

Appendix 3 Adopted Mitigation Measures

Full descriptions of the mitigation measures listed below can be found in the Final EIS Appendix E, Mitigation Measures.

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Water Quality		
Mitigation Measure WQ-1: Implement a Spill Prevention, Control, and Countermeasure Plan	Potential changes in water quality	Program
	Potential to degrade quality of water utilized by a federally recognized Indian tribe	Program
	Potential to change salmonid populations	Program
	Potential changes in the potential for construction and operation and maintenance activities to result in hazards and effects related to hazardous materials	Program
Mitigation Measure WQ-2: Implement a Stormwater Pollution Prevention Plan	Potential changes in water quality	Program
	Potential to degrade quality of water utilized by a federally recognized Indian tribe	Program
	Potential to change salmonid populations	Program
Mitigation Measure WQ-3: Develop a Turbidity Monitoring Program	Potential changes in water quality	Program
	Potential to degrade quality of water utilized by a federally recognized Indian tribe	Program
	Potential to change salmonid populations	Program
Mitigation Measure WQ-4: Develop a Water Quality Mitigation and Monitoring Program	Potential changes in water quality	Program
	Potential to degrade quality of water utilized by a federally recognized Indian tribe	Program
	Potential to change salmonid populations	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Indian Trust Assets		
Mitigation Measure ITA-1: Consult with Tribal Entities Consistent with Secretarial Order 3175	Potential for erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes	Program
Cultural Resources and Indian Sacred Sites		
Mitigation Measure CUL-1: Conduct Archaeological Surveys before the Beginning of Any Project- or Program-Related Action and Implement Further Mitigation as Necessary	Potential changes to historic properties and/or human remains as a result of project-related activities	Program
Mitigation Measure CUL-2: Restrict Ground Disturbance and Implement Measures to Protect Archaeological Resources if Discovered during Surveys or Ground-Disturbing Activities	Potential changes to historic properties and/or human remains as a result of project-related activities	Program
Mitigation Measure CUL-3: Stop Potentially Damaging Work if Human Remains Are Uncovered during Construction, Assess the Significance of the Find, and Pursue Appropriate Management	Potential changes to historic properties and/or human remains as a result of project-related activities	Program
Mitigation Measure CUL-4: Complete Built-Environment Inventory and Evaluation prior to Construction and Implement Treatment Measures for Adverse Effects	Potential changes to historic properties and/or human remains as a result of project-related activities	Program
Air Quality		
Mitigation Measure AQ-1: Develop and Implement a Fugitive Dust Control Plan	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-2: Pave, Apply Gravel, or Otherwise Stabilize the	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-3: Apply Water or Dust Palliatives to Access Roads as Necessary during High Wind Conditions	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-4: Post and Enforce Speed Limits on Unpaved Access Roads	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-5: Stage Activities to Limit the Area of Disturbed Soils Exposed at Any One Time	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQ-6: Water, Stabilize, or Cover Disturbed or Exposed Earth Surfaces and Stockpiles of Dust-Producing Materials, as Necessary	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-7: Install Wind Fences around Disturbed Earth Areas if Windborne Dust Is Likely to Affect Sensitive Areas beyond the Site Boundaries (e.g., Nearby Residences)	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-8: Cover the Cargo Areas of Vehicles Transporting Loose Materials	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-9: Inspect and Clean Dirt from Vehicles, as Necessary, at Access Road Exits to Public Roadways	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Mitigation Measure AQ-10: Remove from Public Roadways Visible Trackout or Runoff Dirt from the Activity Site (e.g., Using Street Vacuum Sweeping)	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce exhaust and fugitive dust emissions	Program
Greenhouse Gas Emissions		
Mitigation Measure GHG-1: Minimize Potential Increases in GHG Emissions from Exhaust Associated with Construction Activities	Actions that include construction of facilities or the transport of fish or materials require the use of construction equipment and vehicles, which would produce GHG emissions from engine exhaust	Program
Visual Resources		
None proposed.		
