TAB F - Avoidance and Minimization Measures, Environmental Commitments, and Mitigation Measures Relevant to Waters of the State

Environmental Commitment: Conduct Environmental Training & AMM1: Conduct Worker Awareness Training

Prior to construction, DWR will inform field management and construction personnel of the need to avoid and protect sensitive resources. Training will be conducted during preconstruction meetings so that construction personnel are aware of their responsibilities and the importance of compliance. This commitment is related to AMM1, Worker Awareness Training, described in Section 3B.4.1 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. This training will be provided by qualified resource specialists (e.g., certified biologists, cultural resource specialists, etc.) as specified by individual management plans and/or mitigation plans.

Construction personnel will be educated on the types of sensitive resources located in the Plan Area and the measures required to avoid impacts on these resources. Materials covered in the training program will include environmental rules and regulations for the construction activities and requirements for limiting activities to approved work areas, timing restrictions, and avoidance of sensitive resource areas.

Training seminars will be held to educate construction supervisors and managers on the following.

- The need for resource avoidance and protection.
- Important timing windows for covered species (i.e. timing of covered fish migration/spawning/rearing, wildlife mating/nesting/fledging, plant flowering periods).
- Provide specific training related to the relevant AMMs that will be implemented during construction for the protection of covered fish, wildlife and plant species, depending upon work to be performed and location of the work (i.e., in-water, upland, wetland).
- The legal requirements for resource avoidance and protection.
- Identification of relevant special-status fish, wildlife, and plant species, depending upon work to be performed and location of the work (e.g., in-water, upland, wetland).
- Protocol for identifying the proper AMMs to implement for the protection of special-status fish, wildlife and plants based upon the nature, timing, and location of construction activities to be performed.
- Brief discussions of covered species and natural communities of concern.
- Boundaries of the work area.
- Avoidance and minimization commitments.
- Exclusion and construction fencing methods.
- Roles and responsibilities.

- What to do when covered fish, wildlife or plants are encountered (dead, injured, stressed, or entrapped) in work areas.
- Staking methods to protect resources.
- Environmental commitments.
- Emergency procedures.
- Consequences of violations of the laws and regulations protecting resources.

A fact sheet or other supporting materials containing this information will be prepared and will be distributed along with a list of contacts (names, numbers, and affiliations) prior to initiating construction activities. A representative will be appointed by the project proponent to be the primary point of contact for any employee or contractor who might inadvertently take a covered species, or a representative will be identified during the employee education program and the representative's name and telephone number provided to the agencies.

If new construction personnel are added to the project, the contractor will ensure that the personnel receive the mandatory training and sign a sheet indicating their attendance and completion of the environmental training before starting work. The training sheets for new construction personnel will be provided to the agencies, if requested.

Explanation of effectiveness: By ensuring that all construction personnel undergo pre-construction environmental training regarding environmental rules and regulations applicable to construction activities, requirements for limiting activities to approved work areas, timing restrictions, and avoidance of sensitive aquatic and terrestrial resource areas, the severity of impacts, and particularly direct impacts, on these resources could be avoided and minimized. However, this environmental commitment alone would not be sufficient to reduce all construction-related significant impacts on fish (and related recreational activities) and terrestrial biological resources given that there are multiple impact mechanisms responsible for these impacts, many of which would require not only the implementation of multiple environmental commitments but also the implementation of mitigation measures in order to reduce impacts to a less-than-significant level.

AMM2: Construction Best Management Practices and Monitoring

DWR will ensure that all construction and operation and maintenance activities in and adjacent to sensitive resources areas (e.g., fish, wildlife, and plant species habitats, and natural communities) implement BMPs and have construction monitored by qualified technical specialists. Depending on the resource of concern and construction timing, construction activities and areas will be monitored for compliance with water quality regulations (SWPPP monitoring) and with AMMs developed for sensitive biological resources (biological monitoring).

Before implementing an approved project, DWR will prepare a construction monitoring plan for the protection of fish, wildlife, and plant species. The plan will include the following elements.

- Reference to or inclusion of the SWPPP prepared under the CGP, where one is needed (AMM3).
- Summaries or copies of planning and preconstruction surveys (if applicable) for natural communities and special-status species.

- Description of AMMs to be implemented, including a description of project-specific BMPs or additional measures not otherwise included in the FEIR/FEIS.
- Descriptions of monitoring parameters (e.g., turbidity), including the specific activities to be monitored (e.g., dredging, grading activities) and monitoring frequency and duration (e.g., once per hour during all in-water construction activities), as well as parameters and reporting criteria (e.g., Turbidity is not to exceed 10 NTU above background. Exceedances will be reported to the Environmental Manager and the construction superintendent must identify and correct the cause.).
- Description of roles and responsibilities of the monitors and protocols for notifying the Environmental Manager and Construction Manager of concerns.
- A monitoring log prepared by the construction monitor, which documents the day's construction activities, notes any problems identified and solutions implemented to rectify those problems, and notifications to the construction superintendent and/or the fish and wildlife agencies regarding any exceedances of specific parameters (i.e., turbidity) or observations of special-status species.

The following measures will be implemented prior to and during construction activities or other project activities for the protection of fish, wildlife and plant species, their designated critical habitat, and natural communities. Additional measures may be developed for site-specific conditions or specific special-status species during the review and preconstruction planning of individual projects.

- All in-water construction activities will be conducted during the allowable in-water work windows established by USFWS, NMFS, and CDFW for the protection of fish species.
- Qualified biologists will monitor construction activities in areas identified during the planning stages and species/habitat surveys as having fish, wildlife, and plant species, their designated critical habitat, and other sensitive natural communities. The intent of the biological monitoring is to ensure that specific AMMs that have been integrated into the project design and permit requirements are being implemented correctly during construction and are working appropriately and as intended for the protection of special-status species, natural communities, and the environment in general.
- Biological monitors will be professional biologists selected for their knowledge of the special-status species and natural communities that may be affected by construction activities. The qualifications of the biologist(s) will be presented to the fish and wildlife agencies prior to initiating construction. If a special status species is observed in an active work area, the biological monitors shall immediately provide the Construction Manager with its location and recommendation on how to handle the special status species. The Construction Manager shall work with the contractor and biological monitor to take steps necessary to ensure the protection of the species consistent with permits and authorizations.
- During construction, the nondisturbance buffers described under the special-status species' AMMs, below, will be established and maintained as necessary. A qualified biologist will monitor the site consistent with the requirements described for special-status species to ensure that buffers are enforced and resources are not disturbed.
- Exclusionary fencing will be placed at the edge of active construction activities and staging areas (after having been cleared by biological surveys) to restrict wildlife access from the adjacent habitats. The need for exclusionary fencing will be determined during the preconstruction surveys and construction planning phase and may vary depending on the species and habitats present. Exclusion fencing will be maintained such that it is intact during rain events. Fencing will be checked daily by

the construction inspector or environmental monitors. Damaged fencing will be repaired promptly to reduce the risk of access by sensitive species. Active construction and staging areas will be delineated with high-visibility temporary fencing at least 4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment outside the defined project footprint. Such fencing will be inspected and maintained daily by the construction foreman until completion of the project. The fencing will be removed from areas only after all construction activities are completed and equipment is removed. No project-related construction activities will occur outside the delineated project construction areas.

- Project-related vehicles will observe a speed limit of 20 miles per hour in construction areas, except on county roads and state and federal highways. A vehicle speed limit of 20 miles per hour will be posted and enforced on all nonpublic access roads, particularly on rainy nights when California tiger salamanders and California red-legged frogs are most likely to be moving between breeding and upland habitats. Extra caution will be used on cool days when giant garter snakes may be basking on roads.
- All ingress/egress at the project site will be restricted to those routes identified in the project plans and description. Cross-country access routes will be clearly marked in the field with appropriate flagging and signs.
- All vehicle parking will be restricted to established areas, existing roads, or other suitable areas.
- To avoid attracting predators, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in enclosed containers and trash will be removed and disposed of at an appropriate facility at least once a week from the construction or project site. All contracts with contractors will include language reminding them of the obligations to abide by all laws related to litter. These obligations will be applicable both within work areas and while traveling along public roads within the Plan Area. Vehicles carrying trash will be required to have loads covered and secured to prevent trash and debris from falling onto roads and adjacent properties.
- To avoid injury or death to wildlife, no firearms will be allowed on the project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials.
- To prevent harassment, injury, or mortality of sensitive wildlife by dogs or cats, no canine or feline pets will be permitted in the active construction area.
- To prevent inadvertent entrapment of special status wildlife during construction, in areas that may be occupied by special status wildlife at risk for entrapment, all excavated, steep-walled holes or trenches more than 1 foot deep will be covered at the close of each working day with plywood or similar material, and/or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If a special-status species is encountered during construction work, to the extent feasible, construction activities should be diverted away from the animal until it can be moved by a USFWS- or CDFW-approved biologist.
- Capture and relocation of trapped or injured wildlife can only be performed by personnel with appropriate USFWS and CDFW handling permits. Any sightings and any incidental take will be reported to CDFW and USFWS via email within 1 working day of the discovery. A follow-up report will be sent to these agencies, including dates, locations, habitat description, and any corrective measures taken to protect special-status species encountered. For each special-status species

encountered, the biologist will submit a completed CNDDB field survey form (or equivalent) to CDFW no more than 90 days after completing the last field visit to the project site.

- Plastic monofilament netting or similar material will not be used for erosion control, because smaller wildlife may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. This limitation will be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package.
- Special-status wildlife can be attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar features; construction equipment; or construction debris left overnight in areas that may be occupied by special status species that could occupy such structures will be inspected by the biological monitor prior to being used for construction. Such inspections will occur at the beginning of each day's activities, for those materials to be used or moved that day If necessary, and under the direct supervision of the biologist, the structure may be moved up to one time to isolate it from construction activities, until the special-status species has moved from the structure of their own volition, been captured and relocated, or otherwise been removed from the structure.
- Rodenticides and herbicides will be used in accordance with the manufacturer recommended uses and applications and in such a manner as to prevent primary or secondary poisoning of special-status fish, wildlife, and plant species and depletion of prey populations upon which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency (EPA), the California Department of Pesticide Regulation, and other appropriate state and federal regulations, as well as additional project-related restrictions imposed by USFWS, NMFS and/or CDFW. If rodent control must be conducted in San Joaquin kit fox habitat, zinc phosphide should be used because of its proven lower risk to kit fox. In addition, the method of rodent control will comply with those discussed in the 4(d) rule published in the final listing rule for tiger salamander (69 *Federal Register* [FR] 47211–47248). The rodent control restrictions described above will be implemented *in perpetuity*.
- Nets or bare hands may be used to capture and handle special-status fish or wildlife species. A professional biologist will be responsible for and direct any efforts to capture and handle special-status species. Any person who captures and handles special-status species will not use soaps, oils, creams, lotions, insect repellents, solvents or other potentially harmful chemicals of any sort on their hands within 2 hours before handling special-status fish or wildlife. Latex gloves will not be used either. To avoid transferring diseases or pathogens between aquatic habitats during the course of surveys or the capture and handling of special-status fish or wildlife species, all species captured and handled will be released in a safe, aquatic environment as close to the point of capture as possible, and not transported and released to a different water body. When capturing and handing special-status amphibians, the biologists will follow the Declining Amphibian Task Force's *Code of Practice* (U.S. Fish and Wildlife Service no date [a]). While in captivity, individual amphibians will be kept in a cool, moist, aerated environment such as a dark (i.e., green or brown) bucket containing a damp sponge. Containers used for holding or transporting these species will be sanitized and will not contain any standing water.
- CDFW, NMFS and/or USFWS will be notified within 1 working day of the discovery of, injury to, or mortality of a special-status species that results from project-related construction activities or is observed at the project site. Notification will include the date, time, and location of the incident or of

the discovery of an individual special-status species that is dead or injured. For a special-status species that is injured, general information on the type or extent of injury will be included. The location of the incident will be clearly indicated on a U.S. Geological Survey 7.5-minute quadrangle and/or similar map at a scale that will allow others to find the location in the field, or as requested by CDFW, NMFS and/or USFWS. The biologist is encouraged to include any other pertinent information in the notification.

- Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities will be minimized by adhering to the following activities. Project designs will limit or cluster permanent project features to the smallest area possible while still permitting achievement of project goals. To minimize temporary disturbances, all project-related vehicle traffic material storage will be restricted to established and/or designated ingress/egress points, construction areas, and other designated staging/storage areas. These areas will also be included in preconstruction surveys and, to the extent possible, will be established in locations disturbed by previous activities to prevent further effects.
- Spoils, RTM, and dredged material will be disposed of at an approved site or facility in accordance with all applicable federal, state, and local regulations.
- Upon completion of the project, all habitat subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, will be recontoured to preproject elevations, as appropriate and necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance is any area that is disturbed to allow for construction of the project, but is not required for operation or maintenance of any project-related infrastructure, will not be subject to further disturbance after project completion by DWR, and has the potential to be revegetated. Appropriate methods and native plant species used to revegetate such areas will be determined on a site-specific basis in consultation with USFWS, NMFS, and/or CDFW, and biologists (AMM10).

Explanation of effectiveness: The development of a construction monitoring plan and the use monitors will ensure that all measures to protect sensitive biological resources and water quality identified in other AMMs and mitigation measures are effectively and efficiently implemented. The best management practices listed in AMM2 provide specific guidance to ensure that, during construction, operations, and maintenance, the take of species and degradation of habitat is avoided and minimized to the extent practicable. These measures help avoid and minimize behavioral changes, injury, and mortality of fish and wildlife, help maintain the integrity of water quality in the Delta and adjacent freshwater habitats, and avoid and minimize effects on adjacent terrestrial habitats.

In absence of the implementation of AMM2, ECs, mitigation measures, and other AMMs, there would be a greater potential for impacts on these species and natural communities due to degradation of habitat and potential injury or mortality of species from construction and/or operations and maintenance of the proposed project. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Develop and Implement Stormwater Pollution Prevention Plans & AMM3: Stormwater Pollution Prevention Plan

Commitment: DWR will be responsible for ensuring coverage under the Construction General Permit for Construction and Land Disturbance Activities (Construction General Permit [CGP]) (Order 2010-0014-DWQ or any more recent version) issued from the State Water Board. The CGP requires the development and implementation of a stormwater pollution prevention plan (SWPPP). This commitment is related to AMM3, Stormwater Pollution Prevention Plan, described in Section 3B.4.3 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. For the alternative selected, a series of separate but related SWPPPs will be prepared by a Qualified SWPPP Developer (QSD) and will be implemented under the supervision of a Qualified SWPPP Practitioner (QSP). As part of the procedure to gain coverage under the CGP, the QSD will determine the "Risk Level" (Levels 1, 2, or 3, or Types 1, 2, or 3 for linear underground/overhead projects) of the construction activities covered by a given SWPPP, which involves an evaluation of the site's "Sediment Risk" and "Receiving Water Risk." The risk is calculated separately for sediment and receiving water, with two risk categories for receiving water (low and high) and three risk categories for sediment risk (low, medium, and high). The overall project risk levels (1, 2, or 3) are then determined through a matrix, where Risk Level 1 applies to projects with low receiving water and sediment risks, Risk Level 3 for projects with high receiving water and sediment risks, and Risk Level 2 for all other combinations of sediment and receiving water risks. These project risk levels determine the level of protection (i.e., the BMPs to be used) and monitoring that is required for the project.

Table 3-1 shows how varying sediment risk and receiving water risk combine to result in a given Risk Level for a given construction site.

Table 3-1. Combined Risk Level Matrix

		Sediment Risk		
		Low	Medium	High
Receiving Water Risk	Low	Level 1	Level 2	
	High	Level 2		Level 3

The objectives of the SWPPPs will be to (1) identify pollutant sources associated with construction activities and operations that may affect the quality of stormwater and (2) identify, construct, and implement stormwater pollution prevention measures to reduce pollutants in stormwater discharges during and after construction. The SWPPP will be kept onsite during construction activity and operations and will be made available upon request to representatives of the San Francisco Bay and Central Valley Water Boards.

