2015 EMERGENCY DROUGHT BARRIER PROJECT

1 INTRODUCTION

Faced with potentially insufficient water supplies to repel salinity in the Sacramento-San Joaquin River Delta (Delta), the California Department of Water Resources (DWR), proposes to install an emergency, temporary rock barrier across a Delta channel. DWR seeks to install a single emergency salinity barrier across West False River in May, to be removed six months later, in November. State and federal water and wildlife officials, working as a Real-Time Drought Operations Management Team, have determined that the barrier would help deter the tidal push of saltwater from San Francisco Bay into the central Delta. The emergency drought barrier (EDB) would be essentially a pile of basketball-size rocks across the 800-foot-wide channel. Keeping saltwater from the central Delta is a priority, as a large portion of the state's freshwater supplies travel through this part of the Delta. The barrier would help prevent saltwater contamination of water supplies used by people who live in the Delta; Contra Costa, Alameda, and Santa Clara counties; and the 25 million people who rely on the Delta-based federal and state water projects for at least some of their supplies.

Water quality conditions in the Sacramento-San Joaquin River Delta (Delta) during 2014 were difficult to control as a result of persistent drought conditions, and put municipal, industrial, and agricultural water supplies at risk. The brackish conditions also were degrading habitat for threatened and endangered fish dependent on the Delta. In response to the statewide drought conditions, the U.S. Department of Agriculture identified 57 counties in California, including Sacramento, Solano, and San Joaquin counties, as eligible for natural disaster assistance, including funding for emergency watershed protection and water assistance for rural communities (USDA, 2014). This announcement came in the spring of 2014, following President Obama's earlier announcement of an administration-wide drought response in February 2014.

In addition, on January 17, 2014, California's Governor Edmund G. Brown Jr. signed a proclamation declaring a State of Emergency, prompted by record dry conditions and projections that 2014 would be the driest year on record (see http://gov.ca.gov/news.php?id=18368). The proclamation found that the lack of precipitation is beyond the ability of local authorities to address, placing the safety of people and property existing within California in peril because of water shortage from persistent drought conditions. Governor Brown issued a number of directives calling for immediate action to implement conservation programs, secure water supplies for at-risk communities, and protect critical environmental resources. A Proclamation of a Continued State of Emergency was issued on April 25, 2014, and an Executive Order was issued on December 22, 2014 extending the waiver of the California Environmental Quality Act (CEQA) and Water Code Section 13247 in paragraph 9 of the January 17, 2014 Proclamation, and paragraph 19 of the April 25, 2014 Proclamation through May 31, 2016.

An Executive Order issued on April 1, 2015 extended the orders and provisions in the January 17, 2014 and April 25, 2014 Proclamations and Executive Orders B-26-14 and B-28-14 and added several modifications, discussed in the following paragraph. Many of the actions in the drought proclamation are being undertaken by DWR and its various federal, state, and local partners. These actions include temporary modifications of requirements included in the State Water Resources Control Board's (SWRCB) Revised Decision 1641 (D-1641) to meet water quality objectives in the Water Quality Control Plan for the Bay-Delta, including increased flexibility for water transfers, regulating diversions, and Delta Cross Channel (DCC) gate operations. The drought proclamation also directed DWR to take other necessary actions to protect water quality and water supply in the Delta, including installation of temporary barriers or temporary water supply connections as needed, and coordination with the California

Department of Fish and Wildlife (CDFW) to minimize impacts on affected aquatic species. The 2015 Executive Order suspends Division 13 (commencing with Section 21000) of the Public Resources Code (related to the CEQA) and regulations adopted pursuant to that Division, as well as Section 13247 (related to compliance with approved or adopted water quality control plans) and Chapter 3 of Part 3 (commencing with Section 85225 related to preparing a written certification of consistency with the Delta Plan) of the Water Code. The Executive Order also calls for DWR to exercise any authority vested in the Central Valley Flood Protection Board to enable the quick installation of the emergency drought barriers, and authorizes the Director of DWR to request that the Secretary of the Army, on the recommendation of the Chief of Engineers of the Army Corps of Engineers, grant permission required pursuant to Section 14 of the Rivers and Harbors Act of 1899.

Setting precedent for the proposed project, several rock barriers were installed at Delta locations during 1976 and 1977 to help mitigate drought conditions. In 1976, one rock barrier was installed at Sutter Slough to help meet water quality criteria and allow for conserving additional water in upstream reservoirs. A second barrier was installed at Old River at its divergence from the San Joaquin River (often referred to as head of Old River) to protect fishery resources by keeping special-status fish in the San Joaquin River, thereby reducing entrainment risk at Central Valley Project/State Water Project (CVP/SWP) export facilities in the South Delta. In 1977, as drought conditions continued, rock barriers were installed at six different locations in the Delta. In addition, control facilities were built at two additional locations. The six rock barrier locations constructed in 1977 included Old River east of Clifton Court, San Joaquin River near Mossdale, Rock Slough, Indian Slough, Dutch Slough, and the head of Old River.

The “Interagency 2015 Drought Strategy for the Central Valley Project and State Water Project” (2015 Drought Strategy), released as a working draft on December 12, 2014, was developed by Bureau of Reclamation (Reclamation), DWR, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and CDFW includes several core principles for CVP and SWP operations, one of which is to control salt water intrusion in the Delta. Installation of temporary rock barriers is considered in the 2015 Drought Strategy. With the current proposed project, one temporary rock barrier would be installed in May and June of 2015.

2 PROJECT DESCRIPTION

2.1 PURPOSE

2.1.1 BASIC PROJECT PURPOSE

The purpose of the proposed EDB is to control saltwater intrusion into the Delta with reduced reservoir releases while continuing to meet federal and state regulatory requirements.

2.1.2 OVERALL PROJECT PURPOSE

Constructing the emergency temporary rock barrier provides a method of controlling saltwater intrusion into the Delta, as well as potentially conserving cold water reservoir storage to protect habitat for sensitive aquatic species. In addition, the EDB purpose would maintain water quality standards set by the SWRCB to help ensure water is drinkable by 25 million Californians and usable by farms that are reliant upon this source.

2.2 PROJECT LOCATION

The temporary rock barrier would be installed at West False River. The general location of the site is shown in Figures 1 and 2, and the specific location is shown in Figure 3. Photographs of the levee banks at the project site are presented in Figure 4.

The project site is located approximately 0.4 mile east of the confluence with the San Joaquin River, between Jersey and Bradford Islands in Contra Costa County, and is about 4.8 miles northeast of Oakley. The banks of the project site are existing rock-lined levees (Figure 4).