Aquatic Resources		
Mitigation Measure AQUA-1: Worker Awareness Training	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-2 Construction Best Management Practices and Monitoring	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
All construction and operation and maintenance activities in and adjacent to suitable habitat for listed species will implement BMPs and have construction monitored by a qualified technical specialist(s). Before initiating construction, Reclamation or its designee will prepare a construction monitoring plan for the protection of listed species.	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run and Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-4: Erosion and Sediment Control Plan	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQUA-5: Spill Prevention, Containment, and Countermeasure Plan	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-6: Disposal of Spoils and Dredged Material	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQUA-7: Fish Rescue and Salvage Plan	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the small screen program (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQUA-8: Underwater Sound Control and Abatement Plan	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQUA-9: Methylmercury Management	Potential changes to Delta Smelt due to changes from tidal habitat restoration (Bay Delta, Delta Smelt)	Program
<p>This Mitigation Measure will promote the following actions.</p> <ul style="list-style-type: none"> • Assessment of pre-restoration conditions to determine the risk that the project could result in increased mercury methylation and bioavailability • Definition of design elements that minimize conditions conducive to generation of methylmercury in restored areas • Definition of strategies that can be implemented to monitor and minimize actual postrestoration creation and mobilization of methylmercury into environmental media and biota 	Potential changes to Longfin Smelt due to changes from tidal habitat restoration (Bay Delta, Longfin Smelt)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-10: Noise Abatement	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
Implement a noise abatement plan to avoid or reduce potential in-air noise impacts related to construction, maintenance, and operations.	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-11: Hazardous Materials Management	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
Reclamation will ensure that each contractor responsible for site work under the proposed action will develop and implement a hazardous materials management plan (HMMP) before beginning construction.	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure AQUA-12: Construction Site Security	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
To ensure adequate construction site security, Reclamation or their contractors will arrange to provide for 24-hour onsite security personnel. Security personnel will monitor and patrol construction sites, including staging and equipment storage areas.	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Sacramento River Winter-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources due to changes from Tracy and Skinner fish facility improvements (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-13: Notification of Activities in Waterways	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
Similar to the requirements specified in the fish rescue and salvage plan (Mitigation Measure AQUA-7), and underwater sound control and abatement plan (Mitigation Measure AQUA-8), before in-water construction or maintenance activities begin,	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Reclamation will ensure notification of appropriate fish and wildlife agency representatives when these activities could affect water quality or aquatic species.		
Mitigation Measure AQUA-14: Fugitive Dust Control	Potential changes to aquatic resources due to tidal habitat restoration (Sacramento River Winter-Run Chinook Salmon)	Program
Reclamation or their contractors will implement basic and enhanced control measures at all construction and staging areas to reduce construction-related fugitive dust.	Potential changes to aquatic resources due to tidal habitat restoration (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (Spring-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Fall-Run Chinook Salmon)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (Central Valley Steelhead)	Program
	Potential changes to aquatic resources due to tidal habitat restoration (North American Green Sturgeon Southern DPS)	Program
	Potential changes to aquatic resources from the Delta Fish Species Conservation Hatchery (North American Green Sturgeon Southern DPS)	Program
Mitigation Measure AQUA-16 Longfin Smelt Monitoring	Potential changes to Longfin Smelt due to seasonal operations (Bay Delta, Longfin Smelt)— <i>Potential reduction in population abundance from reduction in winter-spring Delta outflow; potential increased south Delta entrainment loss, although low proportional loss expected</i>	Project
