Appendix I

CDFW's Conservation Measures for Biological Resources That May Be Affected by Program-level Actions

Table I-1. California Department of Fish and Wildlife's Conservation Measures for Biological Resources that May Be Affected by Program-level Actions

Conservation Measure	Description
GC	**General Conservation Measures**
GC-1. Conduct contractor environmental awareness training	a. For any project activity that involves construction or ground-disturbing activities, all construction workers will be required to participate in environmental awareness training. The training will educate workers on: (1) special-status species that may occur in the work area, (2) procedures to follow in the event a species is observed, and (3) other environmental BMPs and emergency spill response protocols.
GC-2. Work hours	a. All non-emergency work activities will be confined to daylight hours (i.e., sunrise to sunset), unless necessary for assessing or protecting biological resources.
GC-3. Best Management Practices	a. Prior to conducting work in streams, CDFW will identify the limits of the required access routes and encroachment into the stream. CDFW will restrict access routes and encroachment into the stream to the maximum extent while still allowing for necessary activities to be completed. CDFW will take care to prevent trampling riparian vegetation during daily visits to Project sites; as necessary, multiple routes to in-channel Project sites will be identified and used. Disturbance of riparian vegetation will be avoided to the greatest extent practicable. Access routes will not be overtly flagged, to prevent drawing attention to Project equipment and possible damage to related riparian habitat by persons not related to the Project. b. A spill prevention plan will be prepared describing measures to be taken to minimize the risk of fluids or other materials used during construction (e.g., oils, transmission and hydraulic fluids, cement, fuel) from entering streams or contaminating adjacent riparian areas. In addition to a spill prevention plan, a cleanup protocol will be developed before construction begins and will be implemented in case of a spill. c. Stockpiling of materials, including portable equipment, vehicles and supplies (e.g., chemicals), will be restricted to the designated construction staging areas, exclusive of any riparian and wetland areas. d. A qualified biological monitor will be present during construction activities that include clearing, grubbing, pruning and /or trimming of vegetation. The qualified biological monitor will also visit each job site during construction initiation, midway through construction, and at the close of construction to monitor implementation of conservation measures and water quality.
DBC	**Delta button-celery**
DBC-1. Avoid and minimize loss of habitat and risk of take for implementation of construction activities	a. Prior to conducting ground-disturbing activities, suitable habitat within the footprint and a 250-foot buffer around of the proposed activity will be surveyed by a qualified botanist for Delta button-celery in accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009 or current version). Floristic surveys will include the use of a reference population to increase the likelihood of detection and will be performed during the appropriate bloom period(s). b. If Delta button-celery plants are found on or adjacent to the Project site, in consultation with the CDFW Regional botanist, a minimum 50-foot no disturbance buffer will be placed around individual plant(s) or population(s) during activities that could result in disturbance. A greater no disturbance buffer may be warranted to ensure the hydrology of the site is not disrupted and the plants and seed bank will not be impacted. The no disturbance buffer will be clearly identified in the field by staking, flagging, or fencing around depressions, swales, or other features containing Delta button-celery plants. Project activity will avoid buffer areas to ensure that the buffer area is not being encroached upon and that effects are being avoided.
PALM	**Palmate-bracted bird's beak**

Conservation Measure	Description
PALM-1. Avoid and minimize effects to species	a. Prior to conducting ground-disturbing activities, suitable habitat within the footprint and a 250-foot buffer around the proposed activity will be surveyed by a qualified botanist for palmate-bracted bird's in accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009 or current version). Floristic surveys will include the use of a reference population to increase the likelihood of detection and will be performed during the appropriate bloom period(s). b. If palmate-bracted bird's beak plants are found on or adjacent to the Project site, in consultation with the CDFW Regional botanist, a minimum 50-foot no disturbance buffer will be placed around individual plant(s) or population(s) during activities that could result in disturbance and consistent with recommendations in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998). A greater no disturbance buffer may be warranted to ensure the hydrology of the site is not disrupted and the plants and seed bank will not be impacted. The no disturbance buffer will be clearly identified in the field by staking, flagging, or fencing. Project activity will avoid buffer areas to ensure that the buffer area is not being encroached upon and that effects are being avoided.
PLANTS	
PLANTS-1. Avoid and minimize effects to special-status plants	a. Within one year prior to the commencement of ground-disturbing activities, habitat assessment surveys for the special-status plants listed in Table J-1 of Appendix J, will be conducted by a qualified botanist, in accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009 or current version) and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable. b. Locations of special-status plant populations will be clearly identified in the field by staking, flagging, or fencing a minimum 100-foot wide buffer around them prior to the commencement of activities that may cause disturbance. No activity will occur within the buffer area. c. Some special-status plant species are annual plants, meaning the plant completes its entire lifecycle in one growing season. Other special-status plant species are perennial plants that return year after year until they reach full maturity. Due to the differences in life histories, all general conservation measures will be developed on a case-by-case basis and will include strategies that are species and site-specific to avoid or minimize impacts to special-status plants. d. Minimization measures may include transplanting perennial species, seed collection and dispersal for annual species, and other conservation strategies that will protect the viability of the local population. If minimization measures are implemented, monitoring of plant populations will be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation will be no net reduction in the size or viability of the local population.
VP	**Vernal pool habitats, fleshy (succulent) owl's clover, Hoover's spurge, Bogg's Lake hedge-hyssop, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western spadefoot toad**
VP-1. Avoid effects to species and habitat	a. If vernal pools have the potential to be disturbed by a project activity, a qualified biologist will identify and map vernal pools and seasonal wetland habitat potentially suitable for listed vernal pool plants, invertebrates, and western spadefoot toad within the footprint. A 250-foot no disturbance buffer will be established from the high water mark of the vernal pool or wetland habitat and will be delineated by staking, flagging or fencing. b. Access, egress, and ground-disturbing activities will be sited to avoid vernal pools.