2.3 GENERAL DESIGN AND INSTALLATION CONCEPTS

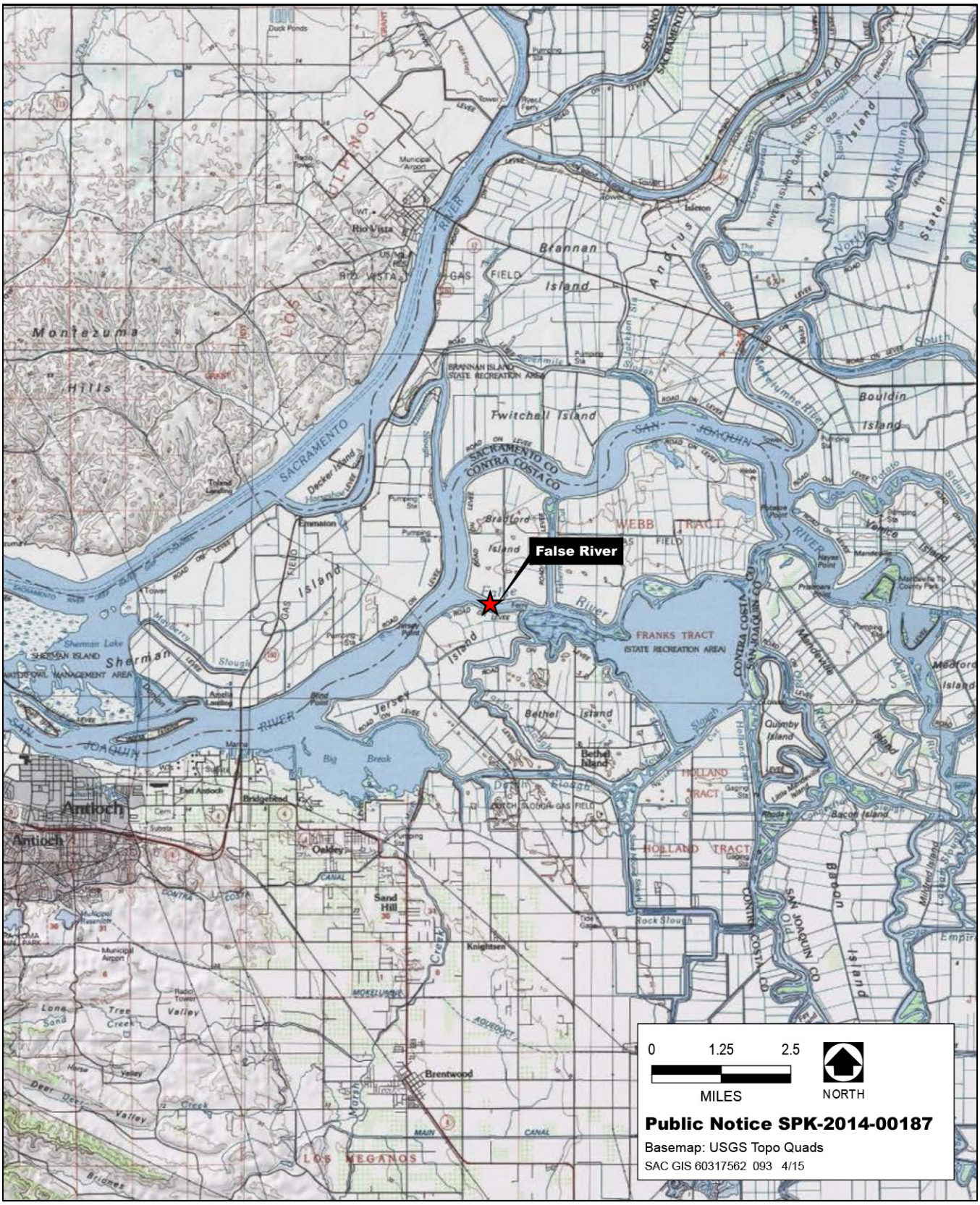
A rock (rip-rap) barrier weir structure would be installed at the West False River site. The structure would be a trapezoid-shaped rock barrier with a wide base tapering up to a 12-foot-wide top width set perpendicular to the channel alignment. It would have transitions to the levees with 75-foot-long sheet pile walls supported by king piles and buttressed with rock, because the levees are weak due to peat soil foundations. To address existing erosion of the waterside levee toe on both Jersey and Bradford islands, DWR will place rock fill, approximately 0.25 acres and approximately 4,500 cubic yards, along the levee toe for a distance of 225 feet upstream and downstream from the center line of the barrier (approximately 125 feet from the ends of the barrier rock placement). This fill must be placed prior to installing the sheet pile wall to prevent sloughing of the levee when the piles are driven. Because this fill is necessary for levee stability, the rock will remain in place. Construction of the barrier may include land-based staging of equipment and materials. Temporary rights for construction of the barrier may be obtained before securing the necessary permanent easement rights required for those portions of the piping preventers, sheet pile walls, king piles, and rock abutments that would be permanent installations. This applies to the following APNs:

- APN 027-010-005-0 (Contra Costa County)
- APN 026-040-005-6 (Contra Costa County)

Temporary access rights for construction inspection and fence installation purposes would be required from the following APNs on Bradford Island:

- APN 026-040-003-1 (Contra Costa County)
- APN 026-050-006-1 (Contra Costa County)
- APN 026-050-018-6 (Contra Costa County)
- APN 026-050-024-4 (Contra Costa County)

The temporary rock barrier would be installed during May and June. The construction period would be approximately 30 to 60 days. Barrier removal may require approximately 45 to 60 days, with removal commencing on or near October 1. The temporary rock barrier would be removed entirely no later than November 15, before the rainy season when freshwater runoff typically occurs and flood risk increases.

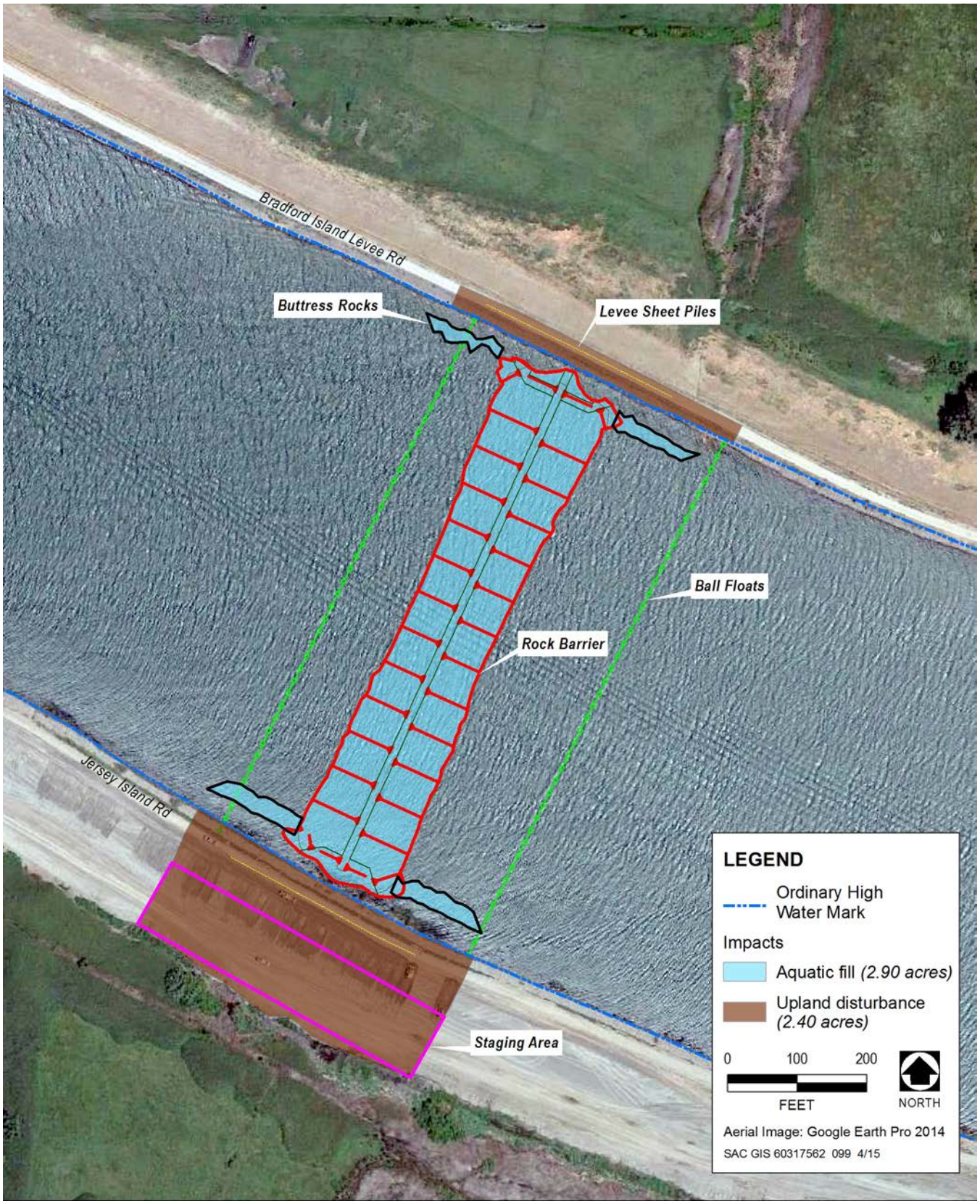


Source: DWR 2015, AECOM 2015

Figure 1 **Location of Proposed Emergency Drought Barrier**

Source: DWR 2015, AECOM 2015

Figure 2 **Aerial View of the Proposed Emergency Drought Barrier Location**



Source: DWR 2015, AECOM 2015

Figure 3 **Aerial View of the Project Site**

Figure 4 **West False River South Levee (top), North Levee (middle), and North Levee at USGS Gaging Station East of the Barrier Site (bottom)**

Tidal flows would be the main factor influencing water quality conditions at the West False River barrier. Fish movement can occur through the adjacent San Joaquin River and through other channels, including Fisherman's Cut, East False River, and Dutch Slough during the West False River closure.

Vessel traffic would be blocked at the barrier site, but alternative routes are available via the Stockton Deep Water Ship Channel in the San Joaquin River between Antioch and eastern Delta locations, or via Fisherman's Cut or East False River to South Delta destinations.

Solar-powered monitoring instruments would be placed at appropriate locations upstream and downstream of the site and would monitor parameters like dissolved oxygen, turbidity, salinity as measured by electrical conductivity (EC), river stage, and flow velocity.

Appropriate navigation signage would be installed at the emergency drought barrier site and would comply with navigation requirements established by the U.S. Aids to Navigation System and the California Waterway Marker system, as appropriate. Signs would be posted at upstream and downstream entrances to each waterway or other key locations, informing boaters of the restricted access. A Notice to Mariners would include information on the location, date, and duration of channel closure. Signs would be posted on each side of each barrier, float lines with orange ball floats would be located across the width of the channels to deter boaters from approaching the barrier, and solar-powered warning buoys with flashing lights would be present on the barrier crest to prevent accidents during nighttime hours. Additional information regarding navigational issues is provided in Section 2.4, "Structural Components."

