often is no better option for implementing water management regimes. The adaptive management program for the PA will be designed and implemented with these principals and scientific guidance in mind.

3.4.8 Monitoring and Research Program

Monitoring will be performed to measure a population's state and structure, to characterize the condition of a species' habitat and to detect and track presence or occupancy by listed species. Four general types of monitoring will occur:

- Continuation of existing monitoring required by the current BiOps (U.S. Fish and Wildlife Service 2008; National Marine Fisheries Service 2009) related to continuing operations of existing facilities and their effects on listed species.
- Monitoring required by permits and authorizations for construction of the proposed new facilities, including the MMRP that will be required under CEQA approvals.
- Monitoring and studies related to operation of the proposed new facilities that must occur prior to operation of the new facilities, including those necessary to inform design of the proposed NDD.
- Monitoring and studies related to operation of the proposed new facilities that must occur after operation of the new facilities has commenced.

In addition to the monitoring commitments specified in the remainder of this section, monitoring under the PA could also be initiated by direction of the Policy Group (described in Section 3.4.7, *Collaborative Science and Adaptive Management and Monitoring Program*). Under this process, a monitoring or research action would be designed and specified by collaborative agreement between DWR, Reclamation, and the jurisdictional fish and wildlife agencies (CDFW, NMFS, USFWS). Implementation of such monitoring actions would only occur if take authorization for the action were approved by the jurisdictional fish and wildlife agencies.

3.4.8.1 Impacts of Continued Monitoring and Operations on Listed Species

Existing monitoring, which has been mandated under existing BiOps and authorizations (U.S. Fish and Wildlife Service 2008; California Department of Fish and Game 2009; National Marine Fisheries Service 2009), includes monitoring to track the status of each listed species of fish, and also monitoring to ascertain performance of minimization measures associated with operations of the south Delta export facilities and their fish salvage programs. Existing monitoring programs will continue, and information from these programs will facilitate tracking status of listed species of fish and evaluating effectiveness of minimization measures. This existing monitoring to track the status of listed species of fish is performed by the Interagency Ecological Program[34], and incidental take associated with this monitoring is authorized via ESA Section 10(a)(1)(A) Research and Enhancement Permits and state Scientific Collection Permits. Monitoring to track

[34] This program is described and data are archived at http://www.water.ca.gov/iep/activities/monitoring.cfm

performance of the south Delta export facilities and their fish salvage programs is authorized through the existing BiOps (National Marine Fisheries Service 2009, Section 13.4; U.S. Fish and Wildlife Service 2008, *Monitoring Requirements*). Use of scientific collection permits constitutes a conservative approach to take authorization associated with monitoring activities because such permits need periodic renewal, at which time methodology can be updated to ensure that incidental take is minimized consistent with available knowledge and techniques. Thus it is expected that continuation of existing monitoring would receive take authorization either through issuance of scientific collection permits, or through an alternative consultation pathway.

3.4.8.2 Required Compliance Monitoring

Monitoring required by permits and authorizations for construction of proposed new facilities consists of compliance monitoring. Fulfillment of compliance monitoring and reporting requirements is solely the responsibility of Reclamation, DWR, and their contractors. Reclamation and DWR will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the PA, and will provide results to NMFS and the USFWS at their request.

The principal permits and authorizations requiring monitoring are those related to ESA, CESA, NEPA and CEQA authorizations. Authorizations related to ESA include the terms and conditions of the BiOp for the PA, as well as the take limits identified in the incidental take statement within the BiOp. Authorizations related to CESA include the terms of the incidental take permit issued for the PA by the CDFW. That permit will be issued subsequent to the record of decision and its terms are additional to those of the other authorizations issued to the PA. Authorizations related to NEPA and CEQA include, respectively, a Record of Decision and a Notice of Determination. Most notably, the CEQA authorization includes a requirement to implement all provisions of the Mitigation Monitoring and Reporting Program (MMRP), as required by CCC §18.04. At this time an MMRP has not been prepared for the PA, but it is a required component prior to issuance of a Notice of Determination; a draft MMRP will be provided to USFWS and NMFS prior to issuance of the BiOp for the PA.