Reclamation will continue to monitor Longfin Smelt in coordination with its partners.	Potential changes in Longfin Smelt survival related to the Temporary Barriers Project (Bay Delta, Longfin Smelt)— <i>Potential for slightly greater negative effects than No Action (e.g., near-field predation), although limited by low presence in south Delta</i>	Project
	Potential changes to Longfin Smelt from North Bay Aqueduct operations (Bay Delta, Longfin Smelt)— <i>Similar to No Action, with potential additional limited negative effect from sediment and aquatic weed removal.</i>	Project
	Potential changes to Longfin Smelt due to changes from Tracy and Skinner fish facilities improvements (Bay Delta, Longfin Smelt)— <i>Potential minor increase in salvage efficiency from reduced predation</i>	Project

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
	<i>at Tracy (CO₂ device), but potential increases in salvage losses as a result of greater proportion of population in south Delta (reduced OMR flows compared to No Action), although low proportional loss expected</i>	
	Potential changes to Longfin Smelt due to changes from tidal habitat restoration (Bay Delta, Longfin Smelt)	Program
	Potential changes to Longfin Smelt due to OMR management (Bay Delta, Longfin Smelt)— <i>Potential increase in entrainment relative to No Action, although low proportional loss expected</i>	Project
	Potential changes to Longfin Smelt due to the reintroduction by Fish Conservation and Culture Laboratory (Bay Delta, Longfin Smelt)— <i>Potential limited negative effects from hybridization, reduced by risk management strategies</i>	Project
	Potential changes to Longfin Smelt from food subsidies (Sacramento Deepwater Ship Channel Food Study; North Delta Food Subsidies/Colusa Basin Drain Study; Suisun Marsh Roaring River Distribution System Food Subsidies Study) (Bay Delta, Longfin Smelt)	Program
	Potential changes to Longfin Smelt from the Delta Fish Species Conservation Hatchery (Bay Delta, Longfin Smelt)	Program
Terrestrial Resources		
Mitigation Measure BIO-1: Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp, Conservancy Fairy Shrimp, Longhorn Fairy Shrimp	Potential to injure or kill special-status species	Program
Avoidance of vernal pool crustacean habitat, including habitat for vernal pool fairy shrimp, vernal pool tadpole shrimp, conservancy fairy shrimp, and longhorn fairy shrimp.	Potential changes to vernal pools and associated special-status species	Program
Mitigation Measure BIO-2: Valley Elderberry Longhorn Beetle Suitable Habitat	Potential changes to existing riparian areas and associated special-status species	Program
Activities will be located to avoid or minimize disturbance of valley elderberry longhorn beetle suitable habitat within the species' range to the greatest extent practicable and preconstruction surveys for elderberry shrubs will be conducted within all project construction footprints.	Potential to injure or kill special-status species	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure BIO-3: California Tiger Salamander and Western Spadefoot Toad	Potential to injure or kill special-status species	Program
For restoration projects and construction of the Conservation Hatchery, Reclamation will avoid California tiger salamander and western spadefoot toad upland and aquatic habitat.	Potential changes to vernal pools and associated special-status species	Program
Mitigation Measure BIO-4: Foothill Yellow-Legged Frog	Potential changes to existing riparian areas and associated special-status species	Program
Prior to any ground-disturbing activity scheduled to occur during the dry season (June 1–October 15), a qualified biologist will survey potential breeding habitat for the presence of foothill yellow-legged frogs and avoidance and minimization measures, including moving individuals to nearby ponds or other appropriate measures, will be implemented.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-5: Giant Garter Snake Avoidance and Minimization Measures	Potential changes to habitat for special-status reptiles	Program
Species-specific mitigation for giant garter snake will be required only for projects occurring within or adjacent to suitable habitat, as identified by assessments conducted during the project component planning phase. A qualified biologist will conduct a field evaluation of suitable upland or aquatic habitat for giant garter snake for all covered activities that occur within suitable giant garter snake habitat.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-6: Western Pond Turtle	Potential to injure or kill special-status species	Program
A qualified biologist will conduct a field evaluation of suitable upland or aquatic habitat for western pond turtles for all covered activities that occur within suitable pond turtle habitat and measures will be required if the project does not fully avoid effects on suitable habitat.		

