State of California
Department of Fish and Wildlife

M e m o r a n d u m

Date: March 8, 2023

To: Mohammed (Shahid) Anwar
Department of Water Resources
Divisions of Operations and Maintenance
South Delta Management
1516 9th Street
Sacramento, CA 95814
mohammed.anwar@water.ca.gov

From: DocuSigned by: Erin Chappell B77E9A6211EF486... Erin Chappell, Regional Manager
California Department of Fish and Wildlife-Bay Delta Region, 2825 Cordelia Road, Suite 100, Fairfield, CA 94534

Subject: Incidental Take Permit 2081-2021-102-03 for Georgiana Slough Salmonid Migratory Barrier Project

Enclosed you will find an electronic copy of the Incidental Take Permit for the above referenced Project, which has been digitally signed by the California Department of Fish and Wildlife (CDFW). Please read the permit carefully, sign the acknowledgement, and return the original **no later than 30 days from CDFW signature**, and prior to initiation of ground-disturbing activities. You may return an electronic copy of the permit with digital signature to CESA@wildlife.ca.gov. Digital signatures shall comply with Government Code section 16.5. Alternatively, you may return a hard copy of the permit via mail to:

California Department of Fish and Wildlife
Habitat Conservation Planning Branch, CESA Permitting
Post Office Box 944209
Sacramento, CA 94244-2090

You are advised to keep the permit in a secure location and distribute copies to appropriate project staff responsible for ensuring compliance with the conditions of approval of the permit. Note that you are required to comply with certain conditions of approval prior to initiation of ground-disturbing activities. Additionally, a copy of the permit must be maintained at the project work site and made available for inspection by CDFW staff when requested.

The permit will not take effect until the signed acknowledgement is received by CDFW. If you wish to discuss these instructions or have questions regarding the permit, please contact Andrea Boertien, Environmental Scientist, at (707) 317-0388 or Andrea.Boertien@wildlife.ca.gov; or Michelle Battaglia, Senior Environmental Scientist (Supervisory), at Michelle.Battaglia@wildlife.ca.gov.

California Department of Fish and Wildlife
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534

California Endangered Species Act
Incidental Take Permit No. 2081-2021-102-03

GEORGIANA SLOUGH SALMONID MIGRATORY BARRIER PROJECT

I. Authority:

This California Endangered Species Act (CESA) Incidental Take Permit (ITP) is issued by the California Department of Fish and Wildlife (CDFW) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, Title 14, section 783.0 et seq. CESA prohibits the take[1] of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.[2] However, CDFW may authorize the take of any such species by permit pursuant to the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c). (See Cal. Code Regs., tit. 14, § 783.4).

Permittee:	**California Department of Water Resources**
Principal Officer:	**Mohammed (Shahid) Anwar, Senior Engineer**
Contact Person:	**Mohammed (Shahid) Anwar, (916) 320-5510**
Mailing Address:	**Department of Water Resources** **Division of Operations and Maintenance** **South Delta Management** **1516 9th Street** **Sacramento, CA 95814**

II. Effective Date and Expiration Date of this ITP:

This ITP shall become effective when signed by all parties and received by CDFW as described in the Notices section of this ITP. Unless renewed by CDFW, this ITP and its authorization to take the Covered Species shall expire on **June 30, 2027**.

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until CDFW accepts as complete the Permittee's Final Mitigation Report required by Condition of Approval 7.7 of this ITP.

[1]Pursuant to Fish and Game Code section 86, "'take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." (See also *Environmental Protection Information Center v. California Department of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 507 [for purposes of incidental take permitting under Fish and Game Code section 2081, subdivision (b), "'take' … means to catch, capture or kill").

[2]The definition of an endangered, threatened, and candidate species for purposes of CESA are found in Fish and Game Code sections 2062, 2067, and 2068, respectively.

III. Project Location:

The Georgiana Slough Salmonid Migratory Barrier Project (Project; GSSMB) and one staging area is located at the Sacramento River at the junction with Georgiana Slough, in the County of Sacramento, State of California; Latitude 38.14209 N; Longitude -121.31045; near Walnut Grove; Assessor's Parcel Number 156-0010-089. Other staging areas are located at the town of Hood, the Sacramento River and Sutter Slough junction, the Sacramento River and Steamboat Slough junction, and adjacent to the Delta Cross Channel. (See Figure 1 – Project Overview Map and Figure 2 – Georgiana Slough and Staging Areas). The GSSMB staging area is the primary staging area where equipment to operate the Bio-Acoustic Fish Fence™ (BAFF) will be located. The other staging areas will accommodate monitoring and support equipment for tracking tagged fish.

IV. Project Description:

The Project includes installation and removal of a BAFF and annual operations of the fence. The BAFF will seasonally operate from early 2023 through 2030 at the Georgiana Slough junction. The purpose of the GSSMB is to reduce impacts of the State Water Project (SWP) and the Central Valley Project (CVP) operations by operating as a behavioral deterrent to prevent Sacramento River juvenile salmonids from entering Georgiana Slough during emigration and, thereafter, the central and south Delta, where they have a lower chance of survival compared to remaining in the mainstem Sacramento River. Specific operations of the BAFF will be developed in coordination with CDFW, National Marine Fisheries Service (NMFS), and the United States Fish and Wildlife Service (USFWS). Operations of the BAFF could occur in the fall, if flexibility is required for high flow years as special-status species fish enter the Sacramento River. The BAFF will cease operations in April or May and be removed by July, consistent with Attachment 1(Georgiana Slough Salmonid Migratory Barrier Operations Plan, May 2022).

The BAFF is a multi-stimulus fish barrier that combines high-intensity light-emitting diode (LED) modulated intense lights (MILs), an air bubble "curtain," and sound emitted at frequencies and levels that are repellent to Chinook salmon. The sound system and MILs flash rate can be tuned to known sensitivities of various fish species. The BAFF sound is trapped by refraction within the bubble curtain, producing a sharply defined sound field that fish detect when they are within a few meters of the BAFF. The flashing MILs are aligned such that the light beam projects onto the bubble curtain. This helps the fish identify the bubbles so that the source of sound can be determined by the fish.

The BAFF will be up to 1,240 feet long, comprised of up to 31 separate 40-foot frame sections. Each frame section will have approximately six (6) sound projectors, 12 MILs, and a perforated "bubble" pipe. The bubble pipe will be positioned along each frame below and upstream of the sound projectors. A bubble curtain will be created by passing compressed air into the perforated pipe. The junction of each frame section can pivot with the adjacent section, and each frame section will be supported at either end with a piling or support column to a pier block, where needed. The frame sections will be adjusted vertically at the

pile attachments to adjust for the uneven riverbed contour. In the main portion of the channel, this is approximately 12 feet from the channel bottom. The top of the frame sections will be at least six (6) feet below the water surface elevation at low tide. The BAFF frame will be supported by up to 31 steel piles (up to 24-inch-diameter) in the riverbed. Up to four (4) concrete pier blocks (up to 24-inch-diameter) will be situated in shallow water to ensure the system remains in alignment. (See Figure 3 - Conceptual Design of the Bio-Acoustic Fish Fence).

Project activities include pile driving; pile removal; installation and removal of concrete pier blocks and anchor blocks; terrestrial assemblage of the BAFF and attachment of the BAFF frames to piles in the water; in-water placement of acoustic telemetry underwater hydrophones; placement of small steel frames and steel structures to keep hydrophones in place; use of monitoring equipment such as Acoustic Doppler Current Profilers (ADCPs), Dual-Frequency Identification Sonar (DIDSON) camera, and multi-beam sonar units; terrestrial placement of onshore receivers, data loggers, and data processing and storage computers; a fish study involving tag and release of late fall-run Chinook salmon, steelhead, and predatory fish; removal of two (2) dolphin structures consisting of three (3) piles per dolphin; adding gravel to the land-based staging area adjacent to Georgiana Slough; installation of a new power pole within the staging area; introduction of trailers to the staging area to hold diesel generators, air compressors, control units, signal generators, amplifiers, telemetry equipment, interfaces, computers, office space, and research facilities.

The Project includes the following elements:

- BAFF: The BAFF will be constructed each year in the Sacramento River at Georgiana Slough and will be operated during the winter and spring periods. Up to 31 steel piles (up to 24-inch-diameter) and four (4) concrete pier blocks (up to 24-inch-diameter) will be installed. The maximum number of piles to be used in any year is 49. The total cumulative number of piles is up to 189 (up to 49 in year 1 and up to 20 per year in years 2-8). Of those piles, 29 will be permanent, meaning that they are installed and retained in the water for more than one operational period. Piles associated with the BAFF will be retained throughout the project, with removal of all remaining piles at the end of the project period.

- Navigation Aids: Up to 40 concrete anchor blocks will be used for navigation aids, such as buoys and signs, at the Sacramento River/Georgiana Slough junction when the BAFF is installed.

- Fish Tracking and other Data Collection Monitoring Equipment: An acoustic telemetry tracking system will be used to track fish, which consists of acoustic tags implanted in juvenile Chinook salmon, underwater hydrophones to detect the transmitters, onshore receivers, data loggers, and data processing and storage computers. The acoustic telemetry equipment will be attached to u up to 18 steel piles at the Georgiana Slough junction (each up to 24-inch-diameter) for hydroacoustic and hydrodynamic BAFF operational monitoring. Up to 250 hydrophones will be deployed each year and will be

placed on the bottom of the channel. Small steel frames (tower mounts) and fabricated steel structures (pound-in mounts) will be used for the channel bottom hydrophones to keep them fixed in place during monitoring. The remaining hydrophones will be deployed higher in the water column and near the BAFF. They will be attached to nearby shore features like docks or to the temporary piles near the water surface. Each hydrophone will be connected by cable to a receiver. Monitoring equipment may include ADCPs and a hydroacoustic-based visual tracking system using a DIDSON or similar acoustic camera and multi-beam active sonar units. Hydrophones will be deployed in coordination with the marine construction activities.

- Study Fish: The Permittee will tag and release up to 7,500 hatchery-reared juvenile late fall-run Chinook salmon and steelhead per year. Permittee may also capture, tag, and release up to 200 predatory fish per year by hook-and-line sampling.

- Study Fish Release Locations: The Permittee will release acoustic tagged juvenile Chinook salmon and/or steelhead at one or more sites per year. The proposed fish release sites include the Sacramento River near Sacramento, just downstream of Steamboat Slough, and/or in Georgiana Slough approximately two (2) miles downstream of its junction with the Sacramento River. (See Figure 4 – Potential Fish Release Locations, Multi-Dimensional Arrays, and Data Collection Nodes). The Sacramento release site will be located at a developed portion of the Sacramento River waterfront (city dock platform under the Tower Bridge); the Steamboat Slough release site will be located at the staging area; and the Georgiana Slough release site will be located at an existing public fishing access location with a developed parking lot.

- BAFF Construction and Operation Window: Pile driving and the installation of anchors and pier block will occur over a period of up to 30 working days, between August 1 and October 31 of each year. The BAFF will be installed in winter/spring and be operational during the winter and spring periods each year. Construction of the BAFF will begin with installation of the pile foundation and concrete pier block supports. Piles will be driven in the wetted channel from a barge, using a vibratory pile driver. The pilings will result in a total temporary impact area of approximately 154 square feet (0.004 acre). Up to 29 piles will remain in place throughout the year for the duration of the project, resulting in a permanent impact of 91 square feet (0.002 acre). In addition to the piles, concrete pier block supports will be placed on top of the streambed, resulting in a total temporary impact of approximately 68 square feet. The BAFF frame section will be assembled on land and will be lowered into the water with the barge-mounted crane. The frame sets will be attached to the piles and concrete pier blocks by divers or from a boat. Conditions for operation the BAFF will be developed in coordination with CDFW and federal agencies. The BAFF components will be removed in the spring through fall, depending on operational need. Land- and water-based mobilization and demobilization will occur within 15 days prior to and after each activity.

- Dolphin Structures: Two (2) dolphin structures (three (3) piles each) that were installed at the Georgiana Slough junction as part of the 2014 Floating Fish Guidance Structure (FFGS) study will be removed as part of the Project.

- Staging Area Improvements: Staging Areas may be improved by adding gravel and undergoing grading. To provide electricity to the potential Point Ranch Property staging area (adjacent to Georgiana Slough), the Permittee will replace in-kind an existing pole located on the property in an existing disturbed area.

- On-Site Operations: Onsite power or trailer or barge-mounted diesel generators with onsite backup may supply the power necessary to operate the BAFF. The generators will be located on a trailer in the staging area and/or on barges. Additional trailers and/or a barge will house the air compressor. A storage container will house the control units, signal generators, and amplifiers. One or more trailers and/or a barge will contain operations equipment (including telemetry equipment, interfaces, computers, office space, and research facilities for staff). The trailers will be towed to and from the staging area and will not require construction or improvements of any roads beyond addition of gravel. If a barge is used to support operations, it will be anchored with spud piles in the Sacramento River adjacent to the bank on the downstream end of the Georgiana Slough junction.

- BAFF Removal and Site Restoration: The Technical Team will review data for BAFF efficiency each year to determine if the existing pile configuration is still appropriate and if the pile configuration requires modification. If the pile configuration needs to be modified, this activity will occur between August and September of each year. The BAFF components may be removed as early as May. All supporting infrastructure for the BAFF, including piles, will be removed upon completion of the project. Piles will be removed using a vibratory hammer and/or by cutting the pile below the substrate line. Rebar is attached to the concrete anchor blocks so that a crane can remove or reposition them. Removal activities may take up to 30 working days. All equipment will be removed from staging areas and the sites will be restored to prior existing conditions.

The Permittee will construct and operate Project components starting in early 2023 and ending in 2030. For Year 1, in-water construction will occur in January and/or February. In subsequent years, in-water construction will occur between August 1 and October 31 and will take up to 30 days. Barrier and project/data collection equipment (e.g., fish tagging station, hydrophones) installation (i.e., installation activities other than in-water construction) will take up to 30 days (specific dates to be determined based on operations plan development). The BAFF will be operational during winter and spring periods, the main period of occurrence of listed wild juvenile salmonids in the Project area.

Removal consists of two (2) separate activities: 1) removal of the barrier components and project/data collection equipment and 2) removal of the piles and remaining supporting infrastructure. The Permittee will remove the barrier and project/data collection equipment, including concrete anchor blocks, after each operational period as described in Attachment 1.

V. Covered Species Subject to Take Authorization Provided by this ITP:

This ITP covers the following species:

Name	CESA Status[3]
1. Central Valley spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)	Threatened[4]
2. Sacramento River winter-run Chinook Salmon (O. *tshawytscha*)	Endangered[5]
3. Delta Smelt (*Hypomesus transpacificus*)	Endangered[6]
4. Longfin Smelt (*Spirinchus thaleichthys*)	Threatened[7]

These species and only these species are the "Covered Species" for the purposes of this ITP.

VI. Impacts of the Taking on Covered Species:

Project activities and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. The activities described above expected to result in incidental take of individuals of the Covered Species include:

- pile driving
- placement of anchor and pier blocks
- removal of prey-producing benthic habitat
- placement and ongoing presence of the BAFF in the channel
- placement of acoustic telemetry underwater hydrophones, monitoring equipment, and appurtenant structures
- tag and release fish study
- dolphin structure removal
- river substrate disturbance resulting in loss of natural river substrate
- suspended sediments
- localized changes to water quality

[3]Under CESA, a species may be on the list of endangered species, the list of threatened species, or the list of candidate species.
[4]See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(C).
[5]See Cal. Code Regs. tit. 14 § 670.5, subd. (a)(2)(M)
[6]See Cal. Code Regs. tit. 14 § 670.5, subd. (a)(2)(O)
[7]See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(E)

- potential exposure to toxic sediment released into the water column, and
- the potential for release of contaminants into the water incidental staging area activities and barges and staging area construction activities (Covered Activities).

Incidental take of individuals of the Covered Species in the form of mortality ("kill") may occur as a result of Covered Activities such as hydroacoustic impacts from pile driving, increased migration timing for Covered Species pre-spawning adults that enter Georgiana Slough from the south during upstream spawning migration, fatal injury, permanent loss of habitat, and increased turbidity. Incidental take of individuals of the Covered Species may also occur from the Covered Activities in the form of pursue, catch, capture, or attempt to do so of the Covered Species from deterrence from migratory pathways, increased vulnerability to predation through creation of enhanced predatory fish habitat adjacent to the BAFF, and accidental bycatch (catch and release) from the fishing study. The areas where authorized take of the Covered Species is expected to occur include: the Sacramento River and Georgiana Slough junction and adjacent staging area and staging areas located at the Town of Hood, the Sacramento River and Sutter Slough junction, the Sacramento River and Steamboat Slough junction, and adjacent to the Delta Cross Channel (collectively, the Project Area).

The Project is expected to cause the permanent loss of 0.01 acre of habitat for the Covered Species, and temporary loss of 0.03 acres of habitat for the Covered Species. Impacts of the authorized taking also include adverse impacts to the Covered Species related to temporal losses, increased habitat fragmentation and edge effects, and the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include: stress resulting from noise and vibrations from barge presence and pile driving, and long-term effects due to increased pollution, light and sound deterrents, displacement from preferred habitat, increased migratory timing during spawning migration, increased competition for food and space, and increased vulnerability to predation.

VII. Incidental Take Authorization of Covered Species:

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, CDFW authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Covered Activities, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Covered Activities, take of Covered Species outside of the Project Area, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species except for capture and relocation of Covered Species as authorized by this ITP.

VIII. Conditions of Approval:

Unless specified otherwise, the following measures apply to all Covered Activities within the Project Area, including areas used for terrestrial and aquatic vehicular ingress and egress, staging and parking, and noise and vibration generating activities that may cause take.

CDFW's issuance of this ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

1. **Legal Compliance:** Permittee shall comply with all applicable federal, state, and local laws in existence on the effective date of this ITP or adopted thereafter.

2. **CEQA Compliance:** Permittee shall implement and adhere to the mitigation measures related to the Covered Species in the Biological Resources section of the Initial Study/Mitigated Negative Declaration (SCH No.: 2021100009) adopted by California Department of Water Resources on March 25, 2022 as lead agency for the Project pursuant to the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

3. **LSA Agreement Compliance:** Permittee shall implement and adhere to the mitigation measures and conditions related to the Covered Species in the Lake and Streambed Alteration (LSA) Agreement (Notification No. EPIMS-SAC-25619-R3) for the Project executed by CDFW pursuant to Fish and Game Code section 1600 et seq.

4. **ESA Compliance:** Permittee shall implement and adhere to the terms and conditions related to the Covered Species in the Georgiana Slough Salmonid Migratory Barrier Project – Biological Opinion (2022-0012599-S7-001) for the Project pursuant to the Federal Endangered Species Act (ESA). For purposes of this ITP, where the terms and conditions for the Covered Species in the federal authorization are less protective of the Covered Species or otherwise conflict with this ITP, the conditions of approval set forth in this ITP shall control.

5. **ITP Time Frame Compliance:** Permittee shall fully implement and adhere to the conditions of this ITP within the time frames set forth below and as set forth in the Mitigation Monitoring and Reporting Program (MMRP), which is included as Attachment 2 to this ITP.

6. **General Provisions:**

   6.1. Designated Representative. Before starting Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with this ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.

   6.2. Designated Biologist(s) and Biological Monitor(s). Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of the Designated Biologist(s) and Biological Monitor(s) using the Biologist Resume Form

(Attachment 3) or another format containing the same information at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist(s) and Biological Monitor(s) are knowledgeable and experienced in the biology, natural history tagging, handling, and monitoring of the Covered Species. The Designated Biologist(s) and Biological Monitor(s) shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist(s) and Biological Monitor(s) in writing before starting Covered Activities and shall also obtain approval in advance, in writing, if the Designated Biologist(s) or Biological Monitor(s) must be changed.