2.4 STRUCTURAL COMPONENTS

The emergency drought barrier located at West False River would be approximately 800 feet long and up to 200 feet wide at the base (in water) and 12 feet wide at the top (above water) (Figure 3). The top of the structure would be at an elevation of 7 feet above sea level across the entire crest. The barrier would include two king pile-supported sheet pile walls extending out from each levee into the channel for a distance of 75 feet. The sheet piles/king piles are required because the levees are weak at this location as they are on peat soils and placing a large volume of rock directly on the levees would cause stress. The walls would be buttressed on both sides with rock that will not be removed this year. After removal of the temporary rock structure, the sheet pile abutments and associated rock placed in order to achieve smooth transitions around the sheet pile abutments will remain in place for possible future use during the declared drought. Removal of the abutments and rock associated with the emergency drought barrier would occur no later than at the end of the term of the CDFW Lake and Streambed Alteration Agreement issued for this project. The permanent rock placed to stabilize the toe of the levee will remain. Inspection of the rock would compare actual conditions with as-constructed plans and/or bathymetric survey data. The results of the inspections and any bathymetric survey data collected would be made available to the Local Maintaining Agency (LMA). Any necessary repairs of the rock would be made using land or water-based construction equipment during summer and fall (July through October) when special-status species are less likely to be affected. DWR would assure that this rock is maintained and either contract with the LMA or use DWR resources or contractors to repair and or replace the transition rock as needed.

In addition to the temporary barrier installation, repair of the undercut toe of the levee is required for a distance of 225 feet from the center line of the barrier upstream and downstream (approximately 125 feet from the ends of the barrier rock placement). The repair includes placement of rockfill within the undercut toe of the levee and this rock will remain in place as a permanent repair.

The piles to be installed would include in total:

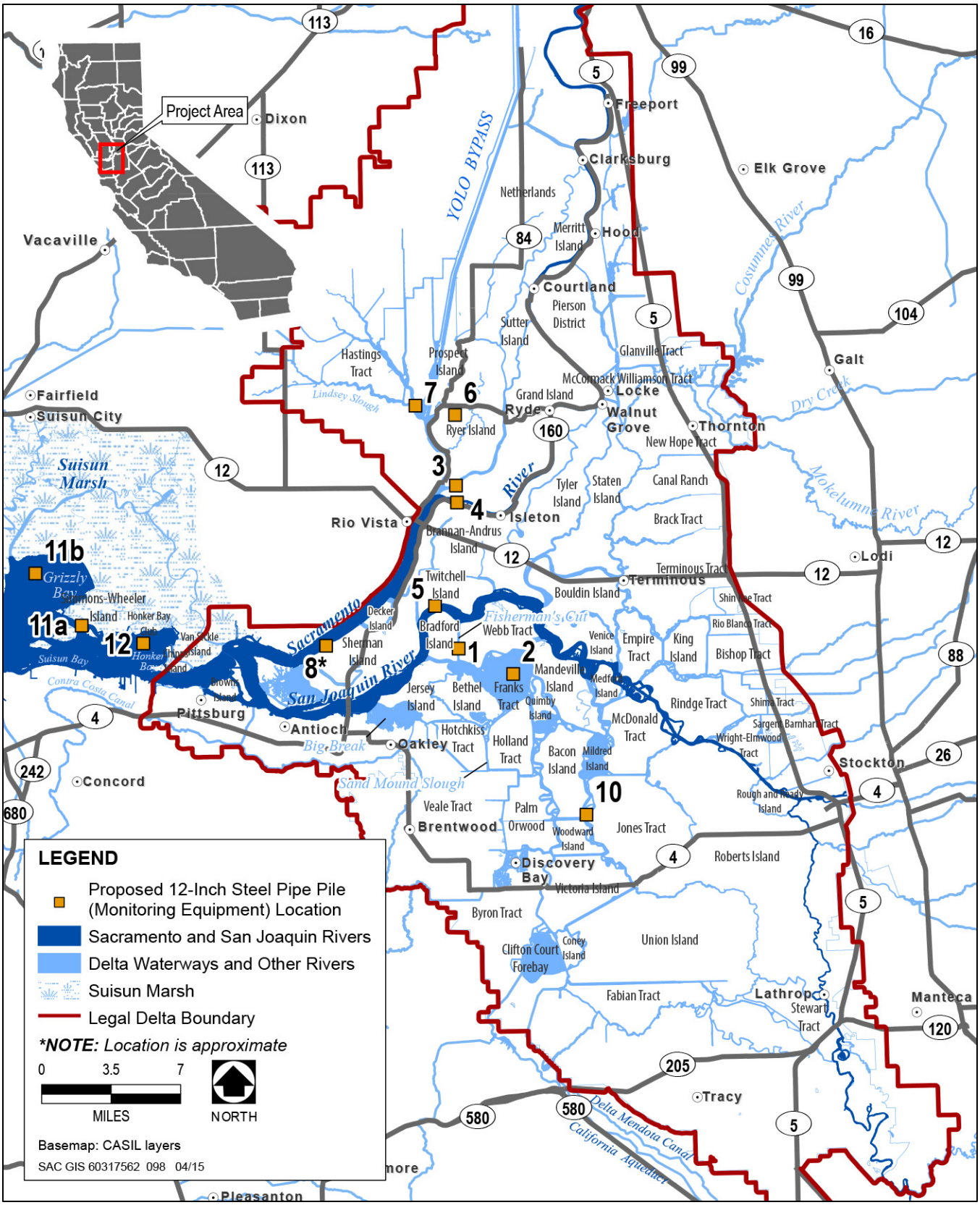
- Eight 36-inch-diameter king piles (barrier abutments)
- About 70 sheet piles (barrier abutments), or about 35 pairs of sheet piles totaling approximately 160 wall feet (including approximately 5 feet on either side that would be in the levee)
- Four 24-inch steel pipe piles (float line attachment, i.e., two piles upstream and downstream of the barrier)
- Twelve permanent 12-inch steel pipe piles (monitoring equipment)

In addition to river sheet piles, approximately 300 feet of sheet piles would be installed through the levee to a depth of approximately 35 feet and parallel to the channel to prevent water piping from the river. These piping preventer sheet piles would be set into the tops of the levees on each side of the barrier and would remain in place for possible future use. The 12-inch steel pipe piles proposed for monitoring equipment will remain in place for future use. The coordinates of the proposed 12-inch steel pipe piles are listed in Table 1 and shown in Figure 5.

Table 1 Coordinates of the Proposed 12-Inch Steel Pipe Piles

No.	Station Name	Latitude	Longitude
1	Fisherman's Cut near Franks Tract	38.065600°	-121.647900°
2	Franks Tract (Mid Tract)	38.046417°	-121.598100°
3	Steamboat Slough	38.184550°	-121.648067°
4	Sacramento River near Steamboat Slough	38.172167°	-121.647350°
5	San Joaquin River at Twitchell Island	38.096900°	-121.669100°
6	Miner Slough near Cache Slough	38.236033°	-121.666072°
7	Liberty Island	38.243183°	-121.684600°
8	Sacramento River near Sherman Lake[1]	38.068933°	-121.770250°
9	Old River	37.968600°	-121.574236°
10	Middle River	37.942967°	-121.532266°
11a	Cutoff Slough near Ryer Island[2]	38.085783°	-121.995833°
11b	Grizzly Bay[2]	38.124250°	-122.038117°
12	Honker Bay	38.072400°	-121.939200°

Notes:
[1] This location is an approximation and may be moved slightly.
[2] DWR will need only one station at either Cutoff Slough near Ryer Island or Grizzly Bay but not both.
Source: DWR 2015



Source: DWR, adapted by AECOM 2015

Figure 5 **Locations of the Proposed 12-Inch Steel Pipe Piles**

No boat passage is provided around the barrier because of safety concerns and because alternative routes (Fisherman's Cut or False River east for vessel traffic between the South Delta to the San Joaquin River; and the Main San Joaquin River for vessel traffic between the Antioch and the eastern Delta) are available. No fish passage is provided because migrating fish would use the adjacent San Joaquin River, Fisherman's Cut, or Dutch Slough, where their access is not restricted.

2.5 PROJECT CONSTRUCTION

2.5.1 CONSTRUCTION SCHEDULES

In-water construction would begin no sooner than May 4, with full barrier closure on or near approximately 30 to 60 days after starting work. Landside work would begin no sooner than May 1. Removal would take approximately 45 to 60 days, with full removal by November 15. Removal activities would begin prior to October 1. Construction would require approximately 10 to 30 workers. DWR assumes that the contractor could conduct daytime and nighttime construction activities for installation of the rock barrier and would conduct daytime and nighttime construction activities for removal of the barrier.

2.5.2 CONSTRUCTION PRACTICES

Notices of construction would be posted at local marinas and in the Local Notice to Mariners. Navigational markers would be used to prevent boaters from entering the immediate construction area, and speed limits would be posted. Safe vessel passage procedures would be coordinated with the U.S. Coast Guard District 11 and California Department of Parks and Recreation Division of Boating and Waterways. An educational program would be implemented to inform boaters of the purpose of the proposed project and the expected duration of installation activities. The program would include notices in local newspapers and boater publications as appropriate; notices also would be posted at local marinas and boat launches and on the proposed project website.