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure BIO-7: California Black Rail	Potential changes to existing marshes and associated special-status species in the Bay-Delta region	Program
Preconstruction surveys for California black rail will be conducted where potentially suitable habitat for this species occurs within 500 feet of work areas where access is available. If California black rail is present in the immediate construction area measures will apply during construction activities.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-8: California Ridgway’s Rail	Potential changes to existing marshes and associated special-status species in the Bay-Delta region	Program
If construction or restoration activities are necessary during the breeding season, preconstruction surveys for California Ridgway’s rail will be conducted where suitable habitat for these species occurs within or adjacent to work areas. If California Ridgway’s rail is present in the immediate construction area, the measures will apply during construction activities.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-9: Greater and Lesser Sandhill Crane	Potential to injure or kill special-status species	Program
If construction and restoration activities are to occur during sandhill crane wintering season (September 15 through March 15) in a greater sandhill crane winter use area or within suitable lesser sandhill crane wintering habitat avoidance and minimization measures will be implemented.		
Mitigation Measure BIO-10: Least Bell’s Vireo	Potential changes to existing riparian areas and associated special-status species	Program
Species-specific mitigation measures for least Bell’s vireo will be required for activities occurring within suitable habitat within the species’ range. Prior to disturbing an area potentially supporting habitat for the species, a USFWS approved biologist will evaluate the area to identify suitable habitat.	Potential to injure or kill special-status species	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure BIO-11: Suisun Song Sparrow, Saltmarsh Common Yellowthroat, Yellow-Breasted Chat, Yellow Warbler	Potential changes to existing riparian areas and associated special-status species	Program
Preconstruction surveys of potential breeding habitat for the Suisun song sparrow, saltmarsh common yellowthroat, yellow-breasted chat, and yellow warbler will be conducted and if an active nest site is present, a 250-foot nondisturbance buffer will be established around nest sites during the breeding season (generally, late February through late August for yellow-breasted chat, early April through mid-July for saltmarsh common yellowthroat and yellow warbler, and early April through late August for Suisun song sparrow).	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-12: Swainson’s Hawk	Potential changes to existing riparian areas and associated special-status species	Program
Preconstruction surveys will be conducted to identify the presence of active nest sites of tree-nesting raptors and where construction will occur within 0.25 mile of an occupied Swainson’s hawk nest tree, a monitoring plan will be implemented.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-13: Tricolored Blackbird	Potential to injure or kill special-status species	Program
Prior to implementation of project activities, a qualified biologist will conduct a preconstruction survey to establish use of suitable habitat by tricolored blackbird colonies. Project activities will avoid active tricolored blackbird nesting colonies and associated habitat during the breeding season (generally March 15 to July 31). Projects (construction and restoration) will be designed to avoid construction activity to the maximum extent practicable from an active tricolored blackbird nesting colony.		
Mitigation Measure BIO-14: Western Burrowing Owl	Potential to injure or kill special-status species	Program
Western burrowing owl surveys will be required within and adjacent to water conveyance work areas and restoration sites where suitable habitat has been identified during habitat assessment surveys where access is available. To the extent feasible, burrowing owls will be avoided by relocating work areas		

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
with flexible locations, and passive relocation will be conducted during the nonbreeding season.		