6.3. Designated Biologist Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall immediately stop any activity that does not comply with this ITP and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species. Permittee shall provide unfettered access to the Project Site and otherwise facilitate the Designated Biologist in the performance of his/her duties. If the Designated Biologist is unable to comply with the ITP, then the Designated Biologist shall notify the CDFW Representative immediately. Permittee shall not enter into any agreement or contract of any kind, including but not limited to non-disclosure agreements and confidentiality agreements, with its contractors and/or the Designated Biologist that prohibit or impede open communication with CDFW, including but not limited to providing CDFW staff with the results of any surveys, reports, or studies or notifying CDFW of any non-compliance or take. Failure to notify CDFW of any non-compliance or take or injury of a Covered Species as a result of such agreement or contract may result in CDFW taking actions to prevent or remedy a violation of this ITP.

6.4. Education Program. Permittee shall conduct an in-person education program for all persons employed or otherwise working in the Project Area before performing any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status pursuant to CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in this ITP. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided to any new workers before they are authorized to perform work in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. This training shall be repeated at least once annually for long-term and/or permanent employees that will be conducting work in the Project Area.

6.5. Construction Monitoring Documentation. The Designated Biologist(s) and Biological Monitor(s) shall maintain construction-monitoring documentation on-site in either hard copy or digital format throughout the construction period, which shall include a copy of this ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring documentation is available for review at the Project site upon request by CDFW.

6.6. Trash Abatement. Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in animal-proof containers and removed, ideally at daily intervals but at least once a week, to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.

6.7. Erosion Control Materials. Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as monofilament netting (erosion control matting) or similar material, in potential Covered Species' habitat. Additionally, all exposed soils/disturbed areas within the work areas shall be stabilized to the greatest extent possible immediately following the completion of ground-disturbing activities, during project activities, or prior to rain events to prevent erosion into the stream channel. Erosion control measures, such as silt fences, fiber rolls, straw wattles, gravel- or rock-lined ditches, water check bars, broadcasted straw, or equally effective measures, shall be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to erosion control measures shall be made as needed to protect water quality. At no time shall silt-laden runoff be allowed to enter the river, placed where it may enter the river, or directed to where it may enter the river.

6.8. Delineation of Property Boundaries. Before starting Covered Activities, Permittee shall clearly delineate the boundaries of the Project Area with fencing, stakes, or flags. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes, and flags until the completion of Covered Activities in that area.

6.9. Delineation of Habitat. Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat. Covered Species habitat to be delineated includes aquatic areas and riparian areas that may provide shaded riverine aquatic habitat.

6.10. Project Access. Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en-route to the Project Area (except for in-water routes). Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. If Permittee determines construction of routes for travel are necessary outside of the Project

Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW may require an amendment to this ITP, among other reasons, if additional take of Covered Species will occur as a result of the Project modification.

6.11. Staging Areas. Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area unless provided for as described in Condition of Approval 6.10 (Project Access) of this ITP.

6.12. Hazardous Waste. Permittee shall immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.

6.13. CDFW Access. Permittee shall provide CDFW staff with reasonable access to the Project, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.

6.14. Refuse Removal. Upon completion of Covered Activities, Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.

6.15. Hazardous Materials. Debris, soil, bark, sawdust, rubbish, creosote-treated wood, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, wildlife, or riparian habitat resulting from project-related activities shall not contaminate the soil or enter waters of the State. Any such materials placed where they may enter the water shall be removed immediately.

6.16. Daylight Limitation. Permittee shall terminate all construction-related project activities covered in this ITP 30 minutes before sunset and shall not resume until 30 minutes after sunrise unless approved in writing by CDFW. Permittee shall use sunrise and sunset times established by the U.S. Naval Observatory Astronomical Applications Department for the geographic area: https://aa.usno.navy.mil/data/index.

7. Monitoring, Notification and Reporting Provisions:

7.1. Notification Before Commencement. The Designated Representative shall notify CDFW 14 calendar days before initiating Covered Activities and shall document

compliance with all pre-Project Conditions of Approval before initiating Covered Activities.

7.2. Notification of Non-compliance. The Designated Representative shall immediately notify CDFW if the Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in this ITP and/or the MMRP. The Designated Representative shall follow up within 24 hours with a written report to CDFW describing, in detail, any non-compliance with this ITP and suggested measures to remedy the situation.

7.3. Compliance Monitoring. The Designated Biologist or Biological Monitor shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections a minimum of once a week during periods of inactivity and after all materials and trailers are placed in the staging area after the staging area construction work (gravelling, exclusion fencing installation, and power pole installation) is completed. The Designated Biologist shall conduct compliance inspections to:

(1) minimize incidental take of the Covered Species;

(2) prevent unlawful take of species;

(3) check for compliance with all measures of this ITP;

(4) check all exclusion zones; and

(5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area.

The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by this ITP.

7.4. Monthly Compliance Report. The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition of Approval 7.3 (Compliance Monitoring) into a Monthly Compliance Report and submit it to CDFW along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted electronically to the CDFW offices listed in the Notices section of this ITP and to CDFW's Regional Representative and Headquarters CESA Program. At the time of this ITP's approval, the CDFW Regional Representative is Andrea Boertien (Andrea.Boertien@wildlife.ca.gov) and Headquarters CESA Program email is CESA@wildlife.ca.gov. CDFW may at any time increase the timing and number of compliance inspections and reports required under this provision

depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in writing of the new reporting schedule.

7.5. Annual Status Report. Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of this ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports for that year identified in Condition of Approval 7.4 (Monthly Compliance Report); (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in avoiding, minimizing and mitigating Project impacts; (5) all available information about Project-related incidental take of the Covered Species; (6) an accounting of the number of acres subject to both temporary and permanent disturbance, both for the prior calendar year, and a total since ITP issuance; and (7) information about other Project impacts on the Covered Species.

7.6. CNDDB Observations. The Designated Biologist shall submit all observations of Covered Species to CDFW's California Natural Diversity Database (CNDDB) within 15 working days of the observation and the Designated Biologist shall include copies of the submitted forms with the next Monthly Compliance Report or ASR, whichever is submitted first relative to the observation.

7.7. Final Mitigation Report. No later than 45 calendar days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; (8) photographs of pre-construction and post-construction results of the staging area and shoreline, and (9) any other pertinent information.

7.8. Notification of Take or Injury. Permittee shall immediately notify the Designated Biologist if a Covered Species is taken or injured by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to CDFW by calling the Regional Office at (707) 428-2002. The initial

notification to CDFW shall include information regarding the location, species, and number of fish taken or injured and the ITP Number. Following initial notification, Permittee shall send CDFW a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the fish or carcass, and if possible, provide a photograph, explanation as to cause of take or injury, and any other pertinent information.

8. **Take Minimization Measures:** The following requirements are intended to ensure the minimization of incidental take of Covered Species in the Project Area during Covered Activities. Permittee shall implement and adhere to the following conditions to minimize take of Covered Species:

8.1. Construction Work Window. To minimize adverse impacts to fish and wildlife and their habitats, project activities below the ordinary high-water mark shall be confined to the periods as follows:

8.1.1 Pile driving and removal: August 1 to November 30. Piles may be driven up to February 28 only during the first year of construction. In all other years, pile driving and pile removal shall occur between August 1 and November 30.

8.1.2 If Permittee needs more time to complete project activities, work may be authorized outside of the work period and extended on a day-by-day or weekly basis by CDFW. Permittee shall submit a written request for work period variance to CDFW Environmental Scientist Andrea Boertien, at Andrea.Boertien@wildlife.ca.gov. The work period variance request shall 1) describe the extent of the work already completed, 2) detail the activities that remain to be completed, 3) detail the time required to complete each of the remaining activities, 4) provide photographs of both the current work completed and the proposed sites for continued work, and 5) provide a weather forecast for the variance period. The work period variance request should consider the effects of increased water flows, rain delays, and increased erosion control measures. Work period variances are issued at the discretion of CDFW. CDFW reserves the right to require additional measures to protect fish and wildlife resources as a condition for granting the variance.

8.2. Equipment Staging, Storage, Maintenance, and Access Routes. The number of access routes and the numbers and size of staging areas shall be limited to the minimum necessary. Staging areas shall be located in a dry upland location, 50 feet or more from above the top of bank where feasible and proper measures shall be installed to avoid runoff into water systems. Staging areas shall be within a paved or gravel-lined site, if feasible. Use existing staging sites, work areas, and levee roads to the extent practicable for staging and access and to avoid impacting previously undisturbed areas. Staging areas and access routes shall be identified in advance of construction and clearly demarcated in the field with fencing and/or flagging. When

not in use, construction equipment shall be stored, refueled, and otherwise maintained in the construction staging areas.

Prior to the entry of any vehicle or equipment into the project area, including the staging sites, the vehicle shall be cleaned of any biological material that may have originated from an off-site location, at an off-site facility. Any equipment or vehicles driven and/or operated in the proximity of the stream and/or waterbody shall be maintained in good working order to prevent the release of contaminants that if introduced to said waters could be deleterious to aquatic life, wildlife, or riparian habitat. If a vehicle is found to be leaking fluids of any kind, it shall be taken to an off-site location immediately. Vehicles shall be moved away from the stream and/or water body prior to refueling and lubrication.

8.3. Stationary Equipment Leaks. Permittee shall ensure that stationary equipment such as motors, pumps, and generators located within or adjacent to any waterbody are positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill or leak.

8.4. Decontamination. Any equipment that will contact the stream flows during project activities shall be decontaminated before and after work to prevent the spread of aquatic diseases and invasive aquatic species to other waterways. Permittee shall require workers to decontaminate waders, boots, SCUBA gear, fins and other clothing that will come in direct contact with the water. Decontamination of clothing and equipment shall be done through one or more of the following methods:

8.4.1 Drying equipment in an upland location following last off-site aquatic use. If average daytime temperatures exceed 80° F, drying times shall be at least 7 days. If average daytime temperatures are below 80° F, drying times shall be at least 30 days.

8.4.2 Scalding water wash (at least 140° F) with varying high- and low-pressure spray to dislodge pathogens, vegetation, and contaminated sediment.

8.4.3 Freezing at a temperature of less than 32° F for more than 72 hours.

8.4.4 Soaking in a CDFW-approved disinfectant solution for at least 2 minutes (or longer, depending on the disinfectant used). To avoid harm to non-target species, disinfected clothing and equipment shall be thoroughly rinsed in a water bath before entering the river.

Repeat decontamination is required only if the equipment/clothing is removed from the site, used within a different water body, and returned to the project site. Decontamination shall take place in an upland location and any chemicals used during decontamination shall be prevented from entering water bodies or storm drains.

8.5 Turbidity Monitoring. Permittee shall monitor turbidity levels in Georgiana Slough at the junction with the Sacramento River during Covered Activities such as pile driving, pile removal, dolphin removal, and placement of any temporary concrete block structures. Monitoring shall be conducted by measuring turbidity 100 feet upstream of the source activity and 300 feet from the downstream of the source activity to determine if there is an increase in turbidity. An increase of up to 15 Nephelometric Units (NTU) above the baseline level will be allowed. If turbidity increases beyond 15 NTUs above the baseline conditions, the source activity shall cease until turbidity levels return to less than 15 NTUs above baseline turbidity. The Permittee shall report the increase in turbidity and actions taken to reduce it to CDFW within 24 hours of detection. All turbidity sample results shall be maintained in a log and kept at the project site and shall be available for immediate inspection. The turbidity sample results shall be included in the Monthly Compliance Reports per Condition 7.4.

8.6 Containment. For overwater activities from barges, a containment area shall be established around areas that contain hazardous materials by laying straw wattles and/or a nonpermeable plastic around the work areas on the barge. If discharge to the river is discovered by any of the personnel on board the barge, overwater activities shall cease until appropriate corrective measures have been completed and the discharge source has been identified and repaired or halted.

8.7 On-Site Spill Prevention Specialist. At all times while Covered Activities are underway, Permittee shall have a designated person onsite who is properly trained in spill containment/clean up to implement spill control devices in the event a spill occurs.

8.8 Emergency Spill Response Plan. An emergency response plan shall be prepared and submitted to CDFW prior to the initiation of Covered Activities. The plan shall be limited to 3 (three) pages in length and may be presented via a written narrative, table, or bulleted list format. The plan shall identify the actions which would be taken in the event of a spill of hazardous materials such as concrete, petroleum products, sediment, or other material harmful to fish, wildlife, plant resources, or the habitats thereof. The plan shall also identify the location of containment and abatement materials onsite, the actions to be taken in the event of a spill of hazardous material, the emergency response materials which shall be kept at the site to allow the rapid containment and clean-up of any spilled material, and notification and cleanup procedures to be enacted in the event of a spill. The emergency response plan shall also be submitted in the final construction report.

8.9 Spill Containment and Spill Kits. All activities performed in or near the water shall have absorbent materials designated for hazardous materials spill containment and cleanup activities onsite for use in an accidental spill. Permittee shall immediately initiate the cleanup activities in the event of a hazardous materials spill. Prior to entering the work site, all field personnel shall know the location of spill kits and

trained in their appropriate use. The emergency response plan shall also be submitted in the final construction report.

8.10 Spill of Material Deleterious to Fish, Wildlife and Plants. Permittee and all contractors shall be subject to the water pollution regulations found in Fish and Game Code sections 5650 and 12015. In the event of a hazardous materials spill into the stream (e.g., petroleum, sediment, etc.), Permittee shall immediately notify the California Office of Emergency Services State Warning Center by calling 1-800-852-7550 and immediately provide written notification to CDFW by emailing CDFW Environmental Scientist Andrea Boertien, at Andrea.Boertien@wildlife.ca.gov.

Permittee shall take all reasonable measures to document the extent of the impacts and affected areas including photographic documentation of affected areas, injured fish and wildlife. If dead fish or wildlife are found in the affected area, Permittee shall collect carcasses and immediately deliver them to CDFW. Permittee shall meet with CDFW within 10 days of the reported spill in order to develop a resolution including: site clean-up, site remediation, and compensatory mitigation for the harm caused to fish, wildlife, and the habitats on which they depend as a result of the spill. Permittee shall be responsible for all spill clean-up, site remediation, and compensatory mitigation costs. Spill of materials to waters of the State that are deleterious to fish and wildlife are in violation of Fish and Game Code section 5650 et seq., and are subject to civil penalties for each person responsible. CDFW reserves the right to refer the matter to the District Attorney's Office if a resolution cannot be agreed upon and achieved within a specified timeframe, generally six (6) months from the date of the incident.

8.11 Temporary and Permanent Lighting. All temporary and permanent lighting installed as part of the Project shall be fully hooded (i.e., no lateral lighting). Any illumination shall be directed to the ground and away from the river. All lighting shall be turned off 30 minutes prior to sunset, unless required for safety or security purposes.

8.12 Vibratory Pile Driver. Pile driving shall be conducted using only a vibratory driver to avoid take by minimizing hydroacoustic impacts to fish species and marine mammals during construction. Use of an impact hammer is not authorized under this ITP for pile driving or pile load testing.

8.13 Release of Covered Species. Any Covered Species that are caught in the course of Project activities shall be immediately released. Species, approximate size, date, time, location of capture, and condition shall be noted prior to release. This documentation shall be included in the Monthly Compliance Report as required by Condition 7.4. Appropriate handling techniques shall be used to minimize potential effects to fish, such as keeping fish in water as much as possible and handling when hands are wet. Capture of Covered Species shall be reported to CDFW per Condition 7.8 (Notification of Take or Injury).

8.14 Wet Hands and Nets. Handling of Covered Species shall be minimized. However, when handling is necessary, the Qualified Biologist shall always wet hands (i.e., free of lotions, creams, sunscreen, oils, ointment, insect repellent or any other harmful materials) or nets prior to touching Covered Species.

8.15 Proper Holding Technique. Holding containers shall be sized such that individual Covered Species will fit without touching the sides. The Qualified Biologist shall temporarily hold individuals in cool, shaded, aerated water in a flow-through live car. The Qualified Biologist shall protect Covered Species from jostling and noise and shall not remove Covered Species from this container until time of release.

8.16 Water Temperature and Water Changes. The Qualified Biologist shall measure air and water temperatures periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature consist with pre-project habitat conditions.

8.17 No Overcrowding. Overcrowding in containers shall be avoided by having at least two containers and segregating individuals from larger age-classes to avoid predation. If fish are abundant, the captures shall cease periodically, and captured fish shall be released at predetermined locations before resuming capture to avoid being held for too long.

9. Habitat Management Land Acquisition: CDFW has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on the Covered Species that will result from implementation of the Covered Activities. This determination is based on factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and CDFW's estimate of the protected acreage required to provide for adequate compensation.

To meet this requirement, the Permittee shall purchase 0.09 acre of Covered Species credits from a CDFW-approved mitigation or conservation bank, pursuant to Condition of Approval 9.2 below. Purchase of Covered Species Credits must be complete before starting Covered Activities, or within 18 months of the effective date of this ITP if Security is provided pursuant to Condition of Approval 10 (Security) below for all uncompleted obligations.

9.1. Cost Estimates. For the purposes of determining the Security amount, CDFW has estimated the cost sufficient for CDFW or its contractors to complete acquisition of Covered Species Credits as follows:

9.1.1 The Cost of Covered Species credits identified in Condition of Approval 9.1 is estimated at $300,000/acre for 0.09 acres: **$27,000**. Acquisition costs are estimated using fair market current value for the cost of credits at a CDFW-

approved mitigation bank for obtaining mitigation credits for land with habitat values meeting mitigation requirements.

9.1.2 Related transaction fees including but not limited to set-up fees, administrative fees and related transactions estimated at: **$3,000**.

9.2. Covered Species Credits. Permittee has elected to purchase Covered Species credits to complete compensatory mitigation obligations. Permittee shall purchase 0.09 acres of Covered Species credits from a CDFW-approved mitigation or conservation bank prior to initiating Covered Activities, or no later than 18 months from the issuance of this ITP if Security is provided pursuant to Condition of Approval 10 below. Prior to purchase of Covered Species credits, Permittee shall obtain CDFW approval to ensure the mitigation or conservation bank is appropriate to compensate for the impacts of the Project. Permittee shall submit to CDFW a copy of the Bill of Sale(s) and Payment Receipt prior to initiating Covered Activities or within 18 months from issuance of this ITP if Security is provided.

10. Security: The Permittee may proceed with Covered Activities only after the Permittee has ensured funding (Security) to complete any activity required by Condition of Approval 9 (Habitat Management and Land Acquisition) that has not been completed before Covered Activities begin. Permittee shall provide Security as follows:

10.1. Security Amount. The Security shall be in the amount of **$30,000**. Or in the amount identified in 9.1 (Cost Estimates) specific to the obligation that has not been completed. This amount is determined by CDFW based on the cost estimates identified in Condition of Approval 9.1 above, sufficient for CDFW or its contractors to complete land acquisition, property enhancement, startup costs, initial management, long-term management, and monitoring.

10.2. Security Form. The Security shall be in the form of an irrevocable letter of credit (see Attachment 4) or another form of Security approved in advance in writing by CDFW's Office of the General Counsel.

10.3. Security Timeline. The Security shall be provided to CDFW before Covered Activities begin or within 30 days after the effective date of this ITP, whichever occurs first.

10.4. Security Holder. The Security shall be held by CDFW, or in a manner approved in advance in writing by CDFW.

10.5. Security Transmittal. Permittee shall transmit it to CDFW with a completed Mitigation Payment Transmittal Form (see Attachment 5) or by way of an approved instrument such as an escrow agreement, irrevocable letter of credit, or other.