Approximately 95,000 cubic yards of rock would be required to construct the emergency drought barrier located at West False River (including approximately 25,200 cubic yards that would remain around the sheet piles and on the adjacent levee). Clean, unwashed rock would be used. The rock source would likely be one or more existing quarries, near San Rafael. All rock, gravel, and structures would be transported to and constructed at the project site in May and June of 2015. The methodology described herein is general. Although construction activities would primarily be situated in water, the contractors would also work from the levees. Vehicle access to the site would be via Jersey Island Road.

The contractors would mobilize construction equipment and crew. DWR would utilize multiple barges with excavators and work boats which would be transported on water to the project site. An excavator or other small earthwork equipment would be needed on each side of the levees to aid with the installation of the sheet pile walls. The contractors would install construction trailers on the levee nearby.

Barges powered by tugs would be used to transport rock from quarries and/or other loading bulkheads or material transfer points to the barrier site. The barge would be appropriately sized based on the depth of the channel where the rock would be placed. The contractors would use excavators, dozers, and loaders to move/push the rock from transportation barges into the channel. The contractors would shape/contour the rock barrier by using a barge-mounted crane with a clamshell or barge-mounted excavator from material barges. The contractors may use a dump scow to transport the rock and place it in the channel. Some of the existing rock slope protection would

need to be temporarily removed in order to construct the abutments; however, no channel dredging or excavation in the levee profiles would be required. To prevent riverbed scour, the contractor would be required to place rock in horizontal layers and to prevent levee scour and the final lifts of rock would be placed on the barrier starting from the levees toward the center of the channel. During final rock placements and closure, excavators would be place rock from the top of the barrier.

Minimal vegetation and clearing would be required on the levees prior to the installation of sheet piles. This would be accomplished by a dozer or backhoe and hand clearing.

Any levee access roads that are damaged as a result of construction equipment or truck use would be restored to pre-construction conditions or better after construction is completed.

The sheet and king piles are anticipated to be installed by an appropriately-sized vibratory hammer, which appears to be feasible given the anticipated ground conditions and modest pile penetration of 20 feet to 50 feet in the ground. Vibratory penetration rates are normally limited to 20 inches per minute (per North American Sheet Piling Associations – Best Practices, www.nasspa.com), which would result in the following vibration times per pile assuming normal driving conditions:

- 20-foot ground penetration: 12 minutes
- 50-foot ground penetration: 30 minutes

Due to uncertainties of the ground conditions and the possibility of encountering dense soil layers and/or obstructions such as left-in-place rip-rap on the existing levee side slopes, a larger impact hammer would be available as a contingency measure, in the event unexpected difficult driving is encountered. The impact hammer would only be used if the vibratory hammer cannot reach design tip elevation of the pilings. In the absence of detailed geotechnical information, it is not known whether an impact hammer would be required, and the exact location and timing of its use. If piles are driven by impact hammers in water deeper than 3.3 feet, a bubble curtain would be employed if underwater noise exceeds pre-established levels (peak pressure levels or cumulative sound exposure level) that would indicate potential injury to fish.

Construction equipment would be placed within the staging area (approximately 1.03 acres) adjacent to Jersey Island Road (i.e., left bank). A complete list of construction equipment anticipated to be used is provided in Table 2.

2.5.3 FACILITIES REMOVAL

All rock, gravel, and structures would be removed from the project site in fall, with the exception of the sheet pile abutments. The methodology described herein is general. Although removal activities would primarily be situated in water, the contractors would also work from the levees.

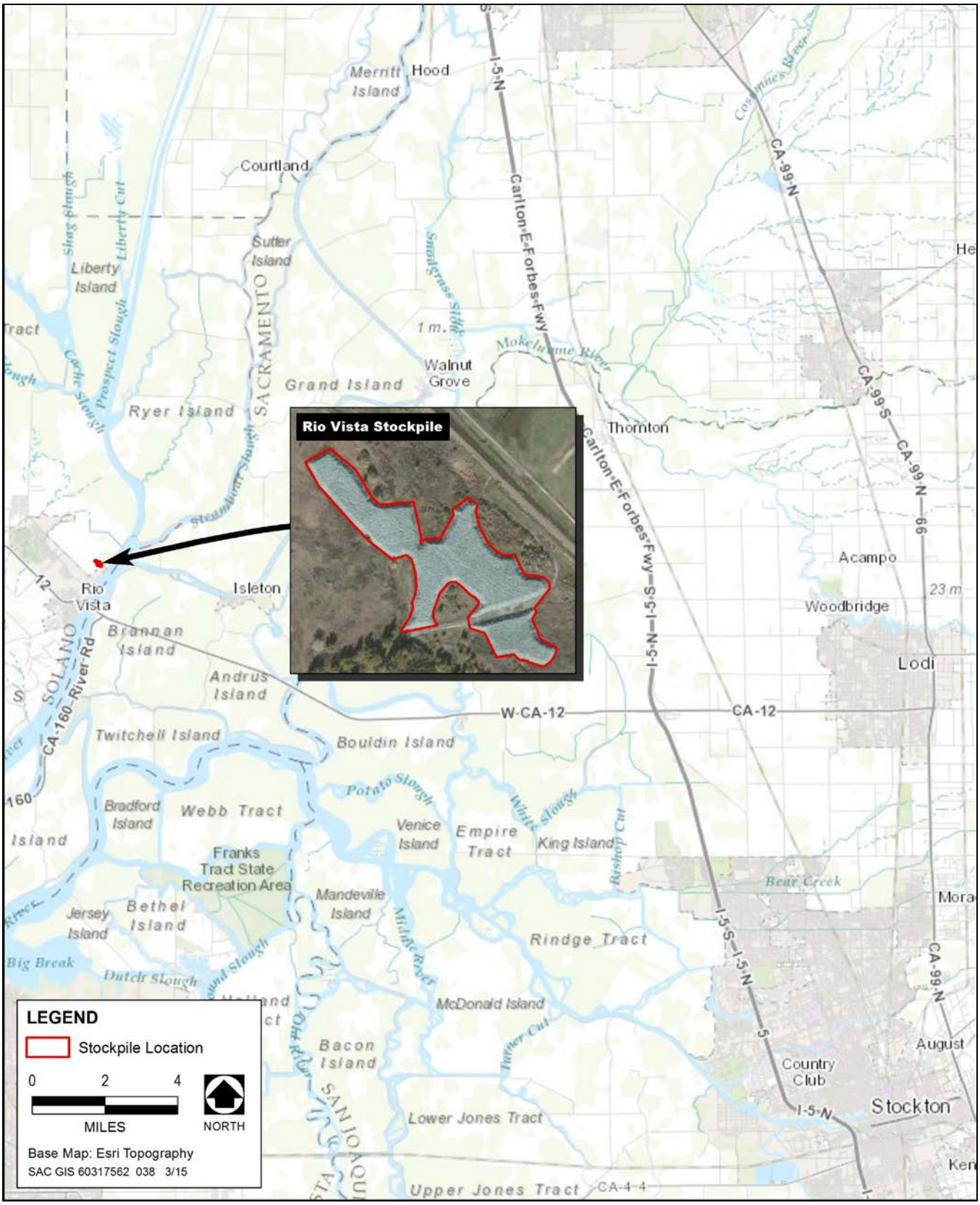
First, the contractors would mobilize construction equipment and crew. DWR would utilize multiple barges with excavators and work boats which would be transported on water to the barrier site. In water work would occur on one side of the barrier–either upstream or downstream of the barrier–in the direction of where the contractors would ship the rock.

Table 2 Anticipated Construction Equipment					
Type of Equipment	Maximum Number	Type of Equipment	Maximum Number	Type of Equipment	Maximum Number
Place Rock					
Tug/barge	8	Dozer	1	Rock haul/dump truck	4
Crane	2	Loader	4	Conveyor	3
Work boat	2				
Drive Piles					
Tug/barge	2	Skid steer loader	1	Crane	1
Crane	2	Off-road crane	1	Pickup	4
Work boat	2	Service truck	1	Air compressor	1
Grader	1	Off-road fork lift	2	Power generator	1
Compactor	1				
Removal					
Tug/barge	8	Excavator	3	Front-end loader	2
Long-reach excavator	3	Dump truck	4	Grader	1
Work boat	2	Dozer	1		
Source: DWR 2014					

Next, the contractors would strategically place the barges adjacent to the barrier in order to excavate the rock. Rock would be excavated using cranes with clam-shell buckets, and/or excavators from one barge and placed onto another barge where it would be transported to an approved off-loading site. Given the volume of rock, DWR anticipates that excavation would occur continuously (i.e., 24 hours per day, 7 days per week). To prevent levee scour, rock removal will start from the center of the channel and work outward. Excavation would occur from the top of the barrier down to the streambed to approximate pre-project contours. DWR would restore the levee geometry to ensure compliance with any local maintaining agency, Central Valley Flood Protection Board, or USACE requirements.

Lastly, the rock would be shipped on a barge from the project site to be off-loaded onto dump trucks using excavators and loaders. The contractors would haul the rock to the Rio Vista stockpile location (outside of waters of the U.S.), which is depicted in Figure 6.