Conservation Measure	Description
VP-2. Minimize effects to species and habitat	a. If vernal pools are present, a 250-foot no disturbance buffer will be established from the high water mark of vernal pools and seasonal wetlands that provide suitable habitat for vernal pool crustaceans or vernal pool plants. This buffer will be established prior to ground-disturbing activities, and remain until ground-disturbing activities in that area are completed. Vernal pool habitat and buffer areas will be clearly identified in the field by staking, flagging, or fencing.
VP-3. Compensate for temporary or permanent loss of habitat	a. If activities occur within the microwatershed or 250-foot buffer for vernal pool habitat, a wetland delineation will be submitted to USACE for verification and mitigation requirements will be determined. CDFW will develop a compensatory mitigation plan consistent with USACE's and EPA's April 10, 2008 *Final Rule for Compensatory Mitigation for Losses of Aquatic Resources* (33 CFR Parts 325 and 332 and 40 CFR Part 230) and other applicable regulations and rules at the time of implementation that will result in no net loss of acreage, function, and value of affected vernal pool habitat. Unavoidable effects will be compensated through a combination of creation, preservation, and restoration of vernal pool habitat or purchase of credits at a mitigation bank approved by the applicable regulatory agency/agencies. b. As applicable, Project effects and compensation will be determined in consideration of the *Vernal Pool Recovery Plan* goals for core areas, which call for 95% preservation for habitat in the Grasslands Ecological Area and Madera core areas, and 85% habitat preservation in the Fresno core area (USFWS 2005). c. Appropriate compensatory ratios for loss of habitat both in and out of core areas would be determined during coordination and consultation with USFWS, as appropriate. d. If off-site compensation includes dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures, the details of these measures will be developed as part of the USFWS coordination and consultation process. The plan will include information on responsible parties for long-term management, holders of conservation easements, long-term management requirements, and other details, as appropriate, for the preservation of long-term viable populations. Any impacts that result in a compensation purchase will be required to do so with an endowment for land management in perpetuity prior to any project groundbreaking activities.
VELB	**Valley elderberry longhorn beetle**
VELB-1. Avoid and minimize effects to species	a. Prior to conducting all project-related activities, a qualified biologist will identify any elderberry shrubs within the footprint and a 100-foot buffer around of the proposed activity. The qualified biologist will survey potentially affected shrubs for valley elderberry longhorn beetle (VELB) exit holes in stems greater than 1- inch in diameter. b. If elderberry shrubs are found on or adjacent to the site, a 100-foot wide avoidance buffer (measured from the dripline of the plant) will be established around all elderberry shrubs with stems greater than 1-inch diameter at ground level and will be clearly identified in the field by staking, flagging, or fencing. No construction activities involving mechanized equipment will occur within the buffer areas. Human access may be permitted in the buffer, provided that it does not cause disturbance to the shrubs. Elderberry shrubs cannot be used as an anchor for any in-channel project equipment. Project workers shall receive training prior to installing any such equipment, to allow them to identify and avoid elderberry shrubs.

Conservation Measure	Description
VELB -2. Compensate for temporary or permanent loss of habitat	a. If impacts to VELB habitat cannot be avoided, CDFW will consult with USFWS to determine appropriate compensation ratios. Compensatory mitigation measures will be consistent with the C*onservation Guidelines for Valley Elderberry Longhorn Beetle* (USFWS 1999), or current guidance. b. Compensatory mitigation for adverse effects may include the transplanting of elderberry shrubs during the dormant season (November 1 to February 15), if feasible, to an area protected in perpetuity as well as required additional elderberry and associated native plantings as approved by the USFWS. c. If off-site compensation includes dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures, the details of these measures will be included in the mitigation plan and must occur with full endowments for management in perpetuity. The plan will include information on responsible parties for long-term management, holders of conservations easements, long-term management requirements, and other details, as appropriate, for the preservation of long-term viable populations.
BNLL	**Blunt-nosed leopard lizard**
BNLL-1. Avoid and minimize effects to species	a. Three locations in the Restoration Area have been identified as having potential blunt-nosed leopard lizard habitat based on aerial maps. These areas include approximately 2,460 acres along the southwest side of the San Joaquin River in Reach 2, approximately 490 acres in a portion of the Eastside Bypass and adjacent lands near Reach 4A of the San Joaquin River, and approximately 2,938 acres encompassing the northern side of the Mariposa Bypass and parcels north of the Mariposa Bypass and west of the Eastside Bypass. Prior to conducting work in these areas, CDFW will perform a focused habitat assessment for blunt-nosed leopard lizard. Prior to any ground-disturbing activities in any area of potentially suitable habitat (e.g., grassland and shrub scrub habitat that contains required habitat elements such as small mammal burrows; open space patches between suitable habitat elements including disturbed sites and unpaved access roadways) qualified CDFW biologists will conduct protocol-level surveys in accordance with the *Approved Survey Methodology for the Blunt-nosed Leopard Lizard* (CDFG 2004). If blunt-nosed leopard lizard are detected, in any area where ground-disturbing activities will occur, suitable burrows within and adjacent to potential habitat for blunt-nosed leopard lizard will be avoided by a minimum 50 foot no disturbance buffer and an appropriate number of qualified CDFW biologists will be present during all ground-disturbing activities to ensure that blunt-nosed leopard lizards above ground are not impacted. Any blunt-nosed leopard lizard(s) that may enter an area of Project activity will be allowed to leave unobstructed on its own. If a blunt-nosed leopard lizard is detected in habitat adjacent to an unpaved road that will serve as ingress and egress routes for motorized transport of equipment and staff, exclusion fencing, qualified CDFW biological monitors, and reduced speed limits will be used to guide vehicles to the site and reduce the probability of vehicle strikes. All survey and monitoring results will be provided to the USFWS; negative finding results of the protocol level surveys will be good for one year.
CTS	**California tiger salamander**
CTS-1. Avoid effects to species	a. Prior to commencing any ground-disturbing activities, the work area will be assessed by CDFW or a qualified biologist for potential California tiger salamander (CTS) habitat. All potential CTS breeding ponds and upland habitat with 1.3 miles of a potential breeding pond will be considered suitable habitat. Ground-disturbing activities will avoid areas that contain suitable breeding and upland habitat for CTS, whenever possible.