Mitigation Measure BIO-15: Western Yellow-Billed Cuckoo	Potential changes to existing riparian areas and associated special-status species	Program
Prior to disturbing an area potentially supporting habitat for the species, a USFWS-approved biologist will evaluate the area to identify suitable habitat and project activities will be located to avoid or minimize disturbance of western yellow-billed cuckoo suitable habitat within the species’ range. Measures will be required for project components unable to avoid western yellow-billed cuckoo habitat.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-16: White-Tailed Kite	Potential changes to existing riparian areas and associated special-status species	Program
Preconstruction surveys will be conducted to identify the presence of active nest sites of tree nesting raptors and where it is infeasible to avoid construction within 0.25 mile of an active white-tailed kite nest identified in preconstruction surveys, measures will be implemented as part of a nesting bird monitoring and management plan.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-17: Bald Eagle	Potential changes to existing riparian areas and associated special-status species	Program
Measures will be implemented to avoid and minimize impacts on bald eagle during Reclamation project activities.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-18: Bank Swallow	Potential changes to wildlife and plant habitat on river banks— <i>Changes in flows compared with the No Action Alternative are expected to result in very minor effects on plants and wildlife along stream and reservoir banks but could result in substantial adverse effects on bank swallow colonies.</i>	Project
The following measures will be implemented to avoid and minimize impacts on bank swallow individuals, colonies, current and potential habitat (i.e., natural banks), and, if feasible, to river processes. This applies to activities year-round, whether bank swallows are present or not.	Potential to injure or kill special-status species	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
<p>Preconstruction Surveys</p> <ul style="list-style-type: none"> • Prior to beginning project activities within 500 feet of the Sacramento River, Feather River, and lower American River during the bank swallow nesting season (April 1 through August 31), a preconstruction survey for bank swallow colonies will be conducted where bank swallow habitat is present within 500 feet of work areas. If no active nesting colonies are present, no further measures are required. • If an active colony is found and work must occur during the nesting season (April 1 through August 31), Reclamation will establish a nondisturbance buffer (in consultation with a biologist) around the colony during the breeding season. In addition, the biologist will monitor any active colony within 500 feet of work areas to ensure that activities do not affect nest success. No project activities will take place within the disturbance buffer. <p>Avoidance and Minimization</p> <ul style="list-style-type: none"> • Prevent Impacts on Individuals, Colonies, and Habitat <ul style="list-style-type: none"> ○ To the extent feasible, where proposed water management or land-use projects (i.e., restoration activities) projects would impact bank swallows or river processes, alternatives such as setback levees can be used to avoid those impacts. ○ Consult with a biologist when planning projects within the floodplain of the Sacramento River and its tributaries to ensure projects do not affect colonies or current or potential habitat. ○ Develop flow criteria that avoid impacts of high water flows by limiting frequency and duration of peak flows over 14,000 cfs (Sacramento River) or rapid draw-downs to nesting bank swallow habitat during the breeding season (April 1 through August 31); this includes downstream tributary flows when timing water releases (Bank Swallow Technical Advisory Committee 2013). 		

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
<ul style="list-style-type: none"> • Prevent Impacts on River Processes <ul style="list-style-type: none"> ○ To the extent feasible, where restoration activities would impact river processes, alternatives to bank stabilization, such as setback and adjacent levees, should be used to preserve dynamic river processes. <p>Maintain flow regimes during the nonbreeding season (September 1 through March 31) that promote natural river processes and create bank swallow habitat by providing annual flows that cause local bank erosion and a minimum of one bankfull flood event every 3 years to promote bank erosion, meander migration, and channel cutoff. (Bank Swallow Technical Advisory Committee 2013).</p>		
<p>Mitigation Measure BIO-19: California Least Tern</p> <p>For restoration projects, Reclamation will avoid California least tern nesting colony sites.</p>	Potential to injure or kill special-status species	Program
<p>Mitigation Measure BIO-20: Migratory Birds (Osprey, Short-Eared Owl, Tule Greater White-fronted Goose, Black Tern, Least Bittern, White-Faced Ibis)</p>	Potential changes to existing riparian areas and associated special-status species	Program
<p>Measures will be implemented to avoid and minimize impacts on nesting migratory birds, including special-status birds, during Reclamation restoration activities.</p>	Potential to injure or kill special-status species	Program