DWR would monitor downstream water quality for parameters, including turbidity, identified in the Emergency Drought Barriers Water Quality Monitoring Plan, during the excavation process. Bathymetric surveys would be completed after emergency drought barrier removal to confirm that the rock is removed.



Source: DWR, adapted by AECOM 2014

Figure 6 **Stockpile Location**

2.5.4 SITE RESTORATION

Disturbed areas would be restored after initial construction and after the EDB is removed. The affected areas would be restored to approximate pre-project conditions.

2.5.5 OPERATIONS AND MAINTENANCE

There are no operational features associated with the proposed barrier. Given the temporary nature of the EDB, maintenance during the time the barrier is installed would be minimal or nonexistent. DWR would inform the permitting fish agencies (CDFW, USFWS, and NMFS) if any major maintenance activities are required during the period of operation (estimated to be June through October).

2.6 ENVIRONMENTAL COMMITMENTS

DWR would implement a number of environmental commitments as part of the proposed project to avoid and minimize potential effects on sensitive species and habitats. These include measures related to general construction practices and measures that focus specifically on sensitive biological resources.

1. PREPARE AND IMPLEMENT AN EROSION CONTROL PLAN

An Erosion Control Plan will be prepared before construction activities that will cause ground disturbance. Site-specific erosion-control, spill-prevention, sedimentation control, and runoff measures will be developed and implemented during construction activities as part of the plan to minimize the potential for erosion and sedimentation during barrier construction and removal.

If applicable, tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used for erosion control and other purposes at the project site to ensure wildlife does not become trapped or entangled in the erosion control material. Coconut coir matting is an acceptable erosion control material, but no plastic mono-filament matting will be used for erosion control. If feasible, the edge of the material will be buried in the ground to prevent wildlife from crawling underneath the material.

2. PREPARE AND IMPLEMENT A SPILL PREVENTION AND CONTROL PROGRAM

A spill prevention and control program will be prepared before the start of construction to minimize the potential for hazardous, toxic, or petroleum substances to be released into the project area during construction and operation. The program will be implemented during construction. In addition, DWR will place sand bags, biologs, or other containment features around the areas used for fueling or other uses of hazardous materials to ensure that these materials do not accidentally leak into the river. DWR will adhere to the standard construction best management practices described in the current California Department of Transportation Construction Site Best Management Practices Manual (California Department of Transportation 2003).

The spill prevention and control program will include procedures for mitigating potential spills caused by collision/stranding of vessel traffic with the barrier during its operation. Spill control materials will be kept at the barrier site and at additional DWR-owned locations in the Delta. The barrier will have clear signage with telephone contact details for DWR personnel as well as the Governor’s Office of Emergency Services (CalOES) hazardous materials (HAZMAT) spill notifications contact number (1-800-852-7550).

3. Prepare and Implement a Hazardous Materials Management Program

A Hazardous Materials Management Program (HMMP) will be prepared and implemented to identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. The HMMP will require that hazardous and potentially hazardous substances stored onsite be kept in securely closed containers located away from drainage courses, storm drains, and areas where stormwater is allowed to infiltrate. It will also stipulate procedures to minimize hazard during onsite fueling and servicing of construction equipment. Finally, the HMMP will require that adjacent land uses be notified immediately of any substantial spill or release.

4. Implement Bay Area Air Quality Management District Basic and Enhanced Construction Emission Control Practices to Reduce Fugitive Dust.

The construction contractor will implement the following applicable basic and enhanced control measures recommended by the Bay Area Air Quality Management District (BAAQMD) to reduce construction-related fugitive dust during site grading at the West False River project site (BAAQMD 2010):

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day, as necessary to control fugitive dust.
- All haul trucks transporting soil, sand, or other loose material off-site will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping will be prohibited.
- All vehicle speeds on unpaved roads will be limited to 15 miles per hour.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and will be determined to be running in proper condition before operation.
- A publicly visible sign with the telephone number and person to contact at the lead agency (i.e., DWR) regarding dust complaints will be posted at the construction sites. The person identified as the contact will respond and take corrective action within 48 hours. The air district's phone number also will be visible, to ensure compliance with applicable regulations.
- Idling time of diesel-powered construction equipment will be no more than 5 minutes.
- All contractors will be required to use equipment that meets the California Air Resources Board's most recent certification standard for off-road heavy-duty diesel engines.

In addition, the construction contractor will implement the following applicable enhanced measures to reduce operation-related diesel particulate matter:

- Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and other options as they become available.

5. Reduce Construction-Related Emissions from Off-Road Equipment and Heavy-Duty Vehicles.

The following measure from the BAAQMD's Additional Construction Mitigation Measures will be implemented during construction at the West False River project site (BAAQMD 2010):

- All contractors will be required to use equipment that meet California Air Resources Board's most recent certification standard for off-road heavy duty diesel engines.

6. Fuel Tugboats/Barges with Renewable Diesel Fuel

All tugboats/barges will be fueled using renewable diesel fuel. The fuel provider could include, but is not limited to Golden Gate Petroleum. However, all renewable diesel fuel used from other providers will achieve a similar emissions reduction potential to Golden Gate Petroleum renewable diesel. In the case that renewable diesel cannot be used for tugboats/barges for logistic reasons, this will be recorded in the bi-weekly construction reports, and incorporated into the final emissions and mitigation fee calculations.

7. Use Construction Monitoring and Bay Area Air Quality Management District Carl Moyer Program or Another Verifiable Offset Program to Offset Regional Off-Site Emissions

DWR and/or its contractor will monitor construction activities throughout construction of the barrier. Construction activities data will be collected, emissions associated with construction activities will be calculated, and these data will be reported to the BAAQMD. The specifics of construction monitoring and reporting will be determined in consultation with BAAQMD. Construction activities data will include, but are not limited to the following items:

1. Tugboats/Barges
    a. Distance traveled by tugboats/barges separated by "loaded" travel and "unloaded" travel.
    b. Horsepower of tugboats and auxiliary engines
    c. Idling time of tugboats/barges
    d. Fuel use and fuel type
2. Construction Equipment
    a. Equipment type and number of pieces
    b. Horsepower
    c. Hours of actual operation
3. Haul Trucks (heavy-duty trucks)
    a. Number of heavy-duty haul truck trips
    b. Total trip distance for haul truck trips
4. Construction Workers
    a. Number of construction workers per day

BAAQMD will collect the construction activity and emissions reports for record keeping and monitoring purposes. Following completion (i.e., removal of the barrier) of the proposed project, the final construction emissions will be evaluated to calculate the total offset mitigation fee based on actual construction activities. DWR will work in coordination with BAAQMD to assess the specific mechanisms associated with construction monitoring, emission calculations, and payment logistics.

DWR will use BAAQMD's Carl Moyer Program (CMP) or another verifiable program to offset the proposed project's reactive organic gases, oxides of nitrogen (NO_X), and particulate matter emissions that exceed the BAAQMD 2010 threshold as determined through the construction monitoring program described above. DWR may achieve the required offset through any combination of the following:

- Reduce on-site emission sources and implement offset actions (i.e., construction or operational changes to site-specific emissions).
- Implement offset emissions and programs available within Contra Costa County and the San Francisco Bay Area Air Basin (SFBAAB).
- Submit payment to BAAQMD on a per ton of NO_X amount (i.e., dollars per ton of NO_X to offset) for emission reduction projects that will be funded by BAAQMD. The price of NO_X emission offsets will be determined by BAAQMD on an annual basis. The types of projects that will be funded by BAAQMD can include:
    - Projects within the Contra Costa County and/or the SFBAAB that are eligible for funding under the CMP guidelines, which are real, surplus, quantifiable, and enforceable.
    - Projects to replace older, high-emitting construction equipment operating in Contra Costa County and/or the SFBAAB with newer, cleaner, retrofitted, or more efficient equipment.

8. Conform to Best Management Practices (BMPs) for Construction and Maintenance Activities to Reduce Greenhouse Gas Emissions that are Contained in the Climate Action Plan Phase I: Greenhouse Gas Emissions Reduction Plan Implementation Procedures (DWR 2012)

DWR will implement the following measures for the proposed project:

Pre-Construction and Final Design BMPs

8.1 Evaluate project characteristics, including location, project work flow, site conditions, and equipment performance requirements, to determine whether specifications of the use of equipment with repowered engines, electric drive trains, or other high efficiency technologies are appropriate and feasible for the project or specific elements of the proposed project.

8.2 Evaluate the feasibility and efficacy of performing on-site material hauling with trucks equipped with on-road engines.

8.3 Ensure that all feasible avenues have been explored for providing an electrical service drop to the construction site for temporary construction power. When generators must be used, use alternative fuels, such as propane or solar, to power generators to the maximum extent feasible.

8.4 Limit deliveries of materials and equipment to the construction sites to off-peak traffic congestion hours.

Construction BMPs

8.5 Minimize idling time by requiring that construction equipment be shut down after 5 minutes when not in use, as required by the State airborne toxics control measure in Section 2485 of Title 13 in the California Code of Regulations. Provide clear signage that posts this requirement for construction workers at the entrances to construction sites and provide a plan for the enforcement of this requirement

8.6 Maintain all construction equipment in proper working condition and perform all preventative maintenance. Required maintenance will include compliance with all manufacturer's recommendations, proper upkeep and replacement of filters and mufflers, and maintenance of all engine and emissions systems in proper operating condition.