Conservation Measure	Description
CTS-2: Minimize effects to species	a. Prior to conducting ground-disturbing activities in suitable CTS habitat, CDFW will conduct a minimum of 2 years of surveys to determine the presence/absence of CTS in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (USFWS 2003). In consultation with the USFWS, CDFW may modify survey protocols to reflect site conditions and known utilization of habitat by CTS. In the absence of protocol surveys, CDFW will assume presence of CTS in all potential breeding and upland refugia habitat. b. To the extent feasible, all ground-disturbing activities will be designed to avoid impacts to suitable CTS upland habitat. Such avoidance measures may include adjusting access routes or choosing alternate locations. c. In the absence of conducting 2 years of protocol surveys or in the event protocol surveys detect CTS, CDFW will consult with the USFWS and after consultation will implement the following minimization measures during construction in suitable CTS habitat: ▪ Prior to commencing ground disturbing activities, construction workers will be educated regarding CTS, and the measures intended to protect this species. ▪ When feasible, there will be a 50-foot no-disturbance buffer around burrows that provide suitable upland habitat for CTS. Burrows considered suitable for CTS will be determined by a qualified biologist, approved by USFWS. ▪ All suitable burrows directly impacted by construction will be hand excavated under the supervision of a qualified wildlife biologist. If CTS are found, the biologist will relocate the organism to the nearest burrow that is outside of the construction impact area. ▪ All ground-disturbing work will occur during daylight hours in coordination with USFWS, and depending on the level of rainfall and site conditions. CDFW will monitor the National Weather Service (NWS) 72-hour forecast for the work area. If a 70% or greater chance of rainfall is predicted within 72 hours of project activity, all activities in areas within 1.3 miles of potential or known CTS breeding sites will cease until no further rain is forecast. If work must continue when rain is forecast, a qualified biologist will survey the Project site before construction begins each day rain is forecast. If rain exceeds 0.25 inch during a 24-hour period, work will cease until no further rain is forecast. This restriction is not applicable for areas located greater than 1.3 miles from potential or known CTS breeding sites once they have been encircled with CTS exclusion fencing. However, even after exclusion fencing is installed, this condition would still apply to construction related traffic moving though areas within 1.3 miles of potential or known CTS breeding sites but outside of the salamander exclusion fencing (e.g. on roads). ▪ For work conducted during the CTS migration season (November 1 to May 31), exclusionary fencing will be erected around the construction site during ground-disturbing activities after hand excavation of burrows has been completed. A qualified biologist will visit the site weekly to ensure that the fencing is in good working condition. Fencing material and design will be subject to the approval of the USFWS. If exclusionary fencing is not used, a qualified biological monitor will be on-site during all ground disturbance activities. Exclusion fencing will also be placed around all spoils and stockpiles. ▪ For work conducted during the CTS migration season (November 1 to May 31), a qualified biologist will survey the active work areas (including access roads) in mornings following measurable precipitation events. Construction may commence once the biologist has confirmed that no CTS are in the work area. ▪ Prior to beginning work each day, underneath equipment and stored pipes greater than 1.2 inches (3 cm) in diameter will be inspected for CTS. If any are found they will be allowed to move out of the construction area under their own

Conservation Measure	Description
	accord. ▪ Trenches and holes will be covered and inspected daily for stranded animals. Trenches and holes deeper than 1 foot will contain escape ramps (maximum slope of 2:1) to allow trapped animals to escape uncovered holes or trenches. Holes and trenches will be inspected prior to filling. ▪ All food and food-related trash will be enclosed in sealed trash containers at the end of each workday and removed completely from the construction site once every three days to avoid attracting wildlife. ▪ A speed limit of 15 mph will be maintained on dirt roads. ▪ All equipment will be maintained such that there are no leaks of automotive fluids such as fuels, oils, and solvents. Any fuel or oil leaks will be cleaned up immediately and disposed of properly. ▪ Plastic monofilament netting (erosion control matting) or similar material will not be used at the Project site because CTS may become entangled or trapped. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. ▪ Hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers in a designated location that is at least 100 feet from wetlands and the San Joaquin River channel. If it is not feasible to store hazardous materials 100 feet from wetlands and the river channel, then spill containment measures will be implemented to prevent the possibility of accidental discharges to wetlands and waters.
WST	**Western spadefoot toad**
WST-1. Avoid effects to species	a. For work conducted during the western spadefoot toad migration and breeding season (November 1 to May 31), a qualified biologist will survey the active work areas (including access roads) in mornings following measurable precipitation events. Construction may commence once the biologist has confirmed that no spadefoot toads are in the work area. b. When feasible, there will be a 50-foot no-disturbance buffer around burrows that provide suitable upland habitat for western spadefoot toad. Burrows considered suitable for spadefoot will be identified by a qualified CDFW biologist. The biologist will delineate and mark the no-disturbance buffer. c. If western spadefoot toad is found within the construction footprint, it will be allowed to move out of harm's way of its own volition or a qualified biologist will relocate the organism to the nearest burrow that is outside of the construction impact area. d. Prior to beginning work each day, a qualified biologist will inspect underneath equipment and stored pipes greater than 1.2 inches (3 cm) in diameter for western spadefoot toad. If any are found they will be allowed to move out of the construction area under their own accord. e. Trenches and holes will be covered and inspected daily for stranded animals. Trenches and holes deeper than one foot deep will contain escape ramps (maximum slope of 2:1) to allow trapped animals to escape uncovered holes or trenches. Holes and trenches will be inspected prior to filling.
GGS	**Giant garter snake**
GGS-1. Avoid effects to species	a. Prior to commencing any ground-disturbing activities, a qualified biologist will assess the footprint and a 100-foot buffer around of the proposed activity for potential giant garter snake (GGS) habitat. Potential GGS habitat in the Project Area includes burrows and crevices in which GGS could be present.