In accordance with the CGP, the SWPPP will describe site topographic, soil, and hydrologic characteristics; construction activities and schedule; construction materials to be used, including sources of imported fill material, and other potential sources of pollutants at the construction site; potential non-stormwater discharges (e.g., trench dewatering); erosion and sediment control measures; "housekeeping" BMPs to be implemented; a BMP implementation schedule; a site and BMP inspection schedule; and ongoing personnel training requirements. These provisions are intended to prevent water quality degradation related to pollutant discharge to receiving waters and to prevent or constrain

changes to the pH of receiving waters. Performance standards specified in the CGP will be met by implementing stormwater pollution prevention BMPs that are tailored to specific site conditions, including the Risk Level of individual construction sites. These environmental commitments mirror the requirements to gain and maintain coverage under the CGP. DWR will ensure consultation with the appropriate Regional Water Board or State Water Board to determine the appropriate aggregation of specific construction activities, or groups of activities, to be authorized under the CGP.

It is anticipated that multiple SWPPPs will be prepared for project-related construction activities, with a given SWPPP prepared to cover a particular water conveyance component (e.g., intermediate forebay), groups of components (e.g., intakes), or construction activities associated with conservation components. The risk level will be identified for each action covered by a specific SWPPP.

The following list of BMPs are requirements common to all Risk Level sites; however, some detail is provided in "Inspection and Monitoring" on various Risk Level requirements.

- Erosion Control Measures
    - Implement effective wind erosion BMPs, such as watering, application of soil binders/tackifiers, and covering stockpiles.
    - Provide effective soil cover for inactive areas and all finished slopes and utility backfill areas, such as seeding with a native seed mix, application of hydraulic mulch and bonded fiber matrices, and installation of erosion control blankets and rock slope protection.
- Sediment Control Measures
    - Prevent transport of sediment at the construction site perimeter, toe of erodible slopes, soil stockpiles, and into storm drains.
    - Capture sediment via sedimentation and stormwater detention facilities.
    - Reduce runoff velocity on exposed slopes.
    - Reduce off-site sediment tracking.
- Management Measures for Construction Materials
    - Cover and berm inactive stockpiled construction materials.
    - Store chemicals in watertight containers.
    - Minimize exposure of construction materials to stormwater.
    - Designate refueling and equipment inspection/maintenance locations.
    - Control of drift and runoff from areas treated with herbicides, pesticides, and other chemicals that may be harmful to aquatic habitats.
- Waste Management Measures
    - Prevent off-site disposal or runoff of any rinse or wash waters.
    - Implement concrete and truck washout facilities and appropriately sized storage, treatment, and disposal practices.
    - Ensure the containment of sanitation facilities (e.g., portable toilets).

- Clean or replace sanitation facilities (as necessary) and inspect regularly for leaks/spills.
- Cover waste disposal containers during rain events and at end of every day.
- Protect stockpiled waste material from wind and rain.

- Construction Site Dewatering and Pipeline Testing Measures.
  - Reclaim site dewatering discharges to the extent practicable, or use for other construction purposes (e.g., land application for dust control).
  - Implement appropriate treatment and disposal of construction site dewatering from excavations to prevent discharges to surface waters, unless permitted by regulatory agencies to discharge to surface waters.
  - Dechlorinate pipeline test waters before discharging to surface waters.
- Accidental Spill Prevention and Response Measures.
  - Provide equipment and materials necessary for cleanup of accidental spills onsite.
  - Clean up accidental spills and leaks immediately and dispose of properly.
  - Ensure that there are trained spill response personnel available.
- Non-Stormwater Management Measures
  - Control all non-stormwater discharges during construction.
  - Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters.
  - Clean streets in such a manner as to prevent non-stormwater discharges from reaching surface water.
  - Discontinue the application of any erodible landscape material during rain, or within 2 days before a forecasted rain event.
- Inspection and Monitoring Common to all Risk Levels.
  - Ensure that all inspection, maintenance, repair, and sampling activities at the construction site will be performed or supervised by a QSP representing the discharger.
  - Develop and implement a written site-specific Construction Site Monitoring Program (CSMP).
- Inspection, Monitoring, and Maintenance Activities Based on the Risk Level of the Construction Site (as defined in the State Water Board CGP).
  - Risk Level 1 Sites:
    - Perform weekly inspections of BMPs, and at least once each 24-hour period during extended storm events.
    - At least 2 business days (48 hours) prior to each anticipated qualifying rain event (a rain 1 event producing 0.5 inch or more of precipitation), visually inspect: (a) stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources; (b) all BMPs to identify whether they have been properly implemented in accordance with the SWPPP; and (c) stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

- Visually observe stormwater discharges at all discharge locations within two business days (48 hours) after each qualifying rain event and identify additional BMPs as necessary, and revise the SWPPP accordingly.
- Conduct minimum quarterly visual inspections of each drainage area for the presence of (or indications of prior) unauthorized and authorized non-stormwater discharges and their sources.
- Collect one or more samples of construction site effluent during any breach, malfunction, leakage, or spill observed within the construction site during a visual inspection which could result in the discharge of pollutants to surface waters that will not be visually detectable in stormwater.

- Risk Level 2 Sites:
  - Risk Level 2 dischargers will perform all of the same visual inspection, monitoring, and maintenance measure specified for Risk Level 1 dischargers.
  - At a minimum, Risk Level 2 dischargers will collect and analyze a minimum of three samples per day for pH and turbidity during qualifying rain events. The CGP also requires the discharger to revise the SWPPP and to immediately modify existing BMPs and/or implement new BMPs such that subsequent discharges are below the relevant Numeric Action Levels (NALs) specified by the CGP. It may be a violation of the CGP if the discharger fails to take corrective action to reduce the discharge below these NALs.
  - Dischargers who deploy Active Treatment Systems (ATS) on their site, or a portion on their site, will collect ATS effluent samples and measurements from the discharge pipe or another location representative of the nature of the discharge.
  - In the event that any effluent sample exceeds an applicable NAL, Risk Level 2 dischargers will submit all storm event sampling results to the State Water Board no later than 10 days after the conclusion of the storm event. The Regional Boards have the authority to require the submittal of an NAL Exceedance Report, which includes a description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.
- Risk Level 3 Sites:
  - Risk Level 3 dischargers will perform all of the same visual inspection, monitoring, and maintenance measure specified for Risk Level 1 and Risk Level 2 dischargers.
  - In the event that a Risk Level 3 discharger exceeds a numeric effluent limitation (NEL) of the CGP (i.e., pH and turbidity), and has a direct discharge into receiving waters, the discharger will subsequently sample receiving waters for all parameter(s) monitored in the discharge. An exceedance of an NEL is considered a violation of the CGP, and the discharger must electronically submit all storm event sampling results to the State and Regional Water Boards via Stormwater Multiple Application and Report Tracking System (SMARTS) no later than 5 days after the conclusion of the storm event.[1]

[1] The State Water Board has suspended the applicability of Numeric Effluent Limitations (NELs) for pH and turbidity at Risk Level 3/LUP Type 3 construction sites. In addition, because receiving water monitoring is required only if the NELs are triggered, all receiving water monitoring requirements are also suspended. The

- If disturbing 30 acres or more of the landscape and discharging directly into receiving waters, conduct a benthic macroinvertebrate bioassessment of receiving waters prior to and after commencement of construction activities to determine if significant degradation to the receiving water's biota has occurred. However, if commencement of construction is outside of an index period (i.e., the period of time during which bioassessment samples must be collected to produce results suitable for assessing the biological integrity of streams and rivers) for the site location, the discharger will participate in the State of California's Surface Water Ambient Monitoring Program.

The SWPPP will also specify the forms and records that must be uploaded to the State Water Board online SMARTS, such as quarterly non-stormwater inspection and annual compliance reports.

If the QSP determines the site is Risk Level 2 or 3, water sampling for pH and turbidity will be required and the SWPPP will specify sampling locations and schedule, sample collection and analysis procedures, and recordkeeping and reporting protocols. In accordance with the CGP numeric action level requirements, the project contractor's QSD will revise the SWPPP and modify existing BMPs or implement new BMPs when effluent monitoring indicates that daily average runoff pH is outside the range of 6.5 to 8.5 and that the daily average turbidity is greater than 250 nephelometric turbidity units (NTUs). Such BMPs may include construction of sediment traps and sediment basins, use of 'Baker' or other type tanks, installation of rock slope protection, covering of active stockpiles in event of rain, constructing desilting basins, and use of ATS. The ability of other areas to withstand excessive erosion and sedimentation may be increased by applying additional mulching, bonded fiber matrices, and erosion control blankets; reseeding with a native seed mix; and installation of additional fiber rolls, silt fences, and gravel bag berms. The QSD may also specify changes in the manner and frequency of BMP inspection and maintenance activities. The determination of which BMP should be applied in a given situation is very site-specific. QSDs typically refer to the California Stormwater Quality Association's *Stormwater Best Management Practice Handbook Portal: Construction* or the similar Caltrans manual for selecting BMPs for particular site conditions.

Additionally, if a given construction component is Risk Level 3, for that component DWR will report to the State Water Board when effluent monitoring indicates that daily average runoff pH is outside the range of 6.0 to 9.0 or the daily average turbidity is greater than 500 NTUs. In the event that the turbidity NEL is exceeded, DWR may also be required to sample and report to the State Water Board pH, turbidity, and suspended sediment concentration of receiving waters for the duration of construction.

The contractor will also conduct sampling of runoff effluent when a leak, spill, or other discharge of non-visible pollutants is detected.

The CGP has specific monitoring and action level requirements for the Risk Levels, which are summarized in Table 3-2.

Level 3/Type 3 NEL requirements are presented here assuming that such NELs will be reinstated when project construction commences.

Table 3-2. SWPPP Monitoring and Action Requirements

	Risk Level/Type		
SWPPP Requirements	1	2	3
Minimum Stormwater and Non-Stormwater BMPs	✓	✓	✓
Numeric Action Levels (NAL) NAL for pH: 6.5–8.5 pH units NAL for turbidity: 250 NTU		✓	✓
Numeric Effluent Limitations (NEL) NEL for pH: 6–9 pH units NEL for turbidity: 500 NTU			✓
Visual Monitoring (weekly; before, during, after rain events; non-stormwater)	✓	✓	✓
Runoff Monitoring		✓	✓
Receiving Water Monitoring			✓

BMP = best management practices
pH = potential hydrogen
NTU = nephelometric turbidity unit
Note: The State Water Board has suspended the applicability of NELs for pH and turbidity at Risk Level 3/LUP Type 3 construction sites. In addition, because receiving water monitoring is required only if the NELs are triggered, all receiving water monitoring requirements are also suspended. The Level 3/Type 3 NEL are presented here assuming that such NELs will be reinstated when project construction commences.

The QSD preparing a SWPPP may include in the SWPPP BMPs such as preservation of existing vegetation, perimeter control, seeding, mulching, fiber roll and silt fence barriers, erosion control blankets, protection of stockpiles, watering to control dust entrainment, rock slope protection, tracking control, equipment refueling and maintenance, concrete and solid waste management, and other measures to ensure compliance with the pH and turbidity level requirements defined by the CGP. Partly because the potential adverse effect on receiving waters depends on location of a work area relative to a waterway, the BMPs will be site-specific. For example, BMPs applied to level island-interior sites will be different than BMPs applied to water-side levee conditions. The QSP will be responsible for day-to-day implementation of the SWPPP, including BMP inspections, maintenance, water quality sampling, and reporting to the State Water Board. If the water quality sampling results indicate an exceedance of NALs and Numeric Effluent Limitations (NELs) for pH and turbidity, as described above, the QSD will modify the type and/or location of the BMPs by amending the SWPPP in order to reduce pH, turbidity, and other contaminants to acceptable levels, consistent with CGP NALs and NELs and with the water quality objectives and beneficial uses set forth in the Basin Plan.

Explanation of effectiveness: The development and implementation of SWPPPs will serve to avoid and minimize direct and indirect effects on sensitive biological resources, which include fish, wildlife, rare plants, and sensitive natural communities such as tidal and nontidal marshes, vernal pool complex, and alkali seasonal wetlands. The BMPs listed above would serve to prevent construction-related chemicals and sediment carried by stormwater from entering aquatic, wetland, and terrestrial habitats where chemicals and sediment can cause injury and mortality of species and affect adjacent natural communities by changing the chemical and physical structure of soils and altering topography (e.g., fill of wetlands).

In absence of the implementation of AMM3, ECs, mitigation measures, and other AMMs, there would be a greater potential for significant impacts on species and natural communities due to loss of habitat and loss of species from construction and/or operation of the proposed project. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Develop and Implement Erosion and Sediment Control Plans & AMM4: Erosion and Sediment Control Plan

DWR commit to implementing measures as described below as part of the construction activities. In accordance with these environmental commitments, DWR will ensure the preparation and implementation of erosion and sediment control plans to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas damaged by construction activities. This commitment is related to AMM4, Erosion and Sediment Control Plan, described in Section 3B.4.4 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. It is anticipated that multiple erosion and sediment control plans will be prepared for project-related construction activities, each taking into account site-specific conditions such as proximity to surface water, erosion potential, drainage, etc. The plans will include all the necessary CGP requirements regarding erosion control and will specify BMPs for erosion and sediment control that are to be implemented during construction activities. These BMPs will be incorporated into the SWPPPs (see *Environmental Commitment: Develop and Implement Stormwater Pollution Prevention Plans*).

Erosion control measures will include the following:

- Install physical erosion control stabilization features (hydroseeding with native seed mix, mulch, silt fencing, fiber rolls, sand bags, and erosion control blankets) to capture sediment and control both wind and water erosion. Erosion control may not utilize plastic monofilament netting or similar materials.
- Keep emergency erosion-control supplies onsite at all times during construction, and have the contractor(s) use these emergency stockpiles as needed. DWR and/or the contractors will ensure that supplies used from the emergency stockpiles are replaced within 48 hours. DWR will also ensure that materials used in construction of erosion control methods will be removed from the work site and properly disposed when no longer needed.
- Design grading to be compatible with adjacent areas and minimize potential for disturbance of adjacent terrain and natural land features and minimize erosion in disturbed areas to the extent feasible.
- Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities.
- To the extent feasible, retain native trees and vegetation to help stabilize hillsides, retain moisture, and reduce erosion.
- Sequence clearing of native vegetation, and disturbance of soils to minimize overall time of soil disturbance.

- Implement construction management and scheduling measures to avoid exposure to rainfall events, runoff, or flooding at construction sites to the extent feasible.
- Conduct frequent site inspections (before and after significant storm events) to ensure that control measures are intact and working properly and to correct problems as needed.
- Install drainage control features (e.g., berms and swales, slope drains) as necessary to avoid and minimize erosion.
- Install wind erosion control features (e.g., application of hydraulic mulch or bonded fiber matrix).

Sediment control measures will include:

- Use detention ponds, silt traps, wattles, berms, barriers or similar measures to slow water velocity and retain sediment transported by onsite run on or runoff.
- Collect and direct surface run on and runoff at non-erosive velocities to controlled drainage courses.
- When ground disturbing activities are required adjacent surface water, wetlands, or aquatic habitat, the use of sediment and turbidity barriers, soil stabilization and revegetation of disturbed surfaces.
- Prevent mud from being tracked onto public roadways by installing gravel on primary construction ingress/egress points, rumble plates, and/or truck tire washing.
- Deposit or store excavated materials away from drainage courses and cover if left in place for more than 5 days or storm events are forecast within 48 hours.

After construction is complete, site-specific restoration efforts will include grading, post construction BMPs for erosion control, and revegetation. Revegetation will emphasize self-sustaining, local native plants, unless the owner of the property or an agency having jurisdiction requires a different but equally or more effective approach to restoring disturbed areas. All disturbed areas will be graded, with disturbed areas revegetated by seeding or other means. Once post construction BMPs are constructed and revegetation is appropriately established a Notice of Termination will be filed with the State Water Board.