Although the terms and conditions of the BiOp are not known at this time, DWR, as the project applicant, will commit to track impacts of the PA on suitable habitat and the type and extent of habitat protection and restoration completed, and report the results to the jurisdictional fish and wildlife agencies (NMFS, USFWS) on an annual basis. Additionally, DWR will assess impacts anticipated for the following year and determine the type, extent, and timing of future habitat protection and restoration needs. DWR will also perform monitoring to ascertain performance relative to the limits identified in the BiOp incidental take statement. This monitoring will be achieved by performance, on an ongoing basis during the operational life of the facility, as specified in items 4, 5 and 10 in Table 3.4-18. Those items deal with monitoring of incidental take in the vicinity of the NDDs through the mechanisms of entrainment, impingement, and predation.

The effects of the proposed action in this biological assessment have been estimated conservatively to provide an analysis of the maximum potential adverse effects to the listed species. DWR, as the project applicant, has incorporated measures into the description of the proposed action to adequately offset the potential maximum adverse effects to the listed species.

DWR will implement the required mitigation commensurate to the level of the actual effect to the listed species, provided that effects remain below the allowable take limits (otherwise reinitiation of consultation would be required, per 50 CFR 402.16).

DWR will ground-truth impact areas prior to initiating proposed actions to determine the extent of suitable habitat present. Suitable habitat is defined for each species in Appendix 4.A, *Status of the Species and Critical Habitat Accounts.* After work is complete, DWR will field-verify the amount of impacts that have actually occurred with implementation of avoidance and minimization measures. DWR will track predicted and actual impacts at each project site and provide that information in annual compliance reporting.

3.4.8.3 Monitoring Prior to Operations

Monitoring and studies related to operation of the proposed new facilities, that must occur prior to operation of the new facilities, is focused on the conveyance facilities and their potential effects on listed fish species.

Specific monitoring studies focused on preconstruction conditions and on design of the north Delta diversions will be developed in collaboration with USFWS, CDFW, and NMFS. The Fish Facilities Technical Team (2011) identifies monitoring associated with the north Delta intakes and their effects. The pre-construction studies identified by this group are focused on specific key questions rather than monitoring and are listed in Table 3.4-17. Monitoring studies focused on the NDDs were developed during the BDCP process and include items 7 and 8 as listed in Table 3.4-18.

Table 3.4-17. Preconstruction Studies at the North Delta Diversions

Potential Research Action[1]	Key Uncertainty Addressed	Timeframe
1. This action includes preconstruction study 1, *Site Locations Lab Study* as described by the Fish Facilities Working Team (2013). The purpose of this study is to develop physical hydraulic models to optimize hydraulics and sediment transport at the selected diversion sites.	What is the relationship between proposed north Delta intake design features and expected intake performance relative to minimization of entrainment and impingement risks?	Ten months to perform study; must be complete prior to final intake design.
2. This action includes preconstruction study 2, *Site Locations Numerical Study* as described by the Fish Facilities Working Team (2013). The purpose of this study is to develop site-specific numerical studies (mathematical models) to characterize the tidal and river hydraulics and the interaction with the intakes under all proposed design operating conditions.	How do tides and diversion rates affect flow conditions at the north Delta intake screens and at the Georgiana Slough junction?	Eight months to perform study; must be complete prior to final intake design.
3. This action includes preconstruction study 3, *Refugia Lab Study* as described by the Fish Facilities Working Team (2013). The purpose of this study is to test and optimize the final recommendations for fish refugia that will be incorporated in the design of the north Delta intakes.	How should north Delta intake refugia be designed in principle to achieve desired biological function?	Nine months to perform study; must be complete prior to final intake design.
4. This action includes preconstruction study 4,	How do alternative north	Two years to perform study;