10.6. Security Drawing. The Security shall allow CDFW to draw on the principal sum if CDFW, in its sole discretion, determines that the Permittee has failed to comply with the Conditions of Approval of this ITP.

10.7. Security Release. The Security (or any portion of the Security then remaining) shall be released to the Permittee after CDFW has conducted an on-site inspection and received confirmation that all secured requirements have been satisfied, as evidenced by:

- Copy of Bill of Sale(s) and Payment Receipt(s) or Credit Transfer Agreement for the purchase of Covered Species credits; and
- Timely submission of all required reports.

IX. Amendment:

This ITP may be amended as provided by California Code of Regulations, Title 14, section 783.6, subdivision (c), and other applicable law. This ITP may be amended without the concurrence of the Permittee as required by law, including if CDFW determines that continued implementation of the Project as authorized under this ITP would jeopardize the continued existence of the Covered Species or where Project changes or changed biological conditions necessitate an ITP amendment to ensure that all Project-related impacts of the taking to the Covered Species are minimized and fully mitigated.

X. Stop-Work Order:

If CDFW determines the Permittee has violated any term or condition of this ITP or has engaged in unlawful take, CDFW may issue Permittee a written stop-work order instructing the Permittee to suspend any Covered Activity for an initial period of up to 30 days or risk suspension or revocation of this ITP. CDFW can issue a stop-work order to prevent or remedy a violation of this ITP, including but not limited to the failure to comply with reporting or monitoring obligations, or to prevent the unauthorized take of any CESA endangered, threatened, or candidate species, regardless of whether that species is a Covered Species under this ITP. Permittee shall stop work immediately as directed by CDFW upon receipt of any such stop-work order. Upon written notice to Permittee, CDFW may extend any stop-work order issued to Permittee for a period not to exceed 30 additional days.

If Permittee fails to remedy the violation or to comply with a stop-work order, CDFW may proceed with suspension and revocation of this ITP. Suspension and revocation of this ITP shall be governed by California Code of Regulations, Title 14, section 783.7, and any other applicable law. Neither the Designated Biologist nor CDFW shall be liable for any costs incurred in complying with stop-work orders.

XI. Compliance with Other Laws:

This ITP sets forth CDFW's requirements for the Permittee to implement the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. Permittee is responsible for complying with all other applicable federal, state, and local law.

XII. Notices:

The Permittee shall sign and return this ITP to CDFW. A manual or digital signature is acceptable, provided a digital signature complies with Government Code section 16.5. Digital signatures facilitated by CDFW will be automatically returned. Manual (wet) signatures on duplicate original paper copies shall be returned by the Permittee via registered first-class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, CA 94244-2090
CESA@wildlife.ca.gov

Written notices, reports and other communications relating to this ITP shall be delivered to CDFW by email, secure link or registered first class mail at the following address, or at addresses CDFW may subsequently provide the Permittee. Notices, reports, and other communications shall reference the Project name, Permittee, and ITP Number (2081-2021-102-03) in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Erin Chappell, Regional Manager
California Department of Fish and Wildlife – Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
R3CESA@wildlife.ca.gov

and a copy to:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, CA 94244-2090
CESA@wildlife.ca.gov

Unless Permittee is notified otherwise, CDFW's Regional Representative for purposes of addressing issues that arise during implementation of this ITP is:

Andrea Boertien
California Department of Fish and Wildlife – Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
Andrea.Boertien@wildlife.ca.gov; Telephone (707) 317-0388

XIII. Compliance with the California Environmental Quality Act:

CDFW's issuance of this ITP is subject to CEQA. CDFW is a responsible agency pursuant to CEQA with respect to this ITP because of prior environmental review of the Project by the lead agency, California Department of Water Resources. (See generally Pub. Resources Code, §§ 21067, 21069). The lead agency's prior environmental review of the Project is set forth in the Georgiana Slough Salmonid Migratory Barrier Initial Study/Mitigated Negative Declaration (SCH No.: 2021100009), dated October 1, 2021, that the California Department of Water Resources adopted for the Georgiana Slough Salmonid Migratory Barrier Project on March 25, 2022. At the time the lead agency adopted the Mitigated Negative Declaration and approved the Project, it also adopted various mitigation measures for the Covered Species as conditions of Project approval.

This ITP, along with CDFW's related CEQA findings, which are available as a separate document, provide evidence of CDFW's consideration of the lead agency's Mitigated Negative Declaration for the Project and the environmental effects related to issuance of this ITP (CEQA Guidelines, § 15096, subd. (f)). CDFW finds that issuance of this ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead agency. Furthermore, to the extent the potential for such effects exists, CDFW finds adherence to and implementation of the Conditions of Project Approval adopted by the lead agency, and that adherence to and implementation of the Conditions of Approval imposed by CDFW through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. CDFW consequently finds that issuance of this ITP will not result in any significant, adverse impacts on the environment.

XIV. Findings Pursuant to CESA:

These findings are intended to document CDFW's compliance with the specific findings requirements set forth in CESA and related regulations. (Fish & G. Code § 2081, subs. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds. (a)-(b), 783.5, subd. (c)(2)).

CDFW finds based on substantial evidence in the ITP application, Georgiana Slough Salmonid Migratory Barrier Initial Study/Mitigated Negative Declaration, the results of site visits and consultations, and the administrative record of proceedings, that issuance of this ITP complies and is consistent with the criteria governing the issuance of ITPs pursuant to CESA:

(1) Take of Covered Species as defined in this ITP will be incidental to the otherwise lawful activities covered under this ITP;

(2) Impacts of the taking on Covered Species will be minimized and fully mitigated through the implementation of measures required by this ITP and as described in the MMRP. Measures include: (1) permanent habitat protection; (2) establishment of avoidance zones; (3) worker education; and (4) Monthly Compliance Reports. CDFW evaluated

factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and CDFW's estimate of the acreage required to provide for adequate compensation. Based on this evaluation, CDFW determined that the protection and management in perpetuity of 0.09 acres of compensatory habitat that is contiguous with other protected Covered Species habitat and/or is of higher quality than the habitat being destroyed by the Project, along with the minimization, monitoring, reporting, and funding requirements of this ITP minimizes and fully mitigates the impacts of the taking caused by the Project;

(3) The take avoidance and mitigation measures required pursuant to the conditions of this ITP and its attachments are roughly proportional in extent to the impacts of the taking authorized by this ITP;

(4) The measures required by this ITP maintain Permittee's objectives to the greatest extent possible;

(5) All required measures are capable of successful implementation;

(6) This ITP is consistent with any regulations adopted pursuant to Fish and Game Code sections 2112 and 2114;

(7) Permittee has ensured adequate funding to implement the measures required by this ITP as well as for monitoring compliance with, and the effectiveness of, those measures for the Project; and

(8) Issuance of this ITP will not jeopardize the continued existence of the Covered Species based on the best scientific and other information reasonably available, and this finding includes consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (1) known population trends; (2) known threats to the species; and (3) reasonably foreseeable impacts on the species from other related projects and activities. Moreover, CDFW's finding is based, in part, on CDFW's express authority to amend the terms and conditions of this ITP without concurrence of the Permittee as necessary to avoid jeopardy and as required by law.

XV. Attachments:

FIGURE 1	Project Overview Map
FIGURE 2	Georgiana Slough and Staging Areas
FIGURE 3	Conceptual Design of the Bio-Acoustic Fish Fence
FIGURE 4	Potential Fish Release Locations, Multi-Dimensional Arrays, and Data Collection Nodes

ATTACHMENT 1	Georgiana Slough Salmonid Migratory Barrier Operations Plan (May 2022)
ATTACHMENT 2	Mitigation Monitoring and Reporting Program
ATTACHMENT 3	Biologist Resume Form
ATTACHMENT 4	Irrevocable Letter of Credit
ATTACHMENT 5	Mitigation Payment Transmittal Form

ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

ON 3/8/2023**.**

DocuSigned by:
Erin Chappell
B77E9A6211EF486...

Erin Chappell, Regional Manager
Bay Delta Region

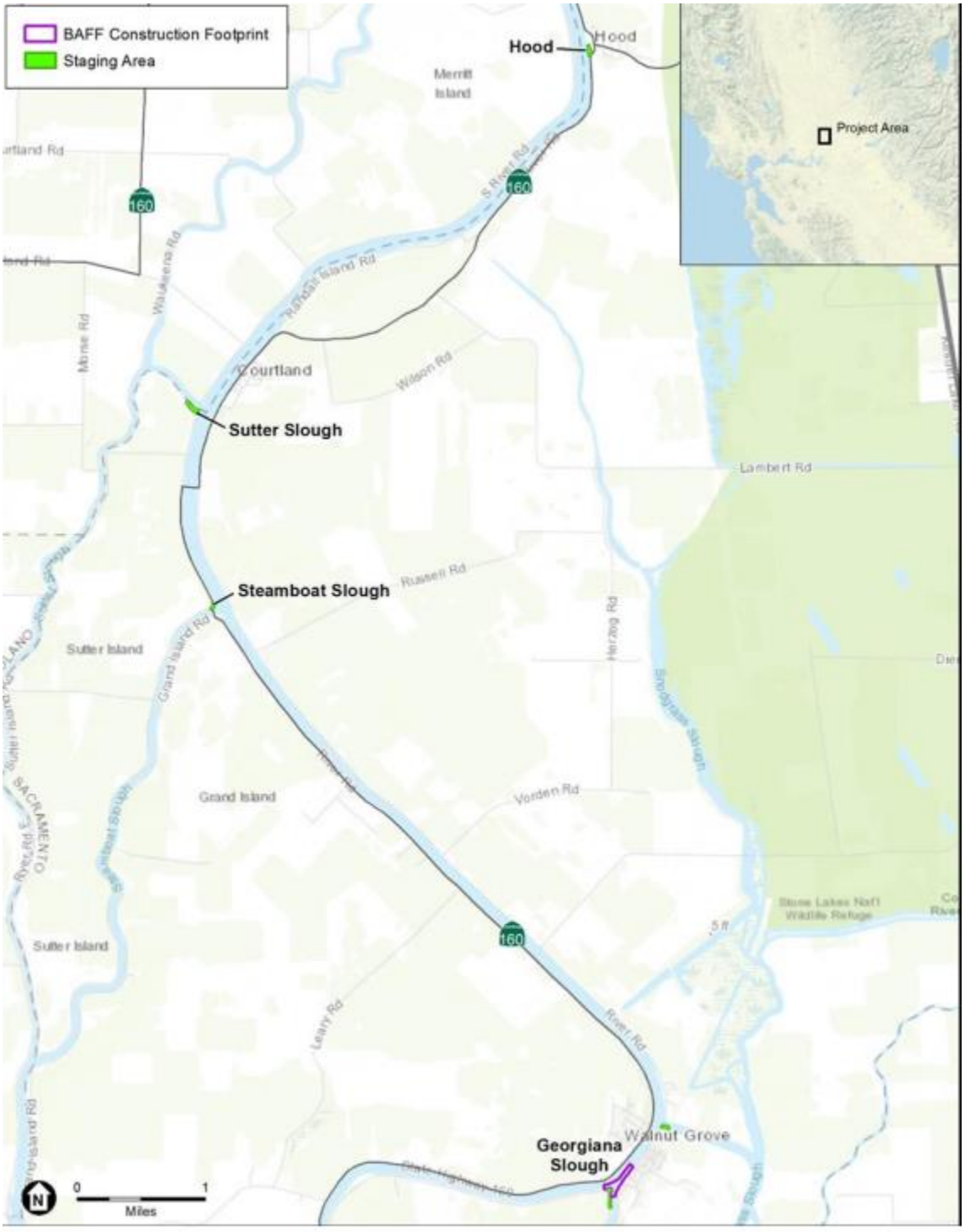
ACKNOWLEDGMENT

The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of this ITP, and (3) agrees on behalf of the Permittee to comply with all terms and conditions.

By: Mohammed Anwar
4366ED2E182246A... Date: 3/9/2023

Printed Name: Mohammed Anwar Title: Senior Engineer, Water Resources

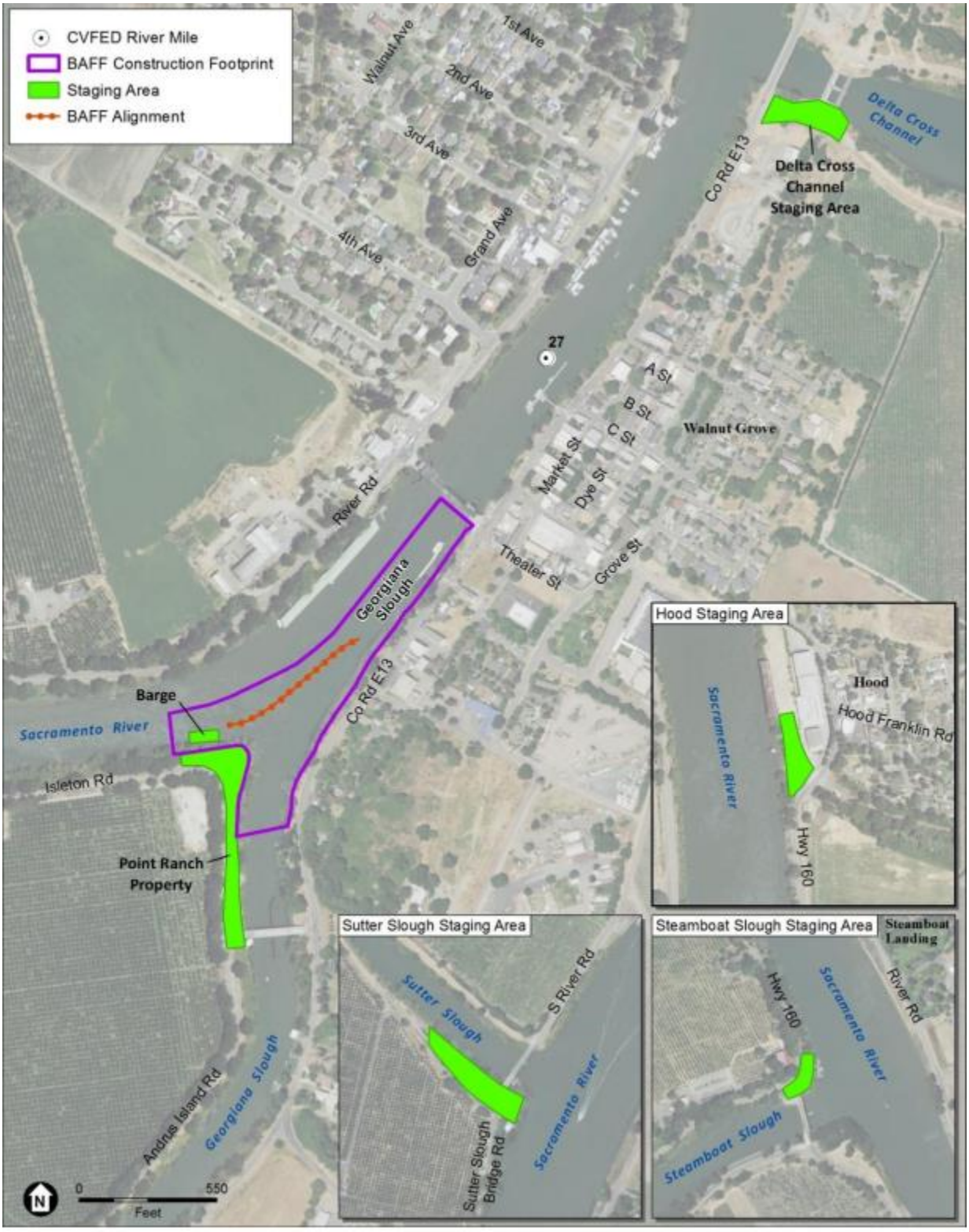
Figure 1: Georgiana Slough Salmonid Migratory Barrier Overview Map



SOURCE: USGS Topo; AECOM adapted by ESA, 2020

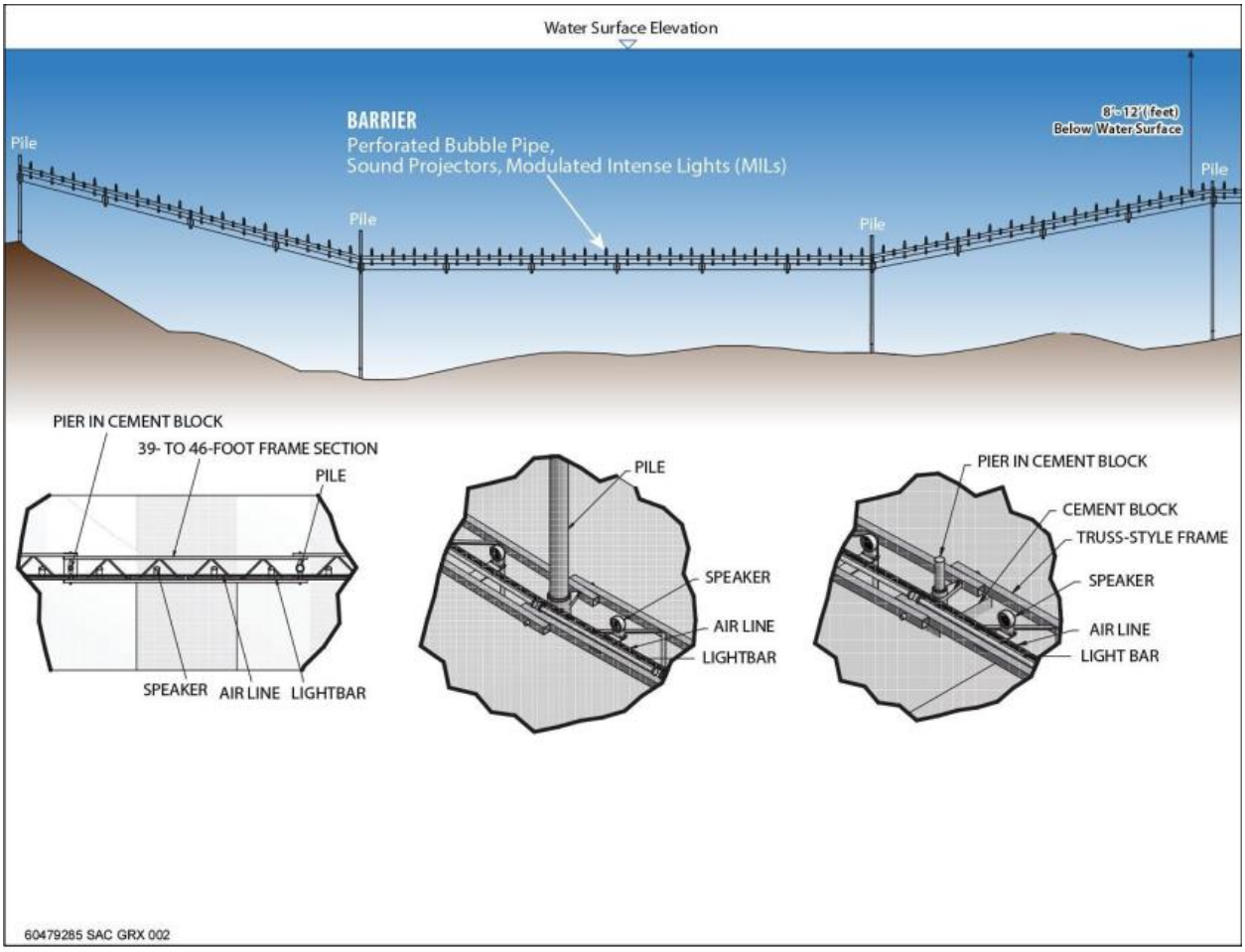
Figure 1
Georgiana Slough Salmonid Migratory Barrier Overview Map