Explanation of effectiveness: The development and implementation of an erosion and sediment control plan will serve to avoid and minimize effects on sensitive biological resources, which include fish, wildlife, rare plants, and sensitive natural communities such as tidal and nontidal marshes, vernal pool complex, and alkali seasonal wetlands. The sediment and erosion control measures listed above would serve to prevent construction-related sediment from entering aquatic, wetland, and terrestrial habitats where it can degraded water quality and affect adjacent natural communities by changing the chemical and physical structure of soils and altering topography (e.g., fill of wetlands). Excessive erosion resulting from water flowing off work areas and completed facilities can alter the topography of adjacent upland and aquatic habitat and contribute to water quality impairment in adjacent water bodies.

In absence of the implementation of AMM4, ECs, mitigation measures, and other AMMs, there would be a greater potential for significant impacts on these species and natural communities due to loss of habitat and loss of species from construction and/or operation of the proposed project. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans & AMM5: Spill Prevention, Containment, and Countermeasure Plan

It is anticipated that multiple Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) will be prepared for project construction activities, each taking into account site-specific conditions. This commitment is related to AMM5, Spill Prevention, Containment, and Countermeasure Plan, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The SPCCPs will be developed in accordance with the regulatory requirements of Title 40 of the Code of Federal Regulations, Part 112 (40 CFR Part 112). 40 CFR Part 112, or the Spill Prevention, Control, and Countermeasure Rule, includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires the preparation, amendment and implementation of SPCCPs for specific facilities. The SPCCPs will be developed and implemented to minimize effects from spills of oil or oil-containing products[2] during project construction and operation. The SPCCPs will include the following measures and practices.

- All necessary personnel will be trained in emergency response and spill containment techniques, and will also be made aware of the pollution control laws, rules, and regulations applicable to their work.
- Petroleum products will be stored in nonleaking containers at impervious storage sites from which an accidental spill cannot escape.
- Absorbent pads, pillows, socks, booms, and other spill containment materials will be stored and maintained at the hazardous materials storage sites for use in the event of an accidental spill.
- Contaminated absorbent pads, pillows, socks, booms, and other spill containment materials will be placed in nonleaking sealed containers until transport to an appropriate disposal facility.
- When transferring oil or other hazardous materials from trucks to storage containers, absorbent pads, pillows, socks, booms or other spill containment material will be placed under the transfer area.
- Refueling of construction equipment will occur only in designated areas that will be a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands.
- Equipment used in direct contact with water will be inspected daily for oil, grease, and other petroleum products. All equipment must be cleaned of external petroleum products prior to beginning work where contact with water may occur to prevent the release of such products to surface waters.
- Oil-absorbent booms will be used when equipment is used in or immediately adjacent to waters.
- All reserve fuel supplies will be stored only within the confines of a designated staging area, to be located a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands.

[2] "Oil" includes a variety of petroleum and non-petroleum based substances including gasoline, diesel fuel, motor oil, hydraulic fluid, aviation fuel, oil-based paint, oil-based paint thinner, roofing tar, and petroleum-based solvents.

- Fuel transfers will take place a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands, and absorbent pads will be placed under the fuel transfer operation.
- Staging areas will be designed to contain contaminants such as oil, grease, fuel, and other petroleum products so that should an accidental spill occur, they do not drain toward receiving waters or storm drain inlets.
- All stationary equipment will be staged in appropriate staging areas and positioned over drip pans.
- In the event of an accidental spill, personnel will identify and secure the source of the discharge and contain the discharge with sorbents, sandbags, or other material from spill kits and will contact appropriate regulatory authorities (e.g., National Response Center will be contacted if the spill threatens navigable waters of the United States or adjoining shorelines, as well as other appropriate response personnel).
- Discharge prevention measures will include procedures for routine handling of products (e.g., loading, unloading, and facility transfers) (*40 CFR 112.7(a)(3)(i)*).
- Discharge or drainage controls will be implemented such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge (*40 CFR 112.7(a)(3)(ii)*).
- Countermeasures will be implemented for discharge discovery, response, and cleanup (both the facility's capability and those that might be required of a contractor) (*40 CFR 112.7(a)(3)(iii)*).
- Methods of disposal of recovered materials will comply with applicable legal requirements (*40 CFR 112.7(a)(3)(iv)*).

Methods of cleanup may include the following.

- Physical—Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Mechanical—Mechanical methods include, but may not be limited to, the use of vacuum cleaning systems and pumps.
- Chemical—Cleanups of material can be achieved with the use of appropriate chemical agents such as sorbents, gels, and foams.

Explanation of effectiveness: The implementation of an SPCC will serve to protect aquatic fish and wildlife in the Delta from the accidental discharge of oil into Delta waters. The SPCC will serve to protect primarily fish and aquatic birds from oils and other petroleum products used during construction and operations. The measures and practices listed above help to prevent accidents from happening and establish procedures for responding to oil spills.

In absence of the implementation of AMM5, ECs, mitigation measures, and other AMMs, there would be a greater potential for significant impacts on these species and natural communities due to loss of habitat and loss of species from construction and/or operation of the proposed project. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Disposal and Reuse of Spoils, Reusable Tunnel Material (RTM), and Dredged Material, AMM6: Disposal and Reuse of Spoils, Reusable Tunnel Material, and Dredged Material, & AMM10: Restoration of Temporarily Affected Natural Communities

In the course of constructing or operating project facilities, substantial quantities of material are likely to be removed from their existing locations based upon their properties or the need for excavation of particular features. Spoils refer to excavated native soils and are associated with construction of pumping plant facilities and other water conveyance features. Reusable tunnel material (RTM) refers to the mixture of saturated soils and biodegradable soil conditioners or additives that will be generated by tunneling operations and are appropriate for reuse based upon chemical characterization and physical properties. Dredged material refers to sediment removed from the bottom of a body of water for the purposes of in-water construction, or water conveyance, operation (e.g. sediment collected at intake sites), or storage requirements. The quantities of these materials generated by construction or operation of project facilities would vary depending on the alternative selected for implementation. See further discussion in Chapter 3, *Description of Alternatives*, Section 3.6.1 of the FEIR/FEIS. These materials will require handling, storage, and disposal, as well as chemical characterization, prior to any reuse. Temporary storage areas will be designated for these materials. However, to reduce the long-term effects on land use and potentially support implementation of other project elements, DWR will develop site-specific plans for the beneficial reuse of these materials, to the greatest extent feasible. This commitment is related to AMM6; Disposal and Reuse of Spoils, Reusable Tunnel Material (RTM), and Dredged Material; and AMM10; Restoration of Temporarily Affected Natural Communities; described in Section 3B.4.6 and 3B.4.10 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. A flowchart outlining the process for disposal and reuse of these materials is shown in Figure 3B-1.

Material Storage Site Determination

Material refers to Spoils, RTM, sediment, and dredged material. These materials will be temporarily stored in designated storage areas. Sediment collected at intake sites will be stored at solids lagoons adjacent to sedimentation basins. Selection of designated storage areas will be based on, but not limited to, the following criteria.

- Material may be placed in project-designated borrow areas.
- Areas for material storage will be located and average of no more than 10 miles from the construction feature
- Areas for material storage will not be located within 100 feet of existing residential or commercial buildings.
- Areas for material storage will not be located within 100 feet of a military facility.
- Material will be located in areas where it will not interfere with existing roads, rail lines, or infrastructure.

- Placement of material in sensitive natural communities and habitat areas, such as surface waters, wetlands, vernal pool complex, alkali seasonal wetland complex or grassland, native grasslands, riparian areas, or crane roost sites, will be avoided or minimized to the extent feasible, consistent with the biological goals and objectives of the project. If placement of material in vernal pool complex or alkali seasonal wetland complex cannot be avoided, material will not be placed within 250 feet of vernal pools or alkali seasonal wetlands (i.e., wetted acres will be avoided by at least 250 feet).
- Landowner concerns and preferences will be considered in designating sites for material storage. DWR will consult directly with landowners to refine the storage area footprint to further minimize impacts to surrounding land uses, including agricultural operations.
- Where feasible, dredged material will be stored on higher elevation land that is set back from surface water bodies a minimum of 150 feet. Upland disposal will help ensure that the material will not be in direct contact with surface water prior to its draining, characterization, and potential treatment.

Additional considerations have been made for the storage of RTM. For example, the proposed locations of the storage areas for RTM have been designed to be close to where the material will be brought to the surface, as well as close to where reuse is expected to occur. In some cases, storage areas are located adjacent to barge landings to facilitate movement to other reuse locations in the Delta.

The area required for material storage is flexible and will depend on several factors.

- The speed with which material is brought to the surface, stored, dried, tested, and moved to reuse locations will be important in determining the final size of storage areas. If material can be dried faster and moved offsite more quickly, less area will be needed at each location.
- The depth to which the material is stacked. Material that is stored in deeper piles will require less area but may dry more slowly, extending the time that is needed.
- The proportion of material at one storage area or another. There will be flexibility during construction to prioritize material storage in some areas as opposed to other areas, based on feasibility of reuse or minimization of impacts.

To preserve this flexibility during construction, the analysis assumes a range of storage area footprints that could be needed across different alternatives (based on different assumptions for the depth of material storage). It is anticipated that less or substantially less of the maximum storage area footprint would actually be required during the construction period. The assumptions used for Alternative 4A represent the maximum storage area that would be needed. To illustrate the potential for smaller RTM storage areas, a range of acreages is provided in relevant impact discussions, accounting for the factors listed above.

Material Storage Site Preparation

A portion of the temporary sites selected for storage of spoils, RTM, and dredged material will be set aside for topsoil storage. The topsoil will be saved for reapplication to disturbed areas post construction. Suitable vegetative material from work site clearing will be chipped, stockpiled, and spread over disturbed soil areas for dust and erosion control purposes where feasible and appropriate and where such material does not contain seeds of nonnative species. Cleared areas will be grubbed as necessary to

prepare the areas for grading or other construction activities. Rocks and other inorganic grubbed materials may be used to backfill borrow areas. The contractor will remove from the work site all debris, rubbish, and other materials not directed to be salvaged and dispose of them in an approved disposal site after obtaining all permits required.

Draining, Chemical Characterization, and Treatment

RTM and associated decant liquid will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively, to determine whether it will meet requirements of the National Pollutant Discharge Elimination System (NPDES) and the Central Valley Regional Water Quality Control Board (Central Valley Water Board) requirements. Should RTM decant liquid constituents exceed discharge limits, these tunneling byproducts will be treated to comply with NPDES permit requirements. Discharges from RTM draining operations will be conducted in such a way as to not cause erosion at the discharge point. If RTM liquid requires chemical treatment, chemical treatment will ensure that after treatment RTM liquid will be nontoxic to aquatic organisms.

While additives used to facilitate tunneling will be nontoxic and biodegradable, it is possible that some quantity of RTM will be deemed unsuitable for reuse. In such instances, the material will be disposed of at a site approved for disposal of such material. In the case of RTM, such requirements are anticipated to apply to less than 1% of the total volume of excavated material (or, 270,000 cubic yards).

Hazardous materials excavated during construction will be segregated from other construction spoils and properly handled and disposed in accordance with applicable federal, state, and local regulations. Riverine or in-Delta sediment dredging and dredge material disposal activities may involve potential contaminant discharges not addressed through typical NPDES or State Water Board CGP processes. Construction of Dredge Material Disposal (DMD) sites will likely be subject to the State Water Board CGP (Order No. 2009-0009-DWQ). The following list of best management practices (BMPs) is based on information from the various regulatory programs that exist to manage dredging operations, and will be implemented during handling and disposal of any potentially hazardous dredged material.

- DWR will ensure the preparation and implementation of a pre-dredge sampling and analysis plan (SAP) to be developed and submitted by the contractor(s) as part of the water plan required pursuant to standard DWR contract specifications Section 01570. Prior to initiating any dredging activity, the SAP will evaluate the presence of contaminants that may impact water quality from the following discharge routes.
    - In-stream discharges during dredging.
    - Direct exposure to contaminants in the material through ingestion, inhalation or dermal exposure.
    - Effluent (return flow) discharge from an upland disposal site.
    - Leachate from upland dredge material disposal that may affect groundwater or surface water.
- Conduct dredging within the allowable in-water “work windows” established by USFWS, NMFS, and CDFW.
- Conduct dredging activities in a manner that will not cause turbidity in the receiving water, as measured in surface waters 300 feet down-current from the construction site, to exceed the Basin

Plan objectives beyond an approved averaging period by the Regional Water Boards and CDFW. Existing threshold limits in the Basin Plan for turbidity generation are as follows.

- Where natural turbidity is between 0 and 5 NTUs, increases will not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases will not exceed 20%.
- Where natural turbidity is between 50 and 100 NTUs, increases will not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases will not exceed 10%.

- If turbidity generated during dredging exceeds implementation requirements for compliance with the Basin Plan objectives, silt curtains will be utilized to control turbidity. Exceptions to turbidity limits set forth in the Basin Plan may be allowed for dredging operations; in this case, an allowable zone of dilution within which turbidity exceeds the limits will be defined and prescribed in a discharge permit.
- The DMD sites will be designed to contain all of the dredged material and all systems and equipment associated with necessary return flows from the DMD site, including equipment to handle, settle, and/or treat the water prior to return to the receiving water.
- The dredged material disposal site will be designed by a California-licensed professional engineer.
- Two feet of freeboard above the 100-year flood event elevation will be maintained in all dredge material disposal site settling pond(s).
- To the extent feasible dredging equipment will be kept out of riparian areas
- Dredge spoil will be disposed of outside of riparian areas.

DMD sites will be constructed using appropriate BMPs (such as erosion and sediment control measures [see *Develop and Implement Stormwater Pollution Prevention Plans* for examples]) to prevent discharges of contaminated stormwater to surface waters or groundwater. Some of these BMPs may not be applicable to dredging activities that would occur as part of operation and maintenance of the sedimentation basins and solids lagoons at intake sites.

Material Reuse Plans

Prior to construction, draining, and chemical characterization of spoil, RTM, and dredged material, DWR will identify sites for reusing such materials to the greatest extent feasible, in connection with project construction activities, habitat restoration and protection activities, as well as potential beneficial uses associated with flood protection and management of groundwater levels within the Plan Area. DWR will undertake a thorough investigation to identify sites for the appropriate reuse of material, and, based on the properties of the material and in consultation with DWR and other interested parties, DWR will identify the specific site for that material. Potential methods of reuse may include, but not be limited to, the following.

- Fill material for construction of embankments or building pads.
- Fill material for levee maintenance.
- Fill material for habitat restoration projects.
- Fill material for roadway projects.

- Localized subsidence reversal.
- Material for flood response.
- Material to fill project -related borrow areas.
- Other beneficial means of reuse.

Material applied to reduce the localized effects of subsidence will be placed on lower elevation lands and lands adjacent to levees, in order to minimize effects on agricultural practices and improve levee stability. The material may be left in place and used as stockpile to assist in flood response. The feasibility of these approaches to reuse will depend upon the suitability of the material for each purpose based on testing of relevant properties. Site-specific factors such as local demand for materials and the ability to transport the materials would also be important considerations in assessing options for reuse. Prior to undertaking the reuse of the materials for these purposes, DWR shall consider whether such reuse may lead to significant or adverse environmental effects that should be addressed through site-specific environmental documents prepared under NEPA and/or CEQA.

DWR will consult relevant parties, such as landowners, reclamation districts, flood protection agencies, federal and state agencies with jurisdiction in the Delta, and counties, in developing such site-specific spoil, RTM, and dredged material reuse plans. Where DWR determine that it is appropriate that materials be used to prepare land at elevations suitable for project -related restoration or protection of habitat, DWR will coordinate with the project Implementation Office in developing site-specific plans for transporting and applying the materials to restoration work sites.

