

Biological Assessment for  
Terrestrial Species Managed by the U.S. Fish and Wildlife Service

West False River Emergency Drought Barrier Project



Prepared for:



California Department of Water Resources

**AECOM**

July 2015



Biological Assessment for  
Terrestrial Species Managed by the U.S. Fish and Wildlife Service

## West False River Emergency Drought Barrier Project



Prepared for:

California Department of Water Resources  
1416 9th Street  
Sacramento, CA 94236-001

Contact:

Jacob McQuirk  
916/653-9883

Prepared by:

AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811

Contact:

Cindy Davis  
Project Manager  
916/414-5800

**AECOM**



# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2</b>	<b>CONSULTATION HISTORY.....</b>	<b>1</b>
<b>3</b>	<b>PURPOSE AND SCOPE OF THIS BIOLOGICAL ASSESSMENT.....</b>	<b>2</b>
<b>4</b>	<b>PROJECT DESCRIPTION .....</b>	<b>3</b>
	4.1 Project Location .....	3
	4.2 Barrier Installation and Operation.....	3
	4.3 Barrier Removal .....	10
<b>5</b>	<b>CONSERVATION MEASURES .....</b>	<b>11</b>
	5.1 DWR Conservation Measures .....	13
	5.2 Additional Measures Required by USFWS.....	26
	5.3 Implementation.....	27
<b>6</b>	<b>ACTION AREA.....</b>	<b>29</b>
<b>7</b>	<b>LIFE HISTORY .....</b>	<b>29</b>
<b>8</b>	<b>ENVIRONMENTAL BASELINE .....</b>	<b>30</b>
	8.1 Status of the Species in the Action Area .....	30
	8.2 Factors Affecting the Species and Habitat in the Action Area.....	32
<b>9</b>	<b>EFFECTS ASSESSMENT .....</b>	<b>32</b>
<b>10</b>	<b>CUMULATIVE EFFECTS.....</b>	<b>34</b>
<b>11</b>	<b>CONCLUSION .....</b>	<b>35</b>
<b>12</b>	<b>REFERENCES .....</b>	<b>35</b>

## Appendices

Appendix A	USFWS Species List for the West False River Emergency Drought Barrier Project
Appendix B	Photographs of the Action Area
Appendix C	Giant Garter Snake Capture and Relocation Report
Appendix D	Revegetation Plan

## Figures

Figure 1	Location of Emergency Drought Barrier .....	4
Figure 2	Aerial View of the Project Site .....	5
Figure 3	Locations of the 12-Inch Steel Pipe Piles .....	9
Figure 4	Stockpile Location .....	12

## Tables

Table 1	Installation Timeline .....	6
Table 2	Construction Equipment Used During Barrier Installation.....	7
Table 3	Coordinates of the 12-Inch Steel Pipe Piles.....	8
Table 4	Construction Equipment Anticipated to be Used for Barrier Removal .....	11
Table 5	Conservation Measures Implemented During Barrier Installation .....	27
Table 6	Confirmed and Potential Observations of Giant Garter Snakes in the Vicinity of the Action Area Before and During 2015 Barrier Installation .....	31

## ACRONYMS AND ABBREVIATIONS

BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan
BMPs	Best Management Practices
BOs	Biological Opinions
CalOES	Governor's Office of Emergency Services
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CMP	Carl Moyer Program
CNDDB	California Natural Diversity Database
Delta	Sacramento-San Joaquin River Delta
DWR	Department of Water Resources
EC	electrical conductivity
EDB	emergency drought barrier
ESA	Endangered Species Act
HAZMAT	hazardous materials
HMMP	Hazardous Materials Management Program
ITP	Incidental Take Permit
NMFS	National Marine Fisheries Service
NO <sub>x</sub>	oxides of nitrogen
SFBAAB	San Francisco Bay Area Air Basin
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

This page intentionally left blank.

# 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) installed an emergency, temporary rock barrier across West False River in May-July 2015. The barrier is scheduled to be removed by November 2015. The emergency drought barrier (EDB) is essentially a pile of basketball-size rocks across the 800-foot-wide channel. Keeping saltwater out of the central Delta is a priority, as a large portion of the state's freshwater supplies travels through this part of the Delta. The barrier helps prevent saltwater contamination of water supplies used by people who live in the Delta and in Contra Costa, Alameda, and Santa Clara counties, as well as the 25 million people who rely on the Delta-based federal and state water projects for at least some of their supplies.

On April 1, 2015, California's Governor Edmund G. Brown Jr. issued Executive Order B-29-15 which extended the orders and provisions in Executive Order B-26-14 (January 17, 2014 Proclamation of State of Emergency) and Executive Order B-28-14 (April 25, 2014 Proclamation of a Continued State of Emergency) 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 in the State Water Resources Control Board's (SWRCB) Decision 1641 to meet water quality objectives in the Water Quality Control Plan for the Bay-Delta and other necessary actions to protect water quality and water supply in the Delta, including installation of a temporary barrier 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 (Section 13247) of the Public Resources Code related to compliance with approved or adopted water quality control plans. The 2015 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 barrier and authorizes the DWR Director to request the Secretary of the Army, on the recommendation of the Chief of Engineers of the U.S. Army Corps of Engineers (USACE), grant permission to install the barrier. On May 4, 2015, USACE Sacramento District authorized DWR to install the barrier (SPK-2014-0087) pursuant to Section 14 of Rivers and Harbors Act of 1899 (RHA) and Section 404 of the Clean Water Act.

## 2 CONSULTATION HISTORY

Consultation with the U.S. Fish and Wildlife Service (USFWS) and other regulatory agencies began when DWR hosted a coordination meeting on March 5, 2014. Representatives from the USFWS, National Marine Fisheries Service (NMFS), Bureau of Reclamation, USACE, SWRCB, and the AECOM-led consulting team attended this meeting. Since then, coordination meetings and calls attended by DWR, the AECOM-led consulting team, and agency representatives have been conducted periodically as the project description has developed.

Five biological assessments were submitted to USACE and USFWS between March 2014 and April 2015. These biological assessments addressed several different proposals for implementing a drought barrier project that varied in the number and location of proposed barriers and the implementation period and frequency. The first biological assessment, dated March 25, 2014 and submitted to USACE with the Section 404 permit application, evaluated

implementation of the proposed action from spring to fall 2014 at three locations. The second document, dated May 7, 2014, evaluated implementation from summer to fall 2014. However, on July 17, 2014, DWR requested that the 404 permit application and associated consultations with USFWS and NMFS be rescinded, because installation of the proposed barriers in 2014 was determined not to be necessary.

The third biological assessment, dated January 28, 2015, was submitted to USACE with the revised Section 404 permit application and evaluated implementation of a proposed action to install temporary barriers at three locations, up to three times over a 10-year period beginning in 2015. The fourth document, dated April 1, 2015 and prepared in response to agency requests to limit the proposed action to 2015 implementation, also proposed new locations for two of the barriers. The fifth biological assessment, dated April 13, 2015, was prepared in response to agency requests to limit the proposed action to only one barrier.

A letter dated April 20, 2015 was submitted to USACE requesting Emergency Procedures be used to secure permits for the EDB in order to begin in-water work by May 7, 2015. A biological assessment, dated April 28, 2015, was prepared to describe the emergency action and provide results of initial biological field surveys conducted at the EDB site. On April 29, 2015, USACE provided the biological assessment to USFWS and requested emergency consultation with USFWS under Section 7 of the ESA (50 CFR 402.05) for construction and removal of a single drought barrier at West False River. USFWS provided an email response on May 1, 2015 indicating that USACE should ensure DWR implement the Conservation Measures described in the April biological assessment, as well additional measures described in the email.

This biological assessment describes barrier installation activities completed in May and July 2015 under the emergency action, provides additional information on anticipated barrier removal methods, summarizes results of biological field surveys and monitoring conducted before and during barrier installation, and discusses effects on terrestrial species managed by USFWS that occurred during the emergency installation and could occur during barrier operation and removal.

### **3 PURPOSE AND SCOPE OF THIS BIOLOGICAL ASSESSMENT**

This biological assessment is intended to satisfy the Section 7 consultation requirements of the federal Endangered Species Act (ESA) for terrestrial species managed by the USFWS. Delta smelt (*Hypomesus transpacificus*) is separately addressed in a biological assessment prepared for aquatic species. A USFWS species list (Appendix A) was generated for the Jersey Island U.S. Geologic Survey quadrangle, in which the temporary barrier would be located, as well as the surrounding eight quadrangles (Antioch North, Antioch South, Birds Landing, Bouldin Island, Brentwood, Isleton, Rio Vista, and Woodward Island). This biological assessment describes effects potentially resulting from implementation of the EDB on giant garter snake (*Thamnophis gigas*).

Many additional species included on the USFWS list generated for the nine quadrangles were evaluated for their potential to occur in the vicinity of the project site and potentially be affected by the EDB. The following terrestrial species were eliminated from consideration in this biological assessment because the EDB and stockpile sites are outside of the current range of the species or field observations and review of aerial photography concluded there is no suitable habitat for the species on, or adjacent to, the sites:

- ▶ Lange's metalmark butterfly (*Apodemia mormo langei*)
- ▶ Conservancy fairy shrimp (*Branchinecta conservatio*)

- ▶ Longhorn fairy shrimp (*Branchinecta longiantenna*)
- ▶ Vernal pool fairy shrimp (*Branchinecta lynchi*)
- ▶ Delta green ground beetle (*Elaphrus viridis*)
- ▶ Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
- ▶ San Bruno elfin butterfly (*Incisalia mossii bayensis*)
- ▶ Vernal pool tadpole shrimp (*Lepidurus packardii*)
- ▶ California tiger salamander, central population (*Ambystoma californiense*)
- ▶ California red-legged frog (*Rana draytonii*)
- ▶ Alameda whipsnake (*Masticophis lateralis euryxanthus*)
- ▶ California clapper rail (*Rallus longirostris obsoletus*)
- ▶ California least tern (*Sterna antillarum browni*)
- ▶ Salt marsh harvest mouse (*Reithrodontomys raviventris*)
- ▶ San Joaquin kit fox (*Vulpes macrotis mutica*)
- ▶ Large-flowered fiddleneck (*Amsinckia grandiflora*)
- ▶ Soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*)
- ▶ Contra Costa wallflower (*Erysimum capitatum* ssp. *angustatum*)
- ▶ Contra Costa goldfields (*Lasthenia conjugens*)
- ▶ Colusa grass (*Neostapfia colusana*)
- ▶ Antioch Dunes evening-primrose (*Oenothera deltoides* ssp. *howellii*)
- ▶ Keck's checker-mallow (*Sidalcea keckii*)

## 4 PROJECT DESCRIPTION

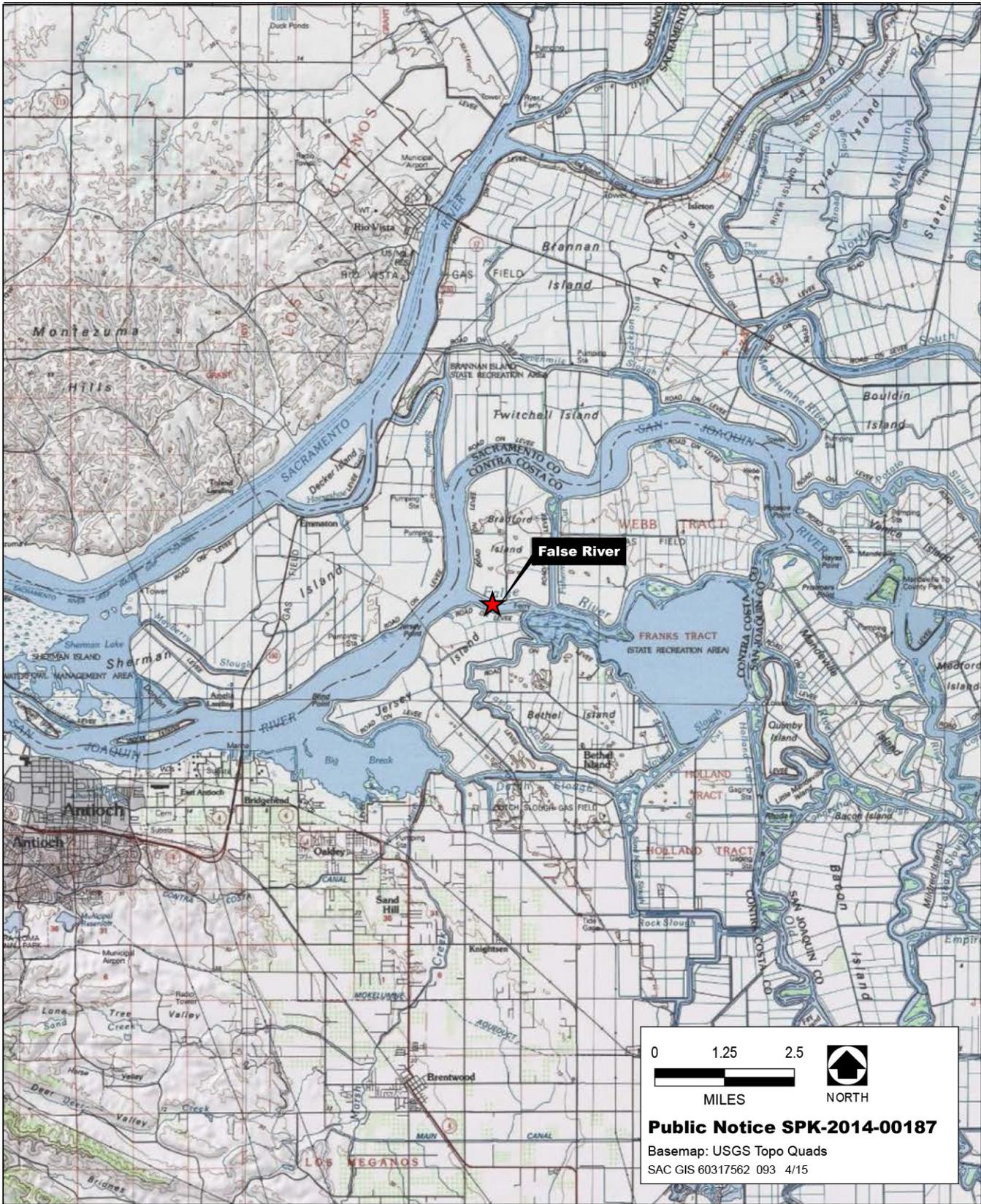
### 4.1 PROJECT LOCATION

The EDB was installed at West False River (**Figure 1** and **Figure 2**). The project site is located on West False River approximately 0.4 mile east of its 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. The project site is approximately 4.8 acres, including 2.85 acres of aquatic fill and 1.95 acres of upland disturbance (of which 1.08 acres on the levee setback was used for staging).