Figure 2: Georgiana Slough and Staging Areas



SOURCE: USDA, 2018; AECOM adapted by ESA, 2020

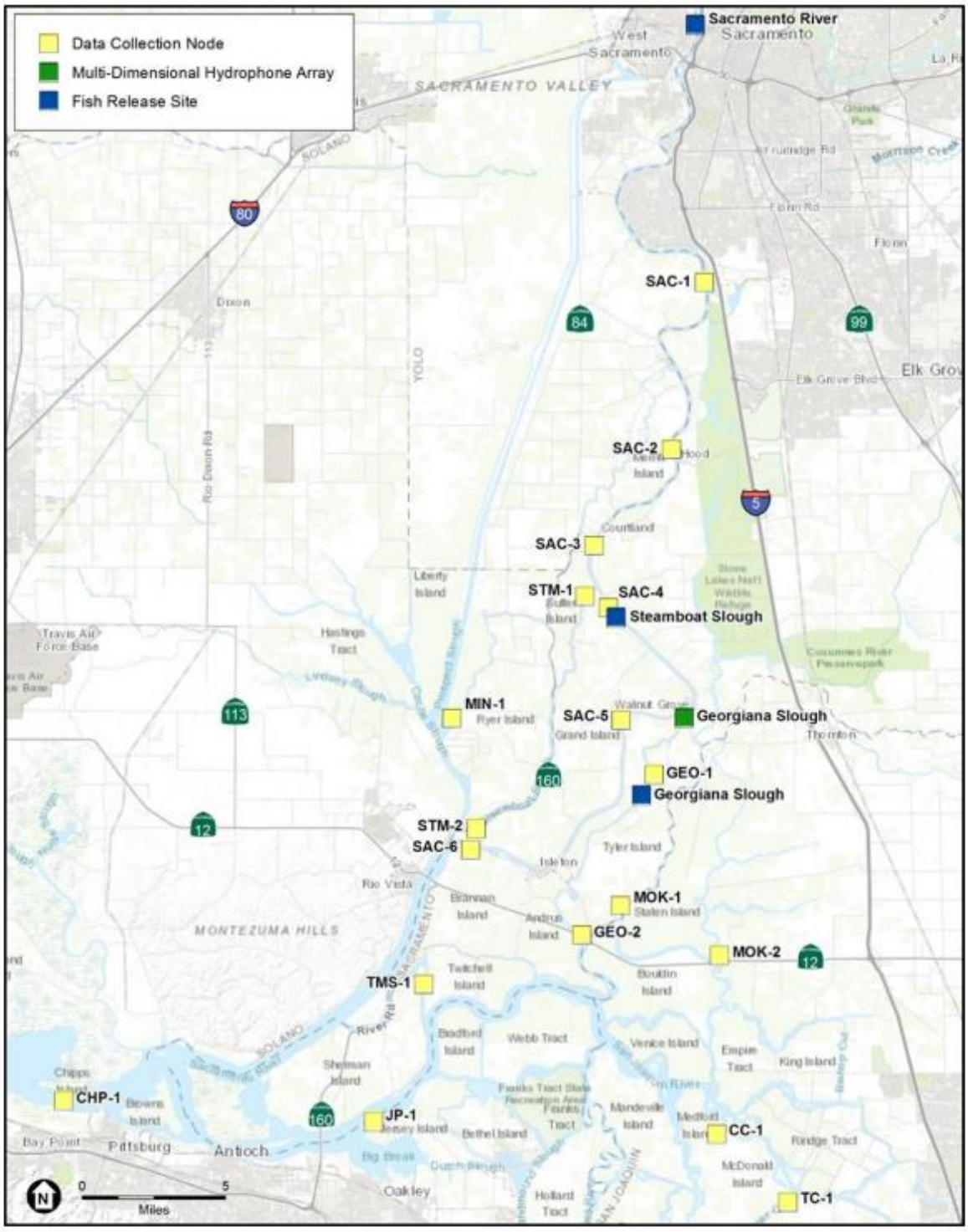
Exhibit 3: Conceptual Design of the Bio-Acoustic Fish Fence



Source: Data provided by DWR in 2019

Figure 3
Conceptual Design of the Bio-Acoustic Fish Fence

Figure 4: Potential Fish Release Locations, Multi-Dimensional Arrays, and Data Collection Nodes



SOURCE: USGS Topo; AECOM adapted by ESA, 2020

GEORGIANA SLOUGH SALMONID MIGRATORY BARRIER

Operations Plan

Prepared by:
Department of Water Resources
Division of Operations and Maintenance
South Delta Branch

May 2022

TABLE OF CONTENTS

Georgiana Slough Salmonid Migratory Barrier Operations Plan

Figures

Tables

This page intentionally left blank.

CHAPTER 1
Introduction

1.1 Background and Purpose

Under the federal Endangered Species Act (FESA), the National Marine Fisheries Service (NMFS) issued the 2009 *Biological and Conference Opinion for the Long-Term Operations of the Central Valley Project and State Water Project for Chinook Salmon (Oncorhynchus tshawytscha), Steelhead (O. mykiss), and Green Sturgeon (Acipenser medirostris)* (BiOp; NMFS 2009). Reasonable and Prudent Alternative (RPA) Action IV.1.3 of the BiOp required the California Department of Water Resources (DWR) and/or U.S. Bureau of Reclamation (Reclamation) to consider engineering solutions to reduce the diversion of juvenile salmonids from the Sacramento River into the interior and south Sacramento–San Joaquin Delta (Delta).

In response to the RPA, DWR investigated engineering alternatives to reduce the diversion of juvenile salmonids into the interior Delta. In 2009 and 2010, DWR evaluated a non-physical barrier using Bio-Acoustic Fish Fence™ (BAFF) technology at the Head of Old River. In 2011 and 2012, DWR tested the BAFF technology at the divergence of Georgiana Slough and the Sacramento River. During the 2011/2012 BAFF study, DWR determined that the probability for emigrating juvenile salmonids to be entrained into Georgiana Slough was significantly reduced if the BAFF were operational and if the juvenile salmonids were distributed more toward the right bank of the Sacramento River opposite Georgiana Slough. Based on these results, DWR conducted an additional study in 2014 utilizing a Floating Fish Guidance Structure (FFGS), which is a much simpler technology than the BAFF and focuses on guiding fish toward the right bank. The FFGS was installed on the Sacramento River just upstream of the confluence with Georgiana Slough. DWR determined that the FFGS was efficient at guiding emigrating juvenile Chinook salmon toward the right bank within a specific Sacramento River flow range.

In 2019, Reclamation prepared National Environmental Policy Act (NEPA) compliance documentation (Environmental Impact Statement [EIS]) and completed FESA reinitiation of consultation with the U.S. Fish and Wildlife Service (USFWS) and NMFS on the long-term reoperation of the State Water Project (SWP) and Central Valley Project (CVP). BiOps for the project were issued by USFWS and NMFS on October 21, 2019 and the Final EIS was published on December 19, 2019, and the Record of Decision signed on February 19, 2020. The NMFS BiOp described the 2009 RPA Action IV.1.3 (Consider Engineering Solutions to Further Reduce Diversion of Emigrating Juvenile Salmonids to the Interior and Southern Delta, and Reduce Exposure to CVP and SWP Export Facilities (including Georgiana Slough Non-Physical Barrier)) as part of the environmental baseline, and recommended its continuation as a conservation measure, as follows (pp. 823 of NMFS BiOp 2019):

> *…Reclamation and DWR should support the following physical and non-physical barrier projects…*
>
> *ii. Non-physical exclusion barrier at Georgiana Slough consistent with DWR's prior pilot study results.*

Under the California Endangered Species Act (CESA), the California Department of Fish and Wildlife (CDFW) issued the 2020 *Incidental Take Permit for Long-term Operation of the State Water Project* (SWP ITP; CDFW 2020). SWP Incidental Take Permit (ITP) Condition of Approval (COA) 8.9.1 includes a requirement for construction and operation of a migratory barrier at Georgiana Slough. The construction and operation of the migratory barrier is required to occur within three years (no later than March 31, 2023) of the effective date of the SWP ITP, i.e., March 31, 2020.

Based on results from the previous BAFF and FFGS studies, and in response to the 2019 NMFS BiOp conservation measure and 2020 CDFW SWP ITP COA, DWR proposes the Georgiana Slough Salmonid Migratory Barrier Project (GSSMB; project).

The GSSMB is being implemented over two phases; the first phase includes planning and design, and construction (anticipated to be completed in winter/spring 2023) and the first year of operation, ending on June 30, 2023. The second phase would begin July 1, 2023 and continue through June 30, 2030, with operations generally occurring from mid-November through May (the key months when listed salmonids are present in the Sacramento River) of each year. Specific details regarding proposed operations of the BAFF (Operations Plan) are required to be developed in coordination with CDFW, NMFS, and USFWS to maximize benefits to migrating listed salmonids, including winter- and Central Valley (CV) spring-run Chinook salmon and California CV (CCV) steelhead. Operation of the GSSMB shall not commence until the final Operations Plan and associated criteria are approved in writing by CDFW.

Similar to the 2011/2012 BAFF study and 2014 FFGS study, the anticipated GSSMB benefits include:

1. Reducing impacts of the SWP and CVP operations by deterring emigrating juvenile salmonids from entering Georgiana Slough and thereafter the central and south Delta. Survival is lower in the Delta interior relative to remaining in the mainstem Sacramento River, thus avoidance of this route will improve survival to Chipps Island;
2. Maintaining SWP compliance with FESA and CESA; and
3. Maintaining existing through-Delta water conveyance with reduced impacts on juvenile salmonids by reducing the number of juvenile salmonids that enter the central and south Delta.

CHAPTER 2
Project Description

2.1 Project Location

The GSSMB project site is situated along the Sacramento River at its junction with Georgiana Slough in the north Delta, with staging areas adjacent to the town of Hood, Sutter Slough, Steamboat Slough , and Georgiana Slough (Point Ranch Property) junctions, and the Delta Cross Channel (DCC) (see **Figure 1** and **Figure 2**). **Table 1** summarizes project locations, from upstream to downstream on the Sacramento River.

TABLE 1
SUMMARY OF PROJECT LOCATIONS

Area Name	Starting and Ending Sacramento River Mile[#]	Nearest Town or Community	GSSMB Activity	Description of Staging Area(s)
Sacramento	59	Sacramento	Study fish release	A possible study fish release site is located at a developed portion of the Sacramento River waterfront (City dock platform under the Tower Bridge).
Hood	–	Hood	Staging only	Possible staging area, approximately 1.8 acres, located on the left bank in Hood west of SR 160. Herein referred to as the "Hood staging area."
Sutter Slough	34.1 to 34.3	Paintersville	Staging only	Possible staging area, approximately 1.8 acres, on the left bank of Sutter Slough (does not include the Sutter Slough Bridge). Herein referred to as the "Sutter Slough staging area."
Steamboat Slough	31.8 to 32.9	Paintersville	Staging and study fish release	Possible staging area and study fish release site, approximately 0.46 acre, on the right bank of Steamboat Slough (does not include the Steamboat Slough Bridge). Herein referred to as the "Steamboat Slough staging area."
DCC	27.0 to 27.2	Locke	Staging only	Possible staging area, approximately 0.9 acre, located on the Sacramento River left bank, south of the DCC. Herein referred to as the "DCC staging area."
Georgiana Slough	26.4 to 26.7	Walnut Grove	BAFF and study fish release	One potential land-based staging area/area for utilities access (known as the Point Ranch Property), approximately 1.7 acre, is located at a point on the confluence of the Sacramento River and Georgiana Slough. If access to the Point Ranch Property is not available, a barge/flexi-floats with a diesel generator(s) to supply power necessary to operate the BAFF would be located on the water adjacent to the Georgiana Slough project site. On the Sacramento River, DWR would use barges and docks along the left bank. A possible study fish release site is located approximately 2 miles downstream of the BAFF location and junction with the Sacramento River.

NOTES:

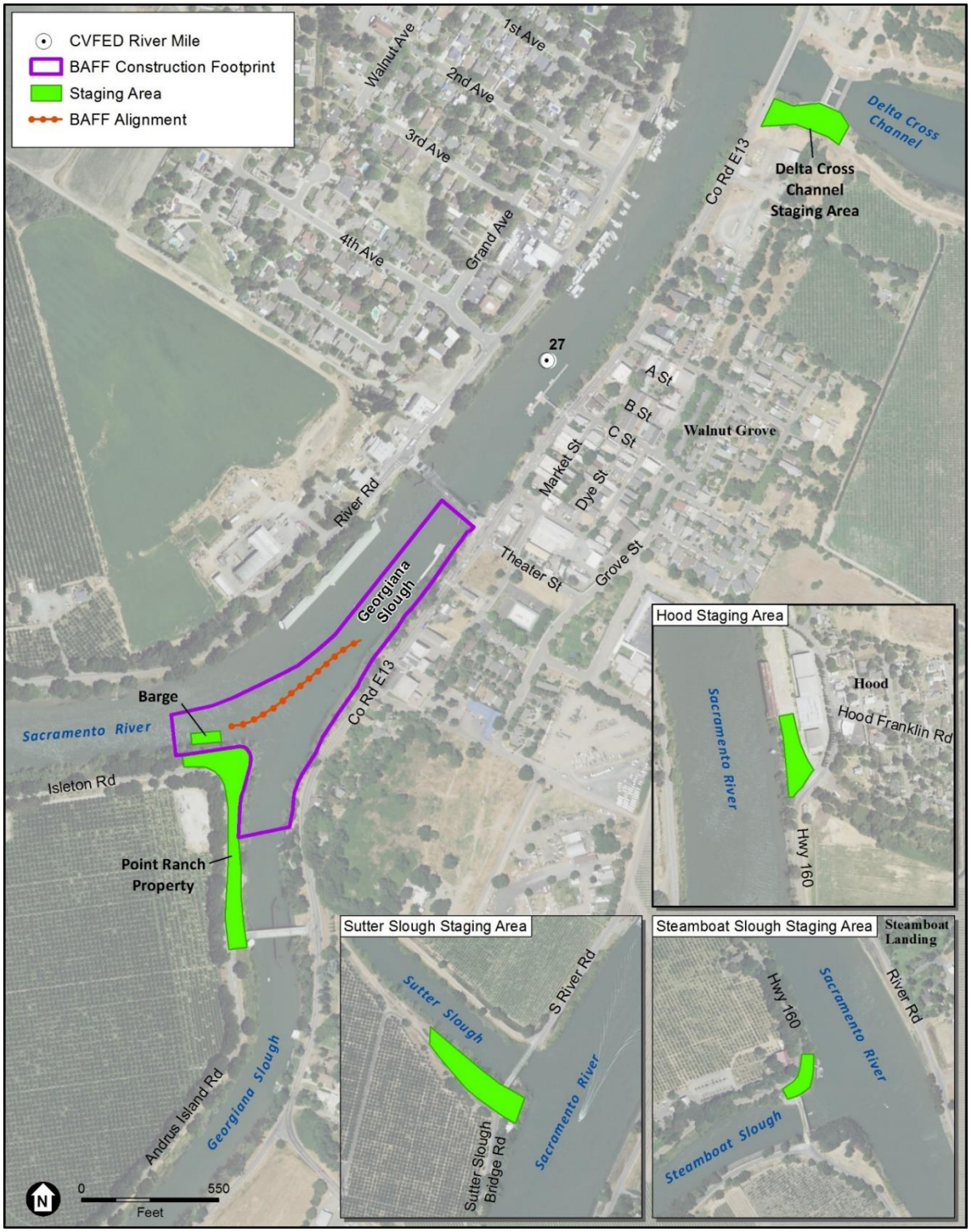
BAFF = Bio-Acoustic Fish Fence™; DCC = Delta Cross Channel; DWR = California Department of Water Resources; GSSMB= Georgiana Slough Salmonid Migratory Barrier; SR = State Route.

[#] The river miles were obtained by using the Clarksburg, Courtland, and Isleton U.S. Geological Survey 7.5-Minute Quadrangles.

SOURCE: Data provided by DWR in 2020

SOURCE: USGS Topo; adapted by ESA, 2020

Figure 1
Georgiana Slough Salmonid Migratory Barrier Overview Map



SOURCE: USDA, 2018; adapted by ESA, 2020

Figure 2
Detailed Map—Georgiana Slough Junction and Staging Areas

2.2 Project Overview

The GSSMB builds on the 2011 and 2012 BAFF and 2014 FFGS studies; however, under the proposed project, the BAFF would seasonally operate from early 2023 through 2030 at the Georgiana Slough junction. Similar to previous studies, the BAFF is being operated as a behavioral deterrent to prevent Sacramento River juvenile salmonids from entering Georgiana Slough during emigration (see additional details below).

DWR proposes the following for the proposed GSSMB:

- Bio-Acoustic Fish Fence (BAFF): The BAFF would be constructed each year in the Sacramento River at Georgiana Slough and would be operated during the winter and spring periods (see below). Up to 31 steel piles (up to 24-inch-diameter) and four concrete pier blocks (up to 24-inch-diameter) would be installed. Piles associated with the BAFF would be retained throughout the project, with removal scheduled at the end of the project period (2030).

- Navigation Aids: Up to 40 concrete anchor blocks would be used for navigation aids, such as buoys and signs at the Sacramento River/Georgiana Slough junction when the BAFF is installed.

- Fish Tracking and other Data Collection Monitoring Equipment: Acoustic telemetry hydrophones/receivers and up to 18 steel piles at the Georgiana Slough junction (up to 24-inch-diameter) would be used to attach equipment for hydroacoustic and hydrodynamic barrier operational monitoring.

- Barrier Construction and Operation Window: To limit the potential for impacts on listed fishes, marine construction, which is defined as pile driving and the installation of anchors and pier blocks, would occur between August 1 and September 30 of each year, when feasible. It is anticipated that the BAFF would be installed in winter/spring (conditions permitting) and be operational during winter and spring periods each year. Specific details regarding proposed operations of the BAFF are described below.

  The barrier components would be removed by the end of June. Mobilization and demobilization, both land- and water-based, would occur within 15 days prior to and after each activity. Supporting infrastructure, including piles, would remain in place throughout the year during the duration of the project (early 2023 through 2030).

- Staging Area Improvements: To prepare, install, and operate the BAFF, DWR may conduct improvements, such as adding gravel and grading at the staging areas. To provide electricity to the potential Point Ranch Property staging area (adjacent to Georgiana Slough), DWR may install a new power pole. The new power pole would replace an existing pole located on the Point Property in an existing disturbed area that is clear of vegetation and other sensitive resources.

- Operations Staging Area: This area will consist of multiple conex boxes used to house the BAFF operations and control equipment and air compressor system, and an office trailer. Other BAFF operating equipment such as the air manifold system with rain shelter, portable power distribution panel and temporary security fencing will also utilize this area.

- Barrier Removal and Site Restoration: As described above, to limit the potential for impacts on listed fishes, marine construction (i.e., removal of piles) would occur between August and September of each year, when feasible. The BAFF components would be removed by the end of June. Supporting infrastructure, including piles, would be removed at the completion of the project. Piles would be removed utilizing a vibratory hammer to unseat the pile and/or by cutting the pile below the substrate line (i.e., bed of river). All equipment would be removed from staging areas and the sites would be restored to prior existing conditions.

- Performance Monitoring: Each year DWR will conduct monitoring to assess performance of the BAFF. This may include the installation of fish tracking and other data collection monitoring equipment, including steel piles at the Georgiana Slough junction to attach equipment for hydroacoustic and hydrodynamic barrier operational monitoring. DWR would also tag and release hatchery-reared juvenile Chinook salmon and steelhead for acoustic telemetry-based fish tracking. DWR may also capture, tag, and release predatory fish by hook-and-line sampling. DWR would release acoustic-tagged juvenile Chinook salmon and/or steelhead at one or more sites. Lastly, the monitoring plan will consider monitoring and performance measures associated with operations timing and associated fish presence, including specific targets and objectives intended to minimize the down-time of the BAFF during periods of winter-run and spring-run Chinook salmon emigration, which may include information regarding annual comparisons of operating periods with emigration timing (e.g., fish presence at rotary screw trap monitoring locations, seine data, eDNA). Details of performance monitoring are being developed as part of a separate monitoring plan.