Potential Research Action[1]	Key Uncertainty Addressed	Timeframe
Refugia Field Study as described by the Fish Facilities Working Team (2013). The purpose of this study is to evaluate the effectiveness of using refugia as part of north Delta intake design for the purpose of providing areas for juvenile fish passing the screen to hold and recover from swimming fatigue and to avoid exposure to predatory fish.	Delta intake refugia designs perform with regard to desired biological function?	must be complete prior to final intake design.
5. This action includes preconstruction study 5, *Predator Habitat Locations* as described by the Fish Facilities Working Team (2013). The purpose of this study is to perform field evaluation of similar facilities (e.g., Freeport, RD108, Sutter Mutual, Patterson Irrigation District, and Glenn Colusa Irrigation District) and identify predator habitat areas at those facilities.	Where is predation likely to occur near the new North Delta intakes?	One to two years to perform study; must be complete prior to final intake design.
6. This action includes preconstruction study 6, *Baseline Fish Surveys* as described by the Fish Facilities Working Team (2013), somewhat modified based on discussions with NMFS during 2014. The purpose of this study is to perform literature search and potentially field evaluations at similar facilities (e.g., Freeport, RD108, Sutter Mutual, Patterson Irrigation District, and Glenn Colusa Irrigation District), to determine if these techniques also take listed species of fish, and to assess ways to reduce such by-catch, if necessary.	What are the best predator reduction techniques, i.e., which techniques are feasible, most effective, and best minimize potential impacts on listed species?	Two years to perform study; must be complete prior to final intake design.
7. This action includes preconstruction study 7, *Flow Profiling Field Study* as described by the Fish Facilities Working Team (2013). The purpose of this study is to characterize the water velocity distribution at river transects within the proposed diversion reaches for differing flow conditions. Water velocity distributions in intake reaches will identify how hydraulics change with flow rate and tidal cycle, and this information will be used in fish screen final design and in model-based testing of fish screen performance (preconstruction study 8, below).	What is the water velocity distribution at river transects within the proposed intake reaches, for differing river flow conditions?	One year to perform study; must be complete prior to final intake design.
8. This action includes preconstruction study 8, *Deep Water Screens Study* as described by the Fish Facilities Working Team (2013). The purpose of this study is to use a computational fluid dynamics model to identify the hydraulic characteristics of deep fish screen panels.	What are the effects of fish screens on hydraulic performance?	Nine months to perform study; must be complete prior to final intake design.
9. This action includes preconstruction study 9, *Predator Density and Distribution* as described by the Fish Facilities Working Team (2013); and includes post-construction study 9, *Predator Density and Distribution*, as described by the Fish Facilities Technical Team (2011). The purpose of this study is to use an appropriate technology (to be identified in the detailed study plan) at two to three proposed screen locations; the study will also perform velocity evaluation of eddy zones, if needed. The study will	What are predator density and distribution in the north Delta intake reaches of the Sacramento river?	Start in 2016 to collect multiple annual datasets before construction begins. The post-construction study will cover at least 3 years, sampling during varied river flows and diversion rates.

Potential Research Action[1]	Key Uncertainty Addressed	Timeframe
also collect baseline predator density and location data prior to facility operations, compare that to density and location of predators near the operational facility; and identify ways to reduce predation at the facilities.		
10. This action includes preconstruction study 10, *Reach-Specific Baseline Juvenile Salmonid Survival Rates* as described by the Fish Facilities Working Team (2013); and includes post-construction study 10, *Post-Construction Juvenile Salmon Survival Rates* as described by the Fish Facilities Technical Team (2011). The purpose of this study is to determine baseline rates of survival for juvenile Chinook salmon and steelhead within the Sacramento River near proposed north Delta diversion sites for comparison to post-project survival in the same area, with sufficient statistical power to detect a 5% difference in survival. Following initiation of project operations, the study will continue, using the same methodology and same locations. The study will identify the change in survival rates due to construction/operation of the intakes.	How will the new north Delta intakes affect survival of juvenile salmonids in the affected reach of the Sacramento River?	The pre-construction study will cover at least 3 years and must be completed before construction begins. The post-construction study will cover at least 3 years, sampling during varied river flows and diversion rates.
11. This action includes preconstruction study 11, *Baseline Fish Surveys* as described by the Fish Facilities Working Team (2013) and includes post-construction study 11, *Post-Construction Fish Surveys* as described by the Fish Facilities Technical Team (2011). The purpose of this study is to determine baseline densities and seasonal and geographic distribution of all life stages of delta and longfin smelt inhabiting reaches of the lower Sacramento River where the north Delta intakes will be sited. Following initiation of diversion operations, the study will continue sampling using the same methods and at the same locations. The results will be compared to baseline catch data to identify potential changes due to intake operations.	How will the new north Delta intakes affect delta and longfin smelt density and distribution in the affected reach of the Sacramento River?	Pre-construction study will cover at least 3 years. Post-construction study will be performed for duration of project operations (or delisting of species), with timing and frequency to be determined.

Notes
1. All research actions listed in this table are part of the PA. For all proposed research actions, a detailed study design must be developed prior to implementation. The study design must be reviewed and approved by CDFW, NMFS, and USFWS prior to implementation.