8.7 Implement a tire inflation program at construction sites to ensure that equipment tires are correctly inflated. Check tire inflation when equipment arrives on-site and every 2 weeks for equipment that remains on-site. Check vehicles used for hauling materials off-site weekly for correct tire inflation.

8.8 Develop a project-specific ride share program to encourage carpools, shuttle vans, transit passes, and/or secure bicycle parking for construction worker commutes.

8.9 Reduce electricity use in temporary construction offices by using high efficiency lighting and requiring that heating and cooling units be Energy Star compliant. Require that all contractors develop and implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment each day at close of business.

8.10 For deliveries to construction sites where the haul distance exceeds 100 miles and a heavy-duty class 7 or class 8 semi-truck or 53-foot or longer box-type trailer is used for hauling, a SmartWay2 certified truck will be used to the maximum extent feasible.

8.11 Develop a project-specific construction debris recycling and diversion program to achieve a documented 50 percent diversion of construction waste.

8.12 Evaluate the feasibility of restricting all material hauling on public roadways to off-peak traffic congestion hours. During construction scheduling and execution, minimize, to the extent possible, uses of public roadways that will increase traffic congestion.

9. CONDUCT A WORKER ENVIRONMENTAL AWARENESS PROGRAM

Construction workers will participate in a worker environmental awareness program that addresses species under jurisdiction of the permitting agencies (CDFW, USFWS, and NMFS). Workers will be informed about the potential presence of listed and other protected species, and habitats associated with such species, and that unlawful take of the species or destruction of their habitat is a violation of the federal ESA, California Endangered Species Act (CESA), and/or Migratory Bird Treaty Act (MBTA). Before the start of construction activities, a qualified biologist approved by the permitting agencies will instruct all construction workers about the life histories of the protected species and the terms and conditions of the EDB Biological Opinions (BOs), CESA

Incidental Take Permit (ITP), and other regulatory permits that include biological resource protection measures. Proof of this instruction will be submitted to the permitting agencies.

10. Conduct Biological Monitoring

A qualified biologist approved by the permitting agencies will be onsite when daytime construction occurs to conduct compliance inspections during barrier installation and removal and monitor pile driving activities. The qualifications of the biologist(s) will be presented to the permitting agencies for review and approval prior to project activities at the project site. The complete set of permitting documents will be onsite after construction begins. The biologist(s) will be given the authority to stop work that may result in, or in the event that there is, take of listed species in excess of limits provided by the permitting agencies in any permitting documents (BOs, CESA ITP). If the biologist(s) exercise(s) this authority, the permitting agencies will be notified by telephone and electronic mail within 1 working day.

A report of daily records from monitoring activities and observations will be prepared and provided to the permitting agencies upon completion of project activities.

11. Conduct Real-Time Monitoring and Adjust Construction Activities Accordingly

DWR will monitor weather patterns and river forecasts for the period preceding the start of construction. If precipitation events or increases in river levels and flows are predicted to occur immediately before the start of construction, DWR will notify NMFS, USFWS, and CDFW before the start of construction and informally will confer with them to determine whether construction actions are still feasible as previously considered. Sudden increases in river flows, imminent precipitation events that create changes in river stage in the Sacramento and San Joaquin valleys, or observed sudden increases in turbidity in the Sacramento or San Joaquin rivers upstream of the Delta may initiate pulses of fish migration into the project channels (e.g., juvenile salmonids moving downstream, pre-spawning delta smelt moving upstream).

DWR also will monitor the capture of listed fishes in the fish monitoring programs currently being employed in and close to the barrier site, (i.e., at the nearest Interagency Ecological Program monitoring stations). If increasing presence of listed fishes (principally juvenile salmonids and smelts) is detected in these monitoring efforts during project implementation, DWR will immediately contact NMFS, USFWS, and CDFW to allow informal consultation to determine whether construction actions will place fish at substantial additional risk near the barrier site.

12. Conduct Pile Driving With a Vibratory Driver To The Extent Possible; Minimize Effects of Impact Driving

DWR will conduct pile driving using a vibratory hammer to minimize to the extent possible the noise generated from pile-driving activities. Compared to the standard impact driving method, vibratory driving substantially reduces the distance that noise exceeds NMFS thresholds, thereby substantially reducing or avoiding the potential to cause take of listed species. However, in certain circumstances (e.g., vibratory driving is not capable of reaching required embedment), impact pile driving may be necessary. Monitoring of underwater sound generated by the vibratory hammer during pile driving in the vicinity of the West False River barrier will be conducted to verify that sound level criteria are not being exceeded as calculated in the effects analysis (i.e., 214 decibels [dB] cumulative sound exposure level [SEL] at approximately 33 feet [10 meters], for each day of pile driving). If

levels are exceeded, the permitting fish agencies will be notified and work halted until corrective actions are instituted to achieve sound level criteria.

If impact driving is necessary, bubble curtains will be employed to attenuate noise. As noted above for vibratory driving, monitoring of underwater sound generated by impact driving will be conducted to verify that sound level criteria are not being exceeded as calculated in the effects analysis (i.e., 218 dB cumulative SEL at approximately 33 feet [10 meters], for each day of pile driving). If levels are exceeded, the permitting fish agencies will be notified and work halted until corrective actions are instituted to achieve sound level criteria.

Should EDB installation occur in summer (e.g., July), DWR will confer with the permitting fish agencies regarding the need for sound monitoring and restrictions on pile driving during a period in which few listed fishes would be likely to be exposed to excessive sound levels.

13. Install In-Water Navigational Buoys, Lights, and Signage

Navigational buoys, lights, and signage will be installed in West False River upstream and downstream from the emergency drought barrier, to advise boaters about the presence of the emergency drought barrier and maintain navigation along both waterways. Temporary floating signs and buoys will be anchored to the bottom with cables and concrete anchor blocks. DWR will coordinate with the U.S. Coast Guard on signage and buoys.

14. Implement Turbidity Monitoring during Construction

DWR will monitor turbidity levels in West False River during ground-disturbing activities, including placement of rock fill material and any major maintenance. Monitoring will be conducted by measuring upstream and downstream of the disturbance area to ensure compliance with the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Central Valley Regional Water Quality Control Board 2011). For Delta waters, the general objectives for turbidity apply except during periods of stormwater runoff; the turbidity of Delta waters shall not exceed 150 Nephelometric Turbidity Units. Exceptions to the Delta specific objectives are considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity in excess of limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

DWR contractors will slow or adjust work to ensure that turbidity levels do not exceed those conditions described in the 401 certification issued by the SWRCB. If slowing or adjusting work to lower turbidity levels is not practical or if thresholds cannot be met, DWR will consult with the State Water Resources Control Board and permitting fish agencies to determine the most appropriate BMPs to minimize turbidity impacts to the maximum extent feasible.

15. Develop a Water Quality Monitoring Plan to Monitor Water Quality

DWR will develop and implement a water quality monitoring plan to assess the effects of the proposed project on flow and water quality throughout the Delta by using solar-powered monitoring instruments. DWR proposes to install twelve permanent water quality and/or flow monitoring stations. DWR would install the stations at strategic locations from Middle River in the south to Liberty Island in the north and Grizzly Bay or Cutoff Slough in the west. In addition to the new permanent stations, DWR may assess monitoring data from existing and recently updgraded stations throughout the Delta.

- The stations will be used to monitor flow, stage, water velocity, water temperature, specific conductance, turbidity, chlorophyll, nutrients, bromide, and organic carbon, pH, and dissolved oxygen. DWR staff will post weekly water quality data summaries of the continuous data. Chlorophyll and nutrient data will be posted online as soon as the results are available.

The water quality monitoring plan will document the procedures for producing the following elements:

- Water quality data from new monitoring sites and augmentation of existing sites;
- Weekly water quality summaries;
- Chlorophyll and nutrient data (discrete data) summaries as soon as the results are available;
- Final report on project effects on water quality.

16. Return Disturbed Areas to Pre-Project Conditions And Conserve Habitat

DWR and its construction contractors will strive to limit vegetation removal during project-related construction activities. Immediately following barrier removal, DWR will restore habitat to approximate pre-project conditions using native vegetation only. DWR will mitigate through an approved mitigation bank for impacts on shallow water habitat at a 3:1 ratio for permanent impacts and a 1:1 ratio for temporary impacts.

17. Limit Land-Based Access Routes and Construction Area

The number of land-based access routes and each construction area will be limited to the minimum area necessary. Access routes will be restricted to established roadways. Construction area boundaries will be clearly demarcated.

18. Implement Protocols for Valley Elderberry Longhorn Beetle

In addition to other conservation measures associated with air quality and traffic, the following protocols will be implemented.

18.1 Preconstruction Surveys

Before construction activities begin, a biological monitor will conduct a survey of the stockpile site and the adjacent area to confirm no elderberry shrubs are present.