As described above, the GSSMB builds on the 2011 and 2012 BAFF studies; however, under the proposed GSSMB project, several improvements have been made to improve BAFF system operations and reliability. These improvements include the following:

- Re-designed the air system for automation and remote operation, improved diagnostics, and reliability.
- Modular packaged, and fully integrated compressed air system.
- New power cables that make handling, deployment, and storage much easier.
- Remote monitoring and operating capabilities.
- Redundancy in power and communication units to minimize operating down time.
- Installation of a Pacific Gas and Electric Company (PG&E) power source to increase operational reliability, reduce environmental impacts (carbon emissions from using generators), and eliminate the hazards (environmental, personnel) of working with fossil fuels to power electrical generators. (Note, see additional discussion below regarding seasonal PG&E power limitations.)

2.3 Project Schedule

The annual construction/operation period is anticipated to begin July 1 and end June 30. Marine (i.e., in-water) construction is anticipated to take up to 30 days and would generally occur between August 1 and September 30 to avoid or minimize the potential for impacting Delta Smelt and Chinook salmon and/or steelhead migrating through the Delta. However, during year one, in-water construction may occur during January/February (2023) due to permit approval delays. Barrier and study/ data collection equipment (e.g., fish tagging station, hydrophones) installation (i.e., installation activities other than marine construction) is also anticipated to take up to 30 days and would occur prior to operations.

Removal consists of two separate activities: (1) removal of the barrier components and study/data collection equipment (by end of June on annual basis), and (2) removal of the piles and remaining supporting infrastructure (August and September; annual basis and at end of ITP period [2030]). DWR would remove the BAFF and study/data collection equipment between June and September after each operational period. DWR may remove the piles associated with the BAFF to reposition the alignment as necessary in future years. Because removal of the piles may require use of a vibratory hammer, DWR would complete this activity within or as close to August/September to the maximum extent practicable.

2.4 Non-Physical Barrier Technology

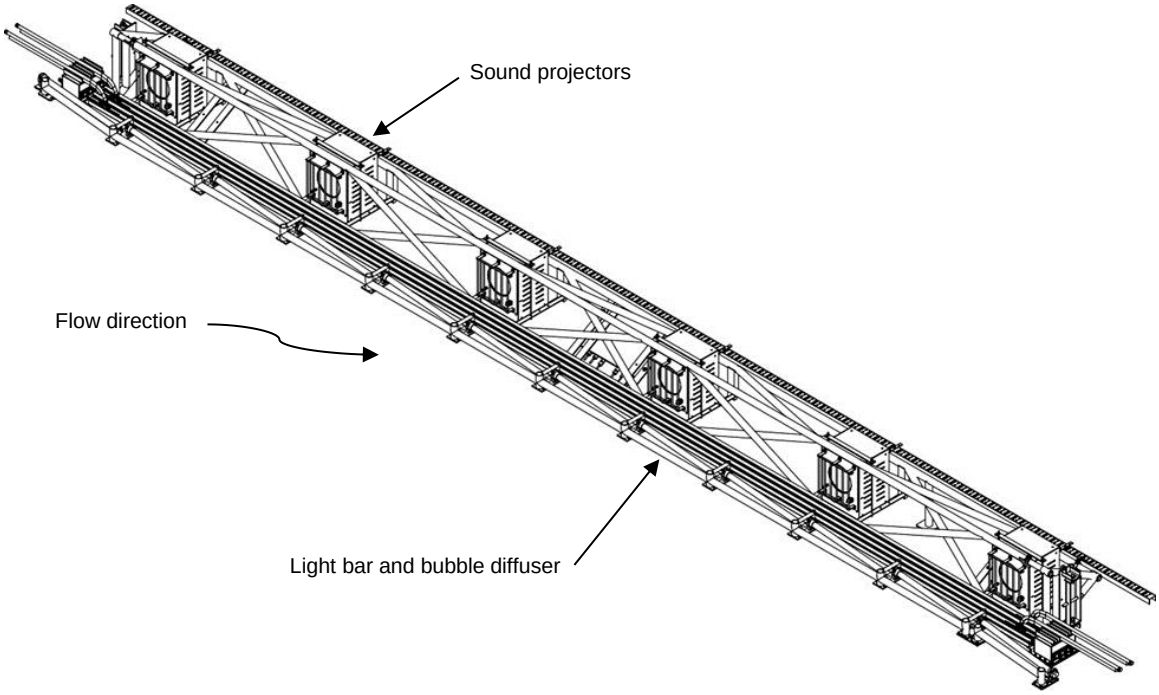
The GSSMB consists of a BAFF that would be installed, operated, and monitored from 2023 through 2030 at Georgiana Slough. Similar to the previous studies, the BAFF is being implemented and monitored for its effectiveness as a behavioral deterrent to prevent emigrating juvenile salmonids in the Sacramento River from entering Georgiana Slough (DWR 2015; Romine et al. 2016).

2.4.1 Bio-Acoustic Fish Fence (BAFF)

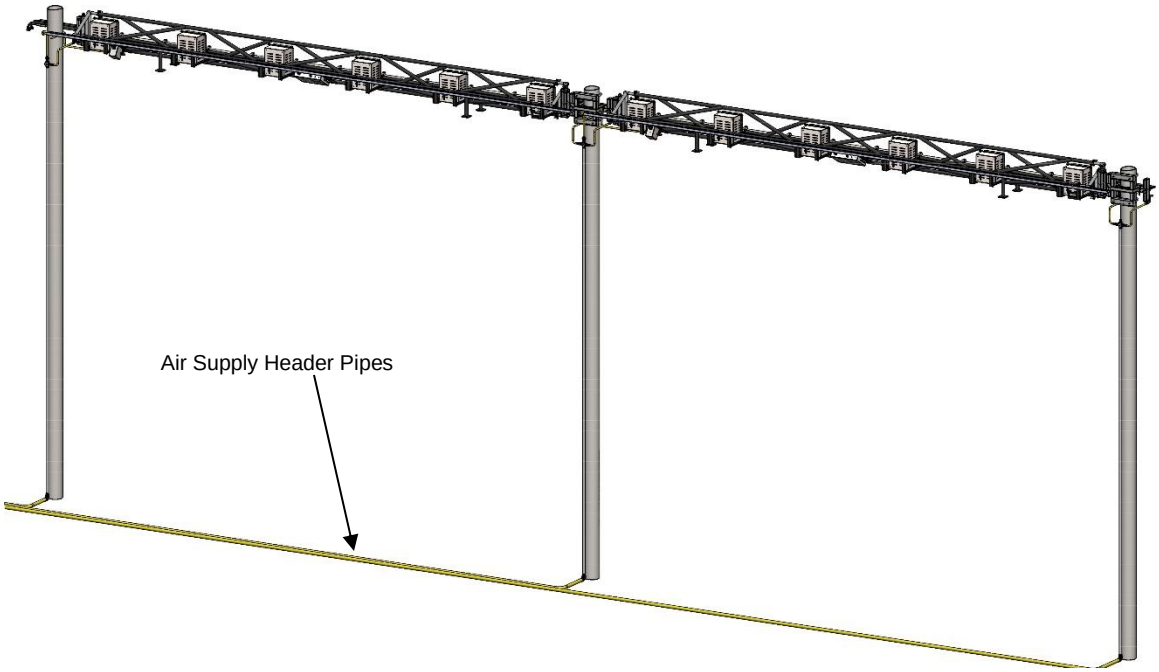
The BAFF is a multi-stimulus fish barrier that combines high-intensity light-emitting diode (LED) modulated intense lights (MILs), an air bubble "curtain," and sound emitted at frequencies and levels that are repellent to Chinook salmon (Bowen et al. 2012; Bowen and Bark 2012). The sound system and MIL flash rate can be tuned to known sensitivities of various fish species. Investigations have indicated that the most effective acoustic deterrents for multiple fish species fall within the sound frequency range of 5 to 600 hertz (Hz) (Bowen and Bark 2012). Studies with Chinook salmon and Delta Smelt have shown that when the sound and strobe light flash rate were tuned according to these species' sensitivities, the barrier was particularly effective as a deterrent for juvenile Chinook salmon (Bowen et al. 2008). Based on these studies, it has been hypothesized that sound is the deterrent. The sound is trapped by refraction within the bubble curtain, producing a sharply defined sound field that fish do not detect until within close proximity to the barrier. The flashing MILs are aligned such that the light beam projects onto the bubble curtain. This helps identify the bubbles so that the source of the sound can be determined by the fish. The narrow, vertical MIL beam minimizes light saturation within the experimental area.

The BAFF, installed at the divergence of the Sacramento River and Georgiana Slough, would be up to approximately 800 feet long, comprising up to 20 separate 40-foot frame sections. Each frame section would have approximately six sound projectors, 12 MILs, and a perforated "bubble" pipe (**Figure 3 A**). The bubble pipe would be positioned along each frame below and upstream of the sound projectors. A bubble curtain would be created by passing compressed air into the perforated pipe. Air flow rate would typically be 1.38 cubic feet per minute (cfm) per linear foot length of barrier. The MILs would be powered from an "accumulator" positioned on each frame section. A mounting plate would be attached to the support tray to house the accumulators. The junction of each frame section can pivot with the adjacent section, and where needed each frame section can be supported at either end with a piling or support column to a pier block. The frame sections could be adjusted vertically at the pile attachments to adjust for the uneven riverbed contour. The sections would be positioned along the barrier line such that its

effectiveness would be optimized. In the main portion of the channel, this is approximately 12 feet from the channel bottom (**Figure 3 B**). The top of the frame sections would be at least 6 feet below the water surface elevation at low tide. The barrier frame would be supported by up to 31 piles (up to 24-inch-diameter) in the riverbed. Up to four concrete pier blocks (up to 24-inch-diameter) would be situated in shallow water to ensure the system remains in alignment.



A) Three-dimensional rendering of BAFF frame with light, sound, and bubble diffuser components.



B) Three-dimensional rendering of BAFF frame suspended off riverbed on piles.

Source: Renderings provided by Fish Guidance Systems in 2021

Figure 3
Conceptual Design of the Bio-Acoustic Fish Fence

CHAPTER 3
Operational Considerations

This chapter provides a summary overview of primary operational considerations.

3.1 Salmonid Migration Windows

Salmonid migration windows are presented below as a basis for informing the operational periods of the GSSMB.

3.1.1 Sacramento River Winter-Run Chinook Salmon

Sacramento River winter-run Chinook salmon (WRCS) was listed as endangered in 1994 (59 FR 440). Juvenile WRCS outmigration through the Delta occurs from October through April (**Table 2**). While Delta presence is greater in December through April, early migrating natural WRCS are present in October and November (ITP) (CDFW 2020).

3.1.2 Central Valley Spring-Run Chinook Salmon

Central Valley spring-run Chinook salmon (SRCS) was listed as threatened by NMFS in 1999 (64 FR 50394). Juvenile SRCS outmigration through the Delta occurs from December through May. While presence is greatest in April and May, outmigrating juveniles are present December through March.

TABLE 2
TEMPORAL OCCURRENCE OF JUVENILE SACRAMENTO RIVER WINTER-RUN AND SPRING-RUN CHINOOK SALMON IN THE DELTA

Relative Abundance	High (^)			Medium (x)			Low (#)			None (-)		
Species	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WRCS	#	x	^	x	-	-	-	-	-	#	#	x
SRCS	#	#	#	^	x	-	-	-	-	-	-	#

Source: NMFS (2019). Data from Delta Juvenile Fish Monitoring Program.

3.2 Fish Hatchery Releases

Under drought conditions, water temperatures in the lower Sacramento River can exceed 20° C which are stressful for salmon and can lead to increased mortality. According to the EPA, migrating juvenile salmon exposure to water temperatures of 20° C for extended periods of time may cause increased disease, impaired smoltification, reduced growth, and increased predation

(U.S. Environmental Protection Agency 2003). In laboratory studies, increased mortality of juvenile Chinook salmon generally occurred when water temperatures exceeded 20° (Yates et al., 2008).

The Coleman National Fish Hatchery produces millions of juvenile salmon each year for release into the Sacramento River. The fish are released downstream of the hatchery into Battle Creek, a tributary to the Sacramento River, to begin their journey downstream into the Pacific Ocean. In some years, however, drought conditions have forced the hatchery to truck salmon to the San Francisco Bay to increase survival. Transporting juvenile salmon to the San Francisco Bay occurred in 2014, 2015, and 2021, all of which were drought years.

The Livingston Stone National Fish Hatchery, a substation of the Coleman National Fish Hatchery complex, is located at the foot of the Shasta Dam. It is the only fish hatchery to produce winter-run Chinook salmon. It typically produces approximately 250,000 juvenile winter-run Chinook salmon for releases each February.

The Feather River Fish Hatchery produces millions of juvenile fall- and spring-run Chinook salmon each year for release into the Feather River. Similar to Coleman, in some years, however, drought conditions have forced the hatchery to truck salmon to the San Francisco Bay to increase survival.

The Nimbus Fish Hatchery produces millions of juvenile Chinook salmon and steelhead each year for release into the American River. Similar to Coleman, in some years, however, drought conditions have forced the hatchery to truck salmon to the San Francisco Bay to increase survival.

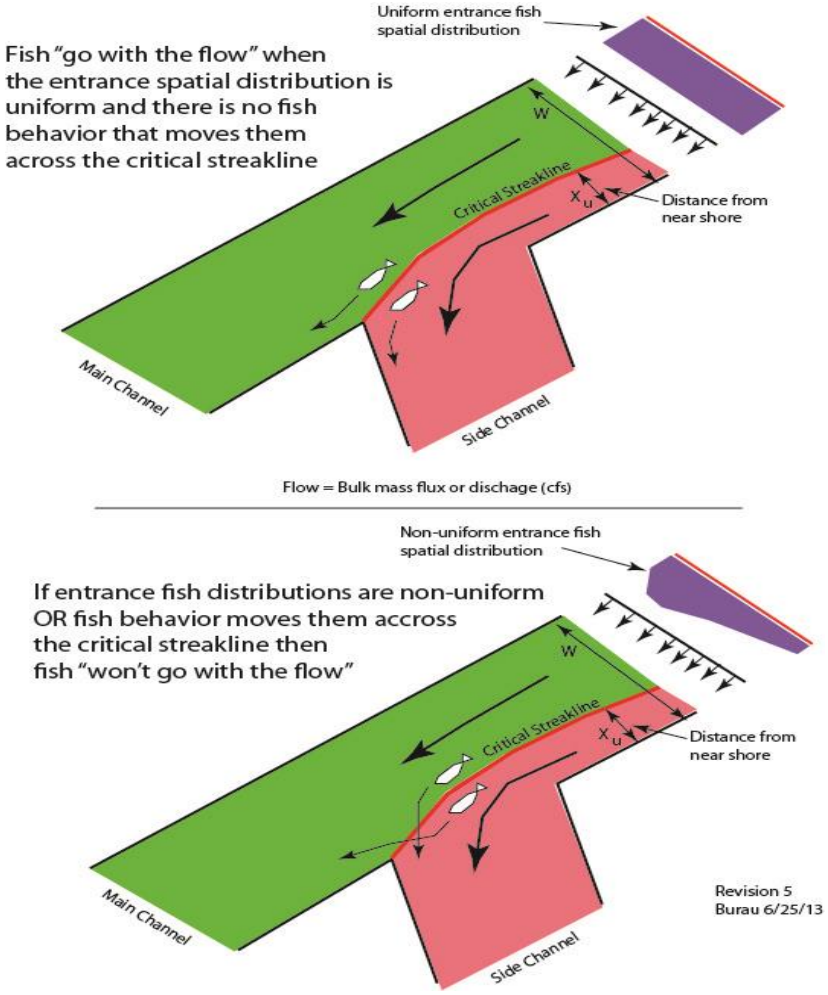
3.3 Junction Hydrodynamics and Critical Streakline

Evidence from past studies on juvenile Chinook salmon entrainment into Georgiana Slough suggests that instantaneous water velocity patterns in the immediate vicinity of the Georgiana Slough divergence affect entrainment into Georgiana Slough (Horn and Blake 2004; DWR 2012; DWR 2015; DWR 2016). The location of the split between the entrainment zones,[1] defined as the critical streakline, is the point in the river cross-section where the two entrainment zones meet. The critical streakline concept is a way of collapsing a complex flow field into its essence with regard to fish routing/entrainment fates, providing a simple metric for comparing the potential for entrainment under a variety of conditions within a junction and between junctions. For example, the critical streakline represents the line separating parcels of water that either remain in a main river channel (Sacramento River); green region in **Figure 4** or enter a side channel (Georgiana Slough); red region in Figure 4. The distribution of fish in relation to the critical streakline has been documented as an important predictor of the risk of entrainment into Georgiana Slough.

In addition to varying critical streakline positions associated with fluctuating downstream discharges, many tidally forced junctions in the Delta, including the Georgina Slough junction,

[1] The position in the Sacramento River where fish on one side of the streakline will have a high likelihood of being entrained into Georgiana Slough while fish on the other side will likely remain in the mainstem channel as they move downstream.

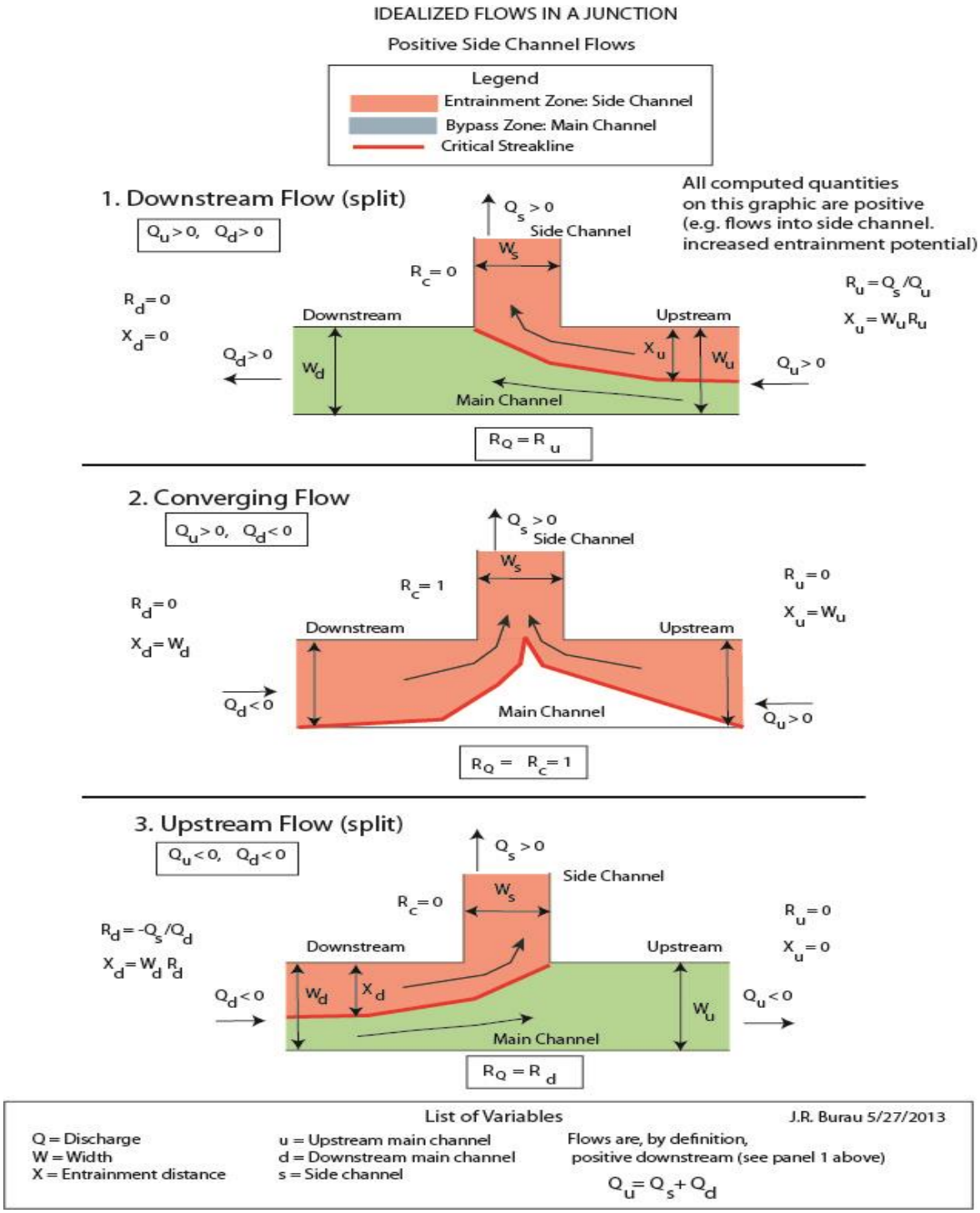
experience velocity conditions where the flow converges into the side channel from both upstream and downstream (e.g. during flood tides). Under relatively low discharge conditions in the Sacramento River, flows can reverse on the flood tide, creating a critical streakline that is variable relative to the cross-section of the river (similar to downstream flow splits, albeit in reverse). Under these conditions, it is possible that fish that have moved downstream of the junction in the Sacramento River can be advected back upstream and entrained into Georgiana Slough under reversing flows on flood tides. These three hydraulic conditions (downstream flow [split], converging flow, and upstream flow [split]) are conceptually depicted in **Figure 5** with example time series plots from 2012 BAFF study conditions in **Figure 6**.