Following removal of spoils, RTM, and dredged material from temporary storage sites, stockpiled topsoil at these areas will be reapplied, and disturbed areas will be returned, to the extent feasible, to preconstruction conditions, by carefully grading to re-establish surface conditions and elevations and reconstructing features such as irrigation and drainage facilities. Restoration of the RTM draining sites will be designed to prevent surface erosion and transport of sediment. Following these activities, the land will be suitable for returning to agricultural production, under the discretion of the landowner. Such areas may also be appropriate for the implementation of habitat restoration or protection in consideration of the project's biological goals and objectives.

In some instances, it may be infeasible to transport and reuse spoil, RTM, or dredged materials for another use due to factors such as the distances and costs involved and/or any environmental effects associated with transport (e.g., unacceptable traffic concerns or levels of diesel emissions). In such instances, sites will be evaluated for the potential to reapply topsoil over the spoils, RTM, or dredged material and to continue or recommence agricultural activities. If, in consultation with landowners and any other interested parties, DWR determine that continued use of the land for agricultural or habitat purposes will be infeasible, the potential for other productive uses of the land will be examined, including stockpile and staging areas for flood response or the potential for the site to host solar or wind power generation facilities (if deemed acceptable after any necessary environmental review). Such instances may require the acquisition of interests in the land and/or coordination with utilities or other entities; specific arrangements will be made on a case-by-case basis. Environmental review will be required where necessary under CEQA and/or NEPA.

Potential Environmental Effects of RTM Use

It is anticipated that one or more of these disposal and reuse methods could be implemented on any individual spoil, RTM, or dredged material site. Depending on which combination of these approaches is selected, implementation of material reuse plans could create environmental impacts requiring site-specific analysis under CEQA and/or NEPA. Many of these activities would require trucks or barges to gather and haul materials from one section of the Plan Area to another. For instance, reuse of material in the implementation of tidal habitat associated with restoration activities could require material to be transported to locations in the West Delta ROA (including Sherman and Twitchell Islands) or the Cosumnes/Mokelumne ROA (including Glannvale Tract and McCormack-Williamson Tract), among other areas. Locations for reuse in support of levee stability could include areas protected by nonproject levees or where levee problems have been reported in the past, including Staten Island, Bouldin Island, Empire Tract, Webb Tract, Bacon Island, or other places in the Delta. While reuse locations near to the spoil or RTM areas would be preferred, such activity would require use of local roadways, which could lead to short-term effects on traffic, noise levels, and air quality. Similarly, earthwork and grading activities to restore sites to preconstruction conditions and to apply the materials consistent with their reuse could create noise and effects on air quality during the implementation of reuse plans.

If materials are applied for the purposes of flood protection, flood response, habitat restoration or subsidence reversal, it is possible that existing topsoil could be overcovered and that Important Farmland or farmland with habitat value for one or more covered species could be disturbed temporarily or converted from active agricultural uses. Additionally, materials placed near levees could affect drainage and/or irrigation infrastructure. If material is used for habitat restoration that would have otherwise been implemented as part of the project, reuse of materials could offset the need for fill materials from other sources.

Depending on the selected reuse strategies, however, implementation of spoil, RTM, and dredged material reuse plans could also result in beneficial effects associated with flood protection and response, habitat creation, and depth to groundwater in areas where the ground level is raised.

Disposal of RTM, Spoils, and Dredged Material

A Sampling and Analysis Plan (SAP) will be developed for the disposal of RTM and Dredged Materials. This SAP will be consistent with the USACE and USEPA Public Notice 99-4 which provides guidance on SAPs as well as reporting requirements for material test results (USACE and USEPA 1999).

In compliance with Section 13260(a) of the California Water Code, prior to disposal of RTM, a Waste Discharge Requirements (WDR) General Order will be issued by the appropriate Regional Water Board based on submittal of a Report of Waste Discharge (RWD) by DWR (or authorized contractor[s]). The WDR Order will require the Discharger to conduct chemical and physical testing of sediments to be extracted prior to dredging, tunneling, etc. The WDR Order may also require supporting special studies and technical reports. Project operations will be subject to this Order and associated monitoring and reporting program.

For disposal of materials within the San Francisco Bay State Board jurisdiction (Region 2) the SAP and results reports will be submitted to the Dredged Material Management Office (DMMO). The DMMO was created to fulfil the cooperative permitting framework goal of the Long Term Management Strategy (LTMS). The DMMO is made up of the participating LTMS agencies (the State Water Board; the San Francisco Bay Water Board; the San Francisco Bay Conservation and Development Commission [BCDC];

USACE, South Pacific Division and San Francisco District; and USEPA, Region 9), the State Lands Commission, and the California Department of Fish and Game and is tasked with reviewing SAPs, test results and permit applications (USACE and USEPA 1999). The DMMO is discussed further under *Permitting* below.

To ensure that sediment accepted at the proposed sites meets state water quality standards, the proposed project will adhere to testing requirements set forth by the DMMO agencies. Sediments must be analyzed for contaminants prior to approval of each dredging project. The San Francisco Bay Water Board staff will review sediment testing data from the project to evaluate its conformity with the dredged material acceptance criteria provided in the WDR General Order which will be adopted for the project by the San Francisco Bay Water Board on a site-specific basis.

Disposal of RTM, Spoils, and Dredge Material within the jurisdiction of the Central Valley Water Board (Region 5) will be subject to the requirements identified by the San Francisco Bay Water Board for evaluation, screening, and disposal as, at this time, the San Francisco Bay Water Board has developed more comprehensive and detailed guidelines for the beneficial reuse of materials. For the purposes of evaluation in this document the requirements set forth by the San Francisco Bay Water Board will be used as the criteria for disposal in both Region 2 and Region 5. WDR General Orders will be issued by the respective Regional Water Board which will determine the final criteria and requirements for RTM, Spoils, and Dredge Material Disposal (DMD).

Sacramento River sediment removed from the water column at the intake sedimentation basins will be reused as described below. However, to the maximum extent feasible, the first and preferred disposition of this material will be to reintroduce it to the water column in order to maintain Delta water quality (specifically, turbidity, as a component of delta smelt critical habitat). DWR will collaborate with USFWS and CDFW to develop and implement a sediment reintroduction plan that provides the desired beneficial habitat effects of maintained turbidity while addressing related permitting concerns (the proposed sediment reintroduction is expected to require permits from the Central Valley Water Board and USACE). CDFW, USFWS, and NMFS will have approval authority for this plan and for monitoring measures, to be specified in the plan, to assess its effectiveness.

Inland Disposal of Materials

Inland- disposal of RTM, spoils, and dredge material will be subject to evaluation and testing as described in the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual (U.S. Environmental Protection Agency and U.S. Army Corps of Engineers 1998), also referred to as the “Inland Testing Manual” (ITM). The ITM was prepared by the USEPA and the USACE as part of the Long-Term Management Strategy and was developed to establish guidance for conducting testing of dredged materials and to assess the potential for contaminant-related impacts associated with dredged material disposal in open water.

Material disposal within the baseline is regulated under Section 404 of the Clean Water Act (CWA) and is subject to compliance with the CWA Section 404(b)(1) Guidelines. As described by the LTMS Management Plan, July 2001, the baseline includes San Francisco Bay and adjacent waters of the U.S., including wetlands. Sediment Quality Criteria (SQC) have not been developed for the Bay Area that represent a single sediment chemical concentration below which disposal poses minimal risk to the aquatic environment. LTMS agencies implemented a measure in 2001 stating that sediment quality

screening guidelines for various beneficial uses will be provided by the San Francisco Bay Water Board's *Sediment Screening Criteria and Testing Requirement for Wetland Creation and Upland Beneficial Reuse.*

Wetland/Upland Material Disposal

Wetland and upland beneficial reuse of RTM, spoils, and dredge material at restoration sites in Region 2 and 5 will be subject to evaluation and testing as required by the San Francisco Bay Water Board Waste Discharge Requirements Order which will be adopted for the project by the San Francisco Bay Water Board and the Central Valley Water Board. The San Francisco Bay Water Board has developed a *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines* (Draft May 2000). This document aids in the screening and testing of dredged materials for beneficial reuse and outlines the anticipated requirements; however, permits for beneficial reuse will be site-specific for the reuse sites identified in the RTM plan for the proposed project. For the purposes of the proposed project it is assumed that RTM is subject to the same screening and testing guidelines as dredged materials.

These guidelines contain testing requirements and evaluation of test results for materials which are intended to be used in upland beneficial reuse environments such as habitat/wetland creation, levee maintenance/fill, and construction fill. The screening values which will be used by the San Francisco Bay Water Board and the Central Valley Water Board to evaluate suitability of materials are contained within.

Sediment characterization will follow the protocols specified in the DMMO guidance document, "*Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region"* (USACE Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal will be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only) and the Water Board May 2000 staff report, "*Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*," or most current revised version. San Francisco Bay Water Board-recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse to Dredged Material are contained in Table 3-3 below.

RTM and Dredge Material Screening

Sediment dredging sites would undergo initial screening and site evaluation to determine and identify any potential for contamination to be present as hazardous waste. Such screening may include review of site documentation, field reconnaissance surveys, historical aerial imagery, and potential in-water observation and analysis (e.g., visual survey, sediment sampling).

Potential presence of hazardous waste would be evaluated with appropriate sediment sampling and chemical characterization procedures. Confirmed presence of hazardous wastes would trigger the need for further planning and analysis of the extent of contamination, and appropriate removal and disposal at a licensed hazardous waste disposal facility.

Screening Criteria for Inland Disposal

Sediment Quality Criteria (SQC) have not been developed for the Bay Area that represent a single sediment chemical concentration below which disposal poses minimal risk to the aquatic environment (LTMS 2001). The LTMS agencies plan to develop a Regional Implementation Manual (RIM) describing testing and analysis requirements for disposal of dredged material in the Bay Area. The RIM will include regional test protocols, contaminants of concern, appropriate species for bioassays, and quality

assurance guidance. Sediment quality guidelines, new or modified testing procedures, reference sites, and other testing and suitability-related information will be included as they become available. (LTMS, 2001)

To facilitate and promote beneficial reuse of dredged material, the LTMS agencies implemented the following measure in 2001:

The San Francisco Bay Water Board will revise *Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse,* which will provide guidelines on testing (including recommendations for reference sites) and sediment quality screening for various beneficial uses. A draft version of the revised document has been issued for public comment and, following the close of the comment period, will be revised and finalized through the formal administrative process (LTMS, 2001)

The San Francisco Bay Water Board's *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines* (Draft May 2000) is discussed below and provides the guidelines for testing and screening of sediment disposed of for wetland/upland beneficial uses and apply to inland disposal of sediment as well as. These screening guidelines are assumed to be adopted for testing and screening for disposal within the Region 5.

Screening Criteria

Sediment characterization will follow the protocols specified in:

- The DMMO guidance document, "Guidelines for Implementing the Inland *Testing Manual in the San Francisco Bay Region*" (USACE Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal will be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and
- San Francisco Bay Water Board Draft May 2000 staff report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version.

Surface and foundation material are subject to acceptance criteria derived from the San Francisco Bay Water Board guidelines. The following are anticipated reuse options for RTM and dredge material:

- fill material for construction of embankments or building pads;
- fill material for levee maintenance;
- fill material for habitat restoration projects;
- fill material for roadway projects;
- localized subsidence reversal;
- material for flood response;
- material to fill project-related borrow areas; or
- other beneficial means of reuse.

The San Francisco Bay Water Board guidelines identify two general classes of dredged material suitable for reuse. Once a potential method of reuse has been identified, dredged material, spoils, and RTM, in the amount necessary to fulfill that reuse method, will be screened to determine if the material meets

the wetland surface material screening values or the wetland foundation material screening values which will be contained in the San Francisco Bay Water Board and Central Valley Water Board Water Quality Certification. Material which does not meet the wetland surface material screening values but does meet the wetland foundation material screening values will likely still be suitable for the upland reuse options listed above. The screening criteria developed for the San Francisco Bay Water Board guidelines were based on statistical estimates of sediment toxicity and ambient concentrations of chemicals found in the sediments of San Francisco Bay (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland surface material is material which is placed in the biotic zone during wetland creation and exhibits bulk sediment concentrations that fall within the range of ambient conditions in the central portions of San Francisco Bay. The screening guidelines for wetland surface material are the most protective of sensitive potential biological receptors. Wetland surface material is not expected to pose a threat to water quality or the aquatic environment (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland foundation material is material used in wetland creation and restoration projects which is covered by surface material and is not in contact with flora and fauna. These materials generally fall within the range of ambient conditions typically found around the margins of the Bay. This material is not of a quality that constitutes a hazardous or listed waste), but has potential for biological effects and should not come in contact with sensitive potential biological receptors (San Francisco Bay Regional Water Quality Control Board 2000). The screening guidelines below (Table 3-3) are intended to protect biological receptors from adverse environmental effects during material placement or leachate after placement. Wetland foundation material must be tested to ensure that any water that leaches through the material will not adversely impact the aquatic environment. Final determination of sediment suitability for any specific permit action, however, will be site-specific and will take into consideration placement of foundation materials.

Material which does not meet the criteria for wetland surface material but does meet the criteria for wetland foundation material may be used for upland purposes contingent upon the leaching characteristics and evaluation of direct human contact with the material. Sediment for upland reuse which involves continual human contact will need to be evaluated for constituents whose ambient concentrations are not an issue for sediments in wetlands or water but would exceed the USEPA Region 9 Preliminary Remediation Goals.

Table 3-3. Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material

	Wetland Surface Material		Wetland Foundation Material	
Analyte	Concentration	Decision Basis	Concentration	Decision Basis
METALS (mg/kg)				
Arsenic	15.3	Ambient Values	70	ER-M
Cadmium	0.33	Ambient Values	9.6	ER-M
Chromium	112	Ambient Values	370	ER-M
Copper	68.1	Ambient Values	270	ER-M
Lead	43.2	Ambient Values	218	ER-M
Mercury	0.43	Ambient Values	0.7	ER-M
Nickel	112	Ambient Values	120	ER-M

	Wetland Surface Material		Wetland Foundation Material	
Analyte	Concentration	Decision Basis	Concentration	Decision Basis
Selenium	0.64	Ambient Values		
Silver	0.58	Ambient Values	3.7	ER-M
Zinc	158	Ambient Values	410	ER-M
ORGANOCHLORINE PESTICIDES/PCBS (lg/kg)				
DDTS, sum	7.0	Ambient Values	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient Values		
Hexachlorobenzene	0.485	Ambient Values		
PCBs, sum	22.7	ER-L	180	ER-M
POLYCYCLIC AROMATIC HYDROCARBONS (lg/kg)				
PAHs, total	3,390	Ambient Values	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient Values	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient Values	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient Values		
1-Methylphenanthrene	31.7	Ambient Values		
2,3,5-Trimethylnaphthalene	9.8	Ambient Values		
2,6-Dimethylnaphthalene	12.1	Ambient Values		
2-Methylnaphthalene	19.4	Ambient Values	670	ER-M
2-Methylphenanthrene		Ambient Values		
3-Methylphenanthrene		Ambient Values		
Acenaphthene	26.0	Ambient Values	500	ER-M
Acenaphthylene	88.0	Ambient Values	640	ER-M
Anthracene	88.0	Ambient Values	1,100	ER-M
Benz(a)anthracene	412	Ambient Values	1,600	ER-M
Benzo(a)pyrene	371	Ambient Values	1,600	ER-M
Benzo(e)pyrene	294	Ambient Values		
Benzo(b)fluoranthene	371	Ambient Values		
Benzo(g,h,i)perylene	310	Ambient Values		
Benzo(k)fluoranthene	258	Ambient Values		
Biphenyl	12.9	Ambient Values		
Chrysene	289	Ambient Values	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient Values	260	ER-M
Fluoranthene	514	Ambient Values	5,100	ER-M
Fluorene	25.3	Ambient Values	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient Values		
Naphthalene	55.8	Ambient Values	2,100	ER-M
Perylene	145	Ambient Values		
Phenanthrene	237	Ambient Values	1,500	ER-M
Pyrene	665	Ambient Values	2,600	ER-M

	Wetland Surface Material		Wetland Foundation Material	
Analyte	Concentration	Decision Basis	Concentration	Decision Basis
Source: San Francisco Bay Regional Water Quality Control Board Guidelines 2000.				