18.2 Impact avoidance and Minimization

If any elderberry shrubs are found, DWR will implement protective buffers. A minimum 100-foot buffer will be established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level.

A fenced avoidance area will be established before the start of construction and material storage to protect all elderberry shrubs located adjacent to the project site or stockpile area. High-visibility fencing will be placed at least 100 feet from the dripline of the shrubs to prevent encroachment of construction workers and vehicles.

If maintaining 100-foot protective buffers around all elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, DWR will coordinate with USFWS to determine if the specific site conditions allow implementation of reduced buffers to adequately minimize impacts on and avoid take of valley elderberry longhorn beetle.

19. IMPLEMENT PROTOCOLS FOR GIANT GARTER SNAKE

In addition to other conservation measures associated with air quality and traffic, the following protocols will be implemented in order to avoid and minimize potential impacts to giant garter snakes that may be present on or adjacent to the project site.

- Initiation of project activities will be restricted to the giant garter snake active season (May 1 – October 1). Barrier installation activities (including staging and pile driving) will not begin before May 1, and barrier removal activities will begin before October 1.

- Before barrier installation and removal activities begin, exclusion fencing will be installed along the landside edge of the construction/staging areas. The appropriate location for the fencing will be determined by the biologist and indicated to the construction contractor. Fencing materials and installation specifications will be determined in coordination with USFWS and CDFW. The fencing will remain in place throughout the duration of barrier installation and removal, and will also be inspected daily when project activities are underway, and will be fully maintained. The fencing will be removed after barrier installation activities are complete and will be re-installed before barrier removal activities begin. After barrier removal activities are complete, all fencing materials will be removed and the area will be returned to pre-project conditions.

- The project site will be surveyed for giant garter snakes by a qualified biologist within 24 hours before barrier installation activities (including fencing installation, equipment and material staging, and pile driving) begin. Surveys will be repeated before barrier removal activities begin and if a lapse in project activities of 2 weeks or greater occurs.

- Through best management practices all attempts will be made to cause no harm or harassment of giant garter snake. If a giant garter snake is encountered within the construction zone, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.

- The biologist will notify USFWS and CDFW immediately if a giant garter snake is found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the snake.

20. IMPLEMENT PROTOCOLS FOR SWAINSON'S HAWK

The following protocols will be implemented to determine if Swainson's hawks are nesting within 0.5 mile of the project site, and to avoid, minimize, and mitigate for potential impacts if active nests are found.

20.1 Preconstruction Surveys

A biological monitor will survey all potential Swainson's hawk nesting trees within 0.5 mile of the project site no more than 5 days before the start of project activities. The biologist will conduct a second survey of potential nesting trees and Swainson's hawk nests no more than 3 days before beginning emergency drought barrier installation. Results will be reported to CDFW within 24 hours of each survey.

20.2 Preconstruction Monitoring

During preconstruction surveys (described immediately above), a biological monitor will observe any nest(s) within 0.5 mile of the project site for at least 1 hour. Nest status will be determined and normal nesting behaviors observed to provide a baseline against which to compare behaviors after construction begins. Results of preconstruction monitoring will be reported to CDFW within 24 hours of each survey.

20.3 Construction Monitoring

All active Swainson's hawk nests within 0.25 mile of the project site (the area in which adverse effects are anticipated to occur) will be monitored during construction activities. Monitoring requirements will generally be based on proximity of construction activities to the nest site, as described below. These requirements may be adjusted, based on observed behavior patterns and response to construction activities by the nesting pair and/or their young. Potential adjustments will be evaluated on a case-by-case basis and in consultation with CDFW.

- 25-Meter Construction Monitoring: Where a Swainson's hawk nest occurs within 25 meters (approximately 80 feet) of construction, a biological monitor will monitor the nesting pair during all construction hours to ensure the hawks are exhibiting normal nesting behavior. Construction activity will be limited to daylight hours.

- 26–100-Meter Construction Monitoring: Where a Swainson's hawk nest occurs between 26 and 100 meters (approximately 80 to 330 feet) of construction, a biological monitor will observe the nest for at least 3 hours per construction day to ensure the hawks are exhibiting normal nesting behavior. Construction activity will be limited to daylight hours.

- 101–200-Meter Construction Monitoring: Where a Swainson's hawk nest occurs between 101 and 200 meters (approximately 330 to 655 feet) of construction, a biological monitor will observe the nest for at least 1.5 hours per construction day to ensure the hawks are exhibiting normal nesting behavior.

- 201–400-Meter Construction Monitoring: Where a Swainson's hawk nest occurs between 201 and 400 (approximately 655 to 1,310 feet) meters of construction, a biological monitor will observe the nest for at least 2 to 3 hours on each of 3 days per construction week to ensure the hawks are exhibiting normal nesting behavior and to check the status of the nest.

- 401–800-Meter Construction Monitoring: Where a Swainson's hawk nest occurs between 401 and 800 meters (approximately 1,310 to 2,635 feet) of construction, a biological monitor will observe the nest for at least 2 to 3 hours on 1 day per construction week to ensure the hawks are exhibiting normal nesting behavior and to check the status of the nest.

20.4 Approach Close to Active Nest Trees

If personnel must approach closer than 25 meters (approximately 80 feet) to an active nest tree for more than 15 minutes while adults are brooding, the nesting adults will be monitored for signs of stressed behavior. If stressed behavior is observed, personnel will leave until the behavior normalizes. If personnel must approach closer than 50 meters (approximately165 feet) for greater than 1 hour, the same applies. All personnel outside vehicles will be restricted to greater than 100 meters (approximately 330 feet) from the nest tree unless construction activities require them to be closer, and the personnel will remain out of the line of sight of the nest during work breaks.

20.5 Authority to Stop Construction

If a biological monitor determines that a nesting Swainson's hawk is significantly disturbed by project activities, to the point where nest abandonment is likely, the biological monitor will have the authority to immediately stop project activity and work will cease until the threat has subsided. The biological monitor will notify CDFW if nests or nestlings are abandoned, and if the nestlings are still alive, to determine appropriate actions.

20.6 Salvage of Eggs and Young

If an abandonment of a nest with eggs or nestlings occurs because of construction activities, DWR will initiate action to retrieve any abandoned eggs or nestlings and deliver them to a CDFW-approved wildlife care facility for rearing and later return to the wild using methods acceptable to CDFW. DWR will fund the recovery, rearing, and controlled release of the young. Persons handling eggs and/or young birds will be qualified and approved by CDFW to conduct retrieval of abandoned eggs or nestlings.

20.7 Compensatory Mitigation

DWR will provide mitigation to compensate for the potential impacts of reduced nest productivity or nest failure as a result of construction activities. If an active nest is present within 0.5 mile of the project site during barrier construction and project activities result in reduced nest productivity, DWR will provide compensation for this potential impact. The circumstances under which compensation will be provided will depend on local conditions, such as distance from the nest to the project site, baseline human activity levels in the vicinity of the nest, and observed behavior of the nesting pair and will be determined in consultation with CDFW. If a monitored nest is abandoned due to construction activities and nestlings are still alive, DWR will fund the recovery and hacking (controlled release) of the nestlings. If a nest is abandoned due to construction activities and the nestlings do not survive, DWR will provide compensation for this loss. The appropriate amount and nature of the compensation will be determined in consultation with and approved by CDFW, based on the specific circumstances of the impact, and all mitigation will be implemented in accordance with the ITP issued for the project. Potential compensation mechanisms may include permanent protection and management of habitat for Swainson's hawk at a mitigation bank, contribution to a Swainson's hawk conservation fund, or other feasible means of promoting the long-term conservation of the species.

21. IMPLEMENT PROTOCOLS FOR BURROWING OWLS

The following protocols will be implemented to determine if burrowing owls are present adjacent to EDB activity areas that support potentially suitable habitat, and to avoid and minimize potential impacts if occupied burrows are found.

21.1 Habitat Assessment and Preconstruction Surveys

A qualified biologist will conduct an assessment of burrowing owl habitat suitability at the project site and the stockpile site. The assessment will evaluate the area subject to direct impact, as well as adjacent areas within 150 to 500 meters (approximately 490 to 1,640 feet), depending on the potential extent of indirect impact. If suitable habitat or sign of burrowing owl presence is observed, surveys and reporting will be conducted in accordance with Appendix D of CDFW's Staff Report on Burrowing Owl Mitigation (CDFW 2012). At a minimum, an initial take avoidance survey will be conducted no less than 14 days before stockpiling activities begin and a second survey will be conducted within 24 hours before activities begin. If sign of burrowing owl presence is observed

during the habitat assessment, the full survey protocol (four surveys during the breeding season and four surveys during the non-breeding season) will be implemented, to the extent feasible, depending on timing of project implementation and stockpiling activities.

21.2 Impact Avoidance and Minimization

If any occupied burrows are observed, DWR will develop and implement avoidance and minimization measures, such as protective buffers, in consultation with CDFW. A qualified biologist will monitor the occupied burrows before and during stockpiling activities to inform development of and confirm effectiveness of these measures. If it is determined, in consultation with CDFW, that passive exclusion of owls from the stockpile area is an appropriate means of minimizing direct impacts, such exclusion will be conducted in accordance with an exclusion and relocation plan developed by DWR in coordination with and approved by CDFW.