Source: USGS, DWR 2015

Note: Red regions denote the entrainment zone for the side channel whereas the green regions show the region where fish continue along the main channel. The red line between these regions is the critical streakline. Top panel shows the required conditions for fish to "go with the flow" – in this case the bulk discharge in each channel. These conditions include a uniform entrance fish spatial distribution and behaviors that don't result in fish crossing the critical streakline. In the bottom panel are indicated those conditions that create conditions where fish aren't distributed in proportion to the flows in each channel. These conditions include a non-uniform entrance fish distribution as is shown and behaviors that cause fish to transit the critical streakline.

Figure 4
Conceptual Diagram of Critical Streakline and Entrainment in a Junction

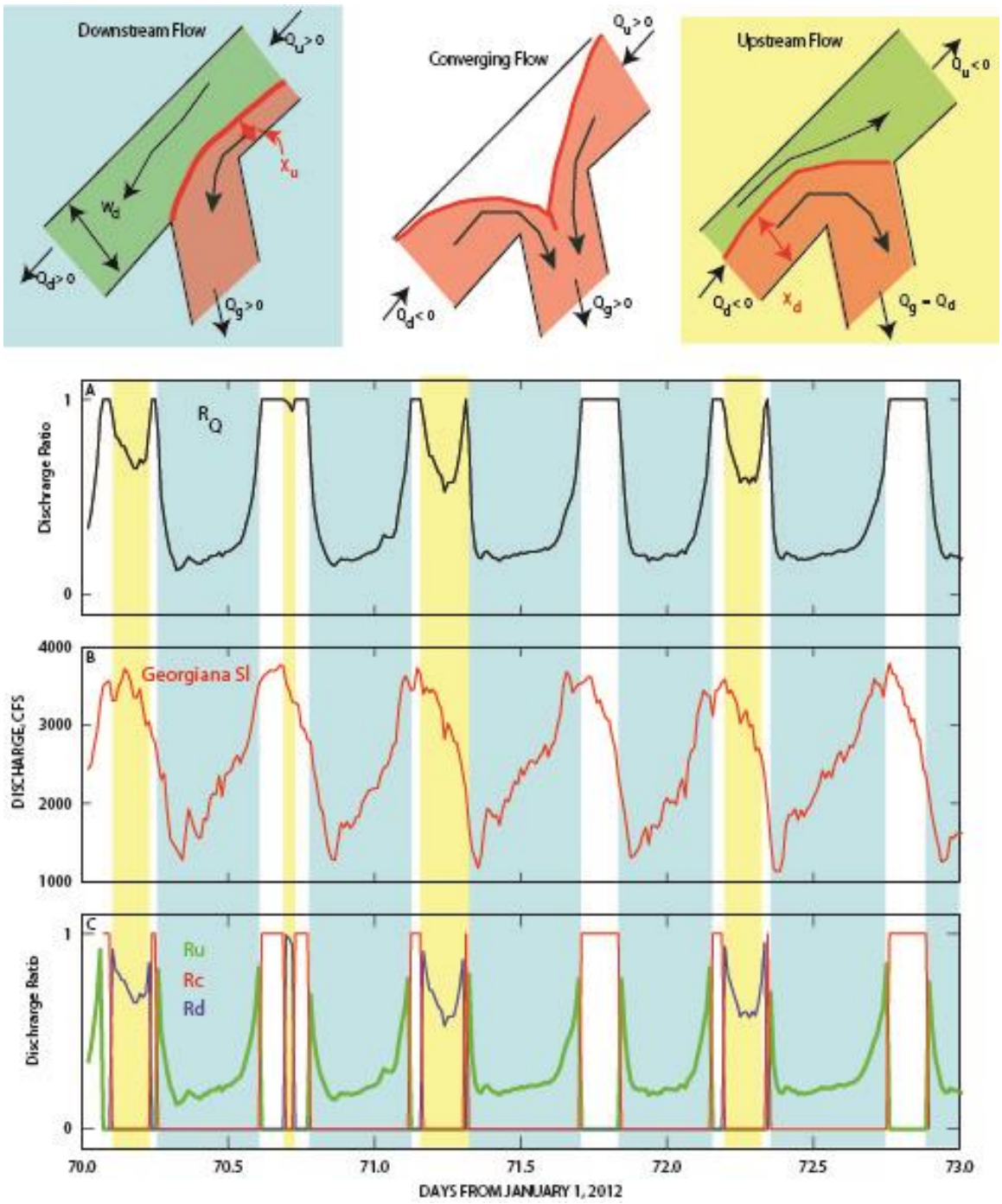


Source: USGS, DWR 2015

Notes: 1) downstream flow in the main channel; 2) converging flow; and 3) upstream flow.

Figure 5

Three Flow Conditions in a Tidally Forced Junction Where the Water is Entering a Side Channel



Source: USGS; DWR 2015

Notes: Time series plots of (A) the total discharge ratio, R, (B) the discharge in Georgiana Slough, and (C) the component discharge ratios RU (flow entering Georgiana Slough from upstream, green), RD (flow entering Georgiana Slough from downstream, blue) and RC (converging flow into Georgiana Slough) during low Sacramento River flow period.

Figure 6

Time-Series Plots of Converging and Upstream Flow Conditions

3.4 2011 and 2012 BAFF Study Results

The migration of juvenile salmonids from the Sacramento River into the interior Delta through pathways such as Georgiana Slough and the DCC has been shown to contribute to greater mortality relative to remaining in the Sacramento River (Brandes and McLain 2001; Perry 2010; Perry et al. 2010; Perry et al. 2012; Singer et al. 2013; Perry et al. 2018). To identify potential engineering approaches to reduce the percentage of the juvenile salmonids entrained into Georgiana Slough, DWR operated a BAFF in 2011 and 2012 and FFGS in 2014 to assess the effectiveness of non-physical and physical barriers as a method for guiding downstream migrating juvenile salmonids. The experimental design of the tests included the use of acoustic-tagged juvenile Chinook salmon (2011, 2012, and 2014) and yearling steelhead (2012), released upstream of the barriers when they were on and when they were off, to determine effectiveness.

During the 2011 study, the BAFF reduced the percentage of juvenile late fall-run Chinook salmon passing into Georgiana Slough from 22.1 percent (BAFF Off) to 7.4 percent (BAFF On), a reduction of approximately two-thirds of the fish that would have been entrained (DWR 2012). Analysis of the 2012 study data showed that the percentage of juvenile Chinook salmon migrating into Georgiana Slough was reduced from 24.1 percent (BAFF Off) to 11.4 percent (BAFF On), approximately one-half less (DWR 2015).

In 2012, this technology was tested on steelhead in addition to late fall-run Chinook Salmon, a total of 23.4 percent of the steelhead were entrained into Georgiana Slough when the BAFF was off compared to 10.5 percent when the BAFF was on, representing a 12.9 percentage point (or approximately one-half) overall reduction in steelhead entrainment into Georgiana Slough (DWR 2015). These findings demonstrated that an integrated multi-sensory (light, sound, and air bubbles) non-physical barrier was able to significantly reduce juvenile salmonid entrainment into Georgiana Slough similarly for both steelhead and Chinook salmon.

During the 2014 study, the FFGS reduced the percentage of juvenile Chinook salmon passing into Georgiana Slough during a subset of environmental conditions, with the FFGS effectiveness being highly dependent upon discharge, fish cross-stream position, and time of day (Romine et al. 2016). Under intermediate Sacramento River discharge conditions (8,794 – 12,394 cubic feet per second [cfs] upstream of the junction with Georgiana Slough and the DCC), the percentage of juvenile Chinook salmon passing into Georgiana Slough was 21.2 percent (FFGS Off) compared to 13.5 percent (FFGS On), a reduction of approximately one-third of the fish that would have been entrained. Under higher Sacramento River discharge conditions (12,395 – 21,083 cfs), the percentage of juvenile Chinook salmon passing into Georgiana Slough increased by around one-half, from 11.7 percent for FFGS Off compared to 17.3 percent for FFGS On. Under lower Sacramento River discharge conditions (4,344 – 8,793 cfs), entrainment differences were negligible. These findings show that a FFGS reduced juvenile salmonid entrainment but only during intermediate discharge; overall, there was little difference in entrainment between FFGS Off and FFGS On. It was suggested that the complex hydrodynamics of the Georgiana Slough junction might require dynamic operation of the FFGS for success (e.g., moving the FFGS toward the bank to avoid turbulence and increased entrainment during high discharge) (DWR 2015).

3.5 BAFF Power Source Availability

During the Operations Plan development, DWR was made aware that power requirements (being provided to the primary staging area by Pacific Gas and Electric [PG&E]) for the full BAFF system would only be available for a November through April time period due to seasonal demands in the area. If operations are to be required outside of this time period, additional resources, including equipment (e.g., diesel generators), fuel, staffing, etc. would be required.

3.6 Operational Costs

As stated above, the BAFF and its operational components will operate off the new PG&E service during the November through April operations period and if operations are to be required outside of this time period, additional resources, including equipment (e.g., diesel generators), fuel, staffing, etc. would be required.

Electricity use at the project site during the November through April period will depend on the BAFF operations schedule. If the BAFF were to operate 24 hours a day for 7 days per week, the electrical operating costs are estimated to be $50,000 per month. As a result, operating costs alone could easily exceed $300,000 for one season (i.e., November through April period). If the BAFF is operated outside of this period (e.g., May), additional costs would be incurred associated with diesel generator acquisition and fuel consumption, totaling approximately $126,000/month.

As described above, under certain conditions, it is possible that fish that have moved downstream of the junction in the Sacramento River can be advected back upstream and entrained into Georgiana Slough under reversing flows on flood tides. This critical streakline concept, which correlates varying river discharge to changing complex tidally forced junction hydraulics, provides an important consideration for fish routing/entrainment and associated BAFF performance at the Georgiana Slough junction.

Operational changes to the GSSMB that reflect drought conditions and water temperatures should be considered in seasonal operation of the GSSMB. Modifying operations when salmon are being trucked past the GSSMB reduces operations and maintenance costs and extends the life of components which equates to less downtime and continued operation of the barrier when juvenile salmon are migrating downstream.

Optimization of BAFF operations is an important consideration to minimize operational costs. The above topics are included in this proposal to initiate further discussion.

This page intentionally left blank.

CHAPTER 4
Proposed BAFF Operations

4.1 Construction and Removal

As described above, to limit the potential for impacts on listed fishes, marine construction, which is defined as pile driving and the installation of anchors and pier blocks, would occur between August and September of each year. Supporting infrastructure, including piles, would remain in place throughout the year during the duration of the project (late 2022/early 2023 through 2030). Piles may be removed and reset as needed during the August/September window if it is determined that the BAFF alignment needs to be adjusted. Piles would be removed at the completion of the project utilizing a vibratory hammer to unseat the piles and/or by cutting the pile below the substrate line (i.e., bed of river). All equipment would be removed from staging areas and the sites would be restored to prior existing conditions.

4.2 Operations Window

Based on information presented above (see Table 2), December through April has been determined to be the key period for operation of the BAFF for WRCS juvenile outmigrants at the Sacramento River junction with Georgiana Slough. The operations window is based on the high and medium temporal occurrence in the Delta that occurs from December through April (NMFS 2019).

December through May is determined to be the key period for operation of the BAFF for SRCS juvenile outmigrants at the Sacramento River junction with Georgiana Slough. The operations window is based on the high and medium temporal occurrence in the Delta that occurs in April and May as well as the low temporal occurrence of juveniles from December through March (NMFS 2019).

The proposed operations window includes an adaptive approach that covers all periods of medium and high temporal occurrence of WRCS and SRCS (mid-November through April/May) and informed by real-time fish monitoring at the Knights Landing Screw Trap and Delta juvenile fish monitoring program (Sacramento trawl, beach seines), and associated operations of the DCC (see Table 3). It also covers five of seven months of low occurrence. The only period it does not cover is September and October when early migrating WRCS may occur in low numbers in the lower Sacramento River/north Delta. Additionally, while not presented in this plan, the mid-November through April/May operations window covers all periods of high occurrence (and the vast majority of medium occurrence) for juvenile fall- and late fall-run Chinook salmon and juvenile steelhead.

Importantly, as discussed above, the month of May is outside of the period where full PG&E power is available to accommodate the BAFF system. As a result, May operations (BAFF

ON/OFF) will be considered on an annual basis within an adaptive framework considering juvenile salmonid outmigration timing patterns and increased operational costs associated with supplemental power source (diesel generator).

TABLE 3
GSSMB BAFF OPERATIONS SCHEDULE

Season	BAFF Operational Status
October 15 - November 15	BAFF is installed; if BAFF is installed and operational prior to November 15 then BAFF operations would correspond to DCC gate operations as early as November 1 (when DCC gates closed for fishery protection purposes, BAFF would be ON). BAFF may be turned OFF for maintenance, monitoring studies, or power issues
November 16 - December 31	BAFF operations would correspond to DCC gate operations (when DCC gates closed for fishery protection purposes, BAFF would be ON). BAFF may be turned OFF for maintenance, monitoring studies, or power issues
January 1 – April 30	BAFF is ON. BAFF may be turned OFF for maintenance, monitoring studies, or power issues
May 1 - May 31	May operations (ON/OFF) will be considered on an annual basis within an adaptive framework considering juvenile salmonid outmigration timing patterns and increased operational costs associated with supplemental power source (diesel generator)
June 30 – October 15	BAFF is removed (out)

4.3 Operations Window Adjustments

4.3.1 Damage/repairs

Floating debris such as trees or logs pose a serious risk to operations of the BAFF during high river discharge events, especially first flush events that mobilize debris that has accumulated during the prior low flow season. Damage to the BAFF system would likely require the use of divers, and barge mounted heavy equipment to repair. Work of this nature is time consuming and could require up to several days to weeks, depending on the extent of the damage and river conditions (flow and turbidity to conduct dive-based work safely). During the repairs, partial or all the BAFF system may not be operational. BAFF operating downtime will be recorded and documented in the Annual Operations Report.

4.3.2 Maintenance

The BAFF system will require periodic maintenance to ensure its operation and effectiveness. Debris removal, air-line issues, light bar cleaning/replacement, and audio speaker cleaning/replacement are normal for this system. Maintenance of the BAFF may require diver assistance and potentially barge mounted equipment and could require hours to days to complete, depending on river conditions. During this work, partial or all the BAFF system by not be operational. BAFF operating downtime will be documented in the Annual Operations Report.

Monitoring to capture baseline conditions may be conducted during these maintenance periods as well as other times when the BAFF is turned off for targeted ‘BAFF OFF’ monitoring. This will

allow for periodic comparison of baseline during off periods, to performance monitoring data when the BAFF is operational. These experiments will be described in the monitoring plan.

4.4 Performance Monitoring

As summarized above, each year DWR will conduct monitoring to assess the performance of the BAFF. This may include the installation of fish tracking and other data collection monitoring equipment, including steel piles at the Georgiana Slough junction to attach equipment for hydroacoustic and hydrodynamic barrier operational monitoring. DWR would also acoustic-tag and release hatchery-reared juvenile Chinook salmon and steelhead for acoustic telemetry-based fish tracking. DWR may also capture, tag, and release predatory fish by hook-and-line sampling. DWR would release acoustic-tagged juvenile Chinook salmon and/or steelhead at one or more sites. Analysis of data collected as part of existing monitoring programs (e.g., juvenile salmonid outmigration monitoring) will also be conducted to inform the operational period, especially the month of May, when full PG&E power is insufficient in meeting BAFF power requirements. Details of performance monitoring are being developed as part of a separate monitoring plan. Performance monitoring may result in changes to the proposed operations schedule, if warranted.

This page intentionally left blank.

CHAPTER 5
References

Bowen, M.D., L. Hanna, R. Bark, V. Maisonneuve, and S. Hiebert. 2008. *Non-Physical Barrier Evaluation, Physical Configuration I*. U.S. Department of the Interior, Bureau of Reclamation. Technical Memorandum. Technical Service Center. Denver, CO.

Bowen, M. D., and R. Bark. 2012. *2010 Effectiveness of a Non-Physical Fish Barrier at the Divergence of the Old and San Joaquin Rivers (CA).* Technical Memorandum 86-68290-10-07. U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver, Colorado.

Bowen, M. D., S. Hiebert, C. Hueth, and V. Maisonneuve. 2012. *2009 Effectiveness of a Non-Physical Fish Barrier at the Divergence of the Old and San Joaquin Rivers (CA).* Technical Memorandum 86-68290-09-05. U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver, Colorado.

Brandes, P. L., and J. S. McLain. 2001. Juvenile Chinook Salmon Abundance, Distribution, and Survival in the Sacramento–San Joaquin Estuary. In Contributions to the Biology of Central Valley Salmonids, ed. R. L. Brown. Volume 2. Reprinted in *California Department of Fish and Game Fish Bulletin* 179:39–136.

DFW (California Department of Fish and Wildlife). 2020. California Endangered Species Act Incidental Take Permit No. 2081-2019-066-00. Long Term Operation of the State Water Project in the Sacramento San Joaquin Delta. Available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP-for-Long-Term-SWP-Operations.pdf.

DWR (California Department of Water Resources). 2012. *2011 Georgiana Slough Non-physical Barrier Performance Project Report*. Department of Water Resources Technical Report. M. D. Bowen, Co–Principal Investigator. Sacramento, California.

DWR (California Department of Water Resources). 2015. *2012 Georgiana Slough Non-Physical Barrier Performance Evaluation Project Report.* California Department of Water Resources, Sacramento, CA.

Horn, M. and A. Blake. 2004. *Acoustic tracking of Chinook Salmon smolts in the vicinity of the Delta Cross Channel, 2001 study*. USBR Technical Memo No. 8220-04-04.