### 4.2 BARRIER INSTALLATION AND OPERATION

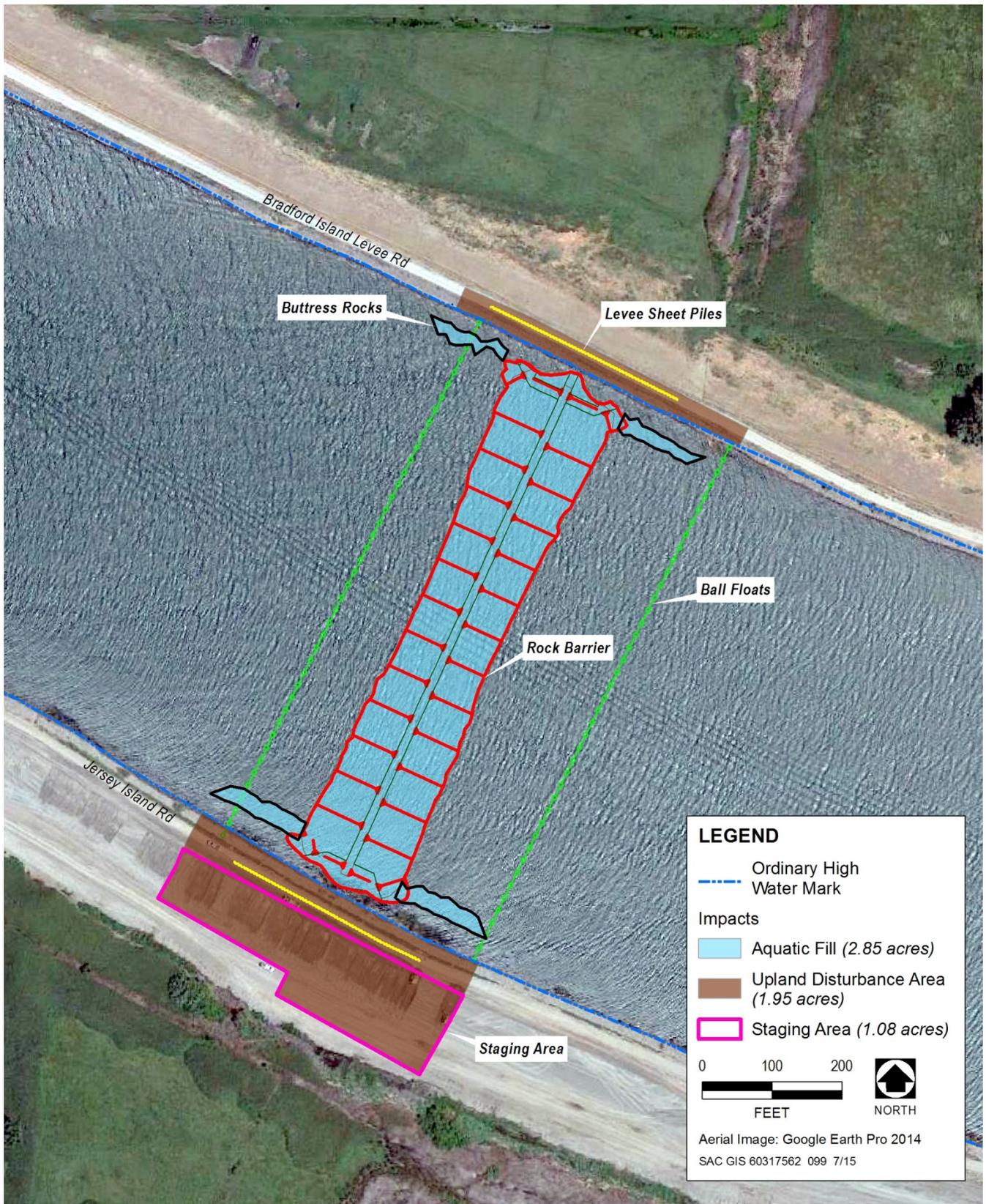
#### 4.2.1 DESIGN

The EDB located at West False River is approximately 800 feet long and up to 200 feet wide at the base (in water) and 12 feet wide at the top (above water). The structure is a trapezoid-shaped rock barrier with a wide base tapering up to a 12-foot-wide top width set perpendicular to the channel alignment. The top of the structure is at an elevation of 7 feet above sea level across the entire crest. The temporary barrier includes two king pile-supported sheet pile walls extending out from each levee into the West False River channel for a total length of approximately 75 feet. The sheet piles/king piles are required because the levees are on peat soils and placing a large volume of rock directly on the levees could cause stress. For construction of the barrier, DWR obtained permanent rights on Bradford Island and temporary rights on Jersey Island.



Source: DWR 2015, AECOM 2015

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



Source: DWR 2015, AECOM 2015

**Figure 2. Aerial View of the Project Site**

To address existing erosion of the waterside levee toe on both Jersey and Bradford islands, rock fill was placed 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) in order to prevent sloughing of the levee when the sheet piles were driven. Because this fill is necessary for levee stability, the rock will remain in place permanently.

The barrier consists of the following piles:

- ▶ Eight 36-inch-diameter king piles (barrier abutments);
- ▶ 70 sheet piles (barrier abutments), or 35 pairs of sheet piles totaling approximately 160 wall feet (including approximately 5 feet on either side that would be in the levee); and
- ▶ Four 12-inch steel pipe piles (buoy line anchors).

In addition to the sheet piles in West False River, 300 feet of sheet piles were 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 were set into the tops of the levees on each side of the barrier and will remain in place.

#### 4.2.2 SCHEDULE

Construction of the EDB started on May 5, 2015 and concluded on July 2, 2015 for a total of 43 working days. A timeline of key installation activities is summarized in **Table 1**.

<b>Table 1. Installation Timeline</b>	
<b>Date</b>	<b>Activity</b>
May 5 and 6, 2015	Mobilized equipment
May 6-12, 2015	Installed buttress rock on the levee toes of Bradford and Jersey islands
May 7-June 12, 2015	Placed and shaped embankment rock with cranes and dump scows
May 8-13, 2015	Installed pipe preventer sheet piles on Bradford and Jersey islands
May 14-15, 2015	Backfilled pipe preventer sheet pile trenches on Bradford and Jersey island levees
May 14-16, 2015	Installed king piles on and perpendicular to Bradford and Jersey islands <sup>1</sup>
May 16 and 18-26, 2015	Installed sheet piles and whaler systems on and perpendicular to Bradford and Jersey islands <sup>2</sup>
May 28, 2015	Barrier closed
June 4-6 and 8-10, 2015	Installed water quality monitoring station piles throughout the Delta <sup>3</sup>
June 13-17, 2015	Demobilized equipment
June 25, 2015	Placed soil stabilization and regraded upland disturbance areas
July 2, 2015	Installed spike strips and metal baffles on whaler system for rodent migration prevention
Notes:	
<sup>1</sup> Pile driving for king piles occurred in-water on three days (May 14-16). DWR conducted in-water noise monitoring during these days.	
<sup>2</sup> Pile driving for sheet piles occurred in-water on only six days (May 16 and 18-22). DWR conducted in-water noise monitoring for five of these days (May 18-22). Pile driving did not occur on May 17 because of strong wind.	
<sup>3</sup> Pile driving for the monitoring stations occurred in-water on all six days (June 4-6 and 8-10). DWR conducted in-water noise monitoring during these days.	
Source: DWR 2015	

Construction generally occurred during the daytime (6:00 a.m.–6:00 p.m.); however, placement of rock occurred on a 24-hour basis from May 21-29 and June 3, 5, and 6. The size of the construction crew varied based on activity; a maximum of 21 people worked on site from May 23–30 during rock placement.

### 4.2.3 CONSTRUCTION METHODOLOGY

The contractor mobilized on May 5 and 6 and established a staging area (approximately 1.08 acres) adjacent to Jersey Island Road (i.e., left bank) and installed silt and exclusion fencing. Next, equipment was transported to the site on barges and trucks. A complete list of construction equipment that was used for barrier installation is provided in **Table 2**.

Type of Equipment	Number	Type of Equipment	Number	Type of Equipment	Number
Derrick barge	2	Crane barge	3	Scow/material barge	6
Work boat	4	Steel skiff	3	Boston whaler	2
Crew boat	1	Survey boat	1	Tug	2
Grader	1	Off-road fork lift	2	Power generator	2
Compactor	1	Mini excavator	1	Light plants	10
Water truck	1	Backhoe	1	Off-road forklift	1
Manlift	1	Pickup trucks	2	Vibratory pile driver	2

Source: DWR 2015

Following mobilization, the contractor worked on strengthening the levees which occurred from May 6-12. Approximately 0.26 acre (approximately 4,000 cubic yards) of rock fill was installed along the levee toe of Bradford and Jersey islands. Concurrently with placement of the buttress rock, the contractor used a vibratory pile driver, mini excavator and backhoe to install the piping preventer sheet piles on Bradford and Jersey islands. Once the piping preventer sheet piles were installed, the associated trenches were backfilled and compacted.

With the levees strengthened, work shifted to the abutments (king piles, river sheet piles, and whaler system). The contractor used barge-mounted pile drivers to install the abutments. The king piles were installed on and perpendicular to the islands on May 14-16. During this time, the contractor used a bubble curtain to attenuate in-water noise. In a similar manner, sheet piles and whaler systems were installed on and perpendicular to the islands on May 16 and 18-26 (in-water pile driving only occurred May 16 and 18-22). To expedite construction, the contractor worked concurrently on both sides of the river. DWR conducted in-water noise monitoring (May 14-16 and 18-22) during in-water pile driving.

Rock placement for the barrier occurred from May 7-June 12. Rock was shipped on barges from the contractor’s quarry in San Rafael, Marin County, California. Concurrent with levee stability work and abutment installation, the contractor began placing rock into West False River with a dump scow. In a uniform manner, rock was first dumped near the levees and then into the center of the river. This methodology was used to prevent levee scour. Because of fluctuations in water level and the increased streambed elevation, the contractor was only able to use the dump scow for approximately 10 days (May 10-19). With barge-mounted cranes using clam-shelled and dragline buckets, the contractor then shaped the rock into the trapezoidal shape and filled the center of the barrier. The barrier was “closed” (i.e., water stopped flowing through West False River) on May 28. The contractor

continued to place and shape rock until June 12. In total, constructing the trapezoidal rock barrier took approximately 36 days, including 12 days of 24-hour work. For construction of the barrier, the contractor installed approximately 2.6 acres (approximately 74,000 cubic yards) of rock fill. Note that approximately 0.01 acre of embankment rock overlaps the buttress rock.

After the barrier was installed, the contractor demobilized from the site on June 13-17. On June 25, the contractor conducted minor regrading activities and placed soil stabilization upland on disturbance areas. On July 2, the contractor installed bird spikes and metal baffles on the whaler system.

#### 4.2.4 WATER QUALITY MONITORING STATIONS

On June 4-6 and 8-10, the contractor installed twelve permanent 12-inch steel pipe piles to be used for water quality monitoring equipment during EDB operation. DWR conducted in-water noise monitoring during in-water pile driving. The solar-powered equipment will monitor water quality parameters like dissolved oxygen, turbidity, salinity as measured by electrical conductivity (EC), river stage, and flow velocity. The coordinates of the 12-inch steel pipe piles are listed in **Table 3** and their locations are shown in **Figure 3**.