Conservation Measure	Description
	b. If the suitable habitat is present, then CDFW will avoid ground-disturbing activities, whenever possible. Avoidance of suitable GGS habitat, as determined by USFWS and CDFW, will occur by demarcating and maintaining a 300-foot-wide no disturbance buffer around these areas.
GGS-2. Minimize effects to species	a. If impacts to GGS habitat cannot be avoided, pre-construction surveys will be completed by a qualified biologist within a 24-hour period before any ground disturbance of potential giant garter snake habitat. If construction activities stop on the Project site for a period of 2 weeks or more, a GGS survey will be repeated no more than 24 hours before the restart of construction activities b. For Project activities within potential GGS habitat, all activity involving disturbance of potential GGS habitat will be restricted to the period between May 1 and October 1, the active season for the species. The construction site will be re-inspected when a lapse in construction activity of two weeks or greater has occurred. c. Clearing will be confined to the minimal area necessary to facilitate construction activities. GGS habitat within or adjacent to the Project site will be flagged, staked, or fenced and designated as an Environmentally Sensitive Area. No activity will occur within this area and USFWS-approved biological monitoring will be conducted to ensure that avoidance measures are being implemented. Construction activities will be minimized within 200 feet of the banks of GGS habitat. Movement of heavy equipment will be confined to existing roadways to minimize habitat disturbance. d. Vegetation will be hand cleared in areas where GGS are suspected to occur. e. If a GGS is found during construction activities, the USFWS will be immediately notified. The biological monitor, or his/her assignee, will stop construction in the vicinity of the find and allow the snake to leave on its own. The monitor will remain in the area for the remainder of the work day to ensure the snake is not harmed. Escape routes for GGS should be determined in advance of construction and snakes will be allowed to leave on their own. If a GGS does not leave on its own within one working day, USFWS will be consulted. f. All construction-related holes will be covered to prevent entrapment of individuals. Where applicable, construction areas will be dewatered two weeks prior to the start of activities to allow giant garter snakes and their prey to move out of the area prior to any disturbance. g. For installation of research and monitoring equipment, t-posts used for anchoring will be placed within the channel when feasible, to minimize impacts to GGS in burrows along the river banks. Prior to t-post installation in the river bank, workers shall inspect the area for burrows and crevices in which GGS could be present. Fyke nets shall be inspected daily to ensure no GGS individuals are caught in the net mesh. If GGS is detected at any time during project activities, workers shall cease working and the individual shall be allowed to leave the site of its own volition before Project activity continues.

Conservation Measure	Description
GGS-3. Compensate for temporary or permanent loss of habitat.	a. Temporarily affected GGS aquatic habitat will be restored in accordance with criteria listed in the USFWS *Mitigation Criteria for* Restoration and/or Replacement of Giant Garter Snake Habitat (Appendix A to *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California* (USFWS 1997)) or the most current criteria from USFWS or CDFW. b. Permanent loss of GGS habitat will be compensated at a ratio and at a manner agreed upon in consultation with the USFWS. Compensation may include preservation and enhancement of existing populations, restoration or creation of suitable habitat, or purchase of credits at a regulatory agency approved mitigation bank in a sufficient quantity to compensate for the effect. Credit purchases, land preservation or enhancement to minimize effects to giant garter snakes should occur geographically close to the impact area. If off-site compensation is chosen, it will include dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures, and the details of these measures will be included in the mitigation plan and must occur with full endowments for management in perpetuity. The plan will include information on responsible parties for long-term management, holders of conservations easements, long-term management requirements, and other details, as appropriate, for the preservation of long-term viable populations.
FYLF	**Foothill yellow-legged frog**
FYLF-1. Avoid and minimize loss of individuals	a. If foothill yellow-legged frog (FYLF) has the potential to be present within a work area, a qualified biologist will make an initial site visit to determine if suitable habitat for the species exists within the vicinity of the work area. b. If work activities occur between April 1 and August 31, CDFW will conduct surveys for FYLF eggs and tadpoles. If FYLF eggs or tadpoles are identified in the work area or within 250 feet downstream of the work area, CDFW will modify the activity to ensure it does not directly or indirectly disturb eggs or tadpoles. c. For research, monitoring and broodstock collection activities, instream sampling equipment (e.g., fyke nets, screw traps) will be inspected daily to ensure no FYLF individuals are caught in the equipment. If FYLF are found in sampling equipment, a biologist will relocate frogs to suitable habitat downstream of the work area.
WPT	**Western pond turtle**
WPT-1. Avoid and minimize loss of individuals	a. Pre-construction surveys for western pond turtle (WPT) shall be conducted by a qualified biologist 14 days before and 24 hours before the start of ground-disturbing activities where suitable habitat exists (e.g., along riparian areas and freshwater emergent wetlands). b. If WPT or their nests are observed during pre-construction surveys, a qualified biologist shall be on-site to monitor construction in suitable WPT habitat. WPT found within the construction area will be allowed to leave of its own volition or it will be captured by a qualified biologist and relocated out of harm's way to the nearest suitable habitat immediately upstream or downstream from the Project site. c. If WPT nests are identified in the work area during pre-construction surveys, a 300-foot no disturbance buffer shall be established between the nest and any areas of potential disturbance. Buffers shall be clearly marked with temporary fencing. Construction will not be allowed to commence in the exclusion area until hatchlings have emerged from the nest, or the nest is deemed inactive by a qualified biologist. d. For research, monitoring and broodstock collection activities, instream sampling equipment (e.g., fyke nets, screw traps) will be inspected daily to ensure no WPT individuals are caught in the equipment. If WPT are found in sampling equipment, a biologist