NMFS (National Marine Fisheries Service). 2009. *NMFS Biological Opinion and Conference Opinion on the Long-Term Operation of the Central Valley Project and State Water Project*. Southwest Region, Long Beach, California. June 4, 2009.

NMFS (National Marine Fisheries Service). 2019. *NMFS Biological Opinion and Conference Opinion on the Reinitiation of Consultation on the Long-Term Operation of the Central Valley Project and State Water Project*. Southwest Region, Long Beach, California.

Perry, R. W. 2010. Survival and Migration *Dynamics of Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento–San Joaquin River Delta*. Ph.D. dissertation, University of Washington. Seattle, Washington.

Perry, R. W., A. C. Pope, J. G. Romine, P. L. Brandes, J. R. Burau, A. R. Blake, A. J. Ammann, and C. J. Michel. 2018. Flow-Mediated Effects on Travel Time, Routing, and Survival of Juvenile Chinook Salmon in a Spatially Complex, Tidally Forced River Delta. *Canadian Journal of Fisheries and Aquatic Sciences* 2018, 75(11):1886–1901.

Perry, R. W., J. G. Romine, S. J. Brewer, P. E. LaCivita, W. N. Brostoff, and E. D. Chapman. 2012. Survival and Migration Route Probabilities of Juvenile Chinook Salmon in the Sacramento–San Joaquin River Delta during the Winter of 2009–10. U.S. Geological Survey Open-File Report 2012-1200. U.S. Geological Survey, Reston, Virginia.

Perry, R. W., J. R. Skalski, P. L. Brandes, P. T. Sandstrom, A. P. Klimley, A. Ammann, and B. MacFarlane. 2010. Estimating Survival and Migration Route Probabilities of Juvenile Chinook Salmon in the Sacramento–San Joaquin River Delta. *North American Journal of Fisheries Management* 30:142–156.

Romine, J. G., R. W. Perry, A. C. Pope, P. Stumpner, T. L. Liedtke, K. K. Kumagai, and R. L. Reeves. 2016. Evaluation of a floating fish guidance structure at a hydrodynamically complex river junction in the Sacramento–San Joaquin River Delta, California, USA. *Marine and Freshwater Research* 68(5):878-888.

Singer, G. P., A. R. Hearn, E. D. Chapman, M. L. Peterson, P. E. LaCivita, W. N. Brostoff, A. Bremner, and A. Klimley. 2013. Interannual Variation of Reach Specific Migratory Success for Sacramento River Hatchery Yearling Late-Fall Run Chinook Salmon (*Oncorhynchus tshawytscha*) and Steelhead Trout (*Oncorhynchus mykiss*). *Environmental Biology of Fishes* 96(2–3):363–379.

U.S. Environmental Protection Agency. 2003. *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards*. EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA).

Yates, David & Galbraith, Hector & Purkey, David & Huber-Lee, Annette & Sieber, Jack & West, Jordan & Julius, Susan & Joyce, Brian. 2008. Climate Warming, Water Storage, and Chinook Salmon in California's Sacramento Valley. *Climatic Change*. 91. 335-350. 10.1007/s10584-008-9427-8.

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
CALIFORNIA ENDANGERED SPECIES ACT
INCIDENTAL TAKE PERMIT NO. 2081-2081-102-03

PERMITTEE: **California Department of Water Resources**

PROJECT: **Georgiana Slough Salmonid Migratory Barrier Project**

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the California Department of Fish and Wildlife (CDFW) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by CDFW is attached. This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a permit requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance with all mitigation measures and for reporting to CDFW on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

CDFW may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP condition that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report, and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	BEFORE DISTURBING SOIL OR VEGETATION				
1	Designated Representative. Before starting Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with this ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.	ITP Condition # 6.1	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
2	Designated Biologist(s) and Biological Monitor(s). Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of the Designated Biologist(s) and Biological Monitor(s) using the Biologist Resume Form (Attachment 3) or another format containing the same information at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist(s) and Biological Monitor(s) are knowledgeable and experienced in the biology, natural history tagging, handling, and monitoring of the Covered Species. The Designated Biologist(s) and Biological Monitor(s) shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist(s) and Biological Monitor(s) in writing before starting Covered Activities and shall also obtain approval in advance, in writing, if the Designated Biologist(s) or Biological Monitor(s) must be changed.	ITP Condition # 6.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
3	Education Program. Permittee shall conduct an in-person education program for all persons employed or otherwise working in the Project Area before performing any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status pursuant to CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in this ITP. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided to any new workers before they are authorized to perform work in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. This training shall be repeated at least once annually for long-term and/or permanent employees that will be conducting work in the Project Area.	ITP Condition # 6.4	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
4	Trash Abatement. Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in animal-proof containers and removed, ideally at daily intervals but at least once a week, to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition # 6.6	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
5	Erosion Control Materials. Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as monofilament netting (erosion control matting) or similar material, in potential Covered Species' habitat. Additionally, all exposed soils/disturbed areas within the work areas shall be stabilized to the greatest extent possible immediately following the completion of ground-disturbing activities, during project activities, or prior to rain events to prevent erosion into the stream channel. Erosion control measures, such as silt fences, fiber rolls, straw wattles, gravel- or rock-lined ditches, water check bars, broadcasted straw, or equally effective measures, shall be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to erosion control measures shall be made as needed to protect water quality. At no time shall silt-laden runoff be allowed to enter the river, placed where it may enter the river, or directed to where it may enter the river.	ITP Condition # 6.7	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
6	Delineation of Property Boundaries. Before starting Covered Activities, Permittee shall clearly delineate the boundaries of the Project Area with fencing, stakes, or flags. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes, and flags until the completion of Covered Activities in that area.	ITP Condition # 6.8	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
7	Delineation of Habitat. Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat. Covered Species habitat to be delineated includes aquatic areas and riparian areas that may provide shaded riverine aquatic habitat.	ITP Condition # 6.9	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
8	Notification Before Commencement. The Designated Representative shall notify CDFW 14 calendar days before initiating Covered Activities and shall document compliance with all pre-Project Conditions of Approval before initiating Covered Activities.	ITP Condition # 7.1	Before commencing ground- or vegetation-disturbing activities	Permittee	
9	Permittee shall purchase 0.09 acre of Covered Species credits from a CDFW6.10-approved mitigation or conservation bank, pursuant to Condition of Approval 9.2 below. Purchase of Covered Species Credits must be complete before starting Covered Activities, or within 18 months of the effective date of the ITP if Security is provided pursuant to Condition of Approval 10 (Security) below for all uncompleted obligations.	ITP Condition # 9	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	
10	Cost Estimates. For the purposes of determining the Security amount, CDFW has estimated the cost sufficient for CDFW or its contractors to complete acquisition of Covered Species Credits as follows: The Cost of Covered Species credits identified in Condition of Approval 9.1 is estimated at $300,000/acre for 0.09 acres: $27,000. Acquisition costs are estimated using fair market current value for the cost of credits at a CDFW-approved mitigation bank for obtaining mitigation credits for land with habitat values meeting mitigation requirements.	ITP Condition # 9.1	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	Related transaction fees including but not limited to set-up fees, administrative fees and related transactions estimated at: $3,000.				
11	Covered Species Credits. Permittee has elected to purchase Covered Species credits to complete compensatory mitigation obligations. Permittee shall purchase 0.09 acres of Covered Species credits from a CDFW-approved mitigation or conservation bank prior to initiating Covered Activities, or no later than 18 months from the issuance of this ITP if Security is provided pursuant to Condition of Approval 10 below. Prior to purchase of Covered Species credits, Permittee shall obtain CDFW approval to ensure the mitigation or conservation bank is appropriate to compensate for the impacts of the Project. Permittee shall submit to CDFW a copy of the Bill of Sale(s) and Payment Receipt prior to initiating Covered Activities or within 18 months from issuance of this ITP if Security is provided.	ITP Condition # 9.2	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	
12	Security: The Permittee may proceed with Covered Activities only after the Permittee has ensured funding (Security) to complete any activity required by Condition of Approval 9 (Habitat Management and Land Acquisition) that has not been completed before Covered Activities begin. Permittee shall provide Security as follows: Security Amount. The Security shall be in the amount of $30,000. Or in the amount identified in 9.1 (Cost Estimates) specific to the obligation that has not been completed. This amount is determined by CDFW based on the cost estimates identified in Condition of Approval 9.1 above, sufficient for CDFW or its contractors to complete land acquisition, property enhancement, startup costs, initial management, long-term management, and monitoring. Security Form. The Security shall be in the form of an irrevocable letter of credit (see Attachment 4) or another form of Security approved in advance in writing by CDFW's Office of the General Counsel. Security Timeline. The Security shall be provided to CDFW before Covered Activities begin or within 30 days after the effective date of this ITP, whichever occurs first. Security Holder. The Security shall be held by CDFW, or in a manner approved in advance in writing by CDFW. Security Transmittal. Permittee shall transmit it to CDFW with a completed Mitigation Payment Transmittal Form (see Attachment 5) or by way of an approved instrument such as an escrow agreement, irrevocable letter of credit, or other. Security Drawing. The Security shall allow CDFW to draw on the principal sum if CDFW, in its sole discretion, determines that the Permittee has failed to comply with the Conditions of Approval of this ITP. Security Release. The Security (or any portion of the Security then remaining) shall be released to the Permittee after CDFW has conducted an on-site inspection and received confirmation that all secured requirements have been satisfied, as evidenced by:	ITP Condition # 10	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	• Copy of Bill of Sale(s) and Payment Receipt(s) or Credit Transfer Agreement for the purchase of Covered Species credits; and • Timely submission of all required reports.				
	DURING CONSTRUCTION				
13	Compliance Monitoring. The Designated Biologist or Biological Monitor shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections a minimum of once a week during periods of inactivity and after all materials and trailers are placed in the staging area after the staging area construction work (gravelling, exclusion fencing installation, and power pole installation) is completed. The Designated Biologist shall conduct compliance inspections to: (1) minimize incidental take of the Covered Species; (2) prevent unlawful take of species; (3) check for compliance with all measures of this ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by this ITP.	ITP Condition # 7.3	Entire Project	Permittee	
14	Monthly Compliance Report. The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition of Approval 7.3 (Compliance Monitoring) into a Monthly Compliance Report and submit it to CDFW along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted electronically to the CDFW offices listed in the Notices section of this ITP and to CDFW's Regional Representative and Headquarters CESA Program. At the time of this ITP's approval, the CDFW Regional Representative is Andrea Boertien (Andrea.Boertien@wildlife.ca.gov) and Headquarters CESA Program email is CESA@wildlife.ca.gov. CDFW may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in writing of the new reporting schedule.	ITP Condition # 7.4	Entire Project	Permittee	
15	Annual Status Report. Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of this ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports for that year identified in Condition of Approval 7.4 (Monthly Compliance Report); (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in avoiding, minimizing and mitigating Project impacts; (5) all available information about Project-related	ITP Condition # 7.5	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	incidental take of the Covered Species; (6) an accounting of the number of acres subject to both temporary and permanent disturbance, both for the prior calendar year, and a total since ITP issuance; and (7) information about other Project impacts on the Covered Species.				
16	CNDDB Observations. The Designated Biologist shall submit all observations of Covered Species to CDFW's California Natural Diversity Database (CNDDB) within 15 working days of the observation and the Designated Biologist shall include copies of the submitted forms with the next Monthly Compliance Report or ASR, whichever is submitted first relative to the observation.	ITP Condition # 7.6	Entire Project	Permittee	
17	Notification of Non-compliance. The Designated Representative shall immediately notify CDFW if the Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in this ITP and/or the MMRP. The Designated Representative shall follow up within 24 hours with a written report to CDFW describing, in detail, any non-compliance with this ITP and suggested measures to remedy the situation.	ITP Condition # 7.2	Entire Project	Permittee	
18	Construction Monitoring Documentation. The Designated Biologist(s) and Biological Monitor(s) shall maintain construction-monitoring documentation on-site in either hard copy or digital format throughout the construction period, which shall include a copy of this ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring documentation is available for review at the Project site upon request by CDFW.	ITP Condition # 6.5	Entire Project	Permittee	
19	Project Access. Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en-route to the Project Area (except for in-water routes). Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW may require an amendment to this ITP, among other reasons, if additional take of Covered Species will occur as a result of the Project modification.	ITP Condition # 6.10	Entire Project	Permittee	
20	Staging Areas. Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area unless provided for as described in Condition of Approval 6.10 (Project Access) of this ITP.	ITP Condition # 6.11	Entire Project	Permittee	
20	Hazardous Waste. Permittee shall immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage	ITP Condition # 6.12	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.				
21	Hazardous Materials. Debris, soil, bark, sawdust, rubbish, creosote-treated wood, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, wildlife, or riparian habitat resulting from project-related activities shall not contaminate the soil or enter waters of the State. Any such materials placed where they may enter the water shall be removed immediately.	ITP Condition # 6.15	Entire Project	Permittee	
22	CDFW Access. Permittee shall provide CDFW staff with reasonable access to the Project, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.	ITP Condition # 6.13	Entire Project	Permittee	
23	Daylight Limitation. Permittee shall terminate all construction-related project activities covered in this ITP 30 minutes before sunset and shall not resume until 30 minutes after sunrise unless approved in writing by CDFW. Permittee shall use sunrise and sunset times established by the U.S. Naval Observatory Astronomical Applications Department for the geographic area: https://aa.usno.navy.mil/data/index.	ITP Condition # 6.16	Entire Project	Permittee	
24	Construction Work Window. To minimize adverse impacts to fish and wildlife and their habitats, project activities below the ordinary high-water mark shall be confined to the periods as follows: Pile driving and removal: August 1 to November 30. Piles may be driven up to February 28 only during the first year of construction. In all other years, pile driving and pile removal shall occur between August 1 and November 30. If Permittee needs more time to complete project activities, work may be authorized outside of the work period and extended on a day-by-day or weekly basis by CDFW. Permittee shall submit a written request for work period variance to CDFW Environmental Scientist Andrea Boertien, at Andrea.Boertien@wildlife.ca.gov. The work period variance request shall 1) describe the extent of the work already completed, 2) detail the activities that remain to be completed, 3) detail the time required to complete each of the remaining activities, 4) provide photographs of both the current work completed and the proposed sites for continued work, and 5) provide a weather forecast for the variance period. The work period variance request should consider the effects of increased water flows, rain delays, and increased erosion control measures. Work period variances are issued at the discretion of CDFW. CDFW reserves the right to require additional measures to protect fish and wildlife resources as a condition for granting the variance.	ITP Condition # 8.1	Entire Project	Permittee	
25	Equipment Staging, Storage, Maintenance, and Access Routes. The number of access routes and the numbers and size of staging areas shall be limited to the minimum necessary. Staging areas shall be located in a dry upland location, 50 feet or more from above the top of bank where feasible and proper measures shall be installed to avoid runoff into water systems. Staging areas shall be within a paved or gravel-lined site, if feasible. Use existing staging sites, work areas, and	ITP Condition # 8.2	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	levee roads to the extent practicable for staging and access and to avoid impacting previously undisturbed areas. Staging areas and access routes shall be identified in advance of construction and clearly demarcated in the field with fencing and/or flagging. When not in use, construction equipment shall be stored, refueled, and otherwise maintained in the construction staging areas. Prior to the entry of any vehicle or equipment into the project area, including the staging sites, the vehicle shall be cleaned of any biological material that may have originated from an off-site location, at an off-site facility. Any equipment or vehicles driven and/or operated in the proximity of the stream and/or waterbody shall be maintained in good working order to prevent the release of contaminants that if introduced to said waters could be deleterious to aquatic life, wildlife, or riparian habitat. If a vehicle is found to be leaking fluids of any kind, it shall be taken to an off-site location immediately. Vehicles shall be moved away from the stream and/or water body prior to refueling and lubrication.				
26	Stationary Equipment Leaks. Permittee shall ensure that stationary equipment such as motors, pumps, and generators located within or adjacent to any waterbody are positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill or leak.	ITP Condition # 8.3	Entire Project	Permittee	
27	Decontamination. Any equipment that will contact the stream flows during project activities shall be decontaminated before and after work to prevent the spread of aquatic diseases and invasive aquatic species to other waterways. Permittee shall require workers to decontaminate waders, boots, SCUBA gear, fins and other clothing that will come in direct contact with the water. Decontamination of clothing and equipment shall be done through one or more of the following methods: Drying equipment in an upland location following last off-site aquatic use. If average daytime temperatures exceed 80° F, drying times shall be at least 7 days. If average daytime temperatures are below 80° F, drying times shall be at least 30 days. Scalding water wash (at least 140° F) with varying high- and low-pressure spray to dislodge pathogens, vegetation, and contaminated sediment. Freezing at a temperature of less than 32° F for more than 72 hours. Soaking in a CDFW-approved disinfectant solution for at least 2 minutes (or longer, depending on the disinfectant used). To avoid harm to non-target species, disinfected clothing and equipment shall be thoroughly rinsed in a water bath before entering the river. Repeat decontamination is required only if the equipment/clothing is removed from the site, used within a different water body, and returned to the project site. Decontamination shall take place in an upland location and any chemicals used during decontamination shall be prevented from entering water bodies or storm drains.	ITP Condition # 8.4	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
28	Turbidity Monitoring. Permittee shall monitor turbidity levels in Georgiana Slough at the junction with the Sacramento River during Covered Activities such as pile driving, pile removal, dolphin removal, and placement of any temporary concrete block structures. Monitoring shall be conducted by measuring turbidity 100 feet upstream of the source activity and 300 feet from the downstream of the source activity to determine if there is an increase in turbidity. An increase of up to 15 Nephelometric Units (NTU) above the baseline level will be allowed. If turbidity increases beyond 15 NTUs above the baseline conditions, the source activity shall cease until turbidity levels return to less than 15 NTUs above baseline turbidity. The Permittee shall report the increase in turbidity and actions taken to reduce it to CDFW within 24 hours of detection. All turbidity sample results shall be maintained in a log and kept at the project site and shall be available for immediate inspection. The turbidity sample results shall be included in the Monthly Compliance Reports per Condition 7.4.	ITP Condition # 8.5	Entire Project	Permittee	
29	Containment. For overwater activities from barges, a containment area shall be established around areas that contain hazardous materials by laying straw wattles and/or a nonpermeable plastic around the work areas on the barge. If discharge to the river is discovered by any of the personnel on board the barge, overwater activities shall cease until appropriate corrective measures have been completed and the discharge source has been identified and repaired or halted.	ITP Condition # 8.6	Entire Project	Permittee	
30	On-Site Spill Prevention Specialist. At all times while Covered Activities are underway, Permittee shall have a designated person onsite who is properly trained in spill containment/clean up to implement spill control devices in the event a spill occurs.	ITP Condition # 8.7	Entire Project	Permittee	
31	Emergency Spill Response Plan. An emergency response plan shall be prepared and submitted to CDFW prior to the initiation of Covered Activities. The plan shall be limited to 3 (three) pages in length and may be presented via a written narrative, table, or bulleted list format. The plan shall identify the actions which would be taken in the event of a spill of hazardous materials such as concrete, petroleum products, sediment, or other material harmful to fish, wildlife, plant resources, or the habitats thereof. The plan shall also identify the location of containment and abatement materials onsite, the actions to be taken in the event of a spill of hazardous material, the emergency response materials which shall be kept at the site to allow the rapid containment and clean-up of any spilled material, and notification and cleanup procedures to be enacted in the event of a spill. The emergency response plan shall also be submitted in the final construction report.	ITP Condition # 8.8	Entire Project	Permittee	
32	Spill Containment and Spill Kits. All activities performed in or near the water shall have absorbent materials designated for hazardous materials spill containment and cleanup activities onsite for use in an accidental spill. Permittee shall immediately initiate the cleanup activities in the event of a hazardous materials spill. Prior to entering the work site, all field personnel shall know the location of spill kits and trained in their appropriate use. The emergency response plan shall also be submitted in the final construction report.	ITP Condition # 8.9	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
33	Spill of Material Deleterious to Fish, Wildlife and Plants. Permittee and all contractors shall be subject to the water pollution regulations found in Fish and Game Code sections 5650 and 12015. In the event of a hazardous materials spill into the stream (e.g., petroleum, sediment, etc.), Permittee shall immediately notify the California Office of Emergency Services State Warning Center by calling 1-800-852-7550 and immediately provide written notification to CDFW by emailing CDFW Environmental Scientist Andrea Boertien, at Andrea.Boertien@wildlife.ca.gov. Permittee shall take all reasonable measures to document the extent of the impacts and affected areas including photographic documentation of affected areas, injured fish and wildlife. If dead fish or wildlife are found in the affected area, Permittee shall collect carcasses and immediately deliver them to CDFW. Permittee shall meet with CDFW within 10 days of the reported spill in order to develop a resolution including: site clean-up, site remediation, and compensatory mitigation for the harm caused to fish, wildlife, and the habitats on which they depend as a result of the spill. Permittee shall be responsible for all spill clean-up, site remediation, and compensatory mitigation costs. Spill of materials to waters of the State that are deleterious to fish and wildlife are in violation of Fish and Game Code section 5650 et seq., and are subject to civil penalties for each person responsible. CDFW reserves the right to refer the matter to the District Attorney's Office if a resolution cannot be agreed upon and achieved within a specified timeframe, generally six (6) months from the date of the incident.	ITP Condition # 8.10	Entire Project	Permittee	
34	Temporary and Permanent Lighting. All temporary and permanent lighting installed as part of the Project shall be fully hooded (i.e., no lateral lighting). Any illumination shall be directed to the ground and away from the river. All lighting shall be turned off 30 minutes prior to sunset, unless required for safety or security purposes.	ITP Condition # 8.11	Entire Project	Permittee	
35	Vibratory Pile Driver. Pile driving shall be conducted using only a vibratory driver to avoid take by minimizing hydroacoustic impacts to fish species and marine mammals during construction. Use of an impact hammer is not authorized under this ITP for pile driving or pile load testing.	ITP Condition # 8.12	Entire Project	Permittee	
36	Release of Covered Species. Any Covered Species that are caught in the course of Project activities shall be immediately released. Species, approximate size, date, time, location of capture, and condition shall be noted prior to release. This documentation shall be included in the Monthly Compliance Report as required by Condition 7.4. Appropriate handling techniques shall be used to minimize potential effects to fish, such as keeping fish in water as much as possible and handling when hands are wet. Capture of Covered Species shall be reported to CDFW per Condition 7.8 (Notification of Take or Injury).	ITP Condition # 8.13	Entire Project	Permittee	
37	Wet Hands and Nets. Handling of Covered Species shall be minimized. However, when handling is necessary, the Qualified Biologist shall always wet hands (i.e., free of lotions, creams, sunscreen, oils, ointment, insect repellent or any other harmful materials) or nets prior to touching Covered Species.	ITP Condition # 8.14	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
38	Proper Holding Technique. Holding containers shall be sized such that individual Covered Species will fit without touching the sides. The Qualified Biologist shall temporarily hold individuals in cool, shaded, aerated water in a flow-through live car. The Qualified Biologist shall protect Covered Species from jostling and noise and shall not remove Covered Species from this container until time of release.	ITP Condition # 8.15	Entire Project	Permittee	
39	Water Temperature and Water Changes. The Qualified Biologist shall measure air and water temperatures periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature consist with pre-project habitat conditions.	ITP Condition # 8.16	Entire Project	Permittee	
40	No Overcrowding. Overcrowding in containers shall be avoided by having at least two containers and segregating individuals from larger age-classes to avoid predation. If fish are abundant, the captures shall cease periodically, and captured fish shall be released at predetermined locations before resuming capture to avoid being held for too long.	ITP Condition # 8.17	Entire Project	Permittee	
41	Notification of Take or Injury. Permittee shall immediately notify the Designated Biologist if a Covered Species is taken or injured by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to CDFW by calling the Regional Office at (707) 428-2002. The initial notification to CDFW shall include information regarding the location, species, and number of fish taken or injured and the ITP Number. Following initial notification, Permittee shall send CDFW a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the fish or carcass, and if possible, provide a photograph, explanation as to cause of take or injury, and any other pertinent information.	ITP Condition # 7.8	Entire Project	Permittee	
42	Designated Biologist Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall immediately stop any activity that does not comply with this ITP and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species. Permittee shall provide unfettered access to the Project Site and otherwise facilitate the Designated Biologist in the performance of his/her duties. If the Designated Biologist is unable to comply with the ITP, then the Designated Biologist shall notify the CDFW Representative immediately. Permittee shall not enter into any agreement or contract of any kind, including but not limited to non-disclosure agreements and confidentiality agreements, with its contractors and/or the Designated Biologist that prohibit or impede open communication with CDFW, including but not limited to providing CDFW staff with the results of any surveys, reports, or studies or notifying CDFW of any non-compliance or take. Failure to notify CDFW of any non-compliance or take or injury of a Covered Species as a result of such agreement or contract may result in CDFW taking actions to prevent or remedy a violation of this ITP.	ITP Condition # 6.3	Entire Project	CDFW	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
	POST-CONSTRUCTION				
43	Refuse Removal. Upon completion of Covered Activities, Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition # 6.14	Post-construction	Permittee	
44	Final Mitigation Report. No later than 45 calendar days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; (8) photographs of pre-construction and post-construction results of the staging area and shoreline, and (9) any other pertinent information.	ITP Condition # 7.7	Post-construction and after completion of mitigation	Permittee	