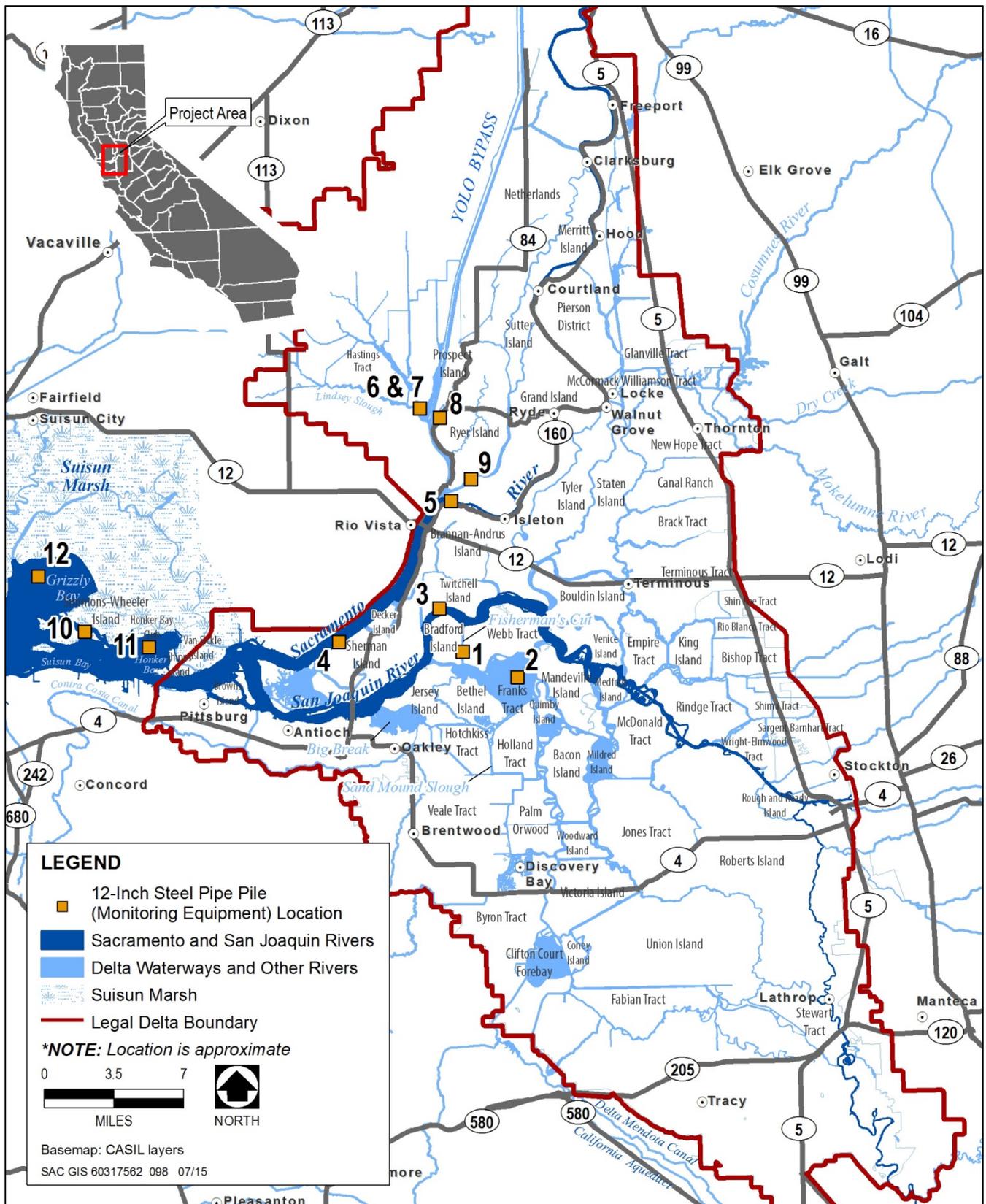
No.	Station Name	Latitude	Longitude
1	Fisherman's Cut	38.0655930°	-121.6479052°
2	Franks Tract	38.0464952°	-121.5980619°
3	Twitchell Island	38.0974562°	-121.6687057°
4	Sacramento River No. 1	38.0741445°	-121.7617272°
5	Sacramento River No. 2 <sup>1</sup>	38.17548°	-121.65686°
6	Liberty Island No. 1 (Left) <sup>2</sup>	38.2430074°	-121.6842674°
7	Liberty Island No. 2 (Right) <sup>2</sup>	38.2430074°	-121.6842674°
8	Miner Slough	38.2360264°	-121.6660510°
9	Steamboat Slough	38.1912650°	-121.6378798°
10	Ryer Island	38.0839000°	-121.9956167°
11	Honker Bay	38.0722000°	-121.9369833°
12	Grizzly Bay	38.1243500°	-122.0380167°

Notes:  
<sup>1</sup> The coordinates for Sacramento River No. 2 are based on reporting from the California Data Exchange Center not surveyors.  
<sup>2</sup> The same coordinates are used for Liberty Island No. 1 and No. 2 because they are separated by only five feet.  
 Source: DWR 2015

#### 4.2.5 FISH MOVEMENT AND NAVIGATION

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 has been 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. DWR installed signs on each side of each barrier, float lines with



Source: DWR, adapted by AECOM 2015

**Figure 3. Locations of the 12-Inch Steel Pipe Piles**

orange ball floats across the width of the channels to deter boaters from approaching the barrier, and solar-powered warning buoys with flashing lights on the barrier crest to prevent accidents during nighttime hours. DWR also posted signs at upstream and downstream entrances to the waterway or other key locations, informing boaters of the restricted access. Navigation signage complies with requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate. DWR has coordinated with the U.S. Coast Guard District 11 and California Division of Boating and Waterways regarding safe vessel passage procedures. DWR has also posted Notice to Mariners, which included information on the location, date, and duration of channel closure, and provided copies to marinas throughout the Delta.

## **4.2.6 OPERATIONS AND MAINTENANCE**

There are no operational features associated with the barrier. Given the temporary nature of the EDB, maintenance will be minimal or nonexistent. DWR would inform the permitting fish agencies (CDFW, USFWS, and NMFS) if any major maintenance activities (such as placement of additional rock) are required.

## **4.3 BARRIER REMOVAL**

### **4.3.1 ANTICIPATED SCHEDULE**

Initial ground disturbance activities, such as mobilization and installation of silt and exclusion fencing, would occur before October 1 to inhibit giant garter snake from entering the construction work area. The contractor may also begin removing rock prior to October 1; however, the barrier will not be breached prior to October 1. Given the volume of rock, DWR anticipates excavation would occur continuously (i.e., 24 hours per day, 7 days per week) and take up to 45 days. The barrier would be removed entirely on or by November 15, 2015, which coincides with the start of the rainy season when freshwater runoff typically occurs and flood risk increases.

DWR would conduct work at the Rio Vista stockpile site from August 15 through September 15, 2015

### **4.3.2 GENERAL CONSTRUCTION METHODOLOGY**

All rock, gravel, and structures, with the exception of the buttress rock (approximately 4,400 cubic yards) used to stabilize the levees, and the levee piping preventers, would be removed from the project site in October and November. 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. A list of construction equipment anticipated to be used for removal is provided in **Table 4**. DWR would utilize multiple barges with excavators, cranes, and work boats that would be transported on water to the barrier site. In-water work would occur on both sides of the barrier (e.g., barge-mounted cranes operating upstream and downstream).

Next, the contractors would strategically place the barges adjacent to the barrier in order to excavate the rock. Barge-mounted cranes with clam-shell or dragline buckets and/or excavators would excavate the rock and place it on another barge. To prevent levee scour, rock removal will start from the center of the channel and work toward the levees. Excavation would occur from the top of the barrier down to approximate pre-project streambed contours. DWR would restore the levee geometry to ensure compliance with any local maintaining agency, or

USACE requirements. The contractor would conduct bathymetric surveys during, and immediately after, barrier removal to confirm all of the rock has been removed.

**Table 4. Construction Equipment Anticipated to be Used for Barrier Removal**

Type of Equipment	Maximum Number	Type of Equipment	Maximum Number	Type of Equipment	Maximum Number
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 2015

The contractor would transport the rock on a barge from the project site to the off-loading site, where it would be transferred onto dump trucks using conveyors, excavators and loaders and then hauled to DWR’s Rio Vista stockpile location (outside of waters of the United States), which is depicted in **Figure 4**. DWR has planned upgrades (e.g., grade, install truck ramp) to the off-loading site that would occur prior to stockpiling EDB rock as part of the DWR Delta Flood Emergency Facilities Improvement Project. Alternatively, the rock may be retained by the contractor and stored/used in accordance with their own separate permits and approvals.

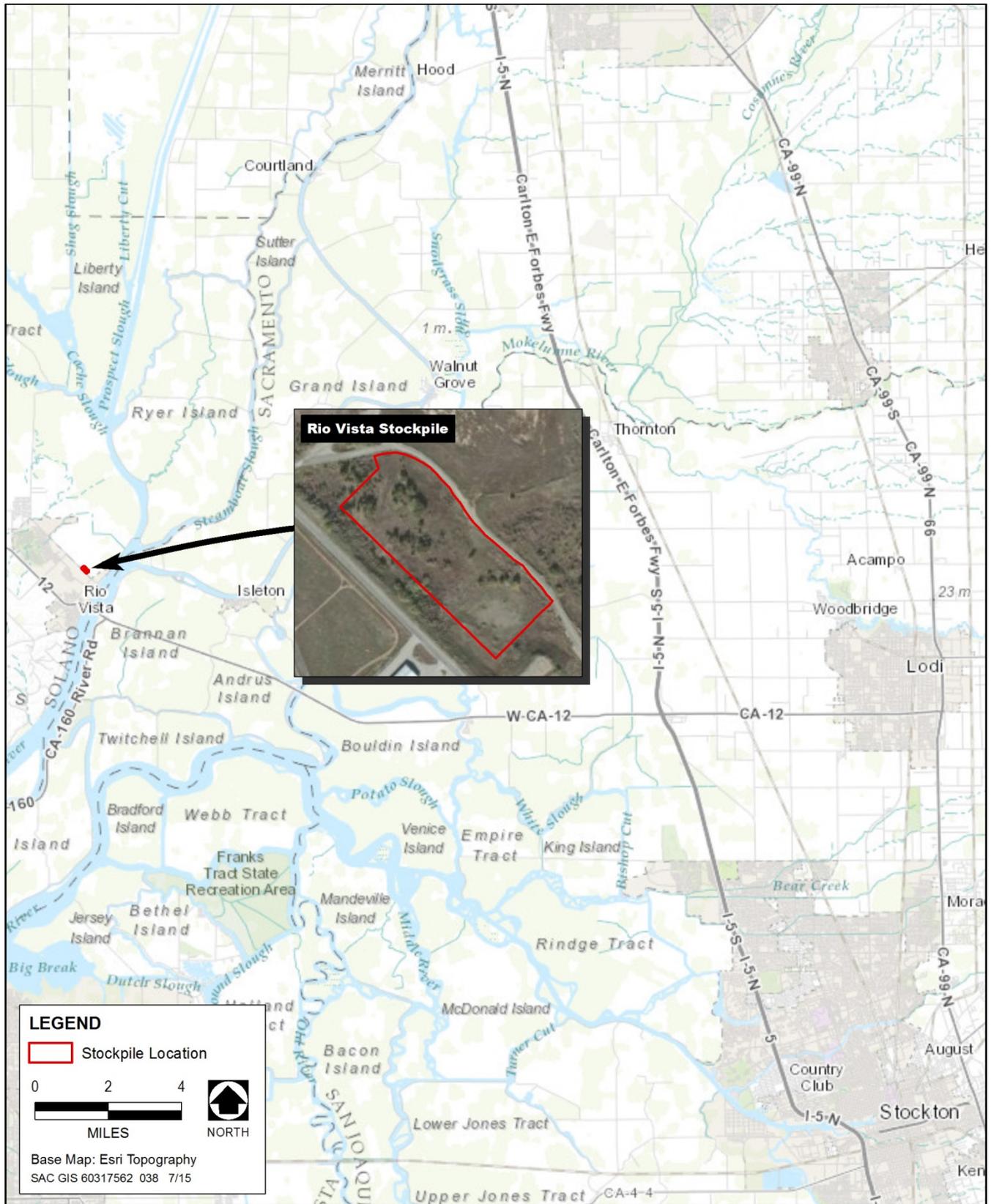
Finally, upon removal of the rock barrier, the contractor would remove the abutments (i.e., river sheet pile walls and king piles); buoy lines, which are anchored by a total of four piles; buoys; and signs. The contractor would remove the abutments by cutting these structures along the original riverbed grade. Cutting would be done by divers for in-water piles and the structures removed by barge-mounted cranes. DWR estimates this work would take approximately 4 days, contingent upon slack tides. Because the buoys and signs are anchored by concrete blocks, the contractor would completely remove these structures by barge-mounted cranes. The contractor is required to retain or properly dispose of these materials.