Burrows occupied during the breeding season (February 1 through August 31) will be provided a protective buffer until a qualified biologist verifies through noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer will depend on distance from the nest to the project footprint, type and intensity of disturbance, presence of visual buffers, and other variables that could affect susceptibility of the owls to disturbance.

22. IMPLEMENT PROTOCOLS FOR NESTING RAPTORS OTHER THAN SWAINSON'S HAWK AND BURROWING OWL

The following protocols will be implemented to determine if raptors other than Swainson's hawk and burrowing owl are nesting on or adjacent to the project site, and to avoid and minimize potential impacts if active nests are found.

22.1 Preconstruction Surveys

Focused surveys for active nests of Cooper's hawk, white-tailed kite, and other common raptors will be conducted by a qualified biologist in areas of suitable nesting habitat within 500 feet of the project site. Surveys will be conducted within 10 days before the start of project activities that would occur during the raptor nesting season (February 1 – September 15).

22.2 Impact Avoidance and Minimization

If an active nest is identified, an appropriate protective buffer will be determined by the biologist, in coordination with CDFW. The size of the buffer will depend on site-specific conditions and potential disturbance levels. Construction-related activities within the buffer will be avoided to the extent feasible until the nest is no longer active. If construction activity is necessary within the buffer, a qualified biologist will monitor the nesting adults and/or young for signs of stressed behavior. If behavior suggesting potential for nest failure is observed, project activity within the buffer will be reduced until behavior normalizes. Frequency and duration of monitoring will depend on the location and intensity of construction activity within the buffer and will be determined by the biologist, in coordination with CDFW.

23. IMPLEMENT PROTOCOLS FOR MIGRATORY BIRDS

The following protocols will be implemented to determine if migratory birds are nesting on or immediately adjacent to the project site, and to avoid and minimize potential impacts if active nests are found.

23.1 Preconstruction Surveys

Focused surveys for active nests of migratory birds will be conducted by a qualified biologist on and immediately adjacent to the project site. Surveys will be conducted within 10 days before the start of project activities that would occur during the nesting season (March 1 to August 31).

23.2 Impact Avoidance and Minimization

If an active migratory bird nest is found within the construction footprint, the biologist will develop appropriate measures, such as implementation of a protective buffer, to avoid disturbance of the nest until it is no longer active.

24. IMPLEMENT PROTOCOLS FOR SPECIAL-STATUS PLANTS

The following protocols will be implemented to determine if special-status plants are present on or immediately adjacent to the project site, and to avoid and minimize potential impacts if target species are found.

24.1 Pre-construction Surveys

A focused survey for delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), delta mudwort (*Limosella australis*), Sanford's arrowhead (*Sagittaria sanfordii*), woolly rose-mallow (*Hibiscus lasiocarpos* var. *occidentalis*), and any other special-status plant that may occur at the project site will be conducted by a qualified botanist in areas of suitable habitat in the ground disturbance footprints and within 25 feet of the footprint boundaries. To the extent feasible depending on timing of barrier installation, surveys will be conducted at an appropriate time of year during which the species are likely to be detected, generally during the blooming period.

24.2 Impact Avoidance and Minimization

If Mason's lilaeopsis is detected, a qualified botanist will ensure the area occupied by this species is fenced for complete avoidance during barrier installation, operation, and removal. Habitat occupied by other special-status species will also be fenced and avoided, to the extent feasible.

If special-status plants (other than Mason's lilaeopsis) cannot be avoided, a qualified botanist will assess the feasibility of salvaging and transplanting individual plants to be removed, collecting and planting seeds of plants to be removed, and/or collecting and translocating seed- and rhizome-containing mud to nearby areas of suitable habitat. If such actions are deemed feasible, they will be implemented under the direction of the botanist, and in coordination with CDFW.

25. MINIMIZE WILDLIFE ATTRACTION

To eliminate attraction of wildlife to the project site, all food-related trash items, such as wrappers, cans, bottles, and food scraps, will be disposed of in closed containers and removed from the site on a daily basis.

26. Work with North Delta Water Agency to Minimize Salinity Changes for Water Users within the Agency's Boundaries

DWR will reach agreement with North Delta Water Agency to ensure that any salinity increases remain below the State Water Resources Control Board limits set in Water Rights Decision 1641 as amended. DWR remains committed to fulfilling its commitments in the 1981 Contract between State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality.

27. Conduct Scour Monitoring

Prior to installation of the emergency drought barrier, DWR will use low-level aerial surveys to conduct aerial video and photo documentation of the existing conditions, critical channels, and levees (mainly at Fisherman's Cut and Dutch Slough). Similar flights would also be conducted following barrier removal. Aerial video and photo documentation both before barrier installation and after barrier removal would be compared. Bathymetric surveys will also be conducted prior to installation of the barrier and after removal and the results will be compared. Although damage to levees or property is not anticipated based on the expected worse case velocities, DWR will be responsible for repairing any damage documented and verified through the pre- and post-construction surveys.

28. Maintain Sheet Piles and Rock Fill

DWR will assure that the sheet piles and rock fill are maintained. DWR will either contract with the Local Maintaining Agency (LMA) or use DWR resources or contractors to repair and or replace the transition rock as needed. If DWR determines that they are no longer functional or a safety issue is identified with the sheet piles that cannot be mitigated through other means, they will be removed either by cutting them off with a torch or driving them into the grade. If removal is needed, DWR will coordinate with the LMA on a removal plan.

Inspections of the sheet piles and rock will compare actual conditions with as constructed plans and/or bathymetric survey data. The results of the inspections and any bathymetric survey data collected will be made available to the LMAs. Any necessary repairs of the rock will be made using land or water-based construction equipment during summer and fall (July through October) when special-status species are less likely to be affected.

If maintenance or removal of the sheet piles or rock fill is deemed necessary, DWR or the LMA will seek authorization from the applicable resources agencies (i.e., USACE, USFWS, NMFS, and CDFW).

29. Remove Invasive Species

DWR will coordinate with the California Department of Parks and Recreation Division of Boating and Waterways Aquatic Weed Control Program for the control of invasive water hyacinth, Brazilian elodea (*Egeria Densa*) or other invasive water weeds covered by the control program in the vicinity of the barrier while the barrier is in place. As needed, the Division of Boating and Waterways will conduct herbicide treatments to control water hyacinth that may result from in changes flow from installation of the barrier. DWR will coordinate with the Division of Boating and Waterways on removal strategies for water hyacinth or other covered invasive water weeds as necessary to assure that the barrier does not exacerbate current aquatic invasive weed problems.

30. Coordinate Traffic Management Plans with Contra Costa County

DWR will coordinate a traffic management plans with Contra Costa County for construction traffic and haul routes. DWR will document pre- and post-construction haul route conditions, if applicable, and will repair any documented pavement damage from heavy equipment.

31. Minimize Impacts to Ferry Service

If needed, DWR will work with the Delta Ferry Authority to implement solutions to minimize impacts to ferry service as a result of installation of the barrier should changes in water flow or growth of aquatic weeds become an issue for normal ferry operations. Coordination will occur during construction, while the barrier is in place, and during removal activities.

3 REFERENCES

BAAQMD. *See* Bay Area Air Quality Management District.

Bay Area Air Quality Management District. 2010. CEQA Air Quality Guidelines. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en. Accessed May 5, 2014.

California Department of Fish and Wildlife. 2012. *Staff Report on Burrowing Owl Mitigation*. Sacramento: Natural Resources Agency.

California Department of Transportation. 2003. *Construction Site Best Management Practices (BMPs) Manual*. Sacramento, CA.

Central Valley Regional Water Quality Control Board. 2011 (October). *Water Quality Control Plan (Basin Plan) for the Sacramento River and San* Joaquin *River Basins*. Fourth edition. Sacramento, CA.

CDFW. *See* California Department of Fish and Wildlife.

California Department of Water Resources. 2012. California Department of Water Resources Climate Action Plan, Phase 1: Greenhouse Gas Emissions Reduction Plan. Available: http://www.water.ca.gov/climatechange/docs/ Final-DWR-ClimateActionPlan.pdf. Accessed May 13, 2014.

DWR. *See* California Department of Water Resources.

Sacramento Metropolitan Air Quality Management District. 2010. Basic Construction Emission Control Practices. Available: http://www.airquality.org/ceqa/cequguideupdate/Ch3BasicConstructionEmissionControlPracticesFINAL.pdf. Accessed September 17, 2014.

SMAQMD. *See* Sacramento Metropolitan Air Quality Management District.

USDA. *See* U.S. Department of Agriculture.

U.S. Department of Agriculture. 2014 (December 10). Secretarial Disaster Designations – 2014 Crop Year. All Drought – Total Counties by State. Available: http://www.usda.gov/documents/2014-all-crop-list-counties.pdf. Accessed December 15, 2014.