Table 3.4-18. Monitoring Actions for Listed Species of Fish for the North Delta Intakes

Monitoring Action(s)	Action Description[1]	Timing and Duration
1. Fish screen hydraulic effectiveness	This action includes post-construction study 2, *Long-term Hydraulic Screen Evaluations*, combined with post-construction study 4, *Velocity Measurement Evaluations*, as described by the Fish Facilities Technical Team (2011). The purpose of this monitoring is to confirm screen operation produces approach and sweeping velocities consistent with design criteria, and to measure flow velocities within constructed refugia. Results of this monitoring will be used to "tune" baffles and other components of	Approximately 6 months beginning with initial facility operations.

Monitoring Action(s)	Action Description[1]	Timing and Duration
	the screen system to consistently achieve compliance with design criteria.	
2. Fish screen cleaning	This action includes post-construction study 3, *Periodic Visual Inspections* as described by the Fish Facilities Technical Team (2011). The purpose of this monitoring is to perform visual inspections to evaluate screen integrity and the effectiveness of the cleaning mechanism, and to determine whether cleaning mechanism is effective at protecting the structural integrity of the screen and maintaining uniform flow distribution through the screen. Results of this monitoring will be used to adjust cleaning intervals as needed to meet requirements.	Initial study to occur during first year of facility operation with periodic re-evaluation over life of project.
3. Refugia effectiveness	This action includes post-construction study 5, *Refugia Effectiveness* as described by the Fish Facilities Technical Team (2011). The purpose is to monitor refugia to evaluate their effectiveness relative to design expectations. This includes evaluating refugia operation at a range of river stages and with regard to effects on target species or agreed proxies. Results of this monitoring will be used to "tune" the screen system to consistently achieve compliance with design criteria.	Approximately 6 months beginning with initial facility operations.
4. Fish screen biological effectiveness	This action includes post-construction study 7, *Evaluation of Screen Impingement* as described by the Fish Facilities Technical Team (2011). The purpose of this monitoring is to observe fish activity at the screen face (using technology to be identified in the detailed study plan) and use an appropriate methodology (to be identified in the detailed study plan) to evaluate impingement injury rate. Results of this monitoring are to be used to assess facility performance relative to take allowances, and otherwise as deemed useful via the collaborative adaptive management process.	Study to be performed at varied river stages and diversion rates, during first 2 years of facility operation.
5. Fish screen entrainment	This action includes post-construction study 8, *Screen Entrainment* as described by the Fish Facilities Technical Team (2011). The purpose of this monitoring is to measure entrainment rates at screens using fyke nets located behind screens, and to identify the species and size of entrained organisms. Results of this monitoring are to be used to assess facility performance relative to take allowances, and otherwise as deemed useful via the collaborative adaptive management process.	Study to be performed at varied river stages and diversion rates, during first 2 years of facility operation.
6. Fish screen calibration	Perform hydraulic field evaluations to measure velocities over a designated grid in front of each screen panel. This monitoring will be conducted at diversion rates close to maximum diversion rate. Results of this monitoring will be used to set initial baffle positions and confirm compliance with design criteria.	Initial studies require approximately 3 months beginning with initial facility operations.
7. Fish screen construction	Document north Delta intake design and construction compliance with fish screen design criteria (note, this is simple compliance monitoring).	Prior to construction and as-built.
8. Operations independent measurement	Document north Delta intake compliance with operational criteria, with reference to existing environmental monitoring programs including (1) IEP Environmental Monitoring Program: Continuous Multi-parameter Monitoring, Discrete Physical/ Chemical Water Quality Sampling; (2) DWR and Reclamation: Continuous Recorder Sites; (3) Central Valley RWQCB: NPDES Self-Monitoring Program; and (4) USGS Delta Flows Network and	Start prior to construction of water diversion facilities and continue for the duration of the PA.