<p>Mitigation Measure BIO-21: Riparian Woodrat and Riparian Brush Rabbit</p>	Potential changes to existing riparian areas and associated special-status species	Program
<p>Measures for riparian woodrat and riparian brush rabbit will be implemented for projects occurring within suitable habitat.</p>	Potential to injure or kill special-status species	Program
<p>Mitigation Measure BIO-22: Salt Marsh Harvest Mouse and Suisun Shrew</p>	Potential changes to existing marshes and associated special-status species in the Bay-Delta region	Program
<p>Where suitable salt marsh harvest mouse and Suisun shrew habitat has been identified within a tidal restoration work area or within 100 feet of a tidal restoration work area where ground-disturbing activities will occur (e.g., at a levee breach or grading location) a biologist will conduct preconstruction surveys for the mouse or shrew prior to ground disturbance. Measures will be implemented for projects occurring within suitable habitat.</p>	Potential to injure or kill special-status species	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measure BIO-23: Ring-Tailed Cat	Potential changes to existing riparian areas and associated special-status species	Program
Reclamation will implement measures for ring-tailed cat habitat assessment, avoidance, and monitoring.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-24: Special-Status Bats	Potential to injure or kill special-status species	Program
Preconstruction Bridge, tree and Other Structure Surveys will be conducted, and avoidance and minimization measures shall be necessary if it is determined that bats are using the bridge/structure or trees as roost sites and/or sensitive bats species are detected during acoustic monitoring	Potential to affect special-status bat species and their habitat	Program
Mitigation Measure BIO-25: Suisun Thistle and Soft Bird’s-Beak	Potential changes to existing marshes and associated special-status species in the Bay-Delta region	Program
Special-status plant surveys required for project-specific permit compliance will be conducted early in the planning process to allow design of the individual restoration projects to avoid adverse modification of habitat for specified covered plants and measures will be implemented to avoid and minimize effects.	Potential to injure or kill special-status species	Program
Mitigation Measure BIO-26: Other Special-Status Plant Species (Contra Costa Goldfields, Delta Button-Celery, Delta Tule Pea, Mason’s Lilaeopsis, Suisun Marsh Aster, Bolander’s Water Hemlock, Sanford’s Arrowhead)	Potential changes to existing marshes and associated special-status species in the Bay-Delta region	Program
Special-status plant surveys required for project-specific permit compliance will be conducted early in the planning process to allow design of the individual restoration projects to avoid adverse modification of habitat for specified covered plants and measures will be implemented to avoid and minimize effects. This mitigation measure does not apply to the routine management and maintenance activities of Reclamation. Reclamation will determine during implementation the most effective and cost-efficient means to minimize the unintentional spread of invasive plants through vehicle travel.	Potential to injure or kill special-status species	Program
	Potential changes to vernal pools and associated special-status species	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Mitigation Measures for Wetlands and Waters of the United States		
Mitigation Measure BIO-27: Wetlands and Waters of the United States	Potential to injure or kill special-status species	Program
Reclamation will avoid fill of wetlands and waters of the United States to the extent feasible, and will offset unavoidable effects through wetland creation, restoration, or enhancement with the goal of achieving no net loss of wetland acres and functions.	Potential changes to wetlands and waters of the United States	Program
Regional Economics		
None proposed.		
Land Use and Agricultural Resources		
None adopted.		
Recreation		
None proposed.		
Environmental Justice		
None proposed.		
Power		
None proposed.		
Noise		
Mitigation Measure NOI-1. Employ Standard Measures to Reduce Noise Levels from Heavy Equipment	Potential exposure of sensitive receptors to temporary construction-related noise	Program
	Potential exposure of sensitive receptors along truck haul routes to a temporary increase in traffic noise	Program
	Sensitive receptors could be exposed to intermittent noise due to long-term maintenance activity including emergency repair activities	Program

Mitigation Measure	Impact— <i>Magnitude and Direction of Impact</i>	Program or Project Level
Hazards and Hazardous Materials		
Mitigation Measure HAZ-1: Prepare and Implement Site-Specific Mosquito Management Plans	Potential changes in mosquito-borne diseases related to habitat restoration	Program
Mitigation Measure HAZ-2: Comply with FAA Safety Guidelines on Wetlands and Wildlife Attractants as Identified in the FAA Draft Advisory Circular 150/5200-33C	Potential changes in the potential for bird-aircraft strikes related to habitat restoration	Program
Mitigation Measure HAZ-3: Prepare and Implement a Hazardous Materials Management Plan for Actions That Will Require Handling Hazardous Materials in Reportable Quantities (CCR, Title 19, Division 2)	Potential changes in the potential for construction and operation and maintenance activities to result in hazards and effects related to hazardous materials	Program
Geology and Soils		
None proposed.		