Draining of RTM, Spoils, and Dredge Material Disposal (DMD)

RTM, dredge material, and associated decant liquid from RTM/DMD/wetland restoration sites will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively, to determine whether it will meet the site specific National Pollutant Discharge Elimination System (NPDES) and associated Regional Water Board requirements. The Regional Water Board requirements to be met are dependent upon the location determined in the Material Storage Site Determination; this could be San Francisco Bay Water Board or Central Valley Water Board.

NPDES Requirements

Water Quality Based Effluent Limits (WQBELs) will be determined by the appropriate Regional Water BOardon a site-specific basis. Effluent Limits are determined based upon: California Toxics Rule (40 CFR Section 131.38); National Toxics Rule; Primary and Secondary maximum contaminants levels (MCLs) (EPA Region 9 MCLs for drinking water standards) and; Basin Plan Site-specific objectives (the San Francisco Bay Water Board and Central Valley Water Board).

The most stringent criteria will be applied for WQBELs. Monthly average and daily maximum effluent limits will be set by the Regional Water Board in the NPDES. Water quality objectives are achieved primarily though adoption of water discharge requirements. If required, treatment systems will be developed and implemented to reduce contaminant discharges to ensure compliance with the NPDES permit terms and conditions for the RTM/DMD drainage.

Sediment and Water Quality Standards

RTM and DM in-water disposal, upland disposal, and wetland restoration activities will be subject to regulatory standards for surface water from direct discharge and DMD dewatering and drainage return flows, and long-term operations-related discharges associated with groundwater leachate, and stormwater runoff. Sediment surfaces will be regulated subject to sediment quality objectives and policies.

Surface Water Quality Criteria/Objectives for the Central Valley Water Board are contained in the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* and in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* for the San Francisco Bay Water Board. These Basin Plans designate beneficial uses, establish water quality objectives, contain implementation plans and policies for protecting waters of the basin, and incorporate by reference, plans and policies adopted by the State Water Board.

The Delta waterways are listed pursuant to CWA Section 303(d) as impaired for chlorpyrifos, DDT, diazinon, Group A pesticides, mercury, unknown toxicity and has recently been listed for pathogens near the Port of Stockton turning basin. A portion of the Delta is listed for electrical conductivity, and low dissolved oxygen causes impairment in the Stockton Deep Water Ship Channel from Channel Point to Disappointment Slough.

The USEPA adopted the *National Toxics Rule* (NTR) on February 5, 1993 and the *California Toxics Rule* (CTR) on May 18, 2000. These Rules contain water quality standards applicable to the proposed project. The State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters (SIP), Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan) which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule.* The Basin Plans contain the "Policy for Application of Water Quality Objectives" that requires consideration of published standards of other agencies in implementing narrative water quality objectives. The CTR and NTR standards may be incorporated in waste discharge requirements where appropriate to implement the Basin Plans consistent with the Policy for Application of Water Quality Objectives.

At a minimum, water designated for domestic or municipal supply will not contain concentrations of chemical constituents in excess of the California maximum contaminant levels (MCLs) specified in the following provisions of Title 22, CCR: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449. The Regional Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

Antidegradation Policy

State Water Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality Waters in California") requires that the Regional Board, in regulating the discharge of waste, must maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., quality that exceeds water quality objectives).

The discharges authorized by the WDR General Order will be consistent with State Water Board Resolution 68-16 and 40 CFR 131.12 (the federal antidegradation policy). The WDR General Order will establish requirements that will result in best practicable treatment or control of the discharge to assure that pollution or nuisance will not occur and that the discharges will not unreasonably affect beneficial uses or result in water quality less than prescribed in the Basin Plans. The assimilative capacity of the underlying soil should prevent degradation of groundwater from infiltration of incidental waste constituents. The receiving water and groundwater limits determined in the WDR General Order are intended to ensure that the assimilative capacity will not be exceeded. If the discharge is causing such an increase, then the proposed project may be required to cease the discharge, implement source control, change the method of disposal, or take other action to prevent groundwater or surface water degradation.

Sediment Quality Objectives

RTM/DMD and wetland restoration activities also will consider the narrative sediment quality objectives of the *Water Quality Control Plan for Enclosed Bays and Estuaries* adopted by the State Water Board in April 2011. Implementation procedures for these objectives are under development.

Permitting

The following agencies also have jurisdiction over dredging and disposal projects:

- California Department of Fish and Wildlife
- National Marine Fisheries Service
- United States Fish and Wildlife Service
- United States Army Corps of Engineers
- State Lands Commission
- San Francisco Bay Regional Water Quality Control Board or Central Valley Regional Water Quality Control Board (Location Dependent)
- San Francisco Bay Conservation and Development Commission

Permitting Agencies

Numerous state and federal agencies regulate dredging and dredged material disposal in the Bay Area. The primary state and federal agencies involved in permitting such projects are the San Francisco Bay and Sacramento-San Joaquin Delta are the BCDC, SLC, San Francisco Bay Water Board, Central Valley Water Board, USACE, and USEPA. These agencies established the DMMO to coordinate the regulatory processes for dredging and disposal projects. Different laws and regulations govern their roles and responsibilities, but often their purposes and goals overlap (Table 3-4 below).

Table 3-4. Basis for Regulatory Authority and Mandates of Primary State and Federal Agencies with Jurisdiction over Dredging and Dredged Material Disposal Projects in the San Francisco Bay Region

USACE	USEPA	BCDC	San Francisco Bay Water Board/Central Valley Water Board	SLC
Basis for Regulatory Authority				
CWA MPRSA Rivers and Harbors Act of 1899	CWA MPRSA	McAteer-Retris Act Suisun Marsh Protection Act Coastal Zone Management Act	Porter Cologne Water Quality Control Act CWA	Ownership of State Lands
Mandate Includes				
Regulate placement of dredged or fill materials into waters of the U.S. Regulate transportation of dredged material for the purpose of ocean disposal Protect and maintain navigable capacity of nation's waters	Maintain integrity of nation's waters Oversee disposal of materials, including dredged material, into ocean water	Reduce Bay fill Protect and manage coastal zone resources	Protect the beneficial uses of waters of the state	Manage state's sovereign lands for purposes consistent with the public trust.
Regulatory Authority of DMMO Agencies for Dredged Material Disposal Environments				

USACE	USEPA	BCDC	San Francisco Bay Water Board/Central Valley Water Board	SLC
In-Bay				
Department of the Army permit pursuant to CWA and Rivers and Harbors Act of 1899	CWA permit oversight	Permit, pursuant to McAteer-Petris Act (MPA) or Suisun Marsh Preservation Act (SMPA), or federal consistency Determination (CD), pursuant to Coastal Zone Management Act (CZMA), for dredging and disposal	CWA Section 401 Water Quality Certification (WQC) or Waste Discharge Requirements (WDRs) pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
Wetland (existing) enhancement				
Department of Army permit pursuant to CWA	CWA permit oversight	Permit, pursuant to MPA or SMPA, or CD, pursuant to CZMA, for dredging, permit or CD for disposal if site within BCDC jurisdiction	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
Restoration of diked historic baylands				
Department of the Army permit pursuant to Rivers and Harbors Act of 1899, and to CWA if disposal site in waters of the US	CWA permit oversight if disposal site in waters of the US	Permit, pursuant to MPA or SMPA, or CD, pursuant to CZMA, for dredging, permit or CD for disposal if site within BCDC jurisdiction	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
Upland disposal (other than diked historic baylands, waters of the US)				
Advisory, Department of Army permit pursuant to CWA for return flows to waters of US	Advisory, CWA permit oversight	Advisory	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
Landfill				
Advisory	Advisory	Advisory	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands

Source: Long Term Management Strategy 2001.

DMMO

The DMMO does not issue permits; instead, it makes consensus-based recommendations to the member agencies on the adequacy of permit applications. This includes recommendations on the completeness of the permit applications, adequacy of sediment sampling and analysis plans, and suitability of sediments for proposed disposal environments. The member agencies may also recommend permit conditions to be included in individual member agency permits.

In the event a project-related dredging and disposal action does not fall under the jurisdiction of each of the DMMO member agency, it will still be reviewed by the DMMO, but only the agencies with regulatory authority participate in approving sediment sampling plans or making recommendations on sediment suitability. Agencies without regulatory authority will have the opportunity to review the project proposals in an advisory capacity only.

Project are initially reviewed by the DMMO and later move through the permitting processes of the individual agencies. The process for obtaining approvals has three phases: (1) suitability determination; (2) permit process; and (3) episode approval, described below. The DMMO is a comprehensive entry point for the permitting progress; however, applicants and permittees must obtain separate approval from the appropriate DMMO member agencies.

The DMMO member agencies determine suitability of the permit application by making a joint recommendation to the individual member agencies on whether the sediments to be dredged are appropriate, in terms of potential for environmental impacts, for the proposed disposal or reuse site. The recommendation is usually based on the results of sediment testing (LTMS 2001).

The project proponents will submit to the DMMO either a sediment Sampling and Analysis Plan (SAP), or a written request (with supporting information) requesting a “Tier I” exclusion from testing requirements based on factors such as previous testing history and physical characteristics of the material proposed for dredging.

The CWA Section 404(b)(1) guidelines provide the substantive criteria used by the USEPA, USACE, and the San Francisco Bay Water Board in evaluating proposed discharges to waters of the U.S and fundamental to the CWA Section 404(b)(1) guidelines is the guideline that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or cumulatively on the ecosystem(s) of concern.

The DMMO will review the SAP to determine consistency with state and federal guidance on testing protocols and to determine whether the proposed testing program would provide the agencies with sufficient information to make a suitability determination of the material for disposal at a specific site. Upon review of a SAP, the DMMO will either approve the SAP, approve the SAP with conditions, or not approve the SAP (LTMS 2001).

Upon approval of the SAP, the project proponents will proceed with testing the sediments proposed for dredging.

The report of these testing results will be submitted to the DMMO for review, at which time the DMMO may recommend one of the following to their respective agencies:

- **Sediments are suitable for the proposed disposal environment,** the applicant may proceed to the next phase (permit process) of authorization.
- **Require further information, such as additional testing of sediments,** to make a recommendation, the applicant may provide the requested information or choose to alter the project in such a way that the agencies can make a determination without additional information.4
- **Some or all of the sediments are not suitable for the proposed disposal environment,** the applicant may elect to not undertake or modify the project, such as by proposing another disposal location, and obtain a suitability determination for the modified project (often the suitability determination process can proceed more quickly for a modified project because of the availability of information from the original project proposal). (LTMS 2001).

The project proponents will conduct confirmation sampling of incoming dredged sediment to demonstrate that contaminant concentrations do not exceed the applicable numeric acceptance criteria in the Waste Discharge Permit. Surface grab samples will be collected from each sediment placement cell as it is being filled. The number of samples collected will be consistent with the volume-based frequency employed during the pre-dredge sediment testing program described in the Waste Discharge Permit. Potential minimum sediment sampling guidelines are presented in Table 3-5.

Table 3-5. Minimum Sediment Sampling Guidelines

Dredge Volume (cubic yards)	Total Number of Samples	Number of Samples per Composite	Total Number of Tests
5,000-20,000	4	4	1
20,000-100,000	8	4	2
100,000-200,000	12	4	3
200,000-300,000	16	4	4
300,000-400,000	20	4	5
400,000-500,000	24	4	6

Source: San Francisco Bay Regional Water Quality Control Board Screening and Testing.

Permits Required for Dredging and Material Disposal

National Pollutant Discharge Elimination System

Any project proposing to discharge pollutants into surface water must file a complete National Pollutant Discharge Elimination System (NPDES) permit application form with the appropriate Regional Water Board. The Regional Water Board requirements to be met are dependent upon the location determined in the Material Storage Site Determination.

Water Quality Certification under Section 401 of the CWA

Under federal CWA Section 401 every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE Section 404 CWA permits for dredge and fill discharges.

Section 404 CWA

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. The proposed project will require a Section 404 permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities).

The purpose of the program is to ensure that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. During the permit application process, the project proponents will be required to demonstrate that steps were taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts were minimized; and that compensation will be provided for all remaining unavoidable impacts (USEPA 2015).

An individual permit will be required for any significant impacts as a result of the proposed project. Individual permits are reviewed by the USACE.

Section 1602 Streambed Alteration Agreement

A CDFW Section 1602 Streambed Alteration Agreement will be required for disposal of RTM, spoils, and Dredged Material. This permit governs proposed project activities that will modify the physical characteristics of the stream and activities that may affect fish and wildlife resource that use the stream and surrounding habitat. The proposed project will require a Master Agreement; this is an agreement for a duration longer than 5 years that is similar to a programmatic agreement.

Potential State Lands Permit or Lease

A Permit or Lease may be required for dredging on State land from the California State Lands Commission. For work in harbors and waterways, dredging permits are issued by the Commission.

Suisun Marsh Preservation Act Permit

The BCDC issues marsh development permits for any activity that qualifies as a marsh development within the primary management area of the Suisun Marsh. A project permit will be required for any new or maintenance dredging or for the disposal of dredged material within the BCDC's jurisdiction.

Section 10 Permit

The proposed project will require a USACE Section 10 permit (Rivers & Harbors Act) for dredging operations within waterways of the United States and may require a Clean Water Act (CWA) Section 404 permit for the discharge of the "effluent" to surface waters. Each project requires a NPDES permit as well as a CWA Section 401 Water Quality Certification from the Regional Board. Such Certification will be issued; in conjunction with each approved "Notice of Applicability". The federal permits must be obtained prior to discharge.

Waste Discharge Requirements

Projects proposing to use wetland foundation material are expected to require Waste Discharge Permits from the San Francisco Bay Water Board and the Central Valley Water Board to ensure that there will be minimal risk of adverse impacts. The appropriate Regional Water Board will review the proposed project, then may grant or deny certification. Additionally, the Regional Water Board may choose to act under

the authority of the state Porter Cologne Water Quality Control Act. The Regional Water Board would do this by issuing waste discharge requirements for the project in combination with the water quality certification.

Water quality certifications and waste discharge requirements often contain conditions to protect water resources. The proposed project will meet these conditions during the term of the permit. The BCD) also regulates dredging and disposal under the provisions of the McAteer-Petris Act. The Regional Water Board will implement these measures through its issuance of Waste Discharge Requirements and Water Quality Certifications under Section 401 of the CWA or other orders. In addition, the Water Board may require pre- and post-dredge surveys to determine disposal volumes and compliance with permit conditions.

Projects eligible for enrollment under the WDR General Order may also be subject to regulation by CDFW, NMFS, USFWS, and SLC.

Reusable Tunnel Material Testing Report Results

Testing of RTM was conducted on samples collected during geotechnical investigations from 2009 through 2012. Environmental tests were conducted on identified baseline and conditioned soil samples. The results of the geotechnical, environmental, and planting suitability tests, RTM appears to be suitable for the above proposed beneficial uses following storage and drying. Consultation with the governing regulatory agency would be required to obtain the necessary approvals and permits. This study consisted of a limited number of samples and tests, and does not constitute a complete evaluation of RTM. RTM and associated decant liquid will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively. The results of these tests can be found in the Reusable Tunnel Material Testing Report (URS 2014).

Restoration of Temporarily Affected Natural Communities

Prior to initiating covered activities that will result in temporary effects on natural communities in the project area, a restoration and monitoring plan will be developed. Restoration and monitoring plans will be prepared by DWR and kept on file for review by any of the fish and wildlife agencies at their request.