Conservation Measure	Description
	will relocate WPT to suitable habitat downstream of the work area.
EAGLE	**Bald eagle and golden eagle**
EAGLE-1. Avoid and minimize effects to bald and golden eagles (as defined in the Bald and Golden Eagle Protection Act)	a. Surveys for bald and golden eagle nests will be conducted within 2 miles of any construction areas supporting suitable nesting habitat and important eagle roost sites and foraging areas. Surveys will be conducted in accordance with the *USFWS Interim Golden Eagle Inventory and Monitoring Protocols* (USFWS 2010a), and *CDFW's Bald Eagle Breeding Survey Instructions* (CDFG 2010), or current guidance. b. If an active eagle's nest is found, project disturbance will not occur within 0.5 mile of the active nest site during the breeding season (December 30 through July 1) or any disturbance if that action is shown to disturb the nesting birds. The 0.5 mile no disturbance buffer will be maintained throughout the breeding season or until the young have fledged and are no longer dependent upon the nest or parental care for survival.
SWH	**Swainson's hawk and White Tailed Kite**
SWH-1. Avoid and minimize impacts to Swainson's Hawk	a. If construction activities occur between February 1 and August 31, CDFW will conduct surveys for Swainson's hawk and white tailed kite in accordance with the Swainson's Hawk Technical Advisory Committee 2000 guidelines (SHTAC 2000), or current guidance. Surveys will cover a minimum of a 0.5-mile radius around the construction area. If nesting Swainson's hawks or white tailed kites are detected, CDFW will establish a 0.5 mile no disturbance buffer. Buffers will be maintained until a qualified CDFW biologist has determined that the young have fledged and are no longer reliant upon the nest or parental care for survival.
SWH-2. Compensate for loss of nest trees	a. If potential nesting trees are to be removed during construction activities, removal will take place outside of Swainson's hawk and white tailed kite nesting season and CDFW will develop a plan to replace known nest trees at a ratio of 3:1. If replacement planting is implemented, monitoring will be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation will be 65% survival of all replacement plantings.
RAPTOR	**Other nesting raptors**
RAPTOR-1. Avoid and minimize loss of individual raptors	a. Construction activity, including vegetation removal, will only occur outside the typical breeding season for raptors (September 16 to December 31), if raptors are determined to be present. b. If construction occurs between February 1 and August 31, CDFW will conduct surveys for nesting raptors in accordance with established CDFW raptor survey protocols. Surveys will cover a minimum of a 0.5-mile radius around the construction area. If nesting raptors are detected, CDFW will establish buffers around nests that are sufficient to ensure that breeding is not likely to be disrupted or adversely impacted by construction. Buffers around active raptor nests will be 500 feet for non-listed raptors, unless a qualified biologist determines that smaller buffers would be sufficient to avoid impacts to nesting raptors. Factors to be considered for determining buffer size will include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained until a qualified CDFW biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.
RAPTOR-2. Compensate for loss of nest trees	a. If potential nesting trees are to be removed during construction activities, removal will take place outside of the raptor nesting season and CDFW will develop a plan to replace known nest trees at a ratio of 3:1. If replacement planting is implemented, monitoring will be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation will be 65% survival of all replacement plantings.
BRO	**Burrowing owl**