Monitoring Action(s)	Action Description[1]	Timing and Duration
	National Water Quality Assessment Program. The purpose of this monitoring is to ensure compliance and consistency with other relevant monitoring programs, and to ensure that this information is provided to CDFW, NMFS, and USFWS in association with other monitoring reporting.	
9. Operations measurement and modeling	Document north Delta intake compliance with the operational criteria using flow monitoring and models implemented by DWR. The purpose of this monitoring is to ensure and demonstrate that the intakes are operated consistent with authorized flow criteria.	Start prior to completion of water diversion facilities and continue for the duration of the permit term.
10. North Delta intake reach salmonid survivorship	Determine the overall impact on survival of juvenile salmonids through the diversion reach, related to the operation of the new north Delta intakes. Use mark/recapture and acoustic telemetry studies (or other technology to be identified in the detailed study plan) to evaluate effects of facility operations on juvenile salmonids, under various pumping rates and flow conditions. Results of this monitoring are to be used to assess whether survival objectives for juvenile salmonids traversing the diversion reach are being met, to determine whether take allowances are exceeded, and otherwise as deemed useful via the collaborative adaptive management process	Study to be performed at varied river flows and diversion rates, during first 2 to 5 years of facility operation.

Notes
1. All monitoring actions are part of the PA. For all proposed monitoring actions, a detailed study design must be developed prior to implementation. The study design must be reviewed and approved by CDFW, NMFS, and USFWS prior to implementation.

3.4.8.4 Monitoring after Operations Commence

Monitoring and studies related to CVP and SWP Delta operations, that must occur after operation of the new facilities has commenced, broadly consists of two types of monitoring, both performed to assess system state and effects on listed species: monitoring addressing the conveyance facilities, and monitoring addressing the habitat protection and restoration sites.

3.4.8.4.1 Monitoring Addressing Conveyance Facilities

Monitoring and studies related to operation of the proposed new facilities, that must occur after operation of the new facilities has commenced, is focused on potential effects on listed fish species.

Specific monitoring studies focused on the effects of operating the north Delta diversions will be developed in collaboration with USFWS, CDFW, and NMFS. The Fish Facilities Technical Team (2011) identifies monitoring associated with the north Delta intakes and their effects. Some of this work is focused on specific key questions rather than monitoring and is described in Section 3.4.11, *Research Program*, while the monitoring studies include items 1-6 and 8-10 as listed in Table 3.4-18. Items 6-10 in Table 3.4-18 are studies focused on NDD performance, which were developed after the Fish Facilities Technical Team work, during the BDCP process.

3.4.8.4.2 Monitoring Addressing Habitat Protection and Restoration Sites

Metrics and protocols for wildlife species effectiveness monitoring will be developed after land acquisition but before restoration actions or enhancement and management activities are begun.

Table 3.4-19 details the proposed effectiveness monitoring actions and success criteria relevant to listed species of wildlife. Effectiveness monitoring actions listed in Table 3.4-19 would be implemented for the duration of the incidental take authorizations provided in the BiOps for the PA.

Research under the PA could also by initiated by direction of the Policy Group (described in Section 3.4.7, *Collaborative Science and Adaptive Management and Monitoring Program*). Under this process, a monitoring or research action would be designed and specified by collaborative agreement between DWR, Reclamation, and the jurisdictional find and wildlife agencies (CDFW, NMFS, USFWS). Implementation of such research actions would only occur if take authorization for the action were approved by the jurisdictional fish and wildlife agencies.

Table 3.4-19. Proposed Effectiveness Monitoring Actions and Success Criteria

Monitoring Type	Action Description	Metric	Success Criteria	Protected Lands Timing and Duration	Restoration Site Timing and Duration
Valley Elderberry Longhorn Beetle – Valley Foothill Riparian	Representative/rotating sampling to assess health of shrubs; survey for signs of valley elderberry longhorn beetle. Survey for stem counts and increased density of shrubs on restoration site.	Health assessment of shrub(s); Dispersal and expansion of valley elderberry longhorn beetle where there are known source populations. Overall shrub health and number of stems and shrubs at restoration locations.	Growth and range expansion of populations above baseline.	All shrubs during the first year; 50% of the shrubs for each of the next two years; every five years thereafter, randomly sampled subset.	All shrubs during each of the first three years; 50% of the shrubs for each of the next six years; every five years thereafter, randomly sampled subset.
San Joaquin Kit Fox – Grasslands	Camera trap for San Joaquin kit fox, depending on site topography and access. Spotlighting will not be used (Fiehler pers. comm.). Protocol will consist of camera stations baited with a cat food can staked to the ground, on which San Joaquin kit fox will readily deposit scat. Camera station details will be consistent with the methods used by Constable et al. (2009), including tracking of competitors and prey.	Number of individuals; Growth and range expansion of populations.	Growth and range expansion of populations above baseline.	Annual surveys for at least 5 years to establish a baseline of whether or not the action area supports persistent populations (Fiehler pers. comm.). At least 5 years of baseline surveys will be repeated after habitat has been restored or conserved. Additionally, whenever a sighting is reported, baited cameras will be placed in the area to confirm the detection. Surveys must be conducted between May 1 and November 1 (U.S. Fish and Wildlife Service 1999).	Annual surveys for at least 5 years to establish a baseline of whether or not the action area supports persistent populations (Fiehler pers. comm.). At least 5 years of baseline surveys will be repeated after habitat has been restored or conserved. Additionally, whenever a sighting is reported, baited cameras will be placed in the area to confirm the detection. Surveys must be conducted between May 1 and November 1 (U.S. Fish and Wildlife Service 1999).
California Tiger Salamander – Grasslands	Dip netting and visual surveys.	Number of individuals per site.	Growth and range expansion of populations above baseline.	One year of surveys at each site; 50% in the second year, and 50% in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.	One year of surveys at each site; 50% in the second year, and 50% in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.