Restoration and monitoring plans will include methods for stockpiling and storing topsoil, restoring soil conditions, and revegetating disturbed areas; monitoring and maintenance schedules; adaptive management strategies; reporting requirements; and success criteria. Restoration will commence immediately after construction is completed, or if construction is completed during a season that is inappropriate for planting the natural community, restoration will commence during the appropriate season for restoring that natural community (e.g., fall plantings for riparian natural community) and within 1 year of completing construction.

With the exception of some borrow sites, temporarily disturbed areas will be restored to the natural community present prior to disturbance. Cultivated lands that are used for borrow sites and cannot be restored to cultivated lands following disturbance, because of topographic alteration, may be restored as grasslands.

Explanation of effectiveness: Construction and maintenance of the water conveyance facilities, as well as implementation of other conservation measures related to habitat restoration and enhancement, would result in the production of RTM, spoils, and dredged material at various locations in the Plan Area.

Handling, storage and disposal of these materials has the potential to result in significant impacts on water quality, visual resources, recreation, land use, agricultural resources, public services, and terrestrial habitat.

While RTM areas are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Implementation of this environmental commitment would provide for chemical characterization of RTM, which would ensure that the material will be disposed of at an appropriate disposal site or reused. Appropriate reuse of any spoils, dredged material, and RTM, as would be implemented through the material reuse plan(s), would reduce the need for long-term stockpiling/storage and would therefore reduce the severity of impacts to terrestrial habitat, land use, agriculture, public services, visual and recreation resources. Generally recognized BMPs for managing dredging operations and dredged materials would act as performance standards for minimizing water quality impacts, such as turbidity, that could adversely affect aquatic and recreation resources.

Although implementation of this environmental commitment would potentially substantially reduce the severity of impacts from RTM, spoils and dredged materials on several resources, this environmental commitment alone would not be sufficient to reduce significant impacts to a less-than-significant level. For example, turbidity effects related to construction of the water conveyance facilities would also be reduced through implementation of other environmental commitments (e.g., erosion and sediment control plans and SWPPPs). In addition, for some impacts where this environmental commitment would be relied upon, mitigation measures would still be necessary to reduce a significant impact to less than significant. For example, to address potentially significant alteration in the existing visual quality or character (Impact AES-1 [in part due to spoil/borrow and RTM storage]), several mitigation measures would be implemented (e.g., AES-1a, AES-1b, AES-1d), including Mitigation Measure AES-1c: Develop and Implement a Spoil/Borrow and Reusable Tunnel Material Area Management Plan.

The implementation of AMM6 will ensure that spoils, RTM, and dredge materials are properly stored, disposed, of and/or screened for reuse, which would avoid and minimize direct and indirect effects on biological and other resources (e.g., water, air) during and following construction. The process outlined in AMM6 will prevent the exposure of fish, wildlife, and plants to contaminants during construction that could cause injury and mortality. AMM6 also will prevent the inappropriate storage and reuse of these materials where they may substantially alter future soils and water quality, which could permanently alter natural community composition in adjacent areas and expose fish and wildlife to contaminants. In absence of the implementation of this avoidance and minimization measure, ECs, and other AMMs, there would be a greater potential for significant impacts on biological resources. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Develop and Implement a Barge Operations Plan & AMM7: Barge Operations Plan

To address the following potential impacts on aquatic habitat and species from barge and tugboat operations associated with water conveyance facilities construction, DWR will ensure that a barge operations plan is developed and implemented for each project that requires the use of a barge. This commitment is related to AMM7, Barge Operations Plan, described in Section 3B.4.7 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. This plan will be developed and

submitted by the construction contractors per standard DWR contract specifications as part of the traffic plans required by those specifications (see Section 01570 of standard DWR construction contracts[3]). The barge operations plan will be part of a comprehensive traffic control plan coordinated with the Coast Guard for large channels. The comprehensive traffic control plan will address traffic routes and machines used to deliver materials to and from the barges, to include the following. DWR, in undertaking construction at the construction sites, will develop a barge operations plan that includes the requirements set forth below, unless equally effective strategies are developed.

- Bottom scour from propeller wash.
- Bank erosion or loss of submerged or emergent vegetation from propeller wash and\or excessive wake.
- Accidental material spillage.
- Sediment and benthic (bottom-dwelling) community disturbance from accidental or intentional barge grounding or deployment of barge spuds (extendable shafts for temporarily maintaining barge position).
- Hazardous materials spills (e.g., fuel, oil, hydraulic fluids).
- Introduction of aquatic invasive species

The plan will be developed to limit barge-related effects on aquatic species. The plan will include provisions to minimize or reduce effects on aquatic species.

The plan will serve as a guide to barge operations and to a Biological Monitor who will evaluate barge operations on a daily basis during construction with respect to stated performance measures.

DWR will ensure that the barge plan will be implemented by barge operators and kept aboard all vessels operating at the construction sites and barge landings.

Sensitive Resources: This plan is intended to protect aquatic species and habitat in the vicinity of barge operations. The plan will be developed to avoid barge-related effects on aquatic species; if and when avoidance is not feasible, the plan will include provisions to minimize effects on aquatic species. The sensitive resources potentially affected by barge maneuvering and anchoring in affected areas are listed below.

- Sediments that could cause turbidity or changes in bathymetry, if disturbed.
- Bottom-dwelling (benthic) invertebrates that provide the prey base for a number of aquatic species.
- Riparian vegetation that provides shade, cover, habitat structure, and organic nutrients to the aquatic environment.
- Submerged aquatic vegetation that provides habitat structure and primary (plant) production.

[3] In 2002 DWR developed standard specifications for contractors to follow when constructing projects. These specifications are designed to protect environmental resources, including air quality, at the project site. The contractor must meet all State and federal environmental statutes, rules, regulations, and policies enacted to protect the environmental resources and ensure that any significant environmental impacts of projects are identified and adequately mitigated. As part of this mitigation, contractors must develop and submit detailed plans including, but not limited to, an Air Quality Control Plan, Traffic and Noise Abatement Plan, and a Fire Prevention and Control Plan.

- Transport and introduction of invasive aquatic species (plants, fish and animals)

Responsibilities:

- Construction contractors operating barges in the process of constructing the water conveyance facilities will be responsible for the following.
- Operating vessels safely and following this plan and other reasonable measures to prevent adverse effects on aquatic resources of the Delta.
- Reading, understanding, and following the barge operations plan.
- Reporting to the Project Biological Monitor any vessel grounding or other deviations from this plan that could have resulted in the disturbance of bottom sediments, damage to river banks, or loss of submerged, emergent, or riparian vegetation.
- Immediate reporting of material fuel or oil spills to the CDFW Office of Spill Prevention and Response (OSPR), the Project Biological Monitor, and DWR.
- Implementing all other relevant plans, including the hazardous materials management plans; SWPPPs; and the spill prevention, containment, and countermeasures plans.

The Biological Monitor will be responsible for the following.

- Observing a sample of barge operation activities including loading and unloading at least one barge at each of the barge loading and unloading facilities.
- Same-day reporting to DWR of any observed problems with barge operations.
- Monitoring during construction will include observation of barge landing, loading or unloading, and departure of one or more barges at each active barge landing site and the condition of both river banks at each landing site, pile driving, and other in-water construction activity as directed by DWR, and visual inspection for invasive aquatic species on in-water equipment such as barges and small work boats. Annual reporting to DWR a summary of monitoring observations over the course of each construction year, including an evaluation of the plan performance measures. The annual report will also include a description of and representative photographs and/or videos of conditions of river banks and vegetation.
- The success of this plan in protecting aquatic resources will be assessed by a qualified biologist. The Biological Monitor will visit each intake and barge landing site to determine the extent of emergent and riparian vegetation, bank conditions, and general site conditions during the growing season prior to initiation of construction and then annually during and after construction.

Barge Avoidance and Minimization Measures: The following avoidance measures will be implemented to ensure that the goal of avoiding impacts on aquatic resources from tugboat and barge operations will be achieved.

If deviations from these procedures are required to maintain the safety of vessels and crew, the Biological Monitor will be informed of the circumstances and if there appeared to be any impacts on water quality, habitats, fish, or wildlife. Any such impacts will be brought to the attention of the applicable resource agency in order to ascertain and implement appropriate remedial measures.

General Procedures:

- During low light conditions barge is outfitted with lighting in compliance and standards of the U.S. Coast Guard for boating visualization.
- In higher boating traffic areas it may be deemed necessary to have warning buoys near the barge/ship and/or a 5 mph zone will be requested from the U.S. Coast Guard near the construction site.
- If anchors are needed, the barge must display warnings for underwater anchors so that other boaters are aware of the potential danger beneath the water in compliance with U.S. Coast Guard regulations.
- Personnel on the barge/ship will watch for colored plumes in the water when drilling, grouting and pulling casing.
- Tow wires or hawsers, winches and associated equipment should be in good working condition and should be formally inspected and properly maintained.
    - Vessel operators should have a policy in place for inspecting tow wires or hawsers and for taking those that do not meet inspection criteria out of service.
- Every manned vessel should be supplied with a fire control plan that clearly shows, for each deck, the: control stations, fire detection and fire alarm systems, fire extinguishing appliances, sprinkler installations, means of access to different compartments, fire dampers, and ventilating system, including fan control, etc.

Environmental Training:

DWR will ensure that tugboat pilots will be required to read and follow this plan and to keep a copy aboard and accessible while working at these sites. DWR will ensure that all tugboat crew members responsible for piloting a vessel at either the intake or barge landing sites will read and agree to comply fully with this plan. Crews should be trained to become and remain proficient at operating winches and towing gear. Periodically, each crew member should participate in drills and receive instruction on, as a minimum, the following emergency situations that may be encountered while towing: fire-fighting duties, loss of propulsion, loss of steering, grounding, allision or collision, oil spill, man overboard, loss of tow wire (hawser or bridle failure), and abandoning towing vessel.

Dock Approach and Departure Protocol:

DWR will develop and implement a protocol for dock approach and departure to ensure the following.

- Vessel operators will obey all federal and state navigation regulations that apply to the Sacramento delta.
- All vessels will approach and depart from the intake and barge landing sites at dead slow in order to reduce vessel wake and propeller wash at the sites frequented by tug and barge traffic.
- In order to minimize bottom disturbance, anchors and barge spuds will be used to secure vessels only when it is not possible to tie up.
- Barge anchoring will be pre-planned. Anchors will be lowered into place and not be allowed to drag across the channel bed.

- Vessel operators will limit vessel speed as necessary to maintain wake of less than 2 feet (66 centimeters) at shore.
- Vessel operators will avoid pushing stationary vessels up against the cofferdam, dock or other structures for extended periods since this could result in excessive directed propeller wash impinging on a single location. Barges will be tied up whenever possible to avoid the necessity of maintaining stationary position by tugboat or by the use of barge spuds.
- Barges will not be anchored where they will ground during low tides.
- All tugboats will obey U.S. Coast Guard regulations related to the prevention, notification, and cleanup of hazardous materials spills.
- All vessels will keep an oil spill containment kit and spill prevention and response plan on-board.
- In the event of a fuel spill, report immediately to the CDFW Office of Spills Prevention and Response: 800-852-7550 or 800-OILS-911 (800-645-7911).
- When transporting loose materials (e.g., sand, aggregate), barges will use deck walls or other features to prevent loose materials from blowing or washing off of the deck.

Vessel to Vessel Transfer Guidelines:

Vessel operators will comply with the following guidelines when performing vessel to vessel transfers.

- Any requirements of the local harbor or terminal authority should be met.
- Both vessels should be manned by a Person in Charge (PIC).
- Before any transfer, a safety and pollution checklist should be completed by both vessels and a cargo transfer plan agreed in writing.
- It is recommended that vessels involved in vessel to vessel transfers are equipped with a high level alarm system that can operate throughout the transfer.
- Where needed, a safe means of access between vessels should be provided.

Performance Measures:

Performance or effectiveness of the measures implemented under the barge operations plan will be assessed based on the results of the biological monitoring reports. The assessment will evaluate observations for the following indicators of impacts.

- **Emergent vegetation loss.** The extent of emergent vegetation and the dominant species in such vegetation will be determined and mapped by GPS at and across the channel from each of the intake and barge landing sites during the growing seasons prior to, during, and after construction. Extent will be mapped as linear coverage along the landing and opposite banks. In the event that the linear extent of emergent vegetation is found to have decreased by 20% or more following construction (or as otherwise conditioned by applicable Department of Fish and Wildlife streambed alteration agreements), the position and nature of the change will be evaluated for the probability that the loss was due to barge grounding, propeller wash, or other effects related to barge operations. Adequate performance will be achieved if the linear extent of riparian and emergent vegetation following construction is at least 80% of the preconstruction extent (or as otherwise conditioned by applicable Department of Fish and Wildlife streambed alteration agreements).

- **Bank erosion and riparian vegetation loss.** The linear extent of bank erosion will be mapped by GPS at each of the intake and barge landing sites prior to, during, and after construction. Photos and written descriptions will be recorded for each area of eroded bank to describe the extent of the erosion. In the event that the linear extent of eroded bank is found to have increased by 20% or more following construction, the position and nature of the change will be evaluated for the probability (low, moderate, or high) that the erosion was due to barge grounding, propeller wash, or other effects related to barge operations, and pre- and postconstruction photographs will be compared to determine if riparian vegetation was also lost as a result of the erosion.
- **Cargo containment.** The biological monitor will note the use of deck walls or other appropriate containment during loading and unloading of sand, aggregate or other materials from a barge at each landing site. Adequate performance will be achieved if appropriate measures are in use during each observed loading and unloading. In the unlikely event that an accidental spill occurs in spite of appropriate containment, the barge crew will describe the type, amount, and location of the spill to the biological monitor. The biological monitor will make observations at the site of the material spill and evaluate the potential impacts of the spill on biological resources for evaluation of whether mitigation is required, and for inclusion in the annual monitoring report. Any such impacts will be brought to the attention of the applicable resource agency in order to ascertain and implement appropriate remedial measures.
- **Fuels spill prevention.** Vessels operating in accordance with the spill prevention, containment, and countermeasures plan (a component of the hazardous materials management plan described in Section 3B.2.12 of Appendix 3B), and all applicable federal, State, and local safety and environmental laws and policies governing commercial tugboat and barge operations, will be considered to be performing adequately with regard to fuel spill prevention. If a collision occurs resulting in a contaminant spill, barge/ship contractor's Emergency Action Plan will go into effect and absorbents and containment booms will be used from the barge to prevent the spill from spreading.
- **Barge grounding.** Barges are not to be grounded or anchored where falling tides are reasonably expected to cause grounding during a low tide. Barge grounding has the potential to disturb bottom sediments and benthic organisms, as well as creating a temporary obstacle to fish passage. Performance will be considered adequate if no cases of vessel grounding occur.

Contingency Measures

In the event that the Performance Measures are not met, DWR will coordinate with NMFS, USFWS, CDFW, and Regional Water Board to determine appropriate rectification or compensation for impacts to aquatic resources as set forth above.

Explanation of effectiveness: The barge operations plan will serve to avoid and minimize effects on tidal perennial aquatic, tidal wetlands, and riparian habitat and the fish and wildlife that utilize these habitats. The plans call for monitors to ensure that barge traffic is not leading to a loss of emergent vegetation, excessive bank erosion, or loss of riparian vegetation adjacent to barge landing areas and barge routes, These plans will also ensure that barge activities to do affect the aquatic environment through accidental spills, which could result in injury and mortality of aquatic life.

In absence of the implementation of this avoidance and minimization measure, ECs, and other AMMs, there would be a greater potential for significant impacts on biological resources. Refer to the impact analyses for each resource for more detail.

AMM 10: Restoration of Temporarily Affected Natural Communities

Prior to initiating project activities that will result in temporary effects on natural communities within the Plan Area, site-specific restoration and monitoring plan will be developed. Restoration and monitoring plans will be prepared by DWR and kept on file for review by any of the fish and wildlife agencies at their request. A list of restoration and monitoring plans for temporary construction impacts will be provided to the fish and wildlife agencies as part of the project's annual report.