DWR would monitor upstream and downstream water quality parameters, including turbidity, identified in the Emergency Drought Barrier Water Quality Monitoring Plan, during the excavation process. DWR also would conduct biological monitoring at the barrier site to avoid/minimize impacts to wildlife species.

Disturbed areas would be restored after the barrier is completely removed. The affected areas would be restored to approximate pre-project conditions and revegetated (e.g., hydroseeding) as appropriate. 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.

## 5 CONSERVATION MEASURES

This section includes a description of conservation measures identified for implementation during barrier installation and/or removal. Most of these measures were implemented during barrier installation, as described in below in Section 5.3 (see Table 5).



Source: DWR, adapted by AECOM 2014

**Figure 4. Stockpile Location**

## **5.1 DWR CONSERVATION MEASURES**

A number of conservation measures were identified by DWR for implementation as part of the 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, as described below. Two measures that were included in the April 29, 2015 biological assessment are not described below because they are no longer relevant. These include the measure related to elderberry shrubs, which were confirmed to be absent from both the EDB site and stockpile site, and the measure related to maintenance of the sheet piles and transition rock, which will be removed when the barrier is removed.

### **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<sub>x</sub>), 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<sub>x</sub> amount (i.e., dollars per ton of NO<sub>x</sub> to offset) for emission reduction projects that will be funded by BAAQMD. The price of NO<sub>x</sub> 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 upgraded 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 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.

## **19. 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.

### **19.1 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.

### **19.2 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.

### **19.3 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.

#### **19.4 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 (approximately 165 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.

#### **19.5 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.

#### **19.6 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.

#### **19.7 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.

## **20. 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.

### **20.1 *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.

### **20.2 *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.

## **21. 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.

### **21.1 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).

### **21.2 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.

## **22. 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.

### **22.1 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).

### **22.2 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.

## **23. 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.

### **23.1 Pre-construction Surveys**

A focused survey for delta tulle pea (*Lathyrus jepsonii* var. *jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), delta mudwort (*Limosella australis*), Sanford's arrowhead (*Sagittaria sanfordii*), woolly rose-mallow (*Hibiscus lasiocarpus* 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.

### **23.2 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.

## **24. 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.

## **25. 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.

## **26. 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.

## **27. 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.

## **28. 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.

## **29. 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.

## **5.2 ADDITIONAL MEASURES REQUIRED BY USFWS**

In addition to the environmental commitments described in the previous section, USFWS indicated in a May 1, 2015 email to USACE that DWR should implement the following measures:

- ▶ Follow, as practicably as possible, the 1997 Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California (USFWS 1997). In particular:
  - Measures in Appendix A Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat
  - Measures in Appendix C Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake (*Thamnophis gigas*) Habitat, with particular emphasis on the start of removal activities prior to the end of the work window (May 1- October 1) to ensure snakes do not seek aestivation habitat within the project footprint (including on or near access roads) during barrier deconstruction and site restoration
- ▶ Provide reporting updates of turbidity monitoring during construction as part of Conservation Measure 16.
- ▶ Work closely with USFWS on development of the Water Quality Monitoring Plan and regular reporting as part of Conservation Measure 17.

- ▶ Coordinate with USFWS on details and implementation of the restoration and to refer to the Giant Garter Snake Programmatic Biological Opinion Appendix A and limit additional ground disturbance activities outside of the May 1- October 1 giant garter snake work window.
- ▶ By November 15, 2015, remove the proposed permanent sheet piles and rock that are related to future potential barrier installation activities and are not germane to the emergency consultation.

### 5.3 IMPLEMENTATION

**Table 5** summarizes how the conservation measures were implemented during barrier installation and indicates if and why a measure was not fully implemented.

<b>Table 5. Conservation Measures Implemented During Barrier Installation</b>	
<b>Conservation Measure</b>	<b>Notes on Implementation</b>
<b>DWR Conservation Measures</b>	
1 Prepare and Implement an Erosion Control Plan	Plan was addressed in the environmental protection plan prepared and implemented by contractor.
2 Prepare and Implement a Spill Prevention and Control Program	Program was addressed in the environmental protection plan prepared and implemented by contractor.
3 Prepare and Implement a Hazardous Materials Management Program	Program was addressed in the environmental protection plan prepared and implemented by contractor.
4 Implement Bay Area Air Quality Management District Basic and Enhanced Construction Emission Control Practices to Reduce Fugitive Dust	Practices listed in the measure description were implemented.
5 Reduce Construction-Related Emissions from Off-Road Equipment and Heavy-Duty Vehicles	Equipment used met the California Air Resources Board's most recent certification standard for off-road heavy duty diesel engines.
6 Fuel Tugboats/Barges with Renewable Diesel Fuel	Independent tug operators refused to use renewable diesel because of equipment concerns; contractor used B20 at their quarry and fueled their main tug with B20.
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	Contractor recorded equipment and fuel usage and has submitted information; DWR will coordinate with the Bay Area Air Quality Management District regarding final construction emissions and calculation of the total offset mitigation fee after barrier removal is complete.
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	Practices listed in the measure description were implemented.
9 Conduct a Worker Environmental Awareness Program	The primary training was conducted at the contractor's yard on May 4; additional training was conducted onsite when new workers were added to the crew.
10 Conduct Biological Monitoring	Biological monitoring was conducted in daytime hours during all installation activities, including mobilization and demobilization.
11 Conduct Real-Time Monitoring and Adjust Construction Activities Accordingly	Monitoring was conducted; biological data (screw traps, trawls, etc.) did not indicate a pulse of out-migrating fish or Delta smelt in the area, so no adjustments to construction activities were necessary.

<b>Table 5. Conservation Measures Implemented During Barrier Installation</b>	
<b>Conservation Measure</b>	<b>Notes on Implementation</b>
12 Conduct Pile Driving With a Vibratory Driver To The Extent Possible; Minimize Effects of Impact Driving	All pile driving was completed with a vibratory hammer and no impact driving was conducted.
13 Install In-Water Navigational Buoys, Lights, and Signage	In-water navigational aids were installed.
14 Implement Turbidity Monitoring during Construction	Turbidity monitoring was conducted.
15 Develop a Water Quality Monitoring Plan to Monitor Water Quality	A Water Quality Monitoring Plan was developed and implemented.
16 Return Disturbed Areas to Pre-Project Conditions And Conserve Habitat	Disturbance was limited to the minimum area necessary; construction debris and stockpiled material was removed; roads and staging area were regraded to pre-project contours (hydroseeding will occur after barrier removal).
17 Limit Land-Based Access Routes and Construction Area	Site access was limited established roads; construction area was limited to the minimum area necessary; staging area was reduced from that shown in Figure 3 of the April 29 biological assessment.
18 Implement Protocols for Giant Garter Snake	Protocols were implemented, including: starting installation activities after May 1; installing, inspecting, maintaining, and removing exclusion fencing; conducting a pre-construction survey within 24 hours of starting installation activities; taking corrective measures when necessary to allow giant garter snakes to leave the project site; and notifying and coordinating with USFWS and CDFW staff when giant garter snakes were observed onsite.
19 Implement Protocols for Swainson's Hawk	Protocols were implemented; no active nests were present within 0.25 mile of the barrier.
20 Implement Protocols for Burrowing Owls	Habitat assessment and pre-construction survey were conducted; no evidence of burrowing owls was detected.
21 Implement Protocols for Nesting Raptors	Protocols were implemented, including pre-construction surveys and construction monitoring.
22 Implement Protocols Migratory Birds	Pre-construction survey was conducted; no evidence of active nests was detected
23 Implement Protocols for Special-status Plants	Pre-construction survey was conducted; measures were implemented to avoid disturbance of three species found nearby on Jersey Island.
24 Minimize Wildlife Attraction	Trash was removed from the site daily.
25 Work with North Delta Water Agency to Minimize Salinity Changes for Water Users within the Agency's Boundaries	Not applicable because no barriers were built within the northern portion of the NDWA service area. Drought conditions in the NDWA agreement have been triggered but there is no EDB action required.
26 Conduct Scour Monitoring	Monitoring was conducted.
27 Remove Invasive Species	DWR is coordinating with Boating and Waterways conduct any necessary removals.
28 Coordinate Traffic Management Plans with Contra Costa County	Coordination was addressed in the environmental protection plan prepared and implemented by contractor.
29 Minimize Impacts to Ferry Service	Conducting ongoing coordination with the Delta Ferry Authority.

<b>Table 5. Conservation Measures Implemented During Barrier Installation</b>	
<b>Conservation Measure</b>	<b>Notes on Implementation</b>
<b>Additional Measures Required by USFWS</b>	
Follow, as practicably as possible, the 1997 Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake, in particular, measures in Appendices A and C	All applicable avoidance and minimization measures included in Appendices A and C were implemented; hydroseeding will occur after barrier removal is complete.
Provide reporting updates of turbidity monitoring during construction as part of Conservation Measure 16 above.	Turbidity monitoring results were provided to USFWS after installation was completed.
Work closely with USFWS on development of the Water Quality Monitoring Plan and regular reporting as part of Conservation Measure 17 above.	Water Quality Monitoring Plan was provided to USFWS after barrier installation was completed.
Coordinate with USFWS on details and implementation of the restoration and refer to the Giant Garter Snake Programmatic Biological Opinion Appendix A and limit additional ground disturbance activities outside of the May 1- October 1 giant garter snake work window.	A Revegetation Plan has been prepared; ground disturbance did not begin until May 4, and disturbance associated with barrier removal will begin before October 1.
Remove the proposed permanent sheet piles and rock that are related to future potential barrier installation activities and are not germane to this emergency consultation.	The abutment sheet piles and rock will be removed when the barrier is removed unless agency approval for them to remain in place is obtained.
Notes: CDFW = California Department of Fish and Wildlife, DWR = California Department of Water Resources, EDB = Emergency Drought Barrier, NDWA = North Delta Water Agency, USFWS = U.S. Fish and Wildlife Service Source: DWR 2015	

## **6 ACTION AREA**

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For the purposes of this biological assessment, the action area includes the footprint of the temporary barrier, associated monitoring instruments and navigational aids, the staging area, and a surrounding area adequate to incorporate any suitable habitat for giant garter snake that could be adversely affected by the EDB. Based on conditions observed during the site visits, it was determined a 200-foot buffer surrounding the anticipated area of disturbance would be appropriate for evaluating potential effects of EDB installation, operation, and removal. The action area also includes locations where the water quality monitoring stations were installed and the Rio Vista stockpile area.

## **7 LIFE HISTORY**

Giant garter snakes inhabit marshes, sloughs, ponds, small lakes, low gradient streams and other waterways and agricultural wetlands. They are inactive or greatly reduce their activities during the late fall and winter months, typically emerging from winter retreats in late March to early April and often remaining active through October. The timing of their annual activities is subject to varying seasonal weather conditions. Giant garter snakes feed on small fishes, tadpoles, and frogs (Hansen 1988). They breed in March and April, with females giving birth to live young from late July through early September (Hansen and Hansen 1990).

Suitable giant garter snake habitat is characterized by all of the features necessary to support permanent populations of the species, including: (1) adequate water during the snake’s active season, (2) emergent

herbaceous wetland vegetation for escape and foraging habitat, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation upland habitat for cover and refuge from flooding (USFWS 2012). Occupied aquatic habitats typically contain permanent or seasonal water, mud bottoms, and vegetated dirt banks (Hansen and Brode 1980).

The width of uplands used by giant garter snake varies considerably. Many summer basking and refuge areas used by this snake are immediately adjacent to canals and other aquatic habitats, and may even be located in the upper canal banks. While this species is strongly associated with aquatic habitats, individuals have been noted using burrows as far as 165 feet from marsh edges during the active season and retreats more than 820 feet from the edge of wetland habitats while overwintering (Wylie et al. 1997, USFWS 1999). Therefore, land within this further distance may be important for snake survival in some cases (Hansen 1988).

## **8 ENVIRONMENTAL BASELINE**

The environmental baseline “includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process” (50 CFR §402.02).

### **8.1 STATUS OF THE SPECIES IN THE ACTION AREA**

Information regarding the status of giant garter snake in the action area is based on observations made during reconnaissance-level and pre-construction field surveys conducted before barrier installation, observations made during biological monitoring of barrier installation, California Natural Diversity Database (CNDDDB) occurrence records, and information presented in the *Bay Delta Conservation Plan* (DWR 2013). Reconnaissance-level surveys were conducted on March 14, 2014 and April 14, 2015; pre-construction surveys were conducted on April 21 and 29 and May 4, 2015; and construction monitoring was conducted May 5 through June 17, 2015.

A large portion of the Delta has not been comprehensively surveyed for giant garter snake, primarily because the majority of land is privately owned. Historical and more recent focused surveys failed to confirm extant population clusters in the region (Hansen 1986; Patterson 2003, 2005; Patterson and Hansen 2004), including during DWR surveys of various Delta locations in 2009. However, individuals have been trapped at White Slough Wildlife Area and several photographed near Little Connection Slough (USFWS 2012). More recent observations have been made at additional locations in the vicinity of Little Connection Slough and farther south in the Delta. These suggest viable populations of giant garter snake may persist in the eastern portion of the Delta.