Conservation Measure	Description
BRO-1. Avoid and minimize impacts to species	a. Pre-construction surveys for burrowing owls will be conducted in areas supporting potentially suitable habitat and within 30 days prior to the start of construction activities. If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site will be resurveyed. CDFW will conduct surveys for burrowing owls in accordance with protocols established in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012 or current version). b. If burrowing owls are detected, disturbance to burrows will be avoided during the nesting season (February 1 through August 31). CDFW will establish buffers around occupied burrows in accordance with guidance provided in the *Staff Report on Burrowing Owl Mitigation*. Buffers around occupied burrows will be a minimum of 656 feet (200 meters) during the nesting season, and 160 feet (100 meters) during the non-breeding season. c. Outside of the nesting season (February 1 through August 31), passive owl relocation techniques will be implemented. Owls would be excluded from burrows in the immediate impact zone within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors will be in place at least 48 hours prior to excavation to insure the owls have departed. d. The work area will be monitored daily for 1 week to confirm owl departure from burrows prior to any ground-disturbing activities. e. Where possible, burrows will be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe will be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.
BRO-2. Compensate for impacts to species	a. If occupied burrows cannot be avoided during the non-breeding season, CDFW will enhance or create burrows in adjacent habitat at a 1:1 ratio of burrow destroyed to created at least one week prior to implementation of passive relocation techniques. If burrowing owl habitat enhancement or creation takes place, CDFW will develop and implement a monitoring and management plan to assess the effectiveness of the mitigation. If monitoring indicates that the actions have not adequately mitigated for the Project's impacts, CDFW will implement remedial actions (e.g., enhancing or creating additional burrows) that compensate for these impacts.
RNB	**Riparian nesting birds: Western yellow-billed cuckoo, least Bell's vireo, and willow flycatcher**
RNB-1. Avoid effects to species	a. If western yellow-billed cuckoo, least Bell's vireo, or willow flycatcher has the potential to be present within a work area, a qualified biologist will make an initial site visit to determine if suitable habitat for the species exists within the vicinity of the project footprint. b. Where suitable habitat is present, surveys will be conducted by biologists adhering to guidance offered in *Western Yellow-billed Cuckoo Natural History Summary and Survey Methodology* (Halterman et al. 2009)*; Least Bell's Vireo Survey Guidelines* (USFWS 2001); and/*or A Survey Protocol for Willow Flycatcher in California* (Bombay et al. 2003). c. If nests are detected, CDFW will establish buffers around nests that are sufficient to ensure that breeding is not likely to be disrupted or adversely impacted by construction. No-disturbance buffers around active nests will be a minimum of 500 feet, unless a qualified CDFW biologist determines that smaller buffers would be sufficient to avoid impacts to nesting birds. Factors to be considered for determining buffer size will include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained until a qualified CDFW biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.
RNB-2. Minimize effects to species	a. If western yellow-billed cuckoo, least Bell's vireo, or willow flycatcher are detected or suspected to be present in the vicinity of the work area based on information collected in RNB-1, then no activities that involve clearing of vegetation, generation of mechanical noise, or ground disturbance will take place during the nesting season of the species that may be present.
MBTA	**Other birds protected by the Migratory Bird Treaty Act**

Conservation Measure	Description
MBTA-1. Avoid and minimize effects to species	a. Whenever possible, impacts to native nesting birds will be avoided by not conducting Project activities that involve clearing of vegetation, generation of mechanical noise, or ground disturbance during the typical breeding season (February 1 to September 1), if species covered under the Migratory Bird Treaty Act and Fish and Game Code sections 3503, 3503.5, and 3513 are determined to be present. b. If Project activities must be conducted during the nesting bird season, CDFW will conduct surveys for nesting birds within a 1,000-ft radius of the construction area. If nests are detected, CDFW will establish buffers around nests that are sufficient to ensure that breeding is not likely to be disrupted or adversely impacted by construction. Buffers around active nests will be a minimum of 250 feet, unless a qualified CDFW biologist determines that smaller buffers would be sufficient to avoid impacts to nesting birds. Factors to be considered for determining buffer size will include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained until young have fledged or the nests become inactive.
BAT	**Special-status bats**
BAT-1: Avoid and minimize loss of species	a. If suitable roosting habitat for special-status bats will be affected by Project construction (e.g., removal or buildings, modification of bridges), a qualified wildlife biologist will conduct surveys for special-status bats during the appropriate time of day to maximize detectability to determine if bat species are roosting near the work area no less than 7 days and no more than 14 days prior to beginning ground disturbance and/or construction. Survey methodology may include visual surveys of bats (e.g., observation of bats during foraging period), inspection for suitable habitat, bat sign (e.g., guano), or use of ultrasonic detectors (e.g., Anabat, etc.). Visual surveys will include trees within 0.25 mile of Project construction activities. The type of survey will depend on the condition of the potential roosting habitat. If no bat roosts are found, then no further study is required. b. If evidence of bat use is observed, the number and species of bats using the roost will be determined. Bat detectors may be used to supplement survey efforts. c. If roosts are determined to be present and must be removed, the bats will be excluded from the roosting site before the facility is removed. A mitigation program addressing compensation, exclusion methods, and roost removal procedures will be developed prior to implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave, but not re-enter), or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young).
BAT-2: Compensate for loss of habitat	a. If roosts cannot be avoided or it is determined that construction activities may cause roost abandonment, such activities may not commence until permanent, elevated bat houses have been installed outside of, but near the construction area. Placement and height will be determined by a qualified wildlife biologist, but the height of bat house will be at least 15 feet. Bat houses will be multi-chambered and be purchased or constructed in accordance with CDFW standards. The number of bat houses required will be dependent upon the size and number of colonies found, but at least one bat house will be installed for each pair of bats (if occurring individually), or of sufficient number to accommodate each colony of bats to be relocated.
BAD	**American Badger**
BAD-1: Avoid and minimize loss of species	a. No less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities, CDFW will conduct a survey to determine if American badger den sites are present at the site. If dens are found, they will be monitored for badger activity. If CDFW determines that dens may be active, the entrances of the dens will be blocked with soil, sticks, and debris for three to five days to discourage the use of these dens prior to project disturbance activities. The den entrances will be blocked to an incrementally greater degree over the 3 to 5-day period. After the qualified CDFW biologist determines that badgers