Restoration and monitoring plans will include methods for stockpiling and storing topsoil, restoring soil conditions, and revegetating disturbed areas; monitoring and maintenance schedules; adaptive management strategies; reporting requirements; and success criteria. Restoration and monitoring plans will be prepared by DWR in consultation with CDFW, USFWS, and NMFS. These site-specific restoration and monitoring plans may be modified over time and in light of changing circumstances. Restoration will commence immediately after construction is completed, or if construction is completed during a season that is inappropriate for planting the natural community, restoration will commence during the appropriate season for restoring that natural community (e.g., fall plantings for riparian natural community) and within 1 year of completing construction.

With the exception of some borrow sites, temporarily disturbed areas will be restored to the natural community present prior to disturbance. Cultivated lands that are used for borrow and RTM sites and cannot be restored to cultivated lands following disturbance, because of topographic alteration, may be restored as grasslands.

The natural communities that are restored in temporarily disturbed areas may count toward the protection requirements under Environmental Commitment 3 if the areas meet the siting and design criteria and other requirements referred to under Environmental Commitment 3.

Explanation of effectiveness: Implementation of the proposed project would result in permanent and temporary impacts on natural communities. Implementation of restoration and protection activities, and AMM10 together with AMM1–AMM7 would reduce the adverse effects that could result from project activities. The restoration and monitoring plans for implementation of AMM10 would involve methods for stockpiling, storing, and restoring topsoil, revegetating disturbed areas, monitoring and maintenance schedules, adaptive management strategies, reporting requirements, and success criteria. AMM10 would also include planting native species appropriate for the natural community being restored, with the exception of some borrow sites in cultivated lands that would be restored as grasslands. This, in addition to other restoration activities, protection, and AMMs, would reduce and offset impacts to a less than significant level.

In the absence of the implementation of this avoidance and minimization measure, ECs, and other AMMs, there would be a greater potential for significant impacts on biological resources. Refer to the impact analyses for each resource for more detail.

AMM 12: Vernal Pool Crustaceans

Vernal pool crustacean critical habitat is present in the Plan Area in Conservation Zones 1, 8, and 11. During the planning phase for individual projects, DWR will ensure that tidal natural communities restoration or other ground-disturbing project activities in Conservation Zones 1 and 11 will not result in

the adverse modification of primary constituent elements of critical habitat for vernal pool fairy shrimp, conservancy fairy shrimp, and vernal pool tadpole shrimp as defined by USFWS (70 FR 46924–46998; also see 2013 Public Draft BDCP Appendix 3.C, Figures 3.C-1, 3.C-2, and 3.C-3). These activities will occur at least 250 feet from vernal pool crustacean critical habitat containing the primary constituent elements defined below or some lesser distance, if it is determined through project review with concurrence from USFWS that the activities will not result in changes in hydrology or soil salinity that could adversely modify the primary constituent elements of vernal pool crustacean critical habitat. No project activities will take place within designated vernal pool crustacean critical habitat units without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of vernal pool crustacean critical habitat.

Primary constituent elements for vernal pool fairy shrimp are defined as follows (70 FR 46924–46998).

- Topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described below, providing for dispersal and promoting hydroperiods of adequate length in the pools.
- Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years, thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.
- Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding.
- Structure within the pools described above, consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter.

Primary constituent elements for vernal pool tadpole shrimp are the same as above except the minimum period of inundation listed in the second bullet is 41 days instead of 18 days. Primary constituent elements for conservancy fairy shrimp are also the same as above except the minimum period of inundation listed in the second bullet is 19 days instead of 18 days.

During the planning phase, site-level assessments will be conducted and projects will be designed to avoid modeled habitat for vernal pool crustaceans to the maximum extent practicable. Where practicable, the project will be planned and designed to ensure no ground-disturbing activities or alterations to hydrology will occur within 250 feet of vernal pool crustacean habitat. As identified above, DWR will ensure that there will be no adverse modification of critical habitat for vernal pool crustaceans.

If project activities are to occur in core recovery areas, protocol-level surveys for vernal pool crustaceans will be conducted to determine whether listed branchiopods are present. Surveys will be conducted according to the most recent USFWS guidelines by qualified biologists with the appropriate recovery permit under Section 10(a)(1)(A) of the Endangered Species Act. If conservancy or longhorn fairy shrimps

are detected in core recovery areas, projects will be redesigned to ensure that no suitable habitat within these areas is adversely affected, due to the rarity of these species.

Projects will be designed to avoid direct and indirect effects on vernal pool crustacean habitat to the extent possible. No more than 10 wetted acres of vernal pool crustacean habitat will be removed (this cap applies to both temporary and permanent loss). No more than 20 wetted acres will be indirectly affected by project activities (a vernal pool is considered indirectly affected if activities that could cause hydrologic or other alternations to a pool occur within 250 feet of the vernal pool). Where construction occurs within 250 feet of vernal pool crustacean habitat, construction BMPs (AMM2) will be implemented to ensure that construction activities minimize effects on the habitat. Protective fencing will be installed around vernal pool crustacean habitat with signage identifying these areas as containing sensitive biological resources. A biological monitor will ensure that fencing and BMPs are maintained for the duration of construction and that construction personnel are provided the necessary worker awareness training (Environmental Commitment: Conduct Environmental Training and AMM1).

Explanation of effectiveness: The implementation of AMM12 would ensure that the construction of the water conveyance facilities, restoration activities, and operations and maintenance avoid and minimize effects on habitat for vernal pool crustaceans that occurs adjacent to project areas. AMM12 provides a process for selecting and designing restoration sites so that they avoid and minimize direct and indirect effects on vernal pool crustacean habitat, and sets a maximum amount of wetted habitat that may be directly and indirectly affected. This AMM provides assurances that project-related activities with unknown locations are carefully designed to avoid and minimize the loss or modification of vernal pool crustacean habitat.

AMM12 will also serve to avoid and minimize effects on other vernal pool species, such nonlisted vernal pool invertebrates, special-status vernal pool plants, and California tiger salamander.

In absence of the implementation of AMM12, restoration and protection measures, AMM1–AMM6, and AMM10, there would be a greater potential for significant impacts on vernal pool species due to loss of or modification of habitat and take of individuals from construction and/or operation of the proposed project. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Electrical Power Guidelines & AMM30: Transmission Line Design and Alignment Guidelines

This commitment is related to AMM30, *Transmission Line Design and Alignment Guidelines*, described in Section 3B.4.30 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. DWR will procure design and construction of the proposed new transmission lines and appurtenances such as supports (poles and towers) and substations through electrical utility providers. DWR will specify that design and construction of power facilities be in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission, *EMF Design Guidelines for Electrical Facilities* (2006) or any comparable federal guidelines. The guidelines describe the routine magnetic field reduction measures that all regulated California electric utilities are to consider for new and upgraded transmission line and transmission substation construction. The guidelines include the following magnetic field reduction methods for new and upgraded electrical facilities.

- Increasing the distance from electrical facilities by:

  - Increasing structure height or trench depth.
  - Locating power lines closer to the centerline of the utility corridor.
- Reducing conductor (phase) spacing.
- Phasing circuits to reduce magnetic fields.

Explanation of effectiveness: During construction of transmission lines, the proposed project could result in the direct loss of vernal pool complex natural community and adversely affect several special-status species that occur there as well as affect other special-status species. The loss of habitat and effects on special-status species would be significant impacts in the absence of the restoration and protection of this natural community, and the implementation of AMM1-AMM6, AMM10, and AMM30. AMM30 would be available to guide the design of transmission lines and the selection of routes to minimize effects to terrestrial biological resources to the maximum extent feasible.

In absence of the implementation of AMM30, there would be a greater potential for significant impacts on vernal pool complexes and special status species, due to loss of habitat and presence of new transmission lines in sensitive areas. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Electrical Power Line Support Placement & AMM30: Transmission Line Design and Alignment

This commitment is related to AMM30, Transmission Line Design and Alignment Guidelines, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The DWR will contract with electric utilities to provide primary power to designated locations for temporary and/or permanent power. DWR will request electric utilities to design and construct power transmission lines and the locations of necessary appurtenances such as supports and substations to avoid sensitive terrestrial and aquatic habitats to the maximum extent feasible. In cases where sensitive habitat cannot be feasibly avoided, disturbance will be minimized to the greatest degree feasible. DWR will request electric utilities to design and construct power transmission lines and the locations of necessary appurtenances to minimize take and encumbrance of agricultural lands. DWR will be responsible for ensuring that disturbed areas are returned to preconstruction conditions, to the extent feasible, and property owners compensated for real property losses. This should be accomplished through an agreement with the utility provider. This should be accomplished through an agreement with the utility provider.

DWR will request electric utilities to design tower and pole placement and location of substations to avoid existing structures and improvements to the extent feasible. In cases where existing structures and improvements cannot be feasibly avoided, DWR will ensure that structures and improvements are relocated or the owner compensated for the loss and ensure that disturbed areas are returned to preconstruction conditions. Where poles or towers are to be constructed in agricultural areas, DWR will request incorporation of the following BMPs where feasible.

- Select means and methods of construction to minimize crop damage.
- Use single-pole structures instead of H-frame or other multiple-pole structures to reduce the potential for interference with farm machinery, reduce land impacts, and minimize weed encroachment issues.

- Locate lines adjacent to roads and existing property lines to reduce property take and encumbrance.
- Use transmission structures with longer spans to clear longer sections of fields or sensitive areas except in aerial spraying and seeding areas. In areas where aerial spraying and seeding are common, install markers on the shield wires above the conductors.
- Minimize the use of guy wires, and keep guy wires out of crop and hay lands. Place highly visible shield guards on guy wires in farm vehicle and equipment traffic areas.
- Locate new transmission lines along existing transmission line corridors.

Explanation of effectiveness: During construction of transmission lines, the proposed project could result in the direct loss of vernal pool complex natural community and adversely affect several special-status species that occur there as well as affect other special-status species. The loss of habitat and effects on special-status species would be significant impacts in the absence of the restoration and protection of this natural community, and the implementation of AMM1-AMM6, AMM10, and AMM30. AMM30 would be available to guide the design of transmission lines and the selection of routes to minimize effects to terrestrial biological resources to the maximum extent feasible.

In absence of the implementation of AMM30, there would be a greater potential for significant impacts on vernal pool complexes and special status species, due to loss of habitat and presence of new transmission lines in sensitive areas. Refer to the impact analyses for each resource for more detail.

Environmental Commitment: Provide Construction Site Security & AMM34: Construction Site Security

All security personnel will receive environmental training similar to that of onsite construction workers so that they understand the environmental conditions and issues associated with the various areas for which they are responsible at a given time. Security operations and field personnel will be given the emergency contact phone numbers of environmental response personnel for rapid response to environmental issues resulting from vandalism or incidents that occur when construction personnel are not onsite. Security operations will also maintain a contact list of backup support from city police, county sheriffs, California Highway Patrol, water patrols (such as the Contra Costa County Marine Patrol), helicopter response, and emergency response (including fire departments, ambulances/emergency medical technicians). The appropriate local and regional contact list will be made available to security personal by DWR, as will the means to make that contact via landline phones, cell phones, or radios.

Explanation of effectiveness: Given the scale and duration of construction required for the water conveyance facilities and other conservation measures requiring construction, there could be an increased demand on law enforcement due to theft and vandalism in major construction sites after work hours. By having 24-hour onsite security at these sites, this demand would be reduced or avoided. An increase in public service demands due to implementation of the project would be a significant impact. However, because potential theft and vandalism of equipment and property would not be the only project-related effects that could result in this potential increase in demand for public services, other environmental commitments related to reducing the potential for fire hazards, hazardous spills, and other hazards would be implemented in order to reduce this impact to a less-than-significant level.

Environmental Commitment: Provide Notification of Maintenance Activities in Waterways & AMM36: Notification of Activities in Waterways

Before maintenance activities begin in waterways, DWR will ensure the posting of information regarding the maintenance of any in-water project facilities (e.g., intakes for the water conveyance facility) at nearby affected Delta marinas and public launch ramps. This information will include maintenance site location(s), maintenance schedules, speed limits, and identification of no-wake zone and/or detours, where applicable. Information on detours would include site-specific details regarding any temporary partial channel closures, including contacting the U.S. Coast Guard, boating organizations, marina operators, city or county parks departments, and California Department of Parks and Recreation (DPR), where applicable. This commitment is related to AMM36, Notification of Activities in Waterways, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS.

Explanation of effectiveness: This AMM would be implemented to reduce impacts on fish in the vicinities of in-water construction or maintenance activities. This AMM would notify fish and wildlife agencies to alert them of sites, schedules, and activities. This AMM, along with AMMs 7, 8, and 9, and environmental commitment 3B.2.8, would reduce impacts on fish species from construction and maintenance activities. It is not likely that implementation of this AMM alone would ensure less-than-significant construction-related impacts on fish. In absence of the implementation of AMM36, mitigation measures, and other AMMs, there would be a greater potential for significant impacts on fish species from construction and/or operation of the proposed project. Refer to the impact analyses for fish and aquatic resources for more detail.

Mitigation Measure SW-4: Implement Measures to Reduce Runoff and Sedimentation

DWR will have to demonstrate no-net-increase in runoff due to construction activities during peak flows. To achieve this, proponents will implement measures to prevent an increase in runoff volume and rate from land-side construction areas and to prevent an increase in sedimentation in the runoff from the construction area as compared to Existing Conditions. To reduce the potential for adverse impacts from large amounts of runoff from paved and impervious surfaces during construction, operations, or maintenance, the proponents will design and implement onsite drainage systems in areas where construction drainage is required. Drainage studies will be prepared for each construction location to assess the need for, and to finalize, other drainage-related design measures, such as a new onsite drainage system or new cross drainage facilities. Based on study findings, if it is determined that onsite stormwater detention storage is required, detention facilities will be located within the existing construction area.

To avoid changes in the courses of waterbodies, DWR will design measures to prevent a net increase in sediment discharge or accumulation in water-bodies compared to Existing Conditions to avoid substantially affecting river hydraulics during peak conditions. A detailed sediment transport study for all water-based facilities will be conducted and a sediment management plan will be prepared and

implemented during construction. The sediment management plan will include periodic and long-term sediment removal actions.

Prior to use of existing stormwater channels, drainage ditches, or irrigation canals for conveyance of dewatering flows, a hydraulic analysis of the existing channels will be completed to determine available capacity for conveyance of anticipated dewatering flows. If the conveyance capacity is not adequate, new conveyance facilities or methods for discharge into the groundwater will be developed. In accordance with National Pollutant Discharge Elimination System (NPDES) requirements and requirements of the Stormwater Pollution Prevention Plan (SWPPP), water quality analyses of the dewatering flows will be conducted to avoid water quality contamination.

As described in Section 3.6.1.1, *North Delta Intakes*, facilities to be constructed along the levees would be designed to provide flood neutrality during construction and operations. Facilities located along the levees, including cofferdams at the intake locations, would be designed to provide continued flood management at the same level of flood protection as the existing levees; or if applicable, to a higher standard for flood management engineering and permitting requirements if the standards are greater than the existing levee design. New facilities would be designed to withstand the applicable flood management standards through construction of flood protection embankments or construction on engineered fill to raise the facilities to an elevation above the design flood elevation for that specific location. The levee design criteria would consider the most recent criteria, including new guidelines for urban and rural levees (DWR 2013, 2014).