Several observations of giant garter snake also have been documented in the vicinity of the project site in recent years. The CNDDDB includes three recent observations of giant garter snakes in the vicinity of the EDB site: a 2002 observation near the ferry dock at the southwestern corner of Webb Tract, approximately 1.5 miles east of the site; a 2010 observation on the south side of Sherman Island, approximately 5 miles southwest of the site; and a 2014 observation on the landside slope of the south levee of Webb Tract, approximately 2.5 miles east of the site. Two older occurrences are also documented in the CNDDDB, a 1998 observation approximately 3.5 miles northwest of the site and a pre-1986 specimen collected in the vicinity of the 2010 observation.

In 2003 and 2004, focused surveys for giant garter snake were conducted on the Webb Tract, but no individuals were documented. The surveyors concluded that though the island provided habitat and had the potential to support a giant garter snake population, such a population didn't appear to exist (USFWS 2006). The origin of giant garter snakes documented in the vicinity of the project site in recent years is uncertain, and observations in the central Delta have typically been considered to be of snakes that occasionally move into the region by 'washing-down' from known populations and that these occurrences do not represent local breeding populations (USFWS 2006; Hansen, pers. comm., in DWR 2013). As a result, Little Connection Slough has been thought to represent the most western Delta location where the species regularly exists (USFWS 2012). However, this assumption is being reconsidered, because the frequency of observations in the area has increased in recent years, potentially indicating a permanent population may be present, despite previous negative survey results.

The potential presence of a permanent population of giant garter snakes in the vicinity of the EDB site was further supported by observations made in April and May 2015, during activities associated with barrier installation. **Table 6** provides a summary of observations of confirmed and potential giant garter snakes that were made by monitoring biologists and contractor personnel on Jersey and Bradford Islands. These include observations made on or immediately adjacent to the EDB site, and while traveling between the Jersey Island ferry dock and the site.

<b>Table 6. Confirmed and Potential Observations of Giant Garter Snakes in the Vicinity of the Action Area Before and During 2015 Barrier Installation</b>	
<b>Date</b>	<b>Description of Observation</b>
April 21, 2015	One confirmed individual observed during pre-construction survey, on the Jersey Island levee road, approximately 900 feet west of the project site.
April 30, 2015	One confirmed individual found dead on public road on the east side of Jersey Island, nearly 1 mile east of the project site; collected (after agency approval) and taken to the Dixon U.S. Geologic Survey Field Station.
May 6, 2015	One confirmed individual found inside the incomplete exclusion fence on Jersey Island; fence was lifted and the snake left the area.
May 8, 2015	One possible individual observed just outside the Jersey Island exclusion fencing; moved quickly into the wetland area to the south before a photograph could be taken or identification confirmed.
May 10, 2015	One possible individual observed on the public road on the east side of Jersey Island; moved into water before photograph could be taken or identification confirmed
May 14, 2015	One possible individual observed on private land, outside the project site on Bradford Island (captured and released by the landowner); a photograph was taken by the contractor it was shown to, but the quality was not adequate to confirm identification.
May 17, 2015	One possible individual observed by contractor on Jersey Island levee road near project site (outside exclusion fencing); no longer present when monitor went to investigate.
May 18 – 20, 2015	One confirmed individual observed in rip-rap between Jersey Island exclusion fencing and in-water work area.
May 21, 2015	Two confirmed individuals, presumably including the one observed in rip-rap on the previous 3 days were captured and relocated (after agency approval) to an area of similar habitat west of the project site.
Source: DWR 2015	

The stockpile site at Rio Vista does not support suitable aquatic habitat for giant garter snake, and no suitable aquatic habitat is present within 200 feet (DWR 2015). Therefore, the species is unlikely to occur on or near the stockpile site.

## **8.2 FACTORS AFFECTING THE SPECIES AND HABITAT IN THE ACTION AREA**

A number of factors have and continue to affect giant garter snake throughout its range. The primary cause of giant garter snake decline throughout its current and former ranges has been attributed to aquatic habitat loss. The most serious current threats to the species are loss and fragmentation of habitat from both urban and agricultural development and potential loss of habitat associated with changes in rice production (USFWS 2012). Activities such as water management and water transfers that result in habitat loss are also of particular concern. Secondary threats include introduced predators, road construction, and erosion control. Based on review of historic aerial photography, habitat in the action area has changed little in the past 20 years. However, if giant garter snakes are present in the area, they could suffer adverse effects from agricultural and pastoral activities, levee maintenance and repair, and vehicle mortality.

There is only one ongoing, recent, or planned future project known from within or nearby the action area for terrestrial species. In 2014, a seepage berm was constructed by the local Reclamation District as part of the Delta Levee Special Flood Control Projects Program. The berm is landside of the Jersey Island levee and overlaps the EDB project site. In addition, the Reclamation District conducted geotechnical borings on and at the toe of the berm on May 14, 2015, during the EDB installation period.

## **9 EFFECTS ASSESSMENT**

This section describes effects on giant garter snake that resulted from EDB installation and associated activities, as well as effects anticipated to result from EDB operation and removal.

### **9.1.1 EFFECTS OF EDB INSTALLATION**

Figure 2 shows the area that was impacted during barrier installation activities, including: installation of the levee sheet piles, king piles, barrier rock fill, abutment transition rock fill, and permanent toe rock fill; staging activities; and general construction-related disturbance. Appendix B includes photographs of the project site and adjacent areas before, during, and after barrier installation.

Barrier installation activities, including mobilization and demobilization on the project site and installation of water quality monitoring stations, began May 5 and ended June 17, 2015. Generally, construction activities occurred from 6 a.m. to 6 p.m., 7 days a week. May 30, June 1, and June 4 were shortened work days, and no work occurred on May 31, June 7, and June 14. The work period was expanded to 24 hours a day from May 21 through 29 and on June 3, 5, and 6. Nighttime activities were limited to in-water rock placement, except for May 20, when in-water pile driving continued past 7:30 p.m. Although nighttime work increased the amount of disturbance within a given 24-hour period, it reduced the number of days required for barrier installation and, except for pile driving conducted after sunset on one evening, was restricted to in-water work that had minimal potential for adverse effects on giant garter snake.

A total of 2.90 acres of aquatic habitat in False River was filled during barrier installation, including 1.90 acres of rock for the barrier and 1.00 acre associated with the sheet pile abutments, transition rock, and toe rock. Approximately 0.25 acre of this fill is associated with the toe rock placed for levee stability, which will not be removed.

The river provides only marginally suitable aquatic habitat, because giant garter snakes are generally absent from large rivers, but it is likely used as a movement corridor between areas of suitable habitat on the islands. It is unlikely, however, that individuals were directly affected by in-water barrier installation activities or placement of rock fill along the levee toe, because they would have been able to leave and/or avoid the area of disturbance. It is also unlikely any individuals were affected by installation of the water quality monitoring stations.

A total of 1.95 acres was disturbed by activities in upland portions of the EDB site, including: equipment staging in an approximately 1-acre area south of the Jersey Island levee; installing approximately 300 linear feet of sheet piles through each levee crown; and general disturbance associated with movement of equipment, materials, and personnel in the construction and staging areas. Upland disturbance during barrier installation was limited to the crown of both levees and the seepage berm that was constructed landside of the Jersey Island levee in 2014. Because soils on the project site were graded and compacted during the recent seepage berm construction, the site does not provide underground refuge for giant garter snake. However, observations of giant garter snakes made just prior to and during barrier installation (see Table 6) indicate the action area and vicinity are used by the species. Three confirmed observations of giant garter snakes on the EDB site were made during barrier installation. One of these individuals was observed inside the exclusion fencing before fence installation was complete; it left the site on its own when the fencing was lifted to allow access to adjacent habitat. Two individuals were captured and moved to an area west of the EDB site after an individual was observed in rip-rap on the waterside slope (between the upland exclusion fencing and in-water construction area) on 3 consecutive days. Details of this relocation are provided in the report included as Appendix C.

Applicable measures described in Section 5, “Conservation Measures” were implemented to avoid and minimize potential adverse effects on giant garter snake during barrier installation activities (see Table 5). Based on results of the biological monitoring, the measures appeared to be effective in minimizing adverse impacts on aquatic habitat in the river and avoiding direct contact of giant garter snakes with project-related equipment, vehicles, supplies, and personnel. No mortality or physical harm of giant garter snake as a result of barrier installation activities was documented, although take of giant garter snake resulted from capture of the two snakes that were relocated.

### **9.1.2 EFFECTS OF EDB OPERATION**

Because there are no operational features associated with the barrier, potential for giant garter snake to be adversely affected by operation is very limited. If unanticipated maintenance is required during the period the EDB is in place, disturbance associated with maintenance activities would likely be minimal.

Although presence of the barrier temporarily reduces the amount of aquatic habitat in the river, the barrier does not hinder movement of giant garter snake. Likewise, rock fill along the waterside toe have a minimal effect on the overall quality of the aquatic habitat for giant garter snake, and leaving the toe rock in place permanently is unlikely to have a permanent adverse effect on the species.

### **9.1.3 EFFECTS OF EDB REMOVAL**

Potential effects of EDB removal on giant garter snake are anticipated to be similar to those that occurred during installation. The same area of aquatic habitat that was affected during installation would be disturbed by removing the barrier and abutment transition rock and cutting off the sheet pile abutments. Activity in upland areas would be somewhat less than during installation, because there would be no disturbance associated with the levee sheet

pile walls, which will remain imbedded in the levee. Upland disturbance would be limited to access by construction and monitoring personnel and vehicles and some staging of equipment and materials.

As during EDB installation, giant garter snakes are likely to be present in areas adjacent to the site during removal activities. Conservation measures described in Section 5 also would be implemented during EDB removal. These include measures implemented during installation activities, as described above under “Effects of EDB Installation,” as well as those that relate specifically to removal activities, such as USFWS requirements to begin EDB removal activities before October 1, remove abutment sheet piles and associated rock by November 15, 2015, and coordinate with USFWS on details and implementation of restoration activities. The revegetation plan is provided as Appendix D.

Implementing the conservation measures would minimize potential for giant garter snakes to access the EDB site and come in contact with personnel, vehicles, equipment, and materials and are anticipated to be effective in avoiding direct injury or death. However, based on the number of observations of giant garter snake made during the barrier installation period, it is likely individuals would be displaced or otherwise disturbed by EDB removal activities. If an individual is repeatedly observed in the same location and determined to be particularly vulnerable to harassment, injury, or death, it may be appropriate to relocate it to an area farther from the EDB site.

EDB removal is anticipated to be complete by November 15, 2015. If removal is completed later than anticipated, ground disturbance associated with removal would extend further into the snake’s inactive season. However, because removal activities would begin before the start of the inactive season, exclusion fencing would be installed to minimize potential for snakes to enter the EDB site, and the site does not provide suitable over-wintering habitat, any increase in potential for adverse effects would be minor.

Giant garter snake would not be adversely affected by placement or storage of rock at the Rio Vista stockpile site, because no suitable aquatic habitat for giant garter snake is present on or within 200 feet of the site.

## **10 CUMULATIVE EFFECTS**

Under the federal ESA, cumulative effects are those effects of future state, tribal, local, or private actions that are reasonably certain to occur within the action area of the federal action subject to consultation (50 Code of Federal Regulations 402.2). Future federal actions that are unrelated to the proposed action are not considered in this assessment because they require separate consultation under Section 7 of the ESA.

The only known future project that may be considered reasonably certain to occur in the action area for terrestrial species is the potential installation of the EDB in a future year. However, such a project would be subject to USACE authorization and would therefore require Section 7 consultation. Additional Reclamation District activities may be under consideration but are not known at this time, and routine agricultural activities and other private landowner actions are likely to be ongoing in the action area. All of these potential future activities could alter habitat for and/or increase incidental take of giant garter snake and would be cumulative to the effects of the emergency action.

## 11 CONCLUSION

Based on observations made during EDB installation, giant garter snake is likely to have been adversely affected by installation activities, and removal of the EDB is likely to result in additional adverse effects. However, implementation of the conservation measures minimized take of giant garter snake during EDB installation activities and would minimize take during removal activities. No individuals were or are likely to be killed as a result of implementing the EDB, and only two individuals experienced other forms of take (i.e., capture and relocation) during installation activities. Therefore, the implementing the EDB would not jeopardize the continued existence of giant garter snake.

## 12 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 and](http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en)

[Research/CEQA/Draft\\_BAAQMD\\_CEQA\\_Guidelines\\_May\\_2010\\_Final.ashx?la=en](http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en). Accessed May 5, 2014. Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. 2010. 2010 Pelagic Organism Decline Work Plan and Synthesis of Results. Interagency Ecological Program, Sacramento, CA.

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

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.

———. 2013. *Bay Delta Conservation Plan*. Public Draft. November. Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA.

