operations criteria not entirely dependent on a single source of information).

Timing: Studies will commence subsequent to approval of the Project and continue as proposed by the AMS Team and approved by the Authority as appropriate for the specific study. Studies would continue into the operational phase of the Project so that operating criteria are continuously monitored and refined for at least a period of 10 years. This should ensure evaluation and refinement across varying water-year types. At the end of the 10-year monitoring period, the program will be evaluated, and a determination will be made in collaboration with the fish agencies whether to extend, modify, or terminate the program.

2D.6.4 Minimum Bypass Flows in the Sacramento River at Wilkins Slough Study

Purpose: This is an area of ongoing research by the fish agencies and a focus of the Sacramento River Science Partnership (see adaptive management plan). The purpose of the Authority's study plan is to support, collaborate with, and, as appropriate, augment ongoing research directed at improving understanding of the flow-survival relationship in the middle reach of the Sacramento River (RBDD to Verona), including the roles of pulses, base flows, sediment levels, predation, and inundated acres of side-channel habitat.

Outcomes: Findings from this ongoing research will be used to refine the criteria for managing diversions to protect the function of the Sacramento River between RBDD and Verona to support migration and rearing of juvenile salmon and sturgeon. For example, adaptive management could

be used to test different levels of bypass flows and channel inundation to improve understanding of how changes in managed hydrology affect Chinook salmon survival at near-field and far-field scales.

Content: The technical study will be developed in collaboration with the fish agencies and existing programs such as the Sacramento River Science Partnership. The study plan will describe how the Authority will use and support ongoing flow/survival and habitat characterization studies, and it will identify any additional studies which may be undertaken by the Authority to refine its understanding of the effect of Project operations on fish survival.

Timing: Subsequent to approval of the Project, the Authority will convene its AMC and AMS Team and direct them to determine how to engage with these ongoing investigations in a way that benefits all interests. The Authority will consider and approve or modify the recommendation from its AMC and implement the plan for engagement as soon as practicable following approval of the Project. Studies would continue into the operational phase of the Project so that operating criteria are continuously monitored and refined for at least a period of 10 years. This should ensure evaluation and refinement across varying water-year types. At the end of the 10-year monitoring period, the program will be evaluated, and a determination will be made in collaboration with the fish agencies whether to extend, modify, or terminate the Authority's involvement in ongoing agency research programs.

2D.6.5 Effects on Fremont Weir Big Notch

DWR and Reclamation have begun construction of the Fremont Weir Big Notch Project (the Notch) to enhance access to floodplain rearing habitat in the Yolo Bypass for emigrating juvenile salmon and to improve passage conditions for adult salmon and sturgeon that are migrating upstream through Yolo Bypass. The Authority expects that its operation of the Project will not have an adverse effect on the performance of the Notch. Since the Notch is not yet operational, how well it works is yet to be determined. CDFW will have the lead in evaluating the effectiveness of the Notch and should have several years of data to establish baseline performance of the Notch before the Project begins operations.

Once the Project is operational, the Authority and its AMS Team will collaborate with CDFW and others to augment the monitoring program at the Notch to determine whether the operation of the Project is having an effect on the Notch. If a reduction in the performance of the Notch is documented, the Authority will engage with CDFW and the other fish agencies to determine what actions may be implemented at the diversion locations (158 miles upstream) to eliminate or mitigate the adverse effect. The Authority would augment CDFW's monitoring program, as necessary, to assess the effectiveness of any measures that are employed. The Authority would utilize its AMS Team and AMC to work with CDFW and the fish agencies to ensure the goal of not interfering with the Notch is achieved.

2D.7 Land Management Plan

Purpose: The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee

or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location. Land management, maintenance, and monitoring actions for any mitigation areas owned by the Authority will also be described in the LMP. These activities will include vegetation maintenance, invasive terrestrial plant control, and rodent control.

Outcomes: The LMP will ensure that the Authority and maintenance personnel are aware of the locations where sensitive wildlife resources may be present and steps to be taken prior to work in these areas. As part of the LMP reporting requirements, annual reports will include recommendations, as needed, to improve and refine land management procedures for the Project.

Content: The LMP will include the following components.

- A statement of purpose, including the role of the LMP in satisfying regulatory compliance obligations under state and federal laws.
- Land management, maintenance, and monitoring actions for any onsite mitigation areas owned by the Authority.
- Vegetation control activities, including the use of vegetation control and grazing around all facilities, recreation areas, and the Project buffer around all facilities.
- An Integrated Pest Management Plan (IPMP) that focuses on long-term prevention of pest damage through habitat modification (Van Vuren et al. 2014), incorporating biological control methods such as raptor perches and owl boxes to increase natural raptor predators and limited and targeted rodenticide use when necessary. The IPMP will include measures to reduce rodent density before any anticoagulant baits are placed to reduce the number of contaminated rodents available to predators and scavengers. The IPMP will require regular monitoring to ensure rodent control measures are taken only in response to current rodent activity.
- The type and frequency of maintenance activities by location and whether pre-activity wildlife surveys or monitoring of work will be required.
- The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring.
- General measures and practices when working in or near habitat for special-status wildlife (e.g., ensure appropriate distance from habitat as described by state or federal protocols, restrict nighttime work, and restrict work during nesting season if work is performed near trees).
- The procedure for reporting incidental injury or mortality of federal or state listed species.
- Clear statements about the Authority's, hired staff's, and qualified contractor's responsibilities for implementing LMP requirements.
- Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that

were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided.