Project Name: Georgiana Slough Salmonid Migratory Barrier Project

LSA Agreement/ITP Number(s): 2081-2021-102-03

Department of Fish and Wildlife

BIOLOGIST RESUME COVER SHEET

SUBMIT EACH RESUME AS A SEPARATE DOCUMENT

Number of Resumes Included in Transmittal: _____

Name	Requested Role(s)[1]	Species/Resource(s)

[1] Requested roles correspond to the biological staffing requirements indicated in the Lake and Streambed Alteration (LSA) Agreement or California Endangered Species Act Incidental Take Permit (ITP). Roles may include a "Qualified Biologist" or "Designated Biologist" with the necessary experience to survey for special status species, or a "Biological Monitor" with the necessary experience to monitor construction activities for special status species. An individual may request more than one role.

Project Name:
LSA Agreement/ITP Number(s):

Department of Fish and Wildlife

BIOLOGIST RESUME FORM

This form requests information about the qualifications of the Qualified Biologist, Designated Biologist and Biological Monitor specified in California Endangered Species Act Incidental Take Permits (ITP) and Lake or Streambed Alteration (LSA) Agreements issued by California Department of Fish and Wildlife (CDFW).

Completing this form will ensure the receipt of adequate information and expedite CDFW review of qualifications.

SECTION I. NAME AND CONTACT INFORMATION

Name:		Title:	
Company Name & Address:		Phone:	
		Email:	

SECTION II. EDUCATION

College/University & Degree Type Related to Natural Resource Science:	
Other Relevant Workshops & Training:	

SECTION III. ROLE(S) AND PERMIT REQUIREMENTS

Requested Role(s):	
Relevant LSA Agreement Measures or ITP Conditions[2]:	

SECTION IV. SPECIES AND RESOURCE EXPERIENCE – SUMMARY

This section summarizes experience by special status species and other resource. Use one row for each species or other resource where surveys or special protections are required in the CESA ITP or LSA Agreement for which biologist approval is requested.[3] If more space is needed, add rows to this table. Provide details in Section 5.

Species or Resource	Number of Field Seasons & Hours, Life Stages Observed *Provide project details in Section 5*	Life History Knowledge *Describe formal workshops & training with dates, or informal training details*	CDFW SCP, MOU, & USFWS 10a1a Authorization Number & Authorized Activities *This form does not fulfill SCP, MOU, & USFWS 10a1a reporting requirements*	
Insert Species or Resource 1	Field seasons: Hours: Life Stages:			Issued to: Expiration: Agency contact:
Insert Species or Resource 2	Field seasons: Hours: Life Stages:			Issued to: Expiration: Agency contact:
Insert Species or Resource 3	Field seasons: Hours: Life Stages:			Issued to: Expiration: Agency contact:

[2] List all measures and conditions from the LSA Agreement or ITP requiring biological staff (i.e., Qualified Biologist, Designated Biologist, or Biological Monitor).

[3] Often LSA Agreements/ITPs require surveys and other protections for multiple species and other resources. Include only those for which the biologist has experience and is requesting approval.

Project Name:
LSA Agreement/ITP Number(s):

SECTION V. SPECIES AND RESOURCE EXPERIENCE – DETAILS

This section details experience from the three most recent and relevant projects for each species and resource identified in Section 4. If more space is needed, attach additional pages in the same table format (i.e., copy/paste format).

A. Species or Resource:			
Project 1 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s)[4]:	
Survey Type(s)[5]:		Construction Monitoring[6]:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB[7] (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 2 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 3 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:

[4] Insert the role as described in the associated LSA Agreement, ITP or other agency permit. If these permits were not issued, describe the role based on the duties, e.g., "lead biologist with handling authorization" or "biological monitor."
[5] For example, pre-construction survey or description of the protocol or guideline followed.
[6] Include the number of days and describe the types of activities monitored (e.g., heavy equipment operation).
[7] CNDDB is the abbreviation for California Natural Diversity Database.

Project Name:
LSA Agreement/ITP Number(s):

Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Additional Information:			

B. Species or Resource:			
Project 1 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 2 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 3 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:

Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Additional Information:			

C. Species or Resource:			
Project 1 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 2 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:
Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Project 3 Name & Location:		Project Start & End Dates:	
LSA Agreement, ITP, or Other Agency Permit Number:		Role(s):	
Survey Type(s):		Construction Monitoring:	Days: Activities:

Project Name:
LSA Agreement/ITP Number(s):

Species Life Stages Observed & Handled, Number of Each:	Life Stage: Number Observed: Number Handled: Reported to CNDDB (Y/N):	Company Name, Professional Reference Name, Phone, Email:	
If not reported to CNDDB, why:			
CDFW and Other Agency Email:			
Additional Information:			

[***Financial institution letterhead***]

IRREVOCABLE STANDBY LETTER OF CREDIT
NO. [***number issued by financial institution***]

Issue Date: [***date***]

Beneficiary:

California Department of Fish and Wildlife
Habitat Conservation Planning Branch
Post Office Box 944209
Sacramento, CA 94244-2090
Attn: HCPB Contract Coordinator

Amount: U.S. $[***dollar number***] [(***dollar amount***)]

Expiry: [***Date***] at our counters

Dear Sirs:

1. At the request and on the instruction of our customer, [***name of applicant***] ("Applicant"), we, [***name of financial institution***] ("Issuer"), hereby establish in favor of the beneficiary, the California Department of Fish and Wildlife ("CDFW"), this irrevocable standby letter of credit ("Credit") in the principal sum of U.S. $[***dollar number***] [(***dollar amount***)] ("Principal Sum").

2. We are informed this Credit is and has been established for the benefit of CDFW pursuant to the terms of the incidental take permit for the [***name of project***] issued by CDFW to the Applicant on [***date***] (No. [***number***]) ("Permit").

3. We are further informed that pursuant to the Permit, the Applicant has agreed to complete certain mitigation requirements, as set forth in conditions [***numbers***] in the Permit ("Mitigation Requirements").

4. We are finally informed that this Credit is intended by CDFW and the Applicant to serve as a security device for the performance by the Applicant of the Mitigation Requirements.

5. CDFW shall be entitled to draw upon this Credit only by presentation of a duly executed Certificate for Drawing ("Certificate") in the same form as Attachment A, which is attached hereto, at our office located at [***name and address of financial institution***].

6. The Certificate shall be completed and signed by an Authorized Representative of CDFW as defined in paragraph 12 below. Presentation by CDFW of a completed Certificate may be made in person or by registered mail, return receipt requested, or by overnight courier.

7. Upon presentation of a duly executed Certificate as above provided, payment shall be made to CDFW, or to the account of CDFW, in immediately available funds, as CDFW shall specify.

8. If a demand for payment does not conform to the terms and conditions of this Credit, we shall give CDFW prompt notice that the demand for payment was not effected in accordance with the terms and conditions of this Credit, state the reasons therefore, and await further instruction.

9. Upon being notified that the demand for payment was not effected in conformity with the Credit, CDFW may correct any such non-conforming demand for payment under the terms and conditions stated herein.

10. All drawings under this Credit shall be paid with our funds. Each drawing honored by us hereunder shall reduce, *pro tanto*, the Principal Sum. By paying to CDFW an amount demanded in accordance herewith, we make no representations as to the correctness of the amount demanded.

11. This Credit will be cancelled or the Principal Sum will be reduced upon receipt by us of Certificate of Cancellation/Reduction, which: (i) shall be in the form of Attachment B, which is attached hereto, and (ii) shall be completed and signed by an Authorized Representative of CDFW, as defined in paragraph 12 below.

12. An Authorized Representative shall mean the Director of CDFW; the General Counsel of CDFW; a Regional Manager of CDFW; or the Branch Chief of CDFW's Habitat Conservation Planning Branch.

13. This Credit shall be automatically extended without amendment for additional periods of one year from the present or any future expiration date hereof, unless at least sixty (60) days prior to any such date, we notify CDFW in writing by registered mail, return receipt requested, or by overnight courier that we elect not to consider this Credit extended for any such period.

14. Communications with respect to this Credit shall be in writing and addressed to us at [***name and address of financial institution***], specifically referring upon such writing to this credit by number. The address for notices with respect to this Credit shall be: (i) for CDFW: Department of Fish and Wildlife, Habitat Conservation Planning Branch, Post Office Box 944209, Sacramento, CA 94244-2090, Attn: HCPB Contract Coordinator; and (ii) for the Applicant: [***name and address of applicant***].

15. This Credit may not be transferred.

16. This Credit is subject to the International Standby Practices 1998 ("ISP 98"). As to matters not covered by the ISP 98 and to the extent not inconsistent with the ISP 98, this credit shall be governed by and construed in accordance with the Uniform Commercial Code, Article 5 of the State of California.

17. This Credit shall, if not canceled, expire on [***expiration date***], or any extended expiration date.

18. We hereby agree with CDFW that documents presented in compliance with the terms of this Credit will be duly honored upon presentation, as specified herein.

19. This Credit sets forth in full the terms of our undertaking. Such undertaking shall not in any way be modified, amended or amplified by reference to any document or instrument referred to herein or in which this Credit is referred to or to which this Credit relates and any such reference shall not be deemed to incorporate herein by reference any document or instrument.

[***Name of financial institution***]

By: _____
Name: _____
Title: _____
Telephone: _____

ATTACHMENT A

CERTIFICATE FOR DRAWING

[***CDFW Letterhead***]

[***Date***]

[***Name and address of financial institution***]

Re: Irrevocable Standby Letter of Credit No. [***number issued by financial institution***]

The undersigned, a duly Authorized Representative of the California Department of Fish and Wildlife ("CDFW"), as defined in paragraph 12 of the above-referenced standby letter of credit ("Credit"), hereby certifies to the Issuer that:

1. [***Insert one of the following statements:*** "In the opinion of CDFW, the Applicant has failed to complete the Mitigation Requirements referenced in paragraph 3 of the Credit." ***or*** "As set forth in paragraph 13, the Issuer has informed CDFW that the Credit will not be extended and the Applicant has not provided CDFW with an equivalent security approved by CDFW to replace the Credit."]

2. The undersigned is authorized under the terms of the Credit to present this Certificate as the sole means of demanding payment on the Credit.

3. CDFW is therefore making a drawing under the Credit in amount of U.S. $_____.

4. The amount demanded does not exceed the Principal Sum of the Credit.

Therefore, CDFW has executed and delivered this certificate as of this ___day of [***month***], [***year***].

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

_____

[***Insert one of the following:*** "Director" ***or*** "General Counsel" ***or*** "Regional Manager, [***Name of Regional Office***]" ***or*** "Chief, Habitat Conservation Planning Branch"]

ATTACHMENT B

CERTIFICATE FOR CANCELLATION/REDUCTION

[***CDFW Letterhead***]

[***Date***]

[***Name and address of financial institution***]

Re: Irrevocable Standby Letter of Credit No. [***number issued by financial institution***]

The undersigned, a duly Authorized Representative of the California Department of Fish and Wildlife ("CDFW"), as defined in the paragraph 12 in the above-referenced Irrevocable Standby Letter of Credit ("Credit"), hereby certifies to the Issuer that:

1. [***Insert one of the following statements:*** "The Applicant has presented documentary evidence of full compliance with the Mitigation Requirements referenced in paragraph 3 of the Credit." ***or*** "The Applicant has presented documentary evidence of compliance with the following Mitigation Requirement[(***s***)] referenced in paragraph 3 of the Credit: [***insert brief description of requirement(s) or requirement number(s) completed***]." ***or*** "The Applicant has provided CDFW with an equivalent security approved by CDFW to replace the Credit."]

2. [***Insert one of the following statements:*** "CDFW therefore requests the cancellation of the Credit." ***or*** "CDFW therefore requests a reduction in the Principal Sum in the amount of $_____, thereby making the new Principal Sum $_____."]

Therefore, CDFW has executed and delivered this certificate as of this ____ day of [***month***], [***year***].

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

_____

[***Insert one of the following:*** "Director" ***or*** "General Counsel" ***or*** "Regional Manager, [***Name of Regional Office***]" ***or*** "Chief, Habitat Conservation Planning Branch"]

State of California - Department of Fish and Wildlife

MITIGATION PAYMENT TRANSMITTAL FORM

DFW 1057 (REV.05/18/21)

Project Applicant Instructions: Please fill out and attach this form to payment. For conservation banks, also attach the Bill(s) of Sale for credits sold. One form may be used for multiple transactions, **BUT YOU MUST USE A SEPARATE FORM FOR EACH CHECK YOU TRANSMIT**. Make sure to include Project Name, Project Tracking Number, and ASB Mitigation Tracking Number (if available) on the attached payment type.

1. DATE: _____

TO: Erin Chappell
Regional Manager

2825 Cordelia Road, Ste 100 Fairfield CA 945
Region Office Address

2. FROM: _____
Name

_____
Mailing Address

_____
City, State, Zip

_____
Telephone Number/FAX Number

3. RE: Georgiana Slough Salmonid Migratory Barrier Project
Project Name as appears on permit/agreement

4. AGREEMENT/ACCOUNT INFORMATION: (check the applicable type)

☑ 2081 Permit ☐ Conservation Bank ☐ 2835 NCCP ☐ 1802 Agreement ☐ 1600 Agreement ☐ Other _____

2081-2021-102-03
Project Tracking Number

5. PAYMENT TYPE (One check per form only): The following funds are being remitted in connection with the above referenced project:

Check information:

Total $_____ Check No. _____

Account No. _____ Bank Routing No. _____

a. Endowment: for Long-Term Management Subtotal $_____

b. Habitat Enhancement Subtotal $_____

c. Security:

1. Cash Refundable Security Deposit Subtotal $_____

2. Letter of Credit Subtotal $_____

1. Financial Institution: _____

2. Letter of Credit Number: _____

3. Date of Expiration: _____

ACCOUNTING OFFICE USE ONLY	
Description	**FI$Cal Coding**
Speedchart (Project, Program, Reference, Fund)	
Reporting Structure	
Category	
Date Established: _____ By: _____	

Please send this form to asbmitigation@wildlife.ca.gov