———. 2015. Record of Field Activity conducted by Gabrielle Bohrer and Kip Young on June 19, 2015 at the Rio Vista transfer facility.

DWR. *See* California Department of Water Resources.

Hansen, G. E. 1986. *Status of the Giant Garter Snake *Thamnophis couchii gigas* (Fitch) in the Southern Sacramento Valley During 1986*. Final report for the California Department of Fish and Game, Standard Agreement No. C-1433.

———. 1988. *Review of the Status of the Giant Garter Snake (*Thamnophis couchii gigas*) and its Supporting Habitat during 1986–87*. Final report for the California Department of Fish and Game, Contract C-2060. Unpublished. 31 pp.

- Hansen, G. E., and J. M. Brode. 1980. *Status of the Giant Garter Snake *Thamnophis couchii gigas* (Fitch)*. Inland Fisheries Endangered Species Special Publication 80(5):1–14. California Department of Fish and Game, Sacramento, CA.
- Hansen, R.W. and G.E. Hansen. 1990. *Thamnophis gigas*. Reproduction. Herpetological Review 21(4):93-94.
- Patterson, L. 2003. *Giant Garter Snake Surveys for the In-Delta Storage Program*. Year End and Summary Report. Sacramento, CA: California Department of Water Resources.
- . 2005. *Giant Garter Snake Surveys for the In-Delta Storage Program*. Year End and Summary Report. Sacramento, CA: California Department of Water Resources.
- Patterson, L. and E. Hansen. 2004. *Giant Garter Snake Surveys on Bacon Island and Webb Tract and Re-evaluation of Habitat Quality in 2003*. Sacramento, CA: California Department of Water Resources.
- U.S. Fish and Wildlife Service. 1997. *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California*. (November 13). Sacramento Fish and Wildlife Office. Sacramento, CA.
- . 1999. *Draft Recovery Plan for the Giant Garter Snake (Thamnophis gigas)*. U.S. Fish and Wildlife Service, Portland, Oregon. Ix + 192 pp.
- . 2006. *Giant Garter Snake (Thamnophis gigas) 5-Year Review: Summary and Evaluation*. Sacramento Fish and Wildlife Office. Sacramento, CA.
- . 2012. *Giant Garter Snake (Thamnophis gigas) 5-Year Review: Summary and Evaluation*. Sacramento Fish and Wildlife Office. Sacramento, CA.
- USFWS. *See* U.S. Fish and Wildlife Service.
- Wylie, G. D., M. L. Casazza, and J. K. Daugherty. 1997. *1996 progress report for the giant garter snake study*. Unpublished (preliminary) report. U.S. Geological Survey, Biological Resources Division, Dixon Field Station, Dixon, California. May 1, 1997. 6 pp. + Figures.

## **APPENDIX A**

---

USFWS Species List for the  
West False River Emergency Drought Barrier Project



**U.S. Fish & Wildlife Service**  
**Sacramento Fish & Wildlife Office**  
**Federal Endangered and Threatened Species that Occur in**  
**or may be Affected by Projects in the Counties and/or**  
**U.S.G.S. 7 1/2 Minute Quads you requested**

Document Number: 150409030031

Current as of: April 9, 2015

Quad Lists

Listed Species

Invertebrates

- Apodemia mormo langei*  
Lange's metalmark butterfly (E)
- Branchinecta conservatio*  
Conservancy fairy shrimp (E)
- Branchinecta longiantenna*  
longhorn fairy shrimp (E)
- Branchinecta lynchi*  
Critical habitat, vernal pool fairy shrimp (X)  
vernal pool fairy shrimp (T)
- Desmocerus californicus dimorphus*  
valley elderberry longhorn beetle (T)
- Elaphrus viridis*  
delta green ground beetle (T)
- Incisalia mossii bayensis*  
San Bruno elfin butterfly (E)
- Lepidurus packardii*  
vernal pool tadpole shrimp (E)

Fish

- Acipenser medirostris*  
green sturgeon (T) (NMFS)
- Hypomesus transpacificus*  
Critical habitat, delta smelt (X)  
delta smelt (T)
- Oncorhynchus mykiss*  
Central Valley steelhead (T) (NMFS)  
Critical habitat, Central Valley steelhead (X) (NMFS)
- Oncorhynchus tshawytscha*  
Central Valley spring-run chinook salmon (T) (NMFS)  
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)  
Critical habitat, winter-run chinook salmon (X) (NMFS)  
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Ambystoma californiense*  
California tiger salamander, central population (T)  
Critical habitat, CA tiger salamander, central population (X)
- Rana draytonii*  
California red-legged frog (T)

Reptiles

- Masticophis lateralis euryxanthus*

Alameda whipsnake [=striped racer] (T)  
Critical habitat, Alameda whipsnake (X)

***Thamnophis gigas***

giant garter snake (T)

**Birds**

***Rallus longirostris obsoletus***

California clapper rail (E)

***Sternula antillarum* (=Sterna, =albifrons) browni**

California least tern (E)

**Mammals**

***Reithrodontomys raviventris***

salt marsh harvest mouse (E)

***Vulpes macrotis mutica***

San Joaquin kit fox (E)

**Plants**

***Amsinckia grandiflora***

large-flowered fiddleneck (E)

***Cordylanthus mollis* ssp. *mollis***

soft bird's-beak (E)

***Erysimum capitatum* ssp. *angustatum***

Contra Costa wallflower (E)  
Critical Habitat, Contra Costa wallflower (X)

***Lasthenia conjugens***

Contra Costa goldfields (E)

***Neostapfia colusana***

Colusa grass (T)

***Oenothera deltoides* ssp. *howellii***

Antioch Dunes evening-primrose (E)  
Critical habitat, Antioch Dunes evening-primrose (X)

***Sidalcea keckii***

Keck's checker-mallow (=checkerbloom) (E)

**Quads Containing Listed, Proposed or Candidate Species:**

WOODWARD ISLAND (463A)  
BRENTWOOD (463B)  
ANTIOCH SOUTH (464A)  
ISLETON (480A)  
RIO VISTA (480B)  
JERSEY ISLAND (480C)  
BOULDIN ISLAND (480D)  
BIRDS LANDING (481A)  
ANTIOCH NORTH (481D)

---

**County Lists**

**Contra Costa County**

**Listed Species**

**Invertebrates**

***Apodemia mormo langei***

Lange's metalmark butterfly (E)

***Branchinecta conservatio***

Conservancy fairy shrimp (E)

***Branchinecta longiantenna***

Critical habitat, longhorn fairy shrimp (X)  
longhorn fairy shrimp (E)

***Branchinecta lynchi***

Critical habitat, vernal pool fairy shrimp (X)  
vernal pool fairy shrimp (T)

***Desmocerus californicus dimorphus***

valley elderberry longhorn beetle (T)

***Elaphrus viridis***

delta green ground beetle (T)

***Incisalia mossii bayensis***

San Bruno elfin butterfly (E)

***Lepidurus packardii***

vernal pool tadpole shrimp (E)

***Speyeria callippe callippe***

callippe silverspot butterfly (E)

***Syncaris pacifica***

California freshwater shrimp (E)

## Fish

***Acipenser medirostris***

green sturgeon (T) (NMFS)

***Eucyclogobius newberryi***

tidewater goby (E)

***Hypomesus transpacificus***

Critical habitat, delta smelt (X)  
delta smelt (T)

***Oncorhynchus kisutch***

coho salmon - central CA coast (E) (NMFS)  
Critical habitat, coho salmon - central CA coast (X) (NMFS)

***Oncorhynchus mykiss***

Central California Coastal steelhead (T) (NMFS)  
Central Valley steelhead (T) (NMFS)  
Critical habitat, Central California coastal steelhead (X) (NMFS)  
Critical habitat, Central Valley steelhead (X) (NMFS)

***Oncorhynchus tshawytscha***

Central Valley spring-run chinook salmon (T) (NMFS)  
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)  
Critical habitat, winter-run chinook salmon (X) (NMFS)  
winter-run chinook salmon, Sacramento River (E) (NMFS)

## Amphibians

*Ambystoma californiense*

California tiger salamander, central population (T)  
Critical habitat, CA tiger salamander, central population (X)

*Rana draytonii*

California red-legged frog (T)  
Critical habitat, California red-legged frog (X)

## Reptiles

*Masticophis lateralis euryxanthus*

Alameda whipsnake [=striped racer] (T)  
Critical habitat, Alameda whipsnake (X)

*Thamnophis gigas*

giant garter snake (T)

## Birds

*Charadrius alexandrinus nivosus*

western snowy plover (T)

*Coccyzus americanus occidentalis*

Western yellow-billed cuckoo (T)

*Pelecanus occidentalis californicus*

California brown pelican (E)

*Rallus longirostris obsoletus*

California clapper rail (E)

*Sternula antillarum (=Sterna, =albifrons) browni*

California least tern (E)

*Strix occidentalis caurina*

northern spotted owl (T)

## Mammals

*Reithrodontomys raviventris*

salt marsh harvest mouse (E)

*Vulpes macrotis mutica*

San Joaquin kit fox (E)

## Plants

*Amsinckia grandiflora*

large-flowered fiddleneck (E)

*Arctostaphylos pallida*

pallid manzanita (=Alameda or Oakland Hills manzanita) (T)

- Calochortus tiburonensis*  
Tiburon mariposa lily (T)
- Castilleja affinis ssp. neglecta*  
Tiburon paintbrush (E)
- Chorizanthe robusta var. robusta*  
robust spineflower (E)
- Clarkia franciscana*  
Presidio clarkia (E)
- Cordylanthus mollis ssp. mollis*  
soft bird's-beak (E)
- Cordylanthus palmatus*  
palmate-bracted bird's-beak (E)
- Erysimum capitatum ssp. angustatum*  
Contra Costa wallflower (E)  
Critical Habitat, Contra Costa wallflower (X)
- Hesperolinon congestum*  
Marin dwarf-flax (=western flax) (T)
- Holocarpha macradenia*  
Critical habitat, Santa Cruz tarplant (X)  
Santa Cruz tarplant (T)
- Lasthenia conjugens*  
Contra Costa goldfields (E)  
Critical habitat, Contra Costa goldfields (X)
- Neostapfia colusana*  
Colusa grass (T)
- Oenothera deltooides ssp. howellii*  
Antioch Dunes evening-primrose (E)  
Critical habitat, Antioch Dunes evening-primrose (X)
- Pentachaeta bellidiflora*  
white-rayed pentachaeta (E)
- Sidalcea keckii*  
Keck's checker-mallow (=checkerbloom) (E)
- Streptanthus niger*  
Tiburon jewelflower (E)
- Suaeda californica*  
California sea blite (E)

*Trifolium amoenum*

showy Indian clover (E)

## Proposed Species

## Plants

*Cordylanthus mollis ssp. mollis*

Critical habitat, soft bird's-beak (PX)

**Key:**(E) *Endangered* - Listed as being in danger of extinction.(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.(NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.*Critical Habitat* - Area essential to the conservation of a species.(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

## Important Information About Your Species List

## How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

## Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

## Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

### Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

### Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [Map Room](#) page.

### Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

### Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These

lists provide essential information for land management planning and conservation efforts.  
[More info](#)

### Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520 .

### Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 08, 2015.

## **APPENDIX B**

---

Photographs of the Action Area





Photo 1: Looking west along the Jersey Island levee crown (April 14, 2015).



Photo 2: Looking south at the staging area on Jersey Island (April 14, 2015).

## Appendix B Photographs of the Action Area



Photo 3: Looking west along the Bradford Island levee crown (April 14, 2015).



Photo 4: Looking northwest from the Bradford Island levee crown (April 14, 2015).

## Appendix B Photographs of the Action Area



Photo 5: Exclusion fencing along east side of staging area on Jersey Island (May 8, 2015).