Conservation Measure	Description
	have stopped using active dens, the dens will be hand-excavated with a shovel to prevent re-use during construction. No disturbance of active dens will take place when cubs may be present and dependent on parental care, as determined by a qualified CDFW biologist.
SJAS	**San Joaquin antelope squirrel**
SJAS-1: Avoid and minimize loss of individuals	a. If San Joaquin antelope squirrels have the potential to be present within a work area, a qualified biologist will make an initial site visit to determine if suitable habitat for the species may exist within and adjacent to the vicinity of the project footprint. If suitable habitat is present, daytime visual surveys will be conducted using line transects with 10 to 30 meter spacing when temperatures are between 68°- 86° F (20°- 30° C). Focused live trapping may also be required when visual surveys are inconclusive. b. Where suitable habitat is present and neither surveys nor trapping has not been conducted, a 50-foot minimum no disturbance buffer will be maintained from all small mammal burrows of suitable size for San Joaquin antelope squirrel.
FKR	**Fresno kangaroo rat**
FKR-1: Avoid and minimize effects to species	a. Focused surveys will be conducted by a qualified biologist within 60 days prior to ground-disturbing activities. The biologist will conduct burrow searches by systematically walking transects, which will be adjusted based on vegetation height and topography. Transects will be used to identify the presence of kangaroo rat burrows. When burrows suitable for use by Fresno kangaroo rat are found within 100 feet of the Proposed Project footprint, focused live trapping surveys will be conducted by a qualified and permitted biologist following a methodology approved in advance by USFWS. b. In all areas of potentially suitable Fresno kangaroo rat habitat, a 50-foot no disturbance buffer will be implemented around small mammal burrows when live trapping is not conducted or when, in consultation with the USFWS, live trapping results are inconclusive in determining presence/absence for the species.
SJKF	**San Joaquin kit fox**
SJKF-1: Avoid and minimize effects to species	a. A qualified biologist will conduct pre-construction surveys no less than 14 days and no more than 30 days before the commencement of activities to identify potential dens more than 5 inches in diameter. CDFW will implement USFWS' *Standardized Recommendations for Protection of San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011 or current version). CDFW will notify USFWS in writing of the results of the pre-construction survey within 30 days after these activities are completed. b. If potential dens are located within the Proposed Project's work area and cannot be avoided during construction activities, a USFWS-approved biologist will determine if the dens are occupied. c. If occupied dens are present within the work area, their disturbance and destruction will be avoided. Exclusion zones will be implemented following the most current USFWS procedures (currently USFWS 2011). d. CDFW will notify USFWS immediately if a natal or pupping den is found in the survey area, and will present the results of pre-activity den searches within 5 days after these activities are completed and before the start of construction activities in the area. e. Construction activities will be conducted at a time that is least likely to affect the species (i.e., after the normal breeding season of December through September) (Ahlborn 1999). This timing will be coordinated with USFWS.
SJKF-2: Compensate for loss of habitat	a. CDFW, in coordination with USFWS, will determine if kit fox den removal is appropriate. If unoccupied dens need to be removed, the USFWS-approved biologist will remove these dens by hand-excavating them in accordance with USFWS procedures (USFWS 2011). b. Additional conservation measures will be coordinated with USFWS and DFW, and may include replacing dens, installing off-site

Conservation Measure	Description
	artificial dens, acquisition of compensatory habitat, or other options to be determined. Compensation may include dedicating conservation easements, purchasing mitigation credits, or other off-site conservation measures, and the details of these measures will be included in the mitigation plan and must occur with full endowments for management in perpetuity. The plan will include information on responsible parties for long-term management, holders of conservations easements, long-term management requirements, and other details, as appropriate, for the preservation of long-term viable populations.
DS	**Delta smelt**
DS-1: Avoid and minimize effects to species	a. All work within waters where there is potential for Delta smelt to occur, as defined by the most recent USFWS guidance, will be confined to a seasonal work window of August 1 through November 30 when Delta smelt are least likely to be present. Because this species does not regulate its movements strictly within this time frame, modifications to the work windows may be approved by the USFWS prior to project implementation based on information from the various in-Delta monitoring programs. b. If activities occur within Delta smelt habitat, measures will be taken to maintain or increase shading of suitable willow water habitat. The project will also avoid areas deemed suitable for Delta smelt habitat that have established aquatic vegetation or have not been previously disturbed.
GS	**Green sturgeon (Southern Distinct Population Segment)**
GS-1. Avoid and minimize loss of habitat and individuals	a. Weir and fish sampling equipment placed in the San Joaquin River will be operated in a manner that will allow for passage of green sturgeon, where applicable. To reduce stress on captured fish, all trapping devices will be checked at least once per day. Untargeted species caught in traps will be released into suitable habitat for the species. Traps will be checked more frequently during times when conditions are stressful (e.g., high temperatures, large amounts of debris during high flow events) to reduce the time that fish are subject to trap-related stress.
CVS	**Central Valley steelhead**
CVS-1. Minimize loss of habitat and risk of take of species	a. In-channel construction activities that could affect designated critical habitat for Central Valley steelhead will be limited to the low-flow period between June 1 and October 1 to minimize potential for adversely affecting federally listed anadromous salmonids during their emigration period. b. If individual Central Valley steelhead are observed within a work area, NMFS will be notified. NMFS personnel will have access to construction sites during construction, and following completion, to evaluate species presence and condition and/or habitat conditions.
PL	**Pacific lamprey**
PL-1: Avoid and minimize effects to species	a. A qualified biologist will conduct pre-construction surveys as outlined in Attachment A of *Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus)*(USFWS 2010b). b. Work in documented areas of Pacific Lamprey presence will be timed to avoid in-channel work during typical lamprey spawning (March 1 to July 1).
RHSNC	**Riparian habitat and other sensitive natural communities**
RHSNC-1. Avoid and minimize loss of riparian habitat and other sensitive natural communities	a. If effects occur to riparian habitat, emergent wetland, or other sensitive natural communities associated with streams, CDFW will comply with Section 1602 of the California Fish and Game Code; compliance may include measures to protect fish and wildlife resources during the project.