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering and Conveyance Operations

Prior to construction, DWR will determine the location of wells within the anticipated area of influence of construction sites at which dewatering would occur and the location of wells within the anticipated area of influence of conveyance operations on the Sacramento River above and below the north Delta intakes, within an approximately 4-mile wide corridor (about 2 miles on either side of the river). Based on available information, thorough site investigations, and desk studies; the location of wells, depths of the wells and the depth to groundwater within these wells will be determined. During construction dewatering, monitoring wells should be installed sufficiently close to the groundwater dewatering sites and along the Sacramento River, or if possible, water levels in existing wells will be monitored, in order to be able to detect changes in water levels attributable to dewatering activities and conveyance operations. Monitoring wells would continue to be used as part of a conveyance operation monitoring program. Monitoring would occur and be reported on a monthly basis with an annual summary report prepared by the project proponents for up to 5 years after commencement of conveyance operations. If monitoring data or other substantial evidence indicates that groundwater levels have declined in a manner that could adversely affect adjacent wells, temporarily rendering the wells unable to provide adequate supply to meet preexisting demands or planned land use demands, DWR will implement one or more of the following measures:

- Offset domestic water supply losses attributable to construction dewatering activities and conveyance operations. DWR will ensure domestic water supplies provided by wells are maintained

during construction and conveyance operations. Potential actions to offset these losses include installing cutoff walls in the form of sheet piles or slurry walls to depths below groundwater elevations, deepening, modifying or providing new wells used for domestic purposes to maintain water supplies at preconstruction levels, or securing potable water supplies from offsite sources. Offsite sources could include potable water transported from a permitted source or providing a temporary connection to nearby wells not adversely affected by dewatering or operations.

- Offset agricultural water supply losses attributable to construction dewatering activities and conveyance operations. DWR will ensure agricultural water supplies are maintained during construction and operations or provide compensation to offset for crop production losses. If feasible, DWR will install sheet piles to depths below groundwater elevations, or deepening, modifying or providing new wells to ensure agricultural production supported by water supplied by these wells is maintained. If deepening or modifying existing wells is not feasible, DWR will secure a temporary alternative water supply or compensate farmers for production losses attributable to a reduction in available groundwater supplies.

Implementation of Mitigation Measure GW-1 will follow the steps below.

- DWR will be responsible for determining the area of influence of construction dewatering operations and conveyance operations and the location of potentially affected existing wells, in addition to the installation of potential new monitoring wells and the monitoring of existing wells.
- Prior to commencement of construction activities DWR will determine the locations of existing wells which will require monitoring. In addition, shallow monitoring wells may be installed prior to construction dewatering operations and conveyance operations. Monitoring of water levels in these wells will occur during construction and up to 5 years during conveyance operations. Implementation of measures necessary to offset domestic and agricultural water supply losses will occur during construction and conveyance operations as necessary.
- Monitoring wells will be installed; or, if feasible, water levels in existing wells will be monitored, in order to detect changes in water levels attributable to dewatering activities. Water levels in the installed monitoring wells and existing wells will be measured by DWR and/or construction contractors prior to construction dewatering and on a weekly or daily basis, as needed, during the entire construction dewatering period and on a monthly basis during conveyance operations. Upon completion of construction, the water levels in the monitoring wells will be measured and monitoring will continue for up to 6 months following termination of construction dewatering activities or less if groundwater levels reach preconstruction levels. During Conveyance operations, monitoring will continue for up to 5 years
- All monitoring data will be reported on a monthly basis, and in an annual summary report prepared by DWR that will evaluate the impacts of the construction dewatering for that year. The monthly reports will contain tabular water level data as well as changes in water levels from the previous months. The annual report will summarize monthly data and show the most recent water level contour map as well as the preconstruction contour map. The final report will include water level contour maps for the area of the groundwater aquifer that is affected by dewatering showing initial, preconstruction water levels and final, post-construction and conveyance operations water levels.

- If water level data indicate that dewatering operations or conveyance operations are responsible for reductions in well productivity such that water supplies are inadequate to meet existing or planned land use demands, mitigation will be required and implemented.
- If monitoring data or other substantial evidence indicates that groundwater levels have declined in a manner that could adversely affect adjacent wells, temporarily rendering the wells unable to provide adequate supply to meet preexisting demands or planned land use demands, DWR will contact the affected landowners in a timely manner and implement one or more of the measures described above.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Areas potentially subject to seepage caused by implementation of habitat restoration and enhancement actions or operation of water conveyance facilities will be monitored and evaluated on a site-specific basis by DWR prior to the commencement of construction activities to identify baseline groundwater conditions. Restoration sites, along with the sites of water conveyance features that could result in seepage, will be subsequently monitored once construction is completed. Monitoring will include placement of piezometers and/or periodic field checks to assess local groundwater levels and salinity and associated impacts on agricultural field conditions. In areas where operation of water conveyance facilities or habitat restoration is determined to result in seepage impacts on adjacent parcels, potentially feasible additional mitigation measures will be developed in consultation with affected landowners. These measures may include installation or improvement of subsurface agricultural drainage or an equivalent drainage measure, as well as pumping to provide for suitable field conditions (groundwater levels near pre-project levels). Such measures will ensure that the drainage characteristics of affected areas would be maintained to the level existing prior to project construction.

The implementation of this mitigation measure will follow the steps below:

- DWR will be responsible for monitoring and evaluation to identify baseline groundwater conditions as well as monitoring after construction is complete.
- Monitoring will occur at areas adjacent to the expanded Clifton Court Forebay portion at Byron Tract, where groundwater recharge from surface water would result in groundwater level increases, and other areas potentially affected by operation of the water conveyance facilities.
- Monitoring and evaluation shall occur prior to commencement of construction activities to identify baseline conditions and with sufficient time allotted to develop additional mitigation measures if needed. Monitoring of restoration sites, along with the sites of water conveyance features that could result in seepage will occur after construction is completed.
- Monitoring shall include placement of piezometers and/or periodic field checks to assess local shallow groundwater levels and salinity and associated impacts on agricultural field conditions.
- Monitoring will collect information on two thresholds:
    1. Water surface elevation (recorded as depth to water)
    2. Shallow groundwater salinity (measured as specific conductance)

- Monitoring of groundwater levels will occur on a daily basis to check real-time measured groundwater levels. This can be performed by equipping the piezometers with electronic water level probes which automatically record levels on a daily basis. Periodic field checks, including measurements of specific conductance will occur on a monthly basis and in the event groundwater levels are above identified thresholds.
- Baseline conditions of shallow groundwater levels and salinity will be determined prior to construction through water level measurements and water testing at the installed piezometers in proximity to restoration areas and conveyance features that might affect drainage on adjacent lands.
- Salinity will be determined by measuring specific conductance at the piezometers with a calibrated field probe before construction begins, and monthly during operation.
- Visual observations will also be used to monitor associated impacts on agricultural field conditions. Visual surveys will be conducted during periodic field checks as well as by local landowners on a continual basis.
- A seepage hotline will be established for landowners to report any visual observations of seepage or deteriorating crop health as a result of an excessive rise in the water table and/or increasing root-zone salinity due to deteriorating shallow groundwater quality.
- All monitoring data will be reported on a monthly basis, and in an annual summary report prepared by DWR that will evaluate the potential impacts of the operation of ECs for that year. The monthly reports will contain tabular water level and salinity data as well as compute changes in water levels and salinity from the previous months. The annual report will summarize monthly data and evaluate if impacts have occurred.
- Groundwater levels at the affected areas will be maintained to the level existing prior to project construction.
- Shallow groundwater salinity will be monitored prior to construction and a threshold will be determined in consultation with the local landowners, based on existing crop salinity tolerance (considerations will include both if shallow groundwater is used for irrigation or if shallow groundwater levels rise and encroach upon the root-zone area).

Mitigation Measure GW-7: Provide an Alternate Source of Water

For areas that will be on or adjacent to implemented restoration components, groundwater quality will be monitored by DWR prior to implementation to establish baseline groundwater quality conditions. Unacceptable degradation of groundwater quality will be determined by comparing post-implementation groundwater quality to relevant regulatory standards and with consideration of previously established beneficial uses. For wells affected by degradation in groundwater quality, water of a quality comparable to pre-project conditions would be provided. Options for replacing the water supply could include drilling an additional well or a deeper well to an aquifer zone with water quality comparable to or better than preconstruction conditions or replacement of potable water supply. Construction activities are anticipated to be localized and would not result in change in land uses. The well drilling activities would

result in short-term noise impacts for several days. (Chapter 31, *Other CEQA/NEPA Required Sections, including Mitigation and Environmental Commitment Impacts, Environmentally Superior Alternative, and Public Trust Considerations,* provides an assessment of the impacts of implementing proposed mitigation measures.)

Mitigation Measure WQ-11e: Implement Real-time Operations, Including Adaptively Managing Diversions at the North and South Delta Intakes, to Reduce or Eliminate Water Quality Degradation in the Western Delta

Modeling results for Alternative 4A indicate water quality degradation for electrical conductivity (EC) in the Sacramento River at Emmaton in the months of July through September of below normal, dry and critical water year types, relative to the No Action Alternative (ELT). This mitigation measure establishes performance standards to address the modeled exceedances of Bay-Delta Water Quality Control Plan (WQCP) EC objectives and EC degradation such that impacts to beneficial uses affected by remaining degradation, following mitigation, would be less than significant.

The Bay-Delta WQCP establishes water quality objectives for EC at Emmaton applicable from April 1 through August 15 for the protection of agricultural beneficial uses. To address exceedances of Bay-Delta WQCP EC objectives and EC degradation at Emmaton that has been modeled to occur in July and the first half of August of below normal, dry, and critical water years, DWOR shall rely upon real-time operations (which cannot be fully captured in the modeling) to ensure that Bay-Delta WQCP Emmaton EC objectives are met. As a component of real-time operations, DWR shall ensure adequate releases from upstream reservoirs on a daily time-step and adaptively manage the split between north and south Delta diversions to achieve the Bay-Delta WQCP EC objectives at Emmaton. DWR is required to operate to meet these objectives under Existing Conditions, and would be required to operate to these objectives under the No Action Alternative. Thus, operation of the project alternative to achieve the Bay-Delta WQCP EC objectives would be consistent with Existing Conditions and the No Action Alternative and result in a minimization of EC degradation at Emmaton during July and the first half of August of below normal, dry, and critical water year types. Hence, the performance standard for July and the first half of August shall be the Bay-Delta WQCP Emmaton EC objectives.

The Bay-Delta WQCP does not establish an EC objective at Emmaton for the latter half of August or September. To address EC degradation at Emmaton that has been modeled to occur during this period of the year with the project alternative, DWR shall manage upstream reservoir releases on a daily basis and adaptively manage the split between north and south Delta diversions of below normal, dry and critical water years. The performance standard for late August and September shall be compliance with the Threemile Slough standard in the North Delta Water Agency Agreement and the Bay-Delta WQCP municipal and industrial objective at Rock Slough as implemented within Decision 1641 or as modified in the future. Allowing sufficient flow in the Sacramento River at Emmaton, through real-time operations, would contribute to reduced EC levels at this location, relative to that modeled for the project alternative, and would reduce EC degradation at Emmaton in late August and September to less-than-significant levels.

This mitigation measure is consistent with the adaptive management and real-time operations that would be utilized to minimize the project alternative's water quality effects to *Microcystis* in the summer months. This mitigation measure also is consistent with the Other (Non-Environmental) Commitment to address reverse flows in the Sacramento River at Freeport that may occur with the project alternative, which are most likely to occur in low flow months of dry and critical years.

Mitigation Measure WQ-11f: Adaptively Manage Head of Old River Barrier and Diversions at the North and South Delta Intakes to Reduce or Eliminate Exceedances of the Bay-Delta WQCP Objective at Prisoners Point

Modeling results for Alternative 4A indicated additional exceedances of the Bay-Delta WQCP objective for protection of striped bass between Jersey Point and Prisoners Point at Prisoners Point. It is expected that by adaptively managing the Head of Old River Barrier and the fraction of south Delta versus north Delta diversions, exceedances of the EC objective at Prisoners Point could be avoided, and EC levels at Prisoners Point would be decreased to a level that would not adversely affect aquatic life beneficial uses. DWR shall adaptively manage the Head of Old River Barrier and the split between north and south Delta diversions during April-May to avoid exceedances of the objective at Prisoners Point. These actions would not be required in critical water years, when the objective does not apply. DWR shall consult with the CDFW, USFWS, NMFS, and Reclamation to ensure that such actions are warranted to avoid adverse impacts of salinity on striped bass spawning in the San Joaquin River between Jersey Point and Prisoners Point, and to minimize adverse effects these mitigation actions may have on other species. As such, the mitigation performance standard for April and May shall be compliance with the Bay-Delta WQCP EC objective at Prisoner's Point.

Mitigation Measure BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.

All mitigation proposed as compensatory mitigation would be subject to specific success criteria, success monitoring, long-term preservation, and long-term maintenance and monitoring pursuant to the requirements of the Mitigation Rule. All compensatory mitigation will fully replace lost function through the mechanisms discussed below which will result in restoration and/or creation of habitat with at least as much function and value as those of the impacted habitat. In some cases, the mitigation habitat will afford significantly higher function and value than that of impacted habitat.

Compensation ratios are driven by type, condition, and location of replacement habitat as compared to type, condition and location of impacted habitat. Compensatory mitigation usually includes restoration, creation, or rehabilitation of aquatic habitat. The USACE does not typically accept preservation as the only form of mitigation; use of preservation as mitigation typically requires a very high ratio of replacement to impact. It is anticipated that ratios will be a minimum of 1:1, depending on the factors listed above.

Compensatory mitigation will consist of restoration, creation, and/or rehabilitation of aquatic habitat. Typically, impacted habitat will be replaced in-kind, although impacts on some habitat types such as agricultural ditches, conveyance channels, and Clifton Court Forebay, will be mitigated out-of-kind with higher functioning habitat types such as riparian wetland, marsh, and/or seasonal wetland. Compensatory mitigation will be accomplished by one, or a combination of the following methods:

- Purchase credits for restored/created/rehabilitated habitat at an approved wetland mitigation bank;
- On-site (adjacent to the project footprint) restoration or rehabilitation of wetlands converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities;
- On-site (adjacent to the project footprint) creation of aquatic habitat;
- Off-site (within the Delta) restoration or rehabilitation of wetlands converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities;
- Off-site (within the Delta) creation of aquatic habitat; and/or
- Payment into the Corps' Fee-in-Lieu program.

Purchase of Credits or Payment into Fee-in-Lieu Program

It is envisioned that purchase of bank credits and/or payment into a fee-in-lieu program will be utilized for habitat types that would be difficult to restore or create within the Delta. Examples are vernal pool habitat, which requires an intact hardpan or other impervious layer and very specific soil types, and alkali seasonal wetland, which requires a specific set of chemical soil parameters. It is anticipated that only a small amount of compensatory mitigation will fall into these categories.

On-Site Restoration, Rehabilitation and/or Creation

Much of the Delta consists of degraded or converted habitat that is more or less functioning as upland. Opportunities will be sought where on-site restoration, rehabilitation, and/or creation could occur immediately adjacent to the project footprint. It is anticipated that some of the compensatory mitigation will fall into this category.

Off-Site Restoration, Rehabilitation and/or Creation

There exists, within the immediate vicinity of the project area, Delta land which has been subject to agricultural practices or other land uses which have degraded or even converted wetlands that existed historically. Sites within the Delta will be evaluated for their restoration, rehabilitation, and/or creation potential. It is anticipated that most of the compensatory mitigation will fall into this category.

Compensatory mitigation will result in no net loss of acreage of Waters of the U.S. and will accomplish full functional replacement of impacted wetlands. All impacted wetlands will be replaced with fully functioning wetland habitat demonstrating high levels of habitat, water quality, and hydrologic/hydraulic function. Since many impacted wetlands are likely to function at significantly less than high levels, the compensatory mitigation will result in a significant net increase in wetland function.

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

DWR will restore barge unloading facility sites once the facilities are decommissioned and removed to minimize the impact on visual quality and character at these sites. Restoration of the decommissioned sites will meet the following performance standards.

- Grading or re-contouring disturbed terrain.
- Replacement plantings will be installed in areas where vegetation was removed.
    - Replacement plantings will be native and indigenous to the area. If indigenous plantings are not available, DWR will coordinate with CDFW to use a mutually acceptable plant mix palette.
    - No invasive plant species will be used under any conditions.

Implementation of this measure will result in restoration of the barge unloading facility sites.