## Appendix B Photographs of the Action Area

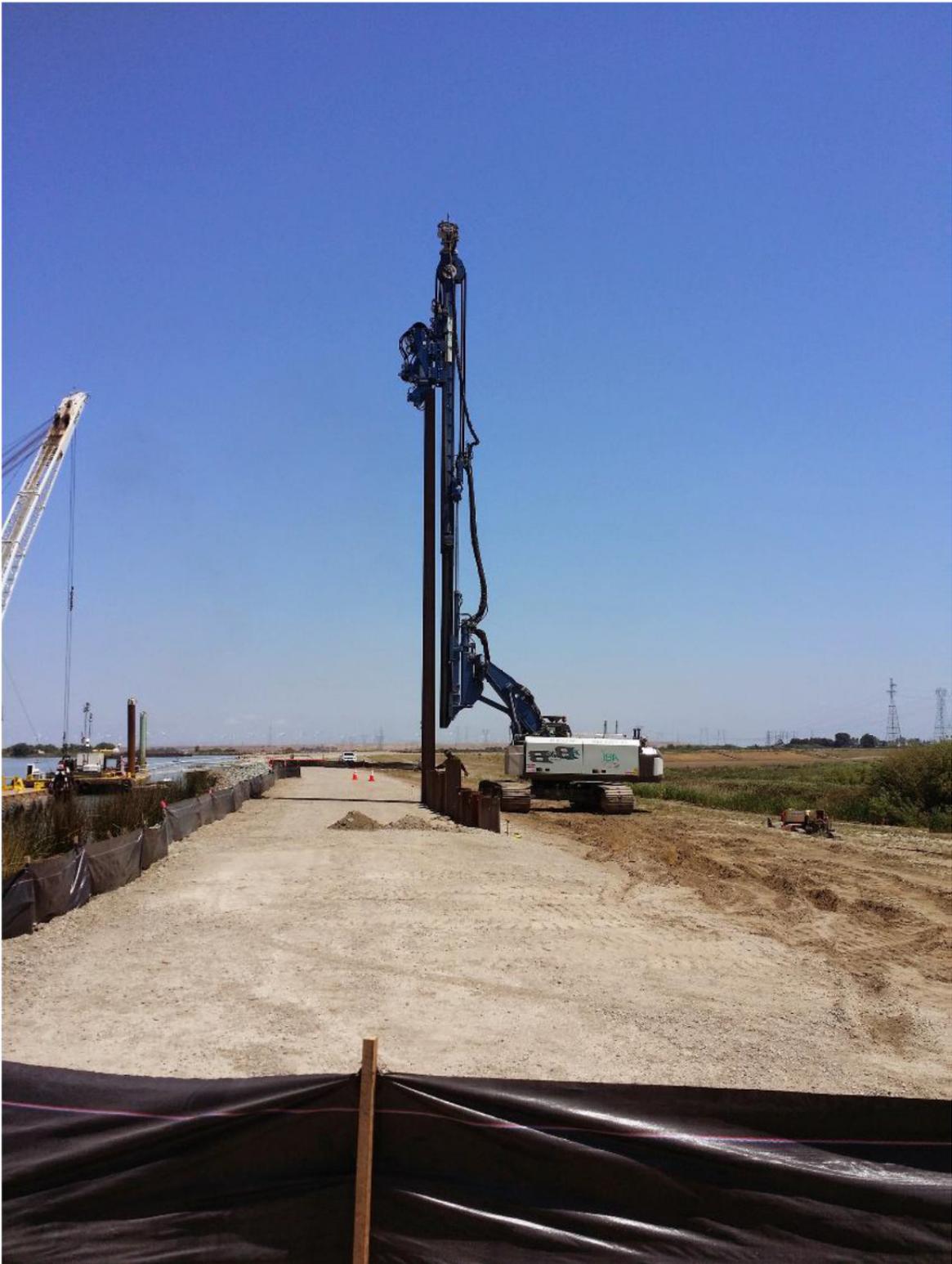


Photo 6: Hammering levee sheet piles on Jersey Island (May 8, 2015).

## Appendix B Photographs of the Action Area



Photo 7: Completed barrier, looking south from Bradford Island to Jersey Island (June 17, 2015).



Photo 8: Looking west on Bradford Island levee road, with barrier fencing on left (June 17, 2015).

## Appendix B Photographs of the Action Area



Photo 9: Looking east on Jersey Island levee road, with barrier on left (June 17, 2015).



Photo 10: Looking west at regraded staging area on Jersey Island (June 25, 2015).

## Appendix B Photographs of the Action Area

## **APPENDIX C**

---

### Giant Garter Snake Capture and Relocation Report



# Giant garter snake capture and relocation report

---

## *Emergency Drought Barrier*

*Prepared by*

*Jessica Barnes  
Senior Environmental Scientist (Specialist)  
California Department of Water Resources  
(916) 376-9789  
jessica.barnes@water.ca.gov*

## **INTRODUCTION**

This document presents the details of the capture and relocation of two giant garter snakes at the Emergency Drought Barrier project site on May 21, 2015.

Beginning on May 18, 2015, a giant garter snake was observed at the Emergency Drought Barrier Project and was observed in the same general location for three consecutive days. Due to the proximity of this snake to project activities and the potential risks to this snake, Department of Water Resources (DWR) requested and received permission from US Fish and Wildlife Service and California Department of Fish and Wildlife on May 20, 2015 to have DWR Environmental Scientists Jessica Barnes and Rhiannon KlingonSmith, who each possess a Section 10(a)(1)(A) permit, to capture the giant garter snake and relocate it.

## **GIANT GARTER SNAKE CAPTURE AND RELOCATION**

On the afternoon of May 21, 2015, a giant garter snake believed to be the one that has been seen the previous several days in the same location at the project site, was observed in the rip-rap. DWR Environmental Scientists who possess a Section 10(a)(1)(A) permit, Rhiannon KlingonSmith (TE-56733A-0) and Jessica Barnes (TE-835365-6.1), hand captured the giant garter snake, recorded morphometric data (Attachment 1), took photos (Attachment 2), and released the snake to a location approximately 0.3 miles west of the project site in an area that had similar habitat features to the capture location, including rip-rap and emergent vegetation (Figure 1). When returning to the capture site, another giant garter snake was observed in the same exact location. That snake was also captured by hand and morphometric data was recorded, photos were taken, and the snake was released at the same relocation site as the first giant garter snake.

## **CONCLUSION**

The two giant garter snakes were successfully captured and relocated to avoid impacts to these individuals due to project activities.

Figure 1: Giant garter snake capture and relocation sites at the Emergency Drought Barriers project site



# Attachment 1

## Morphometric Data

---

## MORPHOMETRIC DATA

Capture Date 5/21/15 Site \_\_\_\_\_ Gen. Location/Trap No. EDB  
 Time: 16:02 Released: 16:40  
 PIT Tag No. \_\_\_\_\_ Ventral Scute Code (VSC)<sup>1</sup> \_\_\_\_\_

Processed by: J Barnes PIT tagged/marked by: \_\_\_\_\_ Assisted by: R Kingon Smith

Camera/Photo numbers \_\_\_\_\_  
 Include at minimum: 1) close-up profile of head; 2) dorsal view of entire snake; 3) close-up of VSC and cloaca

Mass (g) 271

Snout-Vent Length (SVL) mm 335.1  
 Total Length: 1006  
 Vent-Tail Length (VTL) mm (if tail intact) 175

Sex: M  F  Method: Visual / Probe

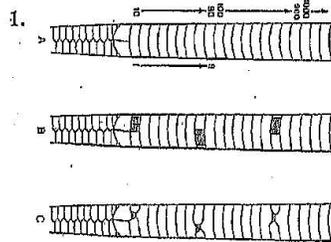
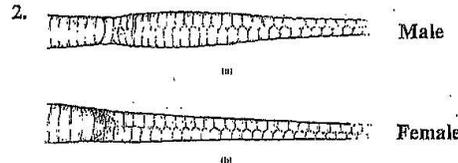


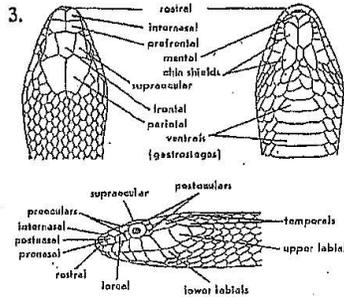
FIGURE 1. Ventral scale dipping system for marking snakes. Diagrams are ventral, posterior views. A. Enumeration of ventrals proceeding anteriorly from anal scutes: 10's, 100's, and 1000's series on observer's left, units series on observer's right. B. A freshly-marked snake, No. 713 (Coluber constrictor ♀, May 1970). C. Same individual (No. 718, April 1973) three years after initial marking, showing appearance of scars.

\* The reduced lengths of male snakes may create a bulge at the base of their tail (a), which may also be longer than that of females (b).

Subcaudal Count (if tail intact) \_\_\_\_\_ Dorsal Scale Row Count (at mid-body) \_\_\_\_\_  
 (male ≥ 77, not ≥ 85) (female ≥ 71, not ≥ 76)

Head Measurements (by caliper to 0.01 mm)<sup>3</sup>

InR = 0.166 (Internasal-Rostral Contact)  
 NR (right side if intact) = 2.78 (Naso-Rostral Contact)  
 W of S6 at mid ht (right side if intact) = 4.11 (Supralabial)  
 W of S7 at mid ht (right side if intact) = 5.84 (Supralabial)



Direct Count (integer)<sup>3</sup>

No. of Supralabials	L <u>8</u>	R <u>8</u>	(Total) <u>16</u>	} Notes
No. of Infralabials	L <u>10</u>	R <u>10</u>	(Total) <u>20</u>	
No. of Preoculars	L <u>1</u>	R <u>1</u>	(Total) <u>2</u>	
No. of Postoculars	L <u>3</u>	R <u>3</u>	(Total) <u>6</u>	

Lumps/Lesions Present? Y  N  Number Present if Yes \_\_\_\_\_ DNA Collected? Y  N

Notes: Missing very tip of tail. Captured in rip-rap area & relocated approximately 0.3 miles downstream to avoid potential harm to GGS due to project activities

## MORPHOMETRIC DATA

Capture Date 5/21/15 Site \_\_\_\_\_ Gen. Location/Trap No. EDB  
 Time: 16:53 Released: 17:20  
 PIT Tag No. \_\_\_\_\_ Ventral Scute Code (VSC)<sup>1</sup> \_\_\_\_\_

Processed by R. King PIT tagged/marked by: \_\_\_\_\_ Assisted by: J. Barnes

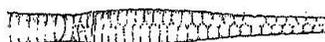
Camera/Photo numbers \_\_\_\_\_  
 include at minimum: 1) close-up profile of head; 2) dorsal view of entire snake; 3) close-up of VSC and cloaca

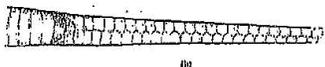
Mass (g) 89

Snout-Vent Length (SVL) mm 583 / \_\_\_\_\_ / \_\_\_\_\_

Vent-Tail Length (VTL) mm (if tail intact) 183

Total length: 766  
 Sex: (M) Method: (Visual) Probe

2.  Male

 Female

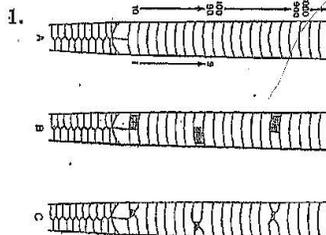


FIGURE 1. Ventral scale clipping system for marking snakes. Diagrams are ventral, posterior views. A. Enumeration of ventrals proceeding anteriorly from anal scutes: 10's, 100's, and 1000's series on observer's left, units series on observer's right. B. A freshly-marked snake, No. 718 (*Coluber constrictor* ♀, May 1970). C. Same individual (No. 718, April 1973) three years after initial marking, showing appearance of scars.

\* The retained homopores of male snakes may create a ledge at the base of their tail pit, which may also be longer than that of females (6).

Subcaudal Count (if tail intact) \_\_\_\_\_ Dorsal Scale Row Count (at mid-body) \_\_\_\_\_  
 (male  $\geq 77$ , not  $\geq 85$ ) (female  $\geq 71$ , not  $\geq 76$ )

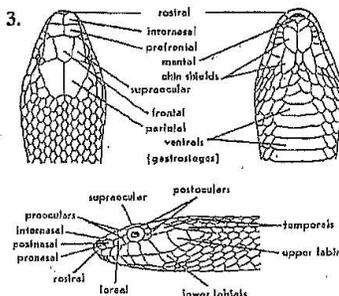
Head Measurements (by caliper to 0.01 mm)<sup>3</sup>

InR = 1.42 (Internasal-Rostral Contact)

NR (right side if intact) = 1.83 (Naso-Rostral Contact)

W of S6 at mid ht (right side if intact) = 2.99 (Supralabial)

W of S7 at mid ht (right side if intact) = 3.25 (Supralabial)



Direct Count (integer)<sup>3</sup>

No. of Supralabials	L <u>8</u>	R <u>8</u>	(Total) <u>16</u>	} Notes
No. of Infralabials	L <u>10</u>	R <u>10</u>	(Total) <u>20</u>	
No. of Preoculars	L <u>1</u>	R <u>1</u>	(Total) <u>2</u>	
No. of Postoculars	L <u>2</u>	R <u>2</u>	(Total) <u>4</u>	

Lumps/Lesions Present? Y (N) Number Present if Yes \_\_\_\_\_ DNA Collected? Y (N)

Notes: Captured in rip-rap area & relocated  
approximately 0.3 miles downstream  
to avoid potential harm to GGS due  
to project activities.

# Attachment 2

## Photos

---

Snake #1

Captured: 16:02 Released: 16:40





Snake #2

Captured: 16:53 Released: 17:20





# **APPENDIX D**

---

## Revegetation Plan



## M e m o r a n d u m

Date: June 17, 2015

To: Mark Holderman, Chief  
South Delta Branch Jacob McQuirk, Chief  
Temporary Barriers and Lower San Joaquin  
Bay Delta OfficeFrom: **Department of Water Resources**

Subject: Revegetation Memorandum for the 2015 Emergency Drought Barrier Project

The purpose of this Memorandum is to provide information pertaining to revegetation activities for the California Department of Water Resources (DWR) 2015 Emergency Drought Barrier Project (Project). This Memorandum includes three sections—Introduction, Schedule, and Revegetation—as described below.