- Description of annual reporting requirements, as approved by regulatory agencies.

The LMP will require a qualified biologist to provide annual training to maintenance personnel on the general measures and practices described in the plan and to document the surveys and monitoring conducted. A qualified biologist with knowledge or oversight of LMP measures and implementation will prepare an annual report summarizing the steps that were taken to minimize impacts on wildlife resources by December 31 of each year. This report will be submitted to USFWS and CDFW by January 31 of the following year. Each annual report will include the following information.

- The date of annual training, the name of the biologist who gave the training, and a list of attendee names and signatures.
- A summary of the measures and practices implemented during any work in or near habitat.
- A summary of wildlife surveys and monitoring that were conducted that year, including the type of maintenance activity for which surveys or monitoring was required, the date(s) and location(s) of the survey(s) or monitoring, the name of the qualified biologist, and observations of the target special-status species or other special-status wildlife during the surveys or monitoring.
- Any problems that were encountered by maintenance staff during implementation of general measures or by biologists conducting surveys or monitoring and an assessment of the success of the LMP in avoiding and minimizing effects on special-status wildlife and their habitats.
- Recommendations for improving existing practices and methods for Project implementation, if needed.
- Assessment of the success of the LMP measures, practices, and methods.

Timing: The Authority and its qualified contractors will complete preparation of the LMP within 1 year of the first fee title acquisition by the Authority and will amend the LMP as needed as additional lands are acquired.

2D.8 Recreation Management Plan

Purpose: The Authority will prepare a Recreation Management Plan to describe the types, management, maintenance, and monitoring activities on all Project recreation lands and areas related to recreation. This plan will describe the coordination with Glenn and Colusa Counties to support emergency services at the recreational facilities and will describe requirements for fire suppression in the recreation areas.

Outcomes: Implementing the Recreation Management Plan will ensure the Authority safely manages recreational facilities in coordination with Glenn and Colusa Counties.

Content: The Recreation Management Plan will:

- Support the existing emergency services and personnel by:
 - Defining specific characteristics of the recreation areas and facilities expected to need emergency services and refine expected numbers of visitors based on the final design of the recreational facilities.
 - Developing different measures, including but not limited to assessing the need for and considering funding for emergency response staff and purchasing equipment based on the specific characteristics of the recreation areas and facilities and in consideration of other potential funding sources that may be secured over time.
 - Placing a helipad within either the Peninsula Hills Recreation Area or the day-use boat ramp area for emergency access and placing a helipad near both Golden Gate Dam and Sites Dam.
 - Incorporation of prefabricated structures for storing equipment and materials to assist emergency services personnel within the footprint of the recreation areas for police and fire emergency response.
- Avoid wildfires and reduce wildfire risk in recreation areas by:
 - Exercising precautions, such as monitoring the National Weather Service for Red Flag Warning events, to notify recreationists of enhanced fire danger.
 - Describing procedures and policies for reporting any fires that are at the recreation areas, triggers for evacuating recreation areas due to fires, and fire evacuation routes.
 - Maintaining fire-suppression equipment (e.g., fire extinguishers, fire blankets) at recreational facilities, as well as in the administrative buildings, and all Authority vehicles.
 - Training Authority employees in fire suppression techniques and use of all fire suppression equipment at least once a year and documenting the training.
 - Posting wildfire awareness signage at locations where recreationists or maintenance staff will likely be, including at entrances to recreation areas and at kiosks for boats.
 - Providing a list of all major potential fire hazards to promote caution and awareness on site.
 - Assigning and enforcing all areas as designated no-smoking areas; prohibiting the use of fireworks and other potential fire ignition sources; limiting campfires to designated areas and prohibiting campfires during Red Flag Warning Events.
 - Enacting fuel management and vegetation reduction practices in select locations in the recreation areas to reduce fuel load and maintain clear roadways.
- Avoid and reduce disruption of sensitive habitats in recreation areas by:
 - Identifying and mapping sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction of recreation areas.

- Installing fencing, posting signage, or implementing other exclusion practices along the boundaries of sensitive habitats in the recreation areas to avoid and minimize disturbance to these habitats during operation and maintenance activities in the recreation areas.
- Support management of recreation traffic through Maxwell by:
 - Controlling and slowing expected recreational traffic through Maxwell in coordination and consultation with Colusa County.
 - Describing and implementing specific locations for lighted pedestrian crossings, stop signs, and other traffic calming features; identify specific timing for implementing these features with the County prior to the full opening of all recreational facilities.
- Support the reduction of boating emissions by developing and implementing Recreation Boating Minimization Plan, which would include strategies implemented by the Authority during the operational lifetime of the recreation areas at the reservoir that are likely to reduce emissions; the strategies that the Authority could implement to reduce boat emissions include but are not limited to the following:
 - Provide free or reduced launch fees for low-emitting or electric boats, to incentivize boats that are alternatively fueled.
 - Post signage near launch areas encouraging users to turn off the boat engines when not in use.
 - Track boat usage and type (i.e., motorized, electric, nonmotorized) at the reservoir on an annual basis by maintaining records of the number and types of boats operated at the reservoir. To maintain these records, the Authority will operate staffed kiosks at the reservoir, and boat users will be required to check in at these kiosks prior to launching their boats. Emissions from boat usage will be quantified based on the Authority's records, and the effectiveness of the minimization plan will be assessed based on the quantification results and relative to the applicable air district threshold at the time of operations.

Timing: The Authority will complete the Recreation Management Plan at least 1 year prior to the opening of Project recreational facilities.

2D.9 References

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