Conservation Measure	Description
RHSNC-2: Compensate for loss of riparian habitat and other sensitive natural communities	a. If losses of other sensitive natural communities (e.g., recognized as sensitive by CNDDB, but not protected under other regulations or policies) would not be offset by the benefits of the Proposed Project, then additional compensation will be provided through creating, restoring, or preserving in perpetuity in-kind communities at a sufficient ratio for no net loss of habitat function or acreage. If habitat enhancement or creation takes place, CDFW will develop and implement a monitoring and management plan to assess the effectiveness of the mitigation. If monitoring indicates that the actions have not adequately mitigated for the Project's impacts, CDFW will implement remedial actions that compensate for these impacts.
WUS	**Waters of the United States/waters of the State**
WUS-1. Identify and quantify wetlands and other waters of the United States	a. Before implementing Proposed Project actions that may affect waters of the United States or waters of the State, CDFW will map the distribution of wetlands (including vernal pools and other seasonal wetlands) in the vicinity of the work area. b. CDFW will determine, based on the mapped distribution of these wetlands and waters, the acreage of effects, if any, on waters of the United States. If it is determined that wetlands will be affected by the Proposed Project, CDFW will conduct a delineation of waters of the United States, and submit the delineation to USACE for verification. The delineation will be conducted according to methods established in the USACE *Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Arid West Supplement* (Environmental Laboratory 2008). c. Construction will be designed to minimize effects on waters of the United States and waters of the State and will employ best management practices to avoid indirect effects on water quality.
WUS-2. Obtain permits and compensate for any loss of wetlands and other waters of the United States/waters of the State	a. CDFW, in coordination with USACE, will determine the acreage of effects on waters of the U. S. and waters of the State that will result from implementation of the Proposed Project. b. CDFW will obtain Section 404 and Section 401 permits and comply with all permit terms. The acreage, location, and methods for compensation will be determined during the Section 401 and Section 404 permitting processes. c. CDFW will adhere to a "no net loss" basis of the acreage of wetlands and other waters of the U. S. and waters of the State that will be removed and/or degraded. Wetland habitat will be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE, the Central Valley RWQCB, as appropriate, depending on agency jurisdiction. The replacement of waters or wetlands will be equivalent to the nature of the habitat lost, and will be provided at a suitable ratio to ensure that, at a minimum, there is no net loss of habitat acreage or value. The replacement habitat will be set aside in perpetuity for habitat use.
CH	**Critical habitat**
CH-1. Avoid and minimize effects to critical habitat	a. Designated critical habitat within the vicinity of project activities will be identified. All Proposed Project actions will be designed to avoid direct and indirect adverse modifications to these areas. Minimization measures, such as establishing and maintaining buffers around areas of designated critical habitat will be implemented in the event that avoidance is not feasible.
CH-2. Compensate for unavoidable adverse effects on Federally designated critical habitat	a. If critical habitat may be adversely modified by the implementation of Proposed Project actions, the area to be modified will be evaluated by a qualified biologist to determine the potential magnitude of the project effects (e.g., description of primary constituent elements present and quantification of those affected) at a level of detail necessary to satisfy applicable environmental compliance and permitting requirements b. CDFW will implement compensatory conservation measures developed through consultation with USFWS or NMFS. If off-site compensation includes dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures. The plan will include information on responsible parties for long-term management, holders of conservation easements, long-term management requirements, and other details, as appropriate, for the preservation of long-term viable

Conservation Measure	Description
	populations. Any impacts that result in a compensation purchase will be required to do so with an endowment for land management in perpetuity prior to any project groundbreaking activities.
EFH	**Essential Fish Habitat (Pacific salmonids)**
EFH-1. Minimize loss of habitat and risk of take	a. In-channel construction activities which could affect habitat for Pacific salmonids will be limited to the low-flow period between June 1 and October 1 to minimize potential for adversely affecting federally listed anadromous salmonids during their emigration period. b. In-channel construction activities which could affect habitat for Pacific salmonids will be limited to daylight hours during weekdays, leaving a nighttime and weekend period of passage for federally listed fish species. c. Construction BMPs for off-channel staging and storage of equipment and vehicles will be implemented to minimize the risk of contamination of the waters of the San Joaquin River by spilled materials. BMPs will also include minimization of erosion and stormwater runoff, as appropriate. d. Riparian vegetation removed or damaged will be replaced at a ratio, coordinated with the NMFS, within the immediate area of the disturbance to maintain habitat quality. e. If individuals of listed species are observed present within a work area, then NMFS must be notified. NMFS personnel will have access to construction sites during construction and following completion in order to evaluate species presence and condition and/or habitat conditions. f. If bank stabilization activities should be necessary, then such stabilization will be constructed to minimize predator habitat, minimize erosion potential, and contain material suitable for supporting riparian vegetation.

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Key:
° C = degrees Celsius
° F = degrees Fahrenheit
BMP = best management practice
BO = Biological Opinion
CFR = Code of Federal Regulations
cfs = cubic feet per second
CNDDB = California Natural Diversity Database
CVP = Central Valley Project
DFW = California Department of Fish and Wildlife
DWR = California Department of Water Resources
EPA = Federal Environmental Protection Agency
NMFS = National Marine Fisheries Service
Reclamation = U.S. Department of the Interior, Bureau of Reclamation
RWQCB = Regional Water Quality Control Board
Settlement = Stipulation of Settlement in NRDC, et al,. v. Kirk Rodgers, et al.
State = State of California
SWP = State Water Project
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service