*Introduction*

DWR installed a temporary rock barrier at West False River in May/June 2015 to reduce the intrusion of salt water into the Sacramento River-San Joaquin River Delta (Delta) and reduce demand on reservoir releases. The West False River barrier is situated approximately 0.4 miles east of the confluence with the San Joaquin River, between Jersey and Bradford islands, in Contra Costa County, California (see Figure 1). DWR anticipates barrier removal would commence prior to October 1, 2015, and removal would be completed by November 15, 2015. As part of installation and removal activities, DWR would utilize approximately 1.95 acres of upland habitat for access, staging, and installation of king piles and sheet piles referred to as the Upland Disturbance Area (see Figure 2).

The Upland Disturbance Area consists of the Staging Area and “developed areas.” The Staging Area, approximately 1.08 acres, is subject to revegetation and situated on the landside of the Jersey Island setback levee. The Staging Area is not located within the jurisdiction of the California Department of Fish and Wildlife (CDFW) under Section 1602 of the California Fish and Game Code; U.S. Army Corps of Engineers (USACE) under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act; or State Water Resources Control Board (SWRCB) under Section 401 of the CWA.

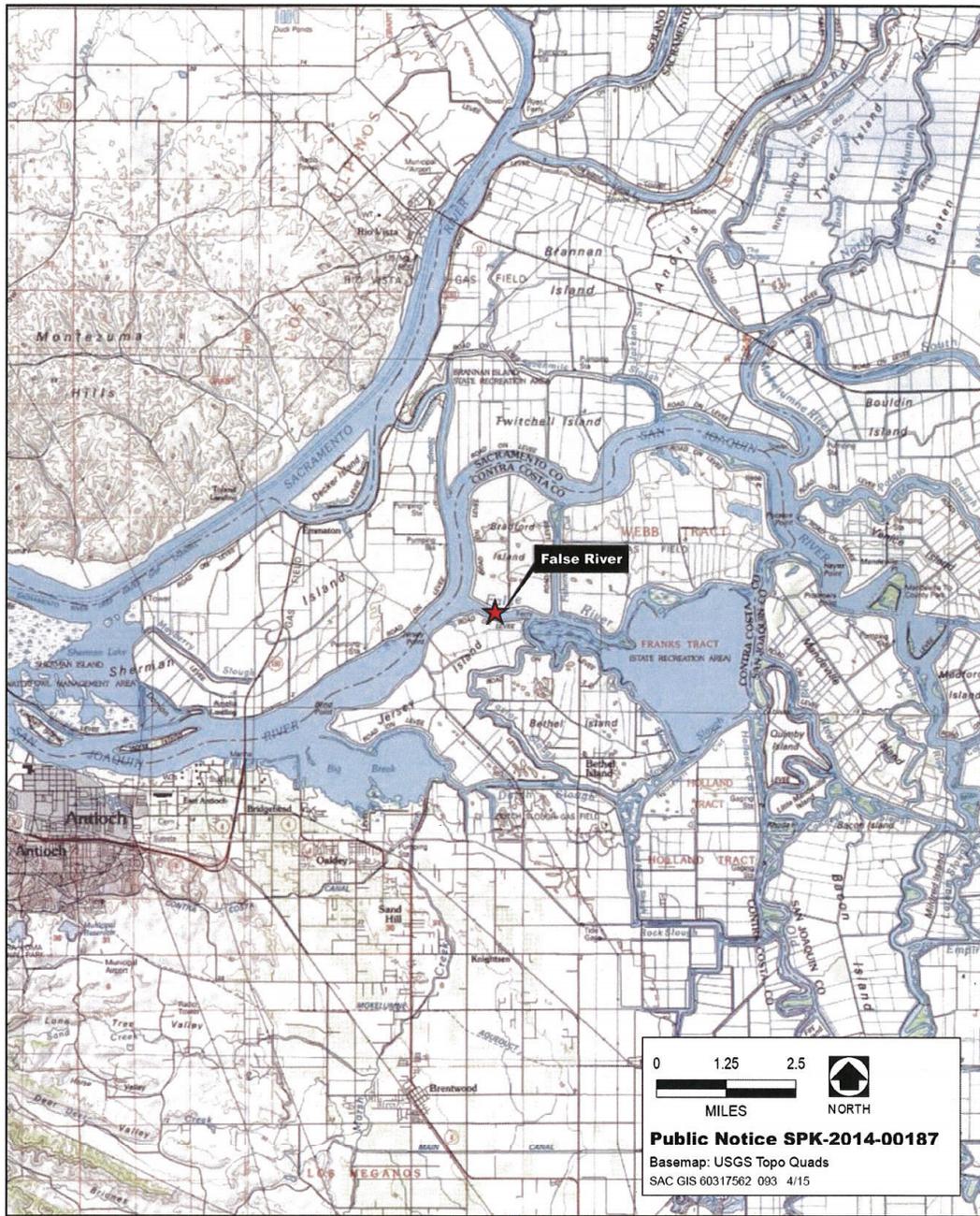
Habitat within the Upland Disturbance Area but outside the Staging Area on both islands consists of rock riprap along the waterside slope and paved road on the levee crown. Because of the developed nature, DWR does not plan on revegetating these areas which may be within CDFW, USACE, and/or SWRCB jurisdiction.

---

SURNAME  
DWR 155 (Rev 7/11)



6/18/15



Source: DWR 2015, AECOM 2015

Figure 1

Location of Proposed Emergency Drought Barrier

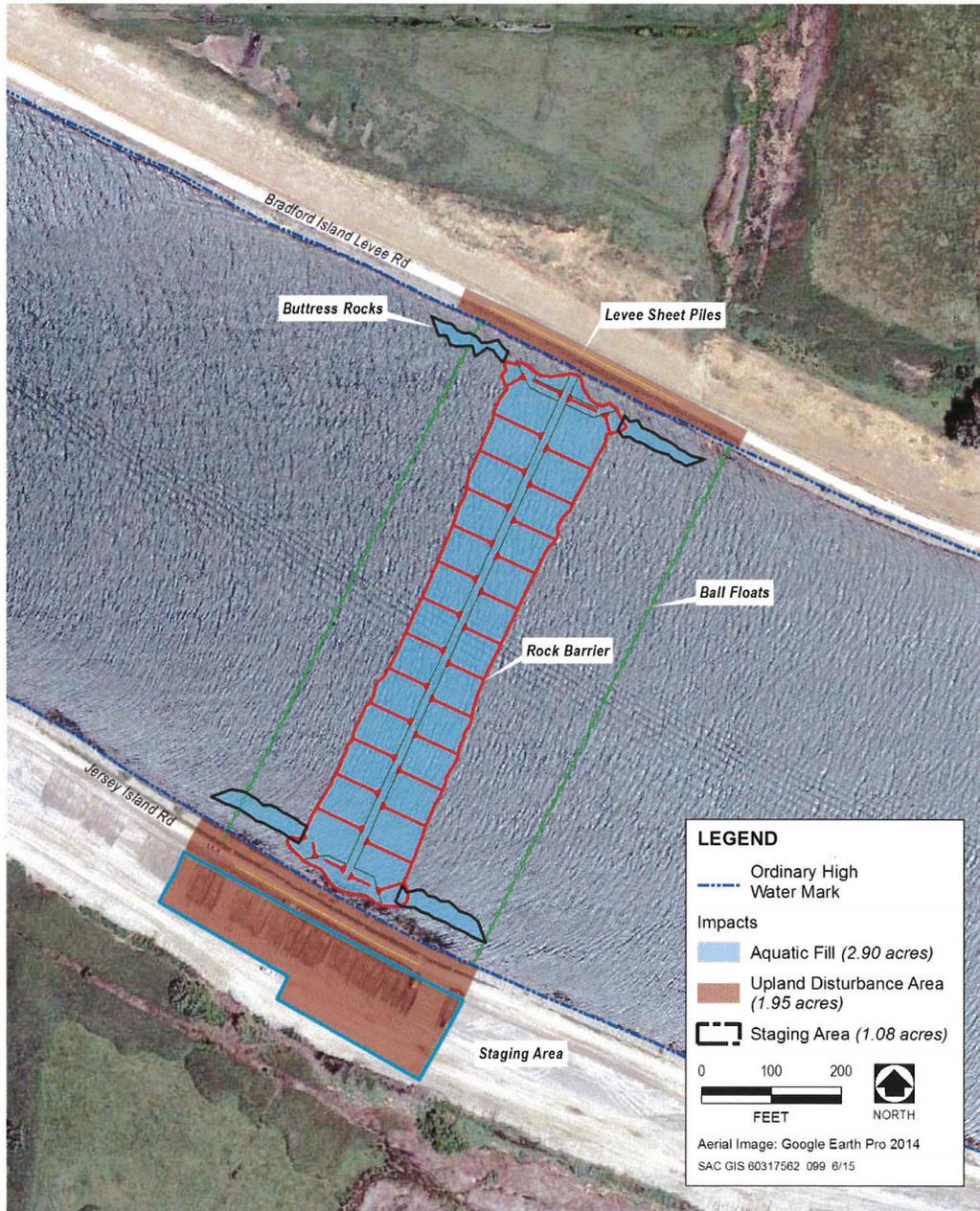


Figure 2

Aerial View of the Project Site

### *Schedule*

Revegetation of the Staging Area at the West False River barrier site would occur after demobilization has been completed. Demobilization includes disassembly, removal, and site cleanup of equipment, temporary structures, and other facilities assembled on the site specifically for the Project. DWR assumes demobilization at the West False River barrier site would be completed by November 15, 2015.

Revegetation activities would directly follow completion of demobilization activities. The optimum season for direct seeding is fall, when moisture, temperatures, and plant physiology are most favorable for establishment. If revegetation is delayed more than 60 days, irrigation and/or reseeding may be required. Delayed implementation may require temporary erosion control measures to be implemented in the interim period. If necessary after grading, all bare soil areas should be seeded with a nurse crop of sterile wheat grass to stabilize the freshly graded areas prior to seeding with the recommended mix.

### *Revegetation*

Prior to the start of revegetation activities, DWR will coordinate with the local maintaining agency. DWR only authorizes the use of native species for the revegetation effort. Revegetation will be accomplished using a seed mix of grass and herbaceous plant species (see Table 1). DWR will approve any proposed modifications to the seed mix at least 15 days prior to revegetation implementation.

Local sources of seed shall be used to the greatest extent feasible. Plant and seed materials shall be sourced within a 100-mile radius and shall be from similar watershed conditions. DWR shall review proposals to use stock that does not originate from this area. Seed mixes shall be 99% weed free and 100% free of any prohibited and restricted noxious weeds. Seed shall be protected from wind, heat, and other conditions which could damage or impair viability, both during delivery and if temporarily stored on site prior to planting.

Prior to seeding, planting areas shall be scarified to a depth of six inches or greater, in two directions. Fertilizer shall not be applied at the time of seeding. Seed application shall be accomplished by hydroseeding.

**Table 1: Proposed Upland Seed Mix**

Common Name	Scientific Name	Pure Live Seed (lbs/acre)	Percent of Total Pure Live Seed Mix
blue wildrye	<i>Elymus glaucus</i>	3.0	16.67%
small fescue	<i>Festuca microstachys</i>	3.0	16.67%
California barley	<i>Hordeum brachyantherum californicum</i>	3.0	16.67%
miniature lupine	<i>Lupinus bicolor</i>	1.5	8.325%
nodding needlegrass	<i>Stipa cernua</i>	3.0	16.67%
purple needlegrass	<i>Stipa pulchra</i>	3.0	16.67%
tomcat clover	<i>Trifolium wildenovii</i>	1.5	8.325%
<b>Total (lbs/acre)</b>		<b>18</b>	<b>-</b>
<p>Note: This seed mix has been provided without specific site condition information including agricultural suitability soil testing data. It is based on similar known locations. Variability in site conditions and unknown adverse soil conditions (e.g., high or low pH, unexpected high micronutrient levels) may preclude optimum establishment.</p> <p>Source: AECOM 2015</p>			

Hydroseeding applications shall be uniformly broadcast at the prescribed application rate and shall consist of the above specified seed mix, 2000 pounds per acre of hydromulch, and 80 pounds per acre of tackifier applied as a slurry. On the same day, after hydroseeding applications, 150 pounds per acre of stabilizer shall be applied with 2,000 pounds per acre of hydromulch without seed in order to anchor the straw mulch in place. Mulch shall be mold-free, air-dry uncut straw, and certified weed free. Additional erosion control measures may be necessary to protect any adjacent waterways or wetland habitat (e.g., straw wattle adjacent to canal). Considerations of stormwater pollution prevention best management practices that may be required are not included in this memo. No watering is necessary if adequate winter rains ensue.

If you have questions or need further information, please contact DWR project manager, Jacob McQuirk, at (916) 653-9883 or [Jacob.mcquirk@water.ca.gov](mailto:Jacob.mcquirk@water.ca.gov).