Monitoring Type	Action Description	Metric	Success Criteria	Protected Lands Timing and Duration	Restoration Site Timing and Duration
California Red-Legged Frog – Grasslands	Eye shine and call surveys for California red-legged frog.	Number of individuals per site.	Growth and range expansion of populations above baseline.	One year of surveys at each site; 50% in the second year, and 50% in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.	One year of surveys at each site; 50% in the second year, and 50% in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.
Branchiopods – Vernal Pools/Alkali Seasonal Wetlands	Sample for individuals.	Number of individuals per site.	Growth and range expansion of populations above baseline; self-sustaining populations.	Two branchiopod surveys per site; all pools/wetlands sampled the first year; 50% second year; 50% third year; then 50% sampled every five years thereafter.	Two branchiopod surveys per site; all pools/wetlands sampled the first year; 50% second year; 50% third year; then 50% sampled every five years thereafter.
Giant Garter Snakes – Nontidal Freshwater Perennial Emergent Wetland	Trapping surveys to detect presence of individuals; measure giant garter snake habitat connectivity.	Number of individuals at each restored site; acreage of connected habitat	Growth and range expansion of populations above baseline; increase in connectivity from baseline.	One year of trapping at each site; 50% of sites sampled in the second year, and 50% of sites sampled in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.	One year of trapping at each site; 50% of sites sampled in the second year, and 50% of sites sampled in the third year; two of the four sites randomly sampled for presence every three years for 10 years and then every five years thereafter.

3.5 Reinitiation of Consultation

As provided in 50 CFR 402.16:

> *Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal involvement or control over the action has been retained or is authorized by law and:*
>
> *(a) If the amount or extent of taking specified in the incidental take statement is exceeded;*
>
> *(b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;*
>
> *(c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or*
>
> *(d) If a new species is listed or critical habitat designated that may be affected by the identified action.*

Reclamation or USACE as the federal action agencies, with DWR as the project applicant, will re-initiate consultation with USFWS and/or NMFS if any of these circumstances occur. Reinitiation of formal consultation may also be appropriate if there are indications that water operations flow criteria may be eliminated or otherwise modified while maintaining the requirements of Section 7 of the ESA and Section 2081 of the Fish and Game Code.

3.6 Interrelated or Interdependent Actions

Interrelated actions are defined under ESA as actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are defined as actions that have no independent utility apart from the action under consideration (50 CFR 402.02). To determine if an action is interrelated to or interdependent with a proposed action, the agency "should ask whether another activity in question would occur 'but for' the proposed action under consultation" (FWS Consultation Handbook at 4-26). In doing so, the agency must be "careful not to reverse the analysis by analyzing the relationship of the proposed action against the other activity." *Id*. For instance, "if the proposed action is the addition of a second turbine to an existing dam, the question is whether the dam (the other activity) is interrelated to or interdependent with the proposed action (the addition of the turbine), not the reverse." *Id*. In this case, the PA is the proposed action under consultation, so the agency should determine whether any other action in question would occur "but for" the PA.

Potential interrelated or interdependent actions were evaluated by considering actions that are ongoing or reasonably foreseeable, that occur wholly or in part within the action area, and that are functionally related to the PA. Functional relationship was defined as applying to projects dealing with surface water resource management and/or habitat protection or restoration actions affecting listed species. Examples of functionally related projects include management of upstream reservoirs, of levees and other flood control works in the Delta, of other surface water intakes located in the action area; and planned habitat protection